

City of Marlborough Contributory Retirement System

Meeting Materials
May 30, 2023

Fund Evaluation Report

Agenda

1. Economic and Market Update
2. Performance Update as of March 31, 2023
3. Current Issues
 - Asset Allocation Discussion
 - Manager Due Diligence Agenda
4. Appendix

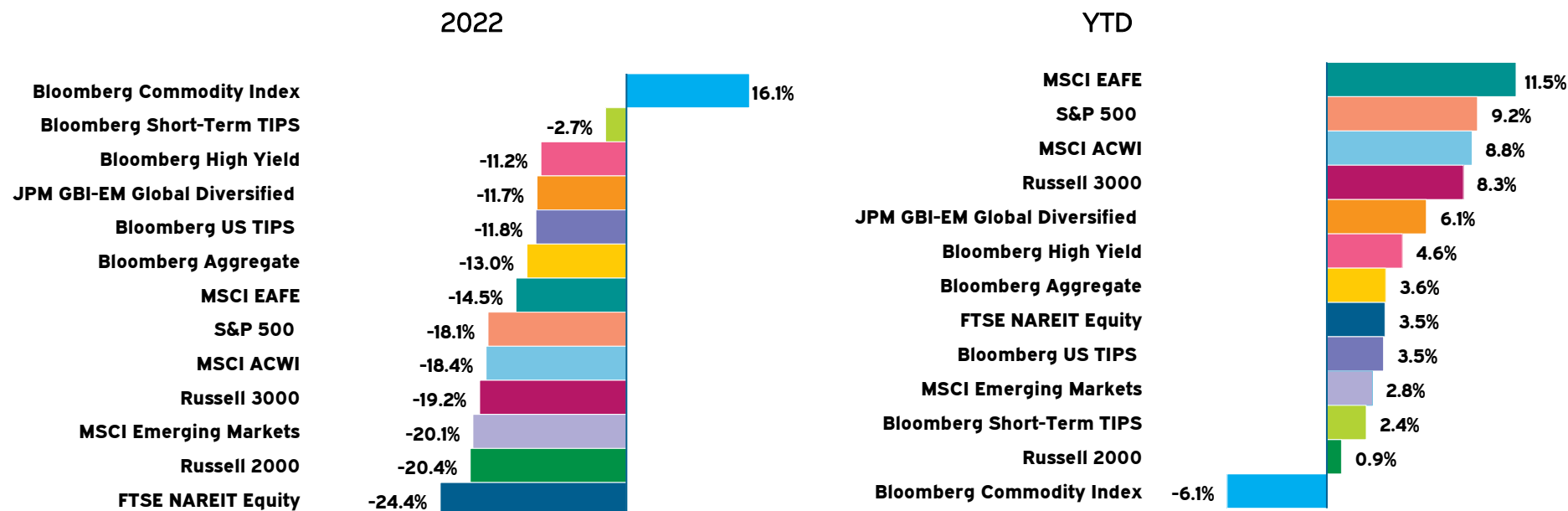
Economic and Market Update

Data as of April 30, 2023

Commentary

- Most asset classes added to first quarter gains in April as investors remained focused on slowing inflation and a potential end to rate hikes.
- The Fed increased interest rates for the tenth time after month-end, to a range of 5.0% - 5.25%, with this action largely expected to be their final hike.
 - Political struggles over the debt ceiling led to a significant increase in short-term rates and a historically high price of the cost to insure against defaults on US Treasuries.
 - US equity markets (Russell 3000) rose in April (+1.1%) adding to YTD gains (+8.3%). Some of the largest technology names drove positive results, with lingering issues in the banking sector (e.g., First Republic) weighing on parts of the equity markets.
 - Non-US developed equity markets also rallied in April (MSCI EAFE +2.8%) extending the outperformance relative to the US so far in 2023 (+11.5% versus +8.3%).
 - Emerging market equities fell in April (-1.1%) driven by declines in China (-5.2%). They significantly trail developed market equities YTD returning +2.8% partly due to higher US-China tensions.
 - After a strong March driven by the issues in the banking sector, bonds had more subdued gains in April, with the broad US bond market (Bloomberg Aggregate) gaining 0.6% for the month.
- This year, the path of inflation and monetary policy, slowing global growth, and the war in Ukraine, as well as recent pressures in regional banks and the looming debt ceiling breach in the US, will all be key.

Index Returns¹



- After a particularly difficult 2022, most public market assets are up in 2023, building on gains from the fourth quarter of last year.
- Risk sentiment has been supported by expectations that policy tightening could be ending soon, as inflation continues to fall and growth has slowed.

¹ Source: Bloomberg and FactSet. Data is as of April 30, 2023.

Domestic Equity Returns¹

Domestic Equity	April (%)	Q1 (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
S&P 500	1.6	7.5	9.2	2.7	14.5	11.4	12.2
Russell 3000	1.1	7.2	8.3	1.5	14.1	10.6	11.7
Russell 1000	1.2	7.5	8.8	1.8	14.2	11.1	12.0
Russell 1000 Growth	1.0	14.4	15.5	2.3	13.6	13.8	14.5
Russell 1000 Value	1.5	1.0	2.5	1.2	14.4	7.7	9.1
Russell MidCap	-0.5	4.1	3.5	-1.7	13.8	8.0	9.9
Russell MidCap Growth	-1.4	9.1	7.6	1.6	9.2	9.0	10.8
Russell MidCap Value	0.0	1.3	1.3	-3.5	15.8	6.4	8.7
Russell 2000	-1.8	2.7	0.9	-3.6	11.9	4.1	7.9
Russell 2000 Growth	-1.2	6.1	4.8	0.7	7.8	4.0	8.4
Russell 2000 Value	-2.5	-0.7	-3.1	-8.0	15.5	3.7	7.0

US Equities: Russell 3000 Index rose 1.1% in April and 8.3% YTD.

- US stocks rose in April as optimism over the Fed potentially ending its rate hiking campaign was mitigated by lingering concerns in the banking sector and slowing growth. Year-to-date gains in the US equity market remain strong though.
- Most sectors in the Russell 3000 index rose during the month, led by consumer staples and communication services. Growth stocks have significantly outperformed value stocks across the market capitalization spectrum this year, particularly in the large cap space due to technology stocks.
- The resurgence of large cap technology stocks is also driving the outperformance of the large cap indices versus the small cap indices. Weakness in the performance of small cap bank stocks is also contributing to results.

¹ Source: Bloomberg. Data is as of April 30, 2023.

Foreign Equity Returns¹

Foreign Equity	April (%)	Q1 (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
MSCI ACWI ex. US	1.7	6.9	8.7	3.0	9.8	2.5	4.0
MSCI EAFE	2.8	8.5	11.5	8.4	11.7	3.6	4.8
MSCI EAFE (Local Currency)	2.3	7.5	9.9	7.7	13.5	5.8	7.1
MSCI EAFE Small Cap	2.0	4.9	7.0	-1.2	9.2	1.0	5.7
MSCI Emerging Markets	-1.1	4.0	2.8	-6.5	4.3	-1.0	1.8
MSCI Emerging Markets (Local Currency)	-0.7	3.8	3.1	-3.9	5.5	1.5	5.0
MSCI China	-5.2	4.7	-0.7	-5.8	-6.3	-5.0	2.7

Foreign Equity: Developed international equities (MSCI EAFE) rose 2.8% in April and 11.5% YTD. Emerging market equities (MSCI EM) fell -1.1% for the month but rose 2.8% YTD.

- Non-US equities had mixed results in April with developed markets (MSCI EAFE) gaining and outpacing US equities (2.8% versus 1.1%) for the month, while emerging markets (MSCI Emerging Markets) were the one area that declined (-1.1%).
- Developed market equity gains were broad-based across European sectors, while financials and energy were strong in the UK. In Japan, further weakness in the yen continued to boost market sentiment.
- The decline in emerging market equities (-1.1%) was driven largely by China (-5.2%). An escalation in US-China tensions and mixed results from the reopening of their economy weighed on shares. Taiwan also experienced marked declines over geopolitical concerns and weakness in semiconductors, while India was a bright spot.

¹ Source: Bloomberg. Data is as of April 30, 2023.

Fixed Income Returns¹

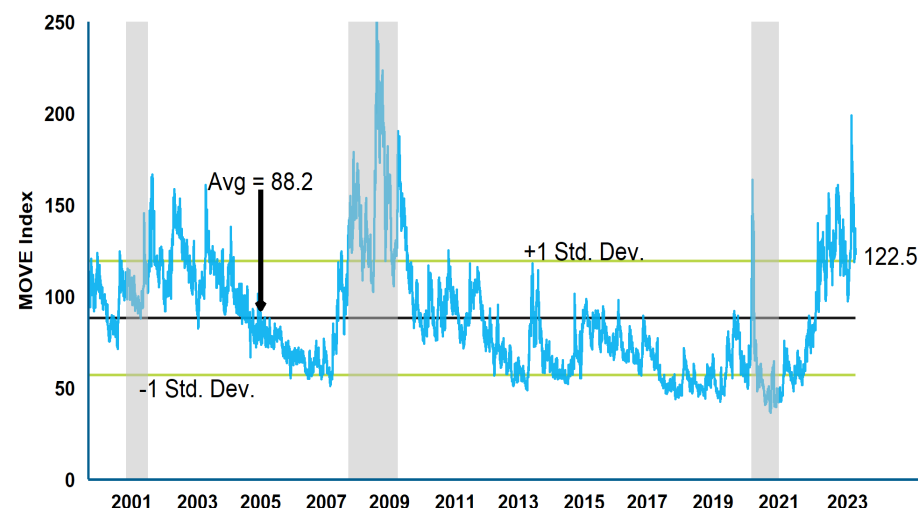
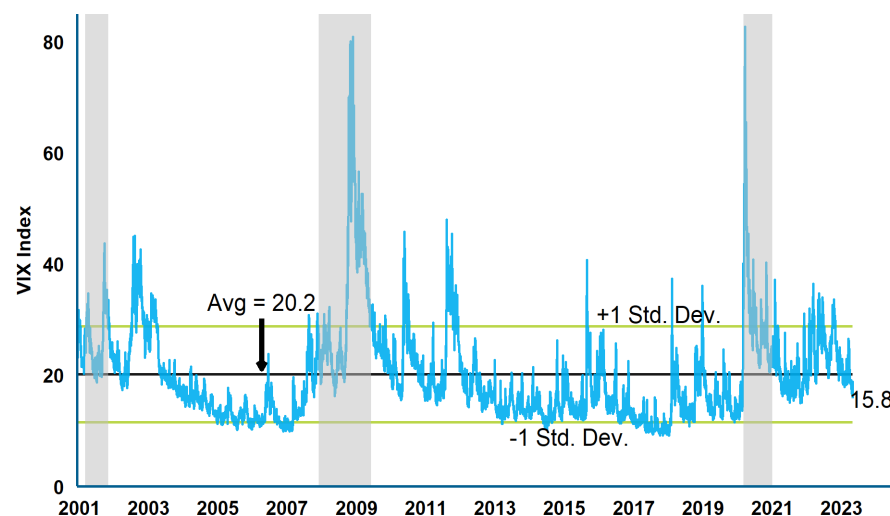
Fixed Income	April (%)	Q1 (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)	Current Yield (%)	Duration (Years)
Bloomberg Universal	0.6	2.9	3.6	-0.3	-2.5	1.3	1.6	4.8	6.3
Bloomberg Aggregate	0.6	3.0	3.6	-0.4	-3.2	1.2	1.3	4.4	6.5
Bloomberg US TIPS	0.1	3.3	3.5	-4.0	0.9	3.0	1.4	4.0	7.0
Bloomberg Short-term TIPS	0.2	2.2	2.4	-0.1	3.1	3.0	1.6	4.6	2.6
Bloomberg High Yield	1.0	3.6	4.6	1.2	4.7	3.3	4.0	8.5	4.2
JPM GBI-EM Global Diversified (USD)	0.9	5.2	6.1	6.6	-0.1	-1.6	-1.8	7.0	5.0

Fixed Income: The Bloomberg Universal rose 0.6% in April and 3.6% YTD as global sovereign debt yields generally declined for major economies.

- As issues in the banking sector from March eased, the US bond market had a calm April, with interest rates, outside of the very shortest maturities, remaining stable.
- The TIPS index and short-term TIPS index had gains for the month but trailed the broad US bond market (Bloomberg Aggregate).
- High yield bonds (+1.0%) had the best results for the month as they particularly benefited from support for the banking sector.

¹ Source: Bloomberg. JPM GBI-EM data is from InvestorForce. Data is as of April 30, 2023. The yield and duration data from Bloomberg is defined as the index's yield to worst and modified duration respectively.

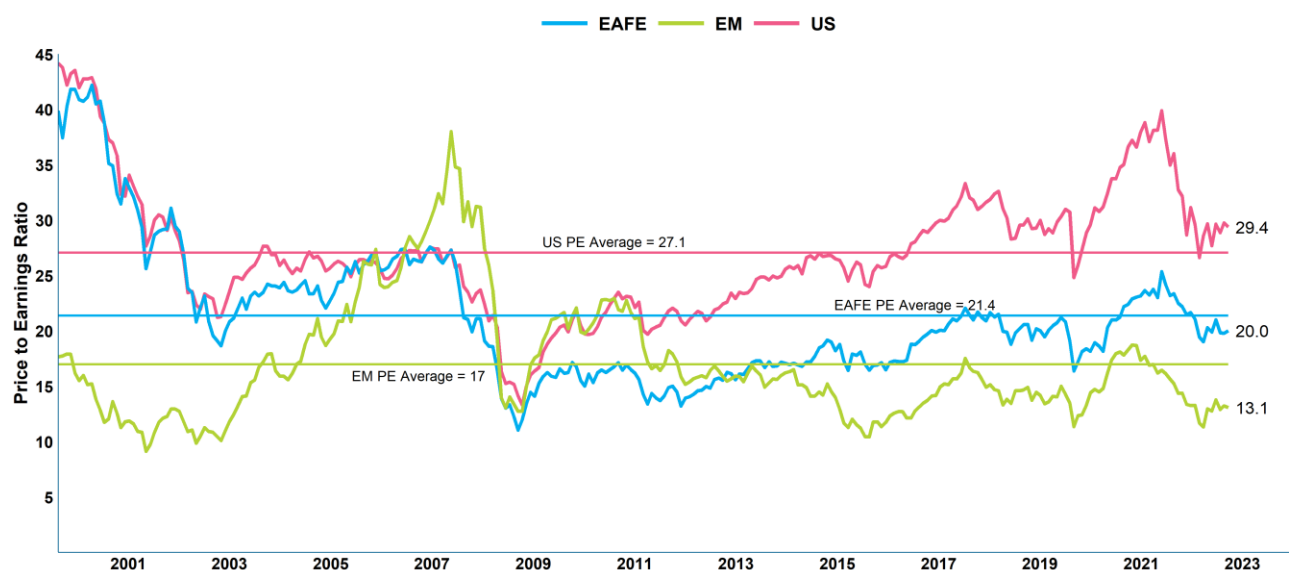
Equity and Fixed Income Volatility¹



- Volatility in equities (VIX) continued to decline in April, reaching levels not seen since late 2021 as investors anticipate the end of the Fed's policy tightening.
- In comparison, the bond market remains on edge after last year's historic losses and continued volatility in interest rates this year due to policy uncertainty and issues in the banking sector. The MOVE (fixed income volatility) remains well above its long-run average, but off its recent peak during the heart of the banking crises.

¹ Equity and 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 April 2023. The average line indicated is the average of the VIX and MOVE values between January 2000 and April 2023.

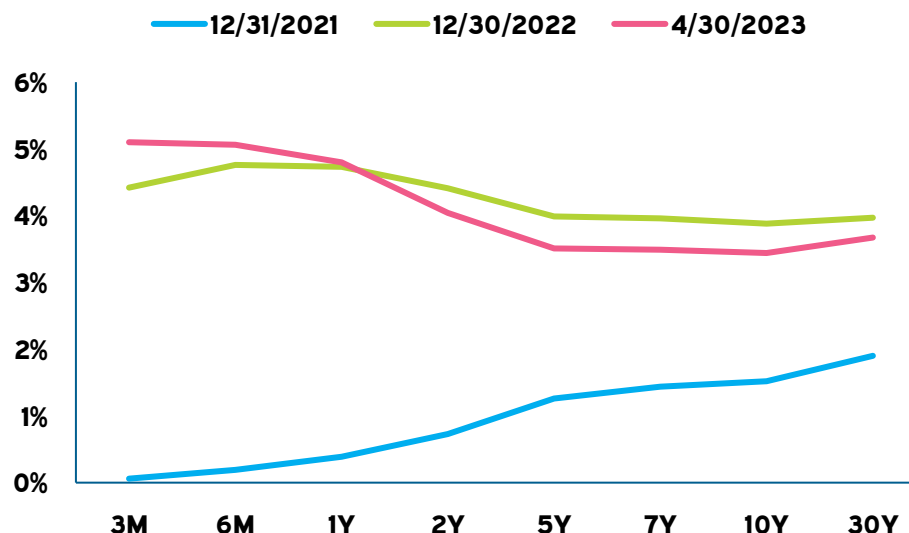
Equity Cyclically Adjusted P/E Ratios¹



- After its dramatic decline last year the US equity price-to-earnings ratio remains above its long-run (21st century) average.
- International developed market valuations are slightly below their own long-term average, with those for emerging markets the lowest and well under the long-term average.

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: MSCI and Bloomberg. Earnings figures represent the average of monthly “as reported” earnings over the previous ten years. Data is as of April 2023. The average line is the long-term average of the US, EM, and EAFE PE values from December 1999 to the recent month-end respectively.

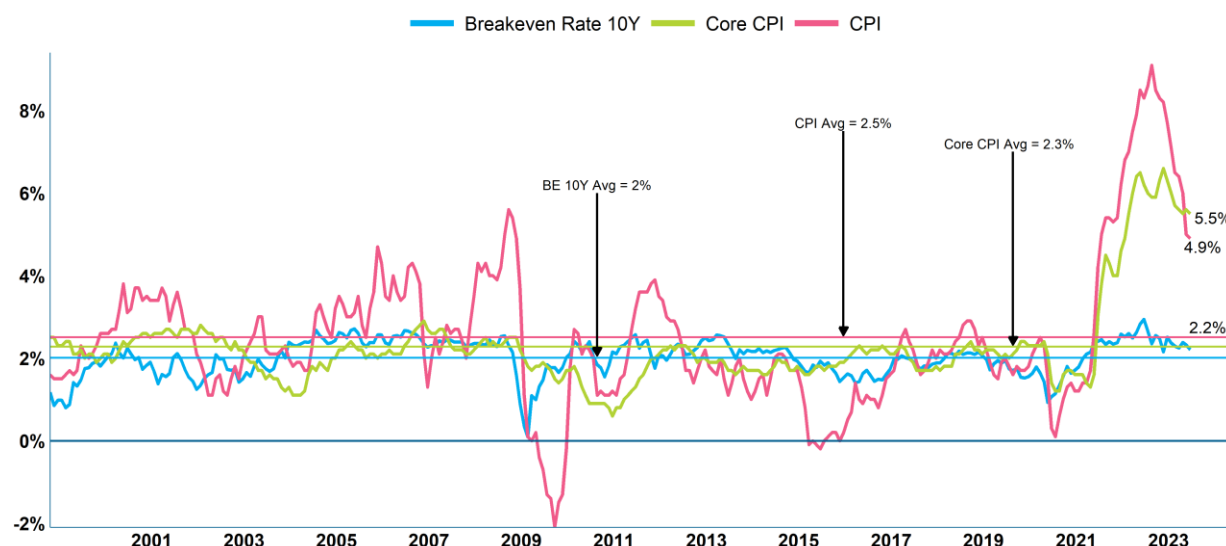
US Yield Curve¹



- Interest rates have declined this year for maturities two years and beyond, given expectations for peaking policy, while the rates on the very shortest maturities increased due to debt ceiling concerns.
- During April, interest rates at the very front-end of the yield curve rose significantly as the debt ceiling debate continued while other maturities remained largely flat.
- After hitting -1.07% in early March, the yield spread between two-year and ten-year Treasuries finished the month largely unchanged at -0.59%. The more closely watched measure (by the Fed) of three-month and ten-year Treasuries remained inverted. Inversions in the yield curve have often preceded recessions.

¹ Source: Bloomberg. Data is as of April 30, 2023.

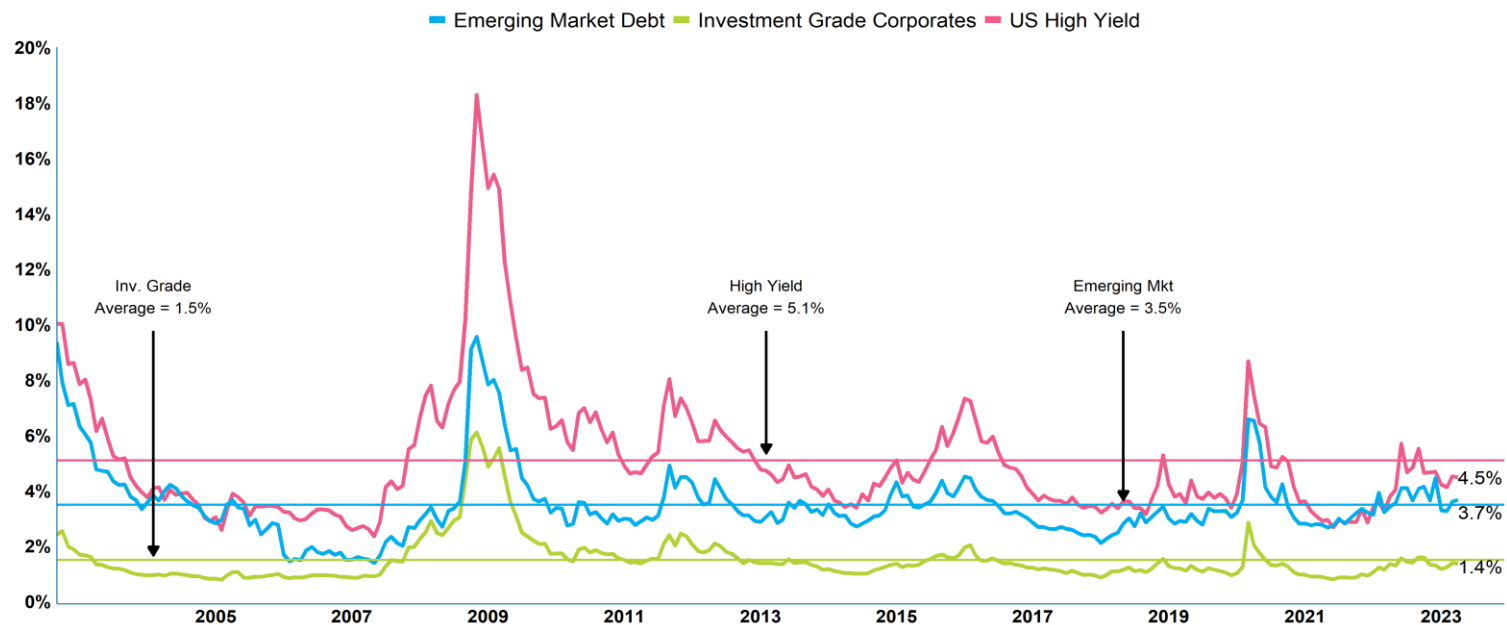
Ten-Year Breakeven Inflation and CPI¹



- Inflation continued to decline in April, with the year-over-year reading falling from 5.0% to 4.9% (slightly below expectations). The month-over-month rate of price increases was 0.4% (matching expectations), with food prices remaining flat, energy prices slightly increasing (0.6%), and all other areas rising 0.4% in aggregate.
- Core inflation – excluding food and energy – fell slightly (5.6% to 5.5%) but remained stubbornly high as the cost for shelter continued to rise.
- Inflation expectations (breakevens) declined very slightly for the month as investors continue to expect inflation to track back toward the Fed's 2% target.

