# MEKETA

**East Bay Municipal Utility District Employees' Retirement System**
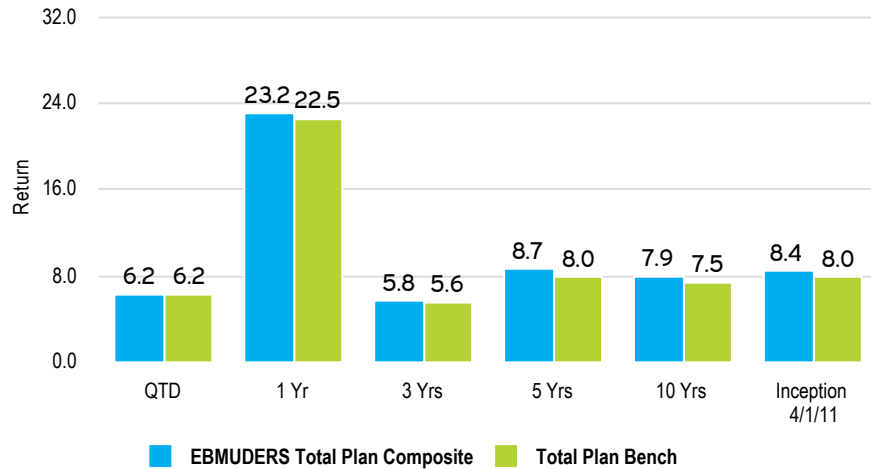
November 21, 2024

Q3 2024 Performance Report

1. Introduction

2. Economic and Market Update as of September 30, 2024

3. Third Quarter Performance Review

4. Manager Watch Screens

5. Manager Compliance Certification Responses

6. Appendix

# Introduction

# MEKETA

## Return Summary



Legend: ■ EBMUDERS Total Plan Composite  ■ Total Plan Bench

## Summary of Cash Flows

| | QTD | 1 Yr |
|---|---|---|
| **EBMUDERS Total Plan Composite** | | |
| Beginning Market Value | $2,505,029,208 | $2,177,281,165 |
| Net Cash Flow | -$4,360,000 | -$25,342,658 |
| Net Investment Change | $156,202,166 | $504,932,867 |
| Ending Market Value | $2,656,871,374 | $2,656,871,374 |

| | 3 Mo (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) | 10 Yrs (%) | 20 Yrs (%) |
|---|---|---|---|---|---|---|
| **EBMUDERS Total Plan Composite - Net** | **6.2** | **23.2** | **5.8** | **8.7** | **7.9** | **--** |
| **EBMUDERS Total Plan Composite - Gross** | **6.2** | **23.3** | **5.9** | **8.8** | **8.1** | **7.6** |
| *Total Plan Bench* | *6.2* | *22.5* | *5.6* | *8.0* | *7.5* | *7.2* |
| InvMetrics Public DB > $1B Median | 4.8 | 17.6 | 4.6 | 8.1 | 7.2 | 7.1 |

Historical net returns for the Total Portfolio Aggregate are currently available from 2Q 2011.

# MEKETA

## East Bay Municipal Utility District Employees' Retirement System

| | Market Value $ | % of Portfolio | 3 Mo (%) | YTD (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) | 10 Yrs (%) | Inception (%) | Inception Date |
|---|---|---|---|---|---|---|---|---|---|---|
| **EBMUDERS Total Plan Composite** | 2,656,871,374 | 100.0 | 6.2 | 13.2 | 23.2 | 5.8 | 8.7 | 7.9 | 8.4 | Apr-11 |
| *Total Plan Bench* | | | *6.2* | *13.3* | *22.5* | *5.6* | *8.0* | *7.5* | *8.0* | |
| **US Equity Composite** | 1,003,015,282 | 37.8 | 6.2 | 20.6 | 35.2 | 10.3 | 15.2 | 13.0 | 13.2 | Apr-11 |
| *Russell 3000 Hybrid* | | | *6.2* | *20.6* | *35.2* | *10.3* | *15.3* | *12.8* | *13.1* | |
| **Non-US Equity Composite** | 658,196,323 | 24.8 | 8.0 | 14.2 | 25.4 | 4.5 | 8.0 | 5.2 | 6.5 | Jul-95 |
| *MSCI ACWI xUS (blend)* | | | *8.2* | *14.7* | *26.0* | *4.7* | *8.1* | *5.7* | *5.7* | |
| **Covered Calls Composite** | 365,830,151 | 13.8 | 4.8 | 13.8 | 21.2 | 7.9 | 10.0 | 8.6 | 9.5 | Feb-14 |
| *Cboe S&P 500 Buy Write Index* | | | *5.5* | *13.6* | *18.3* | *6.4* | *6.6* | *6.3* | *6.7* | |
| **Real Estate Composite** | 53,812,113 | 2.0 | 9.3 | 6.0 | 13.3 | 4.1 | 5.2 | 7.9 | 5.9 | Jan-07 |
| *NCREIF NPI Lag* | | | *-0.3* | *-4.2* | *-5.5* | *2.3* | *3.4* | *6.1* | *6.1* | |
| **Fixed Income Composite** | 573,878,126 | 21.6 | 4.9 | 5.0 | 12.2 | 0.6 | 1.6 | 2.3 | 2.9 | Apr-11 |
| *Fixed Income Composite Bench* | | | *4.7* | *4.9* | *11.5* | *0.4* | *1.5* | *2.4* | *2.8* | |
| **Cash Composite** | 2,139,380 | 0.1 | 1.3 | 3.5 | 4.5 | 3.0 | 2.3 | 1.7 | 1.3 | Aug-10 |
| *FTSE 3 Month T-Bill* | | | *1.4* | *4.2* | *5.6* | *3.6* | *2.4* | *1.7* | *1.2* | |

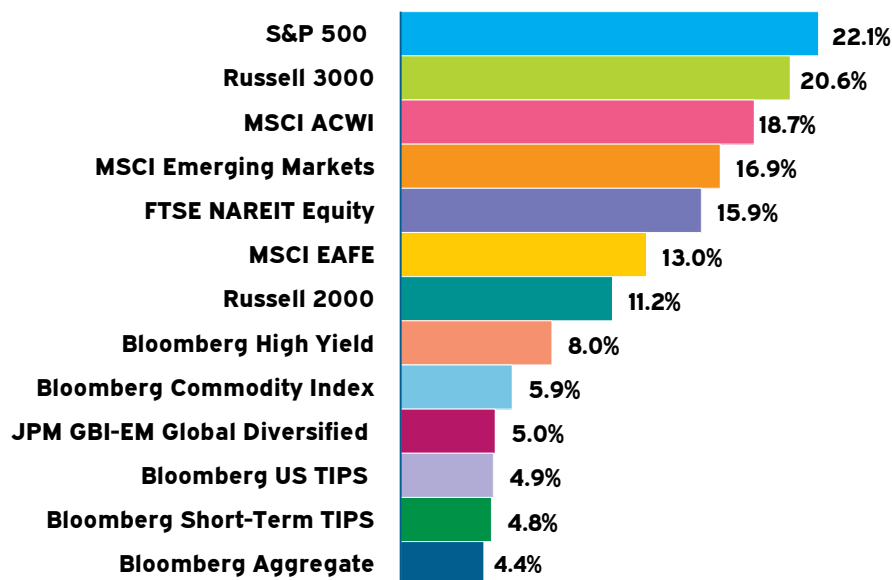# Economic and Market Update
## Data as of September 30, 2024

## Commentary

In the third quarter, stock and bond markets rallied despite heightened volatility. Central bank indications of future interest rate cuts given declining inflation pressures was a key driver of gains.
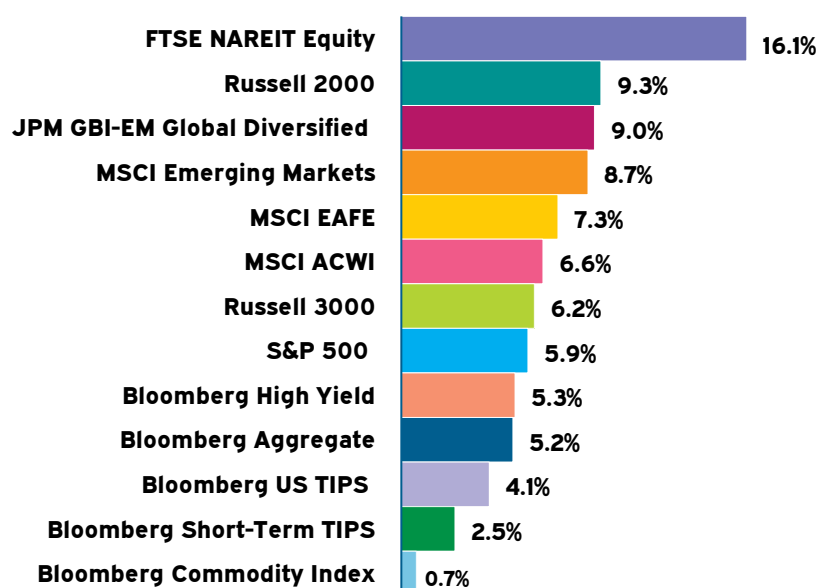
→ In September, the Federal Reserve surprised many in the markets with a 50 basis point interest rate cut while the US economy and employment picture remains quite healthy.

→ In the third quarter, US equities (Russell 3000) rose 6.2%. The US equity rally broadened, with value and small cap stocks outperforming large cap growth stocks, reversing the narrow leadership trend earlier this year.

→ Emerging market stocks (+8.7%) outperformed developed market stocks in the third quarter; in non–US developed markets (+7.3%) value and small cap stocks also beat the broad market.

→ After two years of piecemeal policy stimulus, China's policy makers rolled out a significant stimulus package to support equity prices, reduce bank reserve requirements and funding rates, and support current and future mortgage borrowers. In particular, bank loans for listed company share buybacks and purchases drove the MSCI China equity index to rally 23.9% in September and 23.5% for the entire third quarter.

→ Fixed income markets also posted positive returns on expectations for additional policy rate cuts this year and next, as inflation pressures recede, and the economy slows.

→ Looking ahead, the paths of inflation, labor markets, and monetary policy, China's slowing economy and potential policy stimulus benefits, increased geopolitical tensions, and the looming US election will be key factors.

## Index Returns[1]

**YTD**

| Index | Return |
|---|---|
| S&P 500 | 22.1% |
| Russell 3000 | 20.6% |
| MSCI ACWI | 18.7% |
| MSCI Emerging Markets | 16.9% |
| FTSE NAREIT Equity | 15.9% |
| MSCI EAFE | 13.0% |
| Russell 2000 | 11.2% |
| Bloomberg High Yield | 8.0% |
| Bloomberg Commodity Index | 5.9% |
| JPM GBI-EM Global Diversified | 5.0% |
| Bloomberg US TIPS | 4.9% |
| Bloomberg Short-Term TIPS | 4.8% |
| Bloomberg Aggregate | 4.4% |

**Q3**

| Index | Return |
|---|---|
| FTSE NAREIT Equity | 16.1% |
| Russell 2000 | 9.3% |
| JPM GBI-EM Global Diversified | 9.0% |
| MSCI Emerging Markets | 8.7% |
| MSCI EAFE | 7.3% |
| MSCI ACWI | 6.6% |
| Russell 3000 | 6.2% |
| S&P 500 | 5.9% |
| Bloomberg High Yield | 5.3% |
| Bloomberg Aggregate | 5.2% |
| Bloomberg US TIPS | 4.1% |
| Bloomberg Short-Term TIPS | 2.5% |
| Bloomberg Commodity Index | 0.7% |

→ Major markets finished the third quarter in positive territory despite several spikes in volatility. Falling inflation, resilient growth in the US, and dovish central banks supported stocks and bonds. Rate sensitive sectors, like REITs, particularly benefited from lower interest rates.

→ Year-to-date through September, all major asset classes were positive, led by US equities.

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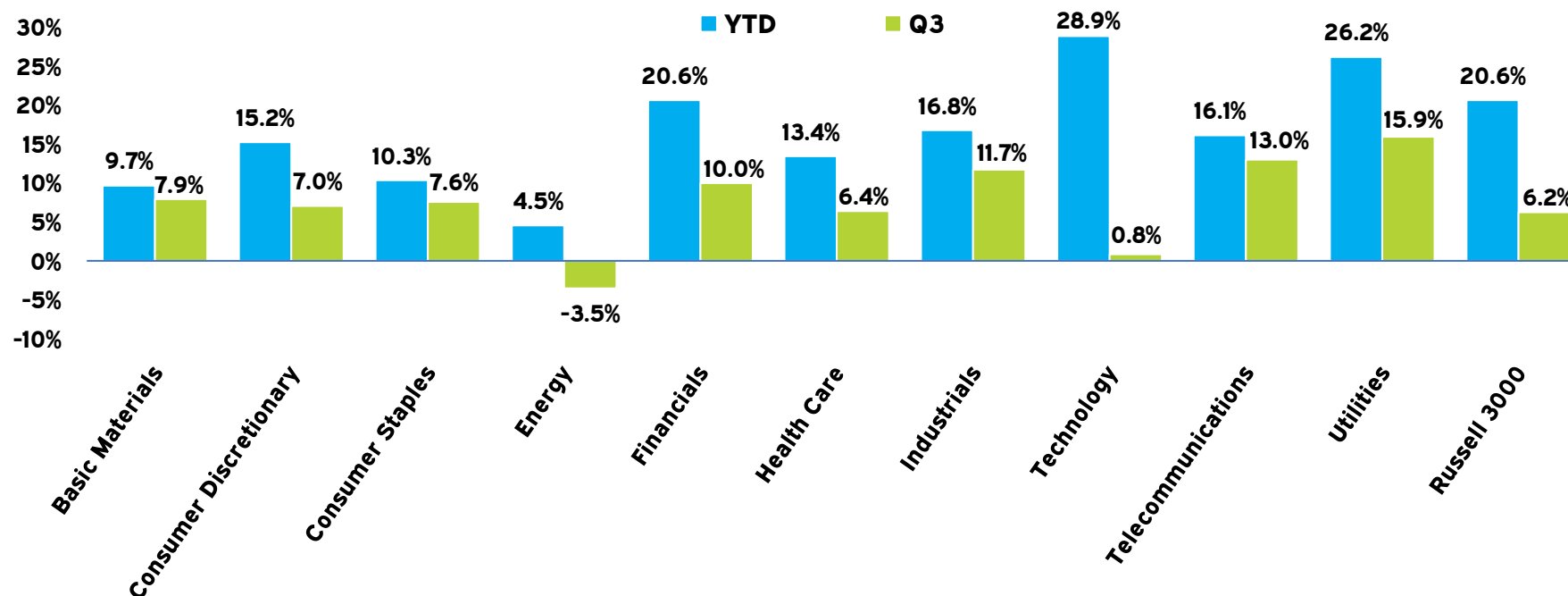[1] Source: Bloomberg. Data is as of September 30, 2024.

## Domestic Equity Returns[1]

| Domestic Equity | September (%) | Q3 (%) | YTD (%) | 1 YR (%) | 3 YR (%) | 5 YR (%) | 10 YR (%) |
|---|---|---|---|---|---|---|---|
| S&P 500 | 2.1 | 5.9 | 22.1 | 36.4 | 11.9 | 16.0 | 13.4 |
| Russell 3000 | 2.1 | 6.2 | 20.6 | 35.2 | 10.3 | 15.3 | 12.8 |
| Russell 1000 | 2.1 | 6.1 | 21.2 | 35.7 | 10.8 | 15.6 | 13.1 |
| Russell 1000 Growth | 2.8 | 3.2 | 24.5 | 42.2 | 12.0 | 19.7 | 16.5 |
| Russell 1000 Value | 1.4 | 9.4 | 16.7 | 27.8 | 9.0 | 10.7 | 9.2 |
| Russell MidCap | 2.2 | 9.2 | 14.6 | 29.3 | 5.7 | 11.3 | 10.2 |
| Russell MidCap Growth | 3.3 | 6.5 | 12.9 | 29.3 | 2.3 | 11.5 | 11.3 |
| Russell MidCap Value | 1.9 | 10.1 | 15.1 | 29.0 | 7.4 | 10.3 | 8.9 |
| Russell 2000 | 0.7 | 9.3 | 11.2 | 26.8 | 1.8 | 9.4 | 8.8 |
| Russell 2000 Growth | 1.3 | 8.4 | 13.2 | 27.7 | -0.4 | 8.8 | 8.9 |
| Russell 2000 Value | 0.1 | 10.2 | 9.2 | 25.9 | 3.8 | 9.3 | 8.2 |

**US Equities: The Russell 3000 rose +6.2% in the third quarter, bringing the year-to-date results to +20.6%.**

→ In the third quarter, the previously technology-driven stock rally broadened out as optimism grew over the potential for a "soft landing" of the US economy and as investors reexamined the future of AI-related stocks.

→ In this environment, value outperformed growth across the capitalization spectrum and small cap stocks (Russell 2000: +9.3%) outperformed large cap stocks (Russell 1000: +6.1%).

→ Despite the third quarter's rally in value and small cap stocks, large cap growth stocks are the best performing asset class (R1000 Growth: +24.5%) for the year-to-date 2024 due to on-going enthusiasm for AI.

[1] Source: Bloomberg. Data is as of September 30, 2024.

## Russell 3000 Sector Returns[1]



Legend: ■ YTD ■ Q3

| Sector | YTD | Q3 |
|---|---|---|
| Basic Materials | 9.7% | 7.9% |
| Consumer Discretionary | 15.2% | 7.0% |
| Consumer Staples | 10.3% | 7.6% |
| Energy | 4.5% | -3.5% |
| Financials | 20.6% | 10.0% |
| Health Care | 13.4% | 6.4% |
| Industrials | 16.8% | 11.7% |
| Technology | 28.9% | 0.8% |
| Telecommunications | 16.1% | 13.0% |
| Utilities | 26.2% | 15.9% |
| Russell 3000 | 20.6% | 6.2% |

→ With the notable exception of energy stocks, all sectors posted positive returns in the third quarter.

→ On the prospect of growing energy demand for cloud computing for AI, utilities were the best performing sector in the third quarter (+15.9%) followed by telecom (+13.0%) and industrials (+11.7%).

→ All sectors feature positive returns for the year-to-date period. Technology stocks (+28.9%) continue to lead the broader market, followed by utilities (+26.2%), and financials (+20.6%).

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1  Source: Bloomberg. Data is as of September 30, 2024.

# Foreign Equity Returns[1]

| Foreign Equity | September (%) | Q3 (%) | YTD (%) | 1 YR (%) | 3 YR (%) | 5 YR (%) | 10 YR (%) |
|---|---|---|---|---|---|---|---|
| MSCI ACWI ex. US | 2.7 | 8.1 | 14.2 | 25.4 | 4.1 | 7.6 | 5.2 |
| MSCI EAFE | 0.9 | 7.3 | 13.0 | 24.8 | 5.5 | 8.2 | 5.7 |
| MSCI EAFE (Local Currency) | -0.4 | 0.8 | 12.0 | 17.5 | 7.9 | 8.8 | 7.4 |
| MSCI EAFE Small Cap | 2.6 | 10.5 | 11.1 | 23.5 | -0.4 | 6.4 | 6.2 |
| MSCI Emerging Markets | 6.7 | 8.7 | 16.9 | 26.1 | 0.4 | 5.7 | 4.0 |
| MSCI Emerging Markets (Local Currency) | 5.6 | 6.6 | 18.3 | 25.0 | 2.9 | 7.4 | 6.5 |
| MSCI EM ex. China | 1.3 | 4.0 | 12.7 | 27.4 | 3.4 | 8.4 | 4.8 |
| MSCI China | 23.9 | 23.5 | 29.3 | 23.9 | -5.6 | 0.8 | 3.4 |

**Foreign Equity: Developed international equities (MSCI EAFE) rose +7.3% in the third quarter, while emerging market equities (MSCI Emerging Markets) gained 8.7%.**

→ Non-US developed market stocks saw similar themes as the US, with value and small cap stocks outperforming large cap stocks in the third quarter, as investors anticipated further rate cuts from the European Central Bank and the Bank of England. Japan's TOPIX index experienced an over 20% decline at the start of August due to the Bank of Japan's (BoJ) unexpected rate increase and related pressures on the yen carry trade. It subsequently recovered, though, as the BoJ signaled that further rate increases were not likely.

→ In late September, China announced significant stimulus measures to support asset prices resulting in Chinese stocks rallying +23.9% just in September. This led to emerging markets having the best quarterly results (+8.7%).

→ The weakening US dollar further supported international stocks, particularly in developed markets.

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[1] Source: Bloomberg. Data is as September 30, 2024.

## Equity Cyclically Adjusted P/E Ratios[1]



EAFE — EM — US

US PE Average = 28.1
EAFE PE Average = 21
EM PE Average = 16.6

35.2
21.7
16.1
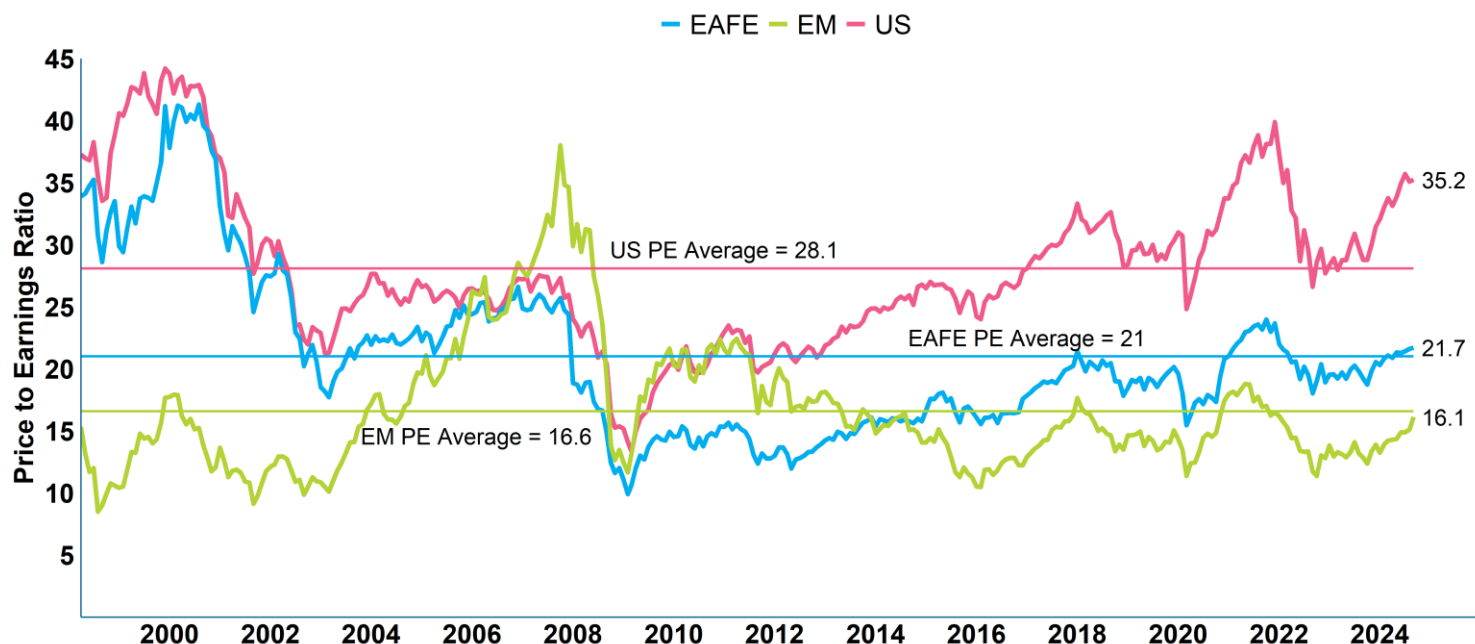
→ The broad global equity rally lifted stocks' cyclically adjusted price/earnings ratios over the quarter, with US stock valuations finishing well above their long-term 28.1 average.

→ Non-US developed market valuations increased to slightly above their long-term average while emerging market stocks are now trading close to their long-term average given the strong recent gains.

[1] US Equity Cyclically Adjusted P/E on S&P 500 Index. Source: Robert Shiller, Yale University, and Meketa Investment Group. Developed and Emerging Market Equity (MSCI EAFE and EM Index) Cyclically Adjusted P/E Source: Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years. Data is as of September 2024. The average line is the long-term average of the US, EM, and EAFE PE values from April 1998 to the recent month-end respectively.

