

City of Marlborough Contributory Retirement System

Meeting Materials
May 24, 2022

Fund Evaluation Report

Agenda

1. Economic and Market Update Data as of April 30, 2022
2. First Quarter 2022 Investment Review
 - Retirement System Summary
 - Retirement System Detail
 - Portfolio Reviews
3. Current Issue
 - Asset Allocation Update
4. Appendices
 - Meketa Investment Group Corporate Update
 - Disclaimer, Glossary, and Notes

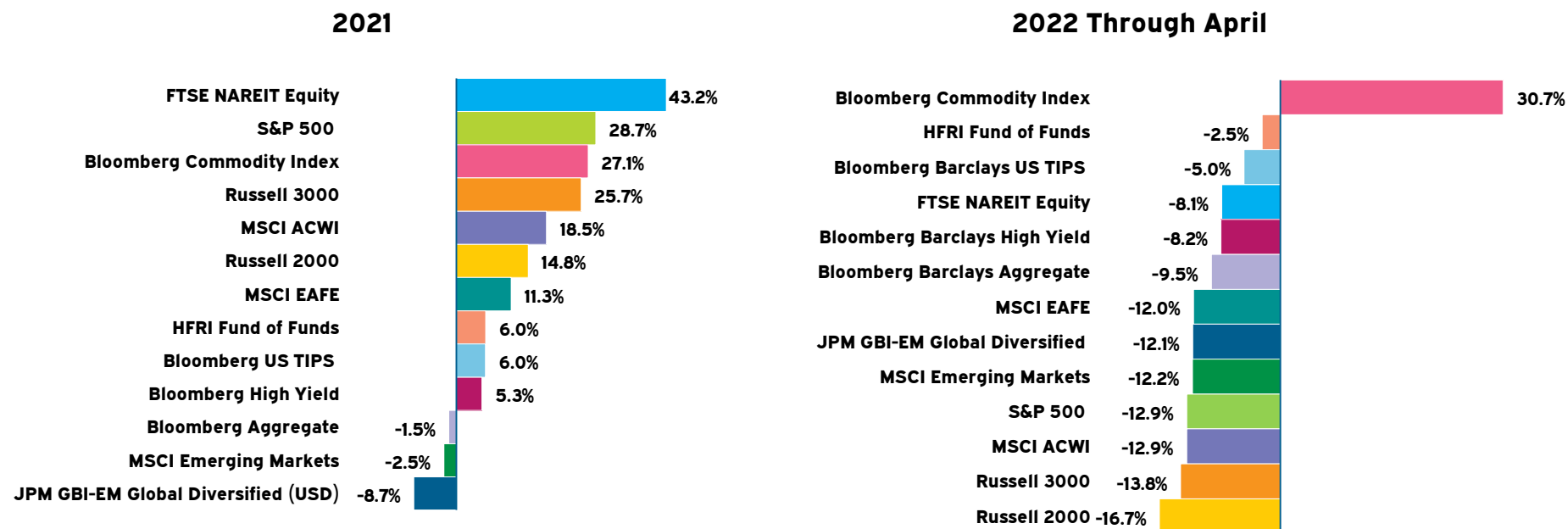
Economic and Market Update

Data as of April 30, 2022

Commentary

- Market volatility rose sharply in April due to continued inflation pressures, driven by supply chain issues, global stimulus, and the war in Ukraine.
- Except for commodities, all asset classes declined in April.
 - Equities fell across the board with the US experiencing the steepest declines.
 - Value-oriented equities outpaced growth in the US, influenced by higher interest rates and notable weakness in some high-profile technology companies.
 - The global bond selloff continued, as rates rose further on inflation fears and policy expectations.
 - Rates rose across the US yield curve, with the curve steepening after a brief early month inversion.
 - Inflation remains high globally given lingering supply issues from the pandemic and the conflict in Ukraine.
 - The pace of policy tightening will likely increase due to persistent inflation.
- The conflict in Ukraine, lingering COVID-19 issues, persistent inflation, and strict lockdowns in China will all have considerable economic and financial consequences for the global economy going forward.

Index Returns¹



- Outside of emerging markets and the broad US investment grade bond market (Bloomberg Aggregate), most asset classes rose in 2021.
- In April, most major asset classes extended their losses from the first quarter, with US stocks and bonds having one of their worst starts to a year on record. Commodities continue to be the one exception to the trend, adding 4.1% in April and bringing the year-to-date return to over 30%.

¹ Source: Bloomberg and FactSet. Data is as of April 30, 2022.

Domestic Equity Returns¹

Domestic Equity	April (%)	Q1 (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
S&P 500	-8.7	-4.6	-12.9	-0.5	13.8	13.7	13.6
Russell 3000	-9.0	-5.3	-13.8	-3.9	13.1	13.0	13.2
Russell 1000	-8.9	-5.1	-13.6	-2.8	13.6	13.4	13.5
Russell 1000 Growth	-12.1	-9.0	-20.0	-6.0	16.7	17.3	15.5
Russell 1000 Value	-5.6	-0.7	-6.3	0.5	9.6	9.1	11.1
Russell MidCap	-7.7	-5.7	-12.9	-7.1	10.5	10.7	11.9
Russell MidCap Growth	-11.3	-12.6	-22.4	-17.7	8.7	12.1	12.1
Russell MidCap Value	-5.9	-1.8	-7.7	-0.9	10.2	8.6	11.3
Russell 2000	-9.9	-7.5	-16.7	-17.9	6.7	7.2	9.9
Russell 2000 Growth	-12.3	-12.6	-23.3	-27.4	4.1	7.1	9.8
Russell 2000 Value	-7.8	-2.4	-10.0	-7.7	8.4	6.7	9.7

US Equities: Russell 3000 Index declined 9%, and value indices outperformed growth in April.

- The steep declines in US stocks were driven by an overall weakening of economic data and persistent inflation, leading to expectations for the Federal Reserve to increase rates much faster than previously expected.
- Value stocks declined far less than growth stocks for the month, maintaining the recent trend as rising rates and inflation continued to weigh on growth companies.
- Large company stocks outpaced small company stocks for the month, extending year-to-date relative outperformance.

¹ Source: Bloomberg. Data is as of April 30, 2022.

Foreign Equity Returns¹

Foreign Equity	April (%)	Q1 (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
MSCI ACWI ex. US	-6.3	-5.4	-11.4	-11.3	4.3	4.9	5.0
MSCI EAFE	-6.5	-5.9	-12.0	-9.1	4.4	4.8	5.7
MSCI EAFE (Local Currency)	-1.4	-3.7	-5.1	2.9	6.5	6.0	8.7
MSCI EAFE Small Cap	-6.9	-8.5	-14.8	-14.4	4.9	5.0	7.6
MSCI Emerging Markets	-5.6	-7.0	-12.2	-19.3	2.2	4.3	3.0
MSCI Emerging Markets (Local Currency)	-3.5	-6.1	-9.4	-15.3	4.1	6.2	6.0
MSCI China	-4.1	-14.2	-17.7	-37.1	-5.0	2.1	3.9

International Developed Market Equities: MSCI EAFE -6.5% in April.

- Non-US stocks fell less than US stocks in April, leading to their smaller year-to-date declines.
- The war in Ukraine, high inflation, continued strength in the US dollar, and slowing growth all weighed on stocks in Europe. A particularly weak currency and diverging monetary policy impacted Japan's results.
- Like the US, value stocks outperformed growth stocks by a wide margin across developed markets, but not in emerging markets where value and growth declined equally in the month of April.

Emerging Markets: MSCI EM -5.6% in April.

- Emerging market stocks suffered negative returns in April but outperformed developed market stocks.
- China's strict COVID-19 policies, increased hawkishness from the US Fed, the war in Ukraine, and US dollar strength all contributed to declines.

¹ Source: Bloomberg. Data is as of April 30, 2022.

Fixed Income Returns¹

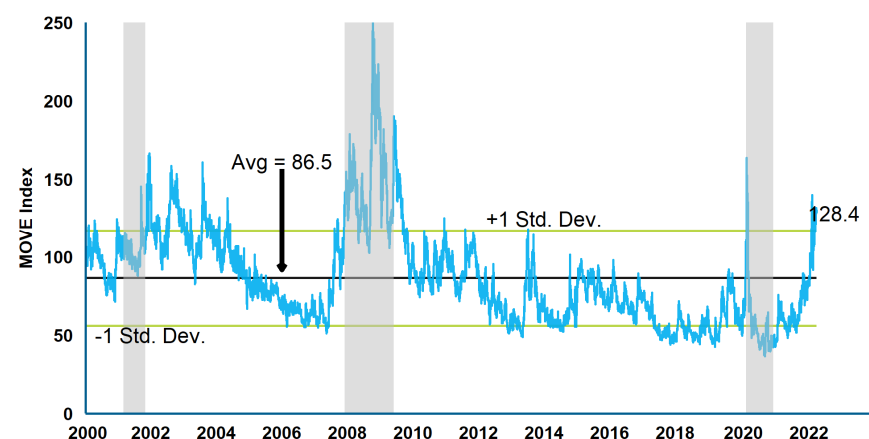
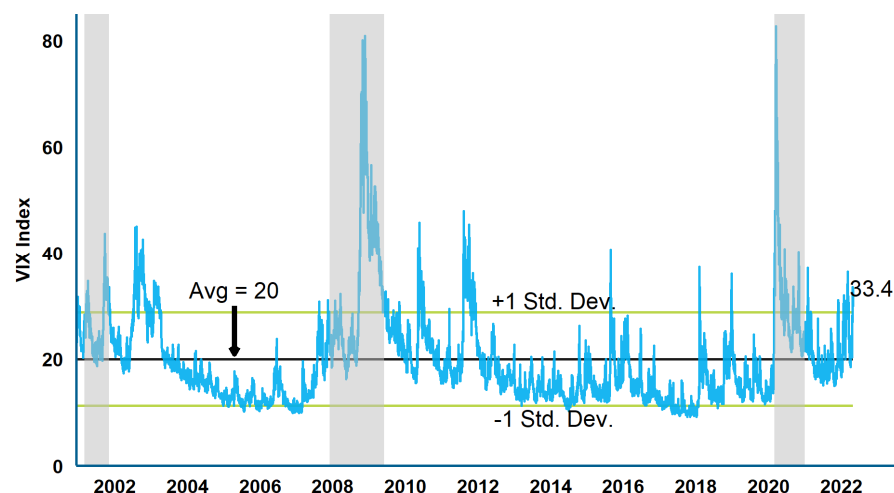
Fixed Income	April (%)	Q1 (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)	Current Yield (%)	Duration (Years)
Bloomberg Universal	-3.7	-6.1	-9.6	-8.5	0.6	1.4	2.1	3.9	6.5
Bloomberg Aggregate	-3.8	-5.9	-9.5	-8.4	0.4	1.2	1.7	3.5	6.7
Bloomberg US TIPS	-2.0	-3.0	-5.0	0.7	5.4	3.9	2.3	3.1	7.5
Bloomberg High Yield	-3.6	-4.8	-8.2	-5.2	2.8	3.7	5.3	7.0	4.8
JPM GBI-EM Global Diversified (USD)	-6.0	-6.5	-12.1	-15.9	-3.1	-1.3	-1.4	6.9	4.9

Fixed Income: Bloomberg Universal -3.7% in April.

- Continued concerns about policy tightening and inflation led to rates rising further in April resulting in the broad US investment grade bond market (Bloomberg Aggregate) having its worst start to a year on record. The nominal 10-year Treasury yield approached 3% by month-end and real yields moved toward becoming positive (this eventually happened after month-end).
- US credit spreads continued to widen, particularly in high yield, as risk assets fell.
- Emerging market debt experienced the worst declines for the month and year-to date periods with the conflict in Ukraine, rising rates in the US, and strict lockdowns in China all contributing.

¹ Source: Bloomberg. JPM GBI-EM is from InvestorForce. Data is as of April 30, 2022.

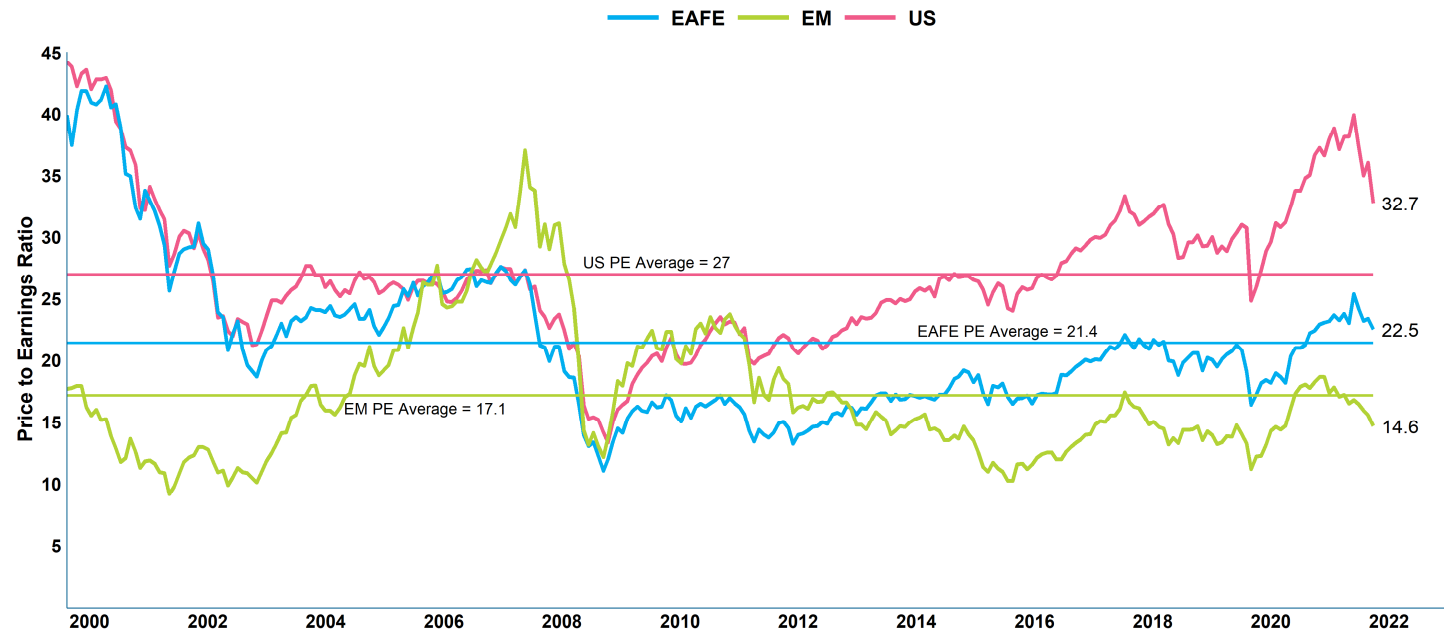
Equity and Fixed Income Volatility¹



- Volatility in both equities (VIX) and fixed income (MOVE) surged in April remaining well above long run averages.
- Concerns over high inflation and the related faster pace of expected policy tightening has led to volatility across markets remaining elevated.

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 2022. The average line indicated is the average of the VIX and MOVE values between January 2000 and the present month-end respectively.

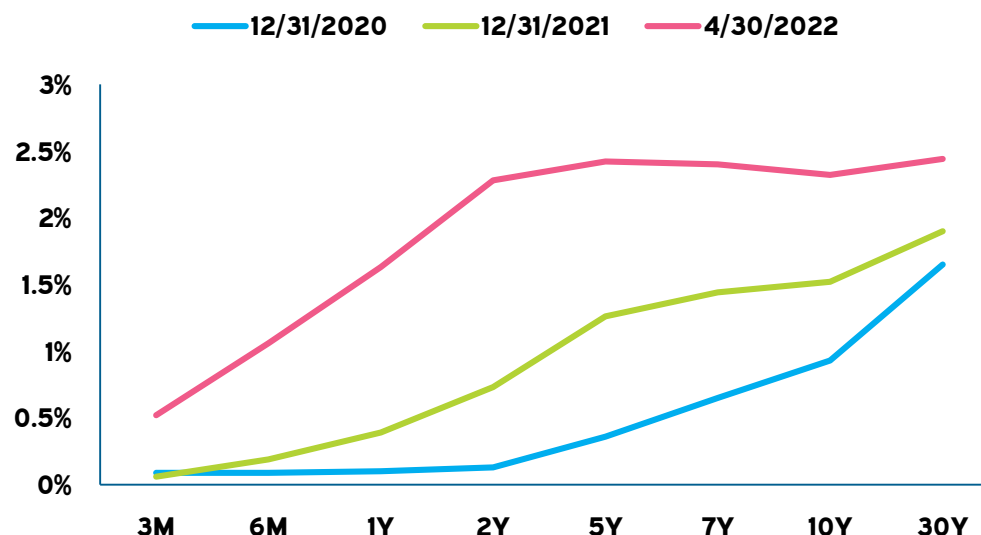
Equity Cyclically Adjusted P/E Ratios¹



- After a pause in March, US stocks resumed their sell-off in April. Despite the recent sell-off, valuations remain well above long-term averages (near +2 standard deviations).
- International developed market valuations remain below the US, with those for emerging markets 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 30, 2022. The average line is the long-term average of the US, EM, and EAFE PE values from December 1999 to month-end respectively.

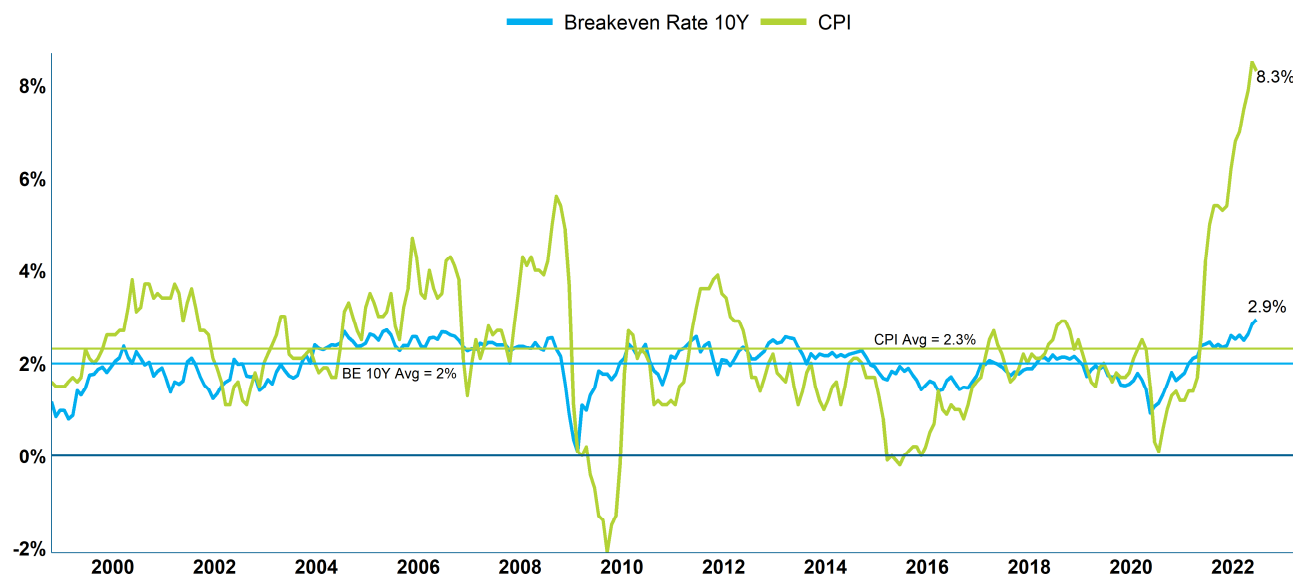
US Yield Curve¹



- In April, the trend of higher rates across maturities persisted as markets continue to reprice inflation, rate expectations, and an accelerated pace of the Federal Reserve reducing its balance sheet.
- After a brief inversion at the start of the month, which historically has often signaled building recessionary pressures, the curve steepened, with the spread between two-year and ten-year Treasuries finishing April at 22.7 basis points.

¹ Source: Bloomberg. Data is as of April 30, 2022.

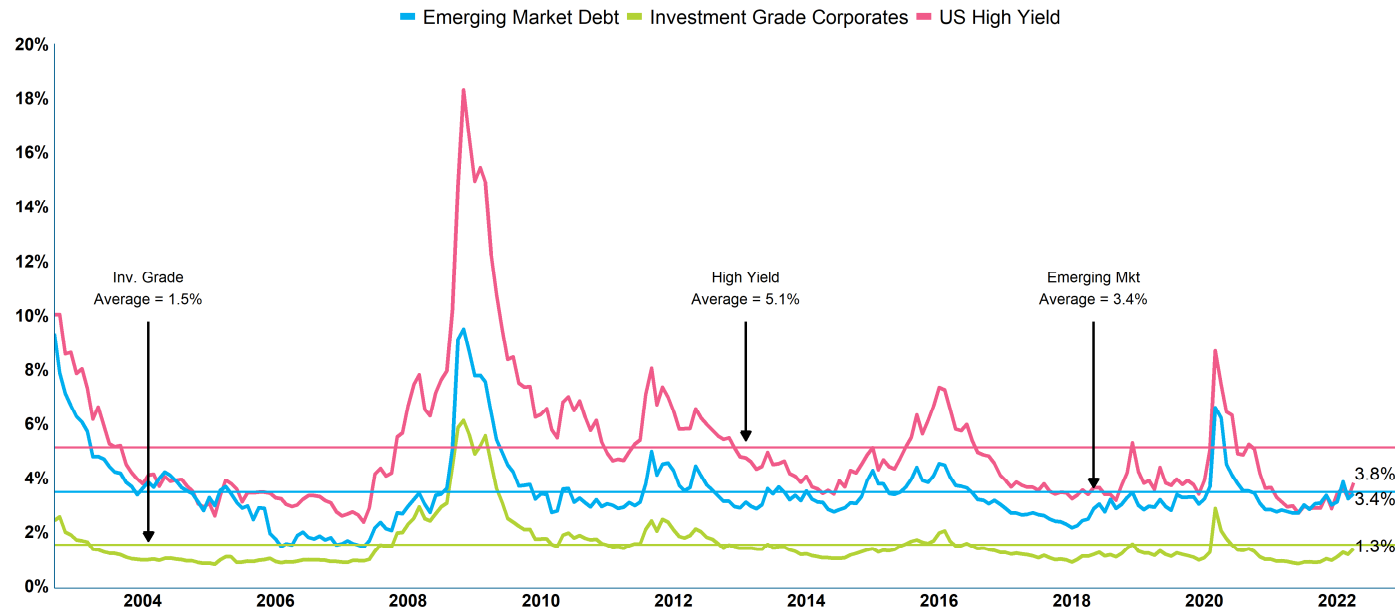
Ten-Year Breakeven Inflation and CPI¹



- Inflation expectations (breakevens) increased slightly in April making a new peak above 3% during the month. It is worth noting that breakevens declined significantly after month-end, on expectations inflation could be peaking.
- Trailing twelve-month CPI declined slightly in April (8.3% versus 8.5%) remaining well above the long-term average of 2.3%.
- Rising prices for energy and food, and for new and used cars, remained key drivers of higher inflation.