¹ Source: Bloomberg. Data is as of April 30, 2023. The CPI and 10 Year Breakeven average lines denote the average values from August 1998 to the present month-end, respectively. Breakeven values represent month-end values for comparative purposes.

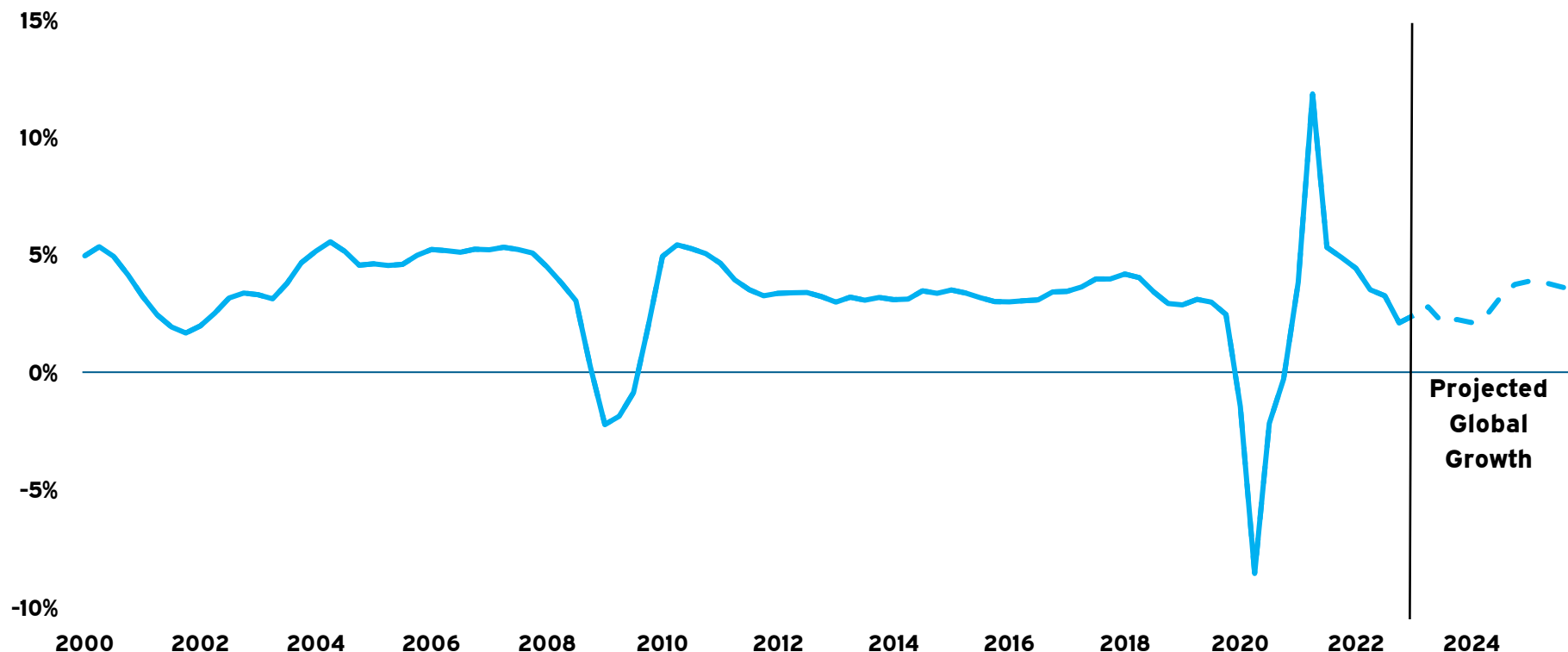
Credit Spreads vs. US Treasury Bonds¹



- Spreads (the added yield above a comparable maturity Treasury) were stable in April as concerns over the banking sector subsided and government and corporate bonds had similar gains.
- High yield spreads remain below the long-term average. Investment grade spreads and emerging market spreads are narrower than high yield spreads and close to their respective long-term averages.

¹ Sources: Bloomberg. Data is as of April 30, 2023. Average lines denote the average of the investment grade, high yield, and emerging market spread values from August 2000 to the recent month-end, respectively.

Global Real Gross Domestic Product (GDP) Growth¹

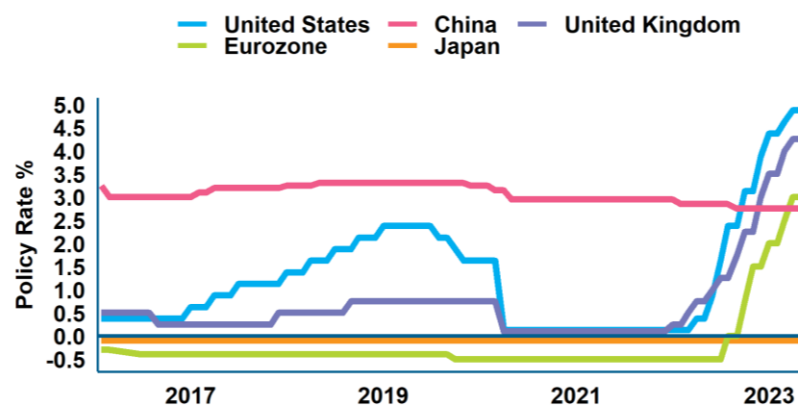


- Global economies are expected to slow this year compared to 2022, with risks of recession increasing given persistently high inflation and related tighter monetary policy.
- The delicate balancing act of central banks trying to reduce inflation without dramatically depressing growth will remain key.

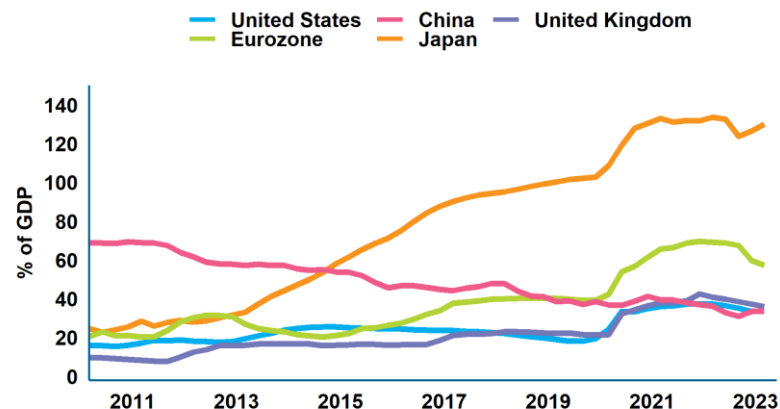
¹ Source: Oxford Economics (World GDP, US\$ prices & PPP exchange rate, real, % change YoY). Updated April 2023.

Central Bank Response¹

Policy Rates



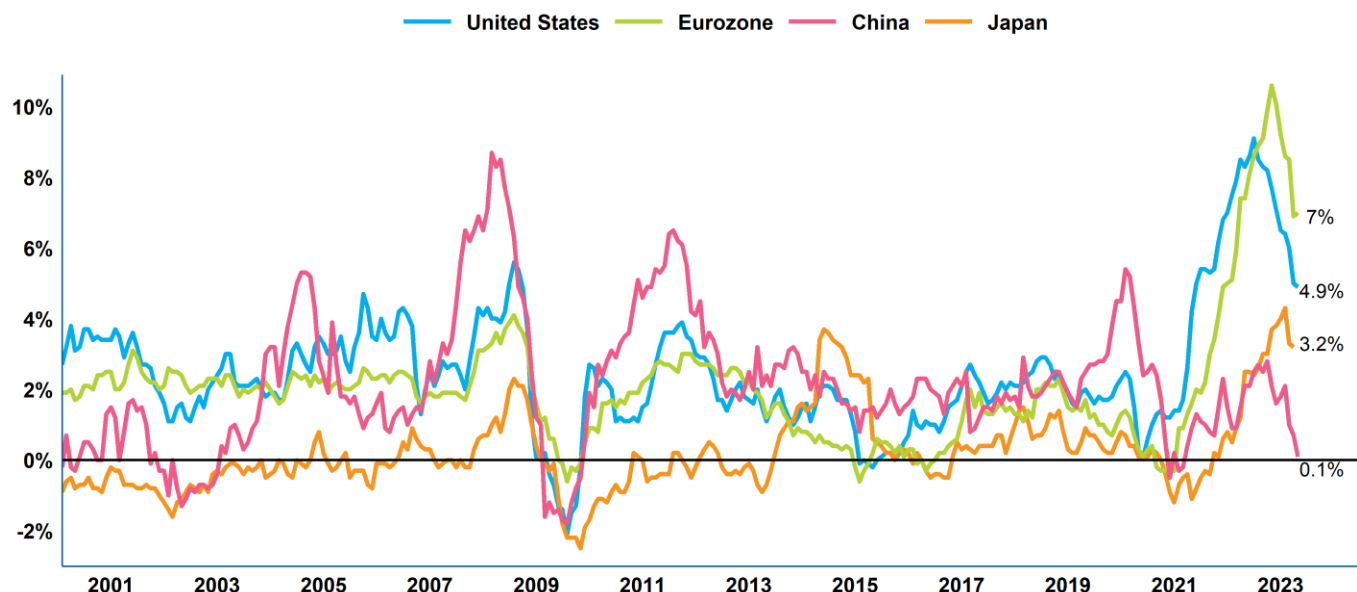
Balance Sheet as % of GDP



- In 2022, many central banks aggressively reduced pandemic-era policy support in the face of high inflation, with the US taking the most aggressive approach. Slowing inflation and recent signs of instability in the banking sector have led to expectations for the slowing of policy tightening going forward.
- Since month-end, the Fed remained committed to fighting inflation despite pressures in the banking sector, raising rates another 25 basis points to a range of 5.0% to 5.25% at its early May meeting. This is largely expected to be the Fed's last rate hike in this cycle.
- China's central bank is a notable exception. They are expected to maintain an accommodative monetary stance to support the economy.
- Looking ahead the risk remains for a policy error as central banks attempt to balance bringing down inflation, maintaining financial stability, and growth.

¹ Source: Bloomberg. Policy rate data is as of April 30, 2023. China policy rate is defined as the medium-term lending facility 1 year interest rate. Balance sheet as % of GDP is based on quarterly data and is as of March 31, 2023.

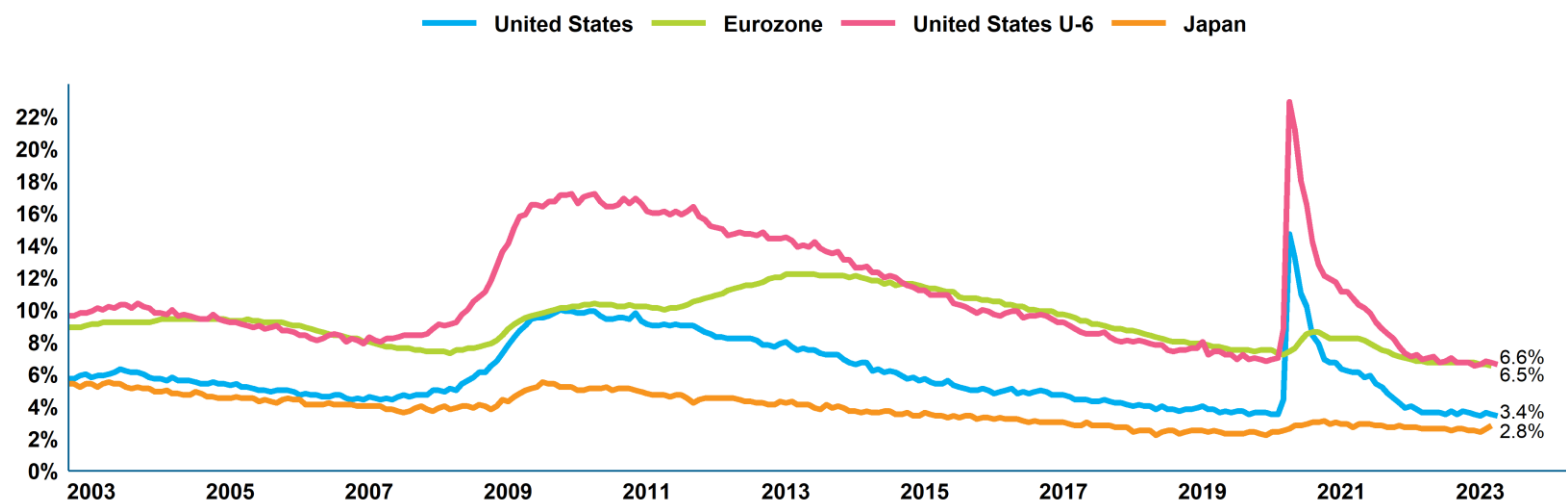
Inflation (CPI Trailing Twelve Months)¹



- Inflation pressures continued to decline globally due to the easing of supply chain issues from the pandemic, declining energy prices, and tighter monetary policy.
- In the US, inflation fell to 4.9% at month-end, while eurozone inflation increased slightly (7.0% versus 6.9%) a level well off its peak. Despite 2023's declines in the US and Europe, inflation levels remain elevated.
- Inflation remains relatively lower in China and Japan and has also declined recently. In China, inflation levels approached 0% at month-end as the reopening of their economy has led to an uneven economic recovery.

¹ Source: Bloomberg. Data is as April 30, 2023. The most recent Japanese inflation data is as of March 2023.

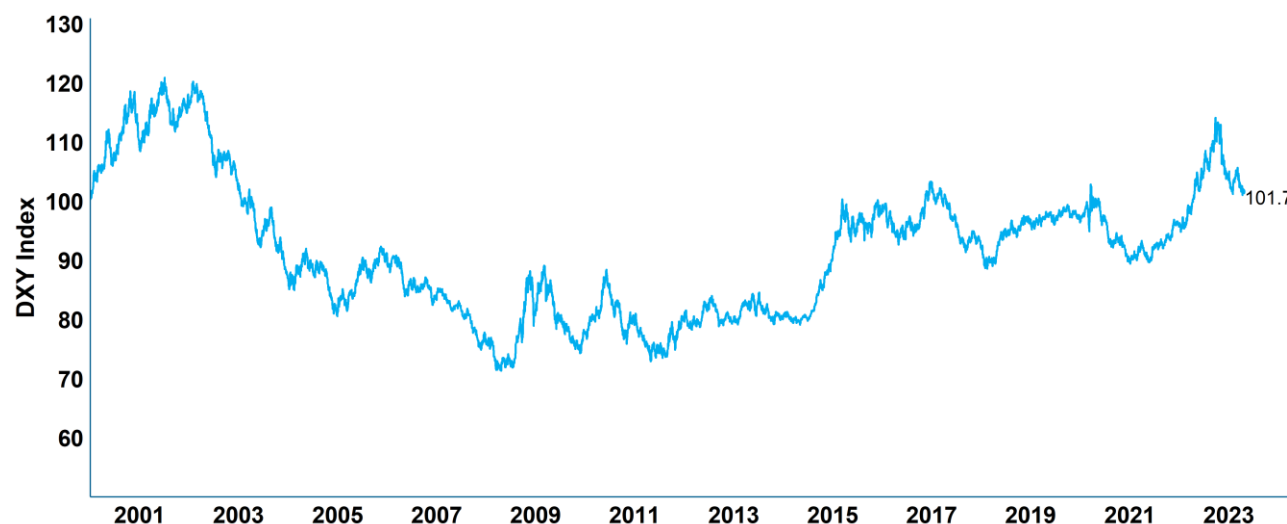
Unemployment¹



- Labor markets have significantly improved from the pandemic as economies have largely reopened.
- Despite slowing growth and high inflation, the US labor market remains a particular bright spot. Unemployment in the US, which experienced the steepest rise, recently returned to pre-pandemic levels. Broader measures of unemployment (U-6) remain higher at 6.6% but also declined dramatically from their peak.
- The strong labor market and higher wages, although beneficial for workers, motivates the Fed's efforts to fight inflation, likely leading to higher unemployment.
- Unemployment in Europe has also declined but remains higher than the US, while levels in Japan have been relatively flat through the pandemic given less layoffs.

¹ Source: Bloomberg. Data is as April 30, 2023, for the US. The most recent data for Eurozone and Japanese unemployment is as of March 2023.

US Dollar versus Broad Currencies¹



- The dollar finished 2022 much higher than it started, due to the increased pace of policy tightening, stronger relative growth, and safe-haven flows.
- Late last year and into early this year, the dollar has fallen, as weaker economic data and declining inflation led to investors anticipating the end of Fed tightening.
- This year, the track of inflation across economies and the corresponding monetary policies will likely be key drivers of currency moves.

¹ Source: Bloomberg. Data as of April 30, 2023.

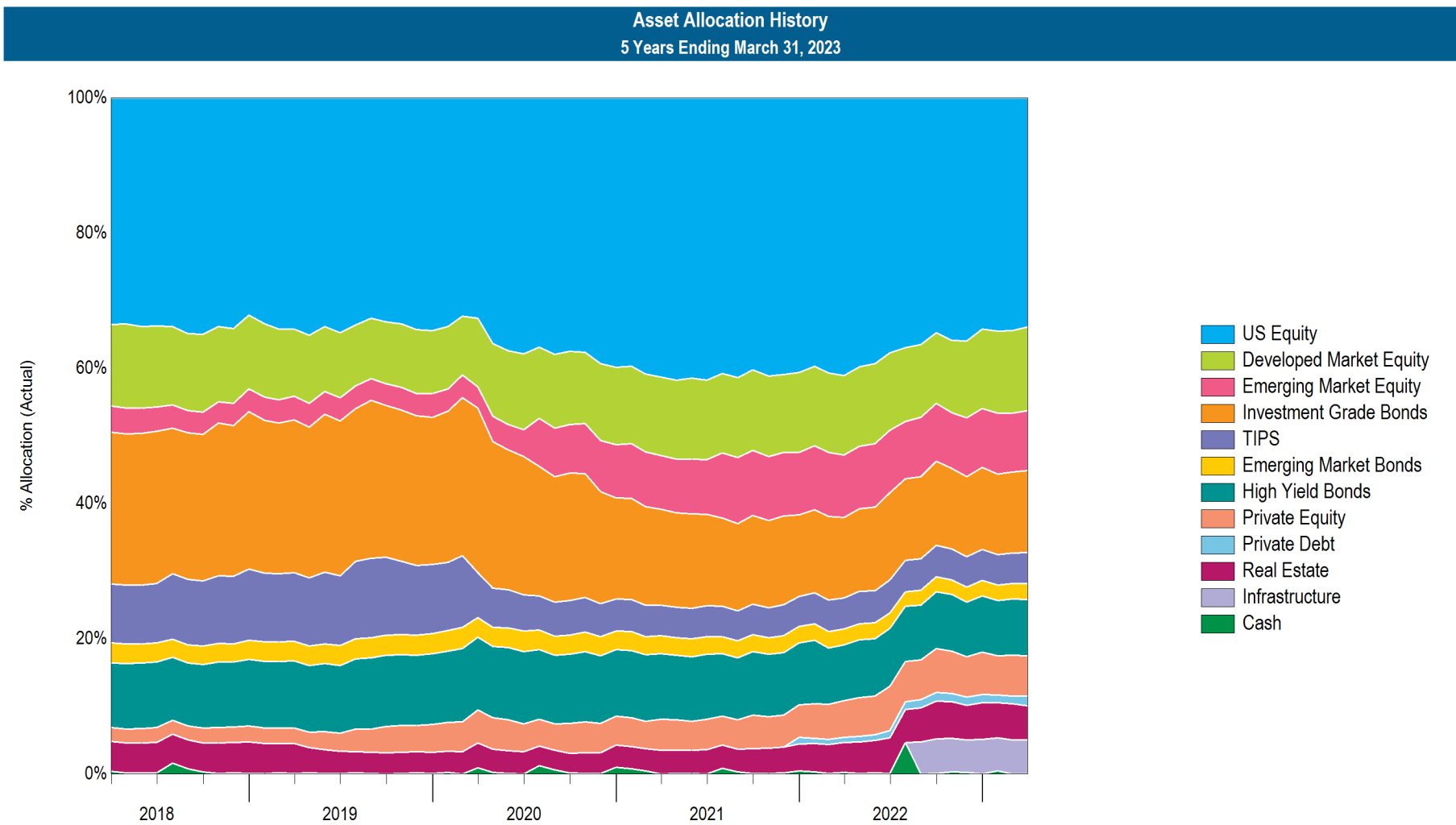
Summary

Key Trends:

- The impacts of still relatively high inflation will remain key, with bond market volatility likely to stay high.
- Recent issues related to the banking sector have created a delicate balance for central banks to continue to fight inflation but also to try to maintain financial stability.
- Global monetary policies could diverge in 2023. The risk of policy errors remains elevated as central banks try to reduce persistent inflation while not tipping their economies into recession.
- Growth is expected to slow globally this year, with many economies forecast to tip into recession. Inflation, monetary policy, and the war will all be key.
- In the US, the end of many fiscal programs is expected to put the burden of continued growth on consumers. Costs for shelter, medical care, and education could continue to rise, keeping 'sticky price' inflation at elevated levels.
- The key for US equities going forward will be whether earnings can remain resilient if growth continues to slow.
- Equity valuations remain lower in both emerging and developed markets, but risks remain, including potential continued strength in the US dollar, higher inflation weighing particularly on Europe, and China's rushed exit from COVID-19 restrictions and on-going weakness in the real estate sector.