## Fixed Income Returns[1]

| Fixed Income | September (%) | QTD (%) | YTD (%) | 1 YR (%) | 3 YR (%) | 5 YR (%) | 10 YR (%) | Current Yield (%) | Duration (Years) |
|---|---|---|---|---|---|---|---|---|---|
| Bloomberg Universal | 1.4 | 5.2 | 4.9 | 12.1 | -1.0 | 0.7 | 2.1 | 4.5 | 6.0 |
| Bloomberg Aggregate | 1.3 | 5.2 | 4.4 | 11.6 | -1.4 | 0.3 | 1.8 | 4.2 | 6.2 |
| Bloomberg US TIPS | 1.5 | 4.1 | 4.9 | 9.8 | -0.6 | 2.6 | 2.5 | 3.8 | 6.9 |
| Bloomberg Short-term TIPS | 1.0 | 2.5 | 4.8 | 7.5 | 2.5 | 3.6 | 2.4 | 3.9 | 2.4 |
| Bloomberg US Long Treasury | 2.0 | 7.8 | 2.4 | 15.4 | -8.3 | -4.3 | 1.1 | 4.2 | 15.5 |
| Bloomberg High Yield | 1.6 | 5.3 | 8.0 | 15.7 | 3.1 | 4.7 | 5.0 | 7.0 | 3.4 |
| JPM GBI-EM Global Diversified (USD) | 3.4 | 9.0 | 5.0 | 13.4 | 0.6 | 0.6 | 0.6 | -- | -- |

**Fixed Income: The Bloomberg Universal index rose 5.2% in the third quarter, bringing the year-to-date return into positive territory (+4.9%).**

→ Fixed income indexes rose in the quarter as rates fell, driven by a continued decline in inflation. This and the weakening labor market led to the Fed cutting interest rates with more cuts expected.

→ The broad US bond market (Bloomberg Aggregate) rose 5.2% over the quarter, with the broad TIPS market gaining 4.1%. The less interest rate sensitive short-term TIPS index increased 2.5%.

→ Riskier bonds experienced volatility during the quarter but ultimately posted strong results as risk appetite remained strong. Emerging market debt gained 9.0% and high yield rose 5.3%.
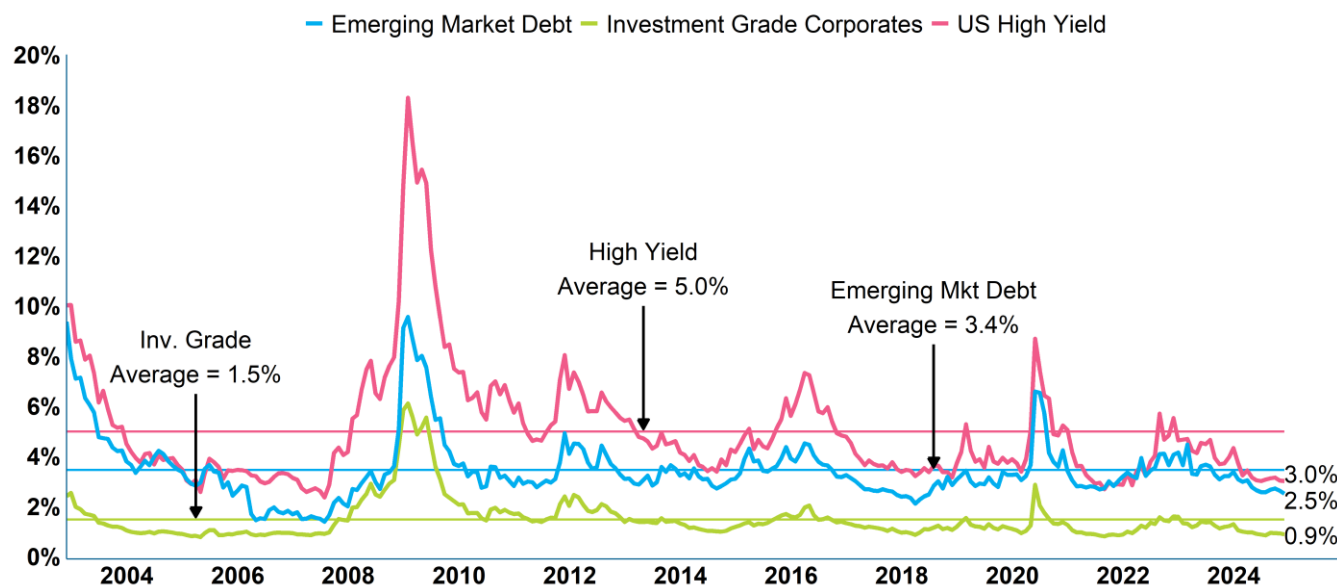
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[1] Source: Bloomberg. Data is as of September 30, 2024. The yield and duration data from Bloomberg is defined as the index's yield to worst and modified duration, respectively. JPM GBI-EM data is from J.P. Morgan. Current yield and duration data is not available.

## US Yield Curve[1]

─── **12/31/2023**   ─── **9/30/2024**
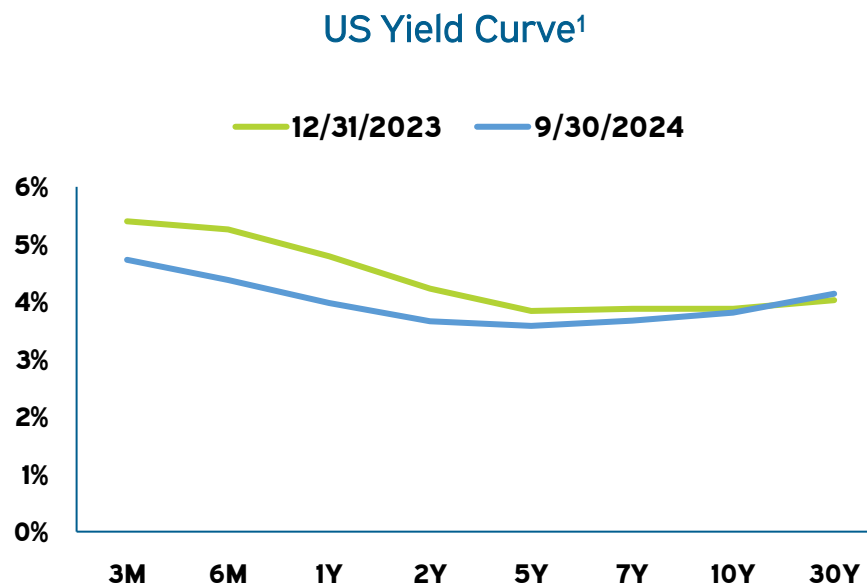


→ US interest rates fell over the quarter as economic data continued to soften and the Fed started its rate cutting cycle.

→ The more policy sensitive 2-year Treasury yield declined from 4.75% to 3.64% over the quarter, while the 10-year Treasury yield fell from 4.40% to 3.78% over the same period.

→ Notably, the portion of the yield curve from 2-years to 10-years was no longer inverted at the end of September, given policy rate cuts and resilient growth. This trend could continue as the Fed likely continues to cut interest rates.

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[1] Source: Bloomberg. Data is as of September 30, 2024.

## Credit Spreads vs. US Treasury Bonds[1]



— Emerging Market Debt — Investment Grade Corporates — US High Yield

High Yield Average = 5.0%

Emerging Mkt Debt Average = 3.4%

Inv. Grade Average = 1.5%

3.0%
2.5%
0.9%

→ Spreads (the yield above a comparable maturity Treasury) widened significantly at the start of the quarter in the volatile environment but declined after, largely finishing where they started.

→ All yield spreads remained below their respective long-run averages, particularly high yield.

→ Although spreads are relatively tight, yields remain at above-average levels compared to the last two decades, particularly for short-term issues.

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[1] Source: Bloomberg. Data is as September 30, 2024. Average lines denote the average of the investment grade, high yield, and emerging market spread values from September 2002 to the recent month-end, respectively.

## Equity and Fixed Income Volatility[1]
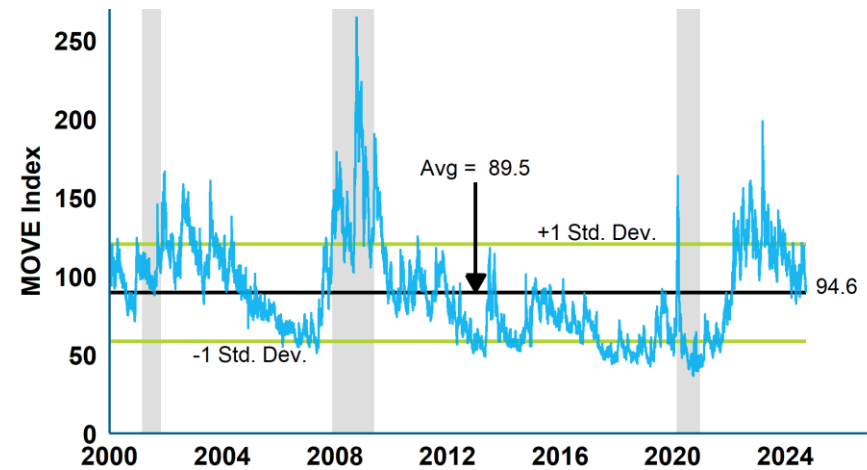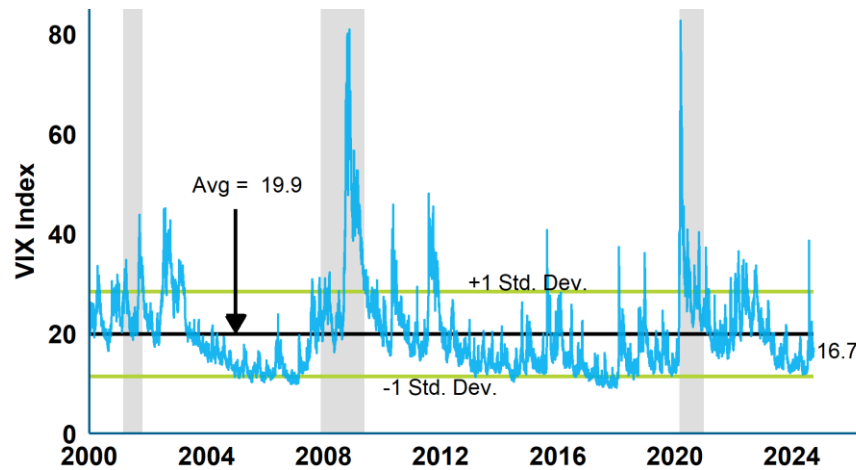


→ In the third quarter, equity and bond market volatility experienced periods of elevation due to concerns over the US labor market, the unwinding of the yen-carry trade, and increased geopolitical tensions. Ultimately, both settled well below their respective peaks as additional economic data and the easing of monetary policy calmed investors.

→ Volatility levels (VIX) in the stock market spiked above one standard deviation of its long-term average in early August but finished below the long-term average.

→ Bond market volatility (MOVE) also fluctuated through the quarter. Uncertainty in the bond market remains above the long-run average as markets continue to reprice the pace of interest rate cuts.

[1] Equity Volatility – Source: FRED. Fixed Income Volatility – Source: Bloomberg. Implied volatility as measured using VIX Index for equity markets and the MOVE Index to measure interest rate volatility for fixed income markets. Data is as of September 2024. The average line indicated is the average of the VIX and MOVE values between January 2000 and September 2024.
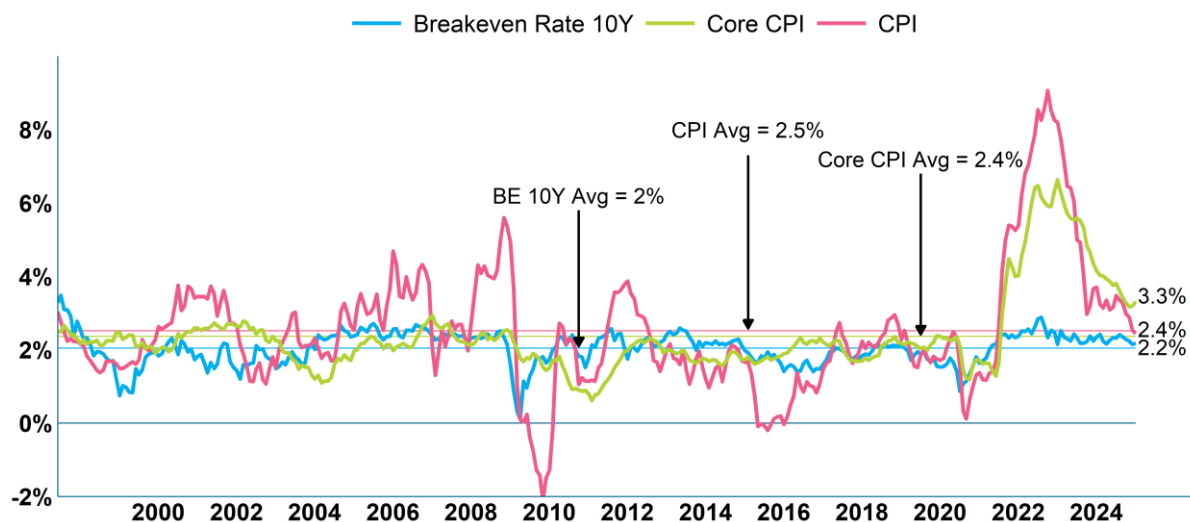
## Recent Market Strength: China[1]



**—— MSCI China Index (Last Price)**

- → On September 24th, Chinese policy makers surprised markets with a suite of policy stimulus measures designed to support stock prices, banks, and mortgage borrowers.

- → Banks were asked to extend loans to publicly traded companies for share purchases and buybacks, contributing to significant equity market gains in the last week of the quarter. These policies also contributed to increased foreign demand for Chinese shares.

- → The banking sector benefited from a cut to the 1-year medium term lending rate and to their reserve requirement rate.

- → Homeowners may also benefit from changes to downpayment minimums and mortgage rate reductions.

- → Despite the recent gains in the stock market, questions remain about the ultimate impact of these policies on longer-term growth in China, as well as policy makers' commitment to continue supporting the economy.

[1] Source: Bloomberg. Data as of September 30, 2024.

## US Ten-Year Breakeven Inflation and CPI[1]



Legend: Breakeven Rate 10Y — Core CPI — CPI

Chart annotations: BE 10Y Avg = 2%; CPI Avg = 2.5%; Core CPI Avg = 2.4%

End values: 3.3%, 2.4%, 2.2%

→ Over the quarter, year-over-year headline inflation continued to decline (3.0% to 2.4%) supporting the Fed's start to cutting policy rates. The 2.4% September level was the lowest since early 2021.

→ Month-over-month inflation increased 0.2% each month over the quarter. Food and shelter costs saw monthly increases, while energy prices largely fell.

→ Year-over-year core inflation (excluding food and energy) finished the quarter where it started (3.3%). Shelter (+4.9% YoY) and transportation (+8.5% YoY) remain key drivers of stickier core inflation.

→ Inflation expectations (breakevens) have been relatively stable over the last several years. They remain below current inflation levels.

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[1] Source: FRED. Data is as September 2024. The CPI and 10 Year Breakeven average lines denote the average values from February 1997 to the present month-end, respectively. Breakeven values represent month-end values for comparative purposes.

## Global Inflation (CPI Trailing Twelve Months)[1]
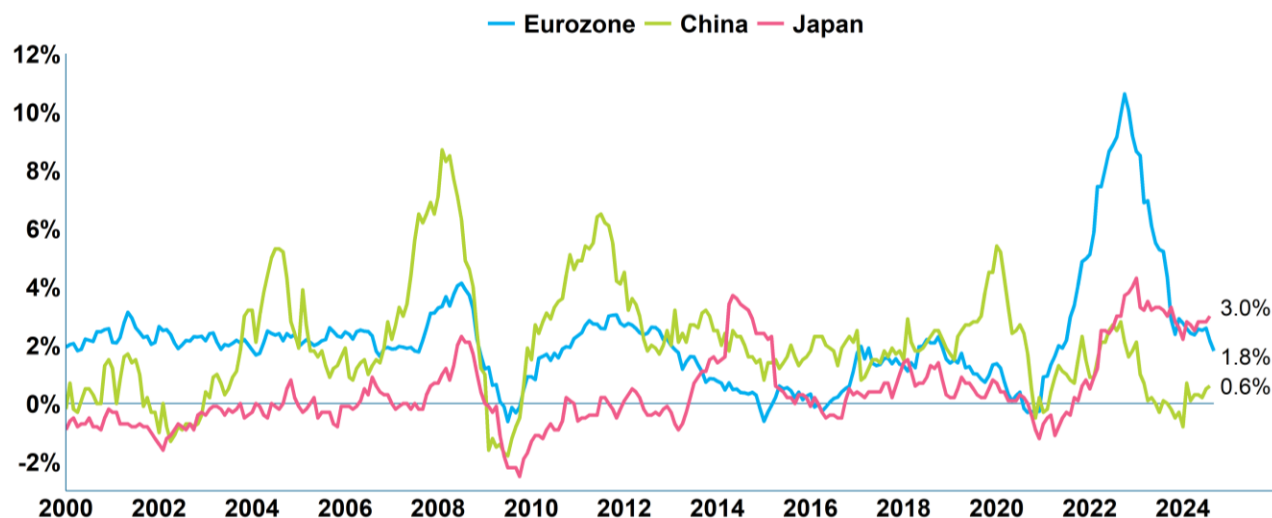


→ In the eurozone, inflation fell from 2.5% to 1.8% over the quarter (a level below the US), potentially clearing the way for further rate cuts from the European Central Bank.

→ By contrast, inflation in Japan recently increased (2.8% to 3.0%) due in part to higher food, electricity, and gas prices supporting the case for additional interest rate increases by the Bank of Japan.

→ In China, inflation increased each of the last seven months, after declines late last year. Recent extreme weather has caused supply issues and contributed to higher prices. Inflation in China remains much lower than in other countries, due to weak consumer spending and as issues in the real estate sector continue to weigh on sentiment.

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[1] Source: Bloomberg. Data is as of September 30, 2024, except Japan and China which are as of August 31, 2024.

### US Unemployment[1]
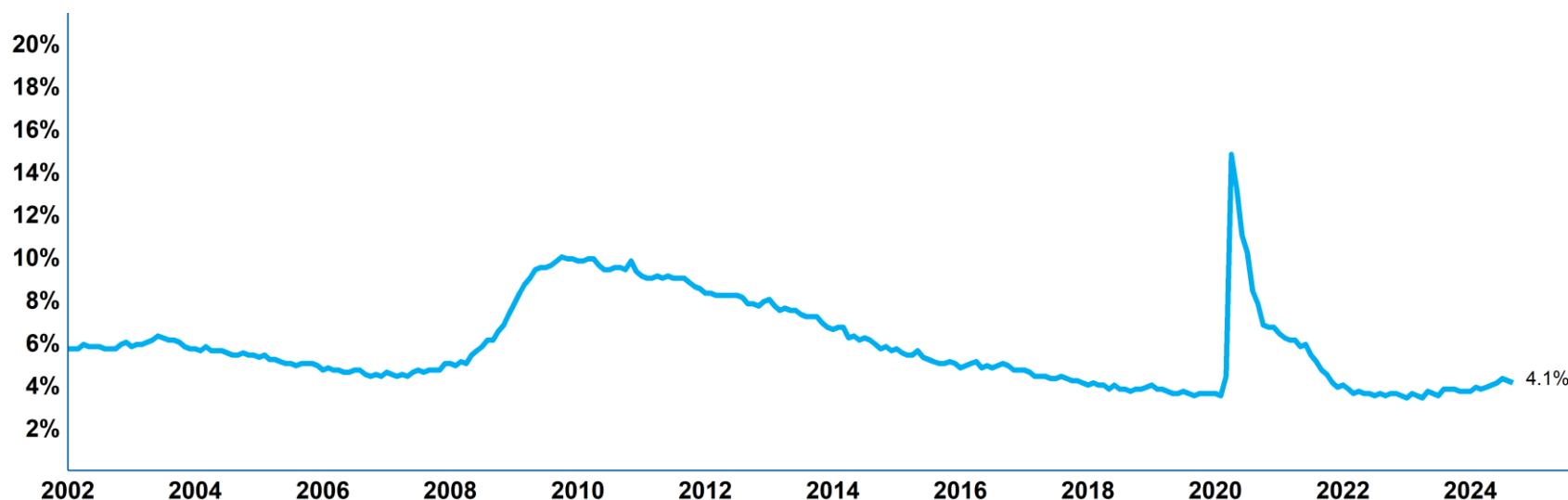


→ The US labor market has softened but remains relatively strong. After reaching 4.3% in July, the unemployment rate finished the quarter at the level it started (4.1%), with 6.8 million people looking for work.

→ After job gains came in below expectations in July (114k versus 175k) and August (142k versus 165k), contributing to some of the market volatility, they finished strong in September, beating estimates (254k versus 150k). Food services (+69K) and healthcare (+45K) were the largest contributors to the September gains.

→ Initial claims for unemployment remain relatively low and year-over-year wage gains remain strong (+4.0%). The number of job openings increased slightly (7.9 to 8.0 million) over the quarter.

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[1] Source: FRED. Data is as of September 30, 2024.

## Policy Rates[1]
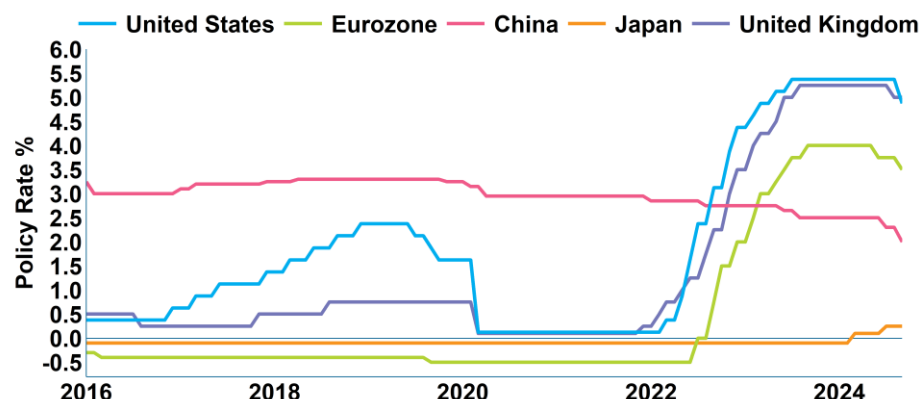


→ In the US, the Fed reduced interest rates by 0.5% after holding them at a 5.25%-5.50% level for over a year. In their statement they highlighted that they would make additional interest rate cut decisions based on incoming data. Market participants are pricing in roughly two additional cuts in 2024.

→ The Bank of England (BoE) and the European Central Bank (ECB) have both started cutting rates. The BoE made a 25 basis points interest rate cut in July while the ECB made two similar cuts in June and September.

→ Inflation in Japan remains elevated, prompting Bank of Japan officials to raise the policy rate 0.15% to 0.25% over the quarter after decades at near-zero rates.

→ China announced a broad based unexpected stimulus package that included lower interest rates, a reduction in bank reserve requirements, and liquidity for stock investors.

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[1] Source: Bloomberg. Data is as of September, 2024. United States rate is the mid-point of the Federal Funds Target Rate range. Eurozone rate is the ECB Deposit Facility Announcement Rate. Japan rate is the Bank of Japan Unsecured Overnight Call Rate Expected. China rate is the China Central Bank 1-Year Medium Term Interest Rate. UK rate is the UK Bank of England Official Bank Rate.

## US Dollar vs. Broad Currencies[1]
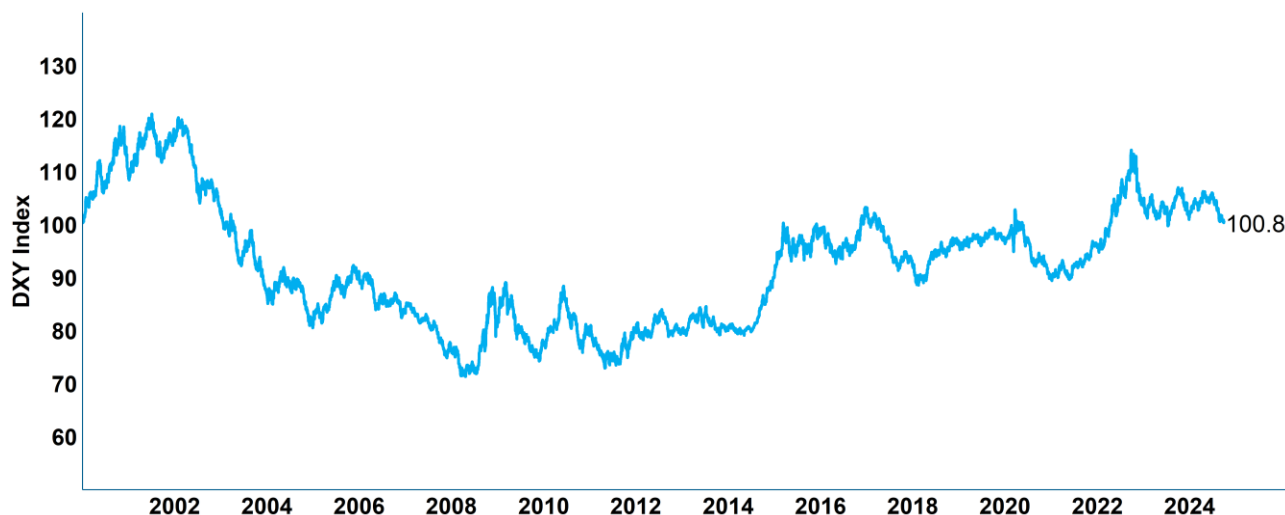


→ The US dollar weakened in the third quarter by 4.7% versus other major currencies, influenced by the decline in interest rates and expectations for slower growth.