¹ Source: Bloomberg. Data is as of April 30, 2022. 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



- Credit spreads (the spread above a comparable maturity Treasury) increased further in April in the risk-off environment extending losses for the year, particularly for riskier bonds.
- In the US, spreads for high yield increased more than investment grade. Emerging market spreads also increased during the month but finished lower than US high yield.
- Despite the recent increase, US high yield spreads remain well below the long-term average (3.8% versus 5.1%).

¹ Sources: Bloomberg. Data is as of April 30, 2022. Average lines denote the average of the investment grade, high yield, and emerging market spread values from August 2000 to the present month-end respectively.

Global Economic Outlook

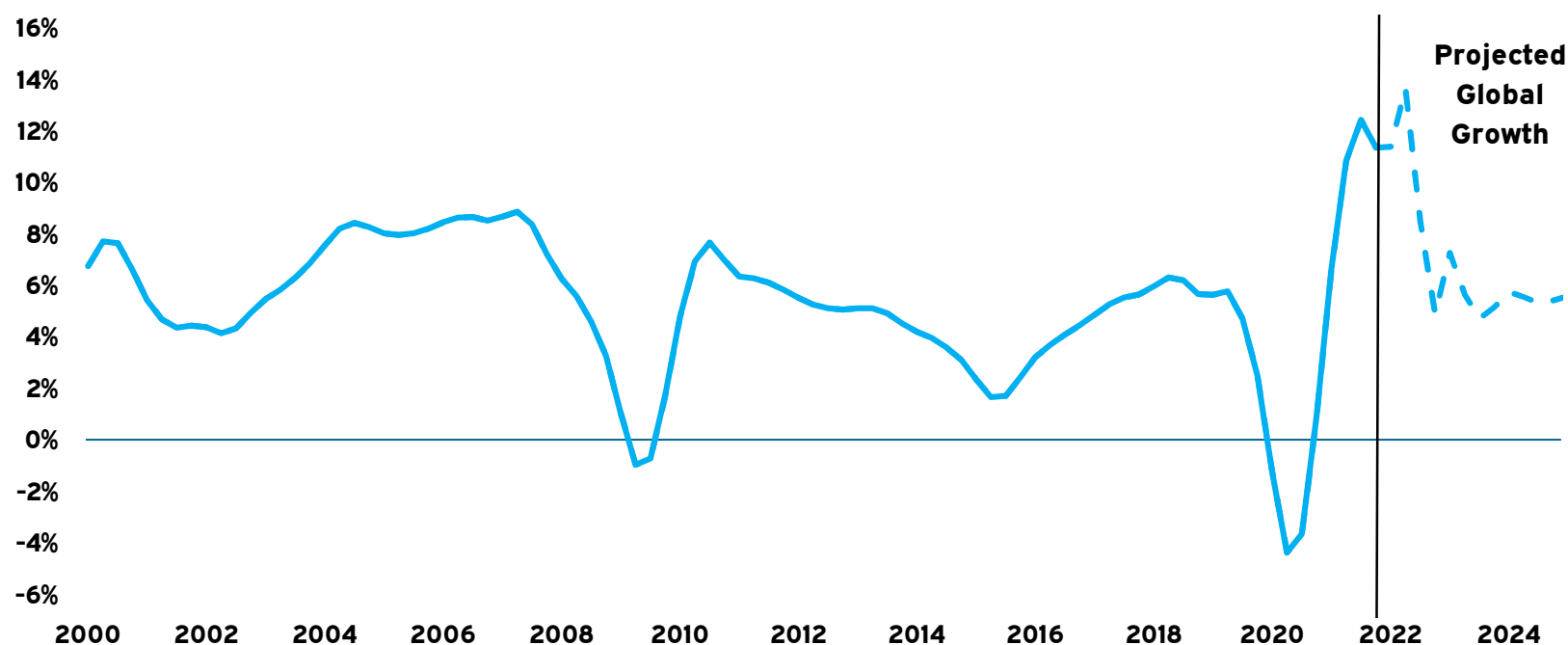
The IMF significantly lowered global growth forecasts in their latest projections, driven by the economic impacts of the war in Ukraine.

- The IMF forecasts final global GDP to come in at 6.1% in 2021 and 3.6% in 2022 (0.8% below the prior 2022 estimate), both still above the past ten-year average of 3.0%.
- In advanced economies, GDP is projected to increase 3.3% in 2022 and 2.4% in 2023. The US has limited economic ties with Russia but saw another downgrade in the 2022 growth forecast (3.7% versus 4.0%) largely due to policy tightening happening faster than previously expected. The euro area saw a significant downgrade in expected growth (2.8% versus 3.9%) in 2022 as rising energy prices particularly weigh on the region that is a net importer of energy. The Japanese economy is expected to grow 2.4% this year.
- Growth projections for emerging markets are higher than developed markets, at 3.8% in 2022 and 4.4% in 2023. China's growth was downgraded (4.4% versus 4.8%) for 2022 given tight COVID-19 restrictions and continued property sector problems.
- The global inflation forecast was significantly increased for 2022 (7.4% versus 3.8%) due to the war in Ukraine.

	Real GDP (%) ¹			Inflation (%) ¹		
	IMF 2022 Forecast	IMF 2023 Forecast	Actual 10 Year Average	IMF 2022 Forecast	IMF 2023 Forecast	Actual 10 Year Average
World	3.6	3.6	3.0	7.4	4.8	3.5
Advanced Economies	3.3	2.4	1.6	5.7	2.5	1.5
US	3.7	2.3	2.1	7.7	2.9	1.9
Euro Area	2.8	2.3	0.9	5.3	2.3	1.2
Japan	2.4	2.3	0.5	1.0	0.8	0.5
Emerging Economies	3.8	4.4	4.2	8.7	6.5	5.1
China	4.4	5.1	6.7	2.1	1.8	2.1

¹ Source: IMF World Economic Outlook. Real GDP forecasts from April WEO Update. Inflation forecasts are as of the April 2022 Update. "Actual 10 Year Average" represents data from 2012 to 2021.

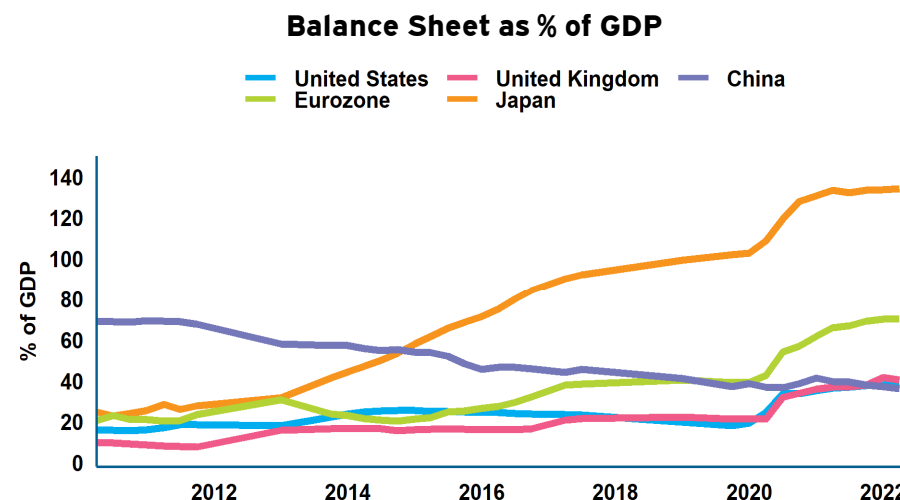
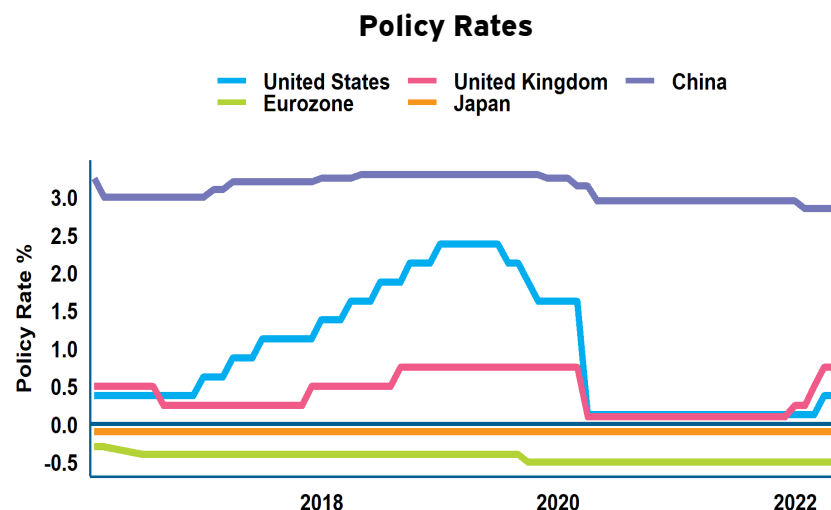
Global Nominal Gross Domestic Product (GDP) Growth¹



- Global economies are expected to slow in 2022 compared to 2021 but are forecasted to have another year of largely above-trend growth as economies continue to emerge from the pandemic.
- Looking forward, the track of the conflict between Russia and Ukraine, continued supply chain issues, ongoing inflationary pressures, tighter monetary policy, and lingering pandemic problems all remain key with the risk for continued downgrades in growth forecasts.

¹ Source: Oxford Economics (World GDP, US\$ prices & PPP exchange rate, nominal, % change YoY). Updated April 2022.

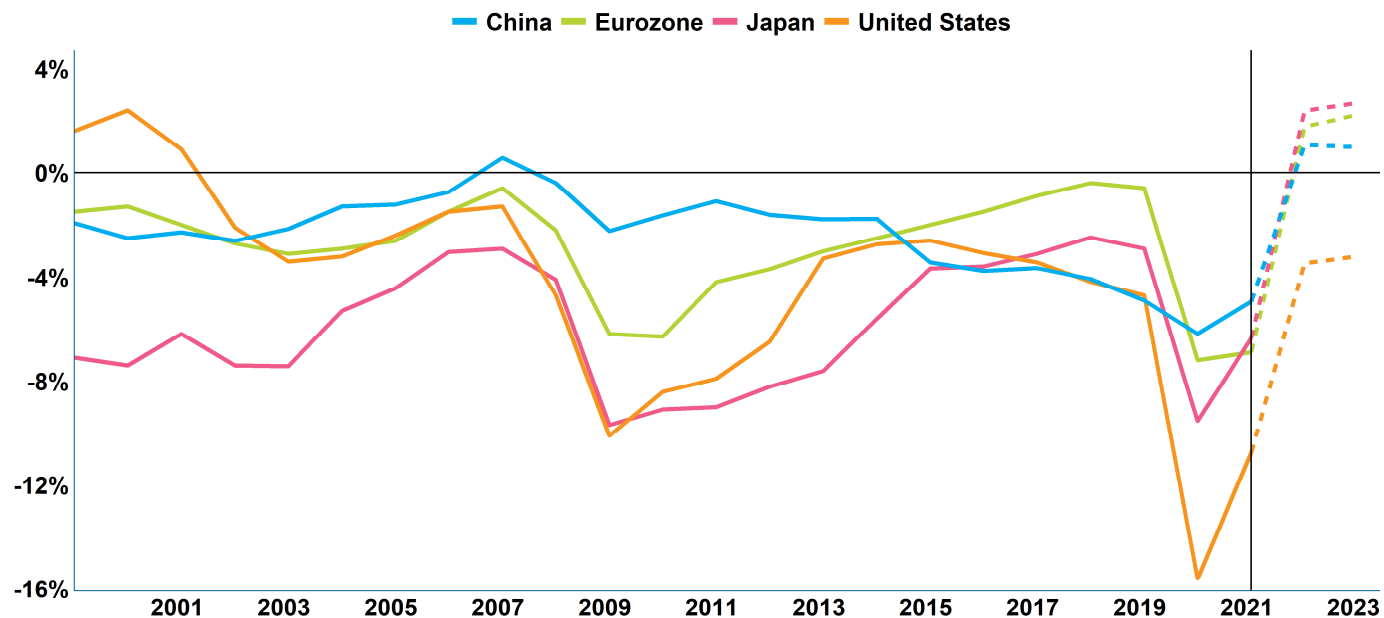
Central Bank Response¹



- After global central banks took extraordinary action to support economies during the pandemic including policy rate cuts and emergency stimulus through quantitative easing (QE), many are considering reducing support in the face of high inflation.
- The pace of withdrawing support will likely vary across central banks with the US expected to take a more aggressive approach. The risk remains for a policy error, particularly overtightening, as the war in Ukraine and a tough COVID-19 policy in China could suppress global growth.
- The one notable outlier is China, where the central bank recently lowered rates and reserve requirements in response to slowing growth.

¹ Source: Bloomberg. Policy rate data is as of April 30, 2022. 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, 2022.

Budget Surplus / Deficit as a Percentage of GDP¹

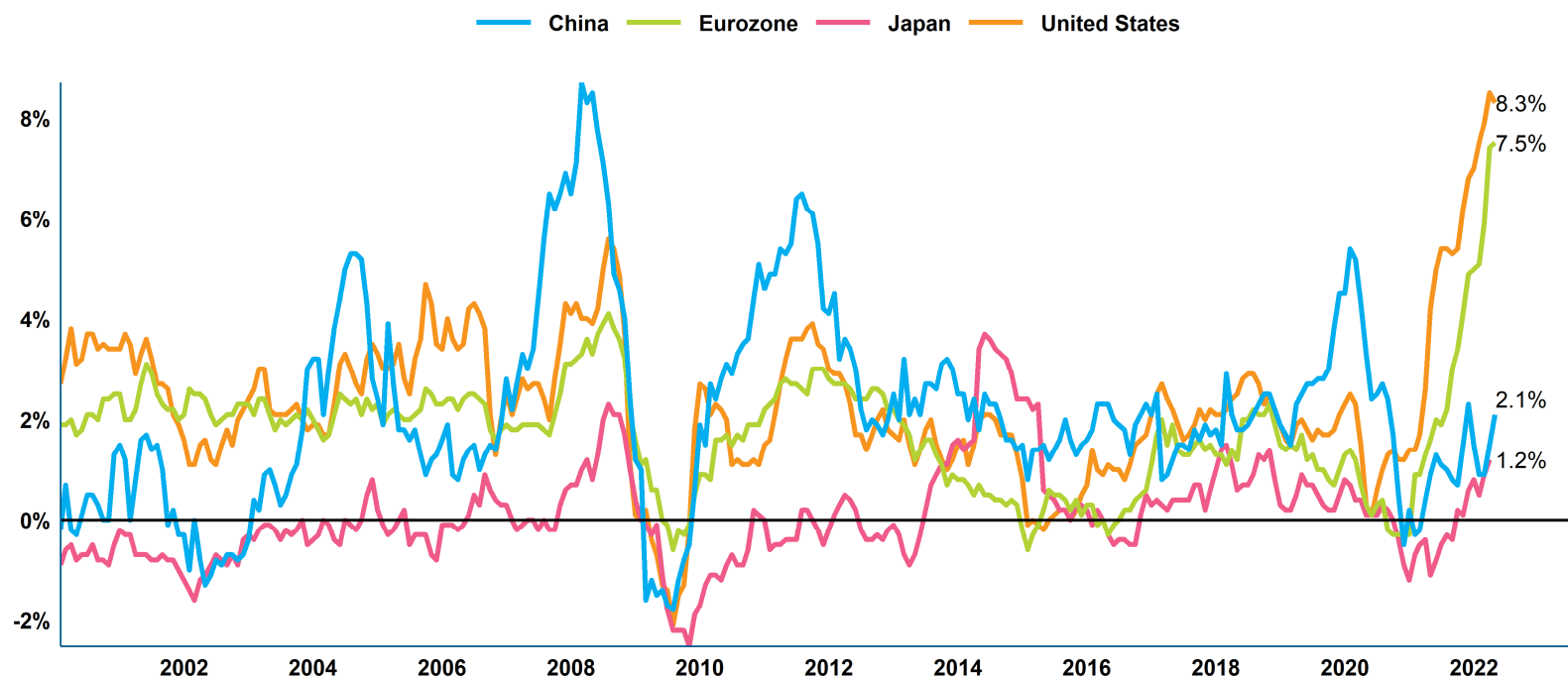


→ Budget deficits as a percentage of GDP drastically increased for major world economies, particularly the US, due to massive fiscal support and the severe economic contraction's effect on tax revenue in 2020 and 2021.

→ As fiscal stimulus programs end, and economic recoveries continue, deficits should improve in the coming years.

¹ Source: Bloomberg. Data is as of March 31, 2022. Projections via IMF Forecasts from April 2022 Report. Dotted lines represent 2022 and 2023 forecasts.

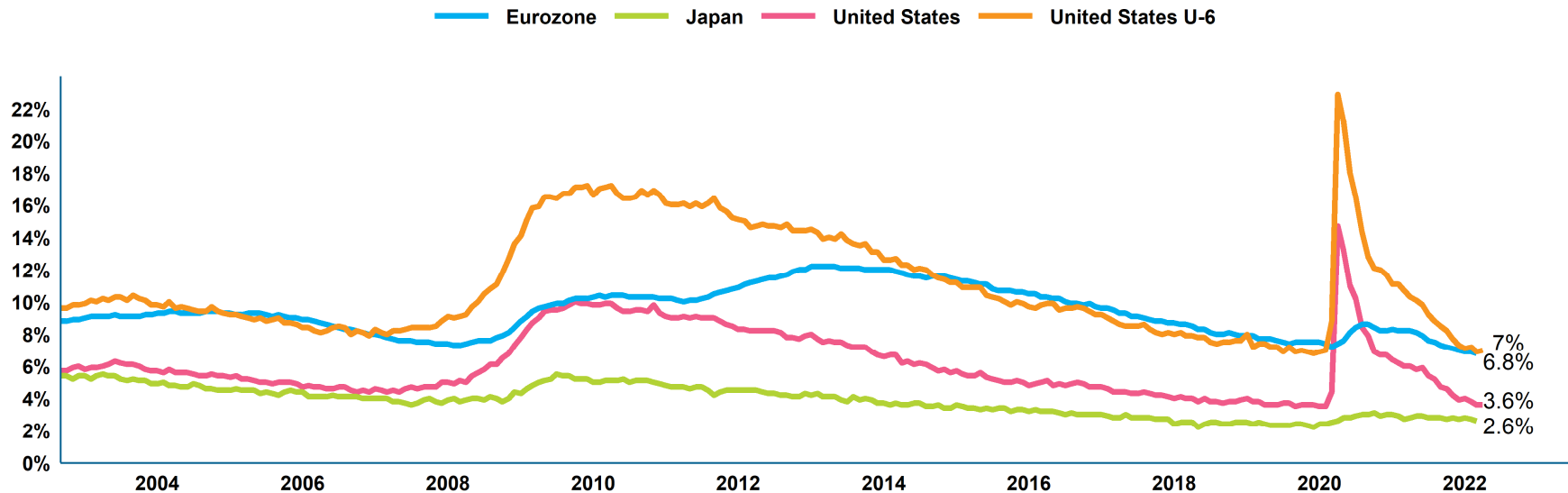
Inflation (CPI Trailing Twelve Months)¹



- Inflation increased dramatically from the lows of the pandemic, particularly in the US and Eurozone where it remains at levels not seen in decades.
- Supply issues related to the pandemic and higher prices in many commodities driven by the Russia and Ukraine conflict have been key drivers of inflation globally.

¹ Source: Bloomberg. Data is as of April 2022, except for Japan, where the most recent data available is as of March 31, 2022.