Performance Update

Allocation vs. Targets and Policy				
	Current Balance	Current Allocation	Policy	Policy Range
US Equity	\$71,268,048	34%	17%	11% - 23%
Developed Market Equity	\$26,077,168	12%	14%	6% - 18%
Emerging Market Equity	\$18,698,692	9%	14%	3% - 16%
Investment Grade Bonds	\$25,540,364	12%	5%	3% - 10%
TIPS	\$9,635,967	5%	5%	3% - 10%
Emerging Market Bonds	\$4,865,519	2%	2%	1% - 5%
High Yield Bonds	\$17,585,237	8%	5%	2% - 8%
Private Equity	\$12,479,095	6%	10%	5% - 15%
Private Debt	\$3,014,665	1%	8%	0% - 12%
Real Estate	\$10,664,490	5%	10%	3% - 13%
Infrastructure	\$10,602,830	5%	10%	0% - 13%
Cash	\$70,433	0%	0%	0% - 5%
Total	\$210,502,509	100%	100%	



Asset Class Performance Summary										
	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Total Retirement System (net)	210,502,509	100.0	4.6	-4.5	10.8	6.1	6.6	7.4	7.5	Jul-88
55% MSCI World & 45% Barclays Aggregate			5.6	-5.7	7.7	5.1	5.7	6.6	6.7	Jul-88
60% MSCI World & 40% Barclays Aggregate			5.8	-5.9	8.6	5.5	6.0	6.9	6.8	Jul-88
InvMetrics Public DB \$50mm-\$250mm Net Median			4.4	-5.3	10.9	6.1	6.9	7.0	7.8	Jul-88
Domestic Equity Assets (net)	71,268,048	33.9	7.0	-6.3	19.3	8.7	10.6	9.6	8.3	Oct-06
Russell 3000			7.2	-8.6	18.5	10.4	11.7	10.4	9.1	Oct-06
PRIT Domestic Equity			7.1	-4.9	20.6	11.2	12.0	10.0	8.5	Oct-06
International Developed Markets Equity Assets (net)	26,077,168	12.4	8.5	-1.2	13.1	3.8	4.7	--	3.2	Oct-06
MSCI EAFE			8.5	-1.4	13.0	3.5	5.0	7.3	3.4	Oct-06
International Emerging Markets Equity Assets (net)	18,698,692	8.9	4.9	-9.7	11.5	1.0	--	--	4.4	Jan-15
MSCI Emerging Markets			4.0	-10.7	7.8	-0.9	2.0	9.3	2.8	Jan-15
Investment Grade Bonds Assets (net)	25,540,364	12.1	3.1	-4.9	-2.8	0.9	1.3	3.2	5.4	Jul-88
Bloomberg US Aggregate TR			3.0	-4.8	-2.8	0.9	1.4	3.2	5.4	Jul-88
PRIT Core Fixed Income			4.5	-9.0	-3.9	1.4	2.3	3.7	6.1	Jul-88
High Yield Bond Assets (net)	17,585,237	8.4	3.8	-2.1	5.6	3.4	3.9	--	5.9	Sep-03
Bloomberg US High Yield TR			3.6	-3.3	5.9	3.2	4.1	7.1	6.7	Sep-03
PRIT Public Value-Added Fixed Income			3.2	-1.5	5.9	1.9	2.1	5.8	5.4	Sep-03
TIPS Assets (net)	9,635,967	4.6	3.5	-6.2	1.7	2.8	1.4	--	3.4	Oct-05
Bloomberg US TIPS TR			3.3	-6.1	1.8	2.9	1.5	3.9	3.5	Oct-05
Emerging Market Debt Assets (net)	4,865,519	2.3	1.8	-8.1	0.9	-0.9	--	--	1.9	Jan-15
JP Morgan EMBI Global Diversified			1.9	-6.9	0.0	-0.6	2.0	6.0	1.9	Jan-15
Open-Ended Real Estate (net)	6,790,841	3.2	-5.1	-2.8	9.0	8.3	10.1	7.6	8.2	Oct-95
NCREIF ODCE			-3.2	-3.1	8.4	7.5	9.5	8.1	8.9	Oct-95
Total Closed End Real Estate (net)	3,873,649	1.8	-1.8	4.8	6.0	-6.9	4.1	--	4.0	Jan-13
Private Equity Assets (net)	12,479,095	5.9	0.1	4.0	21.4	18.8	10.7	--	8.5	Oct-06
Private Debt Assets (net)	3,014,665	1.4	3.1	11.0	--	--	--	--	10.5	Dec-21
Infrastructure (net)	10,602,830	5.0	2.6	--	--	--	--	--	7.0	Aug-22
Cash (net)	70,433	0.0								

	Trailing Performance										Inception Date
	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	
Total Retirement System	210,502,509	100.0	--	4.6	-4.5	10.8	6.1	6.6	7.4	7.5	Jul-88
55% MSCI World & 45% Barclays Aggregate				5.6	-5.7	7.7	5.1	5.7	6.6	6.7	Jul-88
60% MSCI World & 40% Barclays Aggregate				5.8	-5.9	8.6	5.5	6.0	6.9	6.8	Jul-88
InvMetrics Public DB \$50mm-\$250mm Net Median				4.4	-5.3	10.9	6.1	6.9	7.0	7.8	Jul-88
Domestic Equity Assets	71,268,048	33.9	33.9	7.0	-6.3	19.3	8.7	10.6	9.6	8.3	Oct-06
Russell 3000				7.2	-8.6	18.5	10.4	11.7	10.4	9.1	Oct-06
PRIT Domestic Equity				7.1	-4.9	20.6	11.2	12.0	10.0	8.5	Oct-06
RhumbLine S&P 500 Index	22,847,579	10.9	32.1	7.5	-7.7	18.5	11.1	12.2	10.4	7.1	Mar-99
S&P 500				7.5	-7.7	18.6	11.2	12.2	10.4	7.1	Mar-99
eV US Passive S&P 500 Equity Net Median				7.5	-7.8	18.5	11.0	12.1	10.3	7.0	Mar-99
Frontier Capital Appreciation	21,525,152	10.2	30.2	7.5	-7.6	24.4	7.0	9.8	--	10.3	Feb-13
Russell 2500 Growth				6.5	-10.4	14.7	6.8	10.0	11.1	10.4	Feb-13
eV US Small-Mid Cap Growth Equity Net Median				7.0	-11.5	16.8	8.7	10.5	11.4	10.8	Feb-13
RhumbLine HEDI	26,895,317	12.8	37.7	6.4	-3.9	--	--	--	--	10.8	Nov-20
Russell 1000 HEDI Moderate GR USD				6.4	-3.8	17.8	12.2	13.2	11.6	10.9	Nov-20
eV US Large Cap Core Equity Gross Median				5.6	-6.3	18.5	10.6	11.9	10.8	11.7	Nov-20

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
International Developed Markets Equity Assets	26,077,168	12.4	12.4	8.5	-1.2	13.1	3.8	4.7	--	3.2	Oct-06
MSCI EAFE				8.5	-1.4	13.0	3.5	5.0	7.3	3.4	Oct-06
RhumbLine MSCI EAFE Index	26,077,168	12.4	100.0	8.5	-1.2	13.1	3.8	--	--	3.8	Aug-14
MSCI EAFE				8.5	-1.4	13.0	3.5	5.0	7.3	3.6	Aug-14
eV EAFE All Cap Equity Net Median				8.0	-2.4	13.1	3.1	5.3	8.1	4.0	Aug-14
International Emerging Markets Equity Assets	18,698,692	8.9	8.9	4.9	-9.7	11.5	1.0	--	--	4.4	Jan-15
MSCI Emerging Markets				4.0	-10.7	7.8	-0.9	2.0	9.3	2.8	Jan-15
DFA Emerging Markets	9,916,534	4.7	53.0	5.6	-8.3	14.1	0.6	--	--	3.9	Jan-15
MSCI Emerging Markets				4.0	-10.7	7.8	-0.9	2.0	9.3	2.8	Jan-15
eV Emg Mkts All Cap Equity Net Median				4.7	-9.2	9.0	-0.1	2.6	9.8	3.4	Jan-15
Driehaus Emerging Market Equity	8,782,158	4.2	47.0	4.2	-11.2	8.9	1.0	--	--	4.8	Jan-15
MSCI Emerging Markets				4.0	-10.7	7.8	-0.9	2.0	9.3	2.8	Jan-15
eV Emg Mkts All Cap Equity Net Median				4.7	-9.2	9.0	-0.1	2.6	9.8	3.4	Jan-15
Investment Grade Bonds Assets	25,540,364	12.1	12.1	3.1	-4.9	-2.8	0.9	1.3	3.2	5.4	Jul-88
Bloomberg US Aggregate TR				3.0	-4.8	-2.8	0.9	1.4	3.2	5.4	Jul-88
PRIT Core Fixed Income				4.5	-9.0	-3.9	1.4	2.3	3.7	6.1	Jul-88
SSgA U.S. Aggregate Bond Index	25,540,364	12.1	100.0	3.1	-4.9	-2.8	0.9	1.3	3.2	3.7	May-01
Bloomberg US Aggregate TR				3.0	-4.8	-2.8	0.9	1.4	3.2	3.7	May-01
eV US Core Fixed Inc Net Median				3.1	-4.7	-2.0	1.1	1.6	3.4	3.9	May-01

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
High Yield Bond Assets	17,585,237	8.4	8.4	3.8	-2.1	5.6	3.4	3.9	--	5.9	Sep-03
Bloomberg US High Yield TR				3.6	-3.3	5.9	3.2	4.1	7.1	6.7	Sep-03
PRIT Public Value-Added Fixed Income				3.2	-1.5	5.9	1.9	2.1	5.8	5.4	Sep-03
Shenkman Capital	17,585,237	8.4	100.0	3.8	-2.1	5.7	3.4	4.0	--	5.7	Apr-06
Bloomberg US High Yield TR				3.6	-3.3	5.9	3.2	4.1	7.1	6.2	Apr-06
eV US High Yield Fixed Inc Net Median				3.3	-2.8	5.7	3.0	3.8	6.5	5.7	Apr-06
TIPS Assets	9,635,967	4.6	4.6	3.5	-6.2	1.7	2.8	1.4	--	3.4	Oct-05
Bloomberg US TIPS TR				3.3	-6.1	1.8	2.9	1.5	3.9	3.5	Oct-05
SSgA TIPS Index-NL	9,635,967	4.6	100.0	3.5	-6.2	1.7	2.8	1.4	--	3.4	Oct-05
Bloomberg US TIPS TR				3.3	-6.1	1.8	2.9	1.5	3.9	3.5	Oct-05
eV US TIPS / Inflation Fixed Inc Net Median				3.3	-6.0	2.2	3.0	1.5	3.9	3.5	Oct-05
Emerging Market Debt Assets	4,865,519	2.3	2.3	1.8	-8.1	0.9	-0.9	--	--	1.9	Jan-15
JP Morgan EMBI Global Diversified				1.9	-6.9	0.0	-0.6	2.0	6.0	1.9	Jan-15
Payden Emerging Market Bond	4,865,519	2.3	100.0	1.8	-8.1	0.9	-0.9	--	--	1.9	Jan-15
JP Morgan EMBI Global Diversified				1.9	-6.9	0.0	-0.6	2.0	6.0	1.9	Jan-15
Open-Ended Real Estate	6,790,841	3.2	3.2	-5.1	-2.8	9.0	8.3	10.1	7.6	8.2	Oct-95
NCREIF ODCE				-3.2	-3.1	8.4	7.5	9.5	8.1	8.9	Oct-95
Clarion Partners	6,790,841	3.2	100.0	-5.1	-2.8	9.0	8.3	10.1	7.6	7.6	Oct-02
NCREIF ODCE				-3.2	-3.1	8.4	7.5	9.5	8.1	8.1	Oct-02

Total Retirement System | As of March 31, 2023

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Total Closed End Real Estate	3,873,649	1.8	1.8	-1.8	4.8	6.0	-6.9	4.1	--	4.0	Jan-13
Rockwood Capital Real Estate Partners Fund XI, L.P.	3,873,649	1.8	100.0	-1.8	4.8	7.3	--	--	--	6.6	Dec-19
NCREIF-ODCE				-3.2	-3.1	8.4	7.5	9.5	8.1	8.3	Dec-19
Private Equity Assets	12,479,095	5.9	5.9	0.1	4.0	21.4	18.8	10.7	--	8.5	Oct-06
North American Strategic Partners 2006	14,091	0.0	0.1								
Ironsides Partnership Fund IV	2,390,258	1.1	19.2								
Ironsides Direct Investment Fund IV	1,561,857	0.7	12.5								
Ironsides Partnership Fund V, L.P.	1,999,357	0.9	16.0								
Ironsides Direct Investment Fund V, L.P.	3,075,602	1.5	24.6								
HarbourVest 2019 Global Fund	3,437,931	1.6	27.5								
Private Debt Assets	3,014,665	1.4	1.4	3.1	11.0	--	--	--	--	10.5	Dec-21
NB Private Debt Fund IV	3,014,665	1.4	100.0								
Infrastructure	10,602,830	5.0	5.0	2.6	--	--	--	--	--	7.0	Aug-22
IFM Global Infrastructure	10,602,830	5.0	100.0	2.6	--	--	--	--	--	7.0	Aug-22
CPI + 3%				2.4	8.1	8.5	7.0	5.7	5.6	3.9	Aug-22
Cash	70,433	0.0	0.0								

Closed End Real Estate, Private Equity, and Private Debt market values are as of December 31, 2022 and adjusted for subsequent flows.

North American Strategic Partners market value is cash adjusted as of December 31, 2022. The fund is currently in the liquidation process and will only be reported on annually (as of December 31).

	Calendar Year Performance									
	2022 (%)	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)
Total Retirement System	-12.5	13.8	14.2	17.5	-4.5	13.0	8.7	-0.2	6.3	14.0
55% MSCI World & 45% Barclays Aggregate	-15.6	10.9	12.9	19.1	-4.6	13.6	5.5	0.0	5.5	13.0
60% MSCI World & 40% Barclays Aggregate	-15.9	12.0	13.3	20.0	-5.1	14.5	5.7	-0.1	5.4	14.5
Domestic Equity Assets	-16.9	24.8	13.4	27.6	-6.9	20.1	14.6	-1.6	13.1	33.1
Russell 3000	-19.2	25.7	20.9	31.0	-5.2	21.1	12.7	0.5	12.6	33.6
PRIT Domestic Equity	-15.8	27.8	18.9	30.5	-5.1	20.7	12.8	0.1	11.6	33.6
RhumbLine S&P 500 Index	-18.1	28.6	18.3	31.4	-4.4	21.8	11.9	1.4	13.6	32.2
S&P 500	-18.1	28.7	18.4	31.5	-4.4	21.8	12.0	1.4	13.7	32.4
Frontier Capital Appreciation	-18.0	18.2	18.1	28.9	-13.9	19.1	20.5	-6.5	12.4	--
Russell 2500 Growth	-26.2	5.0	40.5	32.7	-7.5	24.5	9.7	-0.2	7.1	40.6
RhumbLine HEDI	-15.2	25.5	--	--	--	--	--	--	--	--
Russell 1000 HEDI Moderate GR USD	-15.1	25.5	18.5	32.7	-0.9	23.4	11.4	4.8	15.4	30.9
International Developed Markets Equity Assets	-14.2	11.5	7.9	22.3	-13.5	24.9	1.4	-0.8	-8.7	21.2
MSCI EAFE	-14.5	11.3	7.8	22.0	-13.8	25.0	1.0	-0.8	-4.9	22.8
RhumbLine MSCI EAFE Index	-14.2	11.5	7.9	22.3	-13.5	24.9	1.4	-0.8	--	--
MSCI EAFE	-14.5	11.3	7.8	22.0	-13.8	25.0	1.0	-0.8	-4.9	22.8
International Emerging Markets Equity Assets	-19.3	2.3	21.1	20.7	-15.4	39.7	9.4	-12.7	--	--
MSCI Emerging Markets	-20.1	-2.5	18.3	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6
DFA Emerging Markets	-16.4	5.8	13.9	16.0	-15.2	36.6	12.4	-14.9	--	--
MSCI Emerging Markets	-20.1	-2.5	18.3	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6
Driehaus Emerging Market Equity	-22.4	-1.5	28.0	25.3	-15.6	43.0	6.5	-10.6	--	--
MSCI Emerging Markets	-20.1	-2.5	18.3	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6

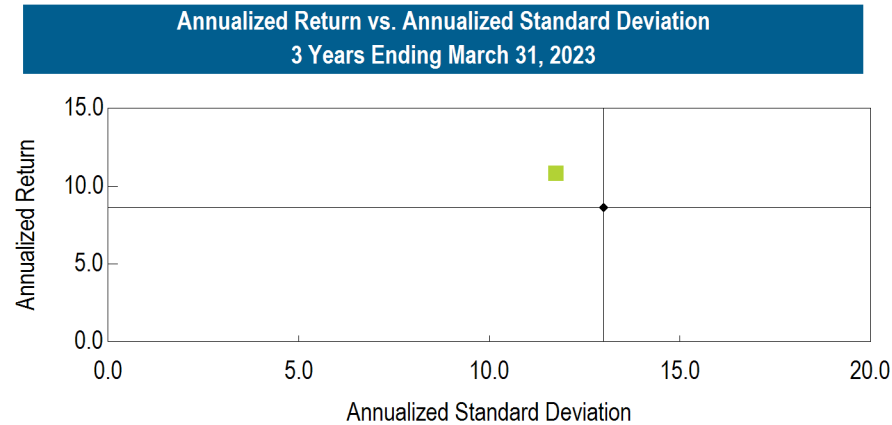
Total Retirement System | As of March 31, 2023

	2022 (%)	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)
Investment Grade Bonds Assets	-13.2	-1.6	7.5	8.7	0.0	3.6	2.6	0.6	6.0	-2.0
<i>Bloomberg US Aggregate TR</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>	<i>-2.0</i>
<i>PRIT Core Fixed Income</i>	<i>-18.3</i>	<i>0.1</i>	<i>12.0</i>	<i>11.2</i>	<i>-0.9</i>	<i>5.3</i>	<i>3.9</i>	<i>-2.0</i>	<i>15.1</i>	<i>-2.9</i>
SSgA U.S. Aggregate Bond Index	-13.2	-1.6	7.5	8.7	0.0	3.6	2.6	0.6	6.0	-2.0
<i>Bloomberg US Aggregate TR</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>	<i>-2.0</i>
High Yield Bond Assets	-8.9	4.0	6.3	14.0	-1.8	6.5	12.6	-2.3	2.9	6.4
<i>Bloomberg US High Yield TR</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>	<i>7.4</i>
<i>PRIT Public Value-Added Fixed Income</i>	<i>-7.8</i>	<i>3.5</i>	<i>4.3</i>	<i>10.7</i>	<i>-2.5</i>	<i>8.5</i>	<i>11.2</i>	<i>-5.2</i>	<i>-0.7</i>	<i>-2.0</i>
Shenkman Capital	-8.8	4.0	6.3	14.0	-1.8	6.5	12.6	-2.3	2.9	6.4
<i>Bloomberg US High Yield TR</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>	<i>7.4</i>
TIPS Assets	-12.1	5.8	10.9	8.4	-1.4	3.0	4.7	-1.4	3.6	-8.6
<i>Bloomberg US TIPS TR</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>	<i>-8.6</i>
SSgA TIPS Index-NL	-12.1	5.8	10.9	8.4	-1.4	3.0	4.7	-1.4	3.6	-8.6
<i>Bloomberg US TIPS TR</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>	<i>-8.6</i>
Emerging Market Debt Assets	-17.4	-2.4	6.2	16.5	-7.0	12.0	11.5	-0.8	--	--
<i>JP Morgan EMBI Global Diversified</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>7.4</i>	<i>-5.3</i>
Payden Emerging Market Bond	-17.4	-2.4	6.2	16.5	-7.0	12.0	11.5	-0.8	--	--
<i>JP Morgan EMBI Global Diversified</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>7.4</i>	<i>-5.3</i>
Open-Ended Real Estate	9.6	23.4	2.2	7.3	8.6	7.9	9.1	15.7	13.2	12.8
<i>NCREIF ODCE</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>15.1</i>	<i>12.5</i>	<i>13.9</i>
Clarion Partners	9.6	23.4	2.2	7.3	8.6	7.9	9.1	15.7	13.2	12.8
<i>NCREIF ODCE</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>15.1</i>	<i>12.5</i>	<i>13.9</i>

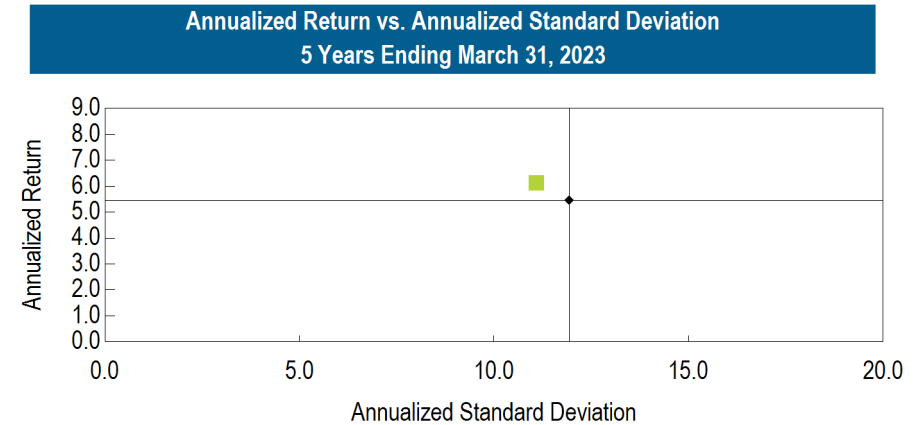
Total Retirement System | As of March 31, 2023

	2022 (%)	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)
Total Closed End Real Estate	10.2	14.3	-5.3	-38.2	-1.8	15.1	9.5	23.8	13.3	18.8
Rockwood Capital Real Estate Partners Fund XI, L.P.	10.2	14.3	0.0	--	--	--	--	--	--	--
<i>NCREIF-ODCE</i>	7.5	22.2	1.2	5.3	8.3	7.6	8.8	15.0	12.5	13.9
Private Equity Assets	10.2	39.5	22.9	17.7	10.2	-5.3	-2.8	8.6	5.5	9.1
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	10.8	--	--	--	--	--	--	--	--	--
NB Private Debt Fund IV										
Infrastructure	--	--	--	--	--	--	--	--	--	--
IFM Global Infrastructure	--	--	--	--	--	--	--	--	--	--
<i>CPI + 3%</i>	9.6	10.2	4.4	5.3	5.0	5.2	5.1	3.7	3.8	4.5
Cash										

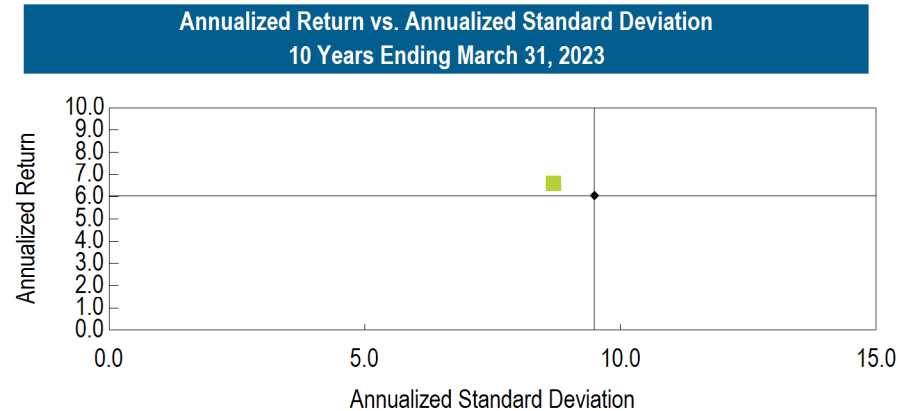
Infrastructure Aggregate returns will be shown after the first full year of performance.



