

City of Marlborough Contributory Retirement System

December 23, 2024

Meeting Materials

Agenda

1. Economic and Market Update as of October 31, 2024
2. Performance Update as of September 30, 2024
3. Current Issue
 - Manager Due Diligence Agenda
4. Appendix
 - Disclaimer, Glossary and Notes

Economic and Market Update

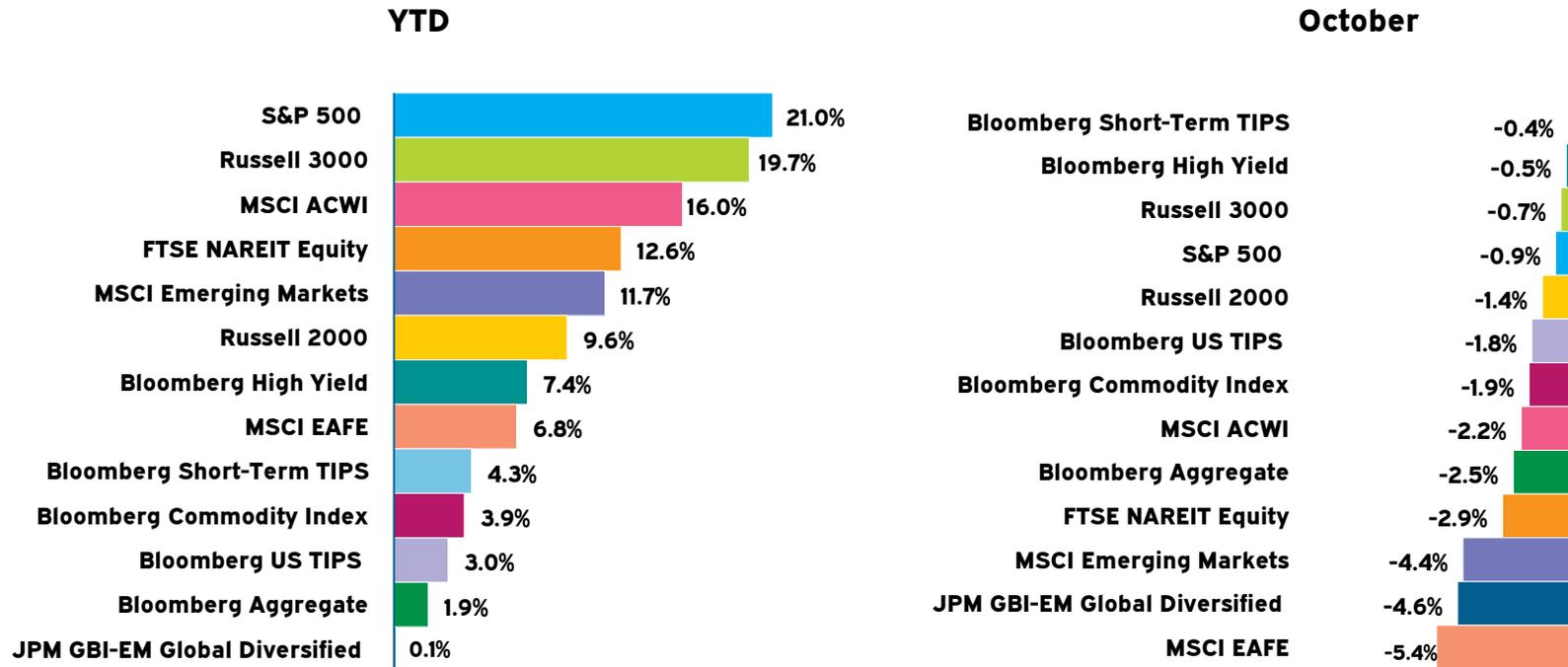
Data as of October 31, 2024

Commentary

October saw markets turn cautious ahead of the looming presidential election with major equity and bond markets declining for the month.

- After month-end, the Federal Reserve cut its policy rate another 0.25% even as unemployment remained low and economic growth was resilient.
- After strong performance in the third quarter, US equities (Russell 3000) fell 0.7% in October.
- Emerging market equities declined 4.4% in October, after rising 8.7% in the third quarter. Despite the decline, they outperformed developed market equities, with the MSCI EAFE index falling 5.4% in October.
- Chinese stocks (MSCI China) sold-off in October, (-5.9%) as investor enthusiasm cooled awaiting more concrete fiscal policy stimulus from policy makers to address the solvency issues for local governments, the real estate sector, and consumers.
- Fixed income markets declined and bond yields rose, as investors considered the policy impacts of a potential second Trump presidency.
- Looking ahead, key factors influencing the global economic outlook include the paths of inflation, labor markets, and monetary policy, China's slowing economy and the impacts of policy stimulus, increased geopolitical tensions, and questions about new policies from the incoming US administration.

Index Returns¹



→ After a strong third quarter, major markets sold-off in October due to uncertainty about the looming US presidential election and continued questions about the path of interest rates.

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

¹ Source: Bloomberg. Data is as of October 31, 2024.

Domestic Equity Returns¹

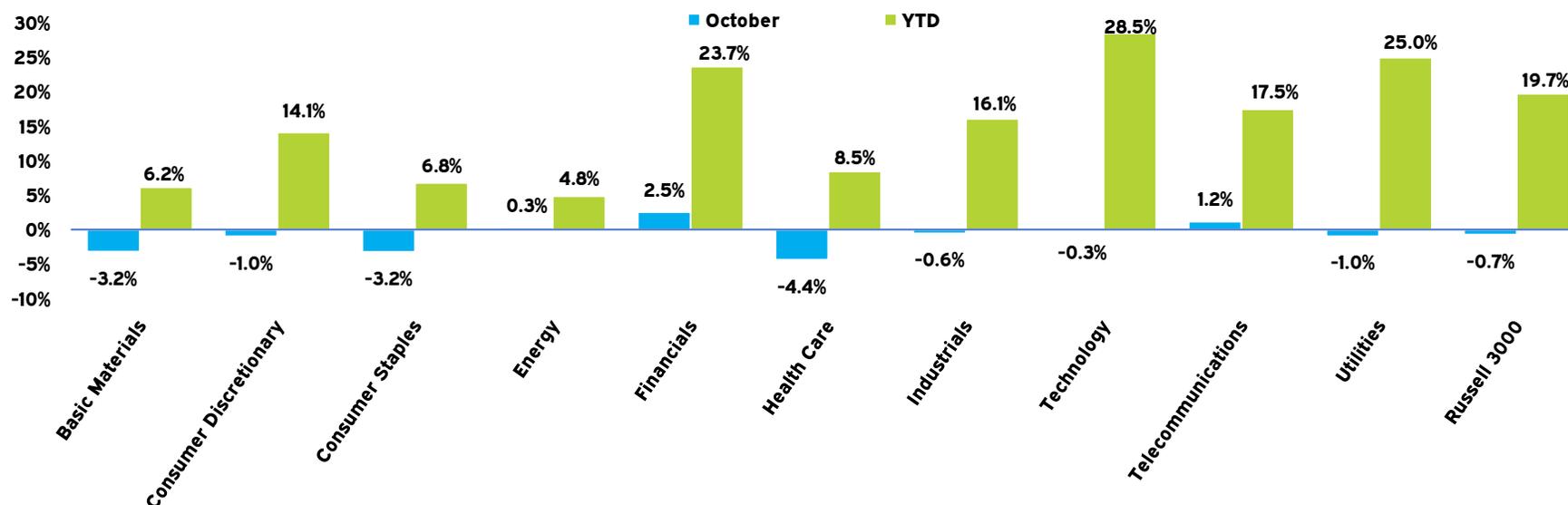
Domestic Equity	October (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
S&P 500	-0.9	21.0	38.0	9.1	15.3	13.0
Russell 3000	-0.7	19.7	37.9	7.6	14.6	12.4
Russell 1000	-0.7	20.3	38.1	8.1	15.0	12.7
Russell 1000 Growth	-0.3	24.1	43.8	8.8	19.0	16.2
Russell 1000 Value	-1.1	15.4	31.0	6.8	10.1	8.9
Russell MidCap	-0.5	14.0	35.4	3.5	10.9	9.8
Russell MidCap Growth	1.7	14.9	38.7	0.6	11.5	11.2
Russell MidCap Value	-1.3	13.6	34.0	5.1	9.9	8.4
Russell 2000	-1.4	9.6	34.1	0.0	8.5	7.9
Russell 2000 Growth	-1.3	11.7	36.5	-2.3	7.9	8.1
Russell 2000 Value	-1.6	7.5	31.8	1.9	8.4	7.3

US Equities: The Russell 3000 fell 0.7% in October, bringing the year-to-date results to +19.7%.

- US stocks fell slightly during October, amid mixed economic signals and, toward the end of month, due to a focus on the looming US presidential election.
- For the month, growth stocks outperformed value stocks across the market cap spectrum, particularly in midcap. In the large cap space, this dynamic was driven mainly by one stock, NVIDIA.
- Large cap stocks (Russell 1000) declined less than small cap stocks (Russell 2000) for the month.

¹ Source: Bloomberg. Data is as of October 31, 2024.

Russell 3000 Sector Returns¹



- All sectors turned negative in October, except Financials and Telecommunications stocks.
- Healthcare stocks led the overall decline among sectors, most notably due to Eli Lilly's decline after reporting disappointing quarterly earnings.
- On a year-to-date basis, Technology continued to lead the way (+28.5%), followed closely by Utilities (+25.0%) largely on growing energy demand for cloud computing data centers. The Fed's rate cuts and generally healthy economy have lifted Financials (+23.7%).

¹ Source: Bloomberg. Data is as of October 31, 2024.

Foreign Equity Returns¹

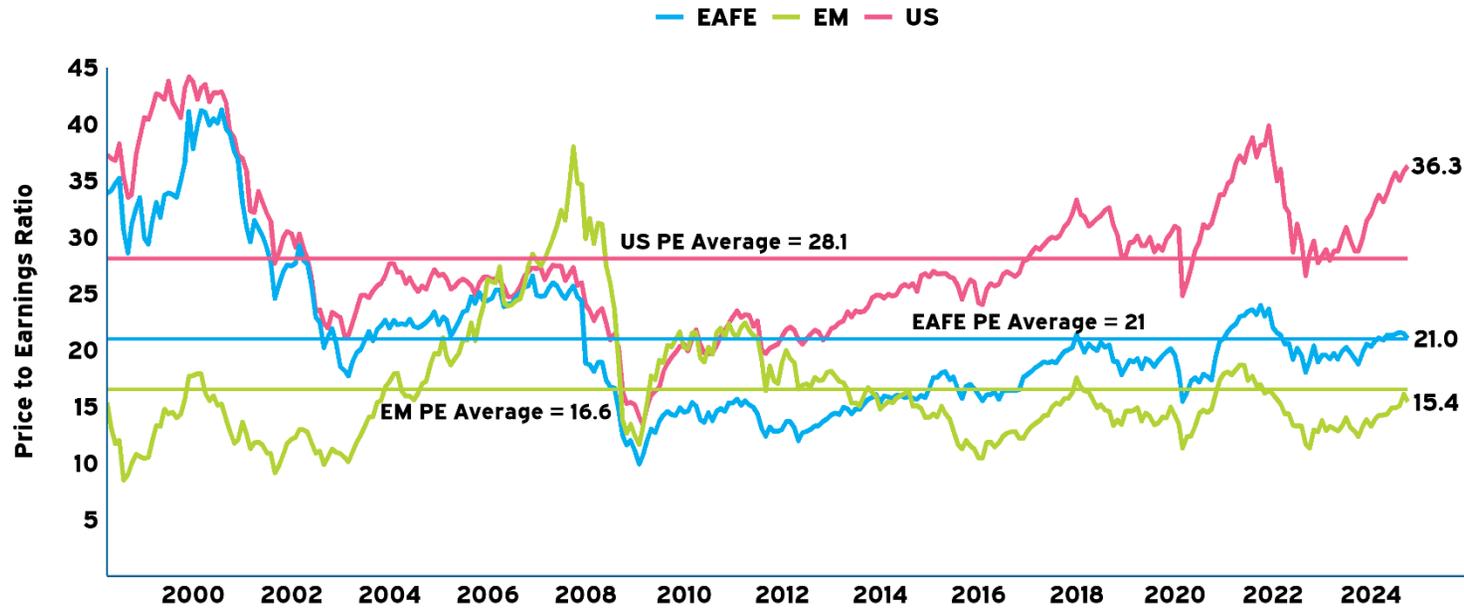
Foreign Equity	October (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
MSCI ACWI ex. US	-4.9	8.6	24.3	1.6	5.8	4.8
MSCI EAFE	-5.4	6.8	23.0	2.7	6.2	5.3
MSCI EAFE (Local Currency)	-1.6	10.2	19.7	6.6	8.1	7.2
MSCI EAFE Small Cap	-6.3	4.1	23.0	-3.0	4.1	5.7
MSCI Emerging Markets	-4.4	11.7	25.3	-1.4	3.9	3.4
MSCI Emerging Markets (Local Currency)	-2.9	14.9	25.9	1.6	6.2	6.0
MSCI EM ex. China	-3.9	8.3	27.2	2.1	6.6	4.4
MSCI China	-5.9	21.7	21.8	-8.4	-1.2	2.3

Foreign Equity: Developed international equities (MSCI EAFE) fell 5.4% in October, while emerging market equities (MSCI Emerging Markets) fell 4.4%.

- In October, emerging and developed markets outside the US both suffered from risk-off sentiment ahead of the US election. Additionally, a stronger dollar served as a headwind, particularly for developed markets.
- Developed market equities fell 1.6% in local terms but factoring in the strengthening dollar brought returns to -5.4% for the month (the worst result of the major indexes).
- The rally in Chinese equities cooled as investors reassessed the Chinese government’s convictions behind stimulating the sluggish economy.

¹ Source: Bloomberg. Data is as October 31, 2024.

Equity Cyclically Adjusted P/E Ratios¹



→ US stocks (36.3) continue to trade well above their long-run PE average of 28.1.

→ Non-US developed market valuations fell slightly to their long-term average while emerging market stock valuations also declined but remain 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 October 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.

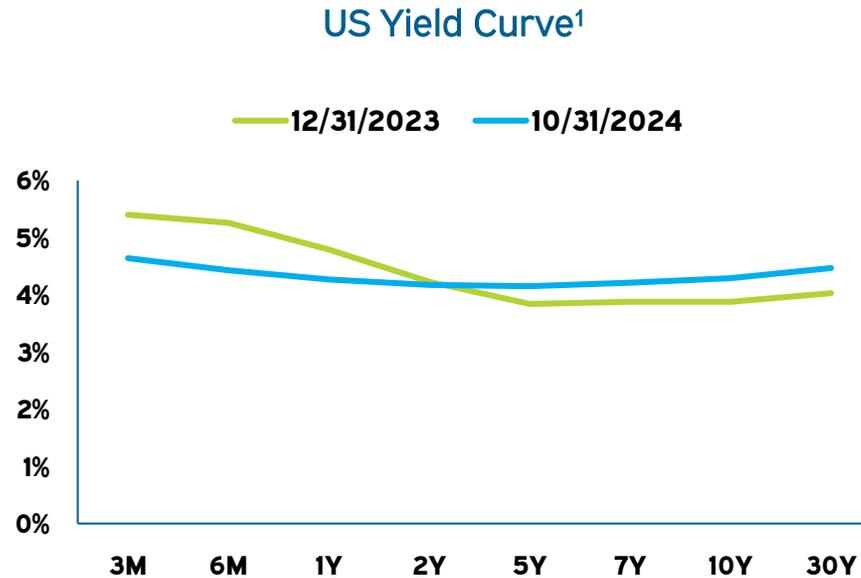
Fixed Income Returns¹

Fixed Income	October (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)	Current Yield (%)	Duration (Years)
Bloomberg Universal	-2.3	2.5	11.2	-1.8	0.2	1.8	5.0	6.0
Bloomberg Aggregate	-2.5	1.9	10.5	-2.2	-0.2	1.5	4.7	6.2
Bloomberg US TIPS	-1.8	3.0	8.6	-1.5	2.2	2.3	4.4	6.8
Bloomberg Short-term TIPS	-0.4	4.3	6.6	2.2	3.4	2.4	4.3	2.5
Bloomberg US Long Treasury	-5.2	-2.9	15.1	-10.5	-5.1	0.3	4.6	15.1
Bloomberg High Yield	-0.5	7.4	16.5	3.0	4.5	4.9	7.3	3.5
JPM GBI-EM Global Diversified (USD)	-4.6	0.1	8.8	-0.5	0.9	-0.1	--	--

Fixed Income: The Bloomberg Universal index fell 2.3% in October, bringing the year-to-date return to +2.5%.

- Fixed income indexes declined during the month, driven by economic data largely beating expectations and markets anticipating the potential policy impacts if Trump was re-elected.
- The broad US bond market (Bloomberg Aggregate) declined 2.5% over the month, with TIPS, particularly short-term TIPS, declining less.
- High yield bonds experienced smaller declines compared to the broad US bond market, while emerging market debt weakened more meaningfully.

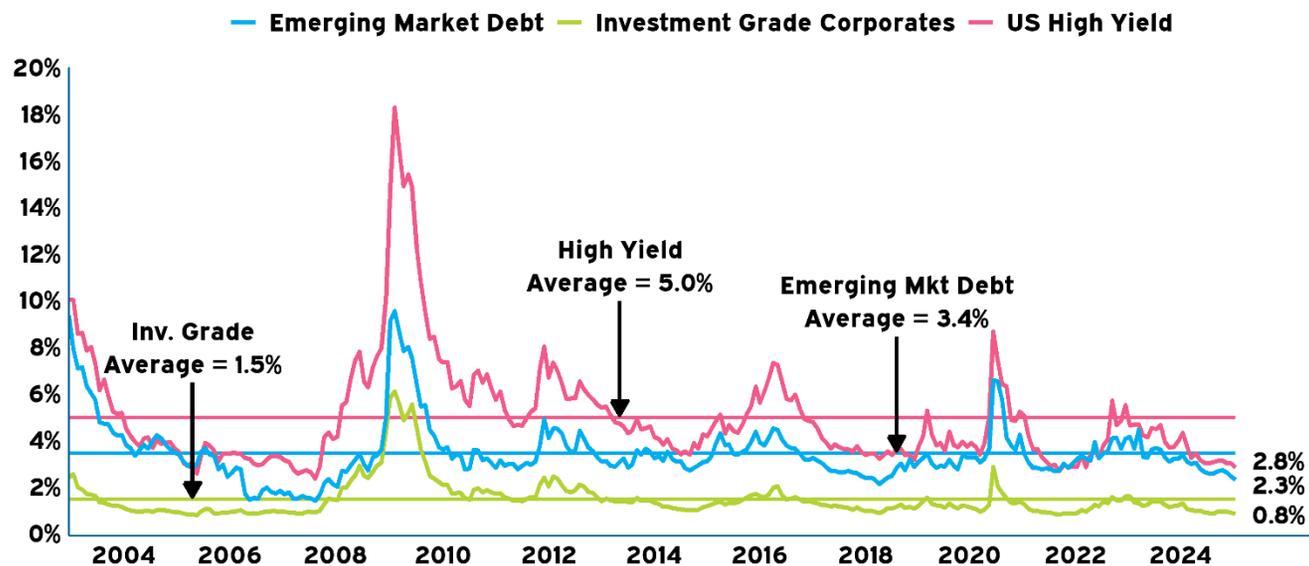
¹ Source: Bloomberg. Data is as of October 31, 2024. The yield and duration data from Bloomberg is defined as the index's yield to worst and modified duration, respectively. JPM GBI-EM data is from J.P. Morgan. Current yield and duration data is not available.