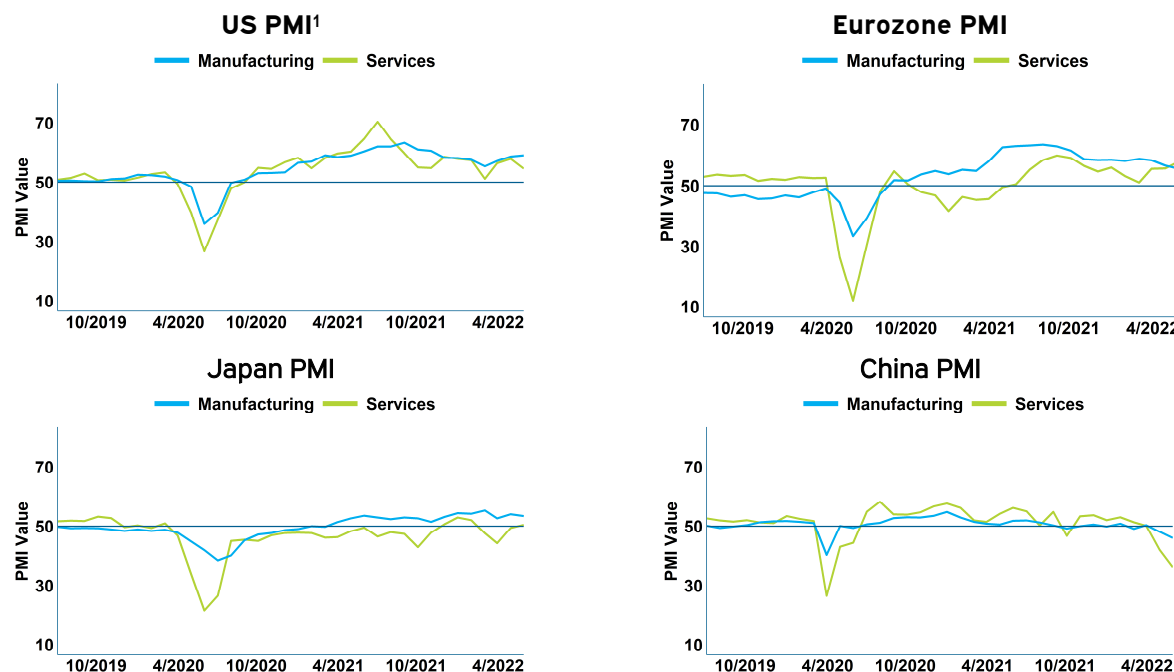
Unemployment¹



- As economies have largely reopened, helped by vaccines for the virus, improvements have been seen in the labor market.
- US unemployment, which experienced the steepest rise from the pandemic, has declined back to pre-pandemic levels. The broader measure (U-6) that includes discouraged and underemployed workers declined but is much higher at 7.0%.

¹ Source: Bloomberg. Data is as of April 30, 2022, for the US. The most recent data for Eurozone and Japanese unemployment is as of March 31, 2022.

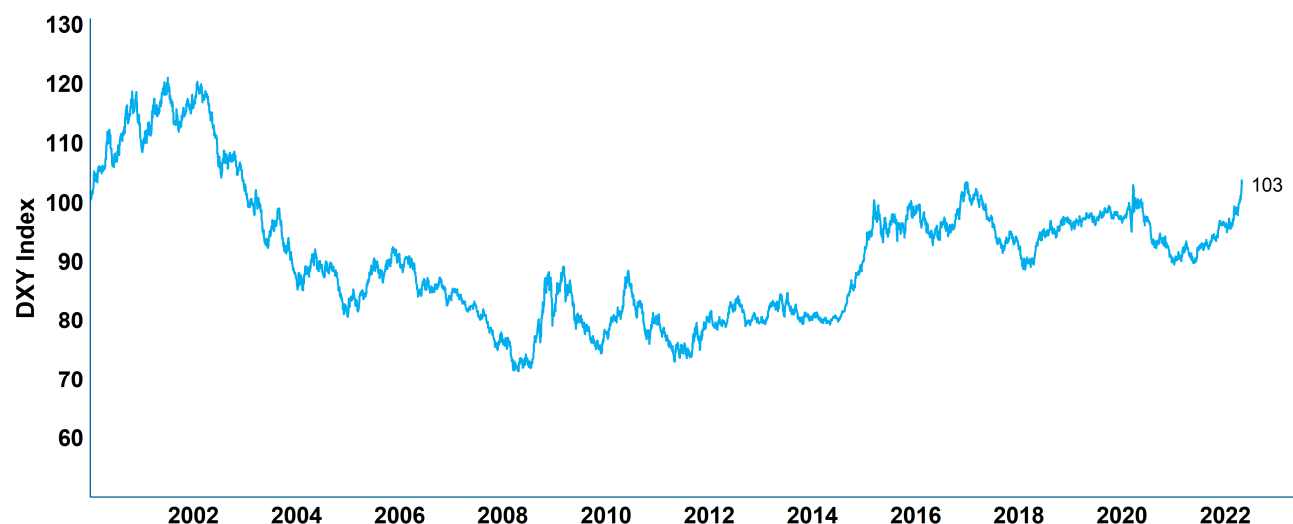
Global PMIs



- After improvements from the lows of the pandemic, Purchasing Managers Indices (PMI), based on surveys of private sector companies, have experienced some pressures recently.
- Service sector PMIs have seen some improvements in the US and Europe lately as the effects of the Omicron variant wane, while Japan and China remain weaker due to a rise in COVID-19 cases, with China still in contraction due to their strict policies.
- In most countries, manufacturing PMIs are in expansion territory as pandemic-related production issues ease and orders increase. China is the one exception, though, with the manufacturing PMI falling below 50 due to increased COVID-19 restrictions.

¹ Source: Bloomberg. US Markit Services and Manufacturing PMI, Caixin Services and Manufacturing PMI, Eurozone Markit Services and Manufacturing PMI, Jibun Bank Services and Manufacturing PMI. Data is as of April 2022. Readings below 50 represent economic contractions.

US Dollar versus Broad Currencies¹



- The US dollar continued its trend of strengthening against a broad basket of peers in April of 2022 with further increases after month-end.
- Safe-haven flows, relatively stronger growth, and higher rates have all been key drivers of the dollar's on-going strength.
- The euro, yen, and yuan have all experienced significant declines versus the dollar, adding to inflation and slowing growth concerns.

¹ Source: Bloomberg. Data as of April 30, 2022.

Summary

Key Trends in 2022:

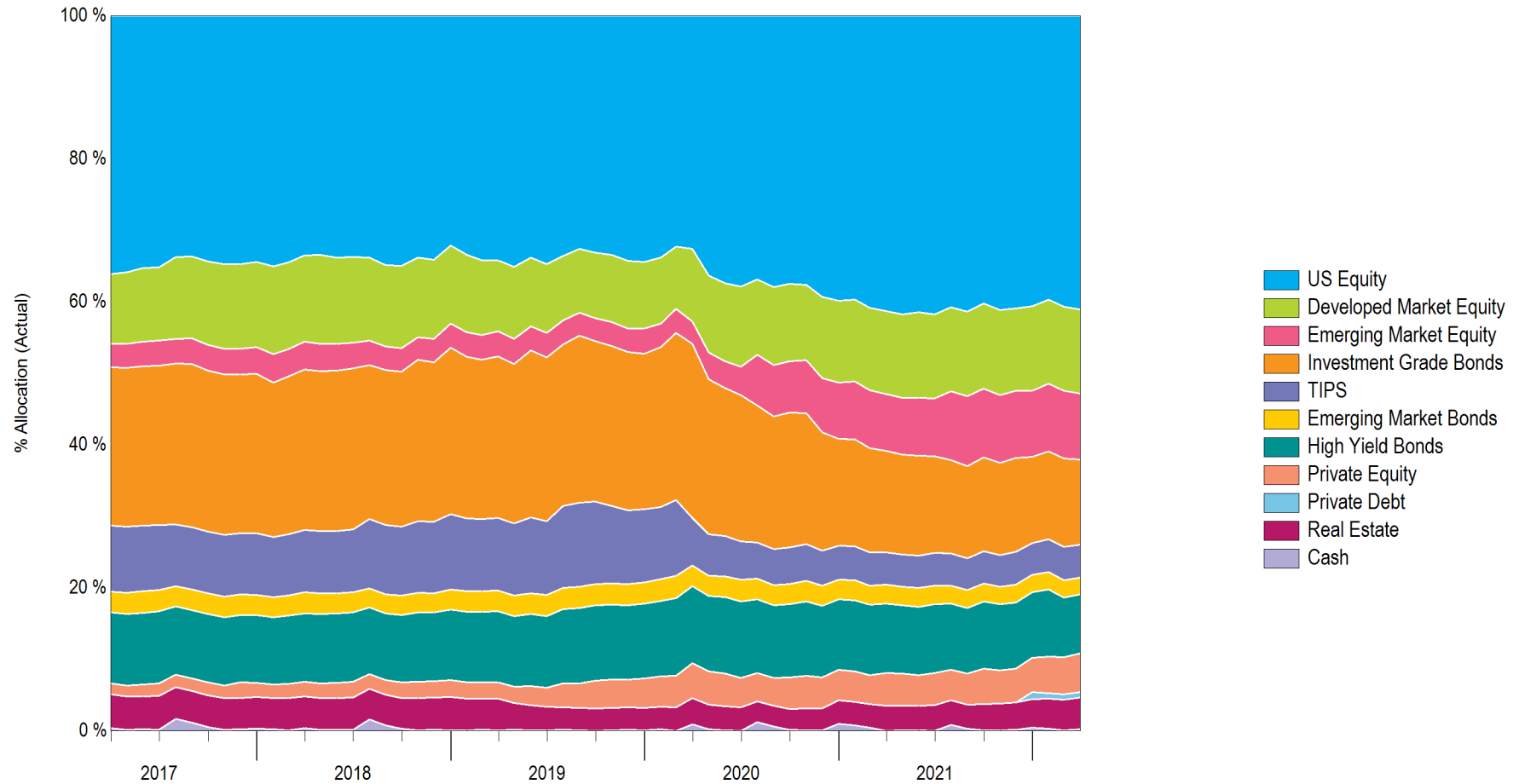
- The war in Ukraine has created significant uncertainty, with a wide range of potential outcomes. Volatility will likely remain high.
- Expect growth to slow globally in 2022 but remain above the long-term trend for the year. The pandemic's impact on economic activity and the war will be key.
- Inflationary pressures could linger, particularly if the Russian invasion of Ukraine intensifies or expands.
- The end of many fiscal programs is expected to put the burden of continued growth on consumers. Higher energy and food prices will depress consumer ability to spend in other areas.
- Monetary policy will likely tighten globally but will remain relatively accommodative. The risk of overtightening policy impacting growth remains.
- Valuations remain high in the US, but relatively low interest rates and strong margins could be supportive of equity markets.
- Outside the US, equity valuations remain lower in both emerging and developed markets, but risks remain, including continued strength in the US dollar, higher inflation particularly weighing on Europe, and China maintaining its restrictive COVID-19 policies.

First Quarter 2022 Investment Review

Retirement System Summary

Allocation vs. Targets and Policy				
	Current Balance	Current Allocation	Policy	Policy Range
US Equity	\$92,176,131	41%	38%	28% - 42%
Developed Market Equity	\$26,397,288	12%	12%	5% - 15%
Emerging Market Equity	\$20,705,106	9%	10%	1% - 12%
Investment Grade Bonds	\$26,839,308	12%	12%	10% - 25%
TIPS	\$10,264,763	5%	0%	0% - 10%
Emerging Market Bonds	\$5,292,791	2%	2%	1% - 5%
High Yield Bonds	\$18,479,586	8%	5%	5% - 12%
Private Equity	\$12,182,157	5%	5%	3% - 7%
Private Debt	\$1,781,674	1%	4%	0% - 5%
Real Estate	\$9,958,596	4%	7%	2% - 10%
Infrastructure	--	--	5%	0% - 5%
Cash	\$496,553	0%	0%	0% - 5%
Total	\$224,573,952	100%	100%	

Asset Allocation History
5 Years Ending March 31, 2022



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)	224,573,952	100.0	-4.2	5.9	10.8	8.7	8.0	7.2	7.9	Jul-88
55% MSCI World & 45% Barclays Aggregate			-5.5	3.6	9.2	8.0	7.2	6.4	7.1	Jul-88
60% MSCI World & 40% Barclays Aggregate			-5.4	4.3	9.9	8.5	7.6	6.6	7.2	Jul-88
InvMetrics Public DB \$50mm-\$250mm Net Median			-4.7	4.8	10.5	9.1	8.3	6.8	8.6	Jul-88
Domestic Equity Assets (net)	92,176,131	41.0	-5.1	11.4	14.9	12.6	12.8	8.4	9.3	Oct-06
Russell 3000			-5.3	11.9	18.2	15.4	14.3	9.4	10.3	Oct-06
PRIT Domestic Equity			-5.3	12.8	18.2	15.4	14.1	8.8	9.4	Oct-06
International Developed Markets Equity Assets (net)	26,397,288	11.8	-5.8	1.4	8.0	6.9	5.7	--	3.5	Oct-06
MSCI EAFE			-5.9	1.2	7.8	6.7	6.3	6.0	3.7	Oct-06
International Emerging Markets Equity Assets (net)	20,705,106	9.2	-6.3	-6.5	8.5	8.1	--	--	6.5	Jan-15
MSCI Emerging Markets			-7.0	-11.4	4.9	6.0	3.4	8.6	4.8	Jan-15
Investment Grade Bonds Assets (net)	26,839,308	12.0	-5.9	-4.2	1.6	2.1	2.2	4.0	5.7	Jul-88
Bloomberg US Aggregate TR			-5.9	-4.2	1.7	2.1	2.2	4.0	5.7	Jul-88
PRIT Core Fixed Income			-6.3	-0.6	4.0	3.8	3.8	4.9	6.5	Jul-88
High Yield Bond Assets (net)	18,479,586	8.2	-3.5	-0.1	4.4	4.5	5.1	--	6.3	Sep-03
Bloomberg US High Yield TR			-4.8	-0.7	4.6	4.7	5.7	7.5	7.3	Sep-03
PRIT Public Value-Added Fixed Income			-3.3	0.0	3.2	3.4	3.1	6.3	5.8	Sep-03
TIPS Assets (net)	10,264,763	4.6	-3.0	4.2	6.1	4.4	2.6	--	4.1	Oct-05
Bloomberg US TIPS TR			-3.0	4.3	6.2	4.4	2.7	5.1	4.1	Oct-05
Emerging Market Debt Assets (net)	5,292,791	2.4	-8.6	-6.4	0.7	2.0	--	--	3.4	Jan-15
JP Morgan EMBI Global Diversified			-10.0	-7.4	0.0	1.7	3.7	7.1	3.2	Jan-15
Open-Ended Real Estate (net)	7,220,660	3.2	7.0	29.2	12.4	10.8	11.5	8.1	8.7	Oct-95
NCREIF ODCE			7.4	28.5	11.3	9.9	10.9	8.7	9.4	Oct-95
Total Closed End Real Estate (net)	2,737,936	1.2	3.3	23.6	-12.8	-5.4	--	--	3.9	Jan-13
Private Equity Assets (net)	12,182,157	5.4	6.1	31.3	27.6	17.5	11.3	--	8.7	Oct-06
Private Debt Assets (net)	1,781,674	0.8								
Cash (net)	496,553	0.2								

	Trailing Performance										Inception (%)	Inception Date
	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)			
Total Retirement System	224,573,952	100.0	--	-4.2	5.9	10.8	8.7	8.0	7.2		7.9	Jul-88
55% MSCI World & 45% Barclays Aggregate				-5.5	3.6	9.2	8.0	7.2	6.4		7.1	Jul-88
60% MSCI World & 40% Barclays Aggregate				-5.4	4.3	9.9	8.5	7.6	6.6		7.2	Jul-88
InvMetrics Public DB \$50mm-\$250mm Net Median				-4.7	4.8	10.5	9.1	8.3	6.8		8.6	Jul-88
Domestic Equity Assets	92,176,131	41.0	41.0	-5.1	11.4	14.9	12.6	12.8	8.4		9.3	Oct-06
Russell 3000				-5.3	11.9	18.2	15.4	14.3	9.4		10.3	Oct-06
PRIT Domestic Equity				-5.3	12.8	18.2	15.4	14.1	8.8		9.4	Oct-06
RhumbLine S&P 500 Index	34,130,943	15.2	37.0	-4.6	15.5	18.8	15.9	14.6	9.3		7.8	Mar-99
S&P 500				-4.6	15.6	18.9	16.0	14.6	9.3		7.8	Mar-99
eV US Passive S&P 500 Equity Net Median				-4.6	15.6	18.8	15.9	14.6	9.1		7.7	Mar-99
Frontier Capital Appreciation	25,267,243	11.3	27.4	-4.5	2.5	14.3	10.6	--	--		12.5	Feb-13
Russell 2500 Growth				-12.3	-10.1	13.0	13.2	12.7	9.8		12.9	Feb-13
eV US Small-Mid Cap Growth Equity Net Median				-12.7	-5.0	15.9	15.6	12.9	10.4		13.3	Feb-13
RhumbLine HEDI	32,777,945	14.6	35.6	-6.2	13.8	--	--	--	--		22.5	Nov-20
Russell 1000 HEDI Moderate GR USD				-6.1	13.9	17.5	16.4	15.2	10.6		22.6	Nov-20
eV US Large Cap Core Equity Gross Median				-4.9	13.9	17.8	15.3	14.2	9.8		26.1	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	26,397,288	11.8	11.8	-5.8	1.4	8.0	6.9	5.7	--	3.5	Oct-06
<i>MSCI EAFE</i>				-5.9	1.2	7.8	6.7	6.3	6.0	3.7	Oct-06
RhumbLine MSCI EAFE Index	26,397,288	11.8	100.0	-5.8	1.4	8.0	6.9	--	--	4.4	Aug-14
<i>MSCI EAFE</i>				-5.9	1.2	7.8	6.7	6.3	6.0	4.3	Aug-14
<i>eV EAFE All Cap Equity Net Median</i>				-6.3	0.2	7.6	7.0	6.7	6.9	4.9	Aug-14
International Emerging Markets Equity Assets	20,705,106	9.2	9.2	-6.3	-6.5	8.5	8.1	--	--	6.5	Jan-15
<i>MSCI Emerging Markets</i>				-7.0	-11.4	4.9	6.0	3.4	8.6	4.8	Jan-15
DFA Emerging Markets	10,809,863	4.8	52.2	-3.8	-3.3	7.4	6.5	--	--	5.7	Jan-15
<i>MSCI Emerging Markets</i>				-7.0	-11.4	4.9	6.0	3.4	8.6	4.8	Jan-15
<i>eV Emg Mkts All Cap Equity Net Median</i>				-8.8	-13.0	5.5	6.0	3.8	8.8	5.2	Jan-15
Driehaus Emerging Market Equity	9,895,244	4.4	47.8	-8.8	-9.7	9.1	9.4	--	--	7.2	Jan-15
<i>MSCI Emerging Markets</i>				-7.0	-11.4	4.9	6.0	3.4	8.6	4.8	Jan-15
<i>eV Emg Mkts All Cap Equity Net Median</i>				-8.8	-13.0	5.5	6.0	3.8	8.8	5.2	Jan-15
Investment Grade Bonds Assets	26,839,308	12.0	12.0	-5.9	-4.2	1.6	2.1	2.2	4.0	5.7	Jul-88
<i>Bloomberg US Aggregate TR</i>				-5.9	-4.2	1.7	2.1	2.2	4.0	5.7	Jul-88
<i>PRIT Core Fixed Income</i>				-6.3	-0.6	4.0	3.8	3.8	4.9	6.5	Jul-88
SSgA U.S. Aggregate Bond Index	26,839,308	12.0	100.0	-5.9	-4.2	1.6	2.1	2.2	4.0	4.1	May-01
<i>Bloomberg US Aggregate TR</i>				-5.9	-4.2	1.7	2.1	2.2	4.0	4.1	May-01
<i>eV US Core Fixed Inc Net Median</i>				-5.8	-4.0	2.0	2.4	2.5	4.2	4.3	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	18,479,586	8.2	8.2	-3.5	-0.1	4.4	4.5	5.1	--	6.3	Sep-03
Bloomberg US High Yield TR				-4.8	-0.7	4.6	4.7	5.7	7.5	7.3	Sep-03
PRIT Public Value-Added Fixed Income				-3.3	0.0	3.2	3.4	3.1	6.3	5.8	Sep-03
Shenkman Capital	18,479,586	8.2	100.0	-3.4	0.0	4.5	4.5	5.1	--	6.3	Apr-06
Bloomberg US High Yield TR				-4.8	-0.7	4.6	4.7	5.7	7.5	6.8	Apr-06
eV US High Yield Fixed Inc Net Median				-3.9	0.0	4.4	4.4	5.4	7.0	6.3	Apr-06
TIPS Assets	10,264,763	4.6	4.6	-3.0	4.2	6.1	4.4	2.6	--	4.1	Oct-05
Bloomberg US TIPS TR				-3.0	4.3	6.2	4.4	2.7	5.1	4.1	Oct-05
SSgA TIPS Index-NL	10,264,763	4.6	100.0	-3.0	4.2	6.1	4.4	2.6	--	4.1	Oct-05
Bloomberg US TIPS TR				-3.0	4.3	6.2	4.4	2.7	5.1	4.1	Oct-05
eV US TIPS / Inflation Fixed Inc Net Median				-2.6	4.1	6.3	4.4	2.7	5.3	4.1	Oct-05
Emerging Market Debt Assets	5,292,791	2.4	2.4	-8.6	-6.4	0.7	2.0	--	--	3.4	Jan-15
JP Morgan EMBI Global Diversified				-10.0	-7.4	0.0	1.7	3.7	7.1	3.2	Jan-15
Payden Emerging Market Bond	5,292,791	2.4	100.0	-8.6	-6.4	0.7	2.0	--	--	3.4	Jan-15
JP Morgan EMBI Global Diversified				-10.0	-7.4	0.0	1.7	3.7	7.1	3.2	Jan-15
Open-Ended Real Estate	7,220,660	3.2	3.2	7.0	29.2	12.4	10.8	11.5	8.1	8.7	Oct-95
NCREIF ODCE				7.4	28.5	11.3	9.9	10.9	8.7	9.4	Oct-95
Clarion Partners	7,220,660	3.2	100.0	7.0	29.2	12.4	10.8	11.5	--	8.1	Oct-02
NCREIF ODCE				7.4	28.5	11.3	9.9	10.9	8.7	8.7	Oct-02

Total Retirement System | As of March 31, 2022

	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	2,737,936	1.2	1.2	3.3	23.6	-12.8	-5.4	--	--	3.9	Jan-13
Rockwood Capital Real Estate Partners Fund XI, L.P. NCREIF-ODCE	2,737,936	1.2	100.0	3.3 7.4	23.6 28.5	-- 11.3	-- 9.9	-- 10.9	-- 8.6	7.4 13.6	Dec-19 Dec-19
Private Equity Assets	12,182,157	5.4	5.4	6.1	31.3	27.6	17.5	11.3	--	8.7	Oct-06
North American Strategic Partners 2006	18,450	0.0	0.2								
Ironsides Partnership Fund IV	2,507,592	1.1	20.6								
Ironsides Direct Investment Fund IV	2,319,019	1.0	19.0								
Ironsides Partnership Fund V, L.P.	1,227,465	0.5	10.1								
Ironsides Direct Investment Fund V, L.P.	3,095,431	1.4	25.4								
HarbourVest 2019 Global Fund	3,014,199	1.3	24.7								
Private Debt Assets	1,781,674	0.8	0.8								
NB Private Debt Fund IV	1,781,674	0.8	100.0								
Cash	496,553	0.2	0.2								

Private Equity market values are as of December 31, 2021 and adjusted for subsequent flows.