→ It remains at historically strong levels, though, given relatively stronger growth, higher interest rates, and on the prospects of other central banks, potentially easing policy faster than the Fed.

→ Looking ahead, the track of policy rates across major central banks will be key for the path of the US dollar from here. If the US economy slows more than expected and the Fed relatedly lowers rates at a faster pace, we could see the dollar weaken further.

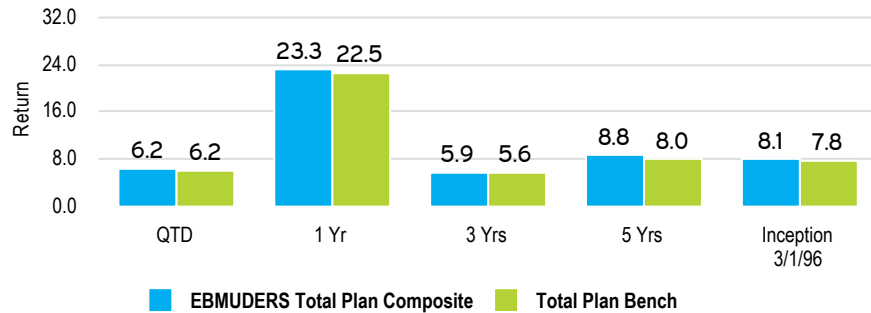[1] Source: Bloomberg. Data as of September 30, 2024.

## Summary

### Key Trends:

→ According to the International Monetary Fund's (IMF) July report, global growth this year is expected to match the 2023 estimate at around 3.2% with most major economies predicted to avoid a recession.

→ Key economic data in the US has largely weakened and come in below expectations, causing markets to expect an additional two rate cuts this year after the Fed's initial 0.5% reduction. Uncertainty remains regarding the timing and pace of interest rate cuts in the coming year.

→ US consumers could feel pressure as certain components of inflation (e.g., shelter) remain high, borrowing costs stay elevated, and the job market may weaken further.

→ A focus for US equities going forward will be whether earnings can remain resilient if growth slows. Also, the future paths of the large technology companies that have driven market gains will be important.

→ We have started to see divergences in monetary policy. Some central banks, such as the Fed, European Central Bank, and the Bank of England, have started to cut interest rates and others, like the Bank of Japan, have increased interest rates. This disparity will likely influence capital flows and currencies.

→ China appears to have shifted focus to more policy support for the economy/asset prices with a new suite of policy stimulus and signals for more support ahead. It is still not clear what the long-term impact of these policies will be on the economy and if policy makers will remain committed to these efforts.
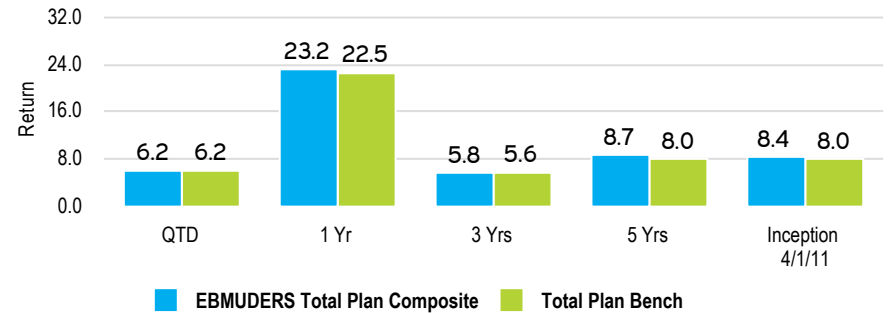
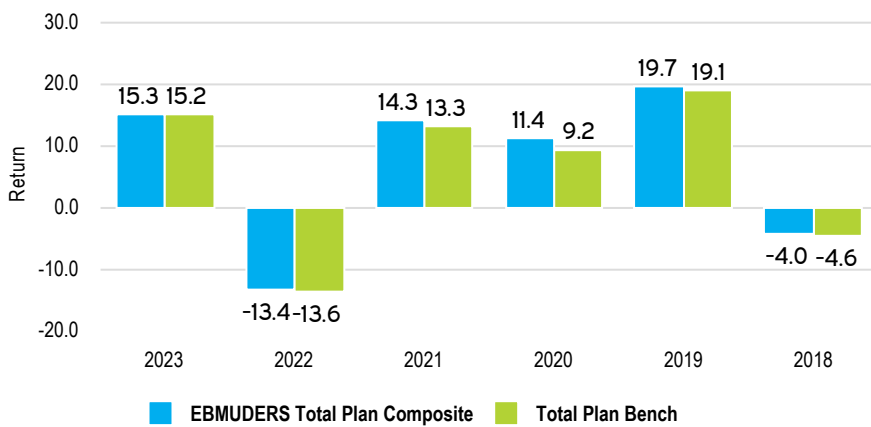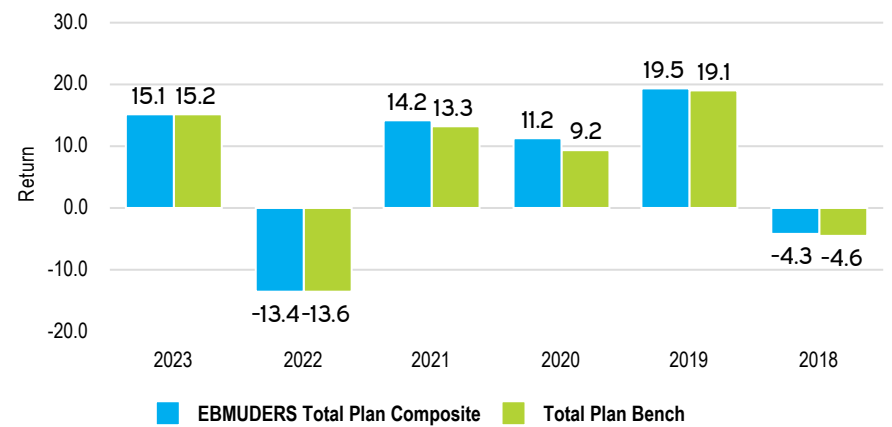# Third Quarter Performance Review

## Trailing Performance - Gross



Bar chart values:
- QTD: EBMUDERS Total Plan Composite 6.2, Total Plan Bench 6.2
- 1 Yr: 23.3, 22.5
- 3 Yrs: 5.9, 5.6
- 5 Yrs: 8.8, 8.0
- Inception 3/1/96: 8.1, 7.8

■ EBMUDERS Total Plan Composite  ■ Total Plan Bench

## Trailing Performance - Net



Bar chart values:
- QTD: EBMUDERS Total Plan Composite 6.2, Total Plan Bench 6.2
- 1 Yr: 23.2, 22.5
- 3 Yrs: 5.8, 5.6
- 5 Yrs: 8.7, 8.0
- Inception 4/1/11: 8.4, 8.0

■ EBMUDERS Total Plan Composite  ■ Total Plan Bench

| | 3 Mo (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) | 10 Yrs (%) | 2023 (%) | 2022 (%) | 2021 (%) | 2020 (%) | 2019 (%) | 2018 (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **EBMUDERS Total Plan Composite** | **6.2** | **23.2** | **5.8** | **8.7** | **7.9** | **15.1** | **-13.4** | **14.2** | **11.2** | **19.5** | **-4.3** |
| **EBMUDERS Total Plan Composite** | **6.2** | **23.3** | **5.9** | **8.8** | **8.1** | **15.3** | **-13.4** | **14.3** | **11.4** | **19.7** | **-4.0** |
| *Total Plan Bench* | *6.2* | *22.5* | *5.6* | *8.0* | *7.5* | *15.2* | *-13.6* | *13.3* | *9.2* | *19.1* | *-4.6* |
| InvMetrics Public DB > $1B Median | 4.8 | 17.6 | 4.6 | 8.1 | 7.2 | 11.4 | -10.4 | 15.8 | 11.7 | 17.3 | -3.2 |

## 12-month Performance - Gross



Bar chart values (EBMUDERS Total Plan Composite, Total Plan Bench):
- 2023: 15.3, 15.2
- 2022: -13.4, -13.6
- 2021: 14.3, 13.3
- 2020: 11.4, 9.2
- 2019: 19.7, 19.1
- 2018: -4.0, -4.6

■ EBMUDERS Total Plan Composite  ■ Total Plan Bench

## 12-month Performance - Net



Bar chart values (EBMUDERS Total Plan Composite, Total Plan Bench):
- 2023: 15.1, 15.2
- 2022: -13.4, -13.6
- 2021: 14.2, 13.3
- 2020: 11.2, 9.2
- 2019: 19.5, 19.1
- 2018: -4.3, -4.6

■ EBMUDERS Total Plan Composite  ■ Total Plan Bench

# MEKETA

| Allocation vs. Targets and Policy | | | | |
|---|---|---|---|---|
| | Current Balance ($) | Current Allocation (%) | Policy Range (%) | Within IPS Range? |
| Domestic Equity | $1,003,015,282 | 38 | 20 - 30 | No |
| International Equity | $658,196,323 | 25 | 20 - 30 | Yes |
| Covered Calls | $365,830,151 | 14 | 17 - 23 | No |
| Real Estate | $53,812,113 | 2 | 3 - 7 | No |
| Core Fixed Income | $451,516,430 | 17 | 17 - 23 | No |
| Non-Core Fixed Income | $122,361,696 | 5 | 3 - 7 | Yes |
| Cash | $2,139,380 | 0 | 0 - 5 | Yes |
| **Total** | **$2,656,871,374** | **100** | | |



Cash Composite 0.1%

Fixed Income Non-Core Fixed Income Composite 4.6%

Fixed Income Core Fixed Income Composite 17.0%

Real Estate Composite 2.0%

Covered Calls Composite 13.8%

NonUS Equity Composite 24.8%

US Equity Composite 37.8%
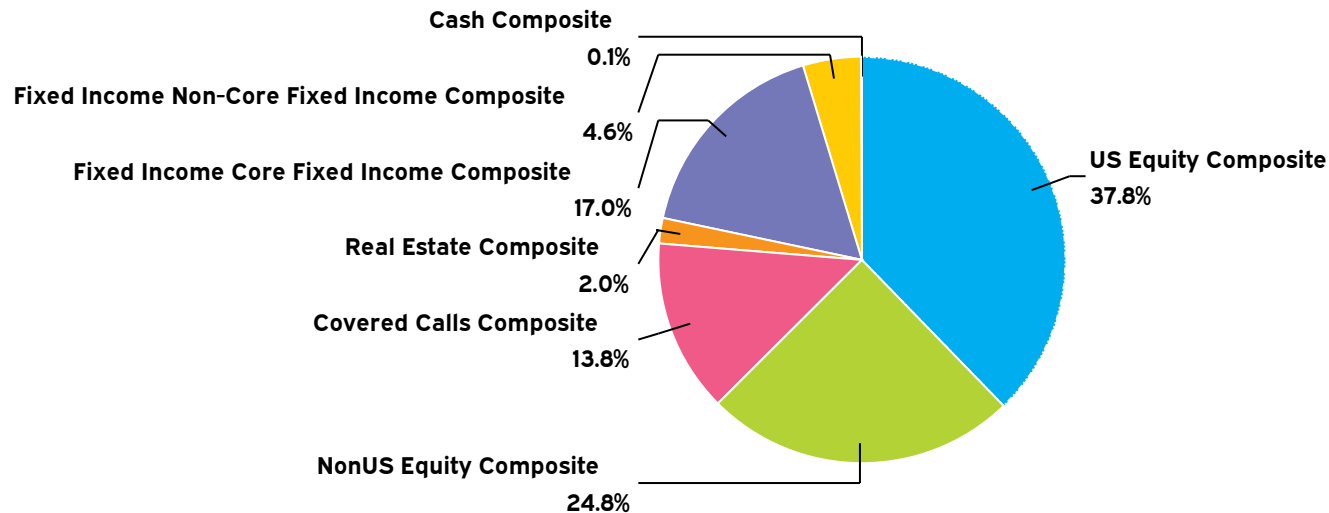
### Annualized Return vs. Annualized Standard Deviation
### 3 Years Ending September 30, 2024
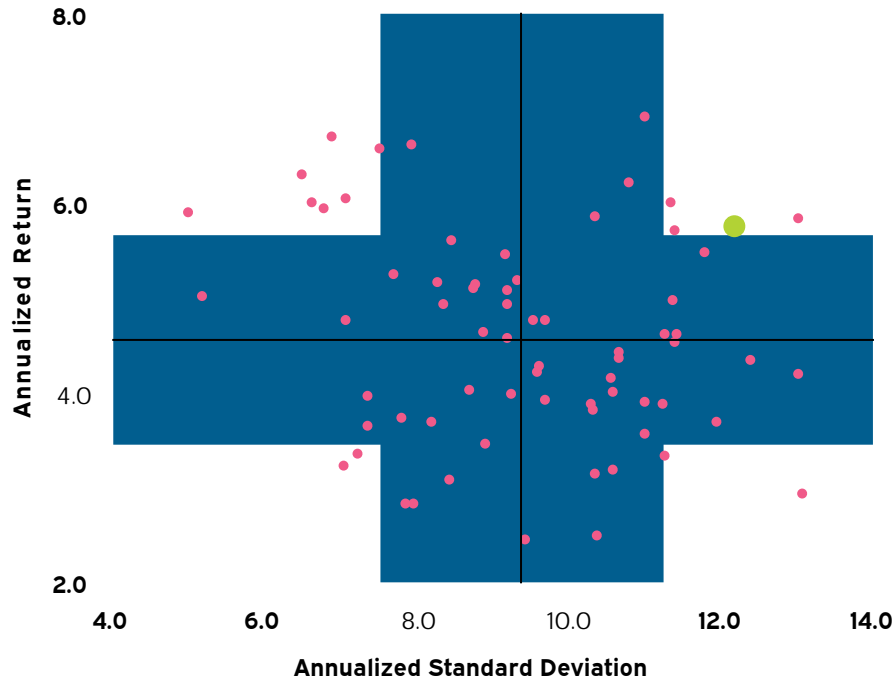


### Annualized Return vs. Annualized Standard Deviation
### 5 Years Ending September 30, 2024



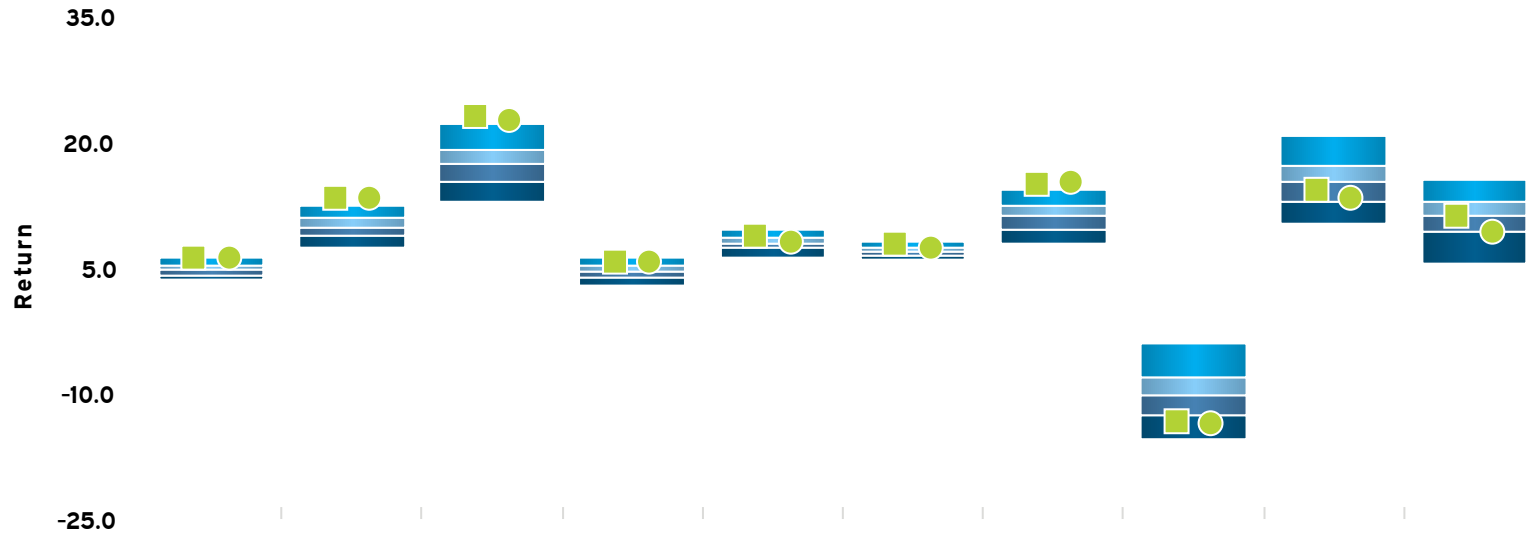● InvMetrics All Public DB Plans > $1B

● EBMUDERS Total Plan Composite
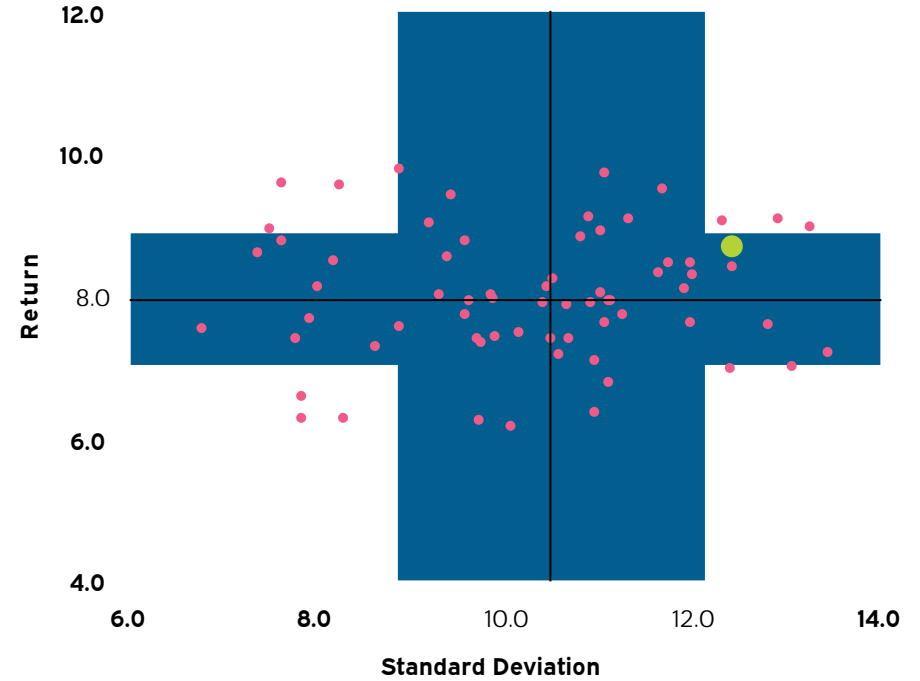
● InvMetrics All Public DB Plans > $1B

● EBMUDERS Total Plan Composite

| 3 Years Ending September 30, 2024 | Return | Standard Deviation | Sharpe Ratio |
|---|---|---|---|
| EBMUDERS Total Plan Composite | 5.8 | 12.2 | 0.2 |
| Total Plan Bench | 5.6 | 11.5 | 0.2 |

| 5 Years Ending September 30, 2024 | Return | Standard Deviation | Sharpe Ratio |
|---|---|---|---|
| EBMUDERS Total Plan Composite | 8.7 | 12.4 | 0.6 |
| Total Plan Bench | 8.0 | 12.3 | 0.5 |

**East Bay Municipal Utility District Employees' Retirement System**

**Plan Sponsor Peer Group Analysis | As of September 30, 2024**

## InvMetrics Public Plans > $1B Return Comparison
### September 30, 2024



| | QTD (%) | YTD (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) | 10 Yrs (%) | 2023 | 2022 | 2021 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|
| ■ EBMUDERS Total Plan Composite | 6.2 (3) | 13.2 (4) | 23.2 (4) | 5.8 (18) | 8.7 (24) | 7.9 (12) | 15.1 (4) | -13.4 (84) | 14.2 (60) | 11.2 (49) |
| ● Total Plan Bench | 6.2 (3) | 13.3 (4) | 22.5 (5) | 5.6 (20) | 8.0 (43) | 7.5 (24) | 15.2 (4) | -13.6 (86) | 13.3 (72) | 9.2 (77) |
| | | | | | | | | | | |
| 5th Percentile | 6.1 | 12.4 | 22.2 | 6.3 | 9.6 | 8.1 | 14.3 | -4.1 | 20.7 | 15.5 |
| 1st Quartile | 5.3 | 10.9 | 19.1 | 5.2 | 8.6 | 7.4 | 12.4 | -8.0 | 17.2 | 13.0 |
| Median | 4.6 | 9.8 | 17.3 | 4.5 | 8.0 | 6.9 | 11.2 | -10.3 | 15.2 | 11.1 |
| 3rd Quartile | 4.2 | 8.8 | 15.2 | 3.7 | 7.4 | 6.4 | 9.6 | -12.6 | 13.0 | 9.3 |
| 95th Percentile | 3.7 | 7.5 | 12.7 | 2.8 | 6.3 | 5.8 | 7.8 | -15.4 | 10.3 | 5.4 |
| | | | | | | | | | | |
| Population | 70 | 70 | 70 | 67 | 66 | 64 | 179 | 178 | 211 | 224 |

Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

# MEKETA

| | Market Value $ | QTR (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) |
|---|---|---|---|---|---|
| **EBMUDERS Total Plan Composite** | **2,656,871,374** | **6.2** | **23.3** | **5.9** | **8.8** |
| *Total Plan Bench* | | *6.2* | *22.5* | *5.6* | *8.0* |
| **US Equity Composite** | **1,003,015,282** | **6.2** | **35.2** | **10.3** | **15.2** |
| *Russell 3000 Hybrid* | | *6.2* | *35.2* | *10.3* | *15.3* |
| Northern Trust Russell 3000 | 1,002,195,816 | 6.2 | 35.2 | 10.3 | 15.3 |
| *Russell 3000 Index* | | *6.2* | *35.2* | *10.3* | *15.3* |
| **Non US Equity Composite** | **658,196,323** | **8.0** | **25.4** | **4.5** | **8.1** |
| *MSCI ACWI xUS (blend)* | | *8.2* | *26.0* | *4.7* | *8.1* |
| Northern Trust ACWI ex US | 658,196,323 | 8.0 | 25.4 | 4.5 | 7.7 |
| *MSCI AC World ex USA index* | | *8.2* | *26.0* | *4.7* | *8.1* |

| | Market Value $ | QTR (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) |
|---|---|---|---|---|---|
| **Covered Calls Composite** | **365,830,151** | **4.8** | **21.4** | **8.1** | **10.1** |
| *Cboe S&P 500 Buy Write Index* | | *5.5* | *18.3* | *6.4* | *6.6* |
| Parametric BXM | 177,232,457 | 4.1 | 18.0 | 7.8 | 9.4 |
| *Cboe S&P 500 Buy Write Index* | | *5.5* | *18.3* | *6.4* | *6.6* |
| Parametric Delta Shift | 188,416,693 | 4.8 | 27.0 | 9.8 | 13.9 |
| *Cboe S&P 500 Buy Write Index* | | *5.5* | *18.3* | *6.4* | *6.6* |
| Van Hulzen | 181,001 | 5.7 | 19.2 | 6.6 | 7.0 |
| *Cboe S&P 500 Buy Write Index* | | *5.5* | *18.3* | *6.4* | *6.6* |

# MEKETA

| | Market Value $ | QTR (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) |
|---|---|---|---|---|---|
| **Core Fixed Income Composite** | **451,516,430** | **5.7** | **13.0** | **-0.1** | **1.0** |
| *Fixed Income Core Composite Bench* | | *4.7* | *10.5* | *-0.6* | *--* |
| CS McKee | 227,983,033 | 5.3 | 13.0 | -0.9 | 0.7 |
| *Blmbg. U.S. Aggregate Index* | | *5.2* | *11.6* | *-1.4* | *0.3* |
| Garcia Hamilton | 223,533,397 | 6.1 | 13.1 | 0.6 | -- |
| *Blmbg. U.S. Aggregate Index* | | *5.2* | *11.6* | *-1.4* | *0.3* |
| **Non-Core Fixed Income Composite** | **122,361,696** | **2.4** | **10.1** | **4.5** | **4.7** |
| *Fixed Income Non-Core Composite Bench* | | *2.9* | *10.9* | *5.0* | *4.6* |
| MacKay Shields (HY) | 63,387,250 | 3.2 | 11.9 | 5.5 | 5.9 |
| *ICE BofA ML US Corp Cash Pay BB-B 1-5Yr* | | *3.9* | *13.8* | *4.8* | *4.7* |
| Federated Investment Counseling (Bank Loans) | 58,974,446 | 1.6 | 8.4 | 3.5 | 3.4 |
| *60% CredSuisLevLoan/40% BBStGovCorp* | | *1.9* | *8.1* | *5.1* | *4.4* |