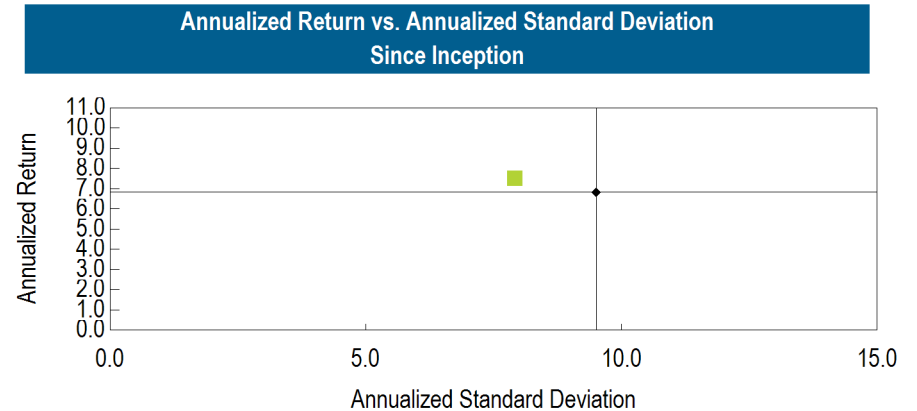
- Total Retirement System
- ◆ 60% MSCI World & 40% Barclays Aggregate



- Total Retirement System
- ◆ 60% MSCI World & 40% Barclays Aggregate

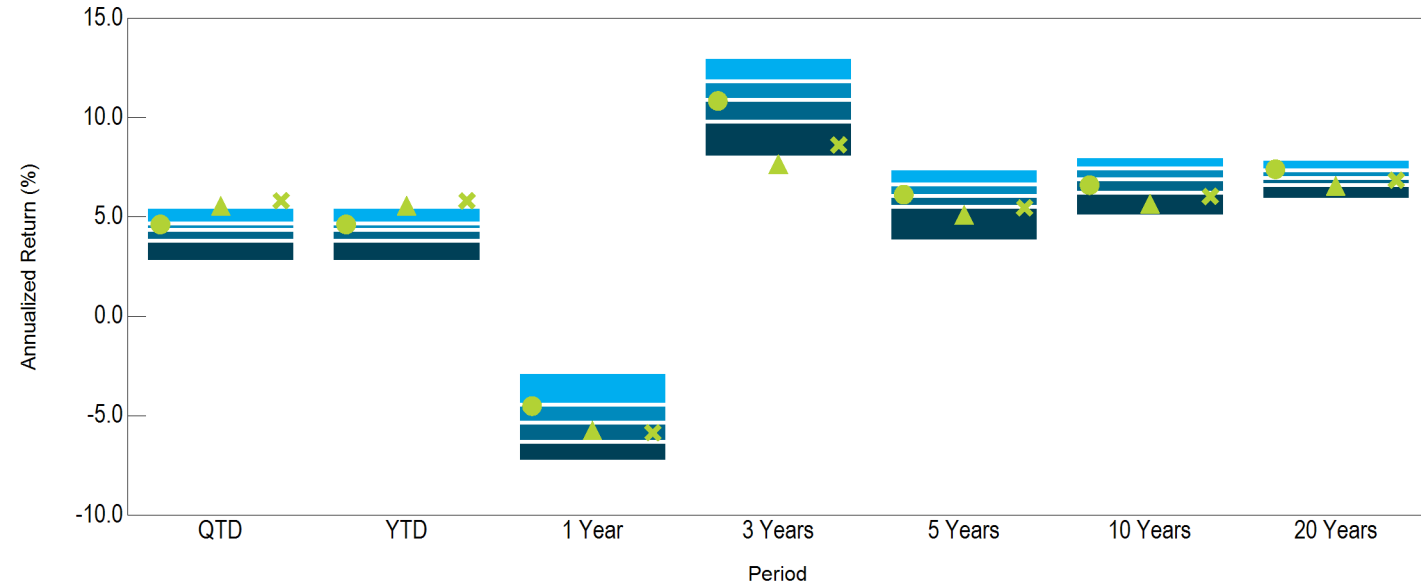


- Total Retirement System
- ◆ 60% MSCI World & 40% Barclays Aggregate



- Total Retirement System
- ◆ 60% MSCI World & 40% Barclays Aggregate

InvMetrics Public DB \$50mm-\$250mm Net Return Comparison
Ending March 31, 2023



	Return (Rank)													
	QTD		YTD		1 Year		3 Years		5 Years		10 Years		20 Years	
5th Percentile	5.5		5.5		-2.8		13.1		7.4		8.0		7.9	
25th Percentile	4.7		4.7		-4.4		11.8		6.7		7.5		7.4	
Median	4.4		4.4		-5.3		10.9		6.1		6.9		7.0	
75th Percentile	3.8		3.8		-6.3		9.8		5.5		6.2		6.6	
95th Percentile	2.8		2.8		-7.3		8.0		3.8		5.0		5.9	
# of Portfolios	159		159		159		153		149		121		59	
● Total Retirement System	4.6	(32)	4.6	(32)	-4.5	(28)	10.8	(53)	6.1	(48)	6.6	(68)	7.4	(24)
▲ 55% MSCI World & 45% Barclays Aggregate	5.6	(5)	5.6	(5)	-5.7	(65)	7.7	(97)	5.1	(84)	5.7	(91)	6.6	(82)
✕ 60% MSCI World & 40% Barclays Aggregate	5.8	(4)	5.8	(4)	-5.9	(67)	8.6	(92)	5.5	(76)	6.0	(86)	6.9	(58)

Statistics Summary						
5 Years Ending March 31, 2023						
	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Total Retirement System	6.1%	11.1%	0.5	1.0	0.4	2.0%
55% MSCI World & 45% Barclays Aggregate	5.1%	11.2%	--	1.0	0.3	0.0%
Equity Assets	6.7%	18.4%	-1.0	0.9	0.3	3.8%
Russell 3000	10.4%	19.2%	--	1.0	0.5	0.0%
Domestic Equity Assets	8.7%	19.7%	-0.7	1.0	0.4	2.7%
Russell 3000	10.4%	19.2%	--	1.0	0.5	0.0%
RhumbLine S&P 500 Index	11.1%	18.6%	-1.4	1.0	0.5	0.0%
S&P 500	11.2%	18.6%	--	1.0	0.5	0.0%
Frontier Capital Appreciation	7.0%	26.5%	0.0	1.1	0.2	9.2%
Russell 2500 Growth	6.8%	23.4%	--	1.0	0.2	0.0%
RhumbLine HEDI	--	--	--	--	--	--
Russell 1000 HEDI Moderate GR USD	12.2%	17.2%	--	1.0	0.6	0.0%
International Developed Markets Equity Assets	3.8%	17.5%	0.9	1.0	0.1	0.3%
MSCI EAFE	3.5%	17.6%	--	1.0	0.1	0.0%
RhumbLine MSCI EAFE Index	3.8%	17.5%	0.9	1.0	0.1	0.3%
MSCI EAFE	3.5%	17.6%	--	1.0	0.1	0.0%
International Emerging Markets Equity Assets	1.0%	18.1%	0.6	0.9	0.0	3.2%
MSCI Emerging Markets	-0.9%	18.9%	--	1.0	-0.1	0.0%

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

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
DFA Emerging Markets	0.6%	19.6%	0.4	1.0	0.0	4.0%
MSCI Emerging Markets	-0.9%	18.9%	--	1.0	-0.1	0.0%
Driehaus Emerging Market Equity	1.0%	17.2%	0.4	0.9	0.0	5.4%
MSCI Emerging Markets	-0.9%	18.9%	--	1.0	-0.1	0.0%
Investment Grade Bonds Assets	0.9%	5.5%	-0.4	1.0	-0.1	0.1%
Bloomberg US Aggregate TR	0.9%	5.5%	--	1.0	-0.1	0.0%
SSgA U.S. Aggregate Bond Index	0.9%	5.5%	-0.4	1.0	-0.1	0.1%
Bloomberg US Aggregate TR	0.9%	5.5%	--	1.0	-0.1	0.0%
High Yield Bond Assets	3.4%	8.2%	0.1	0.9	0.2	1.2%
Bloomberg US High Yield TR	3.2%	9.3%	--	1.0	0.2	0.0%
Shenkman Capital	3.4%	8.2%	0.1	0.9	0.2	1.2%
Bloomberg US High Yield TR	3.2%	9.3%	--	1.0	0.2	0.0%
TIPS Assets	2.8%	6.0%	-0.7	1.0	0.3	0.1%
Bloomberg US TIPS TR	2.9%	6.0%	--	1.0	0.3	0.0%
SSgA TIPS Index-NL	2.8%	6.0%	-0.7	1.0	0.3	0.1%
Bloomberg US TIPS TR	2.9%	6.0%	--	1.0	0.3	0.0%
Emerging Market Debt Assets	-0.9%	12.8%	-0.1	1.1	-0.2	2.6%
JP Morgan EMBI Global Diversified	-0.6%	11.2%	--	1.0	-0.2	0.0%
Payden Emerging Market Bond	-0.9%	12.8%	-0.1	1.1	-0.2	2.6%
JP Morgan EMBI Global Diversified	-0.6%	11.2%	--	1.0	-0.2	0.0%

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Open-Ended Real Estate	8.3%	7.8%	0.5	1.1	0.9	1.8%
NCREIF ODCE	7.5%	7.0%	--	1.0	0.9	0.0%
Clarion Partners	8.3%	7.8%	0.5	1.1	0.9	1.8%
NCREIF ODCE	7.5%	7.0%	--	1.0	0.9	0.0%
Total Closed End Real Estate	-6.9%	22.1%	-0.7	0.6	-0.4	21.9%
NCREIF ODCE	7.5%	7.0%	--	1.0	0.9	0.0%
Rockwood Capital Real Estate Partners Fund XI, L.P.	--	--	--	--	--	--
NCREIF-ODCE	7.5%	7.0%	--	1.0	0.9	0.0%
IFM Global Infrastructure	--	--	--	--	--	--
CPI + 3%	7.0%	1.4%	--	1.0	4.1	0.0%
EB Temporary Investment Fund	0.7%	0.5%	-1.3	0.4	-1.4	0.5%
91 Day T-Bills	1.3%	0.4%	--	1.0	0.0	0.0%

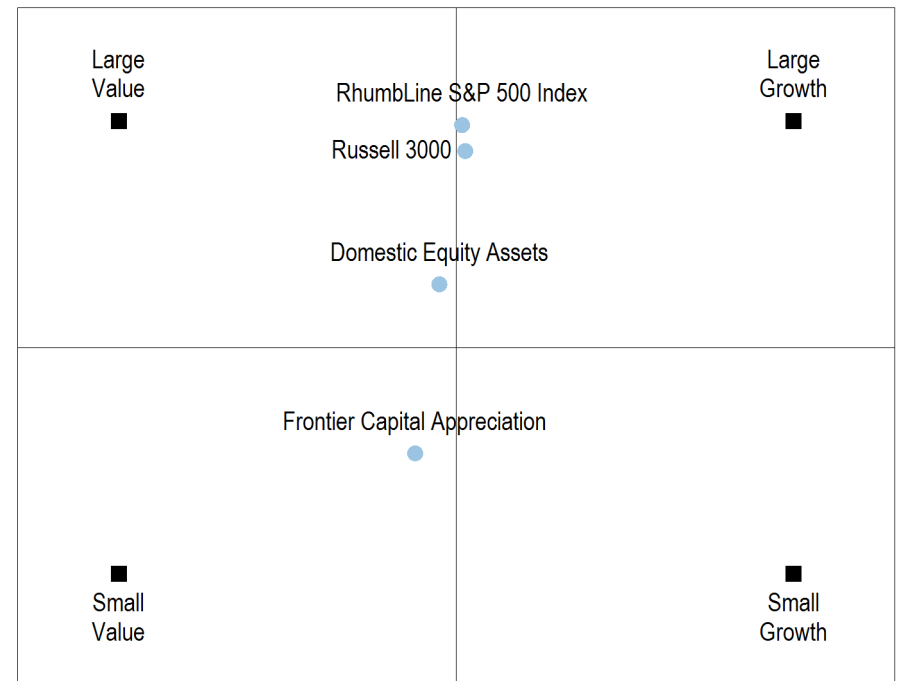
Rockwood Capital XI and IFM Global Infrastructure statistics will be reflected after first full five calendar years.

Retirement System Detail

Asset Allocation on March 31, 2023

	Actual	Actual
Frontier Capital Appreciation	\$21,525,152	30.2%
RhumbLine HEDI	\$26,895,317	37.7%
RhumbLine S&P 500 Index	\$22,847,579	32.1%
Total	\$71,268,048	100.0%

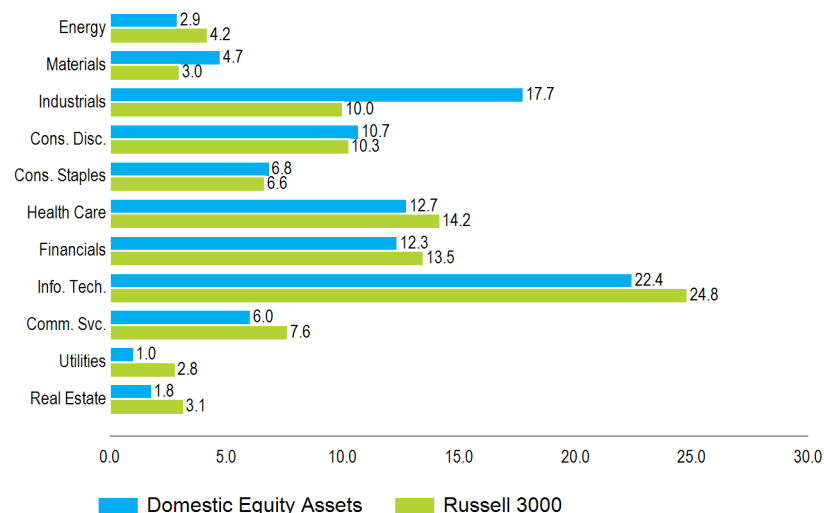
Domestic Equity Assets Style Map 3 Years Ending March 31, 2023



Domestic Equity Assets | As of March 31, 2023

Domestic Equity Assets Characteristics			
	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Market Value			
Market Value (\$M)	71.3	--	69.9
Number Of Holdings	663	2923	652
Characteristics			
Weighted Avg. Market Cap. (\$B)	363.8	470.5	279.7
Median Market Cap (\$B)	25.3	2.5	24.2
P/E Ratio	21.0	20.2	19.2
Yield	1.3	1.6	1.4
EPS Growth - 5 Yrs.	18.4	18.0	16.9
Price to Book	3.8	3.9	3.6

Sector Allocation (%) vs Russell 3000



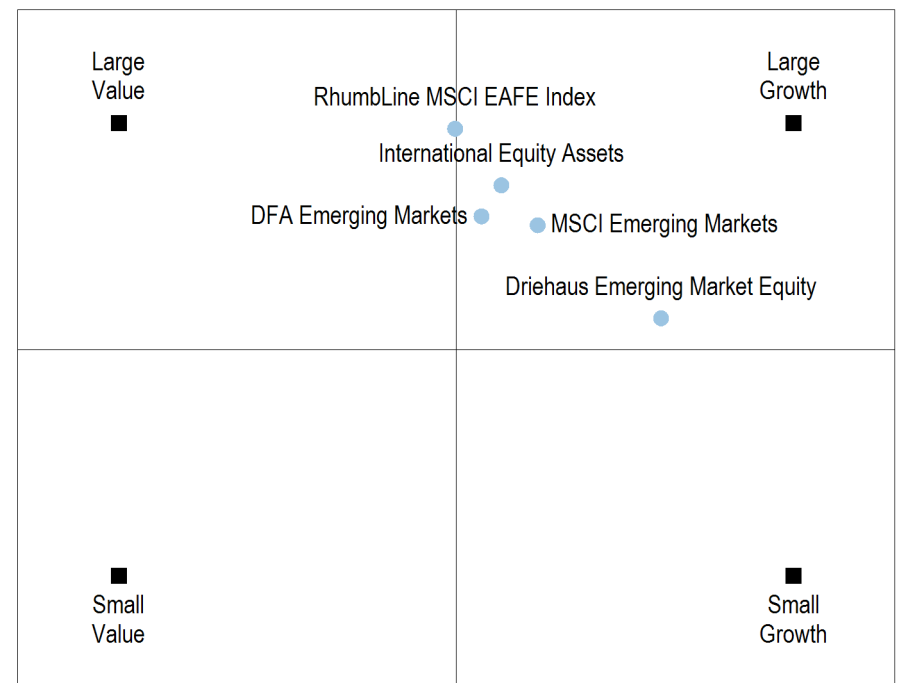
Top 10 Holdings

APPLE INC	4.7%
MICROSOFT CORP	4.3%
AMAZON.COM INC	1.5%
ALPHABET INC	1.3%
ALPHABET INC	1.3%
BERKSHIRE HATHAWAY INC	1.2%
UNITEDHEALTH GROUP INC	0.9%
JOHNSON & JOHNSON	0.9%
META PLATFORMS INC	0.9%
NVIDIA CORPORATION	0.9%
Total	17.8%

Asset Allocation on March 31, 2023

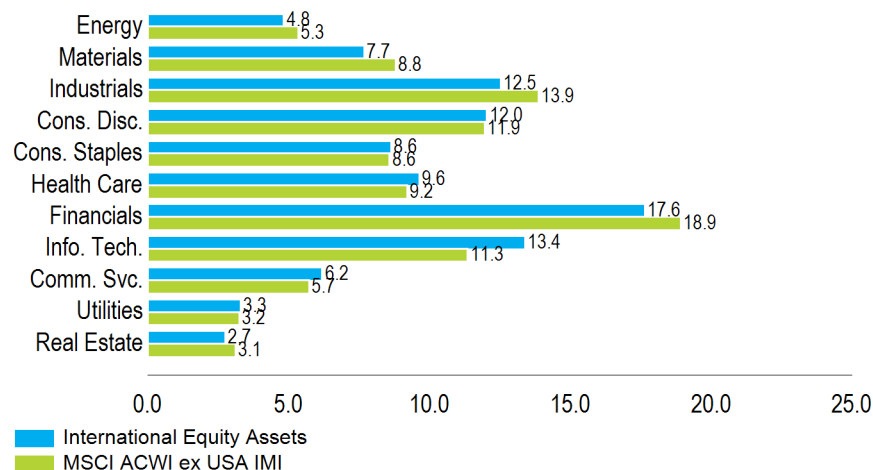
	Actual	Actual
DFA Emerging Markets	\$9,916,534	22.1%
Driehaus Emerging Market Equity	\$8,782,158	19.6%
RhumbLine MSCI EAFE Index	\$26,077,168	58.2%
Total	\$44,775,860	100.0%

International Equity Assets Style Map 3 Years Ending March 31, 2023



International Equity Characteristics			
	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Market Value			
Market Value (\$M)	44.8	--	41.9
Number Of Holdings	7303	6584	7253
Characteristics			
Weighted Avg. Market Cap. (\$B)	94.2	78.0	84.0
Median Market Cap (\$B)	0.7	1.7	0.7
P/E Ratio	12.9	13.4	12.3
Yield	3.3	3.3	3.4
EPS Growth - 5 Yrs.	10.8	10.0	11.7
Price to Book	2.5	2.4	2.5

Sector Allocation (%) vs MSCI ACWI ex USA IMI



Top 10 Holdings

TENCENT HOLDINGS LTD	1.7%
SAMSUNG ELECTRONICS CO LTD	1.7%
TAIWAN SEMICONDUCTOR MANUFACTURING CO LTD	1.5%
NESTLE SA, CHAM UND VEVEY	1.3%
ASML HOLDING NV	1.0%
NOVO NORDISK 'B'	1.0%
LVMH MOET HENNESSY LOUIS VUITTON SE	1.0%
ASTRAZENECA PLC	0.8%
SHELL PLC	0.8%
AIA GROUP LTD	0.8%
Total	11.5%

Country Allocation Report

As of 3/31/2023

Region	% of Total	% of Bench	% Diff
North America ex U.S.	0.0%	7.5%	-7.5%
United States	1.7%	0.0%	1.7%
Europe Ex U.K.	31.7%	32.0%	-0.2%
United Kingdom	7.2%	9.6%	-2.4%
Pacific Basin Ex Japan	9.6%	8.0%	1.6%
Japan	12.7%	14.9%	-2.1%
Emerging Markets	35.7%	27.2%	8.5%
Other	1.3%	0.8%	0.5%
Total	100.0%	100.0%	0.0%

International Equity Country Allocation			
vs MSCI ACWI ex USA IMI			
Country	% of Total	% of Bench	% Diff
ARGENTINA	0.3%	0.0%	0.3%
AUSTRALIA	4.1%	5.1%	-0.9%
AUSTRIA	0.1%	0.2%	-0.1%
BAHRAIN	0.0%	0.0%	0.0%
BANGLADESH	0.0%	0.0%	0.0%
BELGIUM	0.5%	0.7%	-0.2%
BRAZIL	1.9%	1.3%	0.6%
CANADA	0.0%	7.5%	-7.5%
CHILE	0.1%	0.2%	0.0%
CHINA	9.2%	8.1%	1.1%
COLOMBIA	0.0%	0.0%	0.0%
CROATIA	0.0%	0.0%	0.0%
CZECH REPUBLIC	0.0%	0.0%	0.0%
DENMARK	1.8%	1.9%	-0.1%
EGYPT	0.0%	0.0%	0.0%
ESTONIA	0.0%	0.0%	0.0%
FINLAND	0.7%	0.7%	0.0%
FRANCE	6.8%	7.4%	-0.6%
GERMANY	4.9%	5.3%	-0.4%
GREECE	0.2%	0.1%	0.1%
HONG KONG	4.1%	1.7%	2.4%
HUNGARY	0.0%	0.0%	0.0%
INDIA	6.3%	3.9%	2.4%
INDONESIA	1.1%	0.5%	0.5%