North American Strategic Partners market value is cash adjusted as of December 31, 2021. The fund is currently in the liquidation process and will only be reported on annually (as of December 31).

	Calendar Year Performance									
	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Total Retirement System	13.8	14.2	17.5	-4.5	13.0	8.7	-0.2	6.3	14.0	10.9
55% MSCI World & 45% Barclays Aggregate	10.9	12.9	19.1	-4.6	13.6	5.5	0.0	5.5	13.0	10.7
60% MSCI World & 40% Barclays Aggregate	12.0	13.3	20.0	-5.1	14.5	5.7	-0.1	5.4	14.5	11.3
Domestic Equity Assets	24.8	13.4	27.6	-6.9	20.1	14.6	-1.6	13.1	33.1	15.3
Russell 3000	25.7	20.9	31.0	-5.2	21.1	12.7	0.5	12.6	33.6	16.4
PRIT Domestic Equity	27.8	18.9	30.5	-5.1	20.7	12.8	0.1	11.6	33.6	16.8
RhumbLine S&P 500 Index	28.6	18.3	31.4	-4.4	21.8	11.9	1.4	13.6	32.2	16.0
S&P 500	28.7	18.4	31.5	-4.4	21.8	12.0	1.4	13.7	32.4	16.0
Frontier Capital Appreciation	18.2	18.1	28.9	-13.9	19.1	20.5	-6.5	12.4	--	--
Russell 2500 Growth	5.0	40.5	32.7	-7.5	24.5	9.7	-0.2	7.1	40.6	16.1
RhumbLine HEDI	25.5	--	--	--	--	--	--	--	--	--
Russell 1000 HEDI Moderate GR USD	25.5	18.5	32.7	-0.9	23.4	11.4	4.8	15.4	30.9	13.9
International Developed Markets Equity Assets	11.5	7.9	22.3	-13.5	24.9	1.4	-0.8	-8.7	21.2	15.0
MSCI EAFE	11.3	7.8	22.0	-13.8	25.0	1.0	-0.8	-4.9	22.8	17.3
RhumbLine MSCI EAFE Index	11.5	7.9	22.3	-13.5	24.9	1.4	-0.8	--	--	--
MSCI EAFE	11.3	7.8	22.0	-13.8	25.0	1.0	-0.8	-4.9	22.8	17.3
International Emerging Markets Equity Assets	2.3	21.1	20.7	-15.4	39.7	9.4	-12.7	--	--	--
MSCI Emerging Markets	-2.5	18.3	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6	18.2
DFA Emerging Markets	5.8	13.9	16.0	-15.2	36.6	12.4	-14.9	--	--	--
MSCI Emerging Markets	-2.5	18.3	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6	18.2
Driehaus Emerging Market Equity	-1.5	28.0	25.3	-15.6	43.0	6.5	-10.6	--	--	--
MSCI Emerging Markets	-2.5	18.3	18.4	-14.6	37.3	11.2	-14.9	-2.2	-2.6	18.2

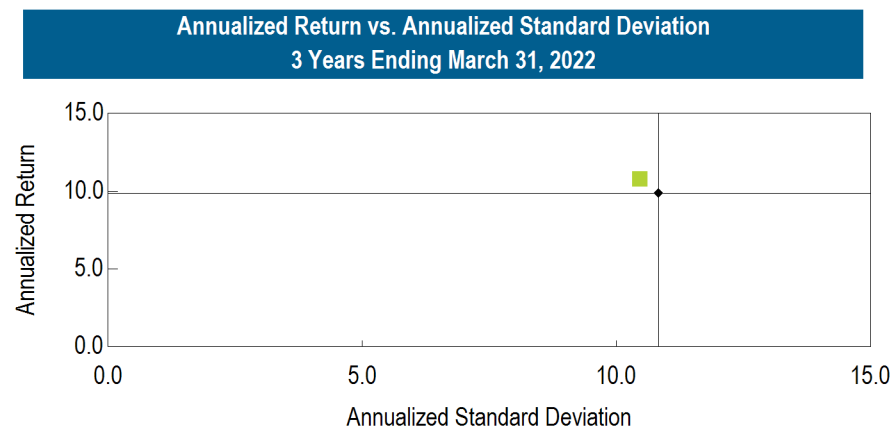
Total Retirement System | As of March 31, 2022

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Investment Grade Bonds Assets	-1.6	7.5	8.7	0.0	3.6	2.6	0.6	6.0	-2.0	4.3
<i>Bloomberg US Aggregate TR</i>	-1.5	7.5	8.7	0.0	3.5	2.6	0.5	6.0	-2.0	4.2
<i>PRIT Core Fixed Income</i>	0.1	12.0	11.2	-0.9	5.3	3.9	-2.0	15.1	-2.9	6.2
SSgA U.S. Aggregate Bond Index	-1.6	7.5	8.7	0.0	3.6	2.6	0.6	6.0	-2.0	4.3
<i>Bloomberg US Aggregate TR</i>	-1.5	7.5	8.7	0.0	3.5	2.6	0.5	6.0	-2.0	4.2
High Yield Bond Assets	4.0	6.3	14.0	-1.8	6.5	12.6	-2.3	2.9	6.4	12.4
<i>Bloomberg US High Yield TR</i>	5.3	7.1	14.3	-2.1	7.5	17.1	-4.5	2.5	7.4	15.8
<i>PRIT Public Value-Added Fixed Income</i>	3.5	4.3	10.7	-2.5	8.5	11.2	-5.2	-0.7	-2.0	14.2
Shenkman Capital	4.0	6.3	14.0	-1.8	6.5	12.6	-2.3	2.9	6.4	12.4
<i>Bloomberg US High Yield TR</i>	5.3	7.1	14.3	-2.1	7.5	17.1	-4.5	2.5	7.4	15.8
TIPS Assets	5.8	10.9	8.4	-1.4	3.0	4.7	-1.4	3.6	-8.6	6.9
<i>Bloomberg US TIPS TR</i>	6.0	11.0	8.4	-1.3	3.0	4.7	-1.4	3.6	-8.6	7.0
SSgA TIPS Index-NL	5.8	10.9	8.4	-1.4	3.0	4.7	-1.4	3.6	-8.6	6.9
<i>Bloomberg US TIPS TR</i>	6.0	11.0	8.4	-1.3	3.0	4.7	-1.4	3.6	-8.6	7.0
Emerging Market Debt Assets	-2.4	6.2	16.5	-7.0	12.0	11.5	-0.8	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	-1.8	5.3	15.0	-4.3	10.3	10.2	1.2	7.4	-5.3	17.4
Payden Emerging Market Bond	-2.4	6.2	16.5	-7.0	12.0	11.5	-0.8	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	-1.8	5.3	15.0	-4.3	10.3	10.2	1.2	7.4	-5.3	17.4
Open-Ended Real Estate	23.4	2.2	7.3	8.6	7.9	9.1	15.7	13.2	12.8	10.9
<i>NCREIF ODCE</i>	22.2	1.2	5.3	8.3	7.6	8.8	15.1	12.5	13.9	10.9
Clarion Partners	23.4	2.2	7.3	8.6	7.9	9.1	15.7	13.2	12.8	10.9
<i>NCREIF ODCE</i>	22.2	1.2	5.3	8.3	7.6	8.8	15.1	12.5	13.9	10.9

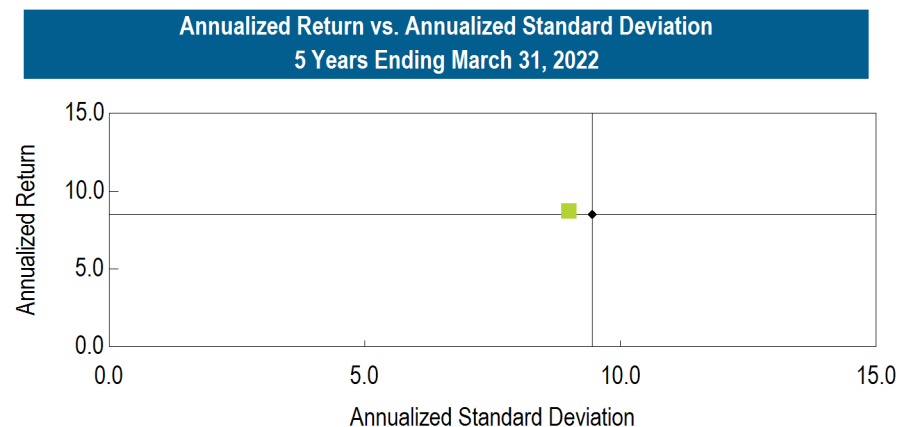
Total Retirement System | As of March 31, 2022

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Total Closed End Real Estate	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.	14.3	0.0	--	--	--	--	--	--	--	--
NCREIF-ODCE	22.2	1.2	5.3	8.3	7.6	8.8	15.0	12.5	13.9	10.9
Private Equity Assets	39.5	22.9	17.7	10.2	-5.3	-2.8	8.6	5.5	9.1	12.2
North American Strategic Partners 2006										
Ironsides Partnership Fund IV										
Ironsides Direct Investment Fund IV										
Ironsides Partnership Fund V, L.P.										
Ironsides Direct Investment Fund V, L.P.										
HarbourVest 2019 Global Fund										
Private Debt Assets										
NB Private Debt Fund IV										
Cash										

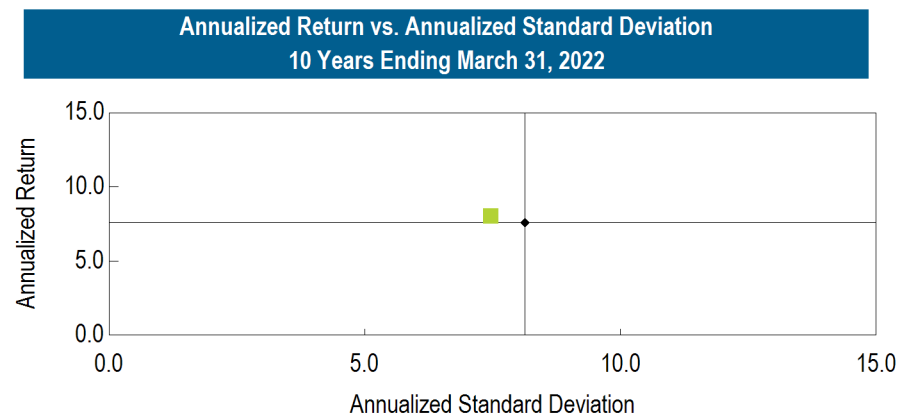
Private Debt Aggregate returns will be shown after the first full year of performance.



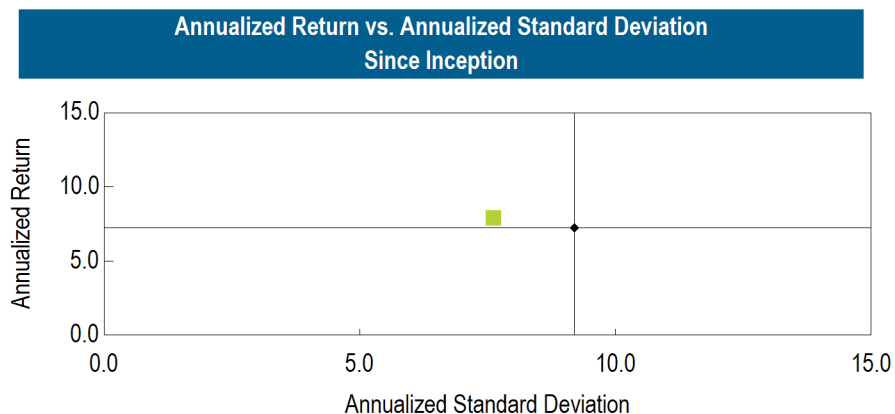
- Total Retirement System
- ◆ 60% MSCI World & 40% Barclays Aggregate



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

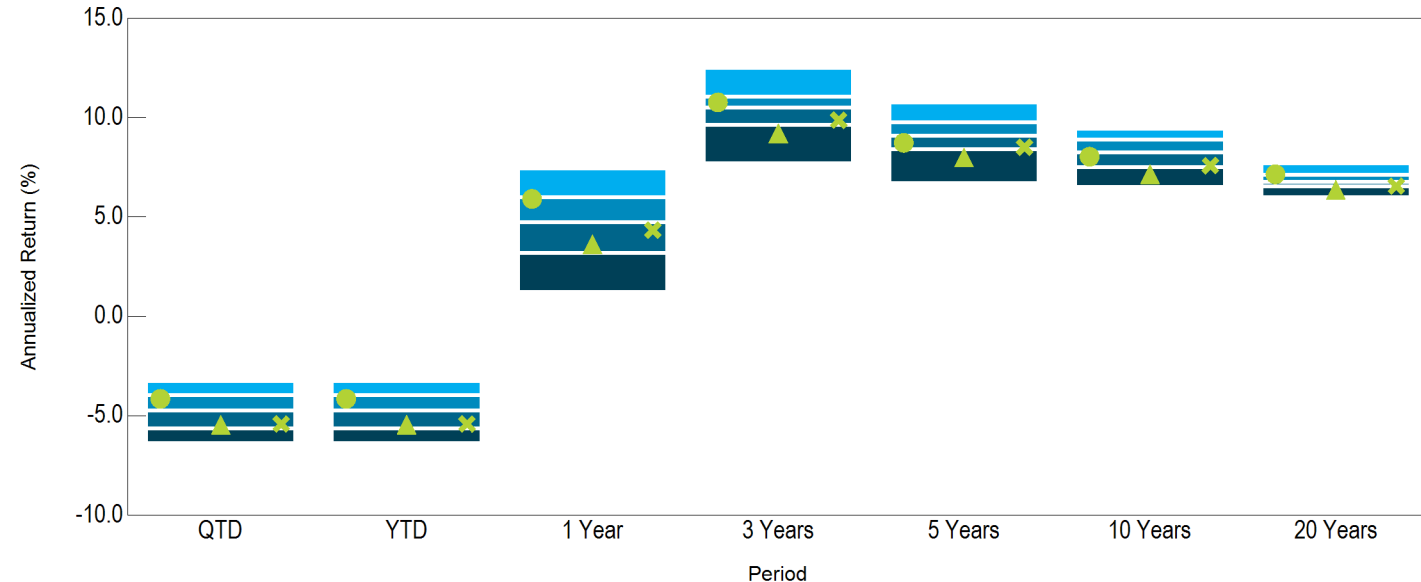


- Total Retirement System
- ◆ 60% MSCI World & 40% Barclays Aggregate



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

InvMetrics Public DB \$50mm-\$250mm Net Return Comparison
Ending March 31, 2022



	Return (Rank)											
5th Percentile	-3.3		-3.3		7.4		12.5		10.7		9.4	
25th Percentile	-3.9		-3.9		6.0		11.1		9.8		8.9	
Median	-4.7		-4.7		4.8		10.5		9.1		8.3	
75th Percentile	-5.6		-5.6		3.2		9.7		8.4		7.5	
95th Percentile	-6.4		-6.4		1.2		7.7		6.7		6.5	
# of Portfolios	161		161		159		158		148		117	
● Total Retirement System	-4.2	(32)	-4.2	(32)	5.9	(28)	10.8	(40)	8.7	(62)	8.0	(61)
▲ 55% MSCI World & 45% Barclays Aggregate	-5.5	(71)	-5.5	(71)	3.6	(70)	9.2	(83)	8.0	(85)	7.2	(90)
✕ 60% MSCI World & 40% Barclays Aggregate	-5.4	(70)	-5.4	(70)	4.3	(56)	9.9	(72)	8.5	(72)	7.6	(75)
											6.6	(76)

Statistics Summary						
5 Years Ending March 31, 2022						
	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Total Retirement System	8.7%	9.0%	0.4	1.0	0.9	1.9%
55% MSCI World & 45% Barclays Aggregate	8.0%	8.7%	--	1.0	0.8	0.0%
Equity Assets	10.7%	15.9%	-1.5	1.0	0.6	3.2%
Russell 3000	15.4%	16.4%	--	1.0	0.9	0.0%
Domestic Equity Assets	12.6%	16.9%	-1.1	1.0	0.7	2.6%
Russell 3000	15.4%	16.4%	--	1.0	0.9	0.0%
RhumbLine S&P 500 Index	15.9%	15.8%	-1.5	1.0	0.9	0.0%
S&P 500	16.0%	15.8%	--	1.0	0.9	0.0%
Frontier Capital Appreciation	10.6%	23.0%	-0.3	1.0	0.4	8.4%
Russell 2500 Growth	13.2%	20.8%	--	1.0	0.6	0.0%
RhumbLine HEDI	--	--	--	--	--	--
Russell 1000 HEDI Moderate GR USD	16.4%	15.0%	--	1.0	1.0	0.0%
International Developed Markets Equity Assets	6.9%	15.0%	0.6	1.0	0.4	0.3%
MSCI EAFE	6.7%	15.0%	--	1.0	0.4	0.0%
RhumbLine MSCI EAFE Index	6.9%	15.0%	0.6	1.0	0.4	0.3%
MSCI EAFE	6.7%	15.0%	--	1.0	0.4	0.0%
International Emerging Markets Equity Assets	8.1%	16.3%	0.8	1.0	0.4	2.5%
MSCI Emerging Markets	6.0%	16.6%	--	1.0	0.3	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	6.5%	17.3%	0.1	1.0	0.3	3.9%
MSCI Emerging Markets	6.0%	16.6%	--	1.0	0.3	0.0%
Driehaus Emerging Market Equity	9.4%	16.0%	0.9	0.9	0.5	4.0%
MSCI Emerging Markets	6.0%	16.6%	--	1.0	0.3	0.0%
Investment Grade Bonds Assets	2.1%	3.6%	-0.4	1.0	0.3	0.1%
Bloomberg US Aggregate TR	2.1%	3.6%	--	1.0	0.3	0.0%
SSgA U.S. Aggregate Bond Index	2.1%	3.6%	-0.4	1.0	0.3	0.1%
Bloomberg US Aggregate TR	2.1%	3.6%	--	1.0	0.3	0.0%
High Yield Bond Assets	4.5%	6.7%	-0.2	0.9	0.5	1.0%
Bloomberg US High Yield TR	4.7%	7.5%	--	1.0	0.5	0.0%
Shenkman Capital	4.5%	6.7%	-0.2	0.9	0.5	1.0%
Bloomberg US High Yield TR	4.7%	7.5%	--	1.0	0.5	0.0%
TIPS Assets	4.4%	3.8%	-1.3	1.0	0.9	0.1%
Bloomberg US TIPS TR	4.4%	3.8%	--	1.0	0.9	0.0%
SSgA TIPS Index-NL	4.4%	3.8%	-1.3	1.0	0.9	0.1%
Bloomberg US TIPS TR	4.4%	3.8%	--	1.0	0.9	0.0%
Emerging Market Debt Assets	2.0%	10.6%	0.2	1.1	0.1	2.2%
JP Morgan EMBI Global Diversified	1.7%	9.4%	--	1.0	0.1	0.0%
Payden Emerging Market Bond	2.0%	10.6%	0.2	1.1	0.1	2.2%
JP Morgan EMBI Global Diversified	1.7%	9.4%	--	1.0	0.1	0.0%

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Open-Ended Real Estate	10.8%	6.2%	0.9	1.0	1.6	1.1%
NCREIF ODCE	9.9%	6.1%	--	1.0	1.4	0.0%
Clarion Partners	10.8%	6.2%	0.9	1.0	1.6	1.1%
NCREIF ODCE	9.9%	6.1%	--	1.0	1.4	0.0%
Total Closed End Real Estate	-5.4%	22.2%	-0.7	0.8	-0.3	21.8%
NCREIF ODCE	9.9%	6.1%	--	1.0	1.4	0.0%
Rockwood Capital Real Estate Partners Fund XI, L.P.	--	--	--	--	--	--
NCREIF-ODCE	9.9%	6.1%	--	1.0	1.4	0.0%
Comerica Short Term Fund	0.4%	0.2%	-1.9	0.0	-3.0	0.3%
91 Day T-Bills	1.1%	0.3%	--	1.0	0.0	0.0%

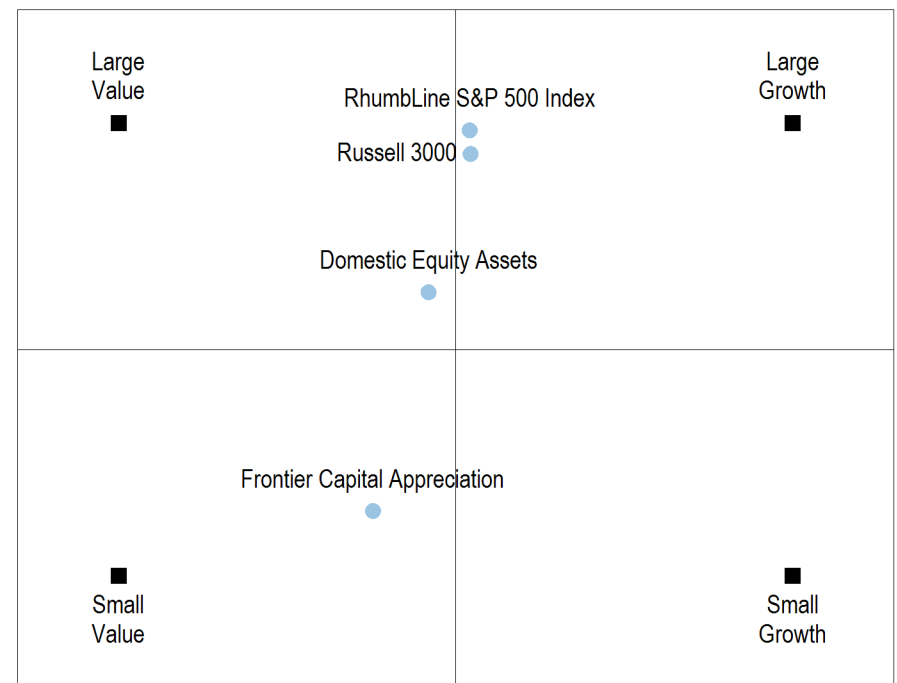
Rockwood Capital XI statistics will be reflected after first full five calendar years.