# MEKETA

**Manager Performance - Gross of Fees | As of September 30, 2024**

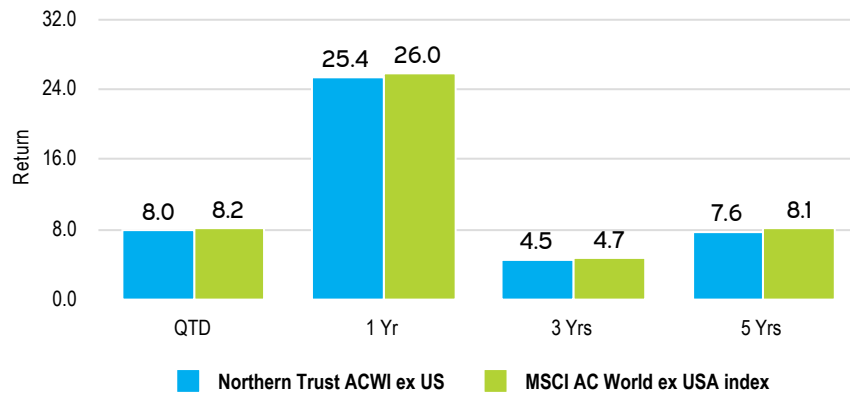| | Market Value $ | QTR (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) |
|---|---|---|---|---|---|
| **Real Estate Composite** | **53,812,113** | **9.5** | **14.0** | **4.6** | **5.8** |
| *Real Estate Composite Benchmark* | | *7.7* | *13.5* | *4.3* | *5.1* |
| RREEF America II Lag | 53,588,843 | -0.9 | -8.1 | 2.4 | 3.7 |
| *NCREIF NPI Lag* | | *-0.3* | *-5.5* | *2.3* | *3.4* |
| CenterSquare | 223,270 | 18.9 | 38.6 | 6.3 | 7.0 |
| *FTSE NAREIT Equity REIT Index* | | *16.1* | *34.7* | *5.1* | *5.5* |

# MEKETA

## Statistics Summary
## 5 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| Northern Trust Russell 3000 | 0.0 | 1.0 | -0.4 | 0.7 | 0.1 | 1.0 | 99.8 | 99.8 |
| Russell 3000 Index | 0.0 | 1.0 | - | 0.7 | 0.0 | 1.0 | 100.0 | 100.0 |
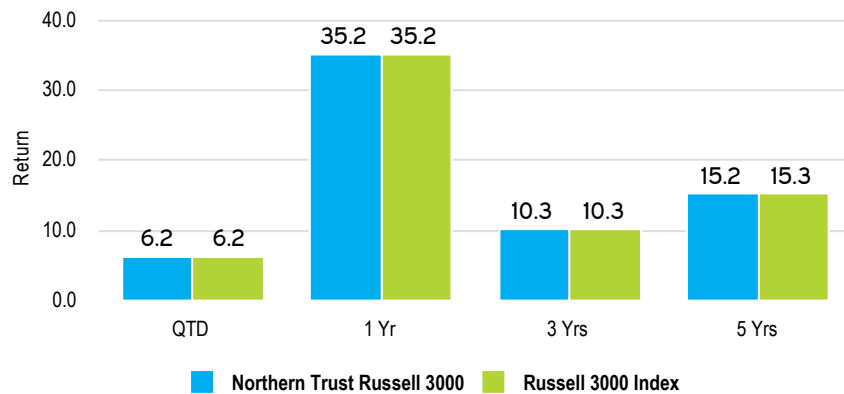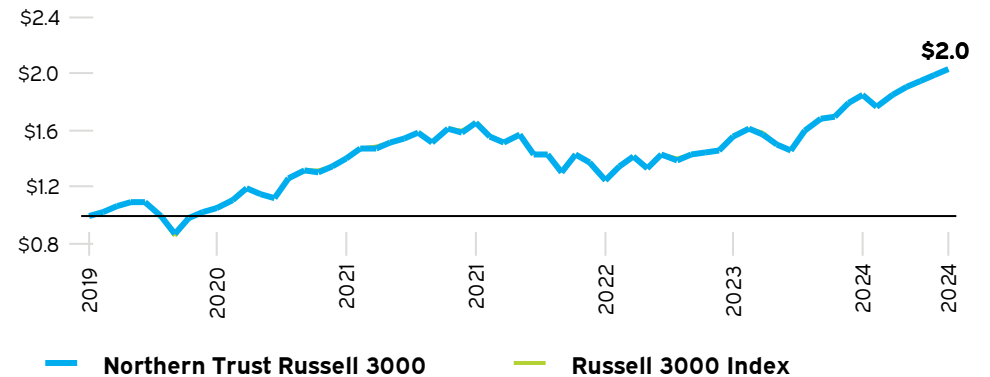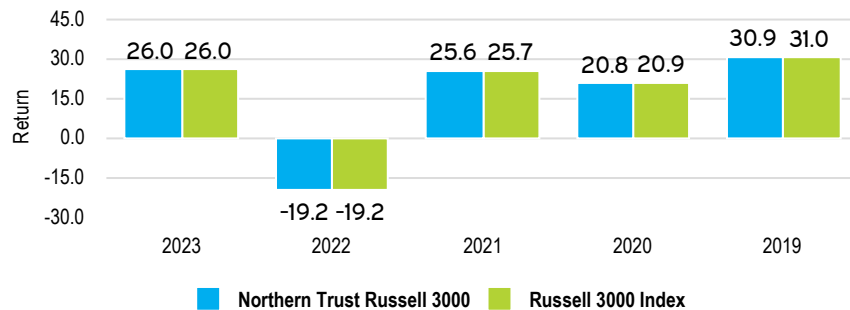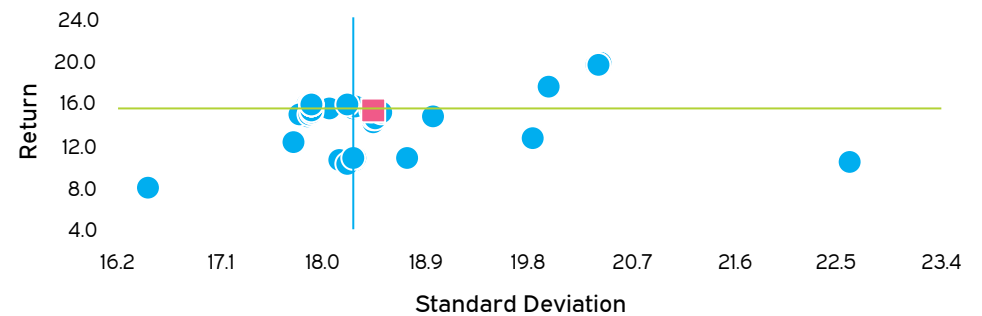
## Return Summary



## Investment Growth
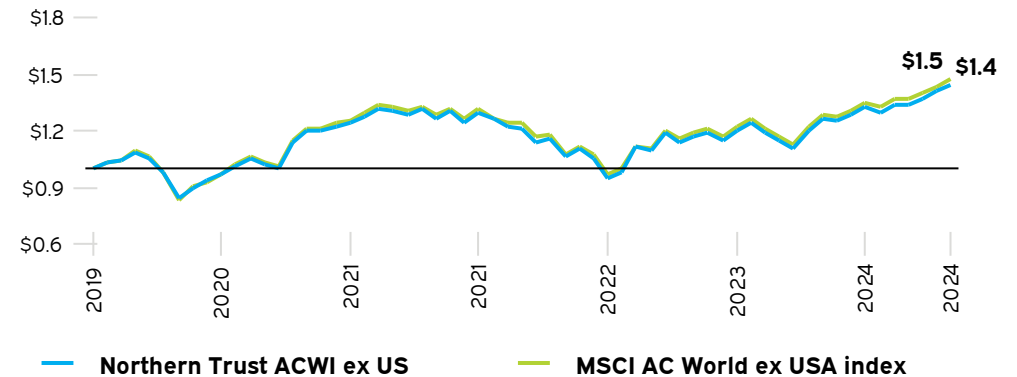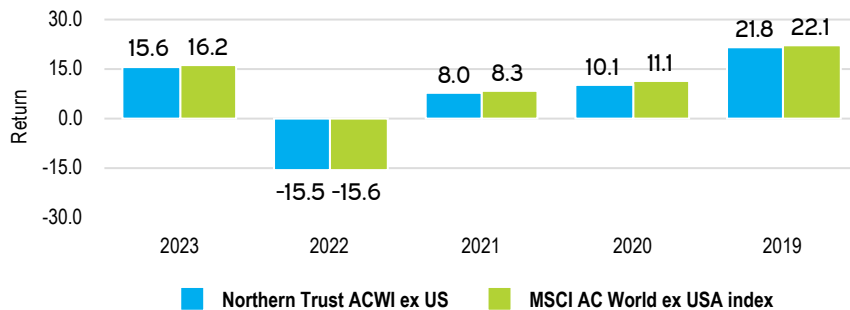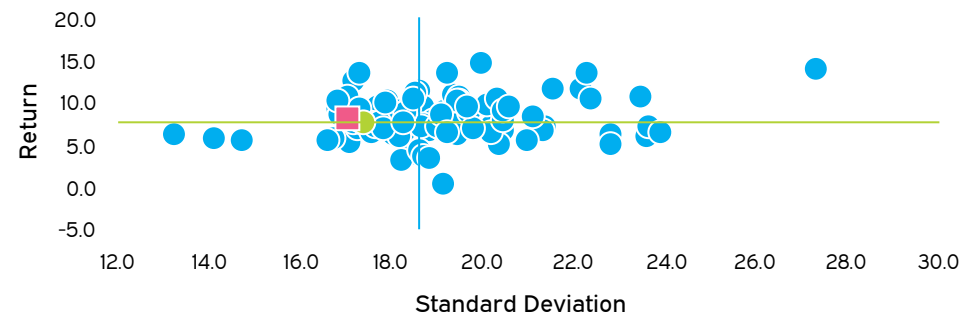
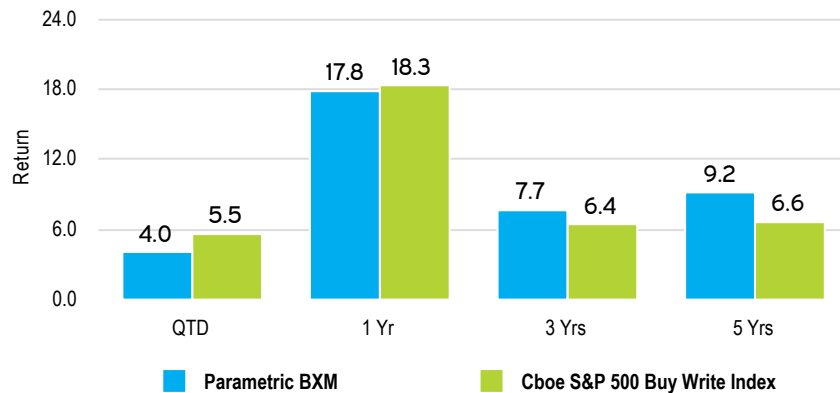
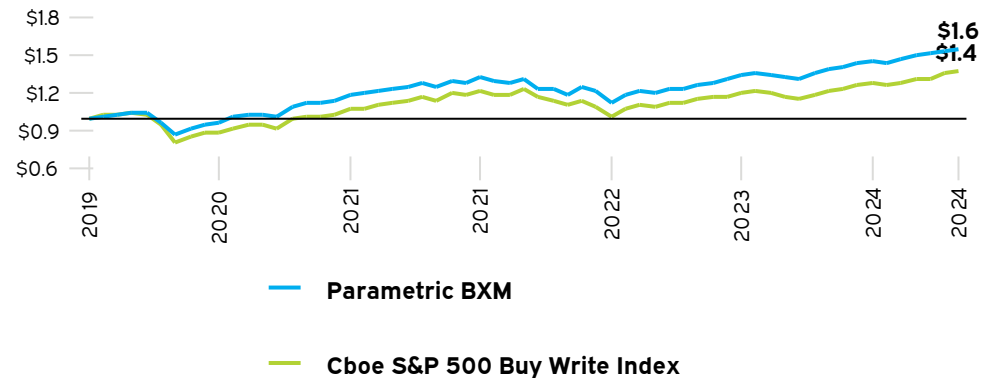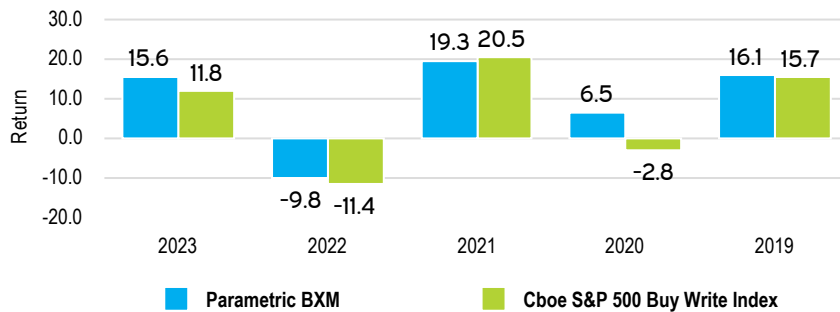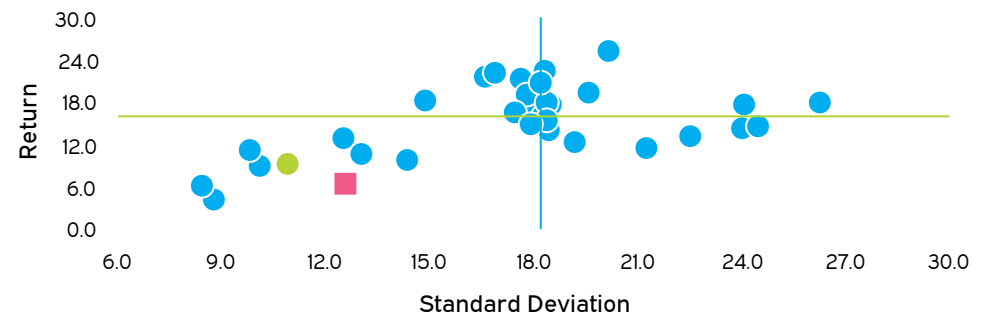
## Return Summary



## Risk Reward

## Statistics Summary
## 5 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| Northern Trust ACWI ex US | -0.5 | 1.0 | -0.2 | 0.4 | 1.7 | 1.0 | 101.3 | 103.9 |
| MSCI AC World ex USA index | 0.0 | 1.0 | - | 0.4 | 0.0 | 1.0 | 100.0 | 100.0 |

## Return Summary



Northern Trust ACWI ex US / MSCI AC World ex USA index

QTD: 8.0, 8.2
1 Yr: 25.4, 26.0
3 Yrs: 4.5, 4.7
5 Yrs: 7.6, 8.1

## Investment Growth



Northern Trust ACWI ex US: $1.5
MSCI AC World ex USA index: $1.4

## Return Summary



Northern Trust ACWI ex US / MSCI AC World ex USA index

2023: 15.6, 16.2
2022: -15.5, -15.6
2021: 8.0, 8.3
2020: 10.1, 11.1
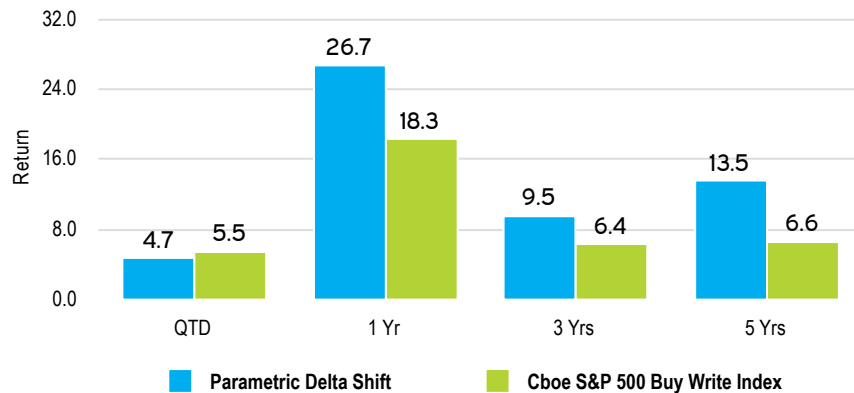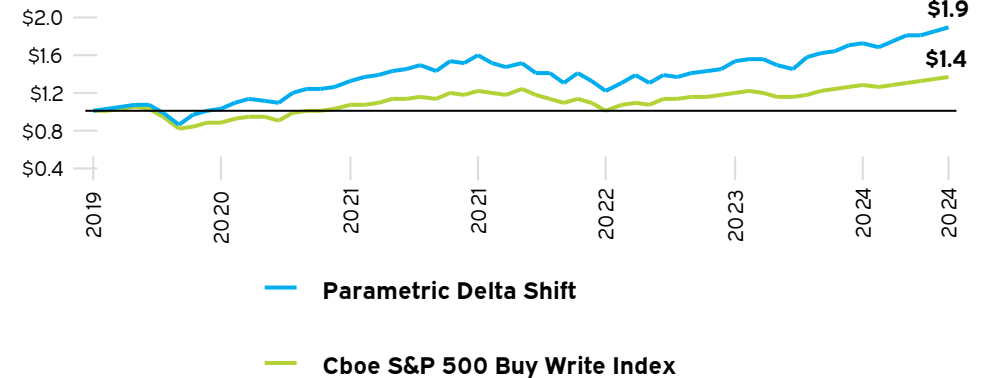2019: 21.8, 22.1

## Risk Reward

# MEKETA

## Statistics Summary
## 5 Years Ending September 30, 2024

|  | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| Parametric BXM | 3.6 | 0.8 | 0.5 | 0.7 | 4.2 | 0.9 | 97.9 | 79.1 |
| Cboe S&P 500 Buy Write Index | 0.0 | 1.0 | - | 0.4 | 0.0 | 1.0 | 100.0 | 100.0 |

### Return Summary



| | Parametric BXM | Cboe S&P 500 Buy Write Index |
|---|---|---|
| QTD | 4.0 | 5.5 |
| 1 Yr | 17.8 | 18.3 |
| 3 Yrs | 7.7 | 6.4 |
| 5 Yrs | 9.2 | 6.6 |

### Investment Growth



Parametric BXM — $1.6
Cboe S&P 500 Buy Write Index — $1.4

### Return Summary



| | Parametric BXM | Cboe S&P 500 Buy Write Index |
|---|---|---|
| 2023 | 15.6 | 11.8 |
| 2022 | -9.8 | -11.4 |
| 2021 | 19.3 | 20.5 |
| 2020 | 6.5 | -2.8 |
| 2019 | 16.1 | 15.7 |

### Risk Reward

## Statistics Summary
### 5 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| Parametric Delta Shift | 5.8 | 1.2 | 0.9 | 0.7 | 7.4 | 0.8 | 150.4 | 125.0 |
| Cboe S&P 500 Buy Write Index | 0.0 | 1.0 | - | 0.4 | 0.0 | 1.0 | 100.0 | 100.0 |

### Return Summary



| | QTD | 1 Yr | 3 Yrs | 5 Yrs |
|---|---|---|---|---|
| Parametric Delta Shift | 4.7 | 26.7 | 9.5 | 13.5 |
| Cboe S&P 500 Buy Write Index | 5.5 | 18.3 | 6.4 | 6.6 |

### Investment Growth



Parametric Delta Shift: $1.9
Cboe S&P 500 Buy Write Index: $1.4

### Return Summary



| | 2023 | 2022 | 2021 | 2020 | 2019 |
|---|---|---|---|---|---|
| Parametric Delta Shift | 23.5 | -17.6 | 28.3 | 15.6 | 27.6 |
| Cboe S&P 500 Buy Write Index | 11.8 | -11.4 | 20.5 | -2.8 | 15.7 |

### Risk Reward

# MEKETA
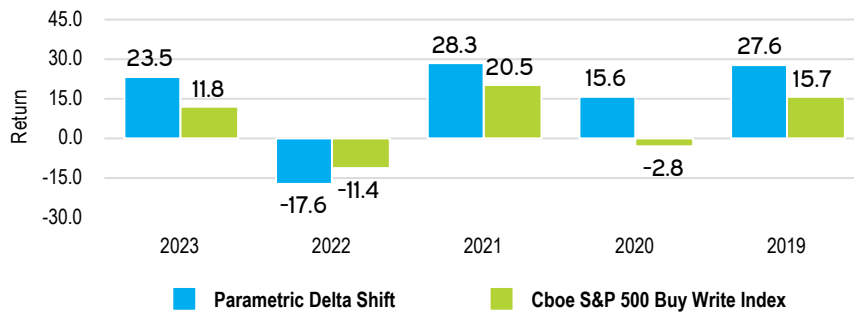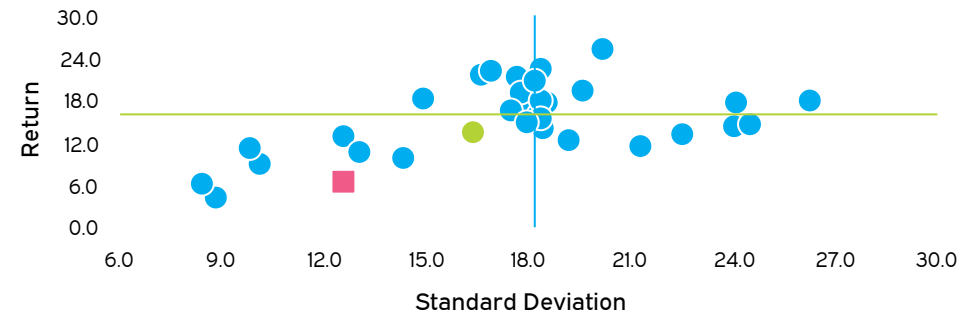
## Statistics Summary
## 5 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| Van Hulzen | 1.9 | 0.7 | 0.0 | 0.5 | 5.4 | 0.8 | 84.5 | 77.5 |
| Cboe S&P 500 Buy Write Index | 0.0 | 1.0 | - | 0.4 | 0.0 | 1.0 | 100.0 | 100.0 |

## Return Summary



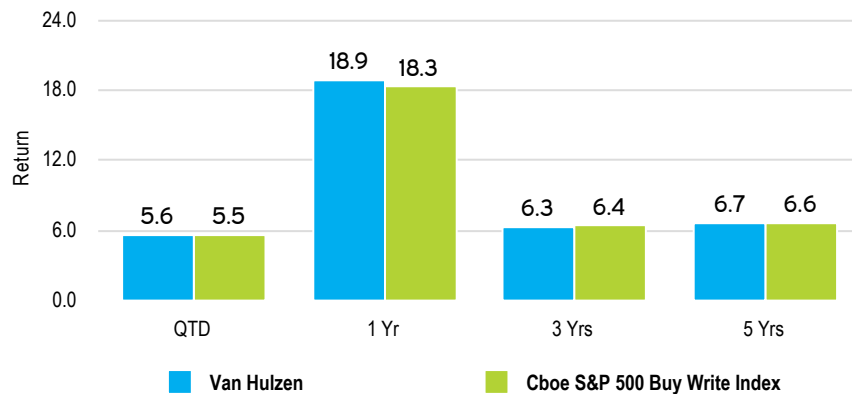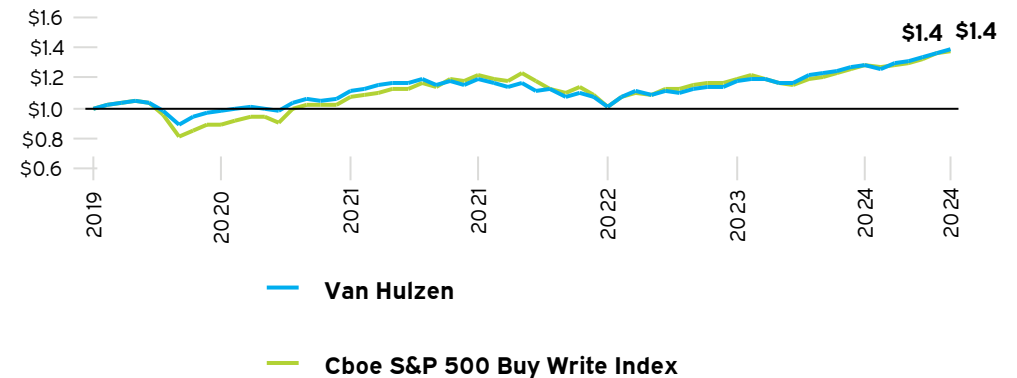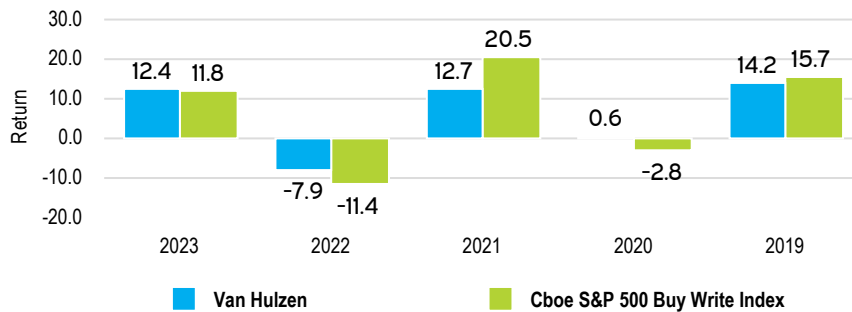## Investment Growth