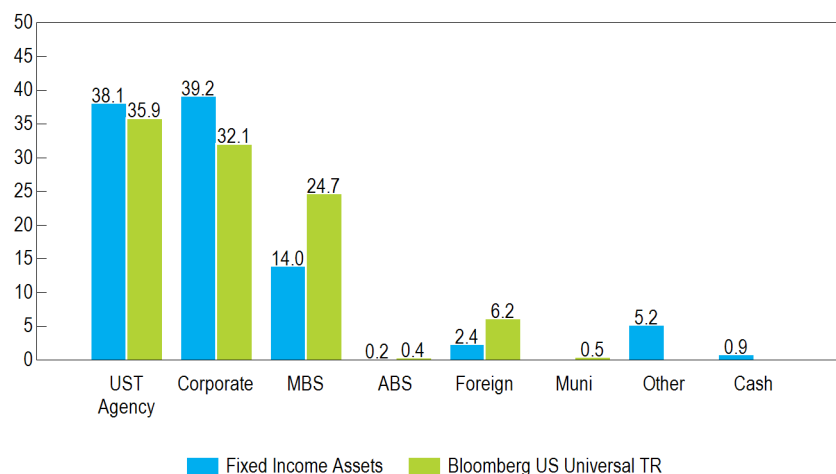
Country	% of Total	% of Bench	% Diff
IRELAND	0.7%	0.5%	0.2%
ISRAEL	0.5%	0.6%	-0.1%
ITALY	1.2%	1.7%	-0.5%
JAPAN	12.7%	14.9%	-2.1%
JORDAN	0.0%	0.0%	0.0%
KAZAKHSTAN	0.0%	0.0%	0.0%
KENYA	0.0%	0.0%	0.0%
KOREA	4.3%	3.4%	0.9%
KUWAIT	0.0%	0.2%	-0.2%
LEBANON	0.0%	0.0%	0.0%
LITHUANIA	0.0%	0.0%	0.0%
LUXEMBOURG	0.3%	0.0%	0.3%
MALAYSIA	0.4%	0.4%	-0.1%
MAURITIUS	0.0%	0.0%	0.0%
MEXICO	1.4%	0.7%	0.7%
MOROCCO	0.0%	0.0%	0.0%
NETHERLANDS	4.7%	2.7%	1.9%
NEW ZEALAND	0.2%	0.2%	-0.1%
NIGERIA	0.0%	0.0%	0.0%
NORWAY	0.4%	0.6%	-0.2%
OMAN	0.0%	0.0%	0.0%
OTHER	0.5%	0.0%	0.5%
PAKISTAN	0.0%	0.0%	0.0%
PERU	0.1%	0.1%	0.0%
PHILIPPINES	0.2%	0.2%	0.0%
POLAND	0.2%	0.2%	0.0%
PORTUGAL	0.1%	0.2%	0.0%

Country	% of Total	% of Bench	% Diff
QATAR	0.2%	0.2%	0.0%
ROMANIA	0.0%	0.0%	0.0%
SAUDI ARABIA	1.2%	1.1%	0.2%
SERBIA	0.0%	0.0%	0.0%
SINGAPORE	1.1%	1.0%	0.1%
SLOVENIA	0.0%	0.0%	0.0%
SOUTH AFRICA	1.0%	1.0%	0.0%
SPAIN	1.5%	1.6%	-0.1%
SRI LANKA	0.0%	0.0%	0.0%
SWEDEN	1.8%	2.4%	-0.6%
SWITZERLAND	6.1%	6.0%	0.0%
TAIWAN	6.3%	4.4%	1.9%
THAILAND	0.8%	0.6%	0.2%
TUNISIA	0.0%	0.0%	0.0%
TURKEY	0.2%	0.2%	0.0%
UNITED ARAB EMIRATES	0.6%	0.3%	0.3%
UNITED KINGDOM	7.2%	9.6%	-2.4%
UNITED STATES	1.7%	0.0%	1.7%
VIETNAM	0.0%	0.0%	0.0%
Total	100.0%	100.0%	0.0%

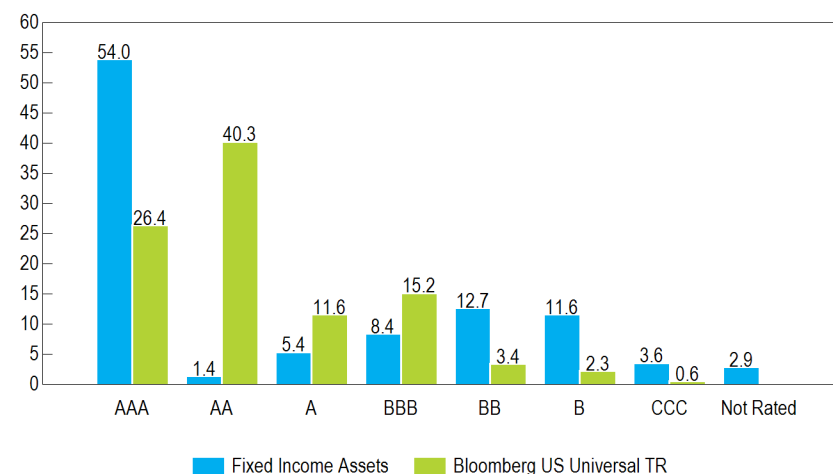
Asset Allocation on March 31, 2023		
	Actual	Actual
Payden Emerging Market Bond	\$4,865,519	8.4%
Shenkman Capital	\$17,585,237	30.5%
SSgA TIPS Index-NL	\$9,635,967	16.7%
SSgA U.S. Aggregate Bond Index	\$25,540,364	44.3%
Total	\$57,627,088	100.0%

Fixed Income Characteristics vs. Bloomberg US Universal TR			
	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Fixed Income Characteristics			
Yield to Maturity	5.5	5.1	6.1
Average Duration	5.1	6.3	5.3
Average Quality	A	AA	A
Weighted Average Maturity	7.2	8.3	7.5

Sector Allocation



Credit Quality Allocation



Portfolio Reviews

RhumbLine S&P 500 Index | As of March 31, 2023

Account Information

Account Name	RhumbLine S&P 500 Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	3/01/99
Account Type	US Equity
Benchmark	S&P 500
Universe	eV US Passive S&P 500 Equity Net

Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
RhumbLine S&P 500 Index	7.5	-7.7	18.5	11.1	12.2	7.1	Mar-99
S&P 500	7.5	-7.7	18.6	11.2	12.2	7.1	Mar-99

Top 10 Holdings

APPLE INC	7.1%
MICROSOFT CORP	6.2%
AMAZON.COM INC	2.7%
NVIDIA CORPORATION	2.0%
ALPHABET INC	1.8%
TESLA INC	1.6%
BERKSHIRE HATHAWAY INC	1.6%
ALPHABET INC	1.6%
META PLATFORMS INC	1.4%
EXXON MOBIL CORP	1.3%
Total	27.2%

RhumbLine S&P 500 Index Equity Characteristics vs S&P 500

	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Market Value			
Market Value (\$M)	22.8	--	20.8
Number Of Holdings	504	503	485
Characteristics			
Weighted Avg. Market Cap. (\$B)	536.5	539.2	424.5
Median Market Cap (\$B)	30.6	30.4	29.6
P/E Ratio	21.1	21.2	19.3
Yield	1.7	1.7	1.8
EPS Growth - 5 Yrs.	18.3	18.2	17.0
Price to Book	4.2	4.2	3.9
Sector Distribution			
Energy	4.6	4.5	5.3
Materials	2.6	2.6	2.7
Industrials	8.6	8.6	7.9
Consumer Discretionary	10.1	10.4	9.6
Consumer Staples	7.2	7.8	7.3
Health Care	14.0	13.9	15.7
Financials	13.4	13.1	12.1
Information Technology	25.9	25.6	25.6
Communication Services	8.1	8.3	7.3
Utilities	2.8	2.7	3.2
Real Estate	2.5	2.5	2.7

Account Information	
Account Name	RhumbLine HEDI
Account Structure	Separate Account
Investment Style	Passive
Inception Date	11/01/20
Account Type	US Equity
Benchmark	Russell 1000 HEDI Moderate GR USD
Universe	eV US Large Cap Core Equity Gross

Portfolio Performance Summary							
	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
RhumbLine HEDI	6.4	-3.9	--	--	--	10.8	Nov-20
Russell 1000 HEDI Moderate GR USD	6.4	-3.8	17.8	12.2	13.2	10.9	Nov-20

Top 10 Holdings	
APPLE INC	6.4%
MICROSOFT CORP	6.0%
ALPHABET INC	2.0%
ALPHABET INC	1.9%
BERKSHIRE HATHAWAY INC	1.7%
AMAZON.COM INC	1.6%
JOHNSON & JOHNSON	1.4%
UNITEDHEALTH GROUP INC	1.4%
VISA INC	1.3%
PROCTER & GAMBLE CO (THE)	1.3%
Total	24.8%

Rhumbline HEDI Characteristics		
	Portfolio Q1-23	Portfolio Q4-22
Market Value		
Market Value (\$M)	26.9	27.4
Number Of Holdings	229	228
Characteristics		
Weighted Avg. Market Cap. (\$B)	473.1	367.0
Median Market Cap (\$B)	37.0	34.1
P/E Ratio	24.2	22.2
Yield	1.5	1.6
EPS Growth - 5 Yrs.	16.7	15.4
Price to Book	4.9	4.8
Sector Distribution		
Energy	0.9	0.9
Materials	2.6	2.3
Industrials	17.9	16.9
Consumer Discretionary	9.0	9.3
Consumer Staples	11.8	12.2
Health Care	12.0	13.2
Financials	14.3	12.0
Information Technology	22.7	24.8
Communication Services	7.2	6.7
Utilities	0.3	0.3
Real Estate	1.3	1.3

Russell 1000 HEDI benchmark characteristic data is unavailable.

Frontier Capital Appreciation | As of March 31, 2023

Account Information	
Account Name	Frontier Capital Appreciation
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	2/01/13
Account Type	US Equity
Benchmark	Russell 2500 Growth
Universe	eV US Small-Mid Cap Growth Equity Net

Portfolio Performance Summary							
	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Frontier Capital Appreciation	7.5	-7.6	24.4	7.0	9.8	10.3	Feb-13
Russell 2500 Growth	6.5	-10.4	14.7	6.8	10.0	10.4	Feb-13

Top 10 Holdings	
BUILDERS FIRSTSOURCE INC	2.1%
ATI INC	2.1%
ARRAY TECHNOLOGIES INC	2.0%
JABIL INC	1.8%
MRC GLOBAL INC	1.7%
KBR INC	1.6%
WOLFSPEED INC	1.5%
COOPER COS INC (THE)	1.5%
CAESARS ENTERTAINMENT INC	1.4%
INSULET CORPORATION	1.4%
Total	17.1%

Frontier Capital Appreciation Characteristics			
	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Market Value			
Market Value (\$M)	21.5	--	21.7
Number Of Holdings	139	1319	142
Characteristics			
Weighted Avg. Market Cap. (\$B)	7.7	6.4	7.4
Median Market Cap (\$B)	4.3	1.8	4.1
P/E Ratio	17.4	18.1	14.7
Yield	0.7	0.9	0.8
EPS Growth - 5 Yrs.	22.1	21.6	20.5
Price to Book	2.6	4.2	2.5
Sector Distribution			
Energy	3.6	5.1	3.5
Materials	9.8	5.2	8.8
Industrials	27.6	19.7	24.1
Consumer Discretionary	13.5	12.9	12.3
Consumer Staples	0.0	4.1	0.0
Health Care	12.3	18.4	12.6
Financials	8.6	8.7	11.7
Information Technology	18.2	20.1	18.3
Communication Services	2.3	1.9	2.5
Utilities	0.0	1.3	0.0
Real Estate	1.5	2.5	1.5

Account Information

Account Name	RhumbLine MSCI EAFE Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	8/01/14
Account Type	Non-US Stock Developed
Benchmark	MSCI EAFE
Universe	eV EAFE All Cap Equity Net

Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
RhumbLine MSCI EAFE Index	8.5	-1.2	13.1	3.8	--	3.8	Aug-14
MSCI EAFE	8.5	-1.4	13.0	3.5	5.0	3.6	Aug-14

Top 10 Holdings

NESTLE SA, CHAM UND VEVEY	2.2%
ASML HOLDING NV	1.8%
NOVO NORDISK 'B'	1.7%
LVMH MOET HENNESSY LOUIS VUITTON SE	1.7%
ASTRAZENECA PLC	1.4%
SHELL PLC	1.3%
ROCHE HOLDING AG	1.3%
NOVARTIS AG	1.3%
BHP GROUP LTD	1.0%
TOYOTA MOTOR CORP	1.0%
Total	14.7%

Rhumbline MSCI EAFE Index Characteristics

	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Market Value			
Market Value (\$M)	26.1	--	24.0
Number Of Holdings	785	795	787
Characteristics			
Weighted Avg. Market Cap. (\$B)	86.1	85.5	78.9
Median Market Cap (\$B)	12.4	12.5	11.7
P/E Ratio	14.7	14.6	13.8
Yield	3.2	3.3	3.4
EPS Growth - 5 Yrs.	8.3	8.2	9.9
Price to Book	2.6	2.6	2.5
Sector Distribution			
Energy	4.5	4.5	4.9
Materials	7.7	7.7	7.7
Industrials	15.5	15.7	14.8
Consumer Discretionary	12.1	12.2	10.9
Consumer Staples	10.2	10.4	10.2
Health Care	13.1	13.2	13.4
Financials	18.0	18.1	18.4
Information Technology	7.8	7.9	7.7
Communication Services	4.5	4.5	4.4
Utilities	3.4	3.4	3.4
Real Estate	2.4	2.4	2.6

DFA Emerging Markets | As of March 31, 2023

Account Information

Account Name	DFA Emerging Markets
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	Non-US Stock Emerging
Benchmark	MSCI Emerging Markets
Universe	eV Emg Mkts All Cap Equity Net

Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
DFA Emerging Markets	5.6	-8.3	14.1	0.6	--	3.9	Jan-15
MSCI Emerging Markets	4.0	-10.7	7.8	-0.9	2.0	2.8	Jan-15

Top 10 Holdings

SAMSUNG ELECTRONICS CO LTD	3.1%
TAIWAN SEMICONDUCTOR MANUFACTURING CO LTD	3.0%
TENCENT HOLDINGS LTD	2.9%
TAIWAN SEMICONDUCTOR MANUFACTURING CO LTD	1.2%
ALIBABA GROUP HOLDING LTD	0.9%
ALIBABA GROUP HOLDING LTD	0.9%
CHINA CONSTRUCTION BANK CORP	0.9%
VALE SA	0.8%
SK HYNIX INC	0.6%
RELIANCE INDUSTRIES LTD	0.6%
Total	15.0%

DFA Emerging Markets Characteristics

	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Market Value			
Market Value (\$M)	9.9	--	9.4
Number Of Holdings	6496	1375	6442
Characteristics			
Weighted Avg. Market Cap. (\$B)	70.6	112.4	59.8
Median Market Cap (\$B)	0.5	6.6	0.5
P/E Ratio	10.3	11.7	9.5
Yield	4.2	3.5	4.2
EPS Growth - 5 Yrs.	13.8	14.2	14.8
Price to Book	2.2	2.4	2.3
Sector Distribution			
Energy	5.0	4.7	5.1
Materials	12.5	8.6	12.9
Industrials	9.4	6.0	9.3
Consumer Discretionary	11.5	13.8	11.0
Consumer Staples	6.3	6.5	6.5
Health Care	4.3	3.8	4.6
Financials	16.2	21.0	17.2
Information Technology	20.6	20.5	18.8
Communication Services	7.6	10.6	7.4
Utilities	2.9	2.6	3.3
Real Estate	3.1	1.9	3.3

Account Information

Account Name	Driehaus Emerging Market Equity
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	Non-US Stock Emerging
Benchmark	MSCI Emerging Markets
Universe	eV Emg Mkts All Cap Equity Net

Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Driehaus Emerging Market Equity	4.2	-11.2	8.9	1.0	--	4.8	Jan-15
MSCI Emerging Markets	4.0	-10.7	7.8	-0.9	2.0	2.8	Jan-15

Top 10 Holdings

TAIWAN SEMICONDUCTOR MANUFACTURING CO LTD	6.1%
TENCENT HOLDINGS LTD	5.6%
SAMSUNG ELECTRONICS CO LTD	5.2%
NORTHERN INSTITUTIONAL U.S. GOVERNMENT SELECT PORTFOLIO	3.7%
GPO FINANCE BANORTE	2.3%
ICICI BANK LTD	2.1%
ALIBABA GROUP HOLDING LTD	1.9%
PING AN INSURANCE GROUP	1.7%
INDUSTRIAL AND COMMERCIAL BANK OF CHINA LIMITED	1.7%
PROYA COSMETICS CO LTD	1.6%
Total	32.1%

Driehaus Emerging Market Equity Characteristics

	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Market Value			
Market Value (\$M)	8.8	--	8.4
Number Of Holdings	104	1375	113
Characteristics			
Weighted Avg. Market Cap. (\$B)	148.9	112.4	130.0
Median Market Cap (\$B)	20.8	6.6	18.4
P/E Ratio	13.2	11.7	13.7
Yield	2.5	3.5	2.3
EPS Growth - 5 Yrs.	15.1	14.2	13.3
Price to Book	2.7	2.4	2.8
Sector Distribution			
Energy	5.7	4.7	5.6
Materials	2.1	8.6	3.2
Industrials	7.1	6.0	9.4
Consumer Discretionary	12.5	13.8	13.9
Consumer Staples	6.6	6.5	6.6
Health Care	5.2	3.8	5.1
Financials	18.2	21.0	21.2
Information Technology	21.8	20.5	16.3
Communication Services	9.5	10.6	6.5
Utilities	3.3	2.6	3.4
Real Estate	3.4	1.9	3.1

Account Information

Account Name	SSgA U.S. Aggregate Bond Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	5/01/01
Account Type	US Fixed Income Investment Grade
Benchmark	Bloomberg US Aggregate TR
Universe	eV US Core Fixed Inc Net

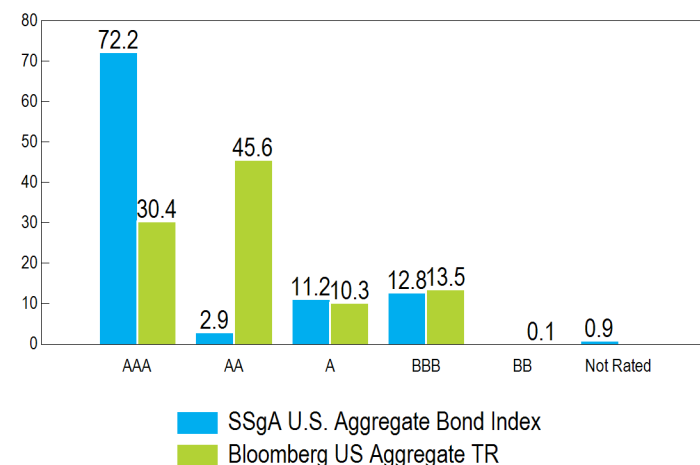
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA U.S. Aggregate Bond Index	3.1	-4.9	-2.8	0.9	1.3	3.7	May-01
Bloomberg US Aggregate TR	3.0	-4.8	-2.8	0.9	1.4	3.7	May-01

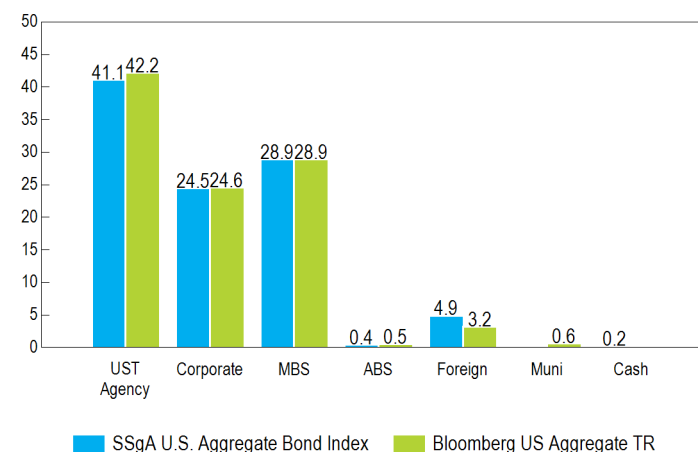
SSgA U.S. Aggregate Bond Index Characteristics vs. Bloomberg US Aggregate TR

	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Fixed Income Characteristics			
Yield to Maturity	4.4	4.6	4.7
Average Duration	6.3	6.5	6.2
Average Quality	AA	AA	AA
Weighted Average Maturity	8.6	8.5	8.6

Credit Quality Allocation



Sector Allocation



Account Information

Account Name	Shenkman Capital
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	4/01/06
Account Type	US Fixed Income High Yield
Benchmark	Bloomberg US High Yield TR
Universe	eV US High Yield Fixed Inc Net

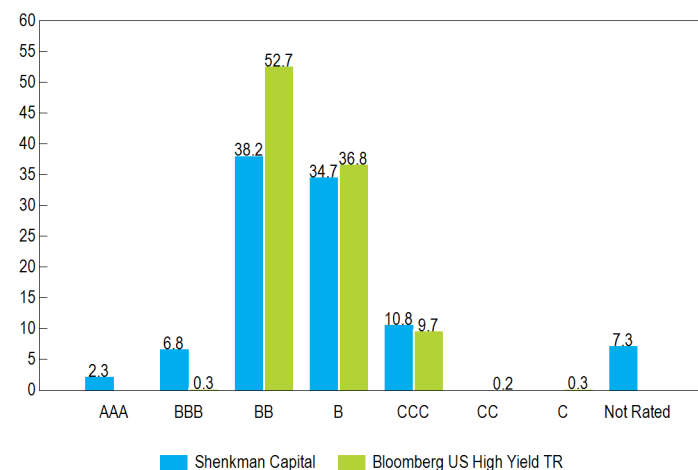
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Shenkman Capital	3.8	-2.1	5.7	3.4	4.0	5.7	Apr-06
Bloomberg US High Yield TR	3.6	-3.3	5.9	3.2	4.1	6.2	Apr-06

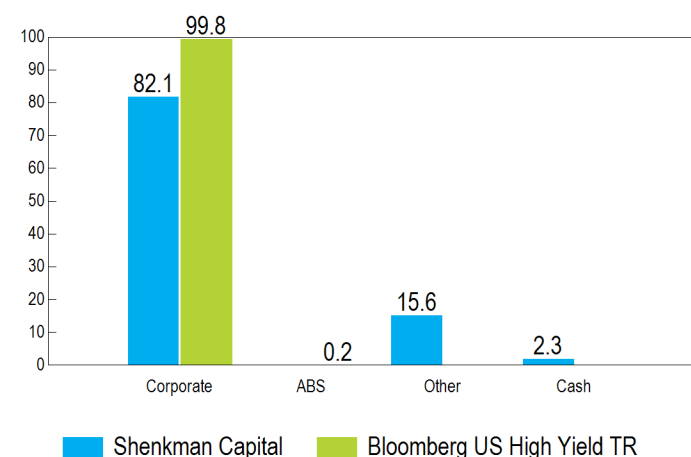
Shenkman Capital Characteristics vs. Bloomberg US High Yield TR

	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Fixed Income Characteristics			
Yield to Maturity	8.0	8.9	8.7
Average Duration	3.3	4.3	3.4
Average Quality	BB	B	BB
Weighted Average Maturity	5.1	5.3	5.0

Credit Quality Allocation



Sector Allocation



SSgA TIPS Index-NL | As of March 31, 2023

Account Information

Account Name	SSgA TIPS Index-NL
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	10/01/05
Account Type	US Inflation Protected Fixed
Benchmark	Bloomberg US TIPS TR
Universe	eV US TIPS / Inflation Fixed Inc Net

