MEKETA

INVESTMENT GROUP

San Jose Federated City Employees' Retirement System

April 21, 2022

Health Care Trust
Asset Allocation Analysis

Introduction