## Return Summary



## Risk Reward

# MEKETA
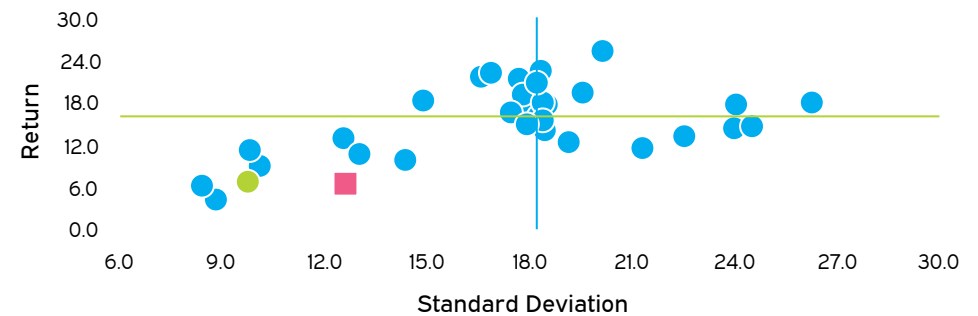
## Statistics Summary
## 5 Years Ending September 30, 2024

|  | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| RREEF America II Lag | -1.7 | 1.4 | -0.1 | 0.1 | 3.9 | 0.8 | 117.2 | 155.9 |
| NCREIF NPI Lag | 0.0 | 1.0 | - | 0.2 | 0.0 | 1.0 | 100.0 | 100.0 |
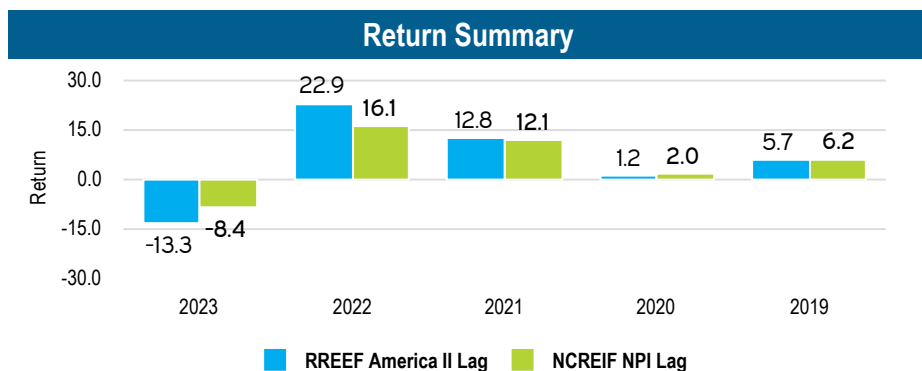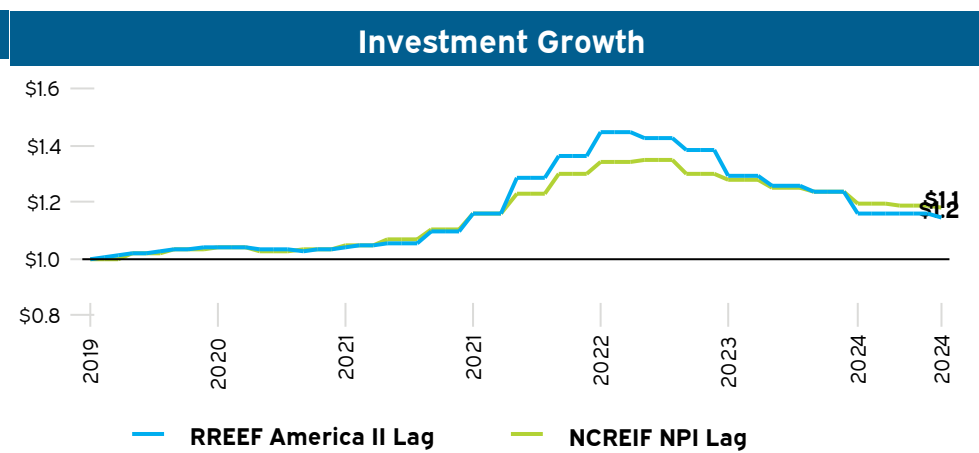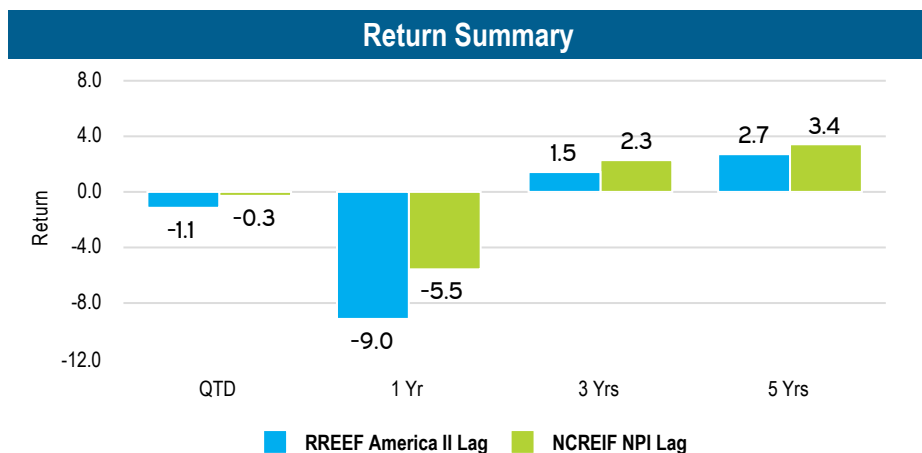
## Return Summary



QTD: RREEF America II Lag -1.1, NCREIF NPI Lag -0.3
1 Yr: RREEF America II Lag -9.0, NCREIF NPI Lag -5.5
3 Yrs: RREEF America II Lag 1.5, NCREIF NPI Lag 2.3
5 Yrs: RREEF America II Lag 2.7, NCREIF NPI Lag 3.4

## Investment Growth



$11 / $12

## Return Summary



2023: RREEF America II Lag -13.3, NCREIF NPI Lag -8.4
2022: RREEF America II Lag 22.9, NCREIF NPI Lag 16.1
2021: RREEF America II Lag 12.8, NCREIF NPI Lag 12.1
2020: RREEF America II Lag 1.2, NCREIF NPI Lag 2.0
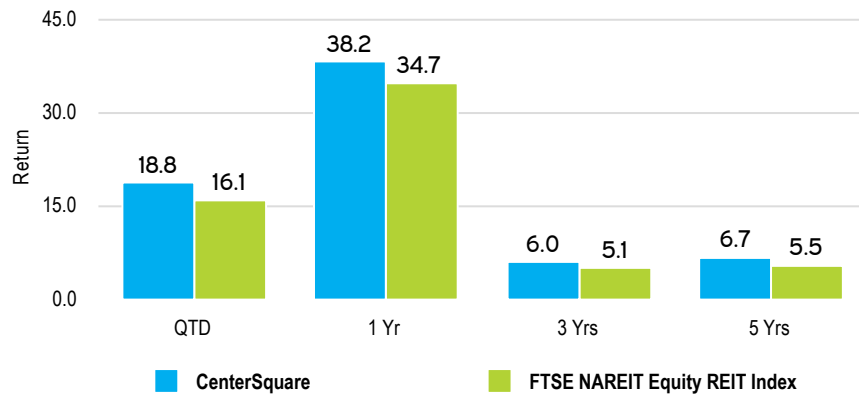2019: RREEF America II Lag 5.7, NCREIF NPI Lag 6.2
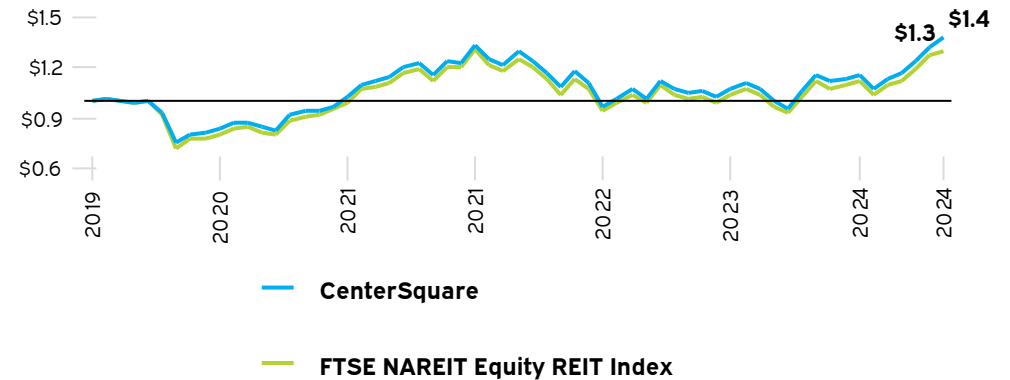
## Risk Reward

## Statistics Summary
## 5 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| CenterSquare | 1.2 | 1.0 | 0.6 | 0.3 | 1.8 | 1.0 | 101.1 | 97.5 |
| FTSE NAREIT Equity REIT Index | 0.0 | 1.0 | - | 0.3 | 0.0 | 1.0 | 100.0 | 100.0 |
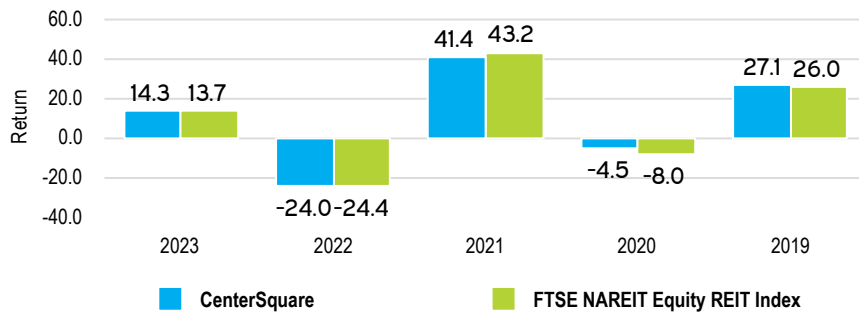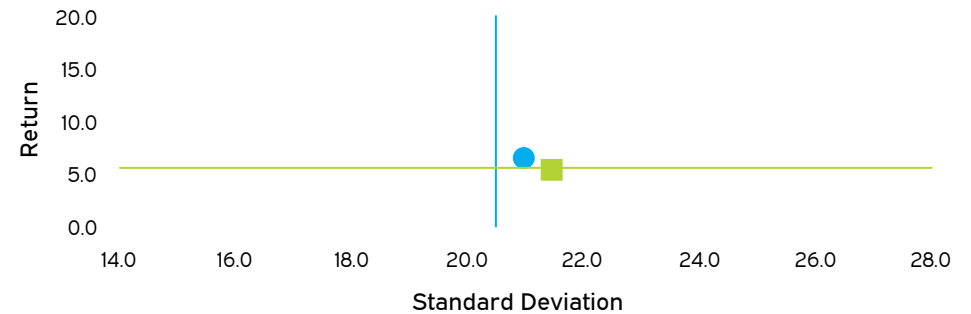
### Return Summary



| | CenterSquare | FTSE NAREIT Equity REIT Index |
|---|---|---|
| QTD | 18.8 | 16.1 |
| 1 Yr | 38.2 | 34.7 |
| 3 Yrs | 6.0 | 5.1 |
| 5 Yrs | 6.7 | 5.5 |

### Investment Growth



CenterSquare: $1.4
FTSE NAREIT Equity REIT Index: $1.3

### Return Summary



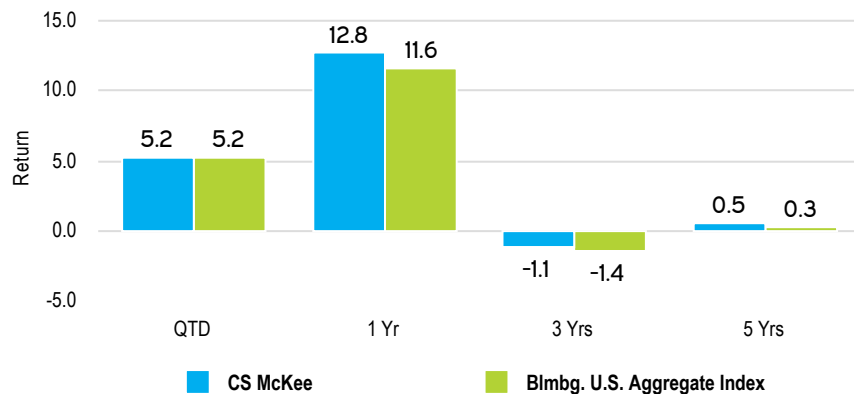| | CenterSquare | FTSE NAREIT Equity REIT Index |
|---|---|---|
| 2023 | 14.3 | 13.7 |
| 2022 | -24.0 | -24.4 |
| 2021 | 41.4 | 43.2 |
| 2020 | -4.5 | -8.0 |
| 2019 | 27.1 | 26.0 |

### Risk Reward

## Statistics Summary
## 5 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| CS McKee | 0.2 | 1.0 | 0.2 | -0.2 | 0.9 | 1.0 | 105.8 | 103.3 |
| Blmbg. U.S. Aggregate Index | 0.0 | 1.0 | - | -0.3 | 0.0 | 1.0 | 100.0 | 100.0 |
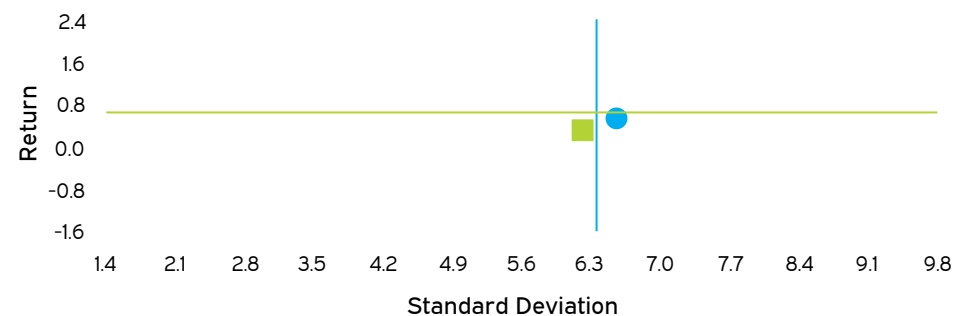
## Return Summary



| | QTD | 1 Yr | 3 Yrs | 5 Yrs |
|---|---|---|---|---|
| CS McKee | 5.2 | 12.8 | -1.1 | 0.5 |
| Blmbg. U.S. Aggregate Index | 5.2 | 11.6 | -1.4 | 0.3 |

## Investment Growth



## Return Summary



| | 2023 | 2022 | 2021 | 2020 | 2019 |
|---|---|---|---|---|---|
| CS McKee | 6.3 | -13.0 | -1.8 | 7.7 | 9.1 |
| Blmbg. U.S. Aggregate Index | 5.5 | -13.0 | -1.5 | 7.5 | 8.7 |

## Risk Reward

## Statistics Summary
## 3 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| Garcia Hamilton | 1.9 | 1.0 | 0.9 | -0.3 | 2.2 | 0.9 | 112.0 | 94.1 |
| Blmbg. U.S. Aggregate Index | 0.0 | 1.0 | - | -0.6 | 0.0 | 1.0 | 100.0 | 100.0 |

## Return Summary



## Investment Growth
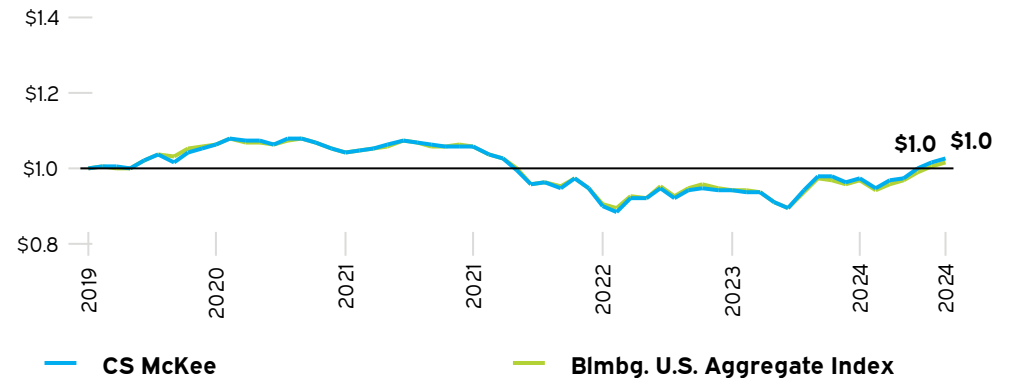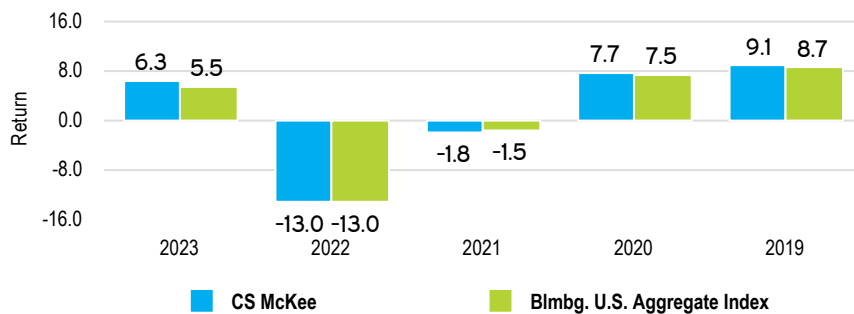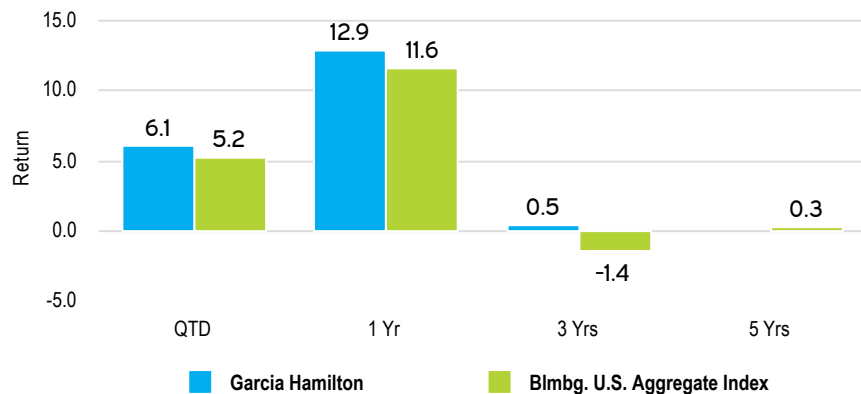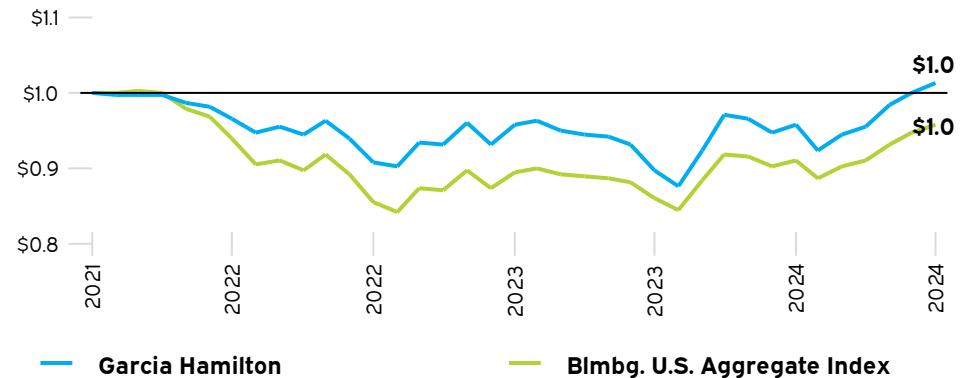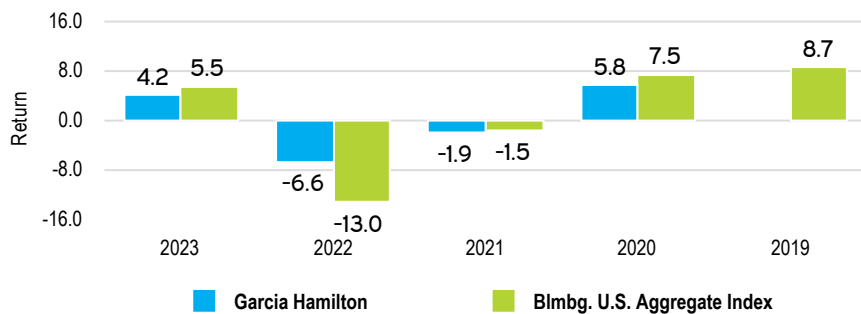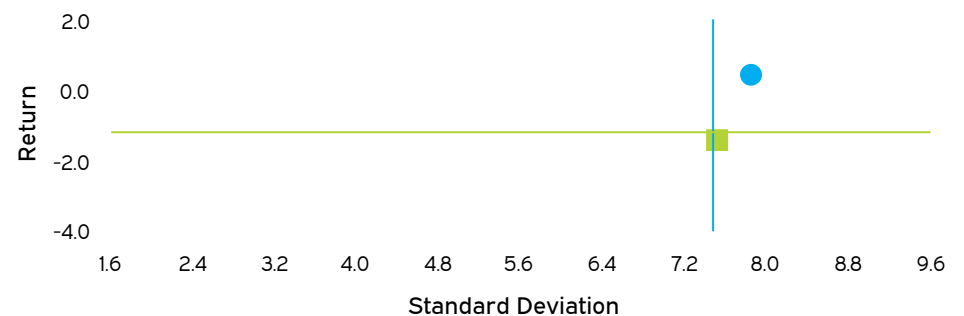


## Return Summary



## Risk Reward

## Statistics Summary
## 5 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| MacKay Shields (HY) | 1.9 | 0.7 | 0.2 | 0.6 | 2.3 | 1.0 | 83.5 | 61.0 |
| ICE BofA ML US Corp Cash Pay BB-B 1-5Yr | 0.0 | 1.0 | - | 0.3 | 0.0 | 1.0 | 100.0 | 100.0 |
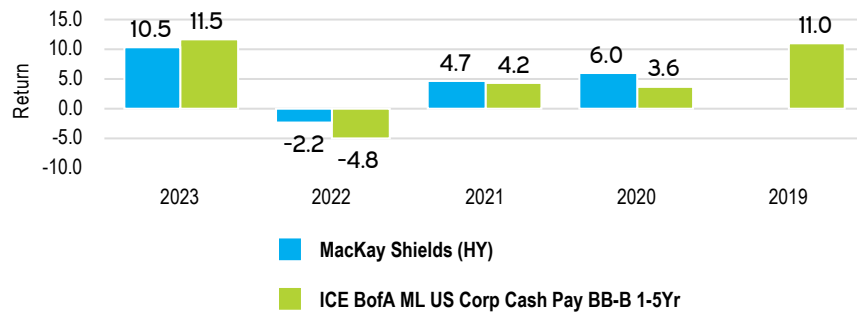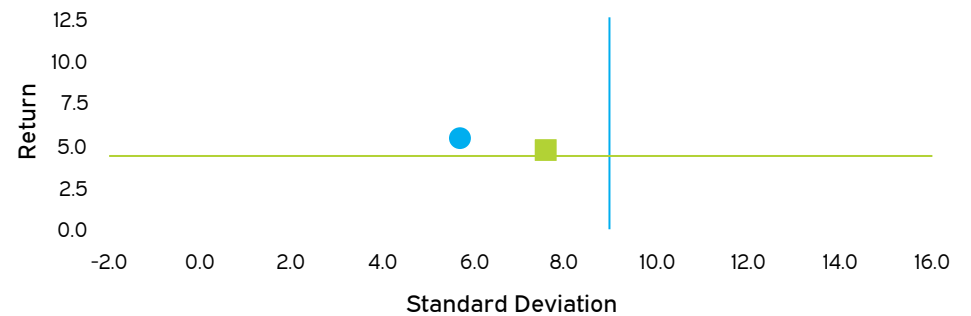
### Return Summary