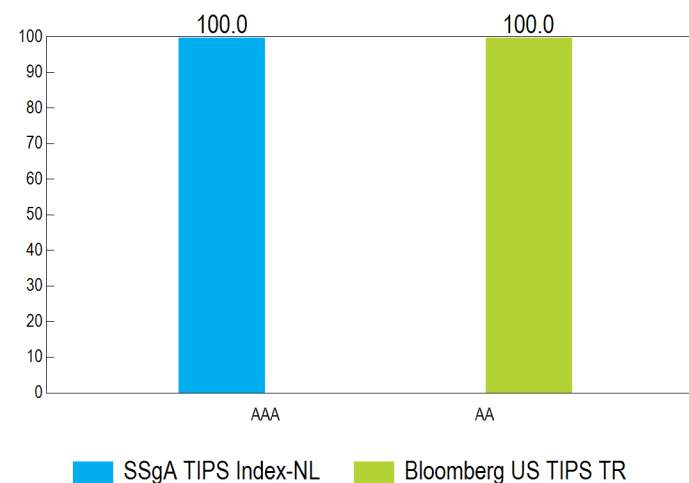
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA TIPS Index-NL	3.5	-6.2	1.7	2.8	1.4	3.4	Oct-05
Bloomberg US TIPS TR	3.3	-6.1	1.8	2.9	1.5	3.5	Oct-05

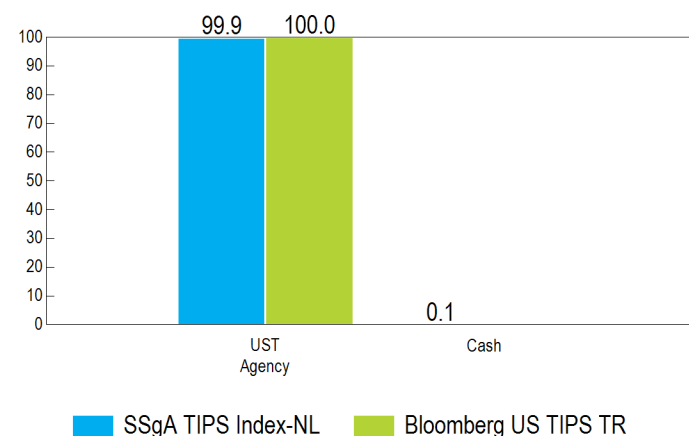
SSgA TIPS Index-NL Characteristics vs. Bloomberg US TIPS TR

	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Fixed Income Characteristics			
Yield to Maturity	4.0	4.1	4.3
Average Duration	5.1	6.9	5.4
Average Quality	AAA	AA	AAA
Weighted Average Maturity	7.4	7.4	7.1

Credit Quality Allocation



Sector Allocation



Account Information

Account Name	Payden Emerging Market Bond
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	International Emerging Market Debt
Benchmark	JP Morgan EMBI Global Diversified
Universe	

Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Payden Emerging Market Bond	1.8	-8.1	0.9	-0.9	--	1.9	Jan-15
JP Morgan EMBI Global Diversified	1.9	-6.9	0.0	-0.6	2.0	1.9	Jan-15

Fund Characteristics as of January 31, 2023

Versus JP Morgan EMBI Global Diversified

Sharpe Ratio (3 Year)	-0.3
Average Duration	6.8
Average Coupon	5.8%
Average Effective Maturity	11.8
R-Squared (3 Year)	1.0
Alpha (3 Year)	0.1%
Beta (3 Year)	1.1

Payden Emerging Market Bond Characteristics vs. JP Morgan EMBI Global Diversified

	Portfolio Q1-23	Index Q1-23	Portfolio Q4-22
Fixed Income Characteristics			
Yield to Maturity	9.3	7.8	8.2
Average Duration	6.8	6.9	7.6
Average Quality	BB	BBB	BB
Weighted Average Maturity	11.6	11.7	12.0

Fixed Income Sectors as of January 31, 2023

GOVERNMENT	61.8%
MUNICIPAL	0.0%
CORPORATE	9.6%
SECURITIZED	0.0%
CASH & EQUIVALENTS	7.1%
DERIVATIVE	21.5%

Credit Quality as of December 31, 2022

AAA	3.0%
AA	4.0%
A	7.0%
BBB	29.0%
BB	30.0%
B	17.0%
Below B	7.0%
Not Rated	3.0%

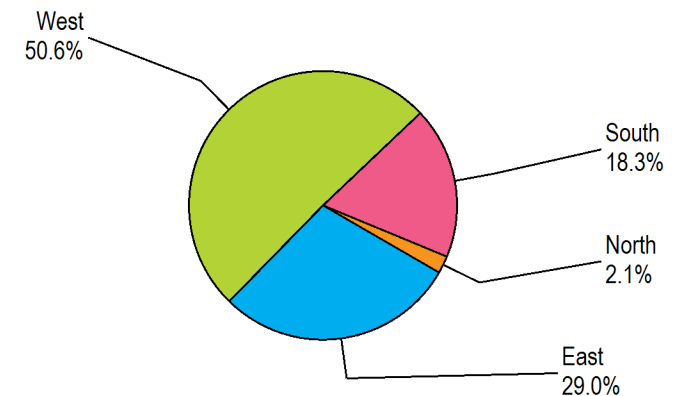
Account Information

Account Name	Clarion Partners
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	10/01/02
Account Type	Real Estate
Benchmark	NCREIF ODCE
Universe	

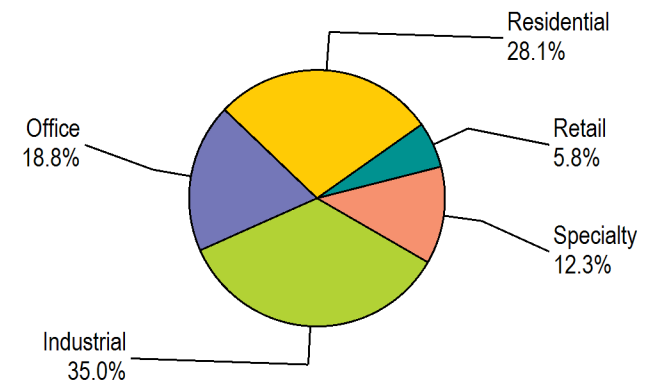
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Clarion Partners	-5.1	-2.8	9.0	8.3	10.1	7.6	Oct-02
NCREIF ODCE	-3.2	-3.1	8.4	7.5	9.5	8.1	Oct-02

Geographic Diversification



Property Type Allocation



Clarion Partners characteristics are as of 3/31/2023.

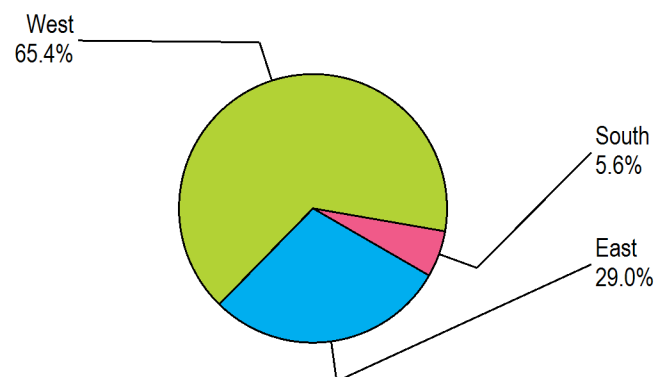
Account Information

Account Name	Rockwood Capital Real Estate Partners Fund XI, L.P.
Account Structure	Other
Investment Style	Passive
Inception Date	12/01/19
Account Type	Real Estate
Benchmark	NCREIF-ODCE
Universe	

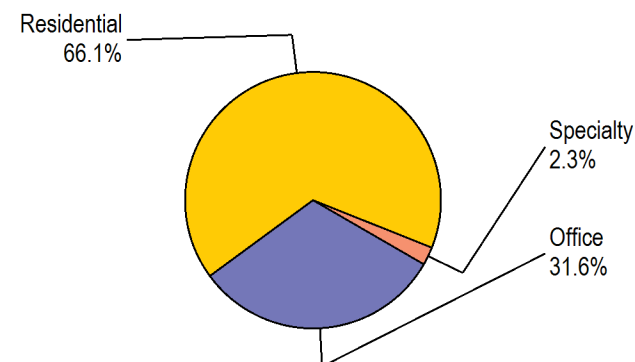
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Rockwood Capital Real Estate Partners Fund XI, L.P.	-1.8	4.8	7.3	--	--	6.6	Dec-19
NCREIF-ODCE	-3.2	-3.1	8.4	7.5	9.5	8.3	Dec-19

Geographic Diversification



Property Type Allocation



Rockwood Real Estate characteristics are as of 12/31/2022.

Non-Marketable Securities Overview						
As of March 31, 2023						
Account	Vintage Year	Commitment	Cumulative Takedown	Cumulative Distributions	Value (RV)	IRR (%)
North American Strategic Partners 2006	2006	\$4,539,998	\$4,411,659	\$2,094,251	\$18,450	6.4
Ironsides Partnership Fund IV	2015	\$2,500,000	\$1,424,191	\$1,609,619	\$2,390,258	31.7
Ironsides Direct Investment Fund IV	2015	\$2,500,000	\$2,419,534	\$3,126,965	\$1,561,857	22.1
Ironsides Partnership Fund V, L.P.	2019	\$2,000,000	\$1,461,799	\$0	\$1,999,357	30.2
Ironsides Direct Investment Fund V, L.P.	2019	\$2,000,000	\$2,538,377	\$436,888	\$3,075,602	37.0
HarbourVest 2019 Global Fund	2019	\$4,000,000	\$2,629,672	\$776,237	\$3,023,695	31.3
Total Account		\$17,539,998	\$14,885,232	\$3,855,457	\$12,069,218	\$15,924,675

IRRs are as of 12/31/2022.

Non-Marketable Securities Overview							
As of March 31, 2023							
Account Type	Account	Vintage Year	Commitment	Cumulative Takedown	Cumulative Distributions	Value (RV)	IRR (%)
Private Debt	NB Private Debt Fund IV	2021	\$5,000,000	\$3,750,000	\$1,027,806	\$3,014,665	--
	Total Account		\$5,000,000	\$3,750,000	\$1,027,806	\$3,014,665	

IRRs for investments less than 2 years are not shown.

Annual Investment Expense Analysis As Of March 31, 2023				
Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Equity Assets		\$116,043,909		
Domestic Equity Assets		\$71,268,048		
RhumbLine S&P 500 Index	0.07% of First 25.0 Mil, 0.05% of Next 25.0 Mil, 0.04% Thereafter	\$22,847,579	\$15,993	0.07%
Frontier Capital Appreciation	0.79% of Assets	\$21,525,152	\$170,049	0.79%
RhumbLine HEDI	0.05% of Assets	\$26,895,317	\$13,448	0.05%
International Equity Assets		\$44,775,860		
International Developed Markets Equity Assets		\$26,077,168		
RhumbLine MSCI EAFE Index	0.08% of First 25.0 Mil, 0.07% of Next 25.0 Mil, 0.05% Thereafter	\$26,077,168	\$20,754	0.08%
International Emerging Markets Equity Assets		\$18,698,692		
DFA Emerging Markets	0.39% of Assets	\$9,916,534	\$38,674	0.39%
Driehaus Emerging Market Equity	0.90% of Assets	\$8,782,158	\$79,039	0.90%
Fixed Income Assets		\$57,627,088		
Investment Grade Bonds Assets		\$25,540,364		
SSgA U.S. Aggregate Bond Index	0.04% of Assets	\$25,540,364	\$10,216	0.04%
High Yield Bond Assets		\$17,585,237		
Shenkman Capital	0.45% of Assets	\$17,585,237	\$79,134	0.45%
TIPS Assets		\$9,635,967		
SSgA TIPS Index-NL	0.04% of Assets	\$9,635,967	\$3,854	0.04%
Emerging Market Debt Assets		\$4,865,519		
Payden Emerging Market Bond	0.69% of Assets	\$4,865,519	\$33,572	0.69%
Real Estate Assets		\$10,664,490		
Open-Ended Real Estate		\$6,790,841		
Clarion Partners	1.10% of Assets	\$6,790,841	\$74,699	1.10%

Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Total Closed End Real Estate		\$3,873,649		
Rockwood Capital Real Estate Partners Fund XI, L.P.	1.4% of committed capital during investment period; 1.4% on invested equity thereafter	\$3,873,649		
Private Equity Assets		\$12,479,095		
North American Strategic Partners 2006	0.8% on drawn and undrawn capital less investments sold or written off 5% carried interest, 8% preferred return	\$14,091		
Ironsides Partnership Fund IV	0% Management fee, 8% Preferred Return, 5% Carried Interest	\$2,390,258		
Ironsides Direct Investment Fund IV	0.5% Management fee, 8% Preferred Return, 15% Carried Interest	\$1,561,857		
Ironsides Partnership Fund V, L.P.		\$1,999,357		
Ironsides Direct Investment Fund V, L.P.	0.5% Management fee, 8% preferred return, 15% carried interest	\$3,075,602		
HarbourVest 2019 Global Fund	0.69% average annual management fee; 8.0% preferred return on secondary and direct investments and with corresponding carried interest of 12.5% on secondary and direct investments	\$3,437,931		
Private Debt Assets		\$3,014,665		
NB Private Debt Fund IV	1.0% on invested capital	\$3,014,665		
Infrastructure		\$10,602,830		
IFM Global Infrastructure	0.77% Management fee, 8% Preferred Return, 10% Carried Interest	\$10,602,830		
Cash		\$70,433		
EB Temporary Investment Fund		\$70,433		
Total		\$210,502,509	\$539,433	0.26%

Meketa has negotiated a 50% discount on fees for NB Private Debt Fund IV through June 2022. After June 2022, depending on Meketa's aggregate investment, the fee will become 0.7% or return to 1%.

Current Issues

Asset Allocation Discussion

Introduction

Introduction

- This document evaluates the current asset allocation policy and presents alternative asset allocation options for the System.
- We provide various approaches to assessing risk in order to provide a “mosaic” of the risks faced by the System.
- The goal of this review is not to declare one portfolio the “right” choice or the only prudent choice, but to highlight the risk and return tradeoffs of different policy portfolios.
- This year’s asset allocation review differs from other recent years’ reviews due to the vast change in market-circumstances, primarily the large increase in interest rates during 2022.
 - The abrupt increase of investment grade yields alongside relatively consistent credit spreads has meaningfully increased long-term expected returns across fixed income instruments.
 - As a result, pension investors seeking mid-to-high single digit levels of nominal return are able to realistically consider lower equity asset allocations for the first time in over a decade.

Asset Allocation Overview

Mean Variance Optimization

- MVO is the traditional starting point for determining asset allocation.
- MVO mathematically determines an “efficient frontier” of policy portfolios with the highest risk-adjusted returns.
- All asset classes exhibit only three characteristics, which serve as inputs to the model:
 - Expected return
 - Expected volatility
 - Expected covariance with all other assets
- The model assumes:
 - Normal return distribution
 - Stable volatility and covariances over time
 - Returns are not serially correlated
- The MVO model tends to underestimate the risks of large negative events.

Proposed Policy Options

Asset Allocation Policy Options¹

	Current Policy (%)	Actual Allocation (%)	Option A (%)	Option B (%)	Option C (%)
Growth/Equity	55	62	55	50	50
US Equity	17	35	20	20	25
Developed Market Equity (non-US)	14	12	15	15	15
Emerging Market Equity	14	9	10	5	5
Private Equity	10	6	10	10	5
Credit	15	11	18	20	15
High Yield Bonds	5	8	5	10	5
Private Debt	8	1	8	5	5
Emerging Market Bonds	2	2	5	5	5
Rate Sensitive	10	17	12	15	25
Cash Equivalents	0	0	0	0	0
Investment Grade Bonds	5	12	7	10	15
TIPS	5	5	5	5	10
Real Assets	20	10	15	15	10
Real Estate	10	5	5	5	5
Infrastructure	10	5	10	10	5
Expected Return (20 years)	9.1	8.6	8.9	8.6	8.2
Est .Exp Return - State	7.9	7.5	7.8	7.6	7.1
Standard Deviation	14.3	13.6	12.4	10.9	9.6
Probability of Achieving 7.5% over 20 Years	68.9	63.6	62.9	57.1	50.6

¹ Expected return and standard deviation are based upon Meketa Investment Group's 2023 Annual Asset Study for 20 year expected returns, state expected return estimated based on publicly available information. Throughout this document, returns for periods longer than one year are annualized.

Review of Proposed Asset Allocation Policies

- The System's expected portfolio return has increased drastically due primarily to an increase in returns for fixed income instruments.
- We prepared portfolios with the following aims in mind:
 - Keeping expected return within 1% of the actuarial target while still achieving that target.
 - Reducing volatility while maintaining adequate diversification.
 - Maintaining protection against other risks to the portfolio, primarily but not limited to, inflation.
 - Reducing implementation lag for private market asset classes.
- The asset allocation policies outlined incorporate various changes.
- Moving toward global equity weight in public equity (contrast with emerging overweight)
- Increasing public fixed income exposure.
- Increasing liquidity.
 - Decreasing targets to private asset classes with significant implementation lag.
- Ultimately, the three alternative policy portfolios on the previous page were selected for presentation to the Board.

Diversification and Risk Analysis

Diversification

- The primary motive for diversifying a portfolio is to reduce risk.
- Diversification is the sole “free lunch” available to investors. That is, it represents the only way to reduce risk without reducing expected returns.
- Therefore, investments should be allocated across multiple classes of assets, based in part on the expected correlation of their returns.
- Within each asset type, investments should be distributed across strategies and risk factors to further reduce volatility.

Types of Risk Analysis Addressed

→ Risk budgeting¹

- Attributes overall portfolio risks to specific asset classes
- Highlights the source and scale of portfolio-level risk

→ MVO-based risk analytics

- Includes worst-case return expectations and Value at Risk (VaR)²
- Relies on assumptions underlying MVO

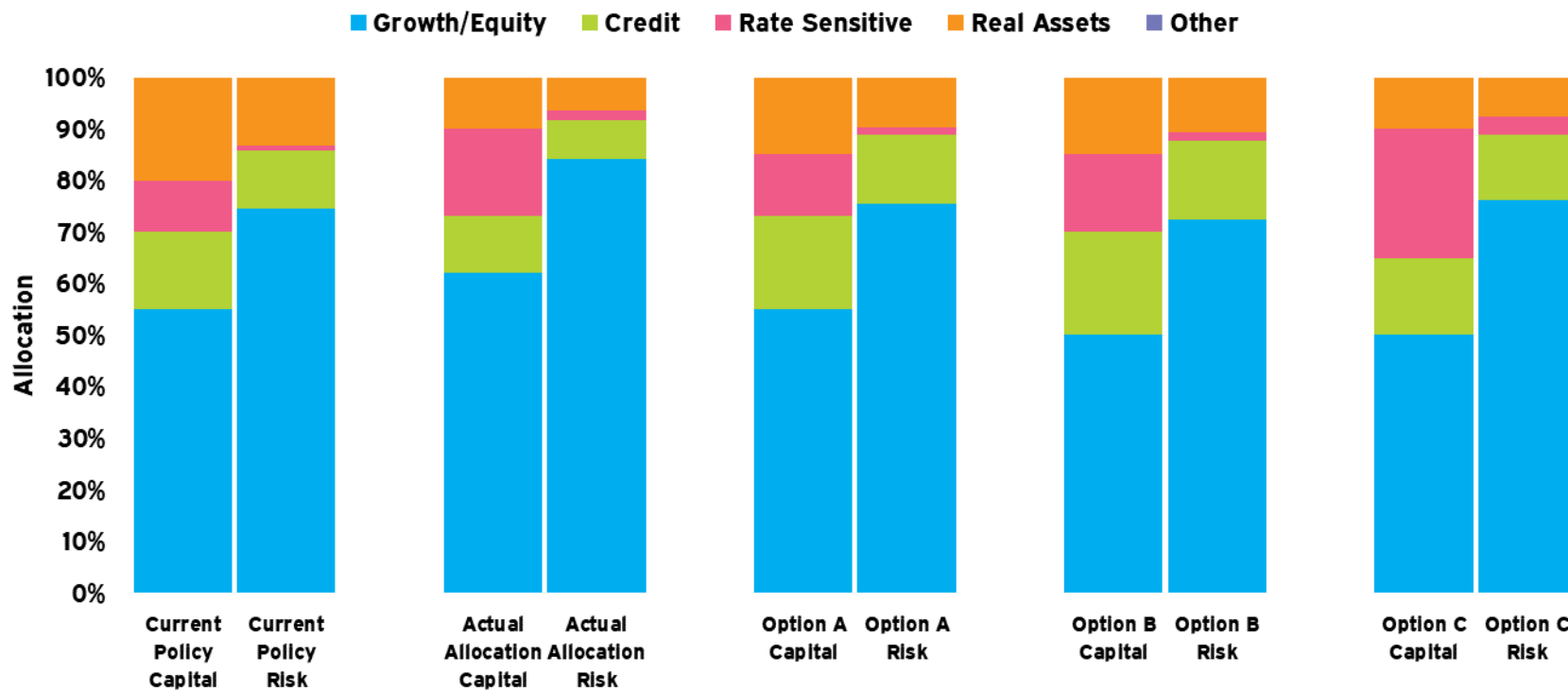
→ Scenario analysis

- Stress tests policy portfolios using actual historical examples
- Stress tests policy portfolios under specific hypothetical scenarios.

¹ Risk budgeting seeks to decompose the aggregate risk of a portfolio into different sources (in this case, by asset class), with risk defined as standard deviation.

² VaR is a risk measure that estimates the maximum loss on a portfolio over a given time horizon and a given confidence level (usually 95% or 99%).

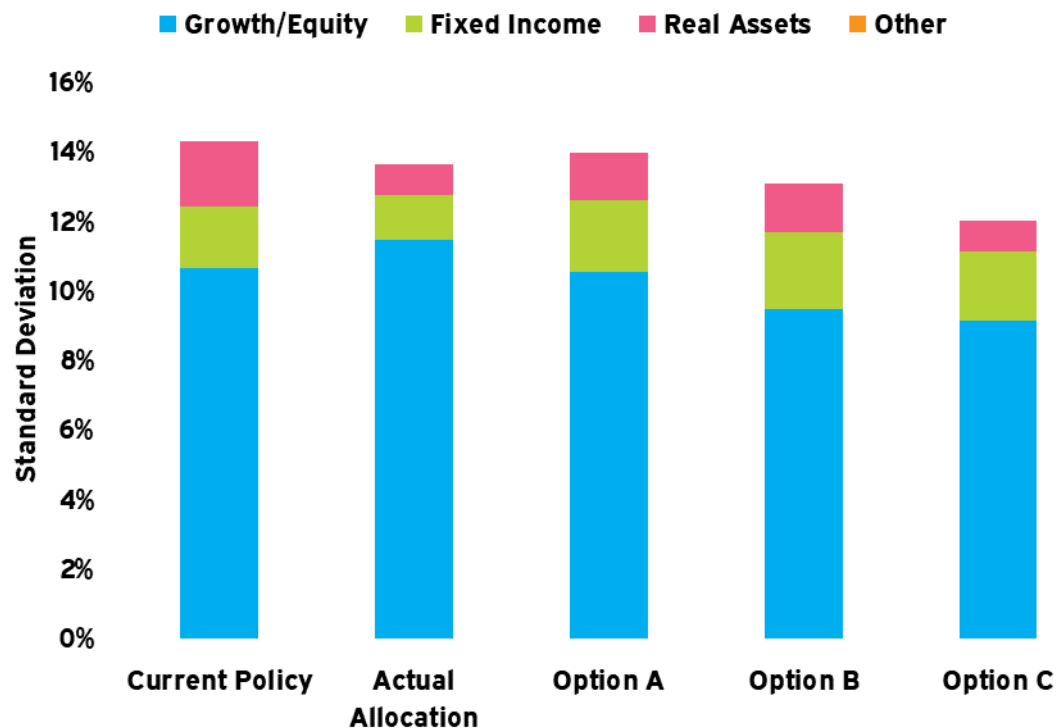
Risk Budgeting Analysis¹ (Capital Allocation vs. Risk Allocation)



→ Assets with low relative volatility, such as rate sensitive fixed income, contribute less to risk than their asset weighting implies.