Retirement System Detail

Asset Allocation on March 31, 2022

	Actual	Actual
Frontier Capital Appreciation	\$25,267,243	27.4%
RhumbLine HEDI	\$32,777,945	35.6%
RhumbLine S&P 500 Index	\$34,130,943	37.0%
Total	\$92,176,131	100.0%

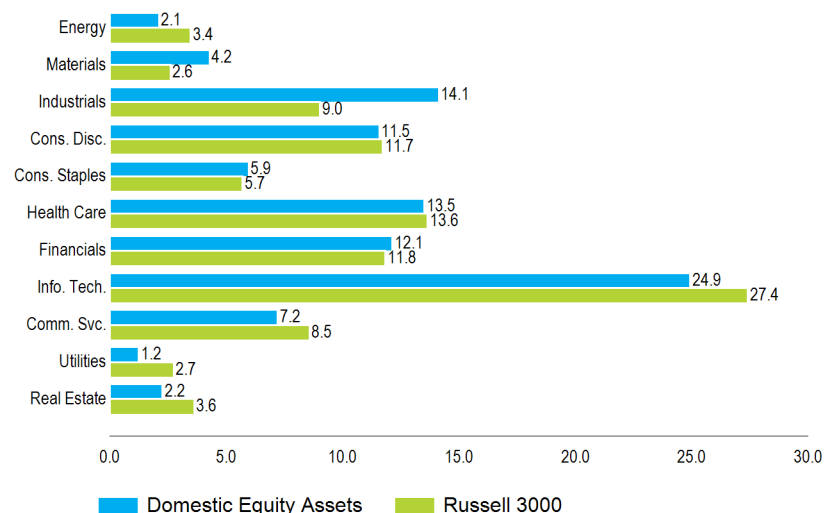
Domestic Equity Assets Style Map 3 Years Ending March 31, 2022



Domestic Equity Assets | As of March 31, 2022

Domestic Equity Assets Characteristics			
	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Market Value			
Market Value (\$M)	92.2	--	96.4
Number Of Holdings	673	3040	677
Characteristics			
Weighted Avg. Market Cap. (\$B)	450.5	550.1	467.0
Median Market Cap (\$B)	27.5	2.6	28.2
P/E Ratio	22.6	21.6	25.0
Yield	1.1	1.4	1.0
EPS Growth - 5 Yrs.	18.5	20.2	18.7
Price to Book	4.1	4.2	4.5

Sector Allocation (%) vs Russell 3000



Top 10 Holdings

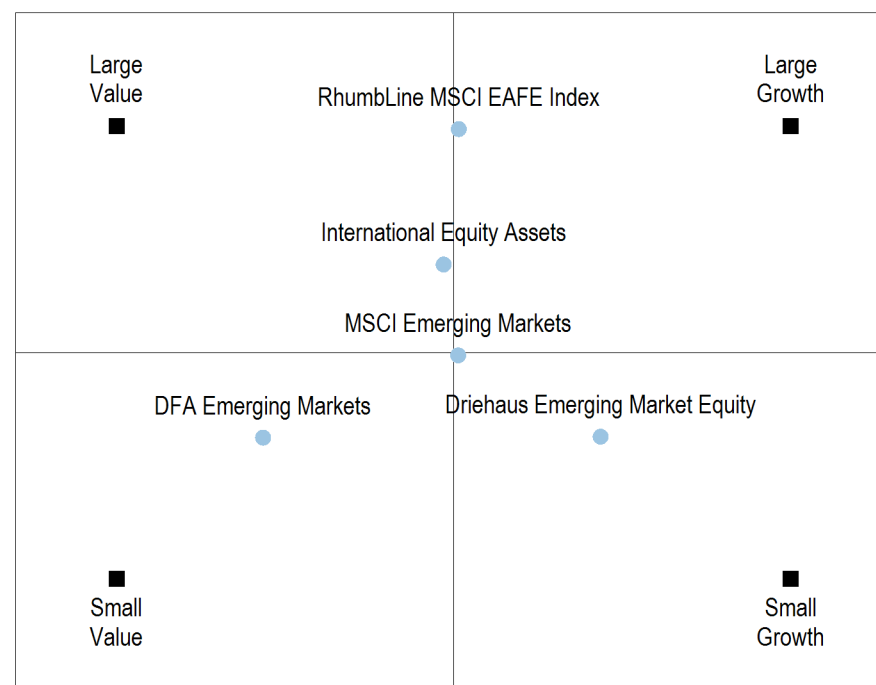
APPLE INC	4.9%
MICROSOFT CORP	4.3%
AMAZON.COM INC	2.6%
ALPHABET INC	1.6%
ALPHABET INC	1.6%
BERKSHIRE HATHAWAY INC	1.3%
NVIDIA CORPORATION	1.0%
META PLATFORMS INC	1.0%
JOHNSON & JOHNSON	1.0%
UNITEDHEALTH GROUP INC	0.9%
Total	20.1%

Asset Allocation on March 31, 2022

	Actual	Actual
DFA Emerging Markets	\$10,809,863	22.9%
Driehaus Emerging Market Equity	\$9,895,244	21.0%
RhumbLine MSCI EAFE Index	\$26,397,288	56.0%
Total	\$47,102,394	100.0%

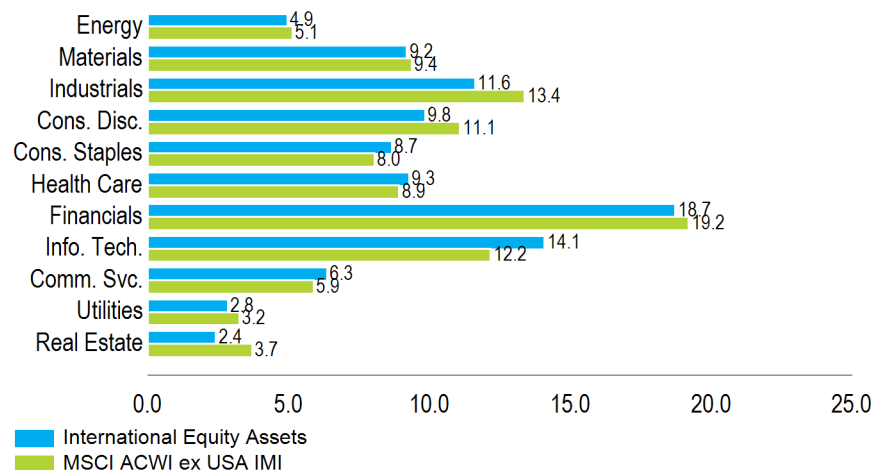
International Equity Assets Style Map

3 Years Ending March 31, 2022



International Equity Characteristics			
	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Market Value			
Market Value (\$M)	47.1	--	50.1
Number Of Holdings	7148	6640	7066
Characteristics			
Weighted Avg. Market Cap. (\$B)	101.3	81.0	106.6
Median Market Cap (\$B)	0.8	1.8	0.8
P/E Ratio	14.0	13.9	15.2
Yield	2.7	2.8	2.6
EPS Growth - 5 Yrs.	15.6	14.4	15.0
Price to Book	2.6	2.5	2.9

Sector Allocation (%) vs MSCI ACWI ex USA IMI



Top 10 Holdings

TAIWAN SEMICONDUCTOR MANUFACTURING CO LTD	2.0%
SAMSUNG ELECTRONICS CO LTD	1.9%
NESTLE SA, CHAM UND VEVEY	1.4%
TENCENT HOLDINGS LTD	1.3%
ASML HOLDING NV	1.0%
ROCHE HOLDING AG	1.0%
NORTHERN INSTITUTIONAL U.S. GOVERNMENT SELECT PORTFOLIO	0.9%
AIA GROUP LTD	0.8%
SHELL PLC	0.7%
ASTRAZENECA PLC	0.7%
Total	11.7%

Country Allocation Report

As of 3/31/2022

Region	% of Total	% of Bench	% Diff
North America ex U.S.	0.6%	8.2%	-7.5%
United States	2.3%	0.0%	2.3%
Europe Ex U.K.	30.0%	30.2%	-0.1%
United Kingdom	7.1%	9.9%	-2.8%
Pacific Basin Ex Japan	8.8%	8.4%	0.4%
Japan	12.7%	14.7%	-2.0%
Emerging Markets	37.2%	27.8%	9.4%
Other	1.2%	0.9%	0.3%
Total	100.0%	100.0%	0.0%

International Equity Country Allocation			
vs MSCI ACWI ex USA IMI			
Country	% of Total	% of Bench	% Diff
ARGENTINA	0.2%	0.0%	0.2%
AUSTRALIA	4.4%	5.4%	-1.0%
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	2.4%	1.7%	0.8%
CANADA	0.6%	8.2%	-7.5%
CHILE	0.1%	0.2%	0.0%
CHINA	8.0%	7.6%	0.3%
COLOMBIA	0.0%	0.1%	0.0%
CROATIA	0.0%	0.0%	0.0%
CZECH REPUBLIC	0.0%	0.0%	0.0%
DENMARK	1.5%	1.6%	-0.1%
EGYPT	0.0%	0.0%	0.0%
ESTONIA	0.0%	0.0%	0.0%
FINLAND	0.7%	0.7%	0.0%
FRANCE	6.1%	6.5%	-0.4%
GERMANY	4.6%	5.0%	-0.4%
GREECE	0.1%	0.1%	0.0%
HONG KONG	3.3%	1.7%	1.6%
HUNGARY	0.0%	0.1%	0.0%
INDIA	7.4%	4.0%	3.4%
INDONESIA	1.1%	0.5%	0.6%

Country	% of Total	% of Bench	% Diff
IRELAND	0.6%	0.4%	0.2%
ISRAEL	0.5%	0.7%	-0.2%
ITALY	1.1%	1.6%	-0.4%
JAPAN	12.7%	14.7%	-2.0%
JORDAN	0.0%	0.0%	0.0%
KAZAKHSTAN	0.0%	0.0%	0.0%
KENYA	0.0%	0.0%	0.0%
KOREA	4.9%	3.7%	1.2%
KUWAIT	0.0%	0.2%	-0.2%
LEBANON	0.0%	0.0%	0.0%
LITHUANIA	0.0%	0.0%	0.0%
LUXEMBOURG	0.4%	0.0%	0.4%
MALAYSIA	0.5%	0.5%	0.1%
MAURITIUS	0.0%	0.0%	0.0%
MEXICO	1.3%	0.6%	0.7%
MOROCCO	0.0%	0.0%	0.0%
NETHERLANDS	4.3%	2.6%	1.7%
NEW ZEALAND	0.2%	0.2%	-0.1%
NIGERIA	0.0%	0.0%	0.0%
NORWAY	0.4%	0.7%	-0.2%
OMAN	0.0%	0.0%	0.0%
OTHER	0.5%	0.0%	0.5%
PAKISTAN	0.0%	0.0%	0.0%
PERU	0.0%	0.1%	-0.1%
PHILIPPINES	0.3%	0.2%	0.0%
POLAND	0.2%	0.2%	0.0%
PORTUGAL	0.1%	0.1%	0.0%

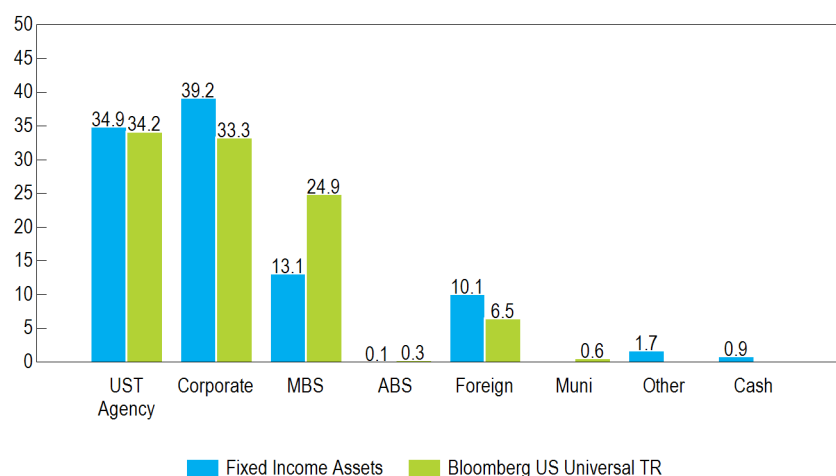
International Equity Assets | As of March 31, 2022

Country	% of Total	% of Bench	% Diff
QATAR	0.3%	0.3%	0.1%
ROMANIA	0.0%	0.0%	0.0%
RUSSIA	0.0%	0.0%	0.0%
SAUDI ARABIA	1.1%	1.1%	0.0%
SERBIA	0.0%	0.0%	0.0%
SINGAPORE	0.9%	1.0%	-0.1%
SLOVENIA	0.0%	0.0%	0.0%
SOUTH AFRICA	1.7%	1.1%	0.6%
SPAIN	1.3%	1.4%	-0.1%
SRI LANKA	0.0%	0.0%	0.0%
SWEDEN	1.9%	2.6%	-0.7%
SWITZERLAND	6.3%	6.1%	0.3%
TAIWAN	6.3%	4.8%	1.5%
THAILAND	1.0%	0.6%	0.4%
TUNISIA	0.0%	0.0%	0.0%
TURKEY	0.1%	0.1%	0.0%
UKRAINE	0.0%	0.0%	0.0%
UNITED ARAB EMIRATES	0.2%	0.4%	-0.2%
UNITED KINGDOM	7.1%	9.9%	-2.8%
UNITED STATES	2.3%	0.0%	2.3%
VIETNAM	0.1%	0.0%	0.1%
Total	100.0%	100.0%	0.0%

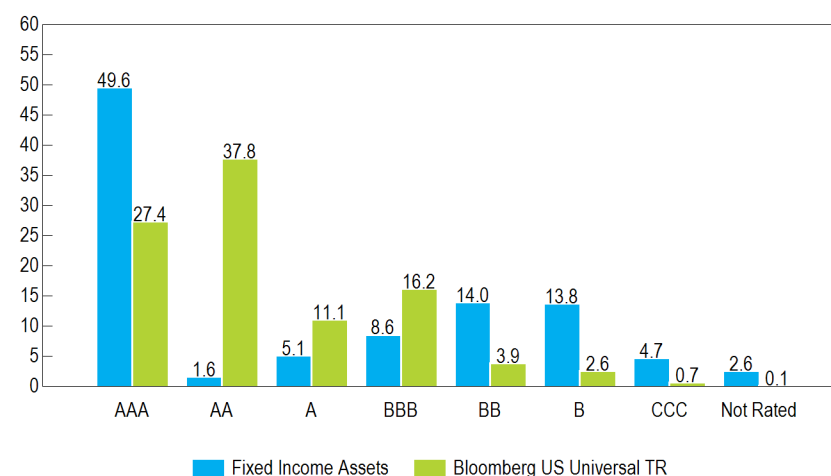
Asset Allocation on March 31, 2022		
	Actual	Actual
Payden Emerging Market Bond	\$5,292,791	8.7%
Shenkman Capital	\$18,479,586	30.4%
SSgA TIPS Index-NL	\$10,264,763	16.9%
SSgA U.S. Aggregate Bond Index	\$26,839,308	44.1%
Total	\$60,876,448	100.0%

Fixed Income Characteristics vs. Bloomberg US Universal TR			
	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Fixed Income Characteristics			
Yield to Maturity	4.1	3.3	3.2
Average Duration	5.6	6.6	5.4
Average Quality	A	AA	A
Weighted Average Maturity	8.1	8.6	8.1

Sector Allocation



Credit Quality Allocation



Portfolio Reviews

RhumbLine S&P 500 Index | As of March 31, 2022

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	-4.6	15.5	18.8	15.9	14.6	7.8	Mar-99
S&P 500	-4.6	15.6	18.9	16.0	14.6	7.8	Mar-99

Top 10 Holdings

APPLE INC	7.0%
MICROSOFT CORP	6.0%
AMAZON.COM INC	3.7%
TESLA INC	2.3%
ALPHABET INC	2.2%
ALPHABET INC	2.0%
NVIDIA CORPORATION	1.8%
BERKSHIRE HATHAWAY INC	1.7%
META PLATFORMS INC	1.3%
UNITEDHEALTH GROUP INC	1.2%
Total	29.3%

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

	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Market Value			
Market Value (\$M)	34.1	--	35.1
Number Of Holdings	507	505	507
Characteristics			
Weighted Avg. Market Cap. (\$B)	638.5	646.0	664.8
Median Market Cap (\$B)	32.1	32.0	34.6
P/E Ratio	22.7	22.8	26.2
Yield	1.4	1.4	1.3
EPS Growth - 5 Yrs.	19.7	19.7	19.9
Price to Book	4.5	4.5	4.9
Sector Distribution			
Energy	3.8	3.7	2.7
Materials	2.6	2.5	2.6
Industrials	7.8	7.8	7.8
Consumer Discretionary	12.0	12.7	12.5
Consumer Staples	6.0	6.5	5.9
Health Care	13.5	13.3	13.2
Financials	11.3	11.4	10.9
Information Technology	27.9	27.4	29.1
Communication Services	9.3	9.5	10.1
Utilities	2.7	2.6	2.5
Real Estate	2.7	2.6	2.8

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	-6.2	13.8	--	--	--	22.5	Nov-20
Russell 1000 HEDI Moderate GR USD	-6.1	13.9	17.5	16.4	15.2	22.6	Nov-20

Top 10 Holdings	
APPLE INC	6.4%
MICROSOFT CORP	5.8%
AMAZON.COM INC	3.5%
ALPHABET INC	2.4%
ALPHABET INC	2.2%
BERKSHIRE HATHAWAY INC	1.8%
JOHNSON & JOHNSON	1.4%
META PLATFORMS INC	1.3%
UNITEDHEALTH GROUP INC	1.3%
MASTERCARD INC	1.1%
Total	27.3%

Rhumbline HEDI Characteristics		
	Portfolio Q1-22	Portfolio Q4-21
Market Value		
Market Value (\$M)	32.8	34.9
Number Of Holdings	240	241
Characteristics		
Weighted Avg. Market Cap. (\$B)	571.9	591.0
Median Market Cap (\$B)	35.6	39.7
P/E Ratio	24.7	27.8
Yield	1.2	1.1
EPS Growth - 5 Yrs.	18.1	17.7
Price to Book	5.5	6.1
Sector Distribution		
Energy	0.0	0.0
Materials	2.4	2.3
Industrials	14.5	14.4
Consumer Discretionary	9.9	10.5
Consumer Staples	10.4	10.3
Health Care	13.2	13.1
Financials	11.6	10.9
Information Technology	26.8	27.2
Communication Services	8.7	8.8
Utilities	0.6	0.6
Real Estate	1.7	1.7

Russell 1000 HEDI benchmark characteristic data is unavailable.

Frontier Capital Appreciation | As of March 31, 2022

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	-4.5	2.5	14.3	10.6	--	12.5	Feb-13
Russell 2500 Growth	-12.3	-10.1	13.0	13.2	12.7	12.9	Feb-13

Top 10 Holdings	
KBR INC	2.2%
BUILDERS FIRSTSOURCE INC	1.9%
WOLFSPEED INC	1.9%
MACOM TECHNOLOGY SOLUTIONS HOLDINGS INC	1.8%
LPL FINANCIAL HOLDINGS INC	1.7%
INSULET CORP	1.5%
CAESARS ENTERTAINMENT INC	1.5%
COOPER COS INC (THE)	1.5%
CONTROLADORA VUELA COMPANIA DE AVIACION SA DE CV	1.4%
MRC GLOBAL INC	1.4%
Total	17.0%

Frontier Capital Appreciation Characteristics			
	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Market Value			
Market Value (\$M)	25.3	--	26.5
Number Of Holdings	140	1467	142
Characteristics			
Weighted Avg. Market Cap. (\$B)	8.1	7.6	8.3
Median Market Cap (\$B)	4.8	1.6	5.3
P/E Ratio	19.5	23.0	19.0
Yield	0.6	0.6	0.5
EPS Growth - 5 Yrs.	15.2	20.1	17.9
Price to Book	2.8	5.1	2.9
Sector Distribution			
Energy	2.4	2.9	1.3
Materials	8.9	3.4	9.0
Industrials	22.1	15.1	22.9
Consumer Discretionary	13.1	14.5	13.0
Consumer Staples	0.0	2.8	0.0
Health Care	13.7	21.1	13.1
Financials	13.8	5.8	13.0
Information Technology	18.3	28.8	19.8
Communication Services	2.3	2.3	2.4
Utilities	0.0	0.4	0.0
Real Estate	2.2	3.0	2.1

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	-5.8	1.4	8.0	6.9	--	4.4	Aug-14
MSCI EAFE	-5.9	1.2	7.8	6.7	6.3	4.3	Aug-14

Top 10 Holdings

NESTLE SA, CHAM UND VEVEY	2.2%
ASML HOLDING NV	1.7%
ROCHE HOLDING AG	1.7%
SHELL PLC	1.3%
ASTRAZENECA PLC	1.3%
BHP GROUP LTD	1.2%
LVMH MOET HENNESSY LOUIS VUITTON SE	1.2%
TOYOTA MOTOR CORP	1.2%
NOVARTIS AG	1.2%
NOVO NORDISK 'B'	1.2%
Total	14.2%

Rhumbline MSCI EAFE Index Characteristics

	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Market Value			
Market Value (\$M)	26.4	--	28.0
Number Of Holdings	824	823	825
Characteristics			
Weighted Avg. Market Cap. (\$B)	84.6	84.0	85.6
Median Market Cap (\$B)	13.0	13.3	14.6
P/E Ratio	14.9	14.8	16.5
Yield	2.9	2.9	2.8
EPS Growth - 5 Yrs.	14.1	13.6	12.5
Price to Book	2.6	2.5	2.7
Sector Distribution			
Energy	4.0	4.1	2.8
Materials	8.1	8.2	8.2
Industrials	15.0	15.4	15.3
Consumer Discretionary	11.3	11.6	11.5
Consumer Staples	10.0	10.2	10.1
Health Care	12.8	13.0	13.0
Financials	17.4	17.7	17.6
Information Technology	8.5	8.6	8.6
Communication Services	4.7	4.8	4.7
Utilities	3.3	3.4	3.3
Real Estate	2.8	2.9	2.9

DFA Emerging Markets | As of March 31, 2022

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	-3.8	-3.3	7.4	6.5	--	5.7	Jan-15
MSCI Emerging Markets	-7.0	-11.4	4.9	6.0	3.4	4.8	Jan-15

Top 10 Holdings	
SAMSUNG ELECTRONICS CO LTD	3.5%
TAIWAN SEMICONDUCTOR MANUFACTURING CO LTD	3.0%
TENCENT HOLDINGS LTD	2.6%
TAIWAN SEMICONDUCTOR MANUFACTURING CO LTD	1.3%
VALE SA	1.1%
CHINA CONSTRUCTION BANK CORP	1.0%
ALIBABA GROUP HOLDING LTD	1.0%
RELIANCE INDUSTRIES LTD	0.8%
PING AN INSURANCE GROUP	0.8%
INFOSYS LTD	0.7%
Total	15.9%

DFA Emerging Markets Characteristics			
	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Market Value			
Market Value (\$M)	10.8	--	11.2
Number Of Holdings	6301	1391	6223
Characteristics			
Weighted Avg. Market Cap. (\$B)	78.2	126.9	93.3
Median Market Cap (\$B)	0.5	7.1	0.6
P/E Ratio	10.7	12.6	11.1
Yield	3.1	2.6	2.8
EPS Growth - 5 Yrs.	16.7	15.8	16.9
Price to Book	2.4	2.6	2.5
Sector Distribution			
Energy	5.0	4.8	4.7
Materials	12.9	9.4	11.3
Industrials	8.8	5.4	8.6
Consumer Discretionary	10.2	12.3	11.0
Consumer Staples	6.0	5.8	5.9
Health Care	3.9	3.9	4.0
Financials	17.3	22.1	15.8
Information Technology	20.9	21.6	22.5
Communication Services	7.6	10.1	8.0
Utilities	3.3	2.5	3.2
Real Estate	3.6	2.1	3.5

Driehaus Emerging Market Equity | As of March 31, 2022

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	-8.8	-9.7	9.1	9.4	--	7.2	Jan-15
MSCI Emerging Markets	-7.0	-11.4	4.9	6.0	3.4	4.8	Jan-15

Top 10 Holdings

TAIWAN SEMICONDUCTOR MANUFACTURING CO LTD	7.9%
SAMSUNG ELECTRONICS CO LTD	5.5%
NORTHERN INSTITUTIONAL U.S. GOVERNMENT SELECT PORTFOLIO	4.4%
TENCENT HOLDINGS LTD	3.3%
RELIANCE INDUSTRIES LTD	2.4%
GPO FINANCE BANORTE	2.4%
PT BANK CENTRAL ASIA TBK	2.4%
CHINA MERCHANTS BANK CO LTD	2.4%
ICICI BANK LTD	2.3%
HOUSING DEVELOPMENT FINANCE CORP LTD	1.9%
Total	34.9%

Driehaus Emerging Market Equity Characteristics

	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Market Value			
Market Value (\$M)	9.9	--	10.9
Number Of Holdings	88	1391	88
Characteristics			
Weighted Avg. Market Cap. (\$B)	171.0	126.9	175.5
Median Market Cap (\$B)	28.7	7.1	34.9
P/E Ratio	18.9	12.6	21.3
Yield	1.8	2.6	1.7
EPS Growth - 5 Yrs.	17.8	15.8	18.6
Price to Book	3.3	2.6	4.1
Sector Distribution			
Energy	7.3	4.8	6.6
Materials	8.0	9.4	7.2
Industrials	5.5	5.4	6.2
Consumer Discretionary	5.4	12.3	9.8
Consumer Staples	8.0	5.8	4.8
Health Care	5.5	3.9	3.9
Financials	23.8	22.1	19.7
Information Technology	21.5	21.6	26.6
Communication Services	9.4	10.1	8.3
Utilities	1.0	2.5	0.8
Real Estate	0.0	2.1	0.0

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

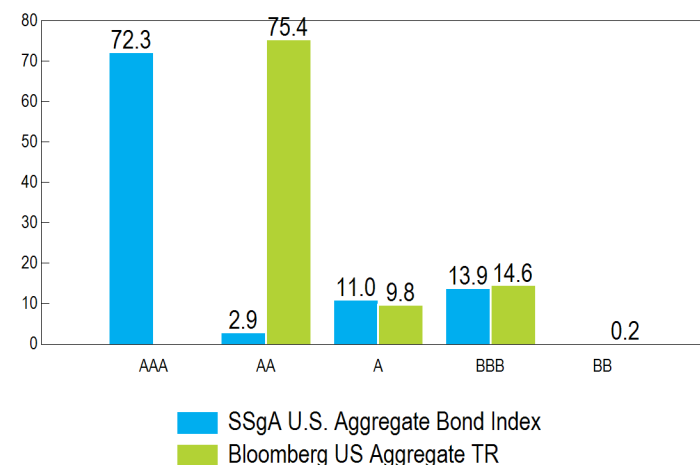
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA U.S. Aggregate Bond Index	-5.9	-4.2	1.6	2.1	2.2	4.1	May-01
Bloomberg US Aggregate TR	-5.9	-4.2	1.7	2.1	2.2	4.1	May-01

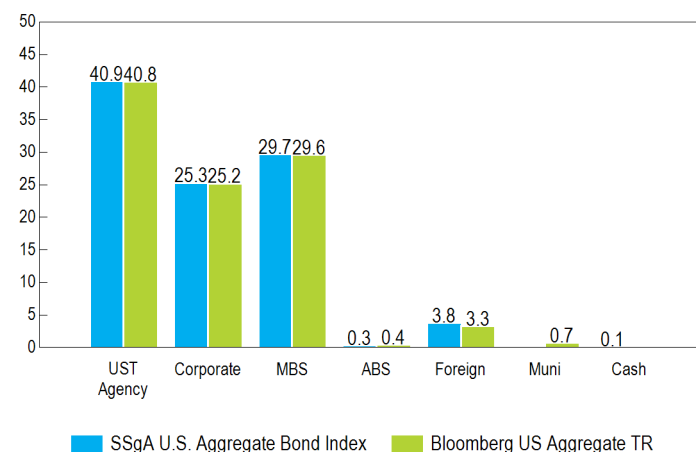
SSgA U.S. Aggregate Bond Index Characteristics vs. Bloomberg US Aggregate TR

	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Fixed Income Characteristics			
Yield to Maturity	2.9	2.9	1.8
Average Duration	6.6	6.9	6.8
Average Quality	AA	AA	AA
Weighted Average Maturity	8.8	8.8	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

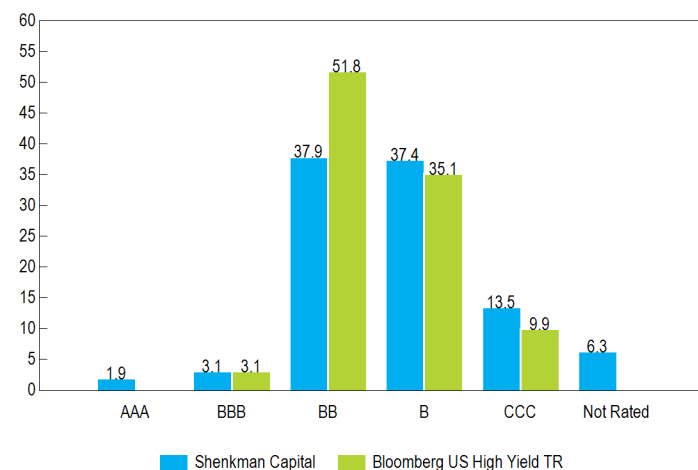
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Shenkman Capital	-3.4	0.0	4.5	4.5	5.1	6.3	Apr-06
Bloomberg US High Yield TR	-4.8	-0.7	4.6	4.7	5.7	6.8	Apr-06

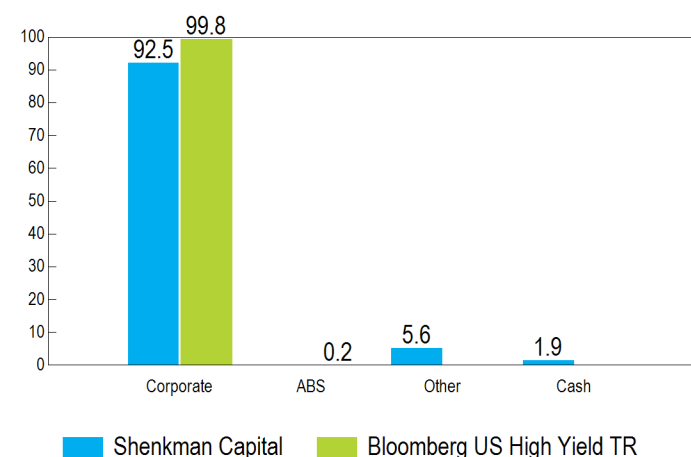
Shenkman Capital Characteristics vs. Bloomberg US High Yield TR

	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Fixed Income Characteristics			
Yield to Maturity	5.6	6.0	4.9
Average Duration	3.5	4.9	3.6
Average Quality	BB	B	BB
Weighted Average Maturity	5.7	6.2	6.3

Credit Quality Allocation



Sector Allocation



SSgA TIPS Index-NL | As of March 31, 2022

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

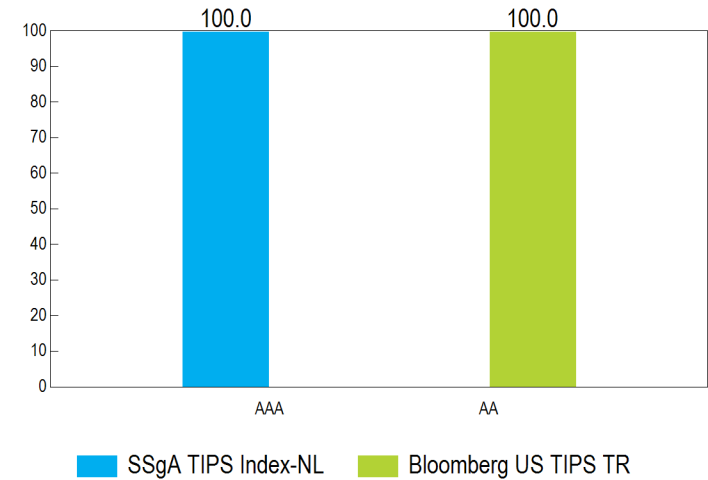
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA TIPS Index-NL	-3.0	4.2	6.1	4.4	2.6	4.1	Oct-05
Bloomberg US TIPS TR	-3.0	4.3	6.2	4.4	2.7	4.1	Oct-05

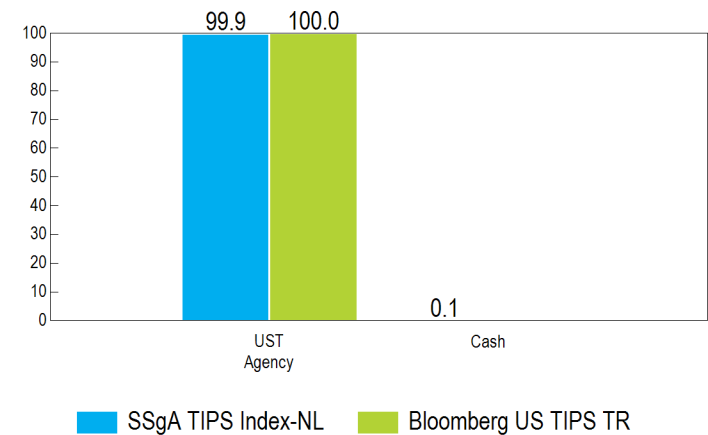
SSgA TIPS Index-NL Characteristics vs. Bloomberg US TIPS TR

	Portfolio Q1-22	Index Q1-22	Portfolio Q4-21
Fixed Income Characteristics			
Yield to Maturity	2.5	2.4	1.3
Average Duration	5.8	7.5	4.4
Average Quality	AAA	AA	AAA
Weighted Average Maturity	8.0	8.0	8.0

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	-8.6	-6.4	0.7	2.0	--	3.4	Jan-15
JP Morgan EMBI Global Diversified	-10.0	-7.4	0.0	1.7	3.7	3.2	Jan-15

Fund Characteristics as of March 31, 2022

Versus JP Morgan EMBI Global Diversified

Sharpe Ratio (3 Year)	0.0
Average Duration	7.7
Average Coupon	5.9%
Average Effective Maturity	12.6
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 Q1-22	Index Q1-22	Portfolio Q4-21
Fixed Income Characteristics			
Yield to Maturity	8.0	6.1	7.1
Average Duration	7.4	7.5	7.7
Average Quality	BB	BB	BB
Weighted Average Maturity	12.7	12.4	12.6

Fixed Income Sectors as of March 31, 2022

GOVERNMENT	66.9%
MUNICIPAL	0.0%
CORPORATE	14.8%
SECURITIZED	0.0%
CASH & EQUIVALENTS	4.7%
DERIVATIVE	13.5%

Credit Quality as of December 31, 2021

AAA	1.0%
AA	4.0%
A	3.0%
BBB	28.0%
BB	26.0%
B	30.0%
Below B	5.0%
Not Rated	3.0%

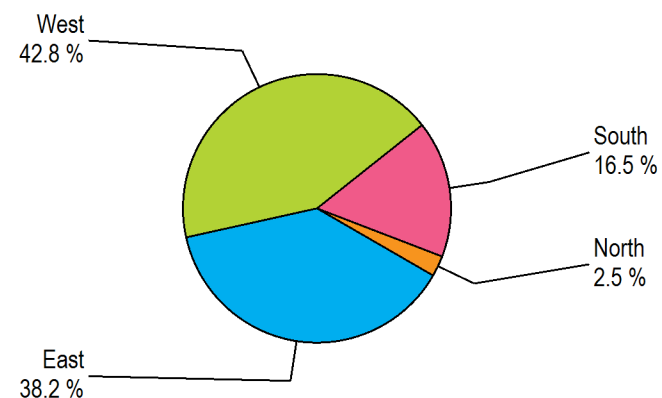
Account Information

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

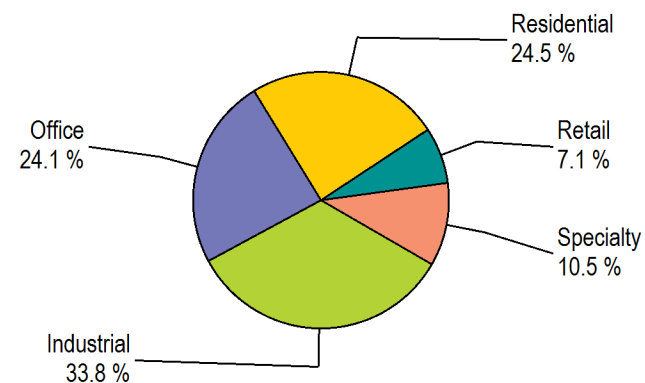
Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Clarion Partners	7.0	29.2	12.4	10.8	11.5	8.1	Oct-02
NCREIF ODCE	7.4	28.5	11.3	9.9	10.9	8.7	Oct-02

Geographic Diversification



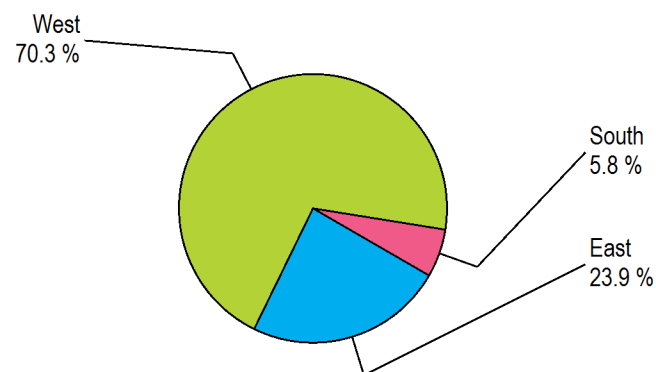
Property Type Allocation



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	

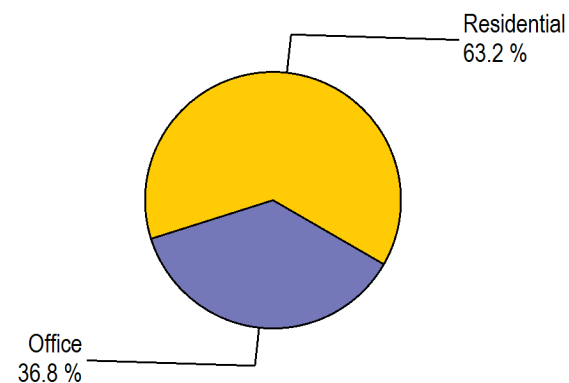
Geographic Diversification



Portfolio Performance Summary

	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Rockwood Capital Real Estate Partners Fund XI, L.P.	3.3	23.6	--	--	--	7.4	Dec-19
NCREIF-ODCE	7.4	28.5	11.3	9.9	10.9	13.6	Dec-19

Property Type Allocation



Rockwood Real Estate characteristics are as of 12/31/21.

Non-Marketable Securities Overview						
As of March 31, 2022						
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	\$1,343,006	\$1,168,745	\$2,507,592	36.7
Ironsides Direct Investment Fund IV	2015	\$2,500,000	\$2,419,534	\$2,368,492	\$2,319,019	19.5
Ironsides Partnership Fund V, L.P.	2019	\$2,000,000	\$878,191	\$0	\$1,227,465	N/A
Ironsides Direct Investment Fund V, L.P.	2019	\$2,000,000	\$2,425,558	\$242,967	\$3,095,431	26.5
HarbourVest 2019 Global Fund	2019	\$4,000,000	\$2,040,000	\$447,081	\$2,679,345	62.1
Total Account		\$17,539,998	\$13,517,948	\$2,133,033	\$11,847,303	

IRRs are as of 12/31/2022. Exceptions include Ironsides Partnership Fund IV which is as of 9/30/2021.

Ironsides Partnership Fund V's IRR is not available yet.

Non-Marketable Securities Overview							
As of March 31, 2022							
Account Type	Account	Vintage Year	Commitment	Cumulative Takedown	Cumulative Distributions	Value (RV)	IRR (%)
Private Debt	NB Private Debt Fund IV	2021	\$5,000,000	\$2,500,000	\$768,420	\$1,781,674	--
	Total Account		\$5,000,000	\$2,500,000	\$768,420	\$1,781,674	

IRRs for investments less than 2 years are not shown.

Annual Investment Expense Analysis As Of March 31, 2022				
Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Equity Assets		\$139,278,525		
Domestic Equity Assets		\$92,176,131		
RhumbLine S&P 500 Index	0.07% of First 25.0 Mil, 0.05% of Next 25.0 Mil, 0.04% Thereafter	\$34,130,943	\$22,065	0.06%
Frontier Capital Appreciation	0.79% of Assets	\$25,267,243	\$199,611	0.79%
RhumbLine HEDI	0.05% of Assets	\$32,777,945	\$16,389	0.05%
International Equity Assets		\$47,102,394		
International Developed Markets Equity Assets		\$26,397,288		
RhumbLine MSCI EAFE Index	0.08% of First 25.0 Mil, 0.07% of Next 25.0 Mil, 0.05% Thereafter	\$26,397,288	\$20,978	0.08%
International Emerging Markets Equity Assets		\$20,705,106		
DFA Emerging Markets	0.33% of Assets	\$10,809,863	\$35,673	0.33%
Driehaus Emerging Market Equity	0.90% of Assets	\$9,895,244	\$89,057	0.90%
Fixed Income Assets		\$60,876,448		
Investment Grade Bonds Assets		\$26,839,308		
SSgA U.S. Aggregate Bond Index	0.04% of Assets	\$26,839,308	\$10,736	0.04%
High Yield Bond Assets		\$18,479,586		
Shenkman Capital	0.45% of Assets	\$18,479,586	\$83,158	0.45%
TIPS Assets		\$10,264,763		
SSgA TIPS Index-NL	0.04% of Assets	\$10,264,763	\$4,106	0.04%
Emerging Market Debt Assets		\$5,292,791		
Payden Emerging Market Bond	0.69% of Assets	\$5,292,791	\$36,520	0.69%

Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Real Estate Assets		\$9,958,596		
Open-Ended Real Estate		\$7,220,660		
Clarion Partners	1.10% of Assets	\$7,220,660	\$79,427	1.10%
Total Closed End Real Estate		\$2,737,936		
Rockwood Capital Real Estate Partners Fund XI, L.P.		\$2,737,936		
Private Equity Assets		\$12,182,157		
North American Strategic Partners 2006	0.8% on drawn and undrawn capital less investments sold or written off 5% carried interest, 8% preferred return	\$18,450		
Ironsides Partnership Fund IV	0% Management fee, 8% Preferred Return, 5% Carried Interest	\$2,507,592		
Ironsides Direct Investment Fund IV	0.5% Management fee, 8% Preferred Return, 15% Carried Interest	\$2,319,019		
Ironsides Partnership Fund V, L.P.		\$1,227,465		
Ironsides Direct Investment Fund V, L.P.	0.5% Management fee, 8% preferred return, 15% carried interest	\$3,095,431		
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	\$3,014,199		
Private Debt Assets		\$1,781,674		
NB Private Debt Fund IV	1.0% on invested capital	\$1,781,674		
Cash		\$496,553		
Comerica Short Term Fund		\$496,553		
Total		\$224,573,952	\$597,721	0.27%

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 Issue

Asset Allocation Overview

Asset Allocation

What is Asset Allocation?

→ Asset allocation refers to the distribution of assets across a number of asset classes that exhibit different correlations with each other. Each asset class exhibits a unique combination of risk and reward. The expected and realized long-term returns vary by asset class, as does the interim volatility of those returns. Some asset classes, like equities, exhibit high degrees of volatility, but also offer high returns over time. Other asset classes, like cash, experience very little volatility, but offer limited return potential.

Why is Asset Allocation important?

→ The distribution of assets across various asset classes exerts a major influence on the return behavior of the aggregate pool over short and long time periods.

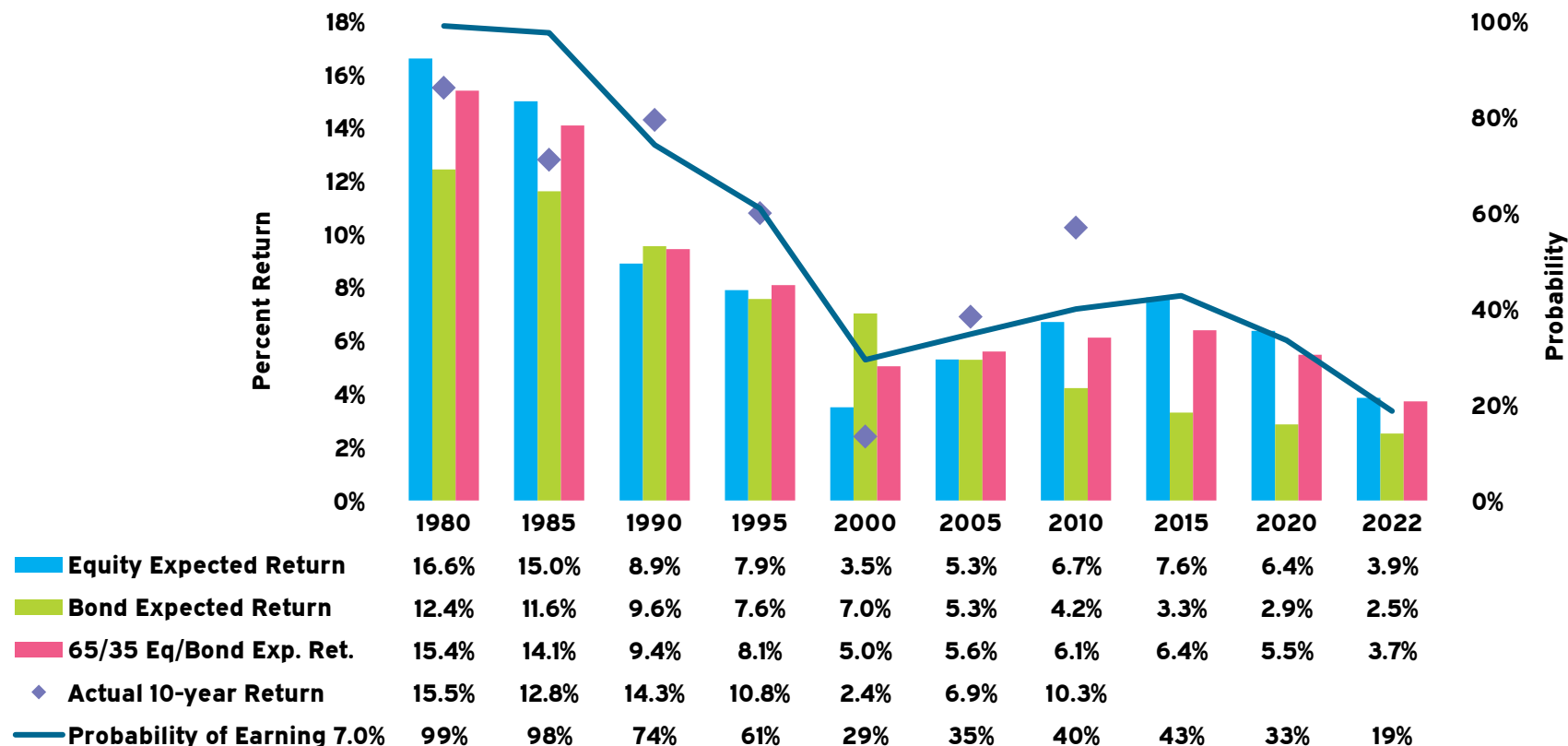
How does Asset Allocation affect aggregate performance?

→ In addition to exhibiting unique characteristics, each asset class interacts differently with other asset classes. Because of low correlations, the likelihood that any two asset classes will move together in the same direction is limited, with the movement of one asset class often offsetting another's. Combining asset classes allows investors to control more fully the aggregate risk and return of their portfolios, and to benefit from the reduction in volatility that stems from diversification.

Asset Allocation Review Process

- Review the spectrum of asset allocation options that plausibly meet the System's return targets.
- Choose a portfolio with expected returns and risk (both investment and non-investment) that are appropriate for the financial position of the System.
- Understand the risks in a portfolio predominantly invested in equities and equity-like assets.

The Secular Decline in Investment Returns¹



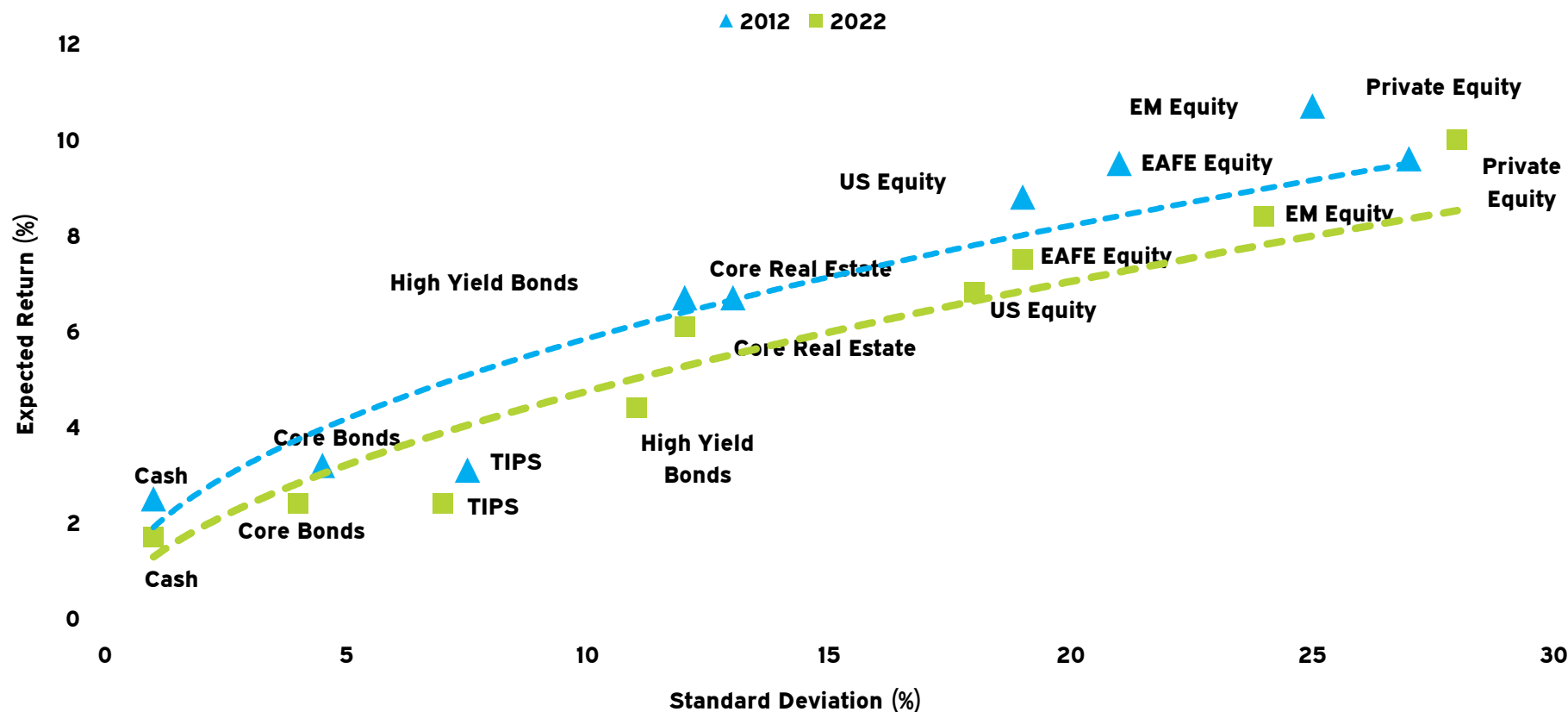
→ The chart above illustrates that a portfolio comprising of 65% domestic stocks and 35% investment grade bonds has produced diminishing expected returns as well as actual returns over the past 30 years.

¹ Expected return assumptions for 1) Bonds equals the yield of the ten-year Treasury plus 100 basis points, and 2) Equities equals the dividend yield plus the earnings yield of the S&P 500 index (using the inflation-adjusted trailing 10-year earnings). Probability calculation is for the subsequent ten years.

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.

Investable Universe over Time: Less Return for the Same or More Risk¹



→ A positive relationship exists between long-term return expectations and the level of risk accepted.

→ However, this relationship is not static.

¹ Expected return and standard deviation are based upon Meketa Investment Group's Annual Asset Study.

Proposed Policy Options

Asset Allocation Policy Options¹

	Actual Allocation (2022 CME) (%)	Current Policy (2022 CME) (%)	Option A (ER: 7.00%) (%)	Option B (ER: 7.25%) (%)	Option C (ER: 7.50%) (%)
Growth/Equity	67	65	51	61	55
US Equity	41	38	20	24	17
Developed Market Equity (non-US)	12	12	20	18	14
Emerging Market Equity	9	10	5	10	14
Private Equity	5	5	6	9	10
Credit	12	11	18	15	15
High Yield Bonds	9	5	5	5	5
Private Debt	1	4	8	8	8
Emerging Market Bonds (major)	2	2	5	2	2
Rate Sensitive	17	12	13	12	10
Cash Equivalents	1	0	0	0	0
Investment Grade Bonds	12	12	8	7	5
TIPS	4	0	5	5	5
Real Assets	4	12	18	12	20
Real Estate	4	7	9	6	10
Infrastructure (Core Private)	0	5	9	6	10
Other	0	0	0	0	0
Expected Return (20 years)	6.60	7.02	6.99	7.25	7.50
Standard Deviation	14.1	14.4	13.4	14.6	14.6
Probability of Achieving 7.5% over 20 Years	38.0	43.4	42.6	46.3	49.4

¹ Expected return and standard deviation are based upon Meketa Investment Group's 2022 Annual Asset Study. Throughout this document, returns for periods longer than one year are annualized.

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

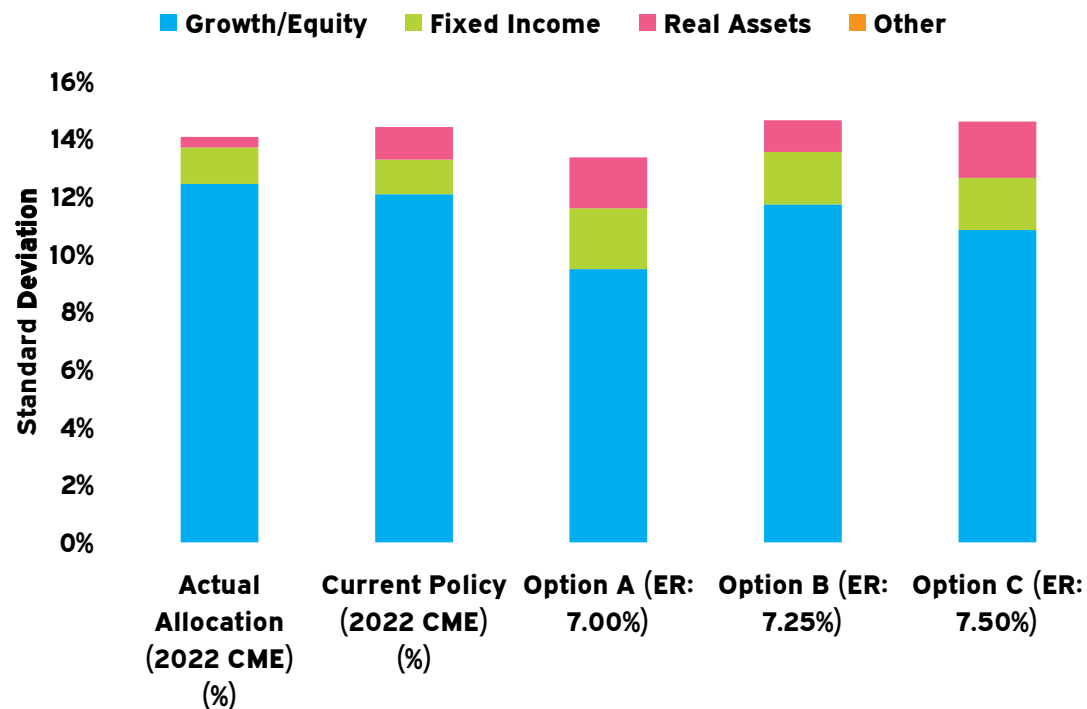
→ Scenario analysis

- 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 (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.

MVO-Based Risk Analysis

Scenario	Actual Allocation (2022 CME) (%)	Current Policy (2022 CME) (%)	Option A (ER: 7.00%) (%)	Option B (ER: 7.25%) (%)	Option C (ER: 7.50%) (%)
Worst Case Returns (1)					
OneYear (annualized)	-21.3	-21.5	-19.8	-21.6	-21.3
ThreeYears (annualized)	-10.6	-10.5	-9.4	-10.5	-10.2
FiveYears (annualized)	-7.0	-6.9	-5.9	-6.8	-6.5
TenYears (annualized)	-3.2	-3.0	-2.3	-2.9	-2.6
TwentyYears (annualized)	-0.4	-0.2	0.3	-0.1	0.2
Probability of Experiencing Negative Returns					
OneYear	31.3	30.6	29.3	30.3	29.6
ThreeYears	20.0	19.0	17.3	18.6	17.6
FiveYears	13.8	12.9	11.2	12.4	11.5
TenYears	6.2	5.5	4.3	5.1	4.5
TwentyYears	1.5	1.2	0.7	1.1	0.8
Probability of Achieving at least a 7.5% Return					
OneYear	47.3	48.5	48.3	49.2	49.9
ThreeYears	45.3	47.4	47.1	48.6	49.8
FiveYears	43.9	46.7	46.3	48.1	49.7
TenYears	41.5	45.3	44.8	47.4	49.6
TwentyYears	38.0	43.4	42.6	46.3	49.4

Conditional Value at Risk¹

Scenario	Actual Allocation (2022 CME) (%)	Current Policy (2022 CME) (%)	Option A (ER: 7.00%)	Option B (ER: 7.25%)	Option C (ER: 7.50%)
CVaR (%):					
1 month	-10.2	-10.4	-9.6	-10.6	-10.5
3 months	-16.9	-17.2	-15.9	-17.5	-17.3
6 months	-22.8	-23.2	-21.3	-23.5	-23.3
CVaR (\$ mm):					
1 month	-10	-10	-10	-11	-11
3 months	-17	-17	-16	-17	-17
6 months	-23	-23	-21	-24	-23

¹ Calculated with a 99% confidence level and based upon Meketa Investment Group's Annual Asset Study. cVaR represents the average loss past the 99th percentile.

Historical Negative Scenario Analysis¹ (Cumulative Return)

Scenario	Actual Allocation (2022 CME) (%)	Current Policy (2022 CME) (%)	Option A (ER: 7.00%) (%)	Option B (ER: 7.25%) (%)	Option C (ER: 7.50%) (%)
COVID-19 Market Shock (Feb 2020-Mar 2020)	-23.8	-22.6	-18.3	-20.3	-17.9
Taper Tantrum (May - Aug 2013)	-0.7	-0.1	-0.6	-0.5	-0.7
Global Financial Crisis (Oct 2007 - Mar 2009)	-33.2	-33.3	-28.5	-31.8	-30.2
Popping of the TMT Bubble (Apr 2000 - Sep 2002)	-23.1	-21.5	-13.0	-18.9	-14.4
LTCM (Jul - Aug 1998)	-11.1	-10.8	-8.7	-9.6	-9.3
Asian Financial Crisis (Aug 97 - Jan 98)	0.5	0.6	1.9	0.6	0.1
Rate spike (1994 Calendar Year)	0.8	0.8	0.7	1.4	0.8
Early 1990s Recession (Jun - Oct 1990)	-9.4	-8.8	-6.5	-7.4	-6.7
Crash of 1987 (Sep - Nov 1987)	-16.3	-15.8	-10.7	-12.6	-11.0
Strong dollar (Jan 1981 - Sep 1982)	1.7	1.3	1.0	-0.5	0.3
Volcker Recession (Jan - Mar 1980)	-4.7	-4.1	-3.7	-4.1	-3.5
Stagflation (Jan 1973 - Sep 1974)	-27.9	-27.3	-21.7	-24.6	-22.8

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.

Historical Positive Scenario Analysis¹ (Cumulative Return)

Scenario	Actual Allocation (2022 CME) (%)	Current Policy (2022 CME) (%)	Option A (ER: 7.00%) (%)	Option B (ER: 7.25%) (%)	Option C (ER: 7.50%) (%)
Global Financial Crisis Recovery (Mar 2009 - Nov 2009)	44.7	42.7	36.3	41.3	39.3
Best of Great Moderation (Apr 2003 - Feb 2004)	34.5	34.4	30.8	34.5	33.9
Peak of the TMT Bubble (Oct 1998 - Mar 2000)	43.1	44.9	40.2	46.0	47.2
Plummeting Dollar (Jan 1986 - Aug 1987)	62.0	60.7	56.0	60.7	56.5
Volcker Recovery (Aug 1982 - Apr 1983)	40.2	38.2	28.2	31.7	28.6
Bretton Wood Recovery (Oct 1974 - Jun 1975)	36.6	35.1	26.5	30.2	27.6

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	Actual Allocation (2022 CME) (%)	Current Policy (2022 CME) (%)	Option A (ER: 7.00%) (%)	Option B (ER: 7.25%) (%)	Option C (ER: 7.50%) (%)
10-year Treasury Bond rates rise 100 bps	5.0	5.2	4.3	5.0	4.9
10-year Treasury Bond rates rise 200 bps	-0.4	-0.2	-0.9	-0.3	-0.2
10-year Treasury Bond rates rise 300 bps	-1.9	-1.6	-3.3	-3.0	-2.8
Baa Spreads widen by 50 bps, High Yield by 200 bps	0.0	0.0	0.3	0.0	0.1
Baa Spreads widen by 300 bps, High Yield by 1000 bps	-25.8	-25.0	-21.8	-24.3	-23.2
Trade Weighted Dollar gains 10%	-4.2	-4.2	-4.5	-5.2	-5.1
Trade Weighted Dollar gains 20%	-1.4	-1.2	-1.7	-2.7	-2.7
U.S. Equities decline 10%	-7.2	-7.1	-5.7	-6.8	-6.4
U.S. Equities decline 25%	-19.9	-19.8	-17.1	-19.0	-18.5
U.S. Equities decline 40%	-31.6	-31.2	-27.0	-29.6	-28.3
Inflation slightly higher than expected	-0.6	-0.6	-0.5	-0.5	-0.4
Inflation meaningfully higher than expected	-7.4	-7.0	-5.9	-6.1	-5.4
Low Growth and Low Inflation	-8.8	-8.3	-7.3	-7.9	-7.3
Low Growth and High Inflation	-13.8	-13.2	-12.0	-12.6	-12.0
Brief, moderate inflation spike	-3.6	-3.4	-3.3	-3.6	-3.7
Extended, moderate inflation spike	-6.7	-6.5	-5.8	-6.5	-6.3
Brief, extreme inflation spike	-8.6	-8.4	-7.3	-8.3	-7.9
Extended, extreme inflation spike	-11.5	-11.4	-9.7	-11.0	-10.4

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

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

- 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.

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

Scenario	Actual Allocation (2022 CME) (%)	Current Policy (2022 CME) (%)	Option A (ER: 7.00%) (%)	Option B (ER: 7.25%) (%)	Option C (ER: 7.50%) (%)
10-year Treasury Bond rates drop 100 bps	2.4	2.1	1.6	1.6	1.5
10-year Treasury Bond rates drop 200 bps	12.7	11.6	9.7	10.7	9.6
Baa Spreads narrow by 30bps, High Yield by 100 bps	8.4	8.6	7.8	8.3	8.1
Baa Spreads narrow by 100bps, High Yield by 300 bps	16.8	16.0	13.7	15.4	14.9
Trade Weighted Dollar drops 10%	8.4	8.3	7.7	8.5	8.5
Trade Weighted Dollar drops 20%	24.1	23.5	21.4	23.6	22.1
U.S. Equities rise 10%	7.6	7.4	6.2	6.9	6.6
U.S. Equities rise 30%	20.7	20.0	15.4	17.4	16.1
High Growth and Low Inflation	12.4	12.0	9.6	11.4	10.6
High Growth and Moderate Inflation	9.2	9.0	6.7	8.4	7.6
High Growth and High Inflation	5.7	5.5	3.5	5.0	4.4

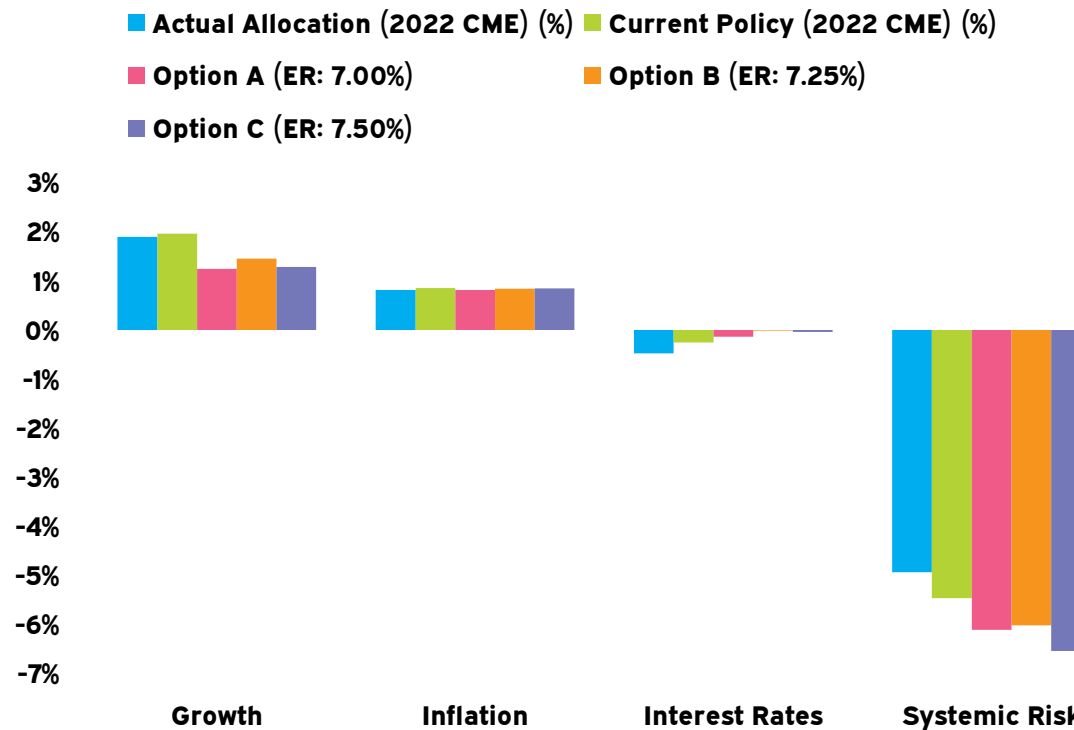
¹ Assumes that assets not directly exposed to the factor are affected nonetheless. See the Appendix for further details.

Economic Regime Management®

Economic Regime Management

- The Economic Regime Management (ERM) approach focuses on understanding the dynamics of the most important macro level forces that drive returns across asset classes.
- We find the most important factors to be:
 - Interest Rate Surprise – Unexpected changes in the 10 year interest rate (related to Duration).
 - Inflation Surprise – Unexpected changes in the CPI growth rate.
 - Growth Surprise – Unexpected changes in the Real GDP growth rate.
 - Systemic Risk – “System-wide” risk that propagates through all asset classes (e.g., 2008).
- We focus on surprises because expectations matter.
 - What was considered “low” inflation in the 1970s would be considered “high” today.
- These factors explain the majority of volatility across asset classes.
 - Understanding these dynamics explain the “why” not just the “what.”

Portfolio Sensitivity Comparison



- The chart above shows the resulting change in portfolio return given a one standard deviation event in the respective risk factor.
- There is more concentration in Growth and Systematic Risk because these sources of risk tend to pay better (have higher expected returns) than the other risk factors.

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.

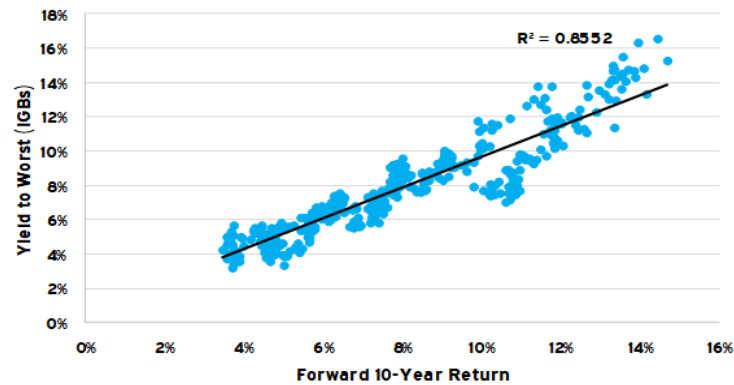
- Each model is based on the most important factors that drive returns for that asset class.

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

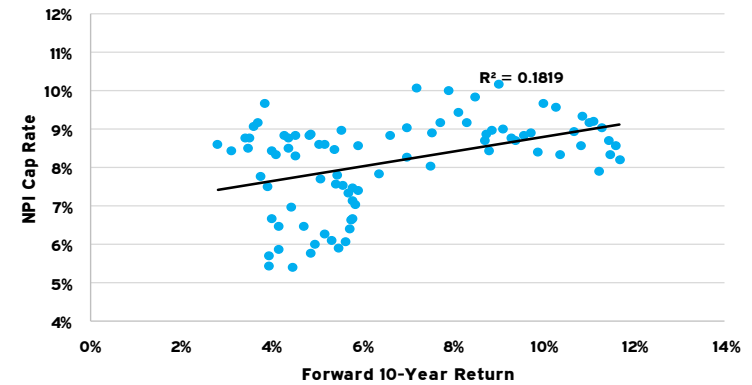
- The common components are income, growth, and valuation.

Some factors are naturally more predictive than others.

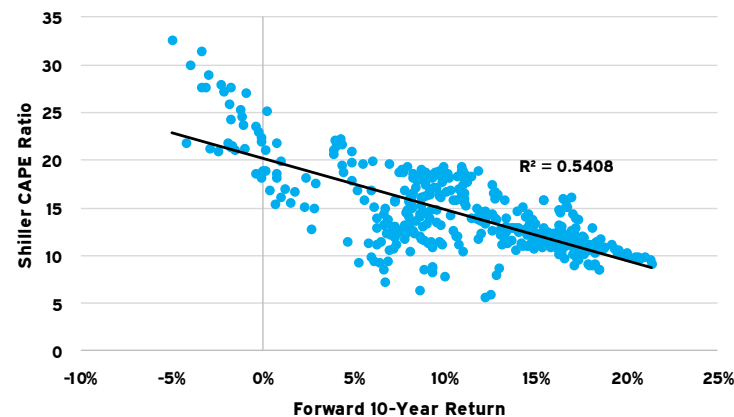
Investment Grade Bonds
Yield to Worst vs. Forward 10-Year Returns



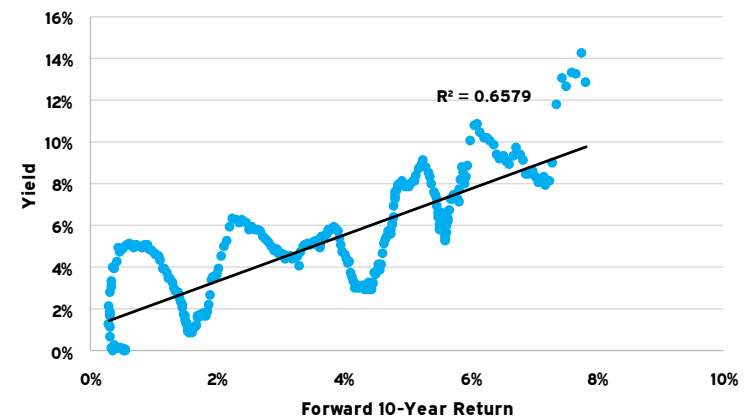
Core Real Estate
Cap Rates vs. Forward 10-Year Returns



US Equities
Shiller CAPE vs. Forward 10-Year Returns



Cash (90-day T-Bill)
Yield vs. Forward 10-Year Returns



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

Positive Historical Scenario Returns - Sample Inputs

	Global Financial Crisis Recovery (Mar 2009 - Nov 2009)	Best of Great Moderation (Apr 2003 - Feb 2004)	Peak of the TMT Bubble (Oct 1998 - Mar 2000)	Plummeting Dollar (Jan 1986 - Aug 1987)	Volcker Recovery (Aug 1982 - Apr 1983)	Bretton Wood Recovery (Oct 1974 - Jun 1975)
Cash Equivalents	0.1	0.9	6.7	10.0	6.0	4.5
Short-term Investment Grade Bonds	4.3	2.8	5.3	13.2	15.4	5.0
Investment Grade Bonds	9.0	4.6	1.7	14.4	26.4	9.2
Long-term Corporate Bonds	28.8	11.3	-3.1	15.9	42.1	17.5
Long-term Government Bonds	2.0	4.9	-2.3	15.4	33.6	11.8
TIPS	14.3	9.1	6.3	10.2	11.5	4.1
Global ILBs	24.7	9.6	6.6	10.8	12.1	4.3
High Yield Bonds	49.1	21.8	2.1	24.9	23.3	19.3
Bank Loans	32.9	10.1	6.1	11.1	10.4	8.7
Direct Lending	-0.2	26.8	8.2	8.3	23.7	-0.2
Foreign Bonds	23.4	15.2	-7.0	44.5	32.3	17.9
Mezzanine Debt	30.8	23.7	26.8	5.4	8.2	8.3
Distressed Debt	30.8	23.7	26.8	5.4	8.2	8.3
Emerging Market Bonds (major)	27.0	20.6	49.0	38.9	21.6	21.0
Emerging Market Bonds (local)	37.5	25.2	61.0	48.4	26.5	25.7
US Equity	51.6	37.2	50.2	64.8	59.3	55.1
Developed Market Equity (non-US)	60.5	56.7	53.0	140.0	29.6	34.6
Emerging Market Equity	94.6	79.4	101.3	126.5	52.1	53.4
Global Equity	59.9	46.2	54.8	108.4	43.0	44.6
Private Equity/Debt	15.4	23.3	84.6	19.1	13.7	18.4
Private Equity	13.0	23.7	92.1	21.7	14.8	20.2
Private Debt Composite	27.5	20.4	21.4	5.9	7.9	8.0
REITs	82.5	44.6	-5.2	51.8	47.4	42.5
Core Private Real Estate	-16.4	9.0	18.1	13.1	6.8	4.5
Value-Added Real Estate	-32.7	11.4	19.6	23.6	11.9	7.8
Opportunistic Real Estate	-19.0	13.6	27.9	16.7	8.6	5.7
Natural Resources (Private)	57.8	36.1	22.2	78.3	30.2	14.8
Timberland	-3.3	8.5	20.5	28.6	20.0	8.7
Farmland	5.4	9.6	10.4	15.9	11.3	5.0
Commodities (naïve)	28.9	30.6	17.1	27.6	6.2	-20.2
Core Infrastructure	2.1	8.5	33.0	1.4	0.6	0.6
Hedge Funds	20.1	22.4	52.8	30.6	13.8	14.5
Long-Short	25.9	25.3	81.4	40.8	18.0	18.9
Hedge Fund of Funds	10.3	13.3	36.8	21.3	9.7	10.3

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.

'Anti' Stress Test Return Assumptions - Sample Inputs¹

	10-year Treasury Bond rates drop 100 bps	10-year Treasury Bond rates drop 200 bps	Baa Spreads narrow by 30bps, High Yield by 100 bps	Baa Spreads narrow by 100bps, High Yield by 300 bps	Trade Weighted Dollar drops 10%	Trade Weighted Dollar drops 20%	US Equities rise 10%	US Equities rise 30%
Cash Equivalents	0.2	0.4	0.6	0.2	2.0	4.5	2.3	3.1
Short-term Investment Grade Bonds	1.3	2.6	0.5	2.0	1.4	3.3	0.8	1.6
Investment Grade Bonds	4.5	9.3	1.3	3.9	2.5	9.4	1.8	3.8
Long-term Corporate Bonds	10.5	23.4	3.9	14.5	5.5	15.8	3.6	7.7
Long-term Government Bonds	13.3	28.8	0.6	-0.6	1.7	22.2	3.6	5.7
TIPS	5.2	10.9	1.2	5.9	3.7	7.8	1.5	2.2
Global ILBs	3.0	6.4	2.1	7.4	5.9	8.4	1.7	3.2
High Yield Bonds	2.8	8.9	7.0	25.7	7.6	8.6	4.8	10.6
Bank Loans	-0.2	2.2	4.0	16.4	4.2	0.6	2.2	4.5
Direct Lending	-0.4	0.2	4.9	5.6	1.7	3.8	1.8	3.4
Foreign Bonds	5.7	11.3	1.6	7.4	9.8	21.3	2.3	6.8
Mezzanine Debt	1.5	2.2	9.0	16.8	6.7	6.2	6.0	7.7
Distressed Debt	1.2	2.9	9.4	17.1	6.9	7.8	6.2	9.7
Emerging Market Bonds (major)	3.1	7.4	5.5	15.5	7.3	15.4	5.5	11.1
Emerging Market Bonds (local)	3.7	9.9	5.5	17.6	10.4	19.4	6.1	13.2
US Equity	3.4	15.3	11.4	18.8	7.9	24.9	10.6	31.7
Developed Market Equity (non-US)	-2.4	16.4	9.4	18.3	13.3	47.6	6.4	18.8
Emerging Market Equity	0.5	17.8	9.5	34.3	19.8	47.9	9.3	28.9
Global Equity	0.7	15.2	9.6	19.6	11.2	35.9	8.6	25.7
Private Equity/Debt	2.4	4.4	10.4	9.5	7.5	16.7	10.5	13.6
Private Equity	2.5	4.3	10.5	8.3	7.4	17.3	11.1	14.2
Private Debt Composite	0.8	1.8	7.7	12.8	5.0	5.9	4.6	6.5
REITs	2.6	14.5	9.7	27.1	6.3	25.5	10.0	24.1
Core Private Real Estate	1.0	1.6	4.6	-3.5	1.3	5.5	3.0	3.5
Value-Added Real Estate	2.7	6.4	5.5	-9.4	1.0	12.6	6.0	7.5
Opportunistic Real Estate	0.1	3.9	5.8	-5.5	-0.3	11.4	4.7	6.3
Natural Resources (Private)	-1.1	11.3	10.2	31.0	16.8	27.2	8.8	19.0
Timberland	6.5	9.2	4.9	-0.6	3.8	12.9	6.2	5.3
Farmland	3.2	4.2	6.6	3.8	3.4	7.8	5.2	4.0
Commodities (naïve)	-2.6	-3.2	3.1	9.8	13.5	-2.5	3.1	4.0
Core Infrastructure	0.8	-4.3	7.0	4.8	3.5	-2.3	2.0	2.9
Hedge Funds	3.3	4.8	5.8	11.3	6.0	9.3	5.6	9.8
Long-Short	3.3	5.8	6.9	12.3	7.8	15.2	7.0	13.3
Hedge Fund of Funds	2.5	3.9	4.9	10.2	5.0	8.3	4.7	8.8

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

Meketa Investment Group 2022 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 (%)	20-year Risk Premia ¹ (%)
Cash Equivalents	1.1	1.7	1.0	-0.5
Investment Grade Bonds	1.7	2.4	4.0	0.4
Long-term Government Bonds	1.4	2.8	12.0	1.15
TIPS	1.6	2.4	7.0	0.5
High Yield Bonds	3.3	4.4	11.0	2.8
Bank Loans	2.7	4.0	10.0	2.5
Emerging Market Debt (local)	5.0	4.6	13.0	1.5
Private Debt	6.7	7.3	16.0	5.0
US Equity	5.4	6.8	18.0	5.5
Developed Non-US Equity	6.7	7.5	19.0	5.5
Emerging Non-US Equity	8.1	8.4	24.0	6.0
Global Equity	6.1	7.2	18.0	5.6
Private Equity	8.9	10.0	28.0	8.2
Real Estate	6.3	7.4	17.0	5.6
Infrastructure	7.1	7.7	16.0	5.6
Commodities	4.3	4.6	17.0	2.0
Hedge Funds	3.4	4.4	7.0	2.8
Inflation	2.6	2.2	3.0	

Meketa Investment Group 2022 Annual Asset Study: Correlation Expectations

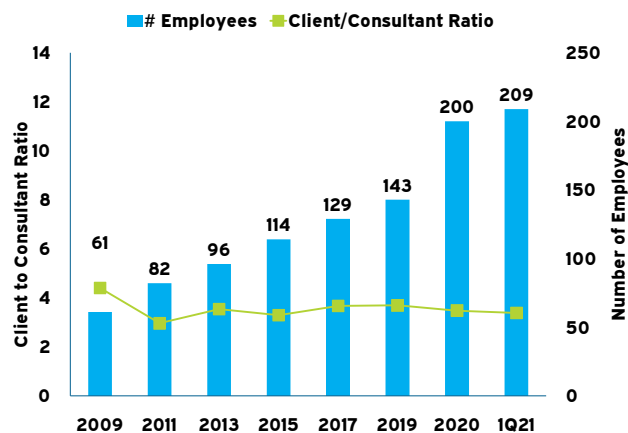
	Inv. Grade Bonds	Long-term Gov't Bonds	TIPS	High Yield Bonds	US Equity	Dev. Non- US Equity	Em. Market Equity	Private Equity	Real Estate	Commod.	Infra.	Hedge Funds
Investment Grade Bonds	1.00											
Long-term Government Bonds	0.83	1.00										
TIPS	0.76	0.53	1.00									
High Yield Bonds	0.22	-0.22	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

Appendices

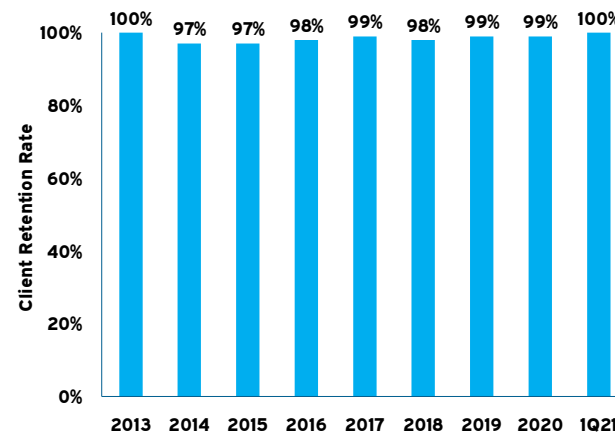
Meketa Investment Group Corporate Update

- Staff of 215, including 142 investment professionals and 43 CFA Charterholders
- 220 clients, with over 350 funds throughout the United States
- Significant investment in staff and resources
- Offices in Boston, Chicago, Miami, New York, Portland (OR), San Diego, and London
- We advise on \$1.6 trillion in client assets
 - Over \$125 billion in assets committed to alternative investments
 - Private Equity ▪ Infrastructure ▪ Natural Resources
 - Real Estate ▪ Hedge Funds ▪ Commodities

Client to Consultant Ratio¹



Client Retention Rate²



Meketa Investment Group is proud to work for over 5 million American families everyday.

¹ On March 15, 2019, 31 employees joined the firm as part of the merger of Meketa Investment Group and Pension Consulting Alliance.

² Client Retention Rate is one minus the number of clients lost divided by the number of clients at prior year-end.

Asset Classes Followed Intensively by Meketa Investment Group

Domestic Equities	International Equities	Private Equity	Real Assets	Fixed Income	Hedge Funds
- Passive - Enhanced Index - Large Cap - Midcap - Small Cap - Microcap - 130/30	- Large Cap Developed - Small Cap Developed - Emerging Markets - Frontier Markets	- Buyouts - Venture Capital - Private Debt - Special Situations - Secondaries - Fund of Funds	- Public REITs - Core Real Estate - Value Added Real Estate - Opportunistic Real Estate - Infrastructure - Timber - Natural Resources - Commodities	- Short-Term - Core - Core Plus - TIPS - High Yield - Bank Loans - Distressed - Global - Emerging Markets	- Long/Short Equity - Event Driven - Relative Value - Fixed Income Arbitrage - Multi Strategy - Market Neutral - Global Macro - Fund of Funds - Portable Alpha

Disclaimer, Glossary, and Notes

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INFORMATION USED TO PREPARE THIS REPORT WAS OBTAINED FROM INVESTMENT MANAGERS, CUSTODIANS, AND OTHER EXTERNAL SOURCES. WHILE WE HAVE EXERCISED REASONABLE CARE IN PREPARING THIS REPORT, WE CANNOT GUARANTEE THE ACCURACY OF ALL SOURCE INFORMATION CONTAINED HEREIN.

CERTAIN INFORMATION CONTAINED IN THIS REPORT MAY CONSTITUTE "FORWARD - LOOKING STATEMENTS," WHICH CAN BE IDENTIFIED BY THE USE OF TERMINOLOGY SUCH AS "MAY," "WILL," "SHOULD," "EXPECT," "AIM," "ANTICIPATE," "TARGET," "PROJECT," "ESTIMATE," "INTEND," "CONTINUE" OR "BELIEVE," OR THE NEGATIVES THEREOF OR OTHER VARIATIONS THEREON OR COMPARABLE TERMINOLOGY. ANY FORWARD-LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION ARE BASED UPON CURRENT ASSUMPTIONS. CHANGES TO ANY ASSUMPTIONS MAY HAVE A MATERIAL IMPACT ON FORWARD - LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS. ACTUAL RESULTS MAY THEREFORE BE MATERIALLY DIFFERENT FROM ANY FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION.

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.