- MacKay Shields (HY)
- ICE BofA ML US Corp Cash Pay BB-B 1-5Yr

### Investment Growth



- MacKay Shields (HY)
- ICE BofA ML US Corp Cash Pay BB-B 1-5Yr

### Return Summary



- MacKay Shields (HY)
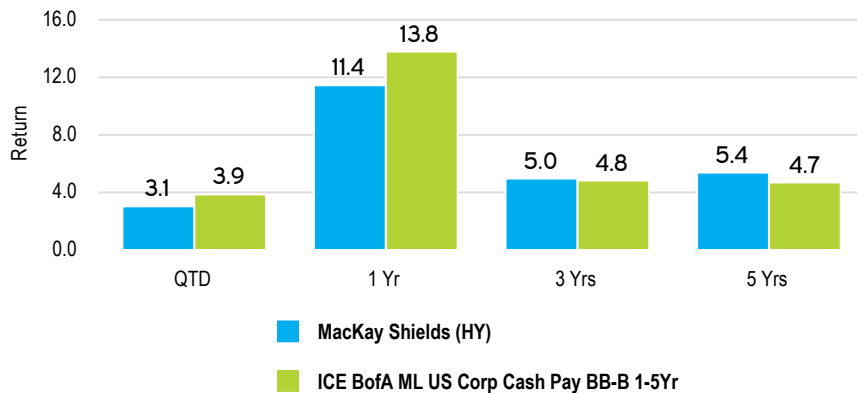- ICE BofA ML US Corp Cash Pay BB-B 1-5Yr
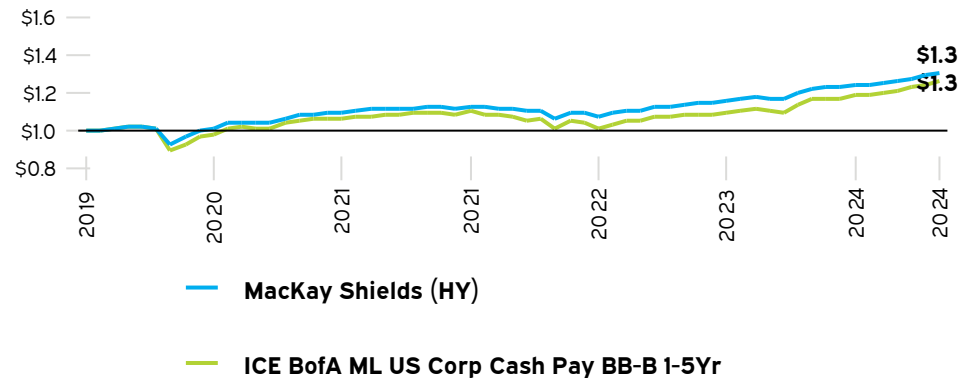
### Risk Reward

## Statistics Summary
## 3 Years Ending September 30, 2024

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Capture | Down Capture |
|---|---|---|---|---|---|---|---|---|
| Federated Investment Counseling (Bank Loans) | -3.7 | 1.4 | -1.3 | -0.1 | 1.5 | 0.9 | 89.2 | 183.5 |
| 60% CredSuisLevLoan/40% BBStGovCorp | 0.0 | 1.0 | - | 0.7 | 0.0 | 1.0 | 100.0 | 100.0 |

### Return Summary



Return Summary bar chart:
- QTD: Federated Investment Counseling (Bank Loans) 1.5, 60% CredSuisLevLoan/40% BBStGovCorp 1.9
- 1 Yr: 7.9, 8.1
- 3 Yrs: 3.0, 5.1
- 5 Yrs: 2.9, 4.4

Legend:
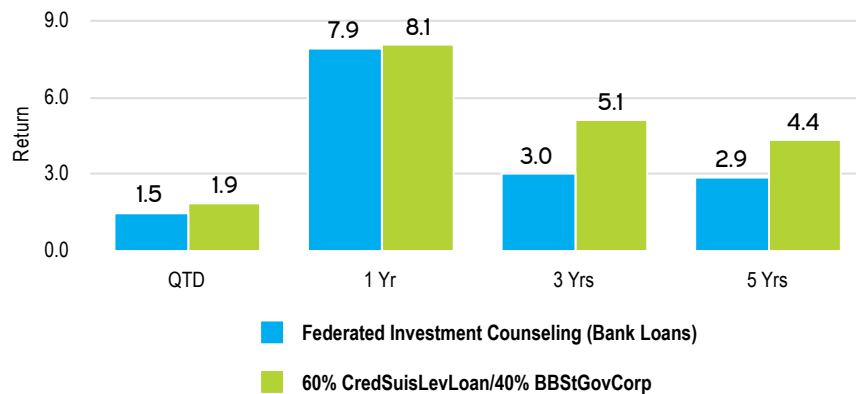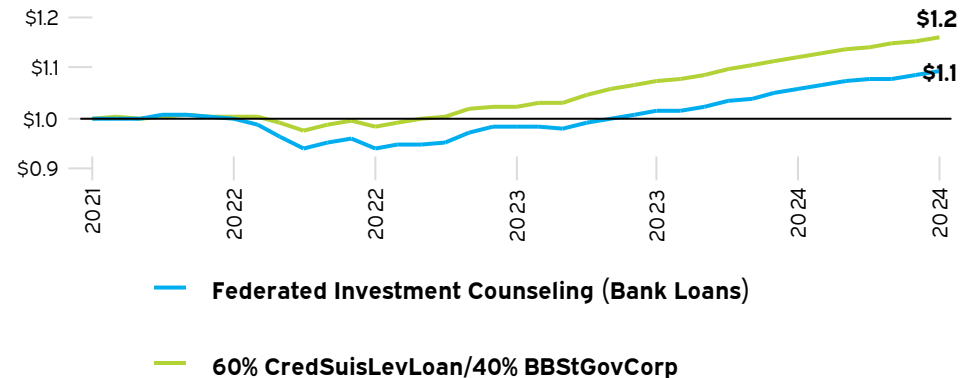- Federated Investment Counseling (Bank Loans)
- 60% CredSuisLevLoan/40% BBStGovCorp

### Investment Growth



Investment Growth line chart: Federated Investment Counseling (Bank Loans) ending $1.1; 60% CredSuisLevLoan/40% BBStGovCorp ending $1.2.

Legend:
- Federated Investment Counseling (Bank Loans)
- 60% CredSuisLevLoan/40% BBStGovCorp

### Return Summary



Return Summary bar chart:
- 2023: Federated 9.0, Benchmark 9.8
- 2022: Federated -5.5, Benchmark -0.3
- 2021: Federated 3.7, Benchmark 3.3
- 2020: Federated 1.0, Benchmark 2.5
- 2019: Benchmark 6.0

Legend:
- Federated Investment Counseling (Bank Loans)
- 60% CredSuisLevLoan/40% BBStGovCorp

### Risk Reward



Risk Reward scatter plot (Return vs Standard Deviation).

**Manager Performance – Net of Fees | As of September 30, 2024**

| | Market Value $ | QTR (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) |
|---|---|---|---|---|---|
| **EBMUDERS Total Plan Composite** | 2,656,871,374 | 6.2 | 23.2 | 5.8 | 8.7 |
| *Total Plan Bench* | | *6.2* | *22.5* | *5.6* | *8.0* |
| **US Equity Composite** | 1,003,015,282 | 6.2 | 35.2 | 10.3 | 15.2 |
| *Russell 3000 Hybrid* | | *6.2* | *35.2* | *10.3* | *15.3* |
| Northern Trust Russell 3000 | 1,002,195,816 | 6.2 | 35.2 | 10.3 | 15.2 |
| *Russell 3000 Index* | | *6.2* | *35.2* | *10.3* | *15.3* |
| **Non US Equity Composite** | 658,196,323 | 8.0 | 25.4 | 4.5 | 8.0 |
| *MSCI ACWI xUS (blend)* | | *8.2* | *26.0* | *4.7* | *8.1* |
| Northern Trust ACWI ex US | 658,196,323 | 8.0 | 25.4 | 4.5 | 7.6 |
| *MSCI AC World ex USA index* | | *8.2* | *26.0* | *4.7* | *8.1* |
| **Covered Calls Composite** | 365,830,151 | 4.8 | 21.2 | 7.9 | 10.0 |
| *Cboe S&P 500 Buy Write Index* | | *5.5* | *18.3* | *6.4* | *6.6* |
| Parametric BXM | 177,232,457 | 4.0 | 17.8 | 7.7 | 9.2 |
| *Cboe S&P 500 Buy Write Index* | | *5.5* | *18.3* | *6.4* | *6.6* |
| Parametric Delta Shift | 188,416,693 | 4.7 | 26.7 | 9.5 | 13.5 |
| *Cboe S&P 500 Buy Write Index* | | *5.5* | *18.3* | *6.4* | *6.6* |
| Van Hulzen | 181,001 | 5.6 | 18.9 | 6.3 | 6.7 |
| *Cboe S&P 500 Buy Write Index* | | *5.5* | *18.3* | *6.4* | *6.6* |

# MEKETA

| | Market Value $ | QTR (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) |
|---|---|---|---|---|---|
| **Core Fixed Income Composite** | **451,516,430** | **5.7** | **12.9** | **-0.3** | **0.9** |
| *Fixed Income Core Composite Bench* | | *4.7* | *10.5* | *-0.6* | *--* |
| CS McKee | 227,983,033 | 5.2 | 12.8 | -1.1 | 0.5 |
| *Blmbg. U.S. Aggregate Index* | | *5.2* | *11.6* | *-1.4* | *0.3* |
| Garcia Hamilton | 223,533,397 | 6.1 | 12.9 | 0.5 | -- |
| *Blmbg. U.S. Aggregate Index* | | *5.2* | *11.6* | *-1.4* | *0.3* |
| **Non-Core Fixed Income Composite** | **122,361,696** | **2.3** | **9.7** | **4.1** | **4.3** |
| *Fixed Income Non-Core Composite Bench* | | *2.9* | *10.9* | *5.0* | *4.6* |
| MacKay Shields (HY) | 63,387,250 | 3.1 | 11.4 | 5.0 | 5.4 |
| *ICE BofA ML US Corp Cash Pay BB-B 1-5Yr* | | *3.9* | *13.8* | *4.8* | *4.7* |
| Federated Investment Counseling (Bank Loans) | 58,974,446 | 1.5 | 7.9 | 3.0 | 2.9 |
| *60% CredSuisLevLoan/40% BBStGovCorp* | | *1.9* | *8.1* | *5.1* | *4.4* |
| **Real Estate Composite** | **53,812,113** | **9.3** | **13.3** | **4.1** | **5.2** |
| *Real Estate Composite Benchmark* | | *7.7* | *13.5* | *4.3* | *5.1* |
| RREEF America II Lag | 53,588,843 | -1.1 | -9.0 | 1.5 | 2.7 |
| *NCREIF NPI Lag* | | *-0.3* | *-5.5* | *2.3* | *3.4* |
| CenterSquare | 223,270 | 18.8 | 38.2 | 6.0 | 6.7 |
| *FTSE NAREIT Equity REIT Index* | | *16.1* | *34.7* | *5.1* | *5.5* |

# MEKETA

| | Market Value $ | QTR (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) |
|---|---|---|---|---|---|
| **Cash Composite** | **2,139,380** | **1.3** | **4.5** | **3.0** | **2.3** |
| Cash LAIF | 2,139,380 | 1.3 | 4.5 | 3.0 | 2.3 |
| *FTSE 3 Month T-Bill* | | *1.4* | *5.6* | *3.6* | *2.4* |

| From Date | To Date | Benchmark |
|---|---|---|
| **Benchmark History** | | |
| **EBMUDERS Total Plan Composite** | | |
| 12/01/2019 | Present | 2.5% FTSE NAREIT Equity REIT Index, 25.0% Russell 3000 Index, 10.0% Blmbg. Intermed. U.S. Government/Credit, 10.0% Blmbg. U.S. Aggregate Index, 25.0% MSCI AC World ex USA index, 2.5% Morningstar LSTA U.S. Performing Loans, 20.0% Cboe S&P 500 Buy Write Index, 2.5% 60% CredSuisLevLoan/40% BBStGovCorp, 2.5% ICE BofA ML US Corp Cash Pay BB-B 1-5Yr |
| 03/01/2019 | 12/01/2019 | 2.5% FTSE NAREIT Equity REIT Index, 25.0% Russell 3000 Index, 5.0% Bloomberg U.S. Gov/Credit 1-3 Year Index, 15.0% Blmbg. U.S. Aggregate Index, 25.0% MSCI AC World ex USA index, 2.5% Morningstar LSTA U.S. Performing Loans, 20.0% Cboe S&P 500 Buy Write Index, 2.5% 60% CredSuisLevLoan/40% BBStGovCorp, 2.5% 50% BBG EM Hard Cur Agg: Sovereign/50% BBG EM USD Aggregate Corporate TR |
| 07/01/2018 | 03/01/2019 | 2.5% FTSE NAREIT Equity REIT Index, 25.0% Russell 3000 Index, 5.0% Bloomberg U.S. Gov/Credit 1-3 Year Index, 15.0% Blmbg. U.S. Aggregate Index, 25.0% MSCI AC World ex USA index, 2.5% Morningstar LSTA U.S. Performing Loans, 2.5% Blmbg. U.S. High Yield 1-5 Yr Cash Pay 2%, 20.0% Cboe S&P 500 Buy Write Index, 2.5% NCREIF NPI Lag |
| 04/01/2014 | 07/01/2018 | 2.5% FTSE NAREIT Equity REIT Index, 40.0% Russell 3000 Index, 5.0% Bloomberg U.S. Gov/Credit 1-3 Year Index, 10.0% Blmbg. U.S. Aggregate Index, 15.0% MSCI AC World ex USA index, 2.5% Morningstar LSTA U.S. Performing Loans, 2.5% Blmbg. U.S. High Yield 1-5 Yr Cash Pay 2%, 20.0% Cboe S&P 500 Buy Write Index, 2.5% NCREIF NPI Lag |
| 03/01/2014 | 04/01/2014 | 2.5% FTSE NAREIT Equity REIT Index, 40.0% Russell 3000 Index, 15.0% Blmbg. U.S. Aggregate Index, 15.0% MSCI AC World ex USA index, 2.5% Morningstar LSTA U.S. Performing Loans, 2.5% Blmbg. U.S. High Yield 1-5 Yr Cash Pay 2%, 20.0% Cboe S&P 500 Buy Write Index, 2.5% NCREIF NPI Lag |
| 11/01/2011 | 03/01/2014 | 2.5% FTSE NAREIT Equity REIT Index, 50.0% Russell 3000 Index, 20.0% MSCI AC World ex USA index, 25.0% Blmbg. U.S. Universal Index, 2.5% NCREIF NPI Lag |
| 01/01/2008 | 11/01/2011 | 50.0% Russell 3000 Index, 20.0% MSCI AC World ex USA index, 25.0% Blmbg. U.S. Universal Index, 5.0% NCREIF NPI Lag |
| 01/01/2007 | 01/01/2008 | 50.0% Russell 3000 Index, 25.0% Blmbg. U.S. Aggregate Index, 20.0% MSCI AC World ex USA index, 5.0% NCREIF NPI Lag |
| 10/01/2005 | 01/01/2007 | 50.0% Russell 3000 Index, 25.0% Blmbg. U.S. Aggregate Index, 20.0% MSCI EAFE (Net), 5.0% NCREIF NPI Lag |
| 04/01/2005 | 10/01/2005 | 10.0% Russell 2000 Index, 30.0% S&P 500 Index, 10.0% S&P MidCap 400 Index, 25.0% Blmbg. U.S. Aggregate Index, 20.0% MSCI EAFE (Net), 5.0% NCREIF NPI Lag |
| 09/01/1998 | 04/01/2005 | 10.0% Russell 2000 Index, 33.0% S&P 500 Index, 10.0% S&P MidCap 400 Index, 30.0% Blmbg. U.S. Aggregate Index, 17.0% MSCI EAFE (Net) |
| 07/01/1978 | 09/01/1998 | 30.0% S&P 500 Index, 30.0% Blmbg. U.S. Aggregate Index, 5.0% FTSE 3 Month T-Bill, 15.0% MSCI EAFE (Net), 5.0% NCREIF NPI Lag, 15.0% Wilshire 5000 Total Market Index |

| From Date | To Date | Benchmark |
|---|---|---|
| **Fixed Income Composite** | | |
| 02/01/2023 | Present | 80.0% Blmbg. U.S. Aggregate Index, 10.0% 60% CredSuisLevLoan/40% BBStGovCorp, 10.0% ICE BofA ML US Corp Cash Pay BB-B 1-5Yr |
| 12/01/2019 | 02/01/2023 | 40.0% Blmbg. Intermed. U.S. Government/Credit, 40.0% Blmbg. U.S. Aggregate Index, 10.0% 60% CredSuisLevLoan/40% BBStGovCorp, 10.0% ICE BofA ML US Corp Cash Pay BB-B 1-5Yr |
| 03/01/2019 | 12/01/2019 | 20.0% Bloomberg U.S. Gov/Credit 1-3 Year Index, 60.0% Blmbg. U.S. Aggregate Index, 10.0% 60% CredSuisLevLoan/40% BBStGovCorp, 10.0% ICE BofA ML US Corp Cash Pay BB-B 1-5Yr |
| 07/01/2018 | 03/01/2019 | 20.0% Bloomberg U.S. Gov/Credit 1-3 Year Index, 60.0% Blmbg. U.S. Aggregate Index, 10.0% Morningstar LSTA U.S. Performing Loans, 10.0% Blmbg. U.S. High Yield 1-5 Yr Cash Pay 2% |
| 04/01/2014 | 07/01/2018 | 25.0% Bloomberg U.S. Gov/Credit 1-3 Year Index, 50.0% Blmbg. U.S. Aggregate Index, 12.5% Morningstar LSTA U.S. Performing Loans, 12.5% Blmbg. U.S. High Yield 1-5 Yr Cash Pay 2% |
| 03/01/2014 | 04/01/2014 | 75.0% Blmbg. U.S. Aggregate Index, 12.5% Morningstar LSTA U.S. Performing Loans, 12.5% Blmbg. U.S. High Yield 1-5 Yr Cash Pay 2% |
| 01/01/2008 | 03/01/2014 | 100.0% Blmbg. U.S. Universal Index |
| 01/01/1976 | 01/01/2008 | 100.0% Blmbg. U.S. Aggregate Index |
| **Fixed Income Core Fixed Income Composite** | | |
| 12/01/2019 | Present | 50.0% Blmbg. Intermed. U.S. Government/Credit, 50.0% Blmbg. U.S. Aggregate Index |
| **Fixed Income Non-Core Fixed Income Composite** | | |
| 12/01/2019 | Present | 50.0% 60% CredSuisLevLoan/40% BBStGovCorp, 50.0% ICE BofA ML US Corp Cash Pay BB-B 1-5Yr |
| 03/01/2019 | 12/01/2019 | 50.0% Bloomberg U.S. Gov/Credit 1-3 Year Index, 25.0% 60% CredSuisLevLoan/40% BBStGovCorp, 25.0% ICE BofA ML US Corp Cash Pay BB-B 1-5Yr |
| 03/01/2014 | 03/01/2019 | 50.0% Bloomberg U.S. Gov/Credit 1-3 Year Index, 25.0% Morningstar LSTA U.S. Performing Loans, 25.0% Blmbg. U.S. High Yield 1-5 Yr Cash Pay 2% |
| **Real Estate Composite** | | |
| 11/01/2011 | Present | 50.0% NCREIF NPI Lag, 50.0% FTSE NAREIT Equity REIT Index |
| 10/01/1998 | 11/01/2011 | 100.0% NCREIF NPI Lag |
| 04/01/1978 | 10/01/1998 | 100.0% NCREIF Property Index |

| From Date | To Date | Benchmark |
|---|---|---|
| **Garcia Hamilton** | | |
| 11/01/2019 | Present | Blmbg. U.S. Aggregate Index |

# Manager Watch Screens

## Performance Monitoring Summary

| Portfolio | Violation Type (Window)[1] | Date of Initial Violation | Correction Action(s) | Current Status | Current Status Est. Beg. Date of Current Status | Months Since Est. Beg. Date | Performance Since Est. Beg. Date[2,3] |
|---|---|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- |

→ No managers are currently on watch

---

[1] Defined as: Short-Term (12 months), Medium-Term (36 months), Long-Term (60 months).

[2] Annualized for periods greater than 12 months.

[3] Performance figures not yet available.

## Quantitative Compliance Monitoring per Watch Criteria

### Active Management Criteria

→ Active investment managers are expected to outperform their respective passive benchmarks related to both their asset class and investment style.

→ Relative excess performance that falls below the red acceptable threshold stated in the Watch Criteria for six consecutive months may be a trigger for Watch status.

### Passive Management Criteria

→ Passive investment managers are expected to track the performance of their respective passive benchmarks related to both their asset class and their investment style.

→ Tracking error is a measure of how closely a portfolio follows the index to which it is benchmarked.

→ For short- and medium-term performance monitoring, a portfolio with tracking error that is above the red acceptable threshold stated in the Watch Criteria for six consecutive months may be a trigger for Watch status.

→ For long-term performance monitoring, relative excess performance that falls below the red acceptable threshold stated in the Watch Criteria for six consecutive months may be a trigger for Watch status.

### Quantitative Monitoring Results - Overall Status Summary

|  | Prior Qtr Status | Current Qtr Status |
|---|---|---|
| Northern Trust – R3000 | Acceptable | Acceptable |
| Northern Trust – ACWIxUS | Acceptable | Acceptable |
| Parametric – BXM | Acceptable | Acceptable |
| Parametric – Delta Shift | Acceptable | Acceptable |
| CS McKee | Acceptable | Acceptable |
| Garcia Hamilton | Acceptable | Acceptable |
| Mackay Shields – Short Term HY | Acceptable | Acceptable |
| Federated – Bank Loans | Acceptable | Acceptable |

# MEKETA

## Investment Performance Criteria by Asset Class

| Asset Class | Short-term (rolling 12-month periods) | Medium-term (rolling 36-month periods) | Long-term (60+ months) |
|---|---|---|---|
| Domestic Equity - Passive | Tracking error > 0.30% | Tracking error > 0.25% for 6 consecutive months | Fund annualized return < benchmark annualized return -0.40% for 6 consecutive months |
| Non-US Equity - Passive | Tracking error > 1.75% | Tracking error > 1.5% for 6 consecutive months | Fund annualized return < benchmark annualized return - 0.50% for 6 consecutive months |
| Covered Calls - Active | Fund return < benchmark return - 3.5% | Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months | VRR < 0.97 for 6 consecutive months |
| Covered Calls - Replication | Fund return < benchmark return - 3.5% | Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months | Fund annualized return < benchmark annualized return - 0.40% for 6 consecutive months |
| Fixed Income - Core – Active | Fund return < benchmark return - 1.5% | Fund annualized return < benchmark annualized return -1.0% for 6 consecutive months | VRR < 0.98 for 6 consecutive months |
| Fixed Income - Core – Passive | Tracking error > 0.25% | Tracking error > 0.20% for 6 consecutive months | Fund annualized return < benchmark annualized return - 0.30% for 6 consecutive months |
| Fixed Income - Non-Core | Fund return < benchmark return - 4.5% | Fund annualized return < benchmark annualized return - 2.0% for 6 consecutive months | VRR < 0.97 for 6 consecutive months |

All criteria are on an annualized basis.
VRR – Value Relative Ratio – is calculated as: manager cumulative return / benchmark cumulative return.

| Manager Performance | | | |
|---|---|---|---|
| | QTD | 1 Yr | 3 Yrs |
| Northern Trust Russell 3000 | 6.2 | 35.2 | 10.3 |
| Russell 3000 Index | 6.2 | 35.2 | 10.3 |

Overall Status:
Acceptable

**Short-Term Criteria (rolling 12-month periods)**
Tracking Error > 0.30% for 6 consecutive months
Current Status: Acceptable

**Medium-Term Criteria (rolling 36-month periods)**
Tracking Error > 0.25% for 6 consecutive months
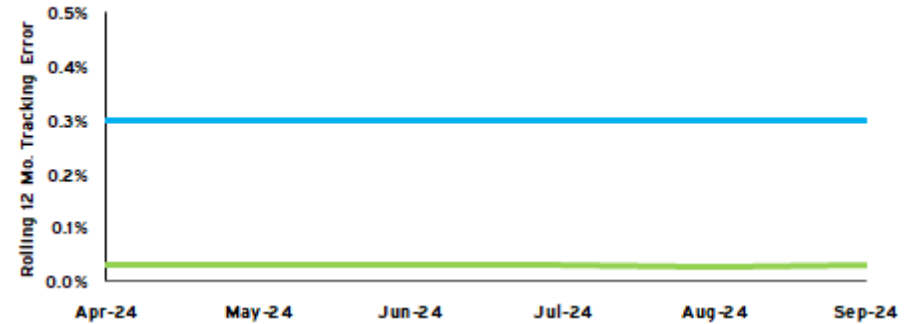Current Status: Acceptable