¹ Risk allocation is calculated by multiplying the weight of the asset class by its standard deviation and its correlation with the total portfolio and then dividing this by the standard deviation of the total portfolio.

Risk Budgeting Analysis¹ (Absolute Contribution to Risk)



→ In each policy option, equity risk dominates the risk profile of the portfolio.

¹ Contribution to risk is calculated by multiplying the weight of the asset class by its standard deviation and its correlation with the total portfolio.

MPT-Based Risk Analysis

Scenario	Current Policy (%)	Actual Allocation (%)	Option A (%)	Option B (%)	Option C (%)
Worst Case Returns					
OneYear (annualized)	-19.3	-18.7	-18.9	-17.7	-16.2
ThreeYears (annualized)	-8.3	-8.1	-8.2	-7.5	-6.7
FiveYears (annualized)	-4.7	-4.6	-4.6	-4.1	-3.5
TenYears (annualized)	-0.9	-0.9	-0.8	-0.5	-0.2
TwentyYears (annualized)	1.9	1.8	1.9	2.1	2.2
Probability of Experiencing Negative Returns					
OneYear	25.2	25.4	25.1	24.4	23.7
ThreeYears	12.3	12.6	12.3	11.5	10.8
FiveYears	6.7	7.0	6.7	6.1	5.5
TenYears	1.7	1.8	1.7	1.4	1.2
TwentyYears	0.1	0.2	0.1	0.1	0.1
Probability of Achieving at least a 7.5% Return					
OneYear	54.4	53.1	54.0	53.4	52.3
ThreeYears	57.6	55.3	56.9	55.9	53.9
FiveYears	59.7	56.9	58.9	57.6	55.1
TenYears	63.6	59.7	62.4	60.7	57.2
TwentyYears	68.9	63.6	67.3	64.9	60.1

Conditional Value at Risk¹

Scenario	Current Policy	Actual Allocation	Option A	Option B	Option C
CVaR (%):					
1 month	-10.2	-9.7	-9.9	-9.3	-8.5
3 months	-16.5	-15.8	-16.2	-15.1	-13.8
6 months	-21.9	-21.0	-21.4	-20.0	-18.2

→ According to the cVaR model, the Fund could lose roughly 10% in a single month and 22% in 6 months with the current policy.

→ cVar drops in the alternative portfolios due to their lower forecast standard deviation.

Historical Negative Scenario Analysis¹ (Cumulative Return)

Scenario	Current Policy (%)	Actual Allocation (%)	Option A (%)	Option B (%)	Option C (%)
COVID-19 Market Shock (Feb 2020-Mar 2020)	-17.9	-21.6	-18.5	-17.8	-18.1
Taper Tantrum (May - Aug 2013)	-0.7	-0.7	-0.7	-0.6	-1.4
Global Financial Crisis (Oct 2007 - Mar 2009)	-30.2	-30.8	-28.6	-26.2	-25.1
Popping of the TMT Bubble (Apr 2000 - Sep 2002)	-14.4	-18.9	-15.1	-12.3	-10.8
LTCM (Jul - Aug 1998)	-9.3	-10.2	-9.6	-8.4	-8.6
Asian Financial Crisis (Aug 97 - Jan 98)	0.1	0.8	0.9	2.6	1.7
Rate spike (1994 Calendar Year)	0.8	0.2	0.2	0.3	-0.3
Early 1990s Recession (Jun - Oct 1990)	-6.7	-8.4	-6.7	-6.4	-6.3
Crash of 1987 (Sep - Nov 1987)	-11.0	-14.5	-11.2	-10.0	-11.0
Strong dollar (Jan 1981 - Sep 1982)	0.3	1.9	-0.2	1.6	3.6
Volcker Recession (Jan - Mar 1980)	-3.5	-4.5	-3.9	-3.9	-4.7
Stagflation (Jan 1973 - Sep 1974)	-22.8	-25.6	-22.6	-20.7	-20.4

¹ See the Appendix for our scenario inputs. In periods where the ideal benchmark was not yet available we used the next closest benchmark(s) as a proxy.

Stress Testing: Impact of Market Movements (Expected Return under Stressed Conditions)¹

Scenario	Current Policy (%)	Actual Allocation (%)	Option A (%)	Option B (%)	Option C (%)
10-year Treasury Bond rates rise 100 bps	4.8	4.5	4.5	3.9	3.3
10-year Treasury Bond rates rise 200 bps	-1.1	-2.0	-1.8	-2.3	-2.9
10-year Treasury Bond rates rise 300 bps	-2.8	-2.5	-3.5	-3.8	-4.2
Baa Spreads widen by 50 bps, High Yield by 200 bps	0.1	0.1	0.1	0.2	0.5
Baa Spreads widen by 300 bps, High Yield by 1000 bps	-23.2	-24.1	-22.5	-21.0	-20.7
Trade Weighted Dollar gains 10%	-5.2	-4.7	-5.0	-4.3	-4.2
Trade Weighted Dollar gains 20%	-2.7	-1.3	-2.7	-1.7	-1.2
US Equities decline 10%	-6.2	-6.7	-6.3	-5.8	-5.3
US Equities decline 25%	-18.5	-18.9	-17.9	-16.7	-16.0
US Equities decline 40%	-28.3	-29.8	-27.4	-25.7	-25.6

- Each policy portfolio has a different sensitivity to four major risk factors: interest rates, credit spreads, currency fluctuations, and equity values.
- The Fund's primary risk factors would continue to be an equity market decline and a widening of credit spreads, no matter the policy.

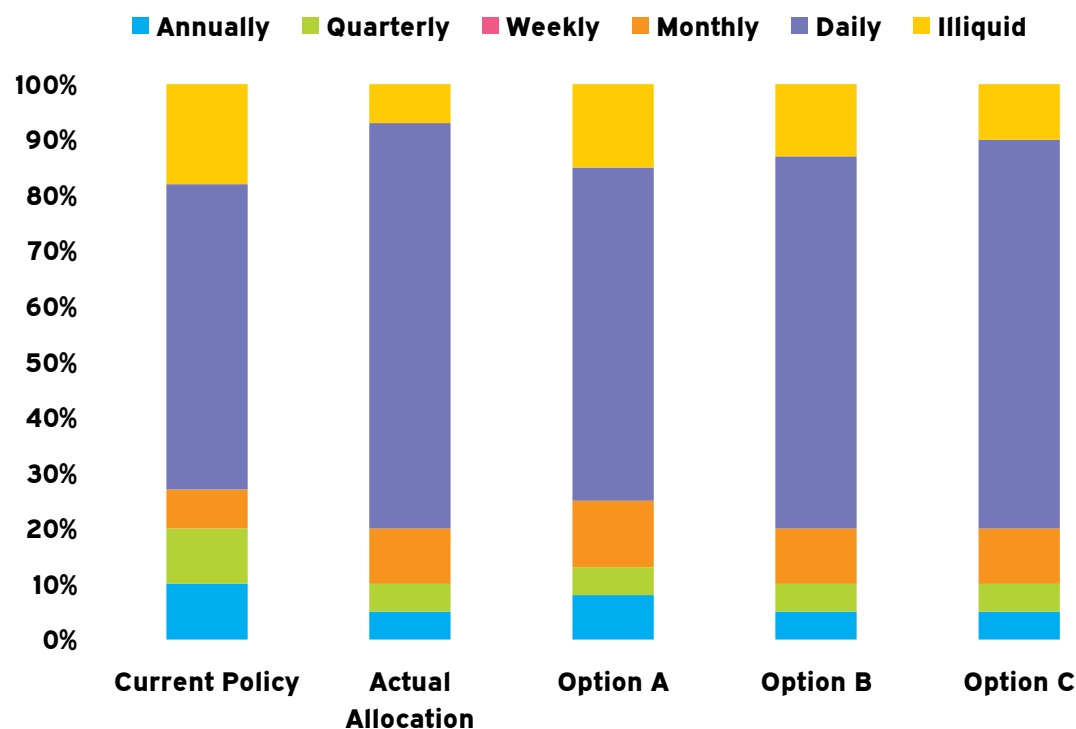
¹ Assumes that assets not directly exposed to the factor are affected nonetheless. See the Appendix for further details.

Liquidity Analysis

Recommendations

- Liquidity risk is a meaningful risk that is generally not captured in traditional asset allocation processes.
- The System must maintain adequate liquidity to satisfy benefit payments and to avoid having to sell illiquid assets at distressed prices if possible.

Liquidity Profile¹



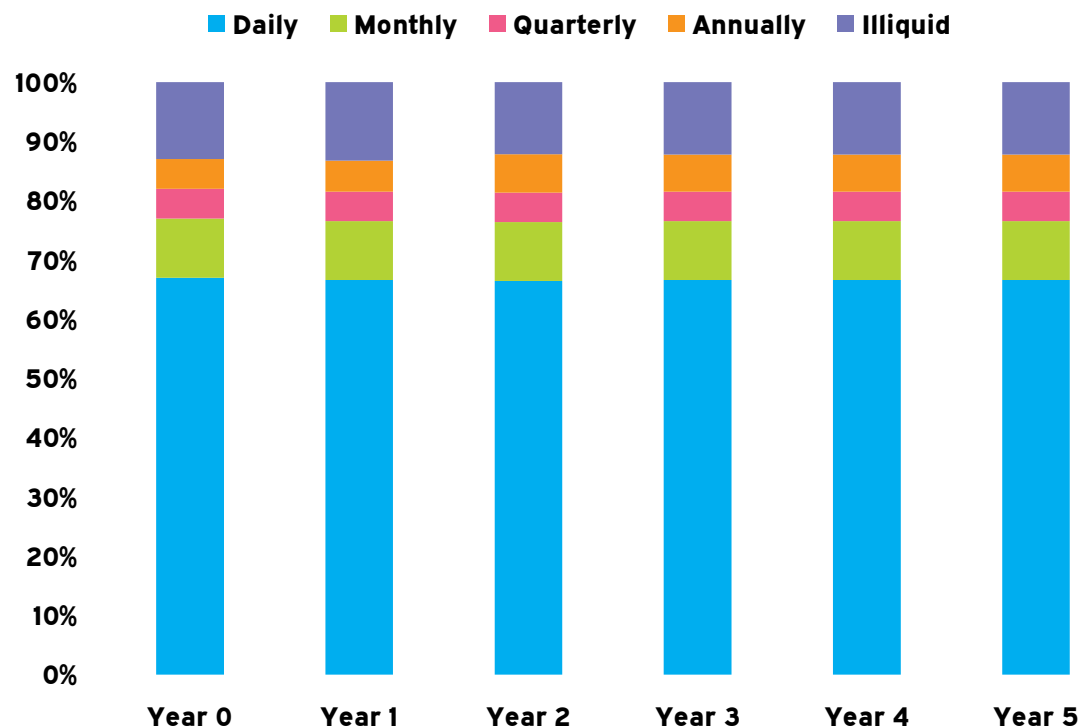
→ The alternative portfolios generally decrease illiquid investments and boost daily liquidity.

¹ For this analysis, we assume that emerging market debt provides monthly liquidity; core real estate and core infrastructure provide quarterly liquidity; and private equity, opportunistic debt, non-core real estate, and non-core infrastructure are illiquid.

Liquidity Stress Test Introduction

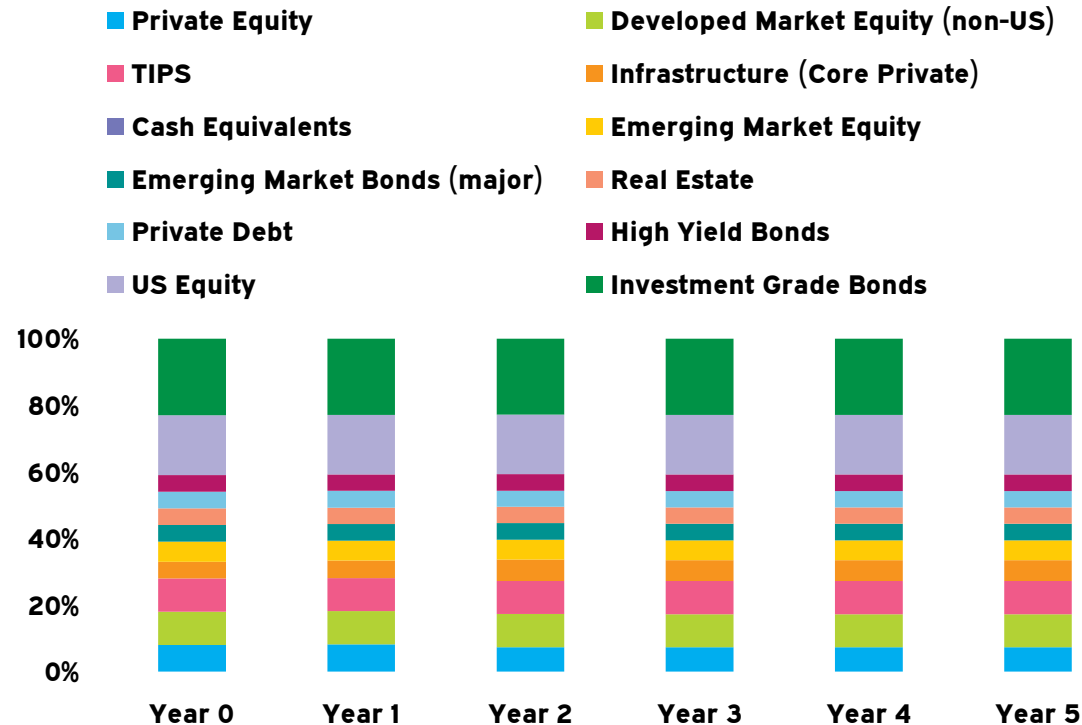
- We conducted an extreme stress test to analyze the System's liquidity. Specifically, we evaluated whether the System could:
- Only receive contributions sufficient to meet outflows (ie, no net external funding),
- While staying within its target allocation ranges,
- And at what cost (i.e., to what extent would it be forced to sell stressed or distressed assets)?
- The scenario is designed to be extreme.
- In Years 1 – 3, we use the returns produced by each asset class in 4Q07, 2008, and 1Q09, respectively. In Years 4 – 5, we assume flat (0%) returns for each asset class (i.e., no rebound).
- We assume closed-end funds offer no liquidity in years 1 – 4, and very limited liquidity in year 5.
- We assume open-end and hedge funds offer no liquidity in years 1 – 3, and limited liquidity in years 4 – 5.
- We assume the System would rebalance toward its policy targets each year.
- We show the results for Policy B on the following pages, as it is the middle case among the alternative options..

Liquidity Stress Test: Liquidity Profile (for Policy B)



→ At the trough, the policy portfolio would have roughly two-thirds of its assets in daily liquid vehicles.

Liquidity Stress Test: Impact on Asset Allocation (for Policy C)



→ A stressful market environment would alter the asset allocation. However, rebalancing of the liquid assets would bring most asset classes back to their targets.

Liquidity Stress Test: Summary (for Policy B)

Metric	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Ending Market Value	204.0	207.1	167.3	161.1	161.1	161.1
Net flows	0.0	0.0	0.0	0.0	0.0	0.0
Flows as percentage of Market Value	0%	0%	0%	0%	0%	0%
Assets Sold in Duress	0.0	0.0	0.0	0.0	0.0	0.0
Percentage of Outflows sold in duress	0%	0%	0%	0%	0%	0%
Percentage of Assets sold in duress	0%	0%	0%	0%	0%	0%
Remaining liquid Market Value	177.5	179.7	146.9	141.4	141.4	141.4
Total Illiquid Assets	26.5	27.4	20.4	19.6	19.6	19.6
Percentage of Illiquid Assets	13%	13%	12%	12%	12%	12%
Portfolio Return	0.0%	1.5%	-19.2%	-3.7%	0.0%	0.0%

→ Even under this extreme scenario, Policy B (and all of the policy portfolios) would maintain sufficient liquidity to pay benefits and other expenses.

Appendices

Setting Capital Market Expectations

Overview of Annual Asset Study Methodology

- In order to construct an optimal portfolio from a risk-return standpoint, conventional financial wisdom dictates that one develop return, volatility, and correlation expectations over the relevant investing horizon.
- Given the uncertainty surrounding financial and economic forecasts, expectations development is challenging, and any of several methodological approaches may meaningfully contribute to this complex task.
- Meketa Investment Group's process relies on both quantitative and qualitative methodologies.
- First, we employ a large set of quantitative models to arrive at a set of baseline expected ten-year annualized returns for major asset classes.
- These models attempt to forecast a gross "beta" return for each public market asset class; that is, we specifically do not model "alpha," nor do we apply an estimate for management fees or other operational expenses.¹
- Our models are fundamentally based (based on some theoretically defined return relationship with current observable factors).
- Some of these models are more predictive than others. For this reason, we next overlay a qualitative analysis, which takes the form of a data-driven deliberation among the research team and our Investment Policy Committee.
- Return assumptions for hard-to-predict asset classes as well as those with limited data will be influenced more heavily by our qualitative analysis.

¹ Our expectations are net of fees where passive management is not available (e.g., private markets and hedge funds).

Overview of Annual Asset Study Methodology (continued)

- As a result of this process, we form our ten-year annualized return expectations, which serve as the primary foundation of our longer-term, twenty-year expectations.
- We form our twenty-year annualized return expectations by systematically considering historical returns on an asset class by asset class level. Specifically, we construct a weighted average of our ten-year expectations and average historical returns in each asset class.
- The weights are determined by a qualitative assessment of the value of the historical data. Generally, if we have little confidence that the historical average return is representative of what an investor can expect,¹ we will weight our ten-year forecast more heavily. Therefore, the weight on our ten-year forecasts ranges from 0.5 to 0.9.
- We develop our twenty-year volatility and correlation expectations differently. We rely primarily on historical averages, with an emphasis given to the experience of the trailing fifteen years.
- Qualitative adjustments, when applied, usually serve to increase the correlations and volatility over and above the historical estimates (e.g., using the higher correlations usually observed during a volatile market).
- We also make adjustments to the volatility based on the historical skewness of each asset class (e.g., increasing the volatility for an asset class that has been negatively skewed).

¹ For example, we have less confidence in historical data that do not capture many possible market scenarios or that are overly polluted by survivorship bias.

Overview of Annual Asset Study Methodology (continued)

- In the case of private markets and other illiquid asset classes where historical volatility and correlations have been artificially dampened, we seek public market equivalents on which to base our estimates before applying any qualitative adjustments.
- These volatility and correlation expectations are then combined with our twenty-year return expectations to assist us in subsequent asset allocation work, including mean-variance optimization and scenario analyses.
- Capital Markets Expectations are the inputs needed to conduct MVO.
 - MVO is the traditional starting point for determining asset allocation.
- Consultants (including Meketa) generally set them once a year.
 - Our results are published in January, based on December 31 data.
- This involves setting long-term expectations for a variety of asset classes for the following.
 - Returns.
 - Standard Deviation.
 - Correlations(i.e., covariance).
- Our process relies on both quantitative and qualitative methodologies.

Asset Class Definitions

- We identify asset classes and strategies that are appropriate for long-term allocation of funds, and that also are investable.
- Several considerations influence this process.
 - Unique return behavior.
 - Observable historical track record.
 - A robust market.
 - Client requests.
- We then make forecasts for each asset class.
 - We created inputs for 97 “asset classes” in 2022.

Building 10-Year Forecasts

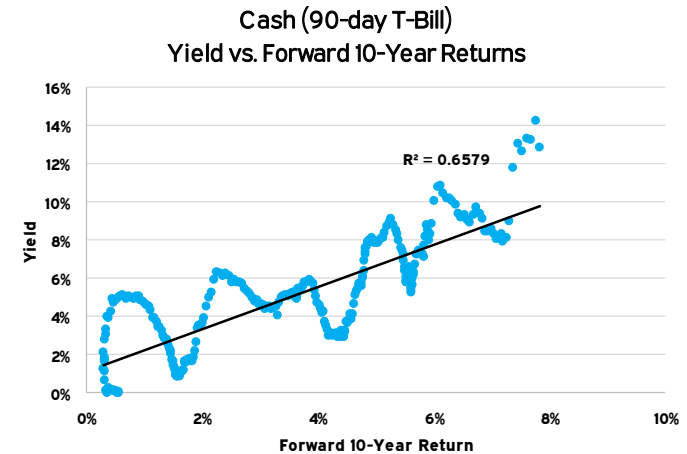
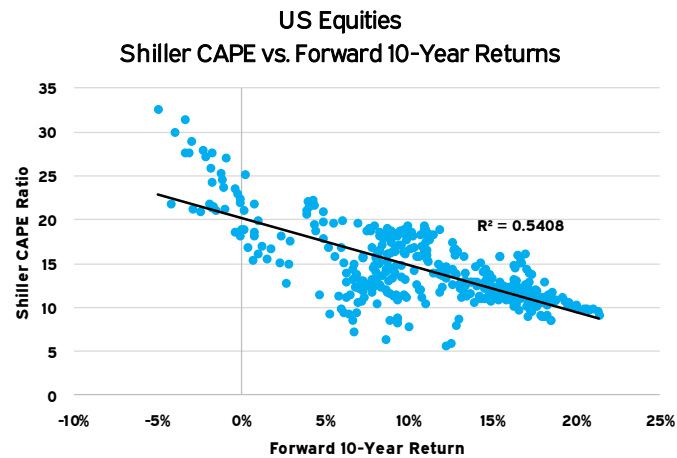
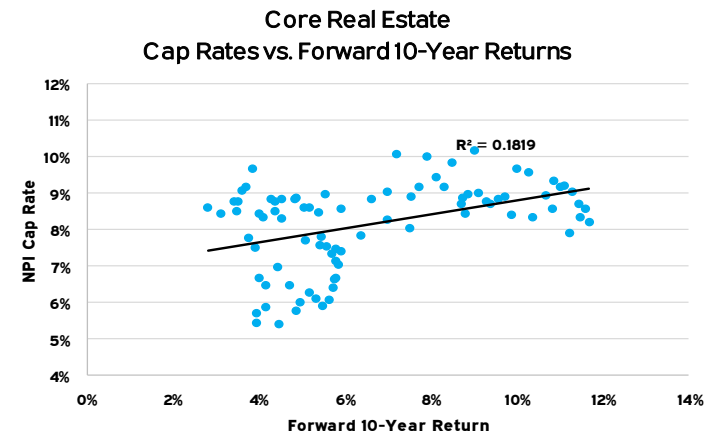
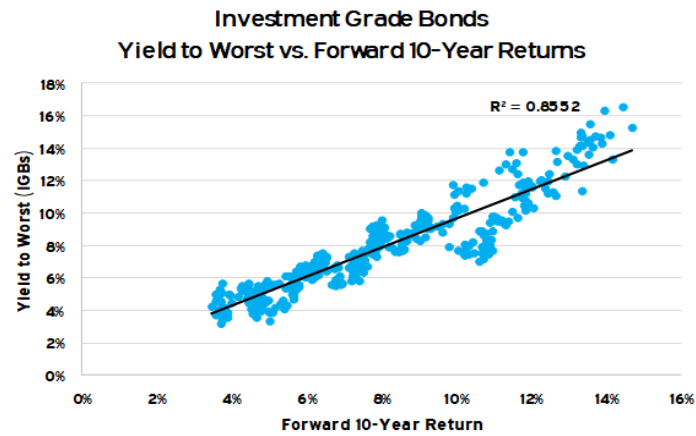
→ The first step is to build our 10-year forecasts based on fundamental models.