- After falling in the third quarter, US Treasury yields rose meaningfully in October across the yield curve. Better-than-expected economic data and growing anticipation of a potential second Trump presidency and related policy actions drove yields higher.
- The more policy sensitive two-year Treasury yield increased from 3.64% to 4.17%, while the ten-year Treasury yield rose from 3.78% to 4.29% over the same period.
- The yield curve from two years to ten years is no longer inverted, given policy rate cuts and resilient growth. This trend could continue as the Fed will likely cut short-term interest rates further.

¹ Source: Bloomberg. Data is as of October 31, 2024.

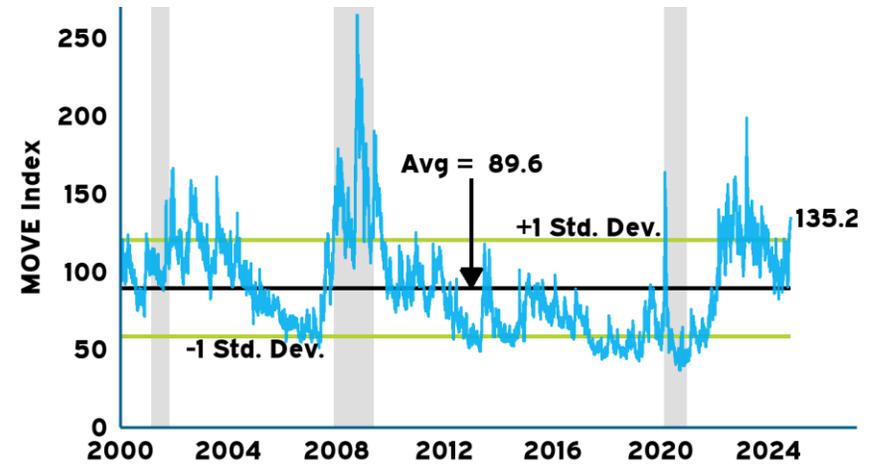
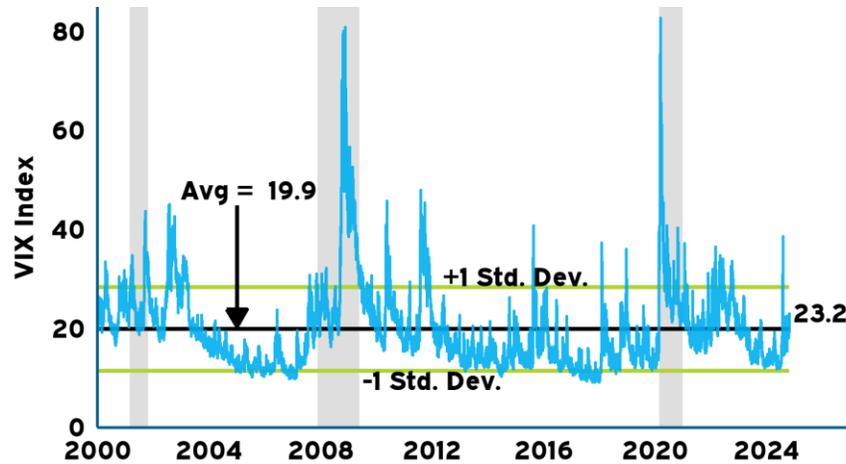
Credit Spreads vs. US Treasury Bonds¹



- Spreads (the yield above a comparable maturity Treasury) resumed their post-pandemic tightening trend with rising Treasury yields narrowing spreads in other fixed income markets.
- 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.

¹ Source: Bloomberg. Data is as October 31, 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.

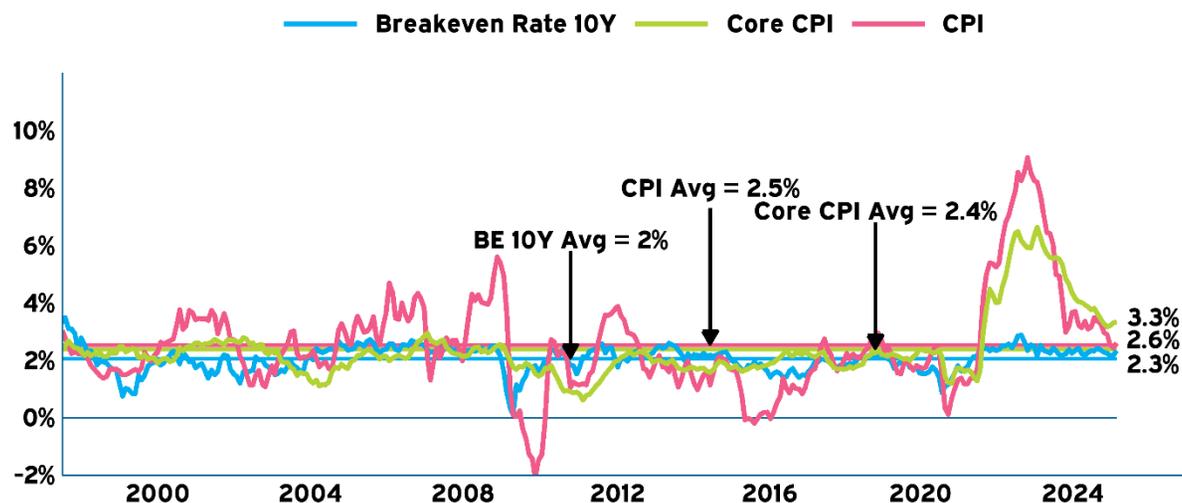
Equity and Fixed Income Volatility¹



- In October volatility, particularly in bonds, increased ahead of the US presidential election.
- Despite the increase, volatility levels (VIX) in the US stock market finished the month slightly above its long-run average. By contrast, volatility in the bond market (MOVE) ended October over one standard deviation above its long-run average as concern increased about the future path of interest rates.

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 October 2024. The average line indicated is the average of the VIX and MOVE values between January 2000 and October 2024.

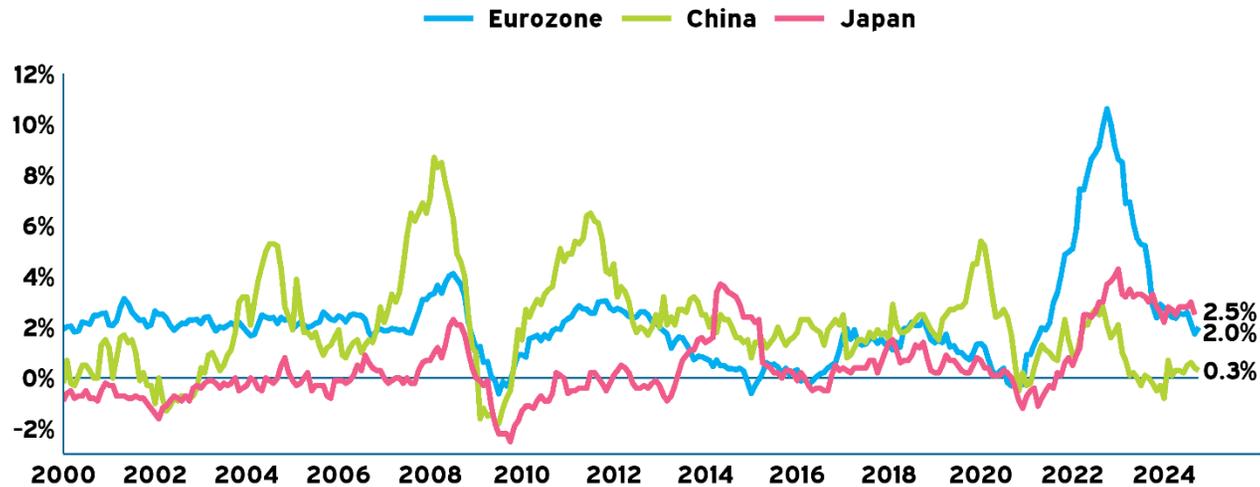
US Ten-Year Breakeven Inflation and CPI¹



- In October, inflation rose 0.2% month-on-month, with shelter accounting for over half of the gain even as energy prices declined.
- Year-over-year inflation increased from 2.4% to 2.6% (matching expectations) largely driven by base year effects. Shelter (+4.9%), transportation (+8.2%), and medical care (+3.8%) contributed to the annual gain while energy prices (-4.9%) fell over the past year.
- Year-over-year core inflation (excluding food and energy) rose 3.3%, also matching expectations.
- Inflation expectations (breakevens) rose in October on the proposed policies of both presidential candidates, and better-than-expected economic data.

¹ Source: FRED. Data is as of October 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.

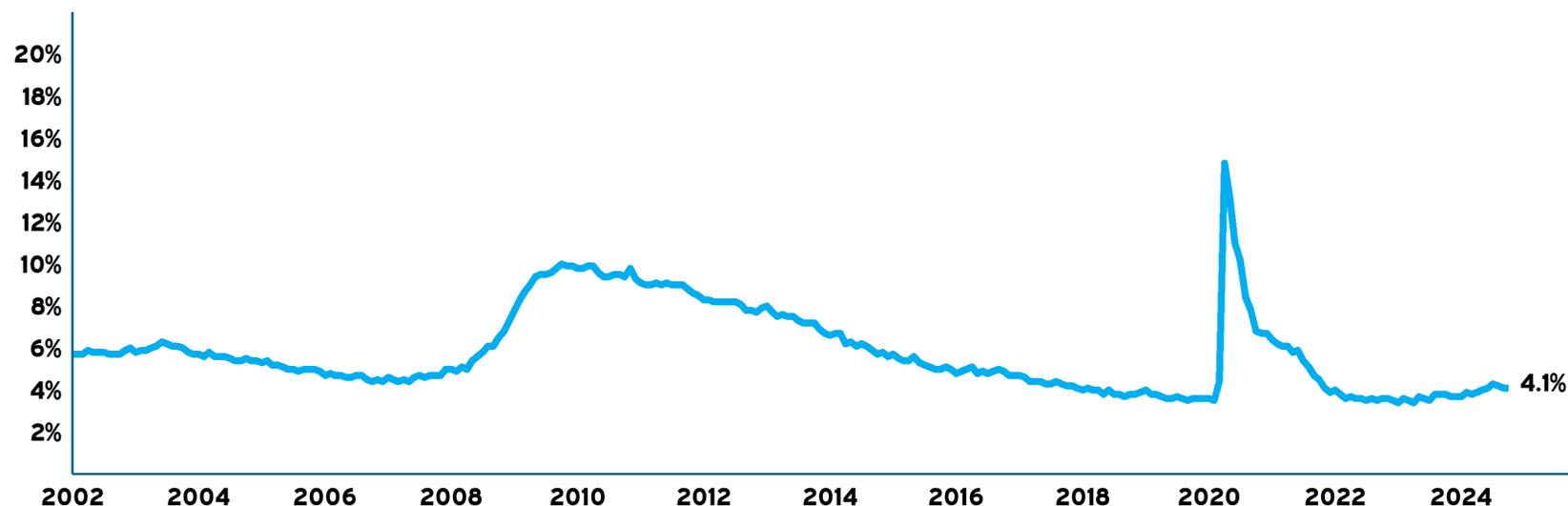
Global Inflation (CPI Trailing Twelve Months)¹



- In the eurozone, inflation rose from 1.7% to 2.0% in October (a level below the US). The increase was driven by the significant fall in energy prices from last year no longer being included in the calculation.
- Inflation in Japan, recently fell (3.0% to 2.5%) due in part to a slowing in the increase of gas and electricity prices. Despite the decline, inflation levels remain elevated from a historical perspective in Japan, supporting the case for additional interest rate increases by the Bank of Japan.
- Inflation in China, came in at 0.3% in October, slightly below expectations of 0.4%. China continues to fight deflationary pressures despite recent stimulus measures.

¹ Source: Bloomberg. Data is as October 31, 2024, except Japan which is as of September 30, 2024.

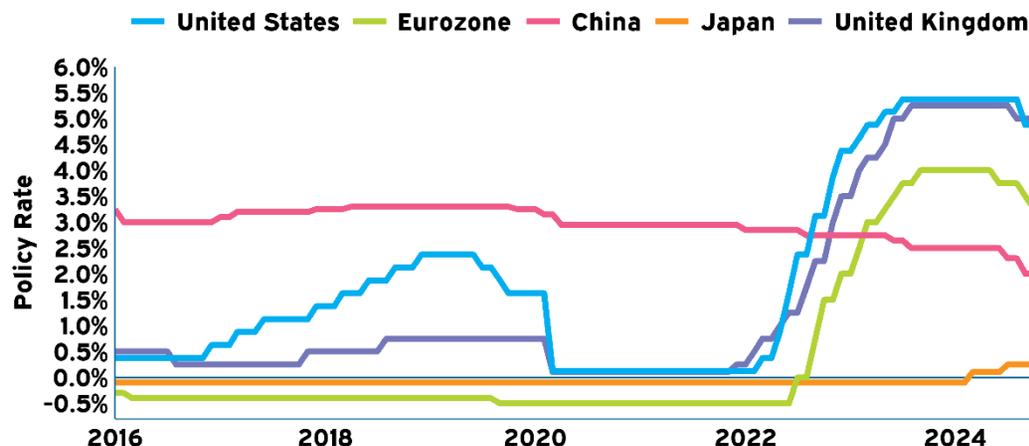
US Unemployment¹



- The unemployment rate stayed steady at 4.1% in October, while the number of people without jobs remained around the 7.0 million level.
- The health care (+52K) and government (+40K) sectors added the most jobs in October while jobs declined in temporary services (-49K) and manufacturing (-46K).
- Initial claims for unemployment remain relatively low and year-over-year wage gains strong (+4.0%).

¹ Source: FRED and BLS. Data is as of October 31, 2024.

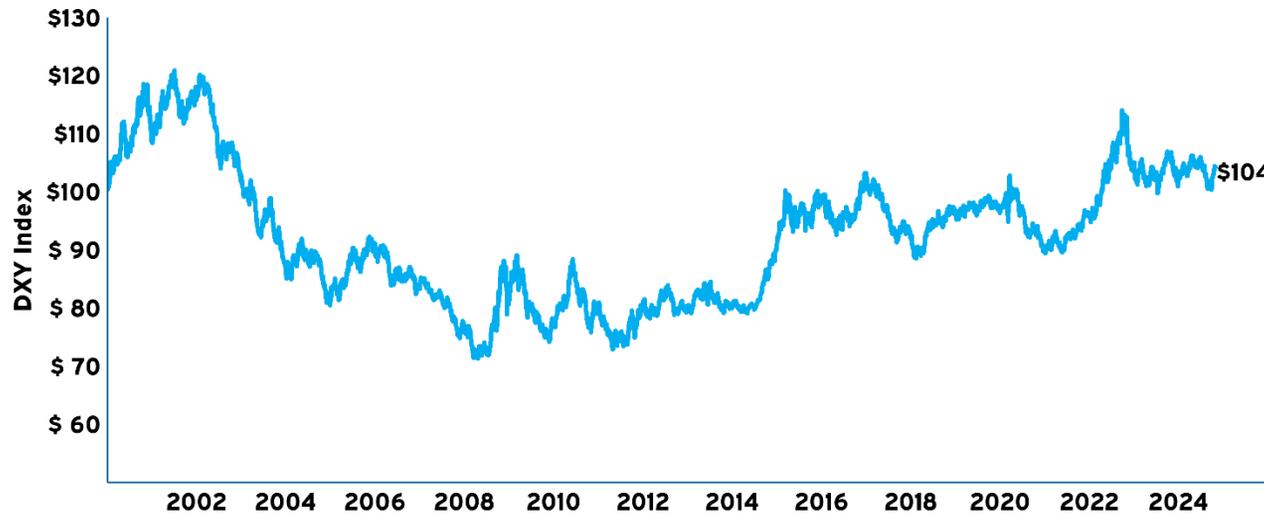
Policy Rates¹



- In the US, the Fed reduced interest rates after month-end by 0.25% to a range of 4.5% to 4.75% in a move largely expected by investors.
- The Bank of England made a similar 0.25% interest rate cut in November, while the European Central Bank made the same rate cut in October.
- After exiting negative interest rates in 2024 and making several rate increases, rate cutting by other major central banks are complicating prospects for further policy rate hikes in Japan.
- China announced a broad-based unexpected stimulus package that included lower interest rates, a reduction in bank reserve requirements, expanding local government borrowing facilities, and liquidity for stock investors.

¹ Source: Bloomberg. Data is as of October 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 Currencies¹



- In October, the US dollar rallied, a trend that continued strongly in November.
- A rise in interest rates driven by potential inflationary impacts of proposed higher tariffs, lower taxes, and immigration policies from candidate, and now president-elect Trump, drove the dollar's gains.
- Looking ahead, the track of policy rates across major central banks and the policies implemented by the incoming administration in the US will be key for the path of the US dollar from here.

¹ Source: Bloomberg. Data as of October 31, 2024.

Summary

Key Trends:

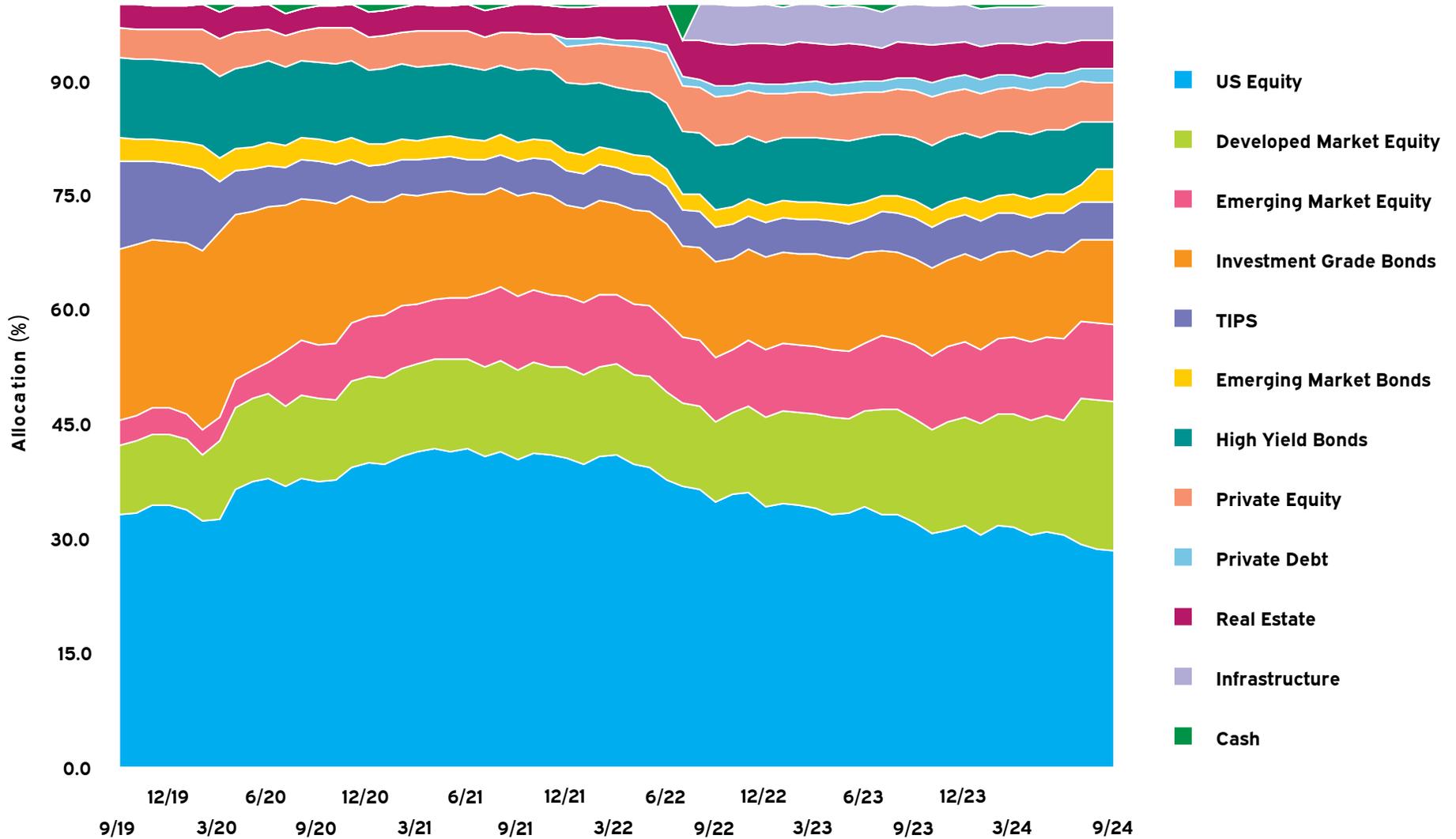
- According to the International Monetary Fund's (IMF) October report, global growth in 2025 is expected to be similar to 2024 at around 3.2% with most major economies predicted to avoid a recession.
- Many questions remain about what policies will be implemented by the new administration in the US. Although deregulation and tax cuts could support growth, these policies, along with higher tariffs and restrictive immigration, could fan inflation. This will likely lead to additional uncertainty 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 fiscal and financial policy stimulus measures. Thus far these efforts have not increased weak consumer spending or helped the lingering trouble in the real estate sector. 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.

**Performance Updated
As of September 30, 2024**

The Endowment Allocation vs. Targets and Policy				
	Current Balance	Current Allocation (%)	Policy (%)	Policy Range (%)
US Equity	\$70,805,416	28.4	20.0	10.0 - 30.0
Developed Market Equity	\$48,528,603	19.5	20.0	8.0 - 28.0
Emerging Market Equity	\$25,633,593	10.3	10.0	5.0 - 15.0
Investment Grade Bonds	\$27,343,273	11.0	5.0	3.0 - 10.0
TIPS	\$12,288,459	4.9	5.0	3.0 - 10.0
Emerging Market Bonds	\$11,001,242	4.4	5.0	2.0 - 8.0
High Yield Bonds	\$15,235,306	6.1	5.0	2.0 - 8.0
Private Equity	\$12,852,878	5.2	15.0	10.0 - 20.0
Private Debt	\$4,420,711	1.8	5.0	0.0 - 10.0
Real Estate	\$9,305,109	3.7	5.0	2.0 - 8.0
Infrastructure	\$11,561,188	4.6	5.0	0.0 - 10.0
Cash	\$419,871	0.2	0.0	0.0 - 5.0
Total	\$249,395,648	100.0	100.0	

Percentages may not sum to 100% due to rounding.

Asset Allocation 5 Years Ending September 30, 2024



City of Marlborough Contributory Retirement System

Asset Allocation & Performance | As of September 30, 2024

	Market Value \$	% of Portfolio	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Since Inception	Inception Date
Total Retirement System	249,395,648	100.0	5.3	10.0	18.2	4.6	8.2	7.1	7.0	7.7	Jul-88
<i>60% MSCI World & 40% Barclays Aggregate</i>			<i>5.9</i>	<i>12.9</i>	<i>23.8</i>	<i>5.0</i>	<i>8.1</i>	<i>7.0</i>	<i>6.7</i>	<i>7.2</i>	
<i>55% MSCI World & 45% Barclays Aggregate</i>			<i>5.8</i>	<i>12.2</i>	<i>22.7</i>	<i>4.4</i>	<i>7.5</i>	<i>6.5</i>	<i>6.4</i>	<i>7.1</i>	
Domestic Equity Assets	70,805,416	28.4	7.0	15.4	28.5	9.4	12.7	11.1	--	9.3	Oct-06
<i>Russell 3000 Index</i>			<i>6.2</i>	<i>20.6</i>	<i>35.2</i>	<i>10.3</i>	<i>15.3</i>	<i>12.8</i>	<i>10.6</i>	<i>10.4</i>	
International Developed Markets Equity Assets	48,528,603	19.5	7.2	13.1	24.8	5.7	8.4	5.6	--	4.1	Oct-06
<i>MSCI EAFE</i>			<i>7.3</i>	<i>13.0</i>	<i>24.8</i>	<i>5.5</i>	<i>8.2</i>	<i>5.7</i>	<i>6.0</i>	<i>4.3</i>	
International Emerging Markets Equity Assets	25,633,593	10.3	4.6	15.1	24.2	1.8	7.7	--	--	6.1	Jan-15
<i>MSCI Emerging Markets</i>			<i>8.7</i>	<i>16.9</i>	<i>26.1</i>	<i>0.4</i>	<i>5.7</i>	<i>4.0</i>	<i>7.3</i>	<i>4.6</i>	
Investment Grade Bonds Assets	27,343,273	11.0	5.2	4.5	11.5	-1.5	0.3	1.8	3.2	5.3	Jul-88
<i>Blmbg. U.S. Aggregate Index</i>			<i>5.2</i>	<i>4.4</i>	<i>11.6</i>	<i>-1.4</i>	<i>0.3</i>	<i>1.8</i>	<i>3.2</i>	<i>5.4</i>	
High Yield Bond Assets	15,235,306	6.1	3.9	6.7	12.7	3.1	4.3	4.7	5.9	6.2	Sep-03
<i>Blmbg. U.S. Corp. High Yield Index</i>			<i>5.3</i>	<i>8.0</i>	<i>15.7</i>	<i>3.1</i>	<i>4.7</i>	<i>5.0</i>	<i>6.7</i>	<i>7.1</i>	
TIPS Assets	12,288,459	4.9	4.1	5.0	9.7	-0.7	2.5	2.5	--	3.4	Oct-05
<i>Blmbg. U.S. TIPS Index</i>			<i>4.1</i>	<i>4.9</i>	<i>9.8</i>	<i>-0.6</i>	<i>2.6</i>	<i>2.5</i>	<i>3.6</i>	<i>3.5</i>	
Emerging Market Debt Assets	11,001,242	4.4	6.0	9.0	20.1	-0.1	1.6	--	--	3.6	Jan-15
<i>JPM EMBI Global Diversified</i>			<i>6.2</i>	<i>8.6</i>	<i>18.6</i>	<i>-0.4</i>	<i>0.9</i>	<i>3.3</i>	<i>5.8</i>	<i>3.4</i>	
Open-Ended Real Estate	5,484,705	2.2	0.2	-5.2	-9.6	-2.2	2.2	6.1	5.8	7.1	Oct-95
<i>NCREIF ODCE (VW) (Monthly)</i>			<i>0.2</i>	<i>-2.6</i>	<i>-7.3</i>	<i>-0.2</i>	<i>2.9</i>	<i>6.1</i>	<i>6.6</i>	<i>8.0</i>	
Total Closed End Real Estate	3,820,404	1.5	-0.9	-10.5	-13.2	-3.1	0.6	-0.8	--	1.5	Jan-13
<i>NCREIF ODCE (VW) (Monthly)</i>			<i>0.2</i>	<i>-2.6</i>	<i>-7.3</i>	<i>-0.2</i>	<i>2.9</i>	<i>6.1</i>	<i>6.6</i>	<i>7.1</i>	
Private Equity Assets	12,852,878	5.2	0.4	3.1	4.6	6.1	15.3	9.8	--	8.0	Oct-06
Private Debt Assets	4,420,711	1.8	3.1	10.0	13.1	--	--	--	--	12.2	Jan-22
Infrastructure	11,561,188	4.6	3.6	3.7	6.4	--	--	--	--	7.8	Aug-22
Cash	419,871	0.2									

City of Marlborough Contributory Retirement System

Asset Allocation & Performance | As of September 30, 2024

	Market Value \$	% of Portfolio	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Since Inception	Inception Date
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<i>60% MSCI World & 40% Barclays Aggregate</i>			5.9	12.9	23.8	5.0	8.1	7.0	6.7	7.2	
<i>55% MSCI World & 45% Barclays Aggregate</i>			5.8	12.2	22.7	4.4	7.5	6.5	6.4	7.1	
<i>InvMetrics Public DB \$50mm-\$250mm Median</i>			5.4	11.9	21.1	4.5	8.4	7.5	6.8	--	
Domestic Equity Assets	70,805,416	28.4	7.0	15.4	28.5	9.4	12.7	11.1	--	9.3	Oct-06
<i>Russell 3000 Index</i>			6.2	20.6	35.2	10.3	15.3	12.8	--	10.4	
RhumbLine S&P 500 Index	21,996,802	8.8	5.9	22.0	36.2	11.9	15.9	13.3	10.7	8.2	Mar-99
<i>S&P 500 Index</i>			5.9	22.1	36.4	11.9	16.0	13.4	10.7	8.2	
<i>eV US Passive S&P 500 Equity Median</i>			5.9	22.0	36.2	11.8	15.8	13.3	10.6	8.1	
Frontier Capital Appreciation	27,556,180	11.0	8.1	11.2	24.8	6.1	11.6	9.8	--	11.3	Feb-13
<i>Russell 2500 Growth Index</i>			7.0	11.2	25.2	-0.7	9.7	10.0	--	11.0	
<i>eV US Small-Mid Cap Growth Equity Median</i>			6.8	11.8	24.5	-0.8	10.9	10.5	--	11.3	
RhumbLine HEDI	21,252,435	8.5	7.0	13.9	25.3	9.7	--	--	--	14.1	Nov-20
<i>Russell 1000 High Effic. Defensive Moderate Index</i>			7.0	18.6	30.4	11.2	--	--	--	15.3	
<i>eV US Large Cap Core Equity Median</i>			5.7	20.3	34.1	10.5	--	--	--	15.9	
International Developed Markets Equity Assets	48,528,603	19.5	7.2	13.1	24.8	5.7	8.4	5.6	--	4.1	Oct-06
<i>MSCI EAFE</i>			7.3	13.0	24.8	5.5	8.2	5.7	--	4.3	
RhumbLine MSCI EAFE Index	48,528,603	19.5	7.2	13.1	24.8	5.7	8.4	5.9	--	5.4	Aug-14
<i>MSCI EAFE</i>			7.3	13.0	24.8	5.5	8.2	5.7	--	5.2	
<i>eV EAFE All Cap Equity Median</i>			7.7	13.0	24.5	4.7	8.1	5.9	--	5.4	

City of Marlborough Contributory Retirement System

Asset Allocation & Performance | As of September 30, 2024

	Market Value \$	% of Portfolio	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Since Inception	Inception Date
International Emerging Markets Equity Assets	25,633,593	10.3	4.6	15.1	24.2	1.8	7.7	--	--	6.1	Jan-15
<i>MSCI Emerging Markets</i>			<i>8.7</i>	<i>16.9</i>	<i>26.1</i>	<i>0.4</i>	<i>5.7</i>	--	--	<i>4.6</i>	
DFA Emerging Markets	13,657,549	5.5	6.6	15.2	24.3	3.9	8.2	--	--	5.7	Jan-15
<i>MSCI Emerging Markets</i>			<i>8.7</i>	<i>16.9</i>	<i>26.1</i>	<i>0.4</i>	<i>5.7</i>	--	--	<i>4.6</i>	
<i>eV Emg Mkts All Cap Equity Median</i>			<i>6.9</i>	<i>14.5</i>	<i>23.6</i>	<i>-0.4</i>	<i>5.8</i>	--	--	<i>5.0</i>	
Driehaus Emerging Market Equity	11,976,043	4.8	2.5	15.0	24.2	-0.4	6.9	--	--	6.3	Jan-15
<i>MSCI Emerging Markets</i>			<i>8.7</i>	<i>16.9</i>	<i>26.1</i>	<i>0.4</i>	<i>5.7</i>	--	--	<i>4.6</i>	
<i>eV Emg Mkts All Cap Equity Median</i>			<i>6.9</i>	<i>14.5</i>	<i>23.6</i>	<i>-0.4</i>	<i>5.8</i>	--	--	<i>5.0</i>	
Investment Grade Bonds Assets	27,343,273	11.0	5.2	4.5	11.5	-1.5	0.3	1.8	3.2	5.3	Jul-88
<i>Blmbg. U.S. Aggregate Index</i>			<i>5.2</i>	<i>4.4</i>	<i>11.6</i>	<i>-1.4</i>	<i>0.3</i>	<i>1.8</i>	<i>3.2</i>	<i>5.4</i>	
SSgA U.S. Aggregate Bond Index	27,343,273	11.0	5.2	4.5	11.5	-1.5	0.3	1.8	3.2	3.7	May-01
<i>Blmbg. U.S. Aggregate Index</i>			<i>5.2</i>	<i>4.4</i>	<i>11.6</i>	<i>-1.4</i>	<i>0.3</i>	<i>1.8</i>	<i>3.2</i>	<i>3.7</i>	
<i>eV US Core Fixed Inc Median</i>			<i>5.2</i>	<i>4.8</i>	<i>11.9</i>	<i>-1.2</i>	<i>0.7</i>	<i>2.1</i>	<i>3.5</i>	<i>4.0</i>	
High Yield Bond Assets	15,235,306	6.1	3.9	6.7	12.7	3.1	4.3	4.7	5.9	6.2	Sep-03
<i>Blmbg. U.S. Corp: High Yield Index</i>			<i>5.3</i>	<i>8.0</i>	<i>15.7</i>	<i>3.1</i>	<i>4.7</i>	<i>5.0</i>	<i>6.7</i>	<i>7.1</i>	
Shenkman Capital	15,235,306	6.1	3.9	6.7	12.7	3.2	4.3	4.7	--	6.1	Apr-06
<i>Blmbg. U.S. Corp: High Yield Index</i>			<i>5.3</i>	<i>8.0</i>	<i>15.7</i>	<i>3.1</i>	<i>4.7</i>	<i>5.0</i>	--	<i>6.7</i>	
<i>eV US High Yield Fixed Inc Median</i>			<i>4.4</i>	<i>7.3</i>	<i>14.3</i>	<i>3.1</i>	<i>4.4</i>	<i>4.6</i>	--	<i>6.0</i>	
TIPS Assets	12,288,459	4.9	4.1	5.0	9.7	-0.7	2.5	2.5	--	3.4	Oct-05
<i>Blmbg. U.S. TIPS Index</i>			<i>4.1</i>	<i>4.9</i>	<i>9.8</i>	<i>-0.6</i>	<i>2.6</i>	<i>2.5</i>	--	<i>3.5</i>	
SSgA TIPS Index-NL	12,288,459	4.9	4.1	5.0	9.7	-0.7	2.5	2.5	--	3.4	Oct-05
<i>Blmbg. U.S. TIPS Index</i>			<i>4.1</i>	<i>4.9</i>	<i>9.8</i>	<i>-0.6</i>	<i>2.6</i>	<i>2.5</i>	--	<i>3.5</i>	
<i>eV US TIPS / Inflation Fixed Inc Median</i>			<i>4.0</i>	<i>4.9</i>	<i>9.6</i>	<i>-0.4</i>	<i>2.6</i>	<i>2.5</i>	--	<i>3.4</i>	

City of Marlborough Contributory Retirement System Asset Allocation & Performance | As of September 30, 2024

	Market Value \$	% of Portfolio	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Since Inception	Inception Date
Emerging Market Debt Assets	11,001,242	4.4	6.0	9.0	20.1	-0.1	1.6	--	--	3.6	Jan-15
<i>JPM EMBI Global Diversified</i>			<i>6.2</i>	<i>8.6</i>	<i>18.6</i>	<i>-0.4</i>	<i>0.9</i>	<i>--</i>	<i>--</i>	<i>3.4</i>	
Payden Emerging Market Bond	11,001,242	4.4	6.0	9.0	20.1	-0.1	1.6	--	--	3.6	Jan-15
<i>JPM EMBI Global Diversified</i>			<i>6.2</i>	<i>8.6</i>	<i>18.6</i>	<i>-0.4</i>	<i>0.9</i>	<i>--</i>	<i>--</i>	<i>3.4</i>	
<i>Emerging Markets Bond Median</i>			<i>6.2</i>	<i>8.4</i>	<i>18.2</i>	<i>0.4</i>	<i>1.7</i>	<i>--</i>	<i>--</i>	<i>3.2</i>	
Open-Ended Real Estate	5,484,705	2.2	0.2	-5.2	-9.6	-2.2	2.2	6.1	5.8	7.1	Oct-95
<i>NCREIF ODCE (VW) (Monthly)</i>			<i>0.2</i>	<i>-2.6</i>	<i>-7.3</i>	<i>-0.2</i>	<i>2.9</i>	<i>6.1</i>	<i>6.6</i>	<i>8.0</i>	
Clarion Partners	5,484,705	2.2	0.2	-5.2	-9.6	-2.2	2.2	6.1	5.8	6.2	Oct-02
<i>NCREIF ODCE (VW) (Monthly)</i>			<i>0.2</i>	<i>-2.6</i>	<i>-7.3</i>	<i>-0.2</i>	<i>2.9</i>	<i>6.1</i>	<i>6.6</i>	<i>6.9</i>	
Total Closed End Real Estate	3,820,404	1.5	-0.9	-10.5	-13.2	-3.1	0.6	-0.8	--	1.5	Jan-13
<i>NCREIF ODCE (VW) (Monthly)</i>			<i>0.2</i>	<i>-2.6</i>	<i>-7.3</i>	<i>-0.2</i>	<i>2.9</i>	<i>6.1</i>	<i>--</i>	<i>7.1</i>	
Rockwood Capital Real Estate Partners Fund XI, L.P.	3,820,404	1.5	-0.9	-10.5	-13.2	-3.1	--	--	--	-0.3	Dec-19
<i>NCREIF ODCE (VW) (Monthly)</i>			<i>0.2</i>	<i>-2.6</i>	<i>-7.3</i>	<i>-0.2</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>3.0</i>	
Private Equity Assets	12,852,878	5.2									
North American Strategic Partners 2006											
Ironsides Partnership Fund IV											
Ironsides Direct Investment Fund IV											
Ironsides Partnership Fund V, L.P.											
Ironsides Direct Investment Fund V, L.P.											
HarbourVest 2019 Global Fund											
Private Debt Assets	4,420,711	1.8	3.1	10.0	13.1	--	--	--	--	12.2	Jan-22
NB Private Debt Fund IV	4,420,711	1.8	3.1	10.0	13.1	--	--	--	--	12.2	Jan-22
Infrastructure	11,561,188	4.6	3.6	3.7	6.4	--	--	--	--	7.8	Aug-22
IFM Global Infrastructure	11,561,188	4.6	3.6	3.7	6.4	--	--	--	--	7.8	Aug-22
<i>CPI +3% (Unadjusted)</i>			<i>1.1</i>	<i>5.1</i>	<i>5.5</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>6.0</i>	
Cash	419,871	0.2									

Closed End Real Estate, Private Equity, and Private Debt market values are as of June 30th, 2024 and adjusted for subsequent flows.

North American Strategic Partners market value is cash adjusted as of December 31, 2023. The fund is currently in the liquidation process and will only be reported on annually (as of December 31).

Asset Allocation & Performance | As of September 30, 2024

	2023 (%)	2022 (%)	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)
Total Retirement System	13.6	-12.5	13.8	14.2	17.5	-4.5	13.0	8.7	-0.2	6.3
<i>60% MSCI World & 40% Barclays Aggregate</i>	<i>16.3</i>	<i>-15.9</i>	<i>12.0</i>	<i>13.3</i>	<i>20.0</i>	<i>-5.1</i>	<i>14.5</i>	<i>5.7</i>	<i>-0.1</i>	<i>5.4</i>
<i>55% MSCI World & 45% Barclays Aggregate</i>	<i>15.3</i>	<i>-15.6</i>	<i>10.9</i>	<i>12.9</i>	<i>19.1</i>	<i>-4.6</i>	<i>13.6</i>	<i>5.5</i>	<i>0.0</i>	<i>5.5</i>
Domestic Equity Assets	24.0	-16.9	24.8	13.4	27.6	-6.9	20.1	14.6	-1.6	13.1
<i>Russell 3000 Index</i>	<i>26.0</i>	<i>-19.2</i>	<i>25.7</i>	<i>20.9</i>	<i>31.0</i>	<i>-5.2</i>	<i>21.1</i>	<i>12.7</i>	<i>0.5</i>	<i>12.6</i>
RhumbLine S&P 500 Index	26.2	-18.1	28.6	18.3	31.4	-4.4	21.8	11.9	1.4	13.6
<i>S&P 500 Index</i>	<i>26.3</i>	<i>-18.1</i>	<i>28.7</i>	<i>18.4</i>	<i>31.5</i>	<i>-4.4</i>	<i>21.8</i>	<i>12.0</i>	<i>1.4</i>	<i>13.7</i>
Frontier Capital Appreciation	23.9	-18.0	18.2	18.1	28.9	-13.9	19.1	20.5	-6.5	12.4
<i>Russell 2500 Growth Index</i>	<i>18.9</i>	<i>-26.2</i>	<i>5.0</i>	<i>40.5</i>	<i>32.7</i>	<i>-7.5</i>	<i>24.5</i>	<i>9.7</i>	<i>-0.2</i>	<i>7.1</i>
RhumbLine HEDI	22.2	-15.2	25.5	--	--	--	--	--	--	--
<i>Russell 1000 High Effic. Defensive Moderate Index</i>	<i>22.1</i>	<i>-15.1</i>	<i>25.5</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
International Developed Markets Equity Assets	18.5	-14.2	11.5	7.9	22.3	-13.5	24.9	1.4	-0.8	-8.7
<i>MSCI EAFE</i>	<i>18.2</i>	<i>-14.5</i>	<i>11.3</i>	<i>7.8</i>	<i>22.0</i>	<i>-13.8</i>	<i>25.0</i>	<i>1.0</i>	<i>-0.8</i>	<i>-4.9</i>
RhumbLine MSCI EAFE Index	18.5	-14.2	11.5	7.9	22.3	-13.5	24.9	1.4	-0.8	--
<i>MSCI EAFE</i>	<i>18.2</i>	<i>-14.5</i>	<i>11.3</i>	<i>7.8</i>	<i>22.0</i>	<i>-13.8</i>	<i>25.0</i>	<i>1.0</i>	<i>-0.8</i>	<i>--</i>
International Emerging Markets Equity Assets	13.6	-19.3	2.3	21.1	20.7	-15.4	39.7	9.4	-12.7	--
<i>MSCI Emerging Markets</i>	<i>9.8</i>	<i>-20.1</i>	<i>-2.5</i>	<i>18.3</i>	<i>18.4</i>	<i>-14.6</i>	<i>37.3</i>	<i>11.2</i>	<i>-14.9</i>	<i>--</i>
DFA Emerging Markets	15.5	-16.4	5.8	13.9	16.0	-15.2	36.6	12.4	-14.9	--
<i>MSCI Emerging Markets</i>	<i>9.8</i>	<i>-20.1</i>	<i>-2.5</i>	<i>18.3</i>	<i>18.4</i>	<i>-14.6</i>	<i>37.3</i>	<i>11.2</i>	<i>-14.9</i>	<i>--</i>
Driehaus Emerging Market Equity	11.6	-22.4	-1.5	28.0	25.3	-15.6	43.0	6.5	-10.6	--
<i>MSCI Emerging Markets</i>	<i>9.8</i>	<i>-20.1</i>	<i>-2.5</i>	<i>18.3</i>	<i>18.4</i>	<i>-14.6</i>	<i>37.3</i>	<i>11.2</i>	<i>-14.9</i>	<i>--</i>
Investment Grade Bonds Assets	5.6	-13.2	-1.6	7.5	8.7	0.0	3.6	2.6	0.6	6.0
<i>Blmbg. U.S. Aggregate Index</i>	<i>5.5</i>	<i>-13.0</i>	<i>-1.5</i>	<i>7.5</i>	<i>8.7</i>	<i>0.0</i>	<i>3.5</i>	<i>2.6</i>	<i>0.5</i>	<i>6.0</i>

Asset Allocation & Performance | As of September 30, 2024

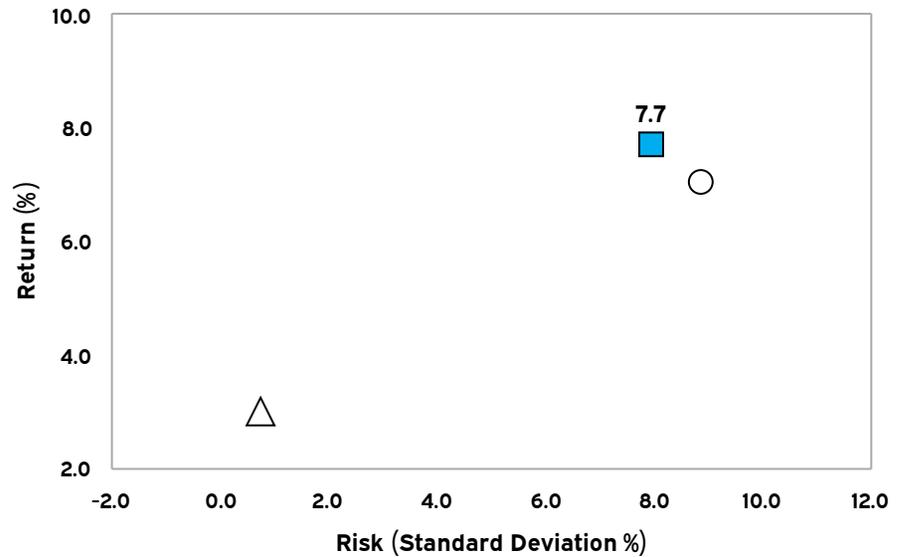
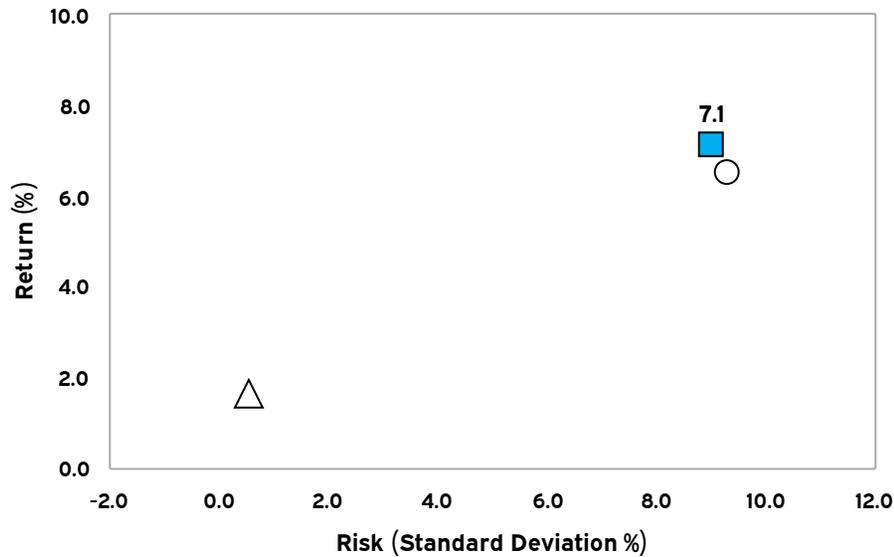
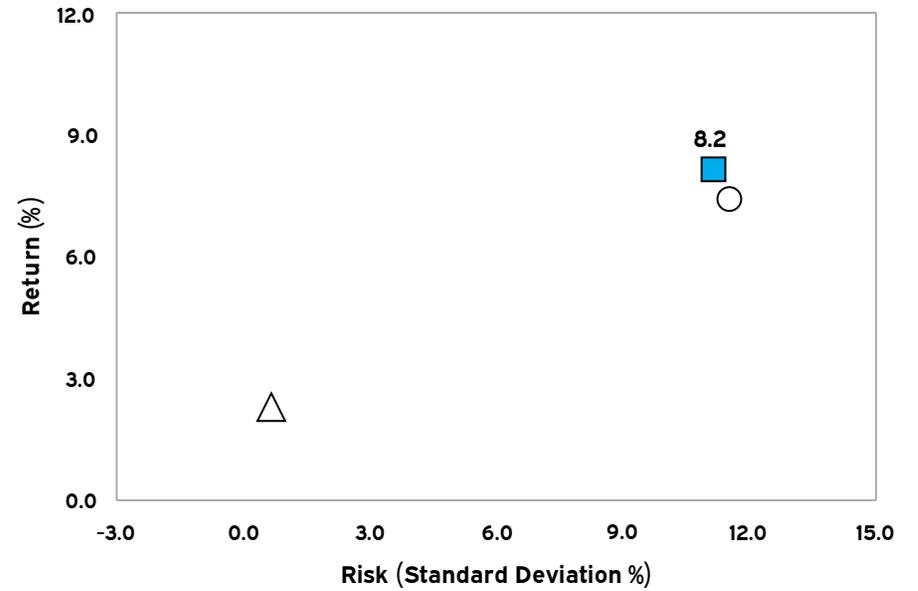
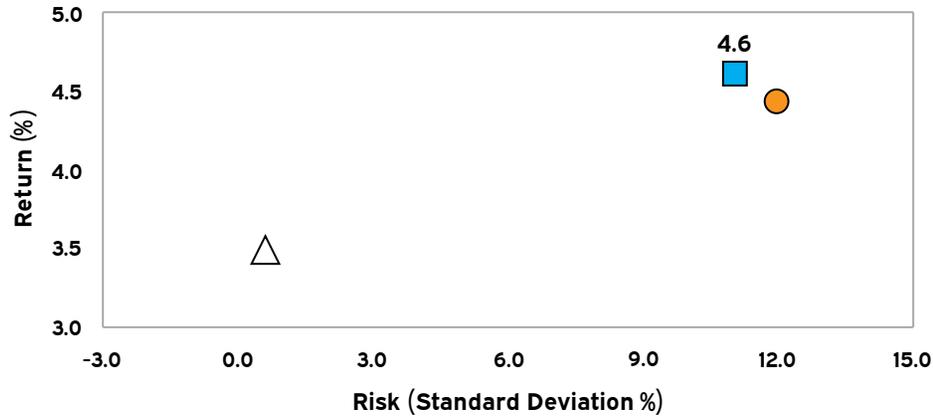
	2023 (%)	2022 (%)	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)
SSgA U.S. Aggregate Bond Index	5.6	-13.2	-1.6	7.5	8.7	0.0	3.6	2.6	0.6	6.0
<i>Blmbg. U.S. Aggregate Index</i>	<i>5.5</i>	<i>-13.0</i>	<i>-1.5</i>	<i>7.5</i>	<i>8.7</i>	<i>0.0</i>	<i>3.5</i>	<i>2.6</i>	<i>0.5</i>	<i>6.0</i>
High Yield Bond Assets	12.4	-8.9	4.0	6.3	14.0	-1.8	6.5	12.6	-2.3	2.9
<i>Blmbg. U.S. Corp: High Yield Index</i>	<i>13.4</i>	<i>-11.2</i>	<i>5.3</i>	<i>7.1</i>	<i>14.3</i>	<i>-2.1</i>	<i>7.5</i>	<i>17.1</i>	<i>-4.5</i>	<i>2.5</i>
Shenkman Capital	12.4	-8.8	4.0	6.3	14.0	-1.8	6.5	12.6	-2.3	2.9
<i>Blmbg. U.S. Corp: High Yield Index</i>	<i>13.4</i>	<i>-11.2</i>	<i>5.3</i>	<i>7.1</i>	<i>14.3</i>	<i>-2.1</i>	<i>7.5</i>	<i>17.1</i>	<i>-4.5</i>	<i>2.5</i>
TIPS Assets	3.8	-12.1	5.8	10.9	8.4	-1.4	3.0	4.7	-1.4	3.6
<i>Blmbg. U.S. TIPS Index</i>	<i>3.9</i>	<i>-11.8</i>	<i>6.0</i>	<i>11.0</i>	<i>8.4</i>	<i>-1.3</i>	<i>3.0</i>	<i>4.7</i>	<i>-1.4</i>	<i>3.6</i>
SSgA TIPS Index-NL	3.8	-12.1	5.8	10.9	8.4	-1.4	3.0	4.7	-1.4	3.6
<i>Blmbg. U.S. TIPS Index</i>	<i>3.9</i>	<i>-11.8</i>	<i>6.0</i>	<i>11.0</i>	<i>8.4</i>	<i>-1.3</i>	<i>3.0</i>	<i>4.7</i>	<i>-1.4</i>	<i>3.6</i>
Emerging Market Debt Assets	12.4	-17.4	-2.4	6.2	16.5	-7.0	12.0	11.5	-0.8	--
<i>JPM EMBI Global Diversified</i>	<i>11.1</i>	<i>-17.8</i>	<i>-1.8</i>	<i>5.3</i>	<i>15.0</i>	<i>-4.3</i>	<i>10.3</i>	<i>10.2</i>	<i>1.2</i>	<i>--</i>
Payden Emerging Market Bond	12.4	-17.4	-2.4	6.2	16.5	-7.0	12.0	11.5	-0.8	--
<i>JPM EMBI Global Diversified</i>	<i>11.1</i>	<i>-17.8</i>	<i>-1.8</i>	<i>5.3</i>	<i>15.0</i>	<i>-4.3</i>	<i>10.3</i>	<i>10.2</i>	<i>1.2</i>	<i>--</i>
Open-Ended Real Estate	-16.5	9.6	23.4	2.2	7.3	8.6	7.9	9.1	15.7	13.2
<i>NCREIF ODCE (VW) (Monthly)</i>	<i>-12.0</i>	<i>7.5</i>	<i>22.2</i>	<i>1.2</i>	<i>5.3</i>	<i>8.3</i>	<i>7.6</i>	<i>8.8</i>	<i>15.0</i>	<i>12.5</i>
Clarion Partners	-16.5	9.6	23.4	2.2	7.3	8.6	7.9	9.1	15.7	13.2
<i>NCREIF ODCE (VW) (Monthly)</i>	<i>-12.0</i>	<i>7.5</i>	<i>22.2</i>	<i>1.2</i>	<i>5.3</i>	<i>8.3</i>	<i>7.6</i>	<i>8.8</i>	<i>15.0</i>	<i>12.5</i>
Total Closed End Real Estate	-12.7	10.2	14.3	-5.3	-38.2	-1.8	15.1	9.5	23.8	13.4
<i>NCREIF ODCE (VW) (Monthly)</i>	<i>-12.0</i>	<i>7.5</i>	<i>22.2</i>	<i>1.2</i>	<i>5.3</i>	<i>8.3</i>	<i>7.6</i>	<i>8.8</i>	<i>15.0</i>	<i>12.5</i>
Rockwood Capital Real Estate Partners Fund XI, L.P.	-12.7	10.2	14.3	0.0	--	--	--	--	--	--
<i>NCREIF ODCE (VW) (Monthly)</i>	<i>-12.0</i>	<i>7.5</i>	<i>22.2</i>	<i>1.2</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>

Asset Allocation & Performance | As of September 30, 2024

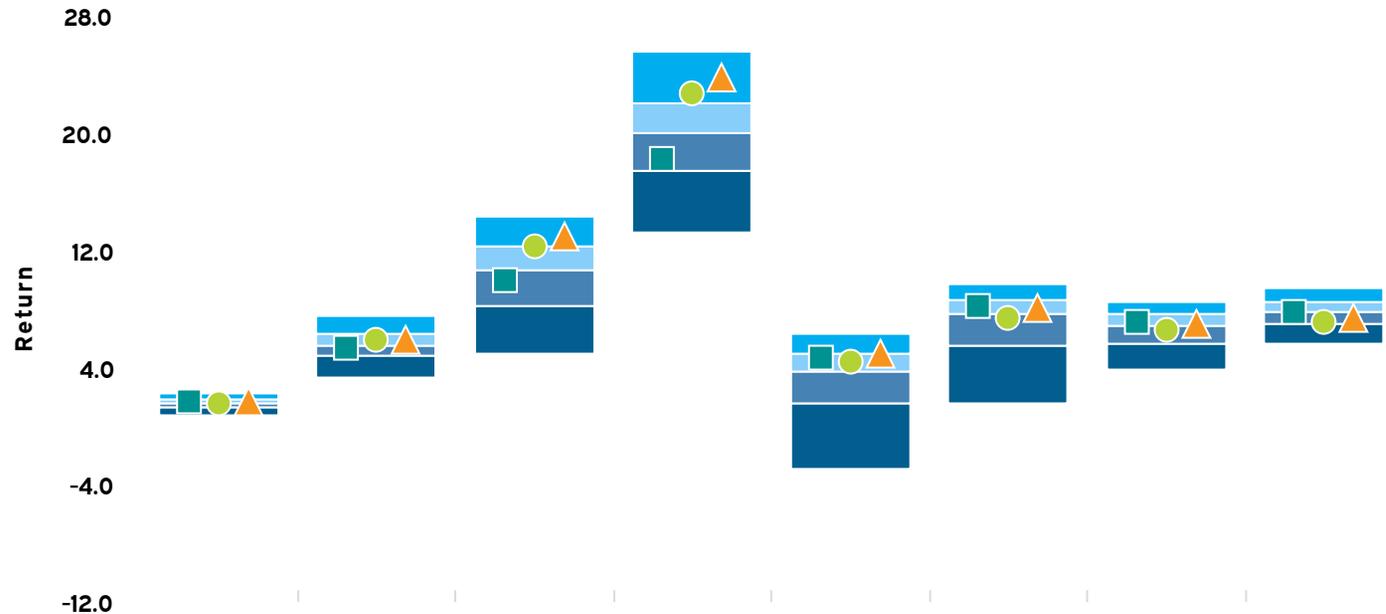
	2023 (%)	2022 (%)	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)
Private Equity Assets										
North American Strategic Partners 2006										
Ironsides Partnership Fund IV										
Ironsides Direct Investment Fund IV										
Ironsides Partnership Fund V, L.P.										
Ironsides Direct Investment Fund V, L.P.										
HarbourVest 2019 Global Fund										
Private Debt Assets	12.7	10.8	--	--	--	--	--	--	--	--
NB Private Debt Fund IV	12.7	10.8	--	--	--	--	--	--	--	--
Infrastructure	8.8	--	--	--	--	--	--	--	--	--
IFM Global Infrastructure	8.8	--	--	--	--	--	--	--	--	--
<i>CPI +3% (Unadjusted)</i>	<i>6.4</i>	--	--	--	--	--	--	--	--	--
Cash										

City of Marlborough Contributory Retirement System Total Retirement System | As of September 30, 2024

- Total Retirement System
- 55% MSCI World & 45% Barclays Aggregate
- △ 90 Day U.S. Treasury Bill



City of Marlborough Contributory Retirement System Peer Group Analysis | As of September 30, 2024



	1 Mo (%)	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	15 Yrs (%)
■ Total Retirement System	1.7 (42)	5.3 (58)	10.0 (57)	18.2 (68)	4.6 (32)	8.2 (37)	7.1 (42)	7.8 (49)
● 55% MSCI World & 45% Barclays Aggregate	1.6 (47)	5.8 (39)	12.2 (27)	22.7 (18)	4.4 (36)	7.5 (55)	6.5 (58)	7.1 (73)
▲ 60% MSCI World & 40% Barclays Aggregate	1.6 (44)	5.9 (37)	12.9 (15)	23.8 (11)	5.0 (25)	8.1 (39)	7.0 (47)	7.4 (62)
5th Percentile	2.2	7.5	14.3	25.6	6.3	9.7	8.4	9.4
1st Quartile	1.9	6.3	12.3	22.0	4.9	8.6	7.6	8.5
Median	1.6	5.5	10.6	20.0	3.7	7.7	6.9	7.8
3rd Quartile	1.3	4.9	8.2	17.4	1.6	5.5	5.6	6.9
95th Percentile	0.8	3.3	4.9	13.2	-2.9	1.5	3.9	5.6
Population	535	534	531	527	502	491	417	327

Peer group is "Taft Hartley DB Plans." Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

5-year risk statistics						
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Tracking Error	Information Ratio	Beta
Total Retirement System	8.19	11.16	0.56	2.40	-0.01	0.90
<i>60% MSCI World & 40% Barclays Aggregate</i>	<i>8.08</i>	<i>12.15</i>	<i>0.51</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
<i>55% MSCI World & 45% Barclays Aggregate</i>	<i>7.45</i>	<i>11.51</i>	<i>0.48</i>	<i>0.75</i>	<i>-0.89</i>	<i>0.95</i>
Equity Assets	10.91	17.88	0.54	3.91	-1.02	0.95
<i>Russell 3000 Index</i>	<i>15.26</i>	<i>18.44</i>	<i>0.74</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Domestic Equity Assets	12.68	19.18	0.60	3.25	-0.66	1.03
<i>Russell 3000 Index</i>	<i>15.26</i>	<i>18.44</i>	<i>0.74</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
RhumbLine S&P 500 Index	15.91	17.86	0.79	0.05	-1.38	1.00
<i>S&P 500 Index</i>	<i>15.98</i>	<i>17.89</i>	<i>0.79</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Frontier Capital Appreciation	11.61	26.02	0.47	9.00	0.29	1.08
<i>Russell 2500 Growth Index</i>	<i>9.75</i>	<i>22.72</i>	<i>0.42</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
RhumbLine HEDI	-	-	-	-	-	-
<i>Russell 1000 High Effic. Defensive Moderate Index</i>	<i>14.33</i>	<i>16.65</i>	<i>0.75</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
International Developed Markets Equity Assets	8.39	17.40	0.42	0.30	0.53	0.99
<i>MSCI EAFE</i>	<i>8.20</i>	<i>17.52</i>	<i>0.41</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
RhumbLine MSCI EAFE Index	8.39	17.40	0.42	0.30	0.53	0.99
<i>MSCI EAFE</i>	<i>8.20</i>	<i>17.52</i>	<i>0.41</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
International Emerging Markets Equity Assets	7.71	17.40	0.38	3.57	0.47	0.93
<i>MSCI Emerging Markets</i>	<i>5.75</i>	<i>18.47</i>	<i>0.27</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>

RhumbLine HEDI funded on 10/5/2020. Statistics will be reflected after first full five calendar years.

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Tracking Error	Information Ratio	Beta
DFA Emerging Markets	8.18	18.79	0.39	3.98	0.60	0.99
<i>MSCI Emerging Markets</i>	<i>5.75</i>	<i>18.47</i>	<i>0.27</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Driehaus Emerging Market Equity	6.92	16.68	0.35	5.74	0.14	0.86
<i>MSCI Emerging Markets</i>	<i>5.75</i>	<i>18.47</i>	<i>0.27</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Investment Grade Bonds Assets	0.27	6.22	-0.30	0.15	-0.38	1.00
<i>Blmbg. U.S. Aggregate Index</i>	<i>0.33</i>	<i>6.21</i>	<i>-0.29</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
SSgA U.S. Aggregate Bond Index	0.27	6.22	-0.30	0.15	-0.37	1.00
<i>Blmbg. U.S. Aggregate Index</i>	<i>0.33</i>	<i>6.21</i>	<i>-0.29</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
High Yield Bond Assets	4.32	8.13	0.28	1.33	-0.36	0.87
<i>Blmbg. U.S. Corp: High Yield Index</i>	<i>4.72</i>	<i>9.27</i>	<i>0.30</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Shenkman Capital	4.34	8.12	0.28	1.33	-0.35	0.87
<i>Blmbg. U.S. Corp: High Yield Index</i>	<i>4.72</i>	<i>9.27</i>	<i>0.30</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
TIPS Assets	2.53	6.15	0.06	0.18	-0.54	1.00
<i>Blmbg. U.S. TIPS Index</i>	<i>2.62</i>	<i>6.16</i>	<i>0.08</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
SSgA TIPS Index-NL	2.53	6.15	0.06	0.18	-0.54	1.00
<i>Blmbg. U.S. TIPS Index</i>	<i>2.62</i>	<i>6.16</i>	<i>0.08</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Emerging Market Debt Assets	1.57	12.79	0.01	2.13	0.40	1.10
<i>JPM EMBI Global Diversified</i>	<i>0.87</i>	<i>11.49</i>	<i>-0.07</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Payden Emerging Market Bond	1.57	12.79	0.01	2.13	0.40	1.10
<i>JPM EMBI Global Diversified</i>	<i>0.87</i>	<i>11.49</i>	<i>-0.07</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>

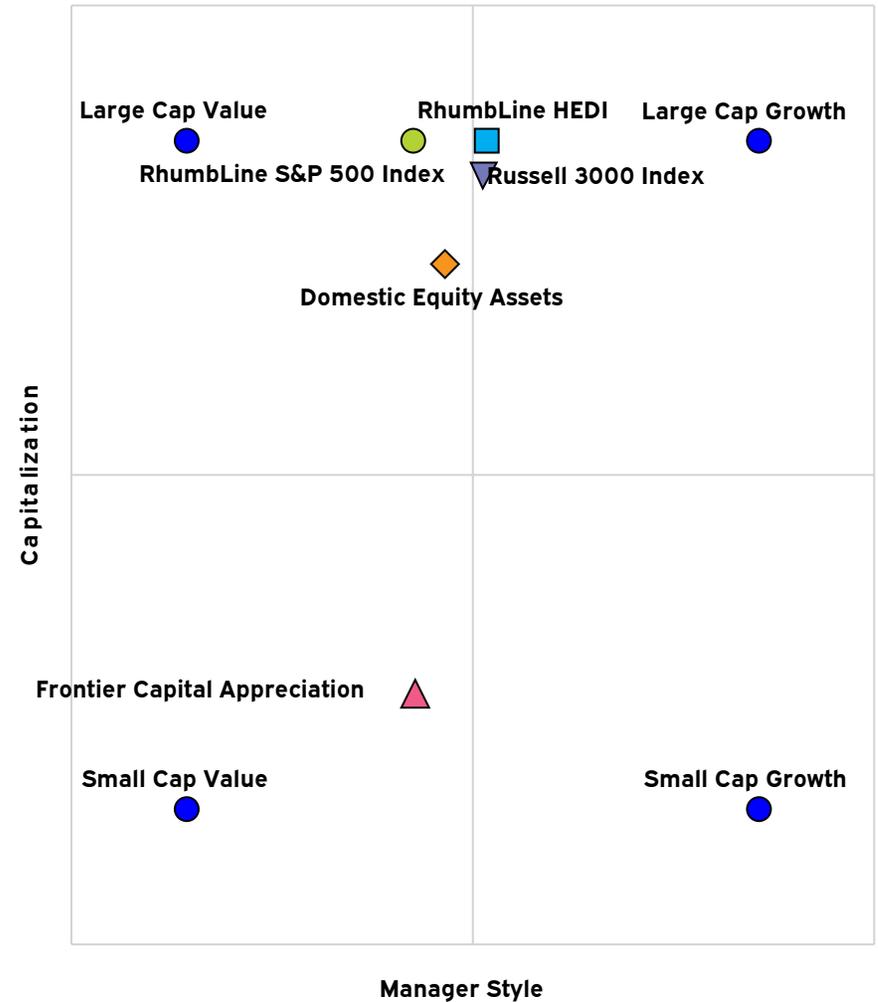
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Tracking Error	Information Ratio	Beta
Open-Ended Real Estate	2.22	8.67	0.03	2.37	-0.26	1.11
<i>NCREIF ODCE (VW) (Monthly)</i>	<i>2.94</i>	<i>7.52</i>	<i>0.11</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Clarion Partners	2.22	8.67	0.03	2.37	-0.26	1.11
<i>NCREIF ODCE (VW) (Monthly)</i>	<i>2.94</i>	<i>7.52</i>	<i>0.11</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Total Closed End Real Estate	0.56	9.12	-0.14	7.24	-0.31	0.77
<i>NCREIF ODCE (VW) (Monthly)</i>	<i>2.94</i>	<i>7.52</i>	<i>0.11</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
Rockwood Capital Real Estate Partners Fund XI, L.P.	-	-	-	-	-	-
<i>NCREIF ODCE (VW) (Monthly)</i>	<i>2.94</i>	<i>7.52</i>	<i>0.11</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
IFM Global Infrastructure	-	-	-	-	-	-
<i>CPI +3% (Unadjusted)</i>	<i>7.31</i>	<i>1.35</i>	<i>2.87</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>
EB Temporary Investment Fund	2.48	1.28	0.15	1.08	0.15	1.04
<i>ICE BofA 3 Month U.S. T-Bill</i>	<i>2.32</i>	<i>0.66</i>	<i>-</i>	<i>0.00</i>	<i>-</i>	<i>1.00</i>

Rockwood Capital XI and IFM Global Infrastructure statistics will be reflected after first full five calendar years.

Retirement System Detail

	Total Fund	
	\$	%
Frontier Capital Appreciation	27,556,180	38.92
RhumbLine HEDI	21,252,435	30.02
RhumbLine S&P 500 Index	21,996,802	31.07
Domestic Equity Assets	70,805,416	100.00

Domestic Equity Style Map 3 Years Ending September 30, 2024



Domestic Equity | As of September 30, 2024

Domestic Equity Characteristics

	Sep-2024	Jun-2024
--	----------	----------

Wtd. Avg. Mkt. Cap \$M

Domestic Equity Assets	1.0	1.0
Russell 3000 Index	0.9	0.9

Median Mkt. Cap \$M

Domestic Equity Assets	-	-
Russell 3000 Index	-	-

Price/Earnings ratio

Domestic Equity Assets	28.0	27.0
Russell 3000 Index	26.9	25.8

Current Yield

Domestic Equity Assets	1.3	1.4
Russell 3000 Index	1.3	1.4

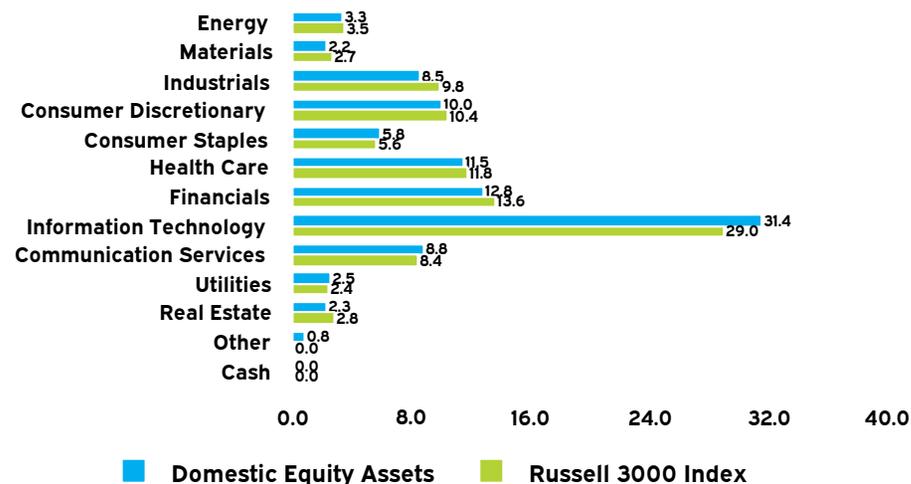
5 Yr. EPS Growth Rate

Domestic Equity Assets	18.9	17.9
Russell 3000 Index	18.4	17.5

Price/Book ratio

Domestic Equity Assets	5.1	4.9
Russell 3000 Index	4.7	4.6

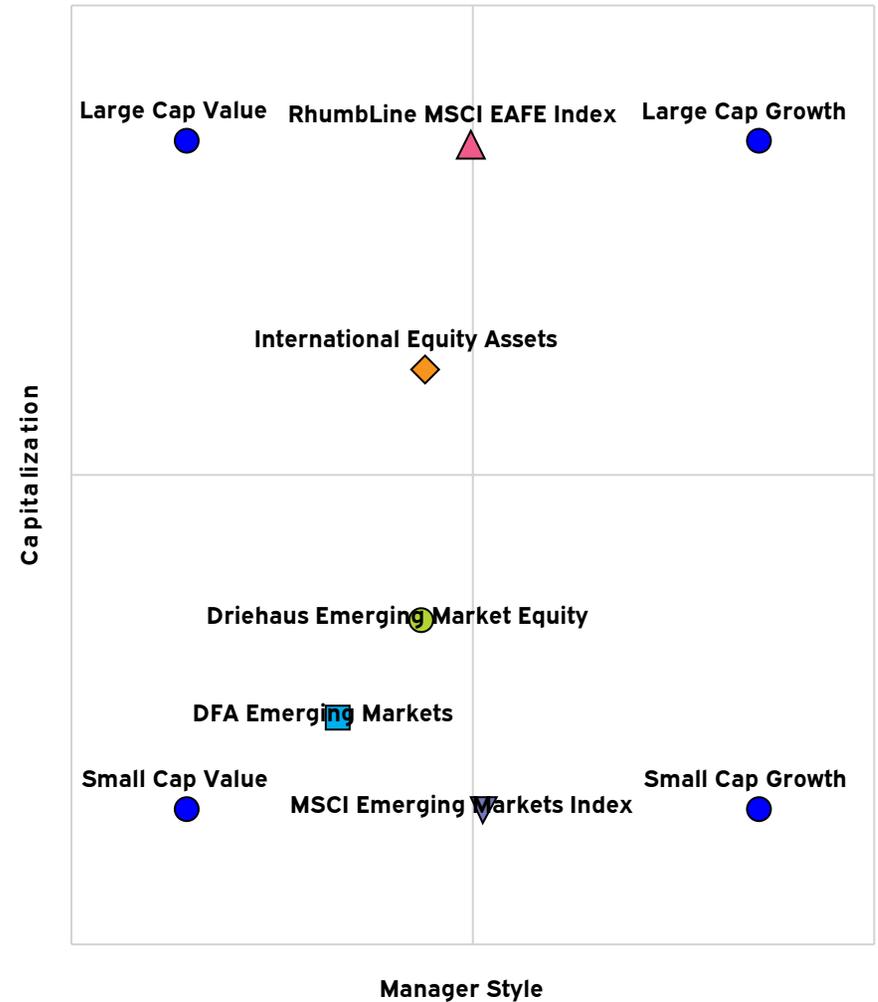
Sector Weights (%)



Domestic Equity Assets	
	Weight %
Apple Inc	7.2
Microsoft Corp	6.5
NVIDIA Corporation	6.1
Amazon.com Inc	3.5
Meta Platforms Inc	2.5
Alphabet Inc Class A	2.0
Berkshire Hathaway Inc	1.7
Alphabet Inc Class C	1.6
Broadcom Inc	1.6
Tesla Inc	1.5

	Total Fund	
	\$	%
DFA Emerging Markets	13,657,549	18.42
Driehaus Emerging Market Equity	11,976,043	16.15
RhumbLine MSCI EAFE Index	48,528,602.94	65.44
International Equity Assets	74,162,196	100.00

International Equity Assets Style Map 3 Years Ending September 30, 2024



International Equity Characteristics

Sep-2024 Jun-2024

Wtd. Avg. Mkt. Cap \$M

International Equity Assets	0.1	0.1
MSCI AC World ex USA IMI	0.1	0.1

Median Mkt. Cap \$M

International Equity Assets	-	-
MSCI AC World ex USA IMI	-	-

Price/Earnings ratio

International Equity Assets	13.9	13.7
MSCI AC World ex USA IMI	15.5	16.1

Current Yield

International Equity Assets	2.7	2.8
MSCI AC World ex USA IMI	2.9	3.0

5 Yr. EPS Growth Rate

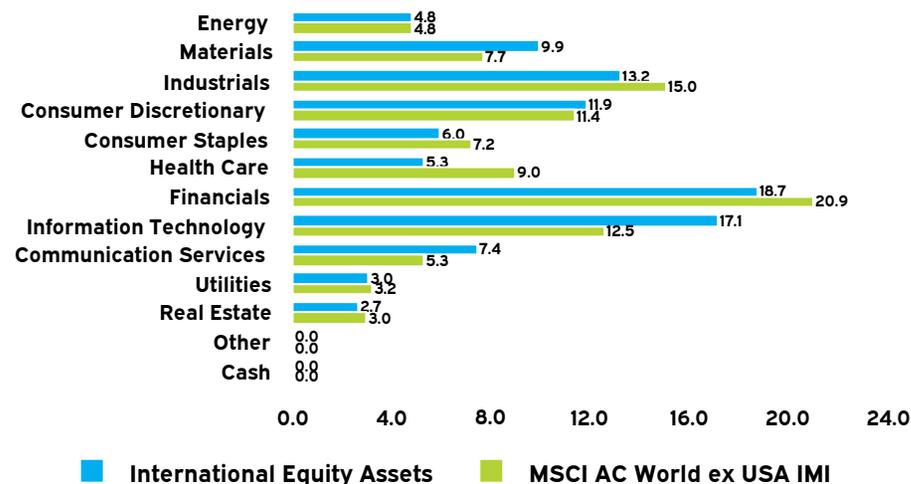
International Equity Assets	15.6	14.7
MSCI AC World ex USA IMI	10.7	10.3

Price/Book ratio

International Equity Assets	2.6	2.5
MSCI AC World ex USA IMI	2.6	2.5

International Equity | As of September 30, 2024

Sector Weights (%)



International Equity Assets	
	Weight %
Taiwan Semiconductor Manufac. COM	3.8
Tencent Holdings LTD	2.8
TECHNO ELECTRIC & ENGINEERIN	1.8
Taiwan Semiconductor Manufac. ADR	1.7
Alibaba Group Holding Ltd	1.1
China Construction Bank Corp	0.7
Reliance Industries Ltd	0.6
Infosys Ltd	0.6
Bharti Airtel Ltd	0.5
ICICI Bank Ltd	0.5

	International Equity Assets	MSCI AC World ex USA IMI
Canada	0.1	7.5
United States	0.3	0.4
Americas	0.4	7.9
Australia	0.5	4.8
Hong Kong	2.8	1.8
Japan	1.2	15.2
New Zealand	0.0	0.2
Singapore	0.3	1.1
Asia Pacific	4.9	23.1
Austria	0.0	0.2
Belgium	0.1	0.6
Denmark	0.2	2.0
Finland	0.1	0.7
France	0.6	6.0
Germany	0.5	5.1
Ireland	0.5	0.8
Israel	0.1	0.7
Italy	0.1	1.6
Netherlands	0.3	3.1
Norway	0.0	0.5
Portugal	0.0	0.1
Spain	0.2	1.6
Sweden	0.2	2.3
Switzerland	0.6	6.0
United Kingdom	0.8	8.8
EMEA	4.3	40.1

	International Equity Assets	MSCI AC World ex USA IMI
Developed Markets	9.5	71.1

City of Marlborough Contributory Retirement System

International Equity | As of September 30, 2024

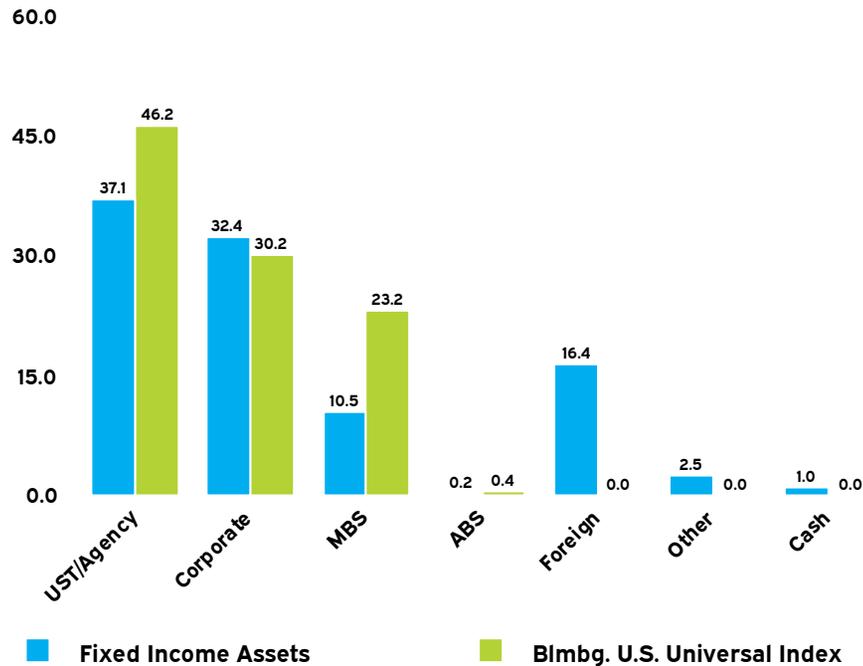
	International Equity Assets	MSCI AC World ex USA IMI
Brazil	4.0	1.3
Chile	0.4	0.1
Colombia	0.1	0.0
Mexico	1.9	0.5
Peru	0.1	0.0
Americas	6.4	2.1
China	19.6	6.5
India	22.4	6.4
Indonesia	1.7	0.5
Korea	8.0	3.1
Malaysia	1.6	0.5
Philippines	0.6	0.2
Taiwan	17.6	5.4
Thailand	1.5	0.5
Asia Pacific	73.1	23.1
Czech Republic	0.1	0.0
Egypt	0.0	0.0
Greece	0.4	0.1
Hungary	0.2	0.1
Kuwait	0.3	0.2
Poland	0.9	0.3
Qatar	0.7	0.2
Saudi Arabia	3.3	1.1
South Africa	2.8	0.9
Turkey	1.0	0.2
United Arab Emirates	1.3	0.3

	International Equity Assets	MSCI AC World ex USA IMI
EMEA	10.9	3.6
Emerging Markets	90.4	28.7
Malta	0.0	0.0
Mauritius	0.0	0.0
Frontier Markets	0.0	0.0
Cash	0.0	0.0
Other	0.0	0.2
Total	100.0	100.0

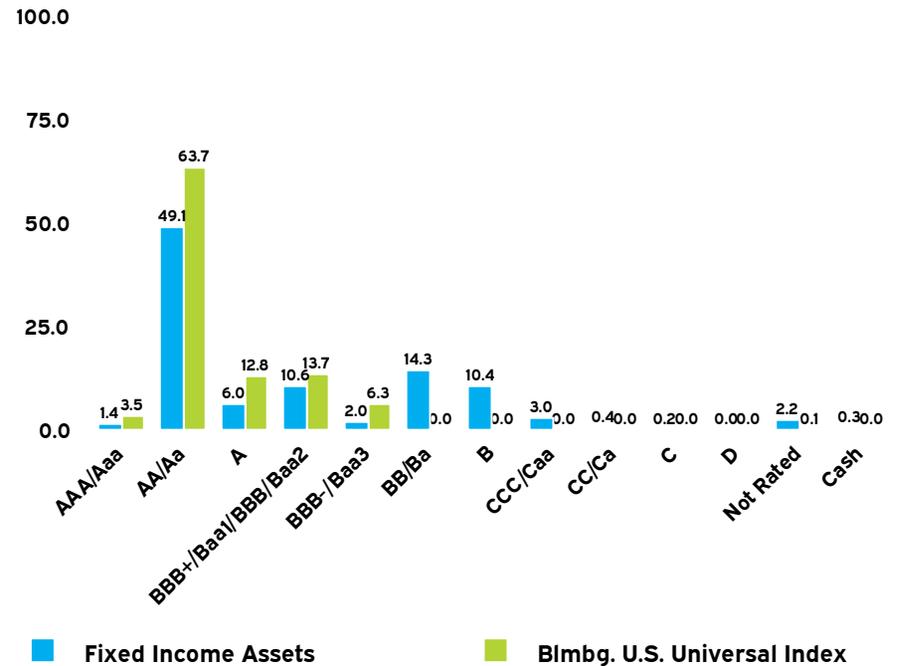
	Total Fund	
	\$	%
Payden Emerging Market Bond	11,001,242	16.70
Shenkman Capital	15,235,306	23.13
SSgA TIPS Index-NL	12,288,459	18.66
SSgA U.S. Aggregate Bond Index	27,343,273	41.51
Fixed Income Assets	65,868,280	100.00

Portfolio Characteristics		
	Portfolio	Benchmark
Yield To Maturity (%)	5.4	4.5
Average Duration	5.5	6.0
Avg. Quality	A	A
Weighted Average Maturity (Days)	7.9	8.2

Sector Distribution (%)



Credit Quality Distribution (%)



Portfolio Reviews

RhumbLine S&P 500 | As of September 30, 2024

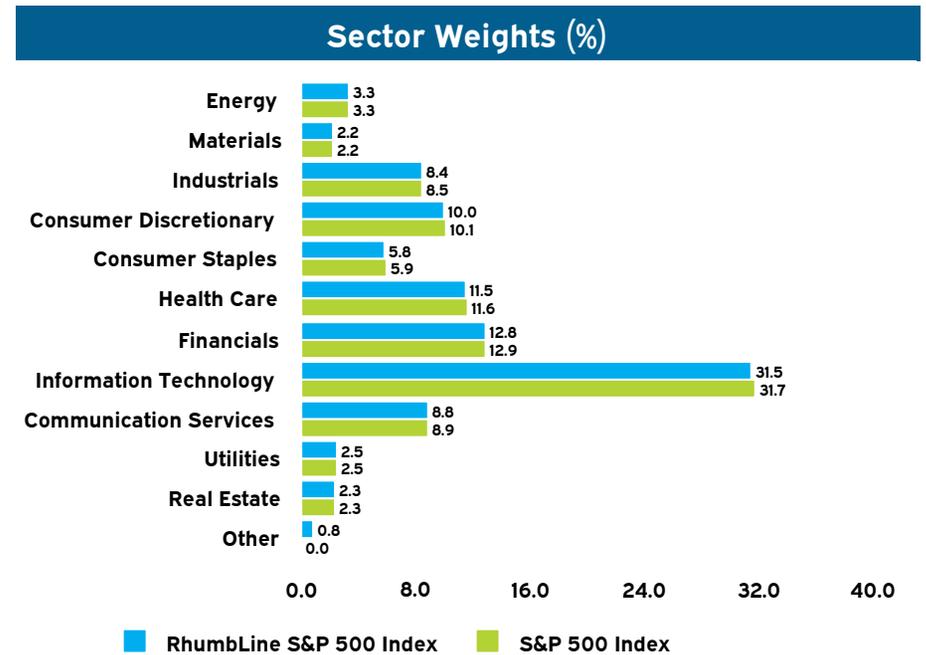
Top Holdings	
Apple Inc	7.2
Microsoft Corp	6.5
NVIDIA Corporation	6.1
Amazon.com Inc	3.6
Meta Platforms Inc	2.6
Alphabet Inc Class A	2.0
Berkshire Hathaway Inc	1.7
Alphabet Inc Class C	1.6
Broadcom Inc	1.6
Tesla Inc	1.5

Account Information	
Account Name	RhumbLine S&P 500 Index
Account Structure	Commingled Fund
Inception Date	02/28/1999
Asset Class	US Equity
Benchmark	S&P 500 Index
Peer Group	eV US Passive S&P 500 Equity

Equity Characteristics vs S&P 500 Index		
	Portfolio	Benchmark
Number of Holdings	505	504
Wtd. Avg. Mkt. Cap \$B	985.2	987.8
Median Mkt. Cap \$B	38.2	38.2
P/E Ratio	28.0	28.0
Yield (%)	1.3	1.3
EPS Growth - 5 Yrs. (%)	18.9	18.9
Price to Book	5.1	5.1

% of Portfolio **34.4**

Portfolio Performance Summary							
	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
RhumbLine S&P 500 Index	5.9	36.2	11.9	15.9	13.3	8.2	03/01/1999
S&P 500 Index	5.9	36.4	11.9	16.0	13.4	8.2	



RhumbLine HEDI | As of September 30, 2024

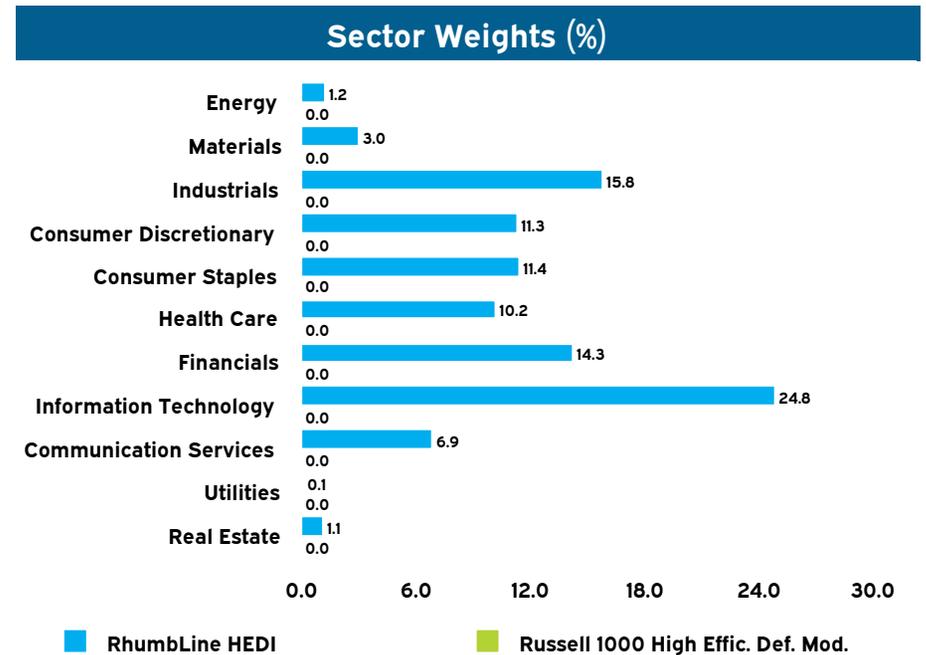
Top Holdings	
Apple Inc	6.5
Microsoft Corp	6.4
NVIDIA Corporation	4.4
Amazon.com Inc	3.0
Alphabet Inc Class C	1.9
Alphabet Inc Class A	1.9
Berkshire Hathaway Inc	1.8
Meta Platforms Inc	1.8
UnitedHealth Group Incorporated	1.3
Mastercard Inc	1.3

Account Information	
Account Name	RhumbLine HEDI
Account Structure	Separate Account
Inception Date	10/05/2020
Asset Class	US Equity
Benchmark	Russell 1000 High Effic. Defensive Moderate Index
Peer Group	eV US Large Cap Core Equity

Equity Characteristics vs Russell 1000 High Effic. Def. Mod.		
	Portfolio	Benchmark
Number of Holdings	225	0
Wtd. Avg. Mkt. Cap \$B	855.8	-
Median Mkt. Cap \$B	41.8	-
P/E Ratio	27.7	-
Yield (%)	1.2	-
EPS Growth - 5 Yrs. (%)	15.9	-
Price to Book	5.8	-

% of Portfolio **30.3**

Portfolio Performance Summary							
	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
RhumbLine HEDI	7.0	25.3	9.7	-	-	14.1	11/01/2020
Russell 1000 High Effic. Def. Mod.	7.0	30.4	11.2	14.3	14.1	15.3	



Russell 1000 HEDI benchmark characteristic data is unavailable.

Frontier Capital Appreciation | As of September 30, 2024

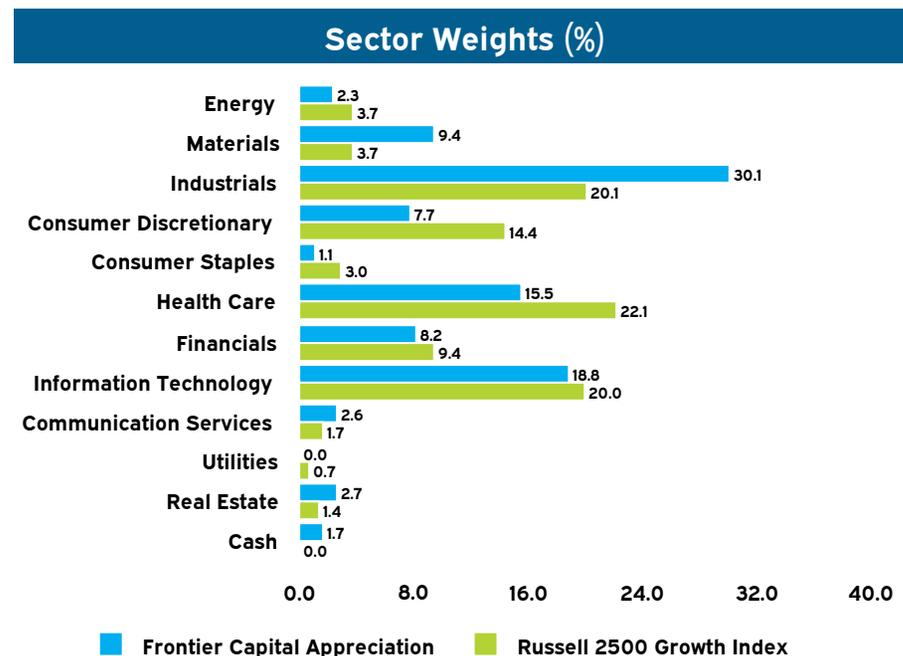
Top Holdings	
FTAI Aviation Ltd	2.5
ATI Inc	2.2
Carpenter Technology Corp	1.9
MRC Global Inc	1.7
Builders FirstSource Inc	1.5
Jabil Inc	1.4
Granite Construction Inc	1.4
Eagle Materials Inc	1.4
Beacon Roofing Supply Inc	1.4
MasTec Inc.	1.4

% of Portfolio **16.8**

Account Information	
Account Name	Frontier Capital Appreciation
Account Structure	Commingled Fund
Inception Date	02/01/2013
Asset Class	US Equity
Benchmark	Russell 2500 Growth Index
Peer Group	eV US Small-Mid Cap Growth Equity

Equity Characteristics vs Russell 2500 Growth Index		
	Portfolio	Benchmark
Number of Holdings	142	1,293
Wtd. Avg. Mkt. Cap \$B	10.2	6.6
Median Mkt. Cap \$B	7.3	1.5
P/E Ratio	21.7	26.7
Yield (%)	0.6	0.6
EPS Growth - 5 Yrs. (%)	17.3	19.1
Price to Book	3.0	5.0

Portfolio Performance Summary							
	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
Frontier Capital Appreciation	8.1	24.8	6.1	11.6	9.8	11.3	02/01/2013
Russell 2500 Growth Index	7.0	25.2	-0.7	9.7	10.0	11.0	



RhumbLine MSCI EAFE | As of September 30, 2024

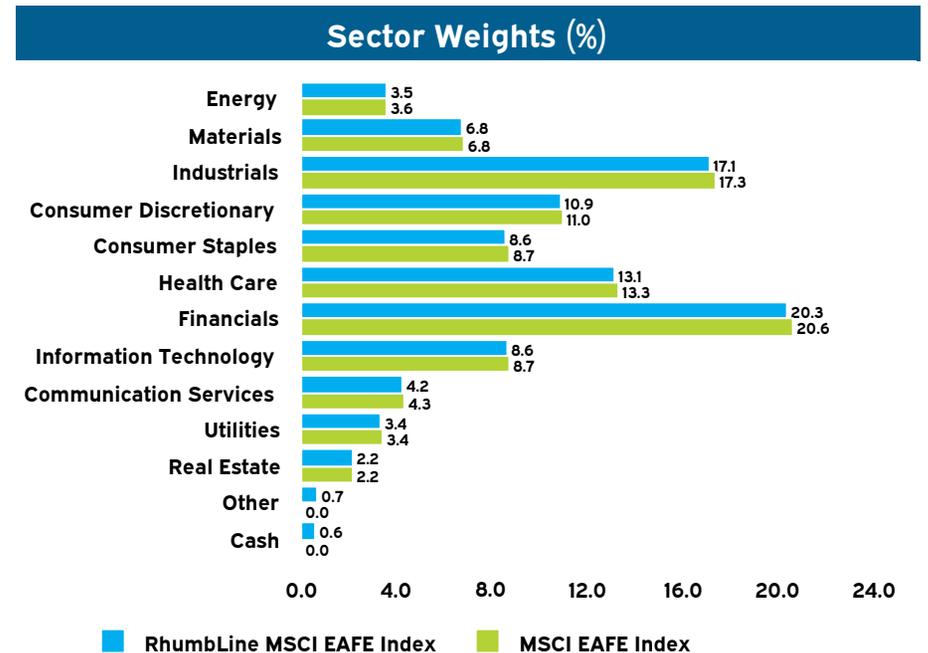
Top Holdings	
Novo Nordisk A/S	2.1
ASML Holding NV	1.9
Nestle SA, Cham Und Vevey	1.5
Astrazeneca PLC	1.4
SAP SE	1.3
Novartis AG	1.3
Roche Holding AG	1.3
LVMH Moet Hennessy Louis Vuitton SE	1.2
Shell Plc	1.2
Toyota Motor Corp	1.0

% of Portfolio **14.2**

Account Information	
Account Name	RhumbLine MSCI EAFE Index
Account Structure	Commingled Fund
Inception Date	07/21/2014
Asset Class	International Equity
Benchmark	MSCI EAFE (Net)
Peer Group	eV EAFE All Cap Equity

Equity Characteristics vs MSCI EAFE Index		
	Portfolio	Benchmark
Number of Holdings	744	732
Wtd. Avg. Mkt. Cap \$B	94.7	95.6
Median Mkt. Cap \$B	15.8	15.8
P/E Ratio	15.2	15.2
Yield (%)	3.0	3.0
EPS Growth - 5 Yrs. (%)	9.4	9.4
Price to Book	2.6	2.6

Portfolio Performance Summary							
	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
RhumbLine MSCI EAFE Index	7.2	24.8	5.7	8.4	5.9	5.4	08/01/2014
MSCI EAFE Index	7.3	25.4	6.0	8.7	6.2	5.7	



DFA Emerging Markets | As of September 30, 2024

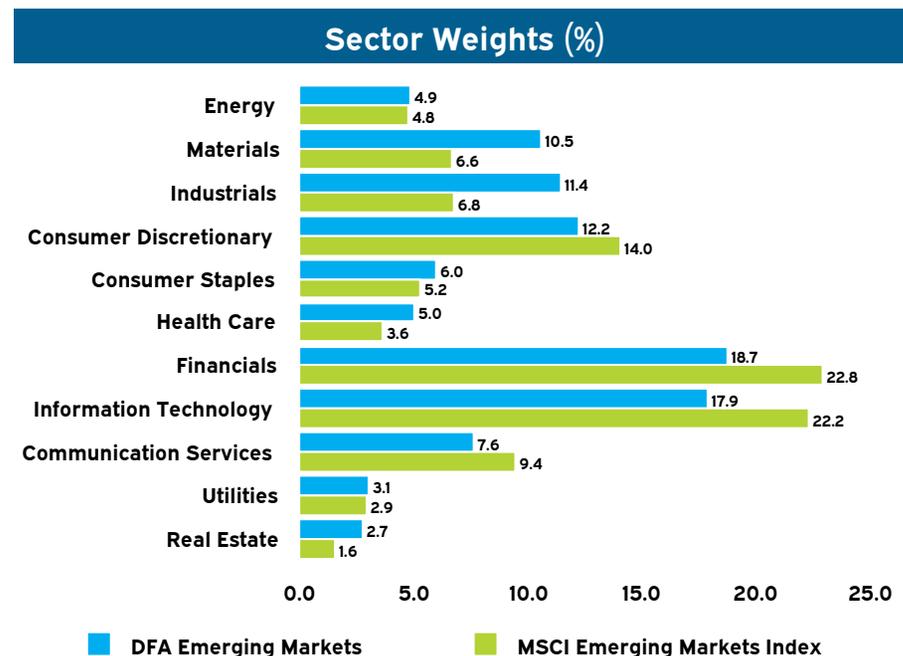
Top Holdings	
Taiwan Semiconductor Manufac. COM	4.3
Tencent Holdings LTD	3.2
Taiwan Semiconductor Manufac. ADR	1.7
Alibaba Group Holding Ltd	1.2
China Construction Bank Corp	0.7
Reliance Industries Ltd	0.7
Infosys Ltd	0.6
Bharti Airtel Ltd	0.5
Petroleo Brasileiro S.A.- Petrobras	0.5
Ping An Insurance Group Co of China Ltd	0.5

% of Portfolio **13.9**

Account Information	
Account Name	DFA Emerging Markets
Account Structure	Mutual Fund
Inception Date	12/01/2014
Asset Class	International Equity
Benchmark	MSCI Emerging Markets (Net)
Peer Group	eV Emg Mkts All Cap Equity

Equity Characteristics vs MSCI Emerging Markets Index		
	Portfolio	Benchmark
Number of Holdings	7,371	1,277
Wtd. Avg. Mkt. Cap \$B	90.2	153.6
Median Mkt. Cap \$B	0.9	8.2
P/E Ratio	13.7	15.7
Yield (%)	2.7	2.6
EPS Growth - 5 Yrs. (%)	15.8	14.7
Price to Book	2.6	2.9

Portfolio Performance Summary							
	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
DFA Emerging Markets	6.6	24.3	3.9	8.2	-	5.7	01/01/2015
MSCI Emerging Markets Index	8.9	26.5	0.8	6.1	4.4	5.0	



Driehaus Emerging Market Equity | As of September 30, 2024

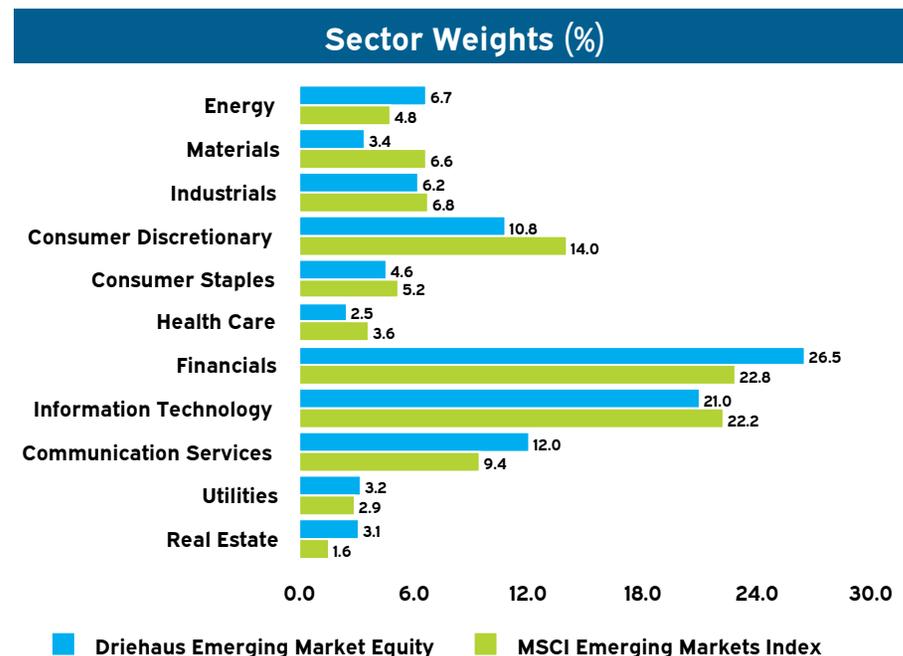
Top Holdings	
Tencent Holdings LTD	7.9
Taiwan Semiconductor Manufac. ADR	7.8
Miscellaneous Security	4.9
Samsung Electronics Co Ltd	4.4
ICICI Bank Ltd	2.7
Hong Kong Exchanges and Clearing Ltd	1.7
Reliance Industries Ltd	1.5
Meituan	1.5
PT Bank Mandiri (Persero) TBK	1.4
Shell Plc	1.4

Account Information	
Account Name	Driehaus Emerging Market Equity
Account Structure	Commingled Fund
Inception Date	12/01/2014
Asset Class	International Equity
Benchmark	MSCI Emerging Markets (Net)
Peer Group	eV Emg Mkts All Cap Equity

Equity Characteristics vs MSCI Emerging Markets Index		
	Portfolio	Benchmark
Number of Holdings	116	1,277
Wtd. Avg. Mkt. Cap \$B	162.6	153.6
Median Mkt. Cap \$B	16.9	8.2
P/E Ratio	15.2	15.7
Yield (%)	2.3	2.6
EPS Growth - 5 Yrs. (%)	22.6	14.7
Price to Book	3.3	2.9

% of Portfolio **35.2**

Portfolio Performance Summary							
	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
Driehaus Emerging Market Equity	2.5	24.2	-0.4	6.9	-	6.3	01/01/2015
MSCI Emerging Markets Index	8.9	26.5	0.8	6.1	4.4	5.0	



City of Marlborough Contributory Retirement System

SSgA U.S. Aggregate Bond | As of September 30, 2024

Account Information

Account Name	SSgA U.S. Aggregate Bond Index
Account Structure	Commingled Fund
Inception Date	04/01/2001
Asset Class	US Fixed Income
Benchmark	Blmbg. U.S. Aggregate Index
Peer Group	eV US Core Fixed Inc

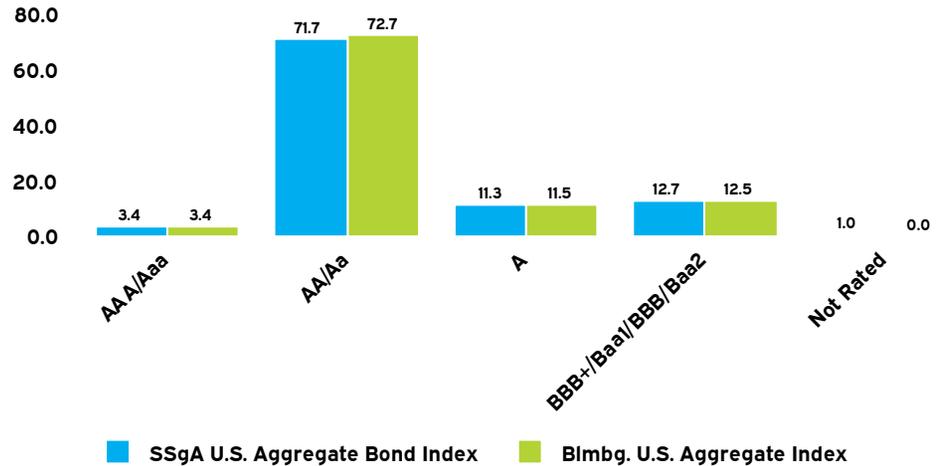
Portfolio Performance Summary

	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
SSgA U.S. Aggregate Bond Index	5.2	11.5	-1.5	0.3	1.8	3.7	05/01/2001
Blmbg. U.S. Aggregate Index	5.2	11.6	-1.4	0.3	1.8	3.7	

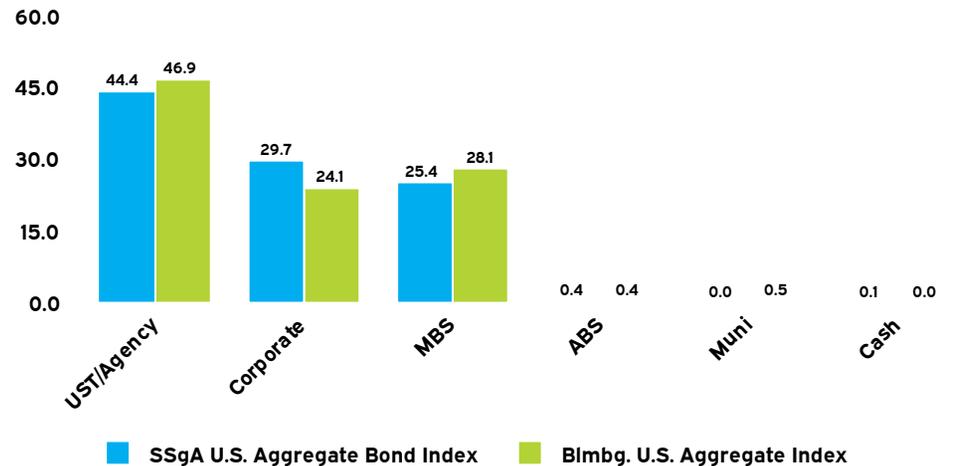
Portfolio Fixed Income Characteristics

	Q3-24 Portfolio	Q2-24 Portfolio
Yield To Maturity	4.2	5.0
Average Duration	6.1	6.1
Average Quality	AA-	AA-
Weighted Average Maturity	8.4	8.6

Credit Quality Allocation



Sector Allocation



Account Information

Account Name	Shenkman Capital
Account Structure	Commingled Fund
Inception Date	04/01/2006
Asset Class	US Fixed Income
Benchmark	Blmbg. U.S. Corp: High Yield Index
Peer Group	eV US High Yield Fixed Inc

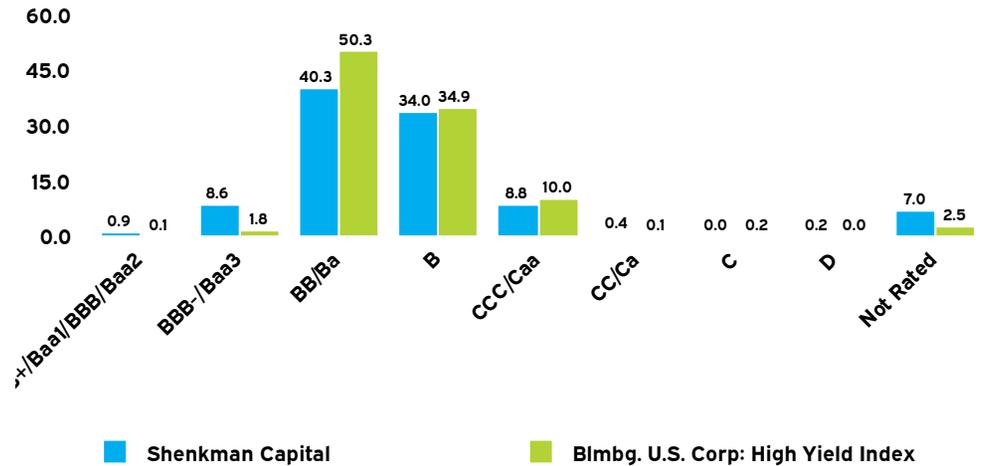
Portfolio Performance Summary

	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
Shenkman Capital	3.9	12.7	3.2	4.3	4.7	6.1	04/01/2006
Blmbg. U.S. Corp: High Yield Index	5.3	15.7	3.1	4.7	5.0	6.7	

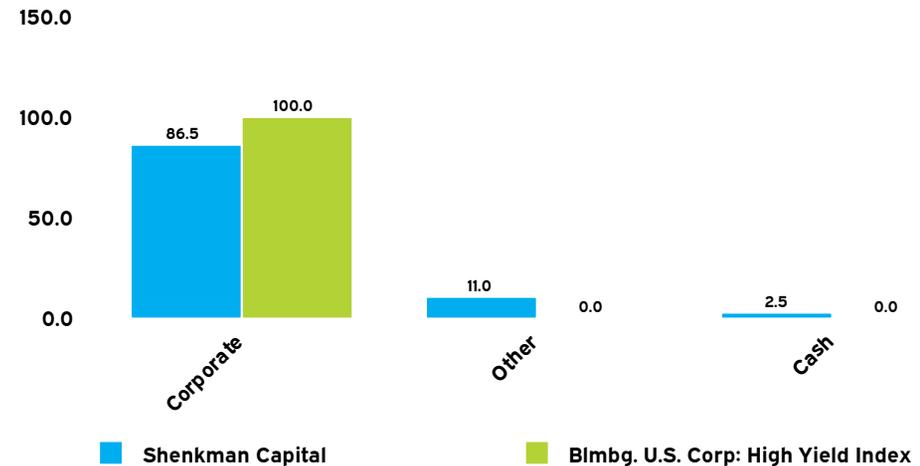
Portfolio Fixed Income Characteristics

	Q3-24 Portfolio	Q2-24 Portfolio
Yield To Maturity	6.9	7.6
Average Duration	2.7	3.0
Average Quality	BB-	B
Weighted Average Maturity	4.7	4.8

Credit Quality Allocation



Sector Allocation



City of Marlborough Contributory Retirement System

SSgA TIPS Index-NL | As of September 30, 2024

Account Information

Account Name	SSgA TIPS Index-NL
Account Structure	Commingled Fund
Inception Date	09/30/2005
Asset Class	US Fixed Income
Benchmark	Blmbg. U.S. TIPS Index
Peer Group	eV US TIPS / Inflation Fixed Inc

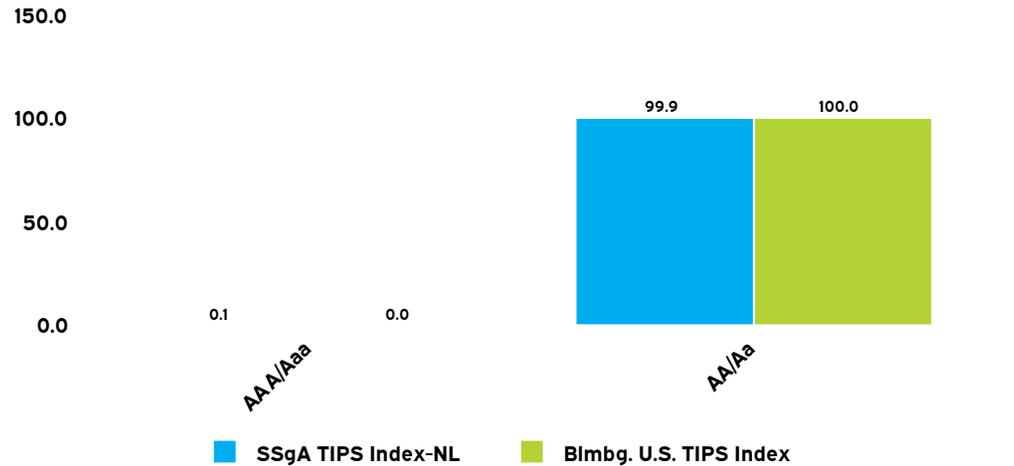
Portfolio Performance Summary

	Quarter To Date	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
SSgA TIPS Index-NL	4.1	9.7	-0.7	2.5	2.5	3.4	10/01/2005
Blmbg. U.S. TIPS Index	4.1	9.8	-0.6	2.6	2.5	3.5	

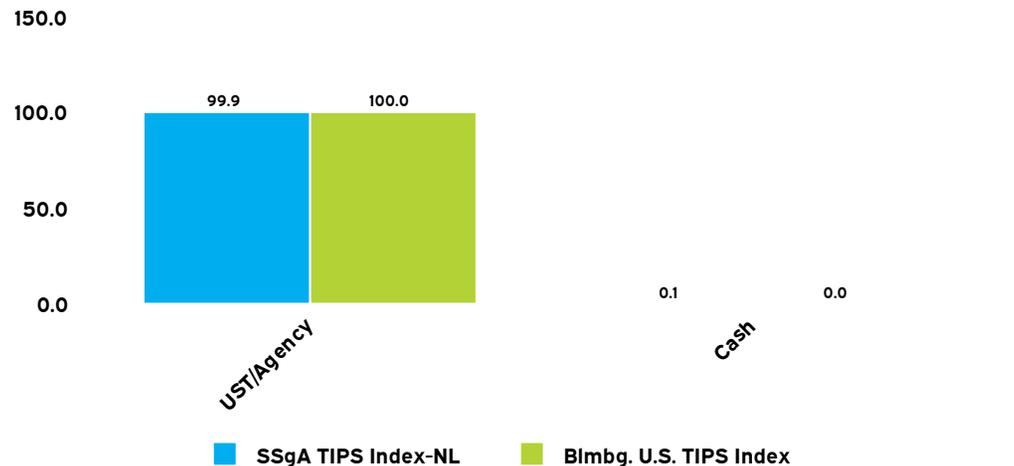
Portfolio Fixed Income Characteristics

	Q3-24 Portfolio	Q2-24 Portfolio
Yield To Maturity	3.8	4.7
Average Duration	6.6	6.6
Average Quality	AA	AA
Weighted Average Maturity	7.2	7.2

Credit Quality Allocation



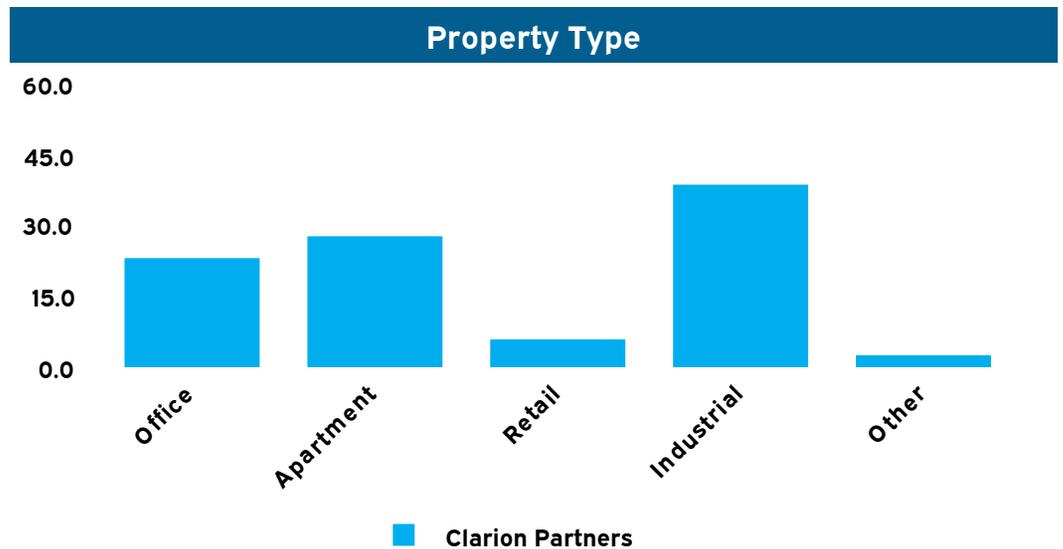
Sector Allocation



Account Information	
Account Name	Clarion Partners
Account Structure	Commingled Fund
Inception Date	09/01/2002
Asset Class	US Private Real Estate
Benchmark	NCREIF ODCE (VW) (Gross) (Monthly)

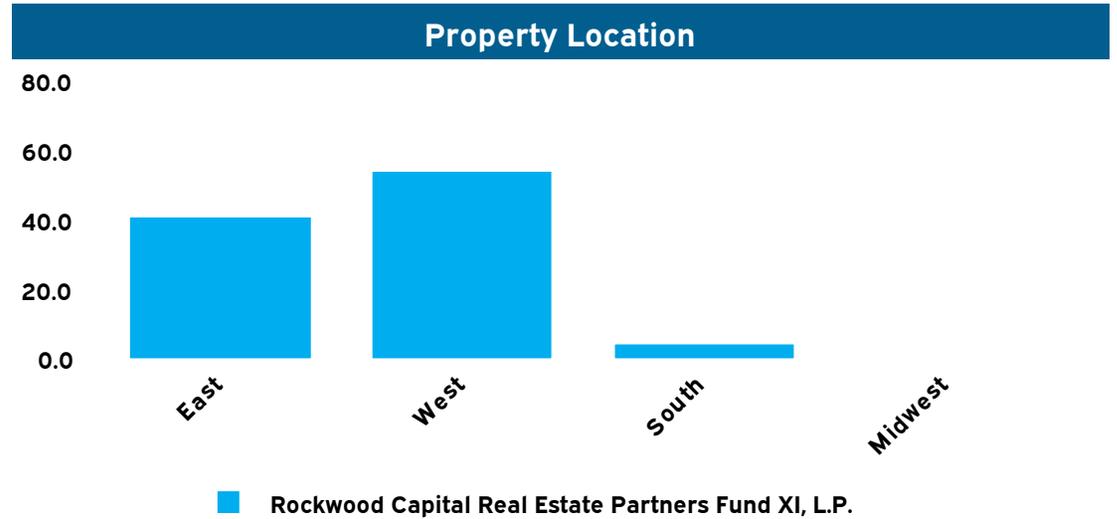


Portfolio Performance Summary							
	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
Clarion Partners	0.2	-9.6	-2.2	2.2	6.1	6.2	10/01/2002
NCREIF ODCE (VW) (Gross) (Monthly)	0.2	-7.3	-0.2	2.9	6.1	6.9	



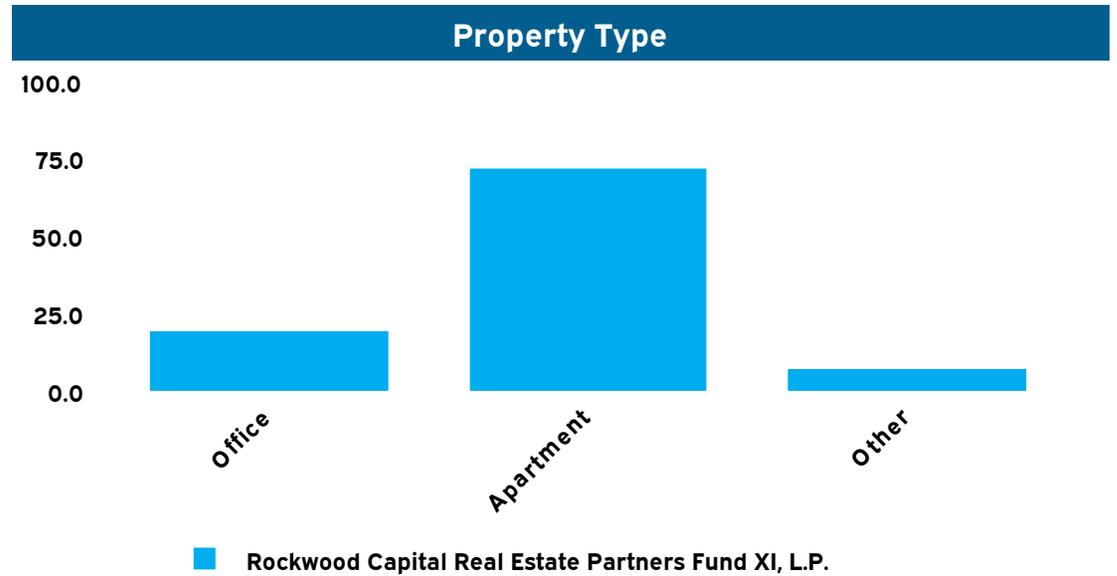
Clarion characteristics as of September 30, 2024

Account Information	
Account Name	Rockwood Capital Real Estate Partners Fund XI, L.P.
Account Structure	Separate Account
Inception Date	12/01/2019
Asset Class	US Private Real Estate
Benchmark	NCREIF ODCE (VW) (Gross) (Monthly)



Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Since Inception	Inception Date
Rockwood Capital Real Estate	-0.9	-13.2	-3.1	-	-	-0.3	12/01/2019
NCREIF Fund Index-ODCE (VW)	0.2	-7.3	-0.2	2.9	6.1	2.8	



Private Equity Market Investment Overview | As of September 30, 2024

Partnerships	Vintage Year	Capital Commitment \$	Total Contribution \$	Total Distribution \$	Market Value \$	Since Inception
North American Strategic Partners 2006	2006	4,539,998.0	4,411,658.9	-2,094,251.4	9,272.2	-40.2
Ironsides Direct Investment Fund IV	2015	2,500,000.0	2,419,534.3	3,593,229.9	769,937.8	14.1
Ironsides Direct Investment Fund V, L.P.	-	-	2,730,291.8	792,279.4	3,191,735.4	9.2
Ironsides Partnership Fund IV	2015	2,500,000.0	1,544,323.5	1,738,375.8	2,446,637.8	26.3
Ironsides Partnership Fund V, L.P.	2019	2,000,000.0	1,591,789.4	-	2,437,633.4	16.6
HarbourVest 2019 Global Fund	-	-	2,927,632.0	665,539.0	3,997,661.0	17.7

Annual Investment Expense Analysis			
	Market Value (\$)	Estimated Expense (\$)	Expense Ratio (%)
Equity Assets	144,967,612	441,237	0.30
Domestic Equity Assets	70,805,416	243,718	0.34
RhumbLine S&P 500 Index	21,996,802	15,398	0.07
Frontier Capital Appreciation	27,556,180	217,694	0.79
RhumbLine HEDI	21,252,435	10,626	0.05
International Equity Assets	74,162,196	197,519	0.27
International Developed Markets Equity Assets	48,528,603	36,470	0.08
RhumbLine MSCI EAFE Index	48,528,603	36,470	0.08
International Emerging Markets Equity Assets	25,633,593	161,049	0.63
DFA Emerging Markets	13,657,549	53,264	0.39
Driehaus Emerging Market Equity	11,976,043	107,784	0.90
Fixed Income Assets	65,868,280	163,621	0.25
Investment Grade Bonds Assets	27,343,273	10,937	0.04
SSgA U.S. Aggregate Bond Index	27,343,273	10,937	0.04
High Yield Bond Assets	15,235,306	68,559	0.45
Shenkman Capital	15,235,306	68,559	0.45
TIPS Assets	12,288,459	4,915	0.04
SSgA TIPS Index-NL	12,288,459	4,915	0.04
Emerging Market Debt Assets	11,001,242	79,209	0.72
Payden Emerging Market Bond	11,001,242	79,209	0.72
Real Estate Assets	9,305,109	60,332	0.65
Open-Ended Real Estate	5,484,705	60,332	1.10
Clarion Partners	5,484,705	60,332	1.10

	Market Value (\$)	Estimated Expense (\$)	Expense Ratio (%)
Total Closed End Real Estate	3,820,404	-	-
Rockwood Capital Real Estate Partners Fund XI, L.P.	3,820,404	-	-
Private Equity Assets	12,852,878	-	-
North American Strategic Partners 2006	9,272	-	-
Ironsides Partnership Fund IV	2,446,638	-	-
Ironsides Direct Investment Fund IV	769,938	-	-
Ironsides Partnership Fund V, L.P.	2,437,633	-	-
Ironsides Direct Investment Fund V, L.P.	3,191,735	-	-
HarbourVest 2019 Global Fund	3,997,661	-	-
Private Debt Assets	4,420,711	-	-
NB Private Debt Fund IV	4,420,711	-	-
Infrastructure	11,561,188	-	-
IFM Global Infrastructure	11,561,188	-	-
Cash	419,871	-	-
EB Temporary Investment Fund	419,871	-	-

Current Issues

Manager Due Diligence Agenda

MARLBOROUGH RETIREMENT SYSTEM

Manager Due Diligence Meetings
Monday, December 23, 2024

I. Manager Due Diligence Presentations

8:30 – 9:00 a.m.

Manager/Product	Asset Class	Phone Number
Frontier Capital Management Company	Domestic Equity	(617) 480-8610
<i>Frontier Capital Appreciation</i>		
Dimensional Fund Advisors	International Emerging Markets Equity	(847) 912-7817
<i>DFA Emerging Markets</i>		
Driehaus Capital Management	International Emerging Markets Equity	(929) 205-6099
<i>Driehaus Emerging Market Equity</i>		
Clarion Partners	Open-Ended Real Estate	(212) 883-2609
<i>Clarion Lion Properties Fund</i>		

Appendix

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PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

Credit Risk: Refers to the risk that the issuer of a fixed income security may default (i.e., the issuer will be unable to make timely principal and/or interest payments on the security).

Duration: Measure of the sensitivity of the price of a bond to a change in its yield to maturity. Duration summarizes, in a single number, the characteristics that cause bond prices to change in response to a change in interest rates. For example, the price of a bond with a duration of three years will rise by approximately 3% for each 1% decrease in its yield to maturity. Conversely, the price will decrease 3% for each 1% increase in the bond's yield. Price changes for two different bonds can be compared using duration. A bond with a duration of six years will exhibit twice the percentage price change of a bond with a three-year duration. The actual calculation of a bond's duration is somewhat complicated, but the idea behind the calculation is straightforward. The first step is to measure the time interval until receipt for each cash flow (coupon and principal payments) from a bond. The second step is to compute a weighted average of these time intervals. Each time interval is measured by the present value of that cash flow. This weighted average is the duration of the bond measured in years.

Information Ratio: This statistic is a measure of the consistency of a portfolio's performance relative to a benchmark. It is calculated by subtracting the benchmark return from the portfolio return (excess return), and dividing the resulting excess return by the standard deviation (volatility) of this excess return. A positive information ratio indicates outperformance versus the benchmark, and the higher the information ratio, the more consistent the outperformance.

Jensen's Alpha: A measure of the average return of a portfolio or investment in excess of what is predicted by its beta or "market" risk. $\text{Portfolio Return} - [\text{Risk Free Rate} + \text{Beta} * (\text{market return} - \text{Risk Free Rate})]$.

Market Capitalization: For a firm, market capitalization is the total market value of outstanding common stock. For a portfolio, market capitalization is the sum of the capitalization of each company weighted by the ratio of holdings in that company to total portfolio holdings; thus it is a weighted-average capitalization. Meketa Investment Group considers the largest 65% of the broad domestic equity market as large capitalization, the next 25% of the market as medium capitalization, and the smallest 10% of stocks as small capitalization.

Market Weighted: Stocks in many indices are weighted based on the total market capitalization of the issue. Thus, the individual returns of higher market-capitalization issues will more heavily influence an index's return than the returns of the smaller market-capitalization issues in the index.

Maturity: The date on which a loan, bond, mortgage, or other debt/security becomes due and is to be paid off.

Prepayment Risk: The risk that prepayments will increase (homeowners will prepay all or part of their mortgage) when mortgage interest rates decline; hence, investors' monies will be returned to them in a lower interest rate environment. Also, the risk that prepayments will slow down when mortgage interest rates rise; hence, investors will not have as much money as previously anticipated in a higher interest rate environment. A prepayment is any payment in excess of the scheduled mortgage payment.

Price-Book Value (P/B) Ratio: The current market price of a stock divided by its book value per share. Meketa Investment Group calculates P/B as the current price divided by Compustat's quarterly common equity. Common equity includes common stock, capital surplus, retained earnings, and treasury stock adjusted for both common and nonredeemable preferred stock. Similar to high P/E stocks, stocks with high P/B's tend to be riskier investments.

Price-Earnings (P/E) Ratio: A stock's market price divided by its current or estimated future earnings. Lower P/E ratios often characterize stocks in low growth or mature industries, stocks in groups that have fallen out of favor, or stocks of established blue chip companies with long records of stable earnings and regular dividends. Sometimes a company that has good fundamentals may be viewed unfavorably by the market if it is an industry that is temporarily out of favor. Or a business may have experienced financial problems causing investors to be skeptical about its future. Either of these situations would result in lower relative P/E ratios. Some stocks exhibit above-average sales and earnings growth or expectations for above average growth. Consequently, investors are willing to pay more for these companies' earnings, which results in elevated P/E ratios. In other words, investors will pay more for shares of companies whose profits, in their opinion, are expected to increase faster than average. Because future events are in no way assured, high P/E stocks tend to be riskier and more volatile investments. Meketa Investment Group calculates P/E as the current price divided by the I/B/E/S consensus of twelve-month forecast earnings per share.

Quality Rating: The rank assigned a security by such rating services as Fitch, Moody's, and Standard & Poor's. The rating may be determined by such factors as (1) the likelihood of fulfillment of dividend, income, and principal payment of obligations; (2) the nature and provisions of the issue; and (3) the security's relative position in the event of liquidation of the company. Bonds assigned the top four grades (AAA, AA, A, BBB) are considered investment grade because they are eligible bank investments as determined by the controller of the currency.

Sharpe Ratio: A commonly used measure of risk-adjusted return. It is calculated by subtracting the risk free return (usually three-month Treasury bill) from the portfolio return and dividing the resulting excess return by the portfolio's total risk level (standard deviation). The result is a measure of return per unit of total risk taken. The higher the Sharpe ratio, the better the fund's historical risk adjusted performance.

STIF Account: Short-term investment fund at a custodian bank that invests in cash-equivalent instruments. It is generally used to safely invest the excess cash held by portfolio managers.

Standard Deviation: A measure of the total risk of an asset or a portfolio. Standard deviation measures the dispersion of a set of numbers around a central point (e.g., the average return). If the standard deviation is small, the distribution is concentrated within a narrow range of values. For a normal distribution, about two thirds of the observations will fall within one standard deviation of the mean, and 95% of the observations will fall within two standard deviations of the mean.

Style: The description of the type of approach and strategy utilized by an investment manager to manage funds. For example, the style for equities is determined by portfolio characteristics such as price-to-book value, price-to-earnings ratio, and dividend yield. Equity styles include growth, value, and core.

Tracking Error: A divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark, as defined by the difference in standard deviation.

Yield to Maturity: The yield, or return, provided by a bond to its maturity date; determined by a mathematical process, usually requiring the use of a “basis book.” For example, a 5% bond pays \$5 a year interest on each \$100 par value. To figure its current yield, divide \$5 by \$95—the market price of the bond—and you get 5.26%. Assume that the same bond is due to mature in five years. On the maturity date, the issuer is pledged to pay \$100 for the bond that can be bought now for \$95. In other words, the bond is selling at a discount of 5% below par value. To figure yield to maturity, a simple and approximate method is to divide 5% by the five years to maturity, which equals 1% pro rata yearly. Add that 1% to the 5.26% current yield, and the yield to maturity is roughly 6.26%.

$$\frac{5\% \text{ (discount)}}{5 \text{ (yrs. to maturity)}} = 1\% \text{ pro rata, plus } 5.26\% \text{ (current yield)} = 6.26\% \text{ (yield to maturity)}$$

Yield to Worst: The lowest potential yield that can be received on a bond without the issuer actually defaulting. The yield to worst is calculated by making worst-case scenario assumptions on the issue by calculating the returns that would be received if provisions, including prepayment, call, or sinking fund, are used by the issuer.

NCREIF Property Index (NPI): Measures unleveraged investment performance of a very large pool of individual commercial real estate properties acquired in the private market by tax-exempt institutional investors for investment purposes only. The NPI index is capitalization-weighted for a quarterly time series composite total rate of return.

NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE): Measures the investment performance of 28 open-end commingled funds pursuing a core investment strategy that reflects funds' leverage and cash positions. The NFI-ODCE index is equal-weighted and is reported gross and net of fees for a quarterly time series composite total rate of return.

Sources: Investment Terminology, International Foundation of Employee Benefit Plans, 1999.
The Handbook of Fixed Income Securities, Fabozzi, Frank J., 1991

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Throughout this report, numbers may not sum due to rounding.

Returns for periods greater than one year are annualized throughout this report.

Values shown are in millions of dollars, unless noted otherwise.