**Long-Term Criteria (60+ months)**
Fund annualized return < benchmark annualized return -0.40% for 6 consecutive months
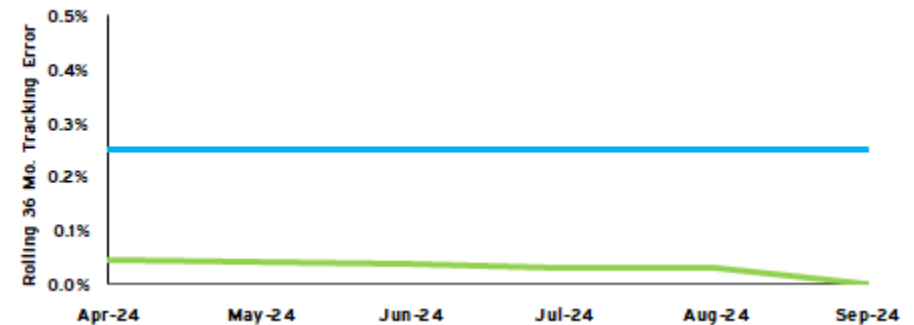Current Status: Not available

**Short-Term Performance Evaluation**



**Medium-Term Performance Evaluation**

| Manager Performance | | | |
|---|---|---|---|
| | QTD | 1 Yr | 3 Yrs |
| Northern Trust ACWI ex US | 8.0 | 25.4 | 4.5 |
| MSCI AC World ex USA index | 8.2 | 26.0 | 4.7 |

**Overall Status:**
**Acceptable**

**Short-Term Criteria (rolling 12-month periods)**
Tracking Error > 1.75% for 6 consecutive months
Current Status: Acceptable

**Medium-Term Criteria (rolling 36-month periods)**
Tracking Error > 1.5% for 6 consecutive months
Current Status: Acceptable

**Long-Term Criteria (60+ months)**
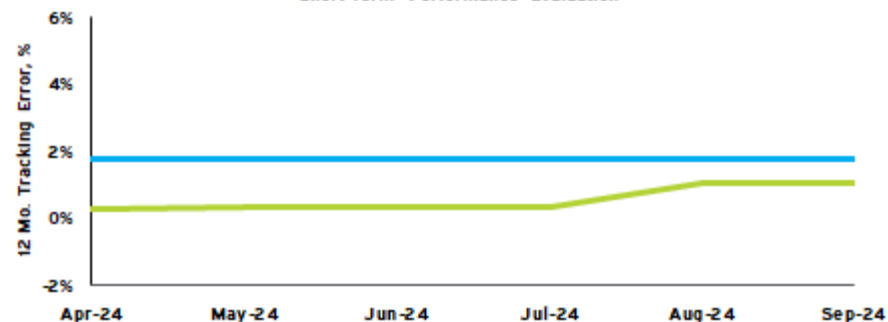Fund annualized return < benchmark annualized return -0.50% for 6 consecutive months
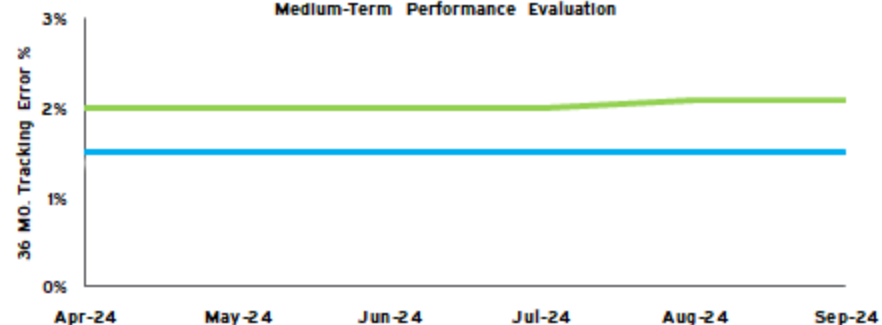Current Status: Not available

**Short-Term Performance Evaluation**

**Medium-Term Performance Evaluation**

| Manager Performance | | | | |
|---|---|---|---|---|
| | QTD | 1 Yr | 3 Yrs | 5 Yrs |
| Parametric BXM | 4.0 | 17.8 | 7.7 | 9.2 |
| Cboe S&P 500 Buy Write Index | 5.5 | 18.3 | 6.4 | 6.6 |

Overall Status:
Acceptable

### Short-Term Criteria (rolling 12-month periods)
Fund return < benchmark return -3.5% for 6 consecutive months
Current Status: Acceptable

### Medium-Term Criteria (rolling 36-month periods)
Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months
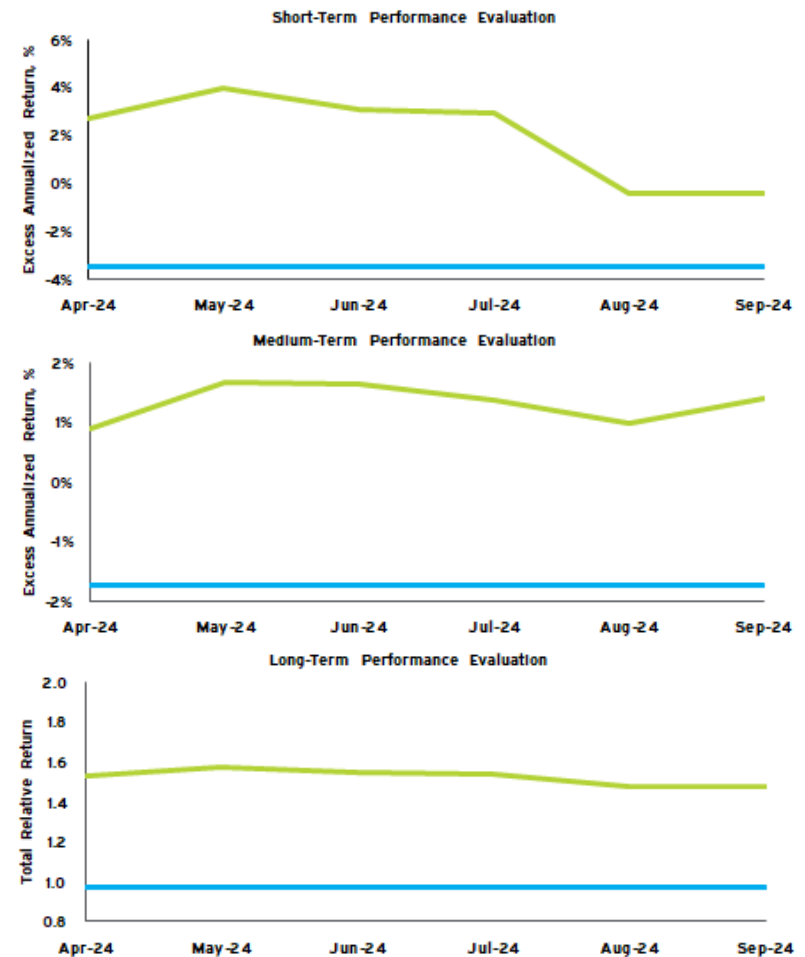Current Status: Acceptable

### Long-Term Criteria (60+ months)
VRR < 0.97 for 6 consecutive months
Current Status: Acceptable



Short-Term Performance Evaluation



Medium-Term Performance Evaluation



Long-Term Performance Evaluation

| Manager Performance | | | | |
|---|---|---|---|---|
| | QTD | 1 Yr | 3 Yrs | 5 Yrs (%) |
| Parametric Delta Shift | 4.7 | 26.7 | 9.5 | 13.5 |
| Cboe S&P 500 Buy Write Index | 5.5 | 18.3 | 6.4 | 6.6 |

**Overall Status:**
**Acceptable**

Short-Term  Performance  Evaluation

Medium-Term  Performance  Evaluation

Long-Term  Performance  Evaluation

### Short-Term Criteria (rolling 12-month periods)
Fund return < benchmark return -3.5% for 6 consecutive months
Current Status: Acceptable

### Medium-Term Criteria (rolling 36-month periods)
Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months
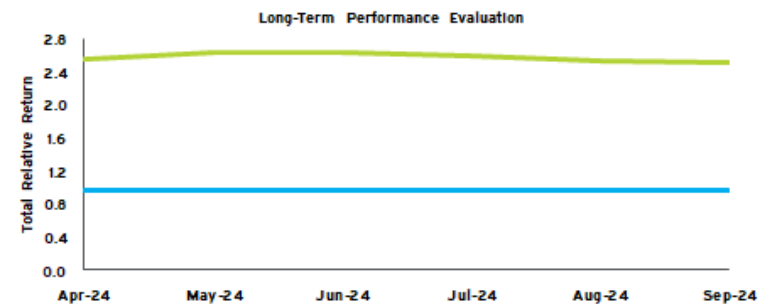Current Status: Acceptable

### Long-Term Criteria (60+ months)
VRR < 0.97 for 6 consecutive months
Current Status: Acceptable

| Manager Performance | | | | |
|---|---|---|---|---|
| | QTD | 1 Yr | 3 Yrs | 5 Yrs |
| CS McKee | 5.2 | 12.8 | -1.1 | 0.5 |
| Blmbg. U.S. Aggregate Index | 5.2 | 11.6 | -1.4 | 0.3 |

**Overall Status:**

**Acceptable**

### Short-Term Criteria (rolling 12-month periods)
Fund return < benchmark return -1.5% for 6 consecutive months
Current Status: Acceptable

### Medium-Term Criteria (rolling 36-month periods)
Fund annualized return < benchmark annualized return -1.0% for 6 consecutive months
Current Status: Acceptable

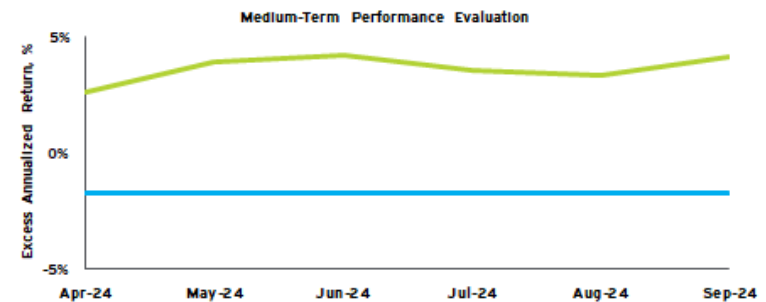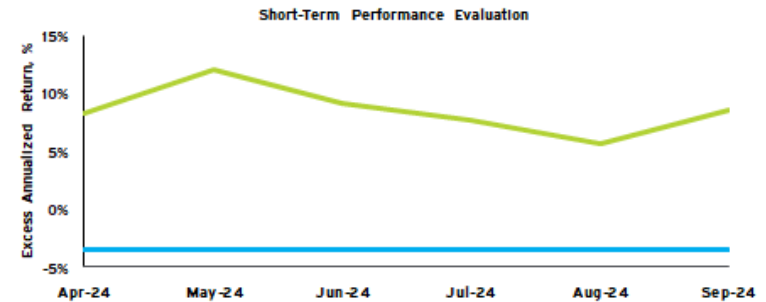### Long-Term Criteria (60+ months)
VRR < 0.98 for 6 consecutive months
Current Status: Acceptable



Short-Term Performance Evaluation



Medium-Term Performance Evaluation



Long-Term Performance Evaluation

| Manager Performance | | | |
|---|---|---|---|
| | QTD | 1 Yr | 3 Yrs |
| Garcia Hamilton | 6.1 | 12.9 | 0.5 |
| Blmbg. U.S. Aggregate Index | 5.2 | 11.6 | -1.4 |

Overall Status:
Acceptable

**Short-Term Performance Evaluation**



**Short-Term Criteria (rolling 12-month periods)**
Fund return < benchmark return -1.5% for 6 consecutive months
Current Status: Acceptable

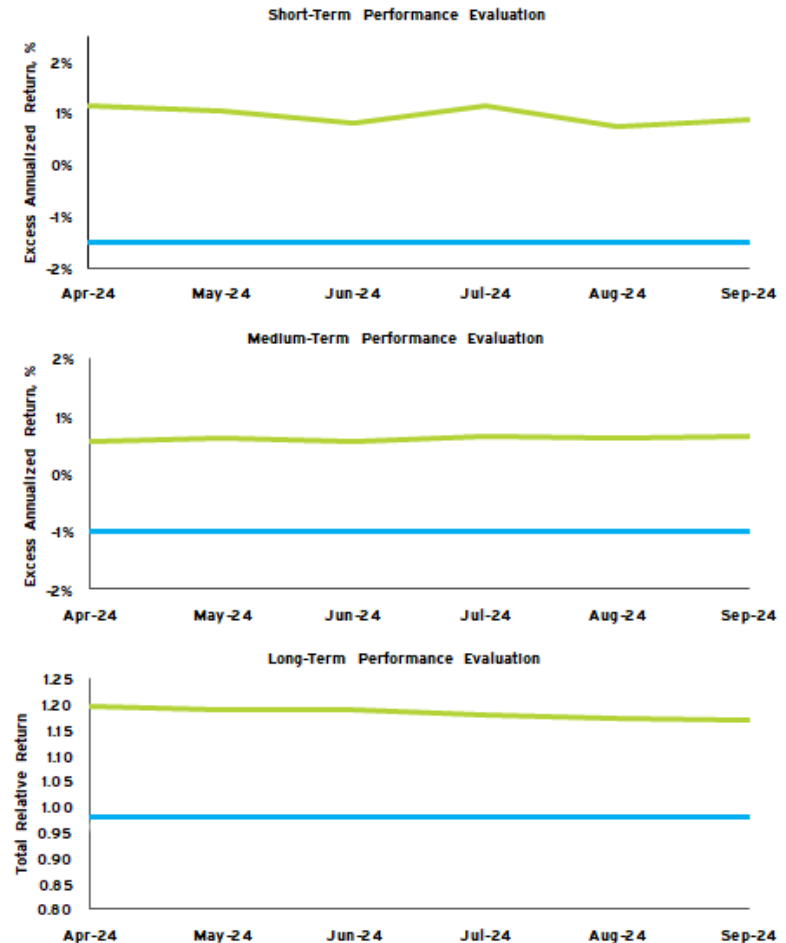**Medium-Term Criteria (rolling 36-month periods)**
Fund annualized return < benchmark annualized return -1.0% for 6 consecutive months
Current Status: Acceptable

**Long-Term Criteria (60+ months)**
VRR < 0.98 for 6 consecutive months
Current Status: Not Applicable

**Medium-Term Performance Evaluation**

| Manager Performance | | | |
|---|---|---|---|
| | QTD | 1 Yr | 3 Yrs |
| MacKay Shields (HY) | 3.1 | 11.4 | 5.0 |
| ICE BofA ML US Corp Cash Pay BB-B 1-5Yr | 3.9 | 13.8 | 4.8 |

### Short-Term Criteria (rolling 12-month periods)
Fund return < benchmark return -4.5% for 6 consecutive months
Current Status: Acceptable

### Medium-Term Criteria (rolling 36-month periods)
Fund annualized return < benchmark annualized return -2.0% for 6 consecutive months
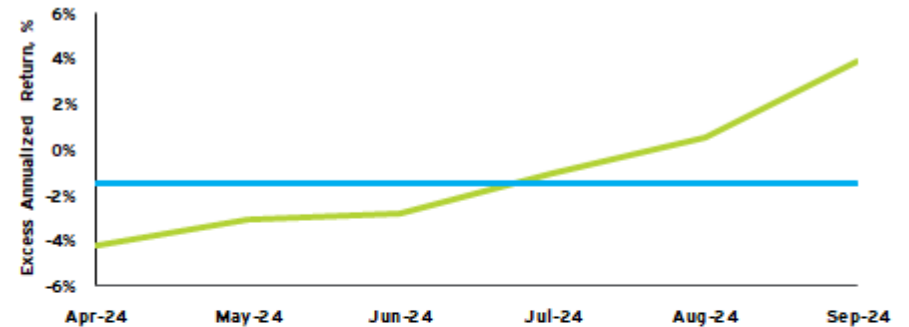Current Status: Acceptable

### Long-Term Criteria (60+ months)
VRR < 0.97 for 6 consecutive months
Current Status: Not Applicable

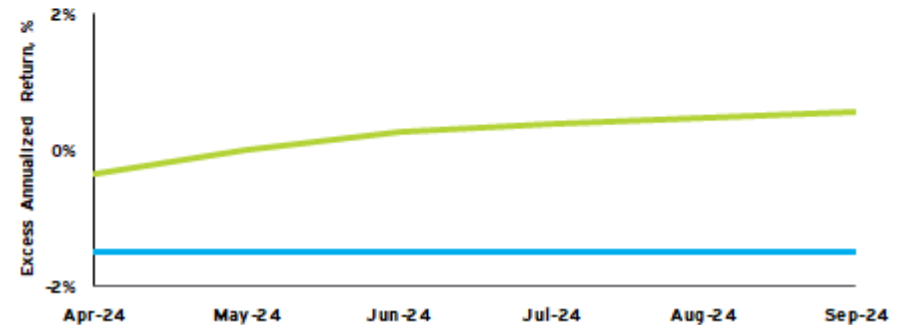### Overall Status:
### Acceptable



Short-Term Performance Evaluation



Medium-Term Performance Evaluation

| Manager Performance | | | |
|---|---|---|---|
| | QTD | 1 Yr | 3 Yrs |
| Federated Investment Counseling (Bank Loans) | 1.5 | 7.9 | 3.0 |
| 60% CredSuisLevLoan/40% BBStGovCorp | 1.9 | 8.1 | 5.1 |

### Short-Term Criteria (rolling 12-month periods)
Fund return < benchmark return -4.5% for 6 consecutive months
Current Status: Acceptable

### Medium-Term Criteria (rolling 36-month periods)
Fund annualized return < benchmark annualized return -2.0% for 6 consecutive months
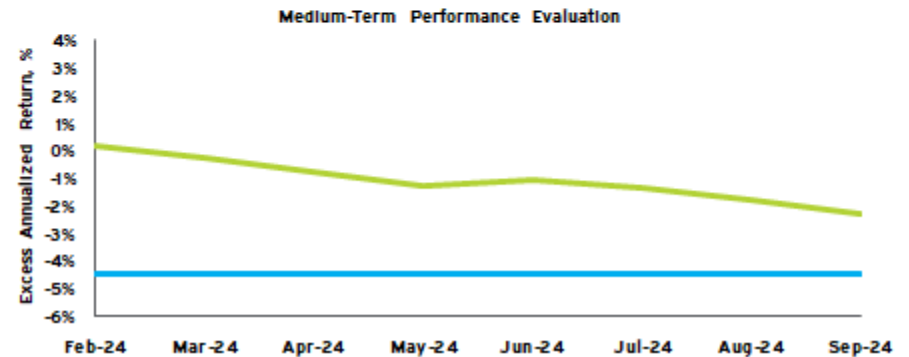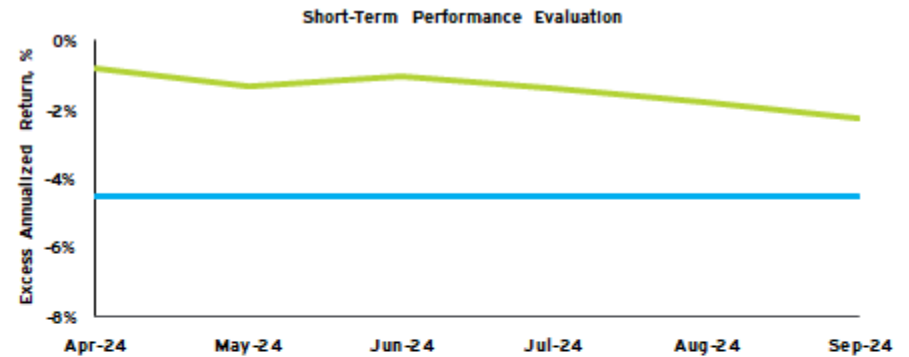Current Status: Acceptable

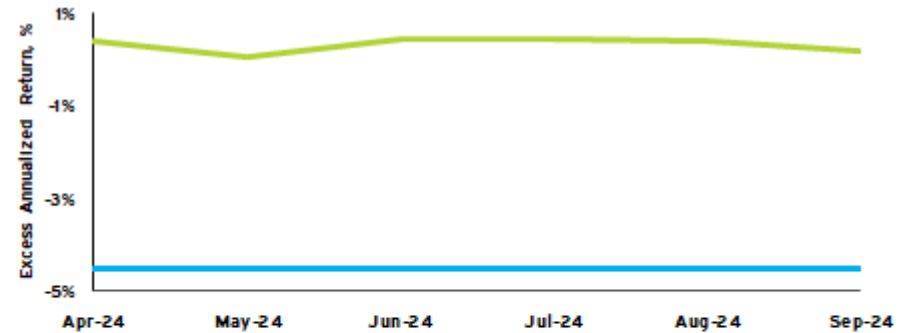### Long-Term Criteria (60+ months)
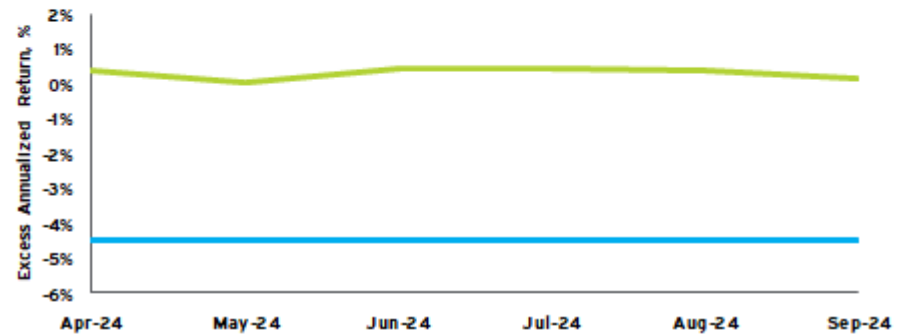VRR < 0.97 for 6 consecutive months
Current Status: Acceptable

Overall Status:
Acceptable



Short-Term Performance Evaluation



Medium-Term Performance Evaluation

# Manager Compliance Certification Responses

## Manager Compliance Certification Responses

### Qualitative Compliance Monitoring per EBMUDERS Investment Policy

Each of EBMUDERS managers is required to respond to a questionnaire on a quarterly basis to certify their compliance with EBMUDERS Investment Policy Statement and provide an update on specific qualitative indicators to be evaluated.

These indicators include:

→ Compliance with the guidelines of 'Eligible Investments' for the manager's specific mandate

→ Any litigation or governmental regulatory proceedings involving the firm/manager

→ Changes to the manager's investment outlook, investment strategy, and/or portfolio structure

→ Personnel changes to the investment team responsible for the EBMUDERS mandate

→ Significant personnel changes at the management level of the firm

→ Material client terminations

→ Compliance with EBMUDERS current Investment Policy Statement

The manager's responses are rated based on the potential effects these factors could pose to the performance and management of the EBMUDERS portfolio.

Reasons for heightened concern triggering Watch status include, but are not limited to:

→ Instability of key members of the portfolio management team and organization

→ Changes in investment strategy and style

→ Failure to comply with investment guidelines

A summary of manager responses as of the latest quarter-end is provided below.

## Manager Compliance Certification Responses

| Manager | Asset Class | Question 1 Compliance with 'Eligible Investments' for mandate | Question 2 Good standing as Registered Investment Advisor | Question 3 Litigation? | Question 4 Changes in manager's investment outlook, strategy, structure | Question 5 Investment team personnel changes | Question 6 Management level personnel changes | Question 7 Material business changes | Question 8 Compliance with IPS |
|---|---|---|---|---|---|---|---|---|---|
| Northern Trust R3000 | Domestic Equity – All Cap | Yes | Yes | No | No | Yes* | Yes* | No | Yes |
| Northern Trust ACWI ex US | International Equity | Yes | Yes | No | No | Yes* | Yes* | No | Yes |
| Parametric | Covered Calls | Yes | Yes | No | No | No | Yes* | No | Yes |
| CS McKee | Fixed Income – Core | Yes | Yes | No | No | No | No | No | Yes |
| Garcia Hamilton | Fixed Income – Core | Yes | Yes | No | No | No | No | Yes* | Yes |
| Mackay Shields | Fixed Income – Short-term HY | Yes | Yes | No | No | No | No | No | Yes |
| Federated | Fixed Income – Bank Loans | Yes | Yes | No | No | No | No | No | Yes |
| RREEF | Real Estate | Yes | Yes | No | No | No | No | No | Yes |

☐ no concern   ☐ low concern   ☐ high concern (Watch status)

\* see detailed manager response below

## Northern Trust – R3000 and ACWI ex US

### Question 5: Have there been any personnel changes to the investment team responsible for the EBMUD portfolio during the quarter?

→ In September of 2024, Brent Reeder, Head of the Chicago-based Index Equity Portfolio management team, is no longer with the firm. As a result, Robert Anstine, Senior Portfolio Manager and Senior Vice President, is replacing Brent, effective October 2, 2024. Robert brings more than 22 years of industry experience, including more than 17 years at Northern Trust Asset Management to the role. Robert has focused primarily on the management of portfolios within Commodities and equity ETFs as well as managing equity index portfolios for large institutional clients, sub-advisory clients, and commingled funds.

→ As you are aware, NTAM utilizes a team managed approach and thus the departure of one portfolio manager does not affect the management of your portfolio.

Northern Trust – R3000 and ACWI ex US (cont.)