- Each model is based on the most important factors that drive returns for that asset class.

Asset Class Category	Major Factors
Equities	Dividend Yield, GDP Growth, Valuation
Bonds	Yield to Worst, Default Rate, Recovery Rate
Commodities	Collateral Yield, Roll Yield, Inflation
Infrastructure	Public IS Valuation, Income, Growth
Natural Resources	Price per Acre, Income, Public Market Valuation
Real Estate	Cap Rate, Yield, Growth
Private Equity	EBITDA Multiple, Debt Multiple, Public VC Valuation
Hedge Funds and Other	Leverage, Alternative Betas

→ The common components are income, growth, and valuation.

Some factors are naturally more predictive than others.



Moving from 10-Year to 20-Year Forecasts

- Our next step is to combine our 10-year forecasts with projections for years 11-20 for each asset class.
- We use a risk premia approach to forecast 10-year returns in ten years (i.e., years 11-20).
 - We start with an assumption (market informed, such as the 10-year forward rate) for what the risk free rate will be in ten years.
 - We then add a risk premia for each asset class.
 - We use historical risk premia as a guide, but many asset classes will differ from this, especially if they have a shorter history.
 - We seek consistency with finance theory (i.e., riskier assets will have a higher risk premia assumption).
 - Essentially, we assume mean-reversion over the first ten years (where appropriate), and consistency with CAPM thereafter.
 - The final step is to make any qualitative adjustments.
 - The Investment Policy Committee reviews the output and may make adjustments.

Capital Market Assumption Development Example

Equities

→ We use a fundamental model for equities that combines income and capital appreciation.

$$E(R) = \text{Dividend Yield} + \text{Expected Earnings Growth} + \text{Multiple Effect} + \text{Currency Effect}$$

→ Meketa Investment Group evaluates historical data statistically to develop expectations for dividend yield, earnings growth, the multiple effect, and currency effect.

→ Our models assume that there is a reversion to the mean over long time periods.

Bonds

→ The short version for investment grade bond models is:

$$E(R) = \text{Current YTW (yield to worst)}$$

→ Our models assume that there is a reversion to the mean for spreads (though not yields).

→ For TIPS, we add the real yield of the TIPS index to the breakeven inflation rate.

→ As with equities, we make currency adjustments when necessary for foreign bonds.

→ For bonds with credit risk, Meketa Investment Group estimates default rates and loss rates, in order to project an expected return:

$$E(R) = \text{YTW} - (\text{Annual Default Rate} * \text{Loss Rate})$$

The Other Inputs: Standard Deviation and Correlation

- Standard Deviation:
- We review the trailing fifteen-year standard deviation, as well as skewness.
- Historical standard deviation serves as the base for our assumptions.
- If there is a negative skew, we increased the volatility assumption based on the size of the historical skewness.

Asset Class	Historical Standard Deviation (%)	Skewness	Assumption (%)
Bank Loans	7.7	-2.7	10.0
FI/L-S Credit	6.8	-2.5	9.0

- We also adjust for private market asset classes with “smoothed” return streams.
- Correlation:
- We use trailing fifteen-year correlations as our guide.
- Again, we make adjustments for “smoothed” return streams.
- Most of our adjustments are conservative in nature (i.e., they increase the standard deviation and correlation).

Horizon Study

- Annually, Horizon Actuarial Services, LLC publishes a survey of capital market assumptions that they collect from various investment advisors.
- In the 2021¹ survey there were 39 respondents.
- The Horizon survey is a useful tool for Board members to determine whether their consultant's expectations for returns (and risk) are reasonable.

Asset Class	10-Year Average (%)	Meketa 10-Year (%)	20-Year Average (%)	Meketa 20-Year (%)
Cash Equivalents	1.2	0.7	1.9	1.1
TIPS	1.6	1.2	2.4	1.8
US Core Bonds	2.1	1.2	3.2	1.8
US High Yield Bonds	3.8	3.3	5.0	4.2
Emerging Market Debt	4.2	3.9	5.3	3.8
Private Debt	6.5	6.6	6.9	6.8
US Equity (large cap)	5.8	5.2	6.7	6.8
Developed Non-US Equity	6.4	6.7	7.1	7.1
Emerging Non-US Equity	7.2	7.5	7.8	8.1
Private Equity	8.8	8.0	9.6	9.1
Real Estate	5.5	6.5	6.2	6.9
Infrastructure	6.2	7.1	6.8	7.0
Commodities	3.1	3.4	4.0	3.7
Hedge Funds	4.5	3.4	5.3	4.3
Inflation	2.1	2.3	2.2	2.1

¹ The 10-year horizon includes all 39 respondents and the 20-year horizon includes 24 respondents. Figures are based on Meketa's 2021 CMEs.

Notes and Disclaimers

- ¹ The returns shown in the Policy Options and Risk Analysis sections rely on estimates of expected return, standard deviation, and correlation developed by Meketa Investment Group. To the extent that actual return patterns to the asset classes differ from our expectations, the results in the table will be incorrect. However, our inputs represent our best unbiased estimates of these simple parameters.
- ² The returns shown in the Policy Options and Risk Analysis sections use a lognormal distribution, which may or may not be an accurate representation of each asset classes' future return distribution. To the extent that it is not accurate in whole or in part, the probabilities listed in the table will be incorrect. As an example, if some asset classes' actual distributions are even more right-skewed than the lognormal distribution (i.e., more frequent low returns and less frequent high returns), then the probability of the portfolio hitting a given annual return will be lower than that stated in the table.
- ³ The standard deviation bars in the chart in the Risk Analysis section do not indicate the likelihood of a 1, 2, or 3 standard deviation event—they simply indicate the return we expect if such an event occurs. Since the likelihood of such an event is the same across allocations regardless of the underlying distribution, a relative comparison across policy choices remains valid.

Scenario Return Inputs

Asset Class	Benchmark Used
Investment Grade Bonds	Barclays Aggregate
TIPS	Barclays US TIPS
Intermediate-term Government Bonds	Barclays Treasury Intermediate
Long-term Government Bonds	Barclays Long US Treasury
EM Bonds (local)	JPM GBI-EM Global Diversified Composite
Bank Loans	CSFB Leveraged Loan
High Yield Bonds	Barclays High Yield
Direct Lending	Cliffwater Direct Lending Index
Mezzanine Debt	Preqin Associates Mezzanine
Distressed Debt	Preqin Distressed Debt Index
Core Real Estate	NCREIF Property
Value-Added RE	NCREIF Townsend Value Added
Opportunistic RE	NCREIF Townsend Opportunistic
REITs	NAREIT Equity
Infrastructure (private)	S&P Global Infrastructure
Natural Resources (private)	S&P Global Natural Resources
Timber	NCREIF Timberland
Commodities	Bloomberg Commodity Index
US Equity	Russell 3000
Public Foreign Equity (Developed)	MSCI EAFE
Public Foreign Equity (Emerging)	MSCI Emerging Markets
Private Equity	Preqin Private Equity Composite
Long-short Equity	HFRI Equity Hedge
Global Macro	HFRI Macro
Hedge Funds	HFRI Fund Weighted Composite
Private Debt	Weighted average of Distressed Debt, Mezzanine Debt and Direct Lending (2nd Lien)

Negative Historical Scenario Returns - Sample Inputs

	Covid-19 Market Shock (Feb 2020-Mar 2020)	Taper Tantrum (May - Aug 2013)	Global Financial Crisis (Oct 2007 - Mar 2009)	Popping of the TMT Bubble (Apr 2000 - Sep 2002)	LTCM (Jul - Aug 1998)
Cash Equivalents	0.4	0.0	2.6	9.9	0.8
Short-term Investment Grade Bonds	0.4	-0.1	7.9	21.9	1.6
Investment Grade Bonds	-0.9	-3.7	8.5	28.6	1.8
Long-term Corporate Bonds	-18.4	-9.3	-10.3	26.9	-0.6
Long-term Government Bonds	12.7	-11.6	24.2	35.5	4.1
TIPS	-0.4	-8.5	8.2	37.4	0.7
Global ILBs	-6.5	-7.4	-3.9	39.7	0.7
High Yield Bonds	-20.8	-2.0	-22.8	-6.3	-5.0
Bank Loans	-20.3	0.8	-23.7	6.3	0.7
Direct Lending	-4.8	2.6	-3.3	-2.6	-2.3
Foreign Bonds	-4.5	-3.2	2.1	8.5	3.5
Mezzanine Debt	-4.8	4.6	-26.4	-2.0	-2.6
Distressed Debt	-12.2	4.6	-26.4	-2.0	-2.6
Emerging Market Bonds (major)	-15.3	-11.5	-5.0	6.3	-28.2
Emerging Market Bonds (local)	-13.9	-14.3	-7.9	7.2	-34.1
US Equity	-35.0	3.0	-45.8	-43.8	-15.4
Developed Market Equity (non-US)	-32.7	-2.2	-52.1	-46.7	-11.5
Emerging Market Equity	-31.2	-9.4	-51.2	-43.9	-26.7
Global Equity	-33.6	-0.7	-49.3	-46.7	-14.0
Private Equity/Debt	-7.8	5.7	-27.7	-23.4	-3.2
Private Equity	-7.4	5.8	-28.2	-26.0	-3.3
Private Debt Composite	-10.1	4.6	-22.3	-1.7	-2.3
REITs	-41.0	-13.3	-63.0	45.4	-15.3
Core Private Real Estate	0.7	3.6	-10.6	23.6	2.3
Value-Added Real Estate	-3.5	3.8	-20.2	177.0	1.8
Opportunistic Real Estate	-8.6	4.0	-25.7	21.4	1.5
Natural Resources (Private)	-22.1	2.5	-31.2	-3.9	-16.9
Timberland	0.1	1.3	20.7	-1.5	0.5
Farmland	-0.1	3.3	26.7	11.4	0.8
Commodities (naïve)	-18.9	-2.4	-36.9	18.5	-12.0
Core Infrastructure	-1.3	3.7	-0.8	24.8	-0.3
Hedge Funds	-9.1	-0.4	-17.8	-2.1	-9.4
Long-Short	-10.9	1.0	-26.4	-8.8	-8.3
Hedge Fund of Funds	-7.6	-0.5	-19.5	-0.4	-7.7

Negative Historical Scenario Returns-Sample Inputs (Continued)

	Rate spike (1994 Calendar Year)	Crash of 1987 (Sep-Nov 1987)	Strong dollar (Jan 1981-Sep 1982)	Volcker Recession (Jan-Mar 1980)	Stagflation (Jan 1973-Sep 1974)
Cash Equivalents	3.9	1.4	24.4	2.9	13.5
Short-term Investment Grade Bonds	0.5	2.3	29.9	-2.6	4.3
Investment Grade Bonds	-2.9	2.2	29.9	-8.7	7.9
Long-term Corporate Bonds	-5.8	1.5	29.6	-14.1	-12.0
Long-term Government Bonds	-7.6	2.6	28.4	-13.6	-1.8
TIPS	-7.5	2.8	15.6	-7.8	4.3
Global ILBs	-7.9	2.9	16.5	-8.3	4.5
High Yield Bonds	-1.0	-3.6	6.9	-2.3	-15.5
Bank Loans	10.3	-1.7	3.3	-1.1	-7.5
Direct Lending	7.6	-2.3	3.2	-1.0	-7.2
Foreign Bonds	5.3	-0.3	34.8	-6.5	-1.4
Mezzanine Debt	7.6	-2.3	3.2	-1.0	-7.2
Distressed Debt	7.6	-2.3	3.2	-1.0	-7.2
Emerging Market Bonds (major)	-18.9	-9.2	-1.6	-2.6	-20.2
Emerging Market Bonds (local)	-22.8	-11.0	-2.0	-3.2	-23.9
US Equity	1.3	-29.5	-2.3	-4.1	-42.6
Developed Market Equity (non-US)	7.8	-14.5	-18.0	-7.0	-36.3
Emerging Market Equity	-7.3	-25.3	-12.1	-6.6	-44.2
Global Equity	5.0	-21.5	-11.2	-5.8	-39.3
Private Equity/Debt	13.2	-0.7	-2.7	-2.5	-18.2
Private Equity	14.2	-0.5	-3.9	-2.7	-20.1
Private Debt Composite	6.2	-1.8	3.0	-1.0	-6.9
REITs	-3.5	-19.5	2.5	-3.6	-33.9
Core Private Real Estate	6.4	2.5	23.9	5.5	-4.4
Value-Added Real Estate	11.2	4.3	44.2	9.6	-7.6
Opportunistic Real Estate	18.8	3.1	30.7	7.0	-5.6
Natural Resources (Private)	12.6	-9.9	-9.5	-9.1	19.3
Timberland	15.4	9.2	23.6	-7.4	5.5
Farmland	9.4	5.3	13.3	-4.2	3.1
Commodities (naïve)	16.6	1.8	-16.0	-9.6	139.5
Core Infrastructure	-11.5	-0.1	-0.2	-0.1	-0.5
Hedge Funds	4.1	-7.8	-3.8	-1.9	-15.7
Long-Short	2.6	-10.0	-4.9	-2.5	-19.8
Hedge Fund of Funds	-3.5	-5.7	-2.7	-1.4	-11.5

Stress Test Return Assumptions-Sample Inputs¹

	10-year Treasury Bond rates rise 100 bps	10-year Treasury Bond rates rise 200 bps	10-year Treasury Bond rates rise 300 bps	Baa Spreads widen by 50 bps, High Yield by 200 bps	Baa Spreads widen by 300 bps, High Yield by 1000 bps	Trade Weighted Dollar gains 10%	Trade Weighted Dollar gains 20%	US Equities decline 10%	US Equities decline 25%	US Equities decline 40%
Cash Equivalents	-0.2	-0.4	-0.5	2.8	1.1	4.0	1.3	3.1	2.3	0.4
Short-term Investment Grade Bonds	-1.2	-2.5	-3.7	2.2	1.5	1.2	1.4	1.3	0.7	0.8
Investment Grade Bonds	-4.3	-8.3	-11.9	3.9	-0.4	1.7	4.2	2.4	0.7	-1.0
Long-term Corporate Bonds	-8.9	-16.2	-20.9	2.6	-13.4	0.8	8.1	0.5	-8.3	-12.3
Long-term Government Bonds	-10.6	-18.8	-23.6	7.8	7.3	3.7	12.8	3.0	2.6	2.4
TIPS	-4.9	-9.8	-13.7	2.8	-6.1	-2.1	-0.2	2.6	-2.3	-8.7
Global ILBs	-1.6	-7.9	-11.9	2.4	-11.1	-3.1	-4.8	2.8	-5.4	-16.3
High Yield Bonds	2.7	-3.4	-3.6	-1.8	-23.0	-3.5	-0.6	-4.9	-15.5	-21.2
Bank Loans	1.4	-0.8	-5.1	-2.8	-20.8	-3.2	-0.6	-3.7	-13.2	-17.4
Direct Lending	0.0	-3.7	-6.3	-1.8	-9.1	-4.3	-0.6	-4.1	-7.6	-5.7
Foreign Bonds	-4.6	-9.8	-15.7	6.6	-2.9	-3.3	-8.8	1.8	-4.6	-9.2
Mezzanine Debt	3.8	-0.9	-6.1	-1.9	-19.4	-2.8	-6.4	-4.9	-15.6	-20.4
Distressed Debt	4.4	-1.1	-6.4	-2.2	-21.4	-3.5	-9.0	-5.4	-17.3	-21.8
Emerging Market Bonds (major)	1.0	-4.9	-3.6	-0.1	-14.7	-1.4	-4.2	-3.3	-12.5	-15.4
Emerging Market Bonds (local)	1.8	-5.1	-3.0	0.1	-12.8	-1.4	-12.2	-2.8	-13.3	-20.5
US Equity	7.2	0.9	2.8	-1.2	-32.0	-2.5	1.6	-10.6	-26.5	-42.4
Developed Market Equity (non-US)	9.2	3.1	-5.6	0.3	-35.1	-12.9	-9.0	-8.7	-23.4	-41.4
Emerging Market Equity	10.3	5.5	0.1	-1.1	-42.8	-15.1	-15.7	-11.9	-30.8	-46.9
Global Equity	7.8	2.1	-0.5	-0.7	-33.6	-8.3	-5.9	-9.8	-25.3	-41.5
Private Equity/Debt	6.4	0.9	-5.5	-0.2	-22.5	-4.3	-7.2	-10.1	-22.5	-25.3
Private Equity	6.8	1.0	-5.3	0.0	-22.8	-4.1	-6.4	-10.9	-23.3	-25.7
Private Debt Composite	2.5	-2.0	-6.2	-1.8	-15.8	-3.5	-4.3	-4.6	-12.8	-15.0
REITs	4.1	-3.5	1.2	-3.8	-37.3	-1.0	12.4	-6.5	-32.8	-55.7
Core Private Real Estate	2.4	2.7	5.0	2.0	-7.1	1.2	9.7	-0.2	-8.5	-14.0
Value-Added Real Estate	4.8	7.4	14.1	7.2	-13.5	13.8	6.4	1.3	-13.6	-23.1
Opportunistic Real Estate	4.1	6.5	9.9	1.1	-20.6	0.8	15.6	-1.5	-17.1	-26.3
Natural Resources (Private)	13.1	5.8	-3.5	-0.9	-27.5	-6.5	-21.5	-5.4	-20.9	-35.9
Timberland	1.4	1.6	-9.9	5.0	6.9	2.5	8.6	0.1	2.7	3.9
Farmland	2.4	-0.1	-9.2	3.9	10.1	0.8	8.0	0.6	4.9	10.3
Commodities (naïve)	9.6	5.3	-6.6	-4.3	-25.0	-5.6	-24.0	4.8	-11.1	-37.8
Core Infrastructure	0.3	-6.4	-6.1	1.2	0.1	-1.8	3.6	-1.1	-5.0	-7.8
Hedge Funds	3.0	-1.4	-5.1	-0.6	-14.5	-2.1	-1.7	-4.3	-12.2	-15.7
Long-Short	5.3	-0.7	-4.2	-0.1	-21.0	-3.0	-4.3	-7.3	-17.7	-23.5
Hedge Fund of Funds	2.2	-2.1	-5.7	-1.3	-14.8	-2.7	-2.4	-4.9	-12.5	-16.0

¹ Assumptions are based on performance for each asset class during historical periods that resembled these situations.

Meketa Investment Group 2023 Annual Asset Study
Twenty-Year Annualized Return and Volatility Expectations for Major Asset Classes

Asset Class	10-year Expected Return (%)	20-year Expected Return (%)	Standard Deviation (%)	11-20 year Risk Premia ¹ (%)
Cash Equivalents	3.1	2.9	1.0	-1.5
Investment Grade Bonds	4.8	4.7	4.0	0.4
Long-term Government Bonds	4.3	5.0	12.0	1.5
TIPS	4.3	4.5	7.0	0.5
High Yield Bonds	8.0	7.3	11.0	2.5
Bank Loans	7.6	7.0	10.0	2.2
Emerging Market Debt (local)	6.4	6.0	12.0	1.5
Private Debt	9.4	9.0	15.0	4.6
US Equity	7.8	8.7	18.0	5.5
Developed Non-US Equity	10.1	9.8	19.0	5.4
Emerging Non-US Equity	10.3	10.0	23.0	5.6
Global Equity	8.8	9.2	18.0	5.5
Private Equity	9.7	11.0	27.0	8.0
Real Estate	5.9	7.8	16.0	5.5
Infrastructure	6.9	8.3	15.0	5.6
Commodities	6.3	5.7	17.0	1.0
Hedge Funds	5.4	6.1	7.0	2.6
Inflation	2.5	2.6	3.0	-1.5

Meketa Investment Group 2023 Annual Asset Study: Correlation Expectations

	Inv. Grade Bonds	Long-term Gov't Bonds	TIPS	High Yield Bonds	US Equity	Dev. Non-US Equity	Em. Market Equity	Private Equity	Real Estate	Commod.	Infra.	Hedge Funds
Investment Grade Bonds	1.00											
Long-term Government Bonds	0.83	1.00										
TIPS	0.76	0.53	1.00									
High Yield Bonds	0.22	-0.22	0.41	1.00								
US Equity	0.02	-0.31	0.20	0.74	1.00							
Developed Non-US Equity	0.09	-0.28	0.26	0.76	0.89	1.00						
Emerging Market Equity	0.14	-0.23	0.34	0.76	0.77	0.87	1.00					
Private Equity	0.00	-0.10	0.05	0.70	0.85	0.80	0.75	1.00				
Real Estate	0.20	0.05	0.10	0.50	0.50	0.45	0.40	0.45	1.00			
Commodities	0.00	-0.29	0.31	0.55	0.53	0.61	0.65	0.30	0.15	1.00		
Infrastructure	0.29	0.09	0.31	0.64	0.63	0.65	0.58	0.50	0.57	0.41	1.00	
Hedge Funds	0.03	-0.34	0.26	0.77	0.86	0.87	0.85	0.60	0.45	0.69	0.65	1.00

Manager Due Diligence Agenda

MARLBOROUGH RETIREMENT SYSTEM

Manager Due Diligence Meetings
Tuesday, May 30, 2023

Dial: (646) 931-3860
Meeting ID: 942 0779 8237
Passcode: 505532

I. Manager Due Diligence Presentations

8:45 a.m.

Manager/Product	Asset Class	Time
Rockwood Capital	Closed End Real Estate	8:45
<i>Rockwood Capital Real Estate Partners Fund XI</i>		
Constitution Capital Partners	Private Equity	8:55
<i>Ironsides Partnership Fund IV</i>		
<i>Ironsides Direct Investment Fund IV</i>		
<i>Ironsides Partnership Fund V</i>		
<i>Ironsides Direct Investment Fund V</i>		
HarbourVest Partners	Private Equity	9:05
<i>HarbourVest 2019 Global Fund</i>		
Neuberger Berman Group	Private Debt	9:15
<i>NB Private Debt Fund IV</i>		

Appendix

Disclaimer, Glossary, and Notes

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SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT AND THAT IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. ANY OPINIONS OR RECOMMENDATIONS PRESENTED HEREIN REPRESENT OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND ARE SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK. THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

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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. $\text{Portfolio Return} - [\text{Risk Free Rate} + \text{Beta} \times (\text{market return} - \text{Risk Free Rate})]$.

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.