Question 6: Have there been any significant personnel changes at the management level of the Firm during the quarter?

→ SENIOR MANAGEMENT CHANGES

→ As a result of the constantly changing landscape of asset management, we believe the occasional organizational changes are a natural progression and necessary in order to adapt to new market and regulatory environments. The most recent changes to senior personnel are the following:

→ 2024:

- October; Rob Anstine has been named Head of Equity Index, U.S. effective October 1, replacing Brent Reeder who left the firm.

- October; NTAM Global Product made the below senior management changes to drive strategy and execution in our areas of focus:

  – Patrick Finegan has joined NTAM as Head of Alternatives Product.

  – Chris Huemmer becomes Director of ETF & Funds Strategy reporting to Head of Global ETFs & Funds, Dave Abner.

  – Wendy Maveety has joined NTAM Global Product as Director of Product Operations, reporting to Global Head

- September; Jen Hoffenkamp has been named chief of staff for investments, reporting to Global CIO, Asset Management, Angelo Manioudakis. Additionally, Morten Olsen will now serve as head of customized fixed income, continuing to report to CIO of Global Fixed Income Chris Roth.

- September; Edgar Gonzalez has joined Northern Trust Asset Management as Head of Strategy, reporting to Archana Kumar, Global COO, Asset Management.

- September; Lyenda Delp will join NTAM as head of the Global Institutional Client Group, effective December 3, 2024. Lyenda, will report to Daniel Gamba, NTAM President.

- September; Darek Wojnar, senior advisor for registered funds, retired at the end of September.

## Northern Trust – R3000 and ACWI ex US (cont.)

### Question 6: Have there been any significant personnel changes at the management level of the Firm during the quarter? (cont.)

→ August; Julie Moret, Head of Sustainable Investing Integration, has left the firm. Sheri Hawkins, Head of Investment Platform Services, Asset Management, will support the team more directly on an interim basis as the next phase of leadership is developed for Sustainable Investing.

→ July; Paul Clark joined NTAM as Global Head of Stewardship, reporting to Sheri Hawkins, Head of Investment Platform Services.

→ July; Colin Mooney joined NTAM as Digital Product Lead, Distribution, reporting to Archana Kumar, Global Chief Operating Officer, Asset Management.

→ July; Xiangrong (Sharon) Jin, Ph.D., joined NTAM as Head of Product Strategy, reporting to Paula Kar Global Head of Product, Asset Management.. Additionally, Brian Kelderhouse will be joining NTAM Global Product on August 1 as Head of Product Intelligence & Pricing, reporting to Sharon.

→ July; Curt Nass has expanded his responsibilities and will serve as the Global Head of Trading for both Equities and Fixed Income.

→ July; To further strive towards achieving our strategic goals and priorities, the following partners roles have been both expanded and elevated:

- Hozaifa Arsiwala joined the Wealth Client Group as Head of Custom SMAs.

- Katie Colelli will serve as Global Head of NTAM Global Family Offices (GFO) and Co-Head of the Alternatives Initiative, transitioning from her previous role as Global Head of OCIO and GFO. In this newly created role, Katie will partner closely with Bob Morgan who will be named Co-Head of the Alternatives Initiative, in addition to his role as Head of 50 South Capital.

  - Lynne Kostakis will expand her responsibilities to serve as the Global Head of Client Strategy for both the Global Institutional Client Group and the Wealth Client Group.

Parametric

Question 6: Have there been any significant personnel changes at the management level of the Firm during the quarter?

→ Reuben Butler, Chief Administrative Officer, left Parametric to pursue other opportunities. Reuben's last day was July 30, 2024. Following his departure, Melissa Fell became CAO and reports to Ranjit Kapila, CO-President and COO, with a dotted line to Tom Lee, Co-President and CIO.

## Garcia Hamilton

### Question 7: Have there been any material changes in your firm's business during the quarter?

→ One client representing 1.13% of the Firm's total assets under management terminated relations due to the consolidation of managers.

## Required California AB 2833 Disclosure – RREEF AMERICA II

Effective January 1, 2017 RREEF America REIT II, Inc. ("alternative investment vehicle") is required to provide to the East Bay Municipal Utility District ("public investment fund" or "District") specific information at least annually pursuant to Section 7514.7 of the California Government Code ("Section 7514.7").

1. The fees and expenses that the public investment fund pays directly to the alternative investment vehicle, the fund manager, or related parties.

   - EBMUD: includes asset management, intermediate, and partnership fees – January 2023 – December 2023 = $579,085.91

2. The public investment fund's pro rata share of fees and expenses not included in paragraph (1) that are paid from the alternative investment vehicle to the fund manager or related parties.

   $0.00

3. The public investment fund's pro rata share of carried interest distributed to the fund manager or related parties.

   N/A

4. The public investment fund's pro rata share of aggregate fees and expenses paid by all of the portfolio companies held within the alternative investment vehicle to the fund manager or related parties.

   - EBMUD: includes asset management, intermediate, and partnership fees – January 2023 – December 2023 = $579,085.91

5. Any additional information described in subdivision (b) of Section 6254.26.

   N/A

6. The gross and net rate of return of each alternative investment vehicle since inception.

   Gross = 6.0%    Net = 5.2% (as of December 31, 2023)[1]

7. Any other information required to be collected pursuant to Section 7514.7.

   N/A

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[1] Please note that since inception returns provided represent the client's time frame in the Fund, and not the returns of the Fund as a whole.

# Appendix

## Glossary of Terms

**Alpha**: The premium an investment earns above a set standard. This is usually measured in terms of a common index (i.e., how the stock performs independent of the market). An Alpha is usually generated by regressing a security's excess return on the S&P 500 excess return.

**Annualized Performance**: The annual rate of return that when compounded t times generates the same t-period holding return as actually occurred from period 1 to period t.

**Batting Average**: Percentage of periods a portfolio outperforms a given index.

**Beta**: The measure of an asset's risk in relation to the Market (for example, the S&P 500) or to an alternative benchmark or factors. Roughly speaking, a security with a Beta of 1.5 will have moved, on average, 1.5 times the market return.

**Bottom-up**: A management style that de-emphasizes the significance of economic and market cycles, focusing instead on the analysis of individual stocks.

**Dividend Discount Model**: A method to value the common stock of a company that is based on the present value of the expected future dividends.

**Growth Stocks**: Common stock of a company that has an opportunity to invest money and earn more than the opportunity cost of capital.

**Information Ratio**: The ratio of annualized expected residual return to residual risk. A central measurement for active management, value added is proportional to the square of the information ratio.

**R-Squared**: Square of the correlation coefficient. The proportion of the variability in one series that can be explained by the variability of one or more other series a regression model. A measure of the quality of fit. 100% R-square means perfect predictability.

**Standard Deviation**: The square root of the variance. A measure of dispersion of a set of data from its mean.

**Sharpe Ratio**: A measure of a portfolio's excess return relative to the total variability of the portfolio.

**Style Analysis**: A returns-based analysis using a multi-factor attribution model. The model calculates a product's average exposure to particular investment styles over time (i.e., the product's normal style benchmark).

**Top-down**: Investment style that begins with an assessment of the overall economic environment and makes a general asset allocation decision regarding various sectors of the financial markets and various industries.

**Tracking Error**: The standard deviation of the difference between the performance of a portfolio and an appropriate benchmark.

**Turnover**: For mutual funds, a measure of trading activity during the previous year, expressed as a percentage of the average total assets of the fund. A turnover rate of 25% means that the value of trades represented one-fourth of the assets of the fund.

**Value Stocks**: Stocks with low price/book ratios or price/earnings ratios. Historically, value stocks have enjoyed higher average returns than growth stocks (stocks with high price/book or P/E ratios) in a variety of countries.

### Definition of Benchmarks

**BC Aggregate:** an index comprised of approximately 6,000 publicly traded investment-grade bonds including U.S. Government, mortgage-backed, corporate, and yankee bonds with an approximate average maturity of 10 years.

**BC High Yield:** covers the universe of fixed rate, non-investment grade debt. Eurobonds and debt issues from countries designated as emerging markets (e.g., Argentina, Brazil, Venezuela, etc.) are excluded, but Canadian and global bonds (SEC registered) of issuers in non-EMG countries are included. Original issue zeroes, step-up coupon structures, 144-As and pay-in-kind bonds (PIKs, as of October 1, 2009) are also included. Must be rated high-yield (Ba1/BB+ or lower) by at least two of the following ratings agencies: Moody's, S&P, Fitch. If only two of the three agencies rate the security, the lower rating is used to determine index eligibility.  All issues must have at least one year to final maturity regardless of call features and have at least $150 million par amount outstanding.

**BC Multiverse Non-US Hedged:** provides a broad-based measure of the international fixed-income bond market. The index represents the union of the BC Global Aggregate Index and the BC Global High Yield Index. In this sense, the term "Multiverse" refers to the concept of multiple universes in a single macro index.

**BC US Credit:** includes publicly issued U.S. corporate and foreign debentures and secured notes that which are rated investment grade or higher by Moody's Investor Services, Standard and Poor's Corporation, or Fitch Investor's Service, with all issues having at least one year to maturity and an outstanding par value of at least $250 million.  Issues must be publicly issued, dollar-denominated and non-convertible.

**BC US Government:** includes treasuries (i.e., public obligations of the U.S. Treasury that have remaining maturities of more than one year) and agencies (i.e., publicly issued debt of U.S. Government agencies, quasi-federal corporations, and corporate or foreign debt guaranteed by the U.S. Government).

**BC Universal:** includes market coverage by the Aggregate Bond Index fixed rate debt issues, which are rated investment grade or higher by Moody's Investor Services, Standard and Poor's Corporation, or Fitch Investor's Service, with all issues having at least one year to maturity and an outstanding par value of at least $100 million) and includes exposures to high yield CMBS securities.  All returns are market value weighted inclusive of accrued interest.

**Citigroup 3-Month Treasury Bills (T-bills):** tracks the performance of U.S. Treasury bills with 3-month maturity.

**MSCI ACWI x US ND:** comprises both developed and emerging markets less the United States. As of August 2008, the index consisted of 23 counties classified as developed markets and 25 classified as emerging markets. This series approximates the minimum possible dividend reinvestment. The dividend is reinvested after deduction of withholding tax, applying the rate to non-resident individuals who do not benefit from double taxation treaties. MSCI Barra uses withholding tax rates applicable to Luxembourg holding companies, as Luxembourg applies the highest rates.

**MSCI EAFE Free (Europe, Australasia, Far East) ND:** is a free float-adjusted market capitalization index that is designed to measure developed market equity performance, excluding the US & Canada. This series approximates the minimum possible dividend reinvestment. The dividend is reinvested after deduction of withholding tax, applying the rate to non-resident individuals who do not benefit from double taxation treaties. MSCI Barra uses withholding tax rates applicable to Luxembourg holding companies, as Luxembourg applies the highest rates.

**MSCI EM (Emerging Markets) GD:** is a free float-adjusted market capitalization index that is designed to measure equity market performance in the global emerging markets. This series approximates the maximum possible dividend reinvestment. The amount reinvested is the entire dividend distributed to individuals resident in the country of the company, but does not include tax credits.

**MSCI Europe** is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of the developed markets in Europe. As of June 2007, this index consisted of the following 16 developed market country indices: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

**MSCI Pacific** is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of the developed markets in the Pacific region. As of June 2007, this index consisted of the following 5 Developed Market countries: Australia, Hong Kong, Japan, New Zealand, and Singapore.

**NAREIT Index:** consists of all tax-qualified REITs listed on the New York Stock Exchange, American Stock Exchange, and the NASDAQ National Market System. The data is market weighted.

**NCREIF Property Index:** the NPI contains investment-grade, non-agricultural, income-producing properties which may be financed in excess of 5% gross market value; were acquired on behalf of tax exempt institutions; and are held in a fiduciary environment.  Returns are gross of fees; including income, realized gains/losses, and appreciation/depreciation; and are market value weighted.  Index is lagged one quarter.

**Russell 1000:** measures the performance of the 1,000 largest securities in the Russell 3000 Index.  Russell 1000 is highly correlated with the S&P 500 Index and capitalization-weighted.

**Russell 1000 Growth:** measures the performance of those Russell 1000 securities with a greater-than-average growth orientation. Securities in this index tend to exhibit higher price-to-book and price-earnings ratios, lower dividend yields and higher forecasted growth values than the Value universe.

**Russell 1000 Value:** measures the performance of those Russell 1000 securities with a less-than-average growth orientation. Securities in this index tend to exhibit lower price-to-book and price-earnings ratios, higher dividend yields and lower forecasted growth values than the Growth universe.

**Russell 2000:** measures the performance of the 2,000 smallest companies in the Russell 3000 Index, which represents approximately 8% of the total market capitalization of the Russell 3000 Index.

**Russell 2000 Growth:** measures the performance of those Russell 2000 securities with a greater-than-average growth orientation. Securities in this index tend to exhibit higher price-to-book and price-to-earnings ratios.

**Russell 2000 Value:** measures the performance of those Russell 2000 securities with a less-than-average growth orientation. Securities in this index tend to exhibit lower price-to-book and price-to-earnings ratios.

**Russell 3000:** represents the largest 3,000 US companies based on total market capitalization, representing approximately 98% of the investable US equity market.

**Value Relative Ratio (VRR):** Performance metric used to evaluate long-term manager performance relative to a benchmark and to highlight compounded over/under performance data over a certain time frame.  VRR is calculated by the growth of a dollar invested with the manager divided by the growth of a dollar invested in the benchmark for the same time period.

## Risk Metric Description – Rationale for Selection and Calculation Methodology

### US Equity Markets

Metric: P/E ratio = Price / "Normalized" earnings for the S&P 500 Index

To represent the price of US equity markets, we have chosen the S&P 500 index. This index has the longest published history of price, is well known, and also has reliable, long-term, published quarterly earnings. The price=P of the P/E ratio is the current price of the market index (the average daily price of the most recent full month for the S&P 500 index). Equity markets are very volatile. Prices fluctuate significantly during normal times and extremely during periods of market stress or euphoria. Therefore, developing a measure of earnings power (E) which is stable is vitally important, if the measure is to provide insight. While equity prices can and do double, or get cut in half, real earnings power does not change nearly as much. Therefore, we have selected a well known measure of real, stable earnings power developed by Yale Professor Robert Shiller known as the Shiller E-10. The calculation of E-10 is simply the average real annual earnings over the past 10 years. Over 10 years, the earnings shenanigans and boom and bust levels of earnings tend to even out (and often times get restated). Therefore, this earnings statistic gives a reasonably stable, slow-to-change estimate of average real earnings power for the index. Professor Shiller's data and calculation of the E-10 are available on his website at http://www.econ.yale.edu/~shiller/data.htm. We have used his data as the base for our calculations. Details of the theoretical justification behind the measure can be found in his book *Irrational Exuberance* [Princeton University Press 2000, Broadway Books 2001, 2nd ed., 2005].

### Developed Equity Markets Excluding the US

Metric: P/E ratio = Price / "Normalized" earnings for the MSCI EAFE Index

To represent the price of non-US developed equity markets, we have chosen the MSCI EAFE index. This index has the longest published history of price for non-US developed equities. The price=P of the P/E ratio is the current price of the market index (the average daily price of the most recent full month for the MSCI EAFE index). The price level of this index is available starting in December 1969. Again, for the reasons described above, we elected to use the Shiller E-10 as our measure of earnings (E). Since 12/1972, a monthly price earnings ratio is available from MSCI. Using this quoted ratio, we have backed out the implied trailing-twelve month earnings of the EAFE index for each month from 12/1972 to the present. These annualized earnings are then inflation adjusted using CPI-U to represent real earnings in US dollar terms for each time period. The Shiller E-10 for the EAFE index (10 year average real earnings) is calculated in the same manner as detailed above.

However, we do not believe that the pricing and earnings history of the EAFE markets are long enough to be a reliable representation of pricing history for developed market equities outside of the US. Therefore, in constructing the Long-Term Average Historical P/E for developed ex-US equities for comparison purposes, we have elected to use the US equity market as a developed market proxy, from 1881 to 1982. This lowers the Long-Term Average Historical P/E considerably. We believe this methodology provides a more realistic historical comparison for a market with a relatively short history.

## Emerging Market Equity Markets

Metric: Ratio of Emerging Market P/E Ratio to Developed Market P/E Ratio

To represent the Emerging Markets P/E Ratio, we have chosen the MSCI Emerging Market Free Index, which has P/E data back to January 1995 on Bloomberg. To represent the Developed Markets PE Ratio, we have chosen the MSCI World Index, which also has data back to January 1995 on Bloomberg. Although there are issues with published, single time period P/E ratios, in which the denominator effect can cause large movements, we feel that the information contained in such movements will alert investors to market activity that they will want to interpret.

## US Private Equity Markets

Metrics: S&P LCD Average EBITDA Multiples Paid in LBOs and US Quarterly Deal Volume

The Average Purchase Price to EBITDA multiples paid in LBOs is published quarterly by S&P in their LCD study. This is the total price paid (both equity and debt) over the trailing-twelve month EBITDA (earnings before interest, taxes, depreciation and amortization) as calculated by S&P LCD. This is the relevant, high-level pricing metric that private equity managers use in assessing deals. Data is published monthly.

US quarterly deal volume for private equity is the total deal volume in $ billions (both equity and debt) reported in the quarter by Thomson Reuters Buyouts. This metric gives a measure of the level of activity in the market. Data is published quarterly.

## US Private Real Estate Markets
Metrics:  US Cap Rates, Cap Rate Spreads, and Transactions as a % of Market Value

Real estate cap rates are a measure of the price paid in the market to acquire properties versus their annualized income generation before financing costs (NOI=net operating income). The data, published by NCREIF, describes completed and leased properties (core) on an unleveraged basis.  We chose to use current value cap rates.  These are capitalization rates from properties that were revalued during the quarter. This data relies on estimates of value and therefore tends to be lagging (estimated prices are slower to rise and slower to fall than transaction prices). The data is published quarterly.

Spreads between the cap rate (described above) and the 10-year nominal Treasury yield, indicate a measure of the cost of properties versus a current measure of the cost of financing.

Transactions as a % of Market Value Trailing-Four Quarters is a measure of property turnover activity in the NCREIF Universe. This quarterly metric is a measure of activity in the market.

## Credit Markets Fixed Income
Metric:  Spreads

The absolute level of spreads over treasuries and spread trends (widening / narrowing) are good indicators of credit risk in the fixed income markets.  Spreads incorporate estimates of future default, but can also be driven by technical dislocations in the fixed income markets.  Abnormally narrow spreads (relative to historical levels) indicate higher levels of valuation risk, wide spreads indicate lower levels of valuation risk and / or elevated default fears.   Investment grade bond spreads are represented by the Barclays Capital US Corporate Investment Grade Index Intermediate Component.  The high yield corporate bond spreads are represented by the Barclays Capital US Corporate High Yield Index.

## Measure of Equity Market Fear / Uncertainty
Metric: VIX – Measure of implied option volatility for US equity markets

The VIX is a key measure of near-term volatility conveyed by implied volatility of S&P 500 index option prices.  VIX increases with uncertainty and fear.  Stocks and the VIX are negatively correlated.  Volatility tends to spike when equity markets fall.

**Measure of Monetary Policy**
Metric: Yield Curve Slope

We calculate the yield curve slope as the 10 year treasury yield minus the 1 year treasury yield.  When the yield curve slope is zero or negative, this is a signal to pay attention.  A negative yield curve slope signals lower rates in the future, caused by a contraction in economic activity.  Recessions are typically preceded by an inverted (negatively sloped) yield curve.  A very steep yield curve (2 or greater) indicates a large difference between shorter-term interest rates (the 1 year rate) and longer-term rates (the 10 year rate).  This can signal expansion in economic activity in the future, or merely higher future interest rates.

**Measures of US Inflation Expectations**
Metrics:  Breakeven Inflation and Inflation Adjusted Commodity Prices

Inflation is a very important indicator impacting all assets and financial instruments.  Breakeven inflation is calculated as the 10 year nominal treasury yield minus the 10 year real yield on US TIPS (treasury inflation protected securities). Abnormally low long-term inflation expectations are indicative of deflationary fears.  A rapid rise in breakeven inflation indicates an acceleration in inflationary expectations as market participants sell nominal treasuries and buy TIPs.  If breakeven inflation continues to rise quarter over quarter, this is a signal of inflationary worries rising, which may cause Fed action and / or dollar decline.

Commodity price movement (above the rate of inflation) is an indication of anticipated inflation caused by real global economic activity putting pressure on resource prices.  We calculate this metric by adjusted in the Dow Jones UBS Commodity Index (formerly Dow Jones AIG Commodity Index) by US CPI-U.  While rising commodity prices will not necessarily translate to higher US inflation, higher US inflation will likely show up in higher commodity prices, particularly if world economic activity is robust.

These two measures of anticipated inflation can, and often are, conflicting.

## Measures of US Treasury Bond Interest Rate Risk

Metrics: 10-Year Treasury Forward-Looking Real Yield and 10-Year Treasury Duration

The expected annualized real yield of the 10 year US Treasury Bond is a measure of valuation risk for US Treasuries. A low real yield means investors will accept a low rate of expected return for the certainly of receiving their nominal cash flows. Meketa estimates the expected annualized real yield by subtracting an estimate of expected 10 year inflation (produced by the Survey of Professional Forecasters as collected by the Federal Reserve Bank of Philadelphia), from the 10 year Treasury constant maturity interest rate.

Duration for the 10-Year Treasury Bond is calculated based on the current yield and a price of 100. This is a measure of expected percentage movements in the price of the bond based on small movements in percentage yield. We make no attempt to account for convexity.

## Definition of "Extreme" Metric Readings

A metric reading is defined as "extreme" if the metric reading is in the top or bottom decile of its historical readings. These "extreme" reading should cause the reader to pay attention. These metrics have reverted toward their mean values in the past.

RISK METRICS DESCRIPTION – Meketa Market Sentiment Indicator

## What is the Meketa Market Sentiment Indicator (MMSI)?

The MMSI is a measure meant to gauge the market's sentiment regarding economic growth risk. Growth risk cuts across most financial assets, and is the largest risk exposure that most portfolios bear. The MMSI takes into account the momentum[1] (trend over time, positive or negative) of the economic growth risk exposure of publicly traded stocks and bonds, as a signal of the future direction of growth risk returns; either positive (risk seeking market sentiment), or negative (risk averse market sentiment).

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[1] Momentum is defined as the persistence of relative performance. There is a significant amount of academic evidence indicating that positive momentum (e.g., strong performing stocks over the recent past continue to post strong performance into the near future) exists over near-to-intermediate holding periods. See, for example, "Understanding Momentum," *Financial Analysts Journal*, Scowcroft, Sefton, March, 2005.

### How do I read the Meketa Market Sentiment Indicator (MMSI) graph?

Simply put, the MMSI is a color coded indicator that signals the market's sentiment regarding economic growth risk. It is read left to right chronologically. A green indicator on the MMSI indicates that the market's sentiment towards growth risk is positive. A gray indicator indicates that the market's sentiment towards growth risk is neutral or inconclusive. A red indicator indicates that the market's sentiment towards growth risk is negative. The black line on the graph is the level of the MMSI. The degree of the signal above or below the neutral reading is an indication the signal's current strength.

### How is the Meketa Market Sentiment Indicator (MMSI) Constructed?

The MMSI is constructed from two sub-elements representing investor sentiment in stocks and bonds:

1. Stock return momentum: Return momentum for the S&P 500 Equity Index (trailing 12-months)
2. Bond yield spread momentum: Momentum of bond yield spreads (excess of the measured bond yield over the identical duration U.S. Treasury bond yield) for corporate bonds (trailing 12-months) for both investment grade bonds (75% weight) and high yield bonds (25% weight). The scale of this measure is adjusted to match that of the stock return momentum measure.

The black line reading on the graph is calculated as the average of the stock return momentum measure and the bonds spread momentum measure. The color reading on the graph is determined as follows:

1. If both stock return momentum and bond spread momentum are positive = GREEN (positive)
2. If one of the momentum indicators is positive, and the other negative = GRAY (inconclusive)
3. If both stock return momentum and bond spread momentum are negative = RED (negative)

## What does the Meketa Market Sentiment Indicator (MMSI) mean?  Why might it be useful?

There is strong evidence that time series momentum is significant and persistent.[1]  In particular, across an extensive array of asset classes, the sign of the trailing 12-month return (positive or negative) is indicative of future returns (positive or negative) over the next 12 month period. The MMSI is constructed to measure this momentum in stocks and corporate bond spreads. A reading of green or red is agreement of both the equity and bond measures, indicating that it is likely that this trend (positive or negative) will continue over the next 12 months.  When the measures disagree, the indicator turns gray.  A gray reading does not necessarily mean a new trend is occurring, as the indicator may move back to green, or into the red from there.  The level of the reading (black line) and the number of months at the red or green reading, gives the user additional information on which to form an opinion, and potentially take action.

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[1] "Time Series Momentum" Moskowitz, Ooi, Pedersen, August 2010  http://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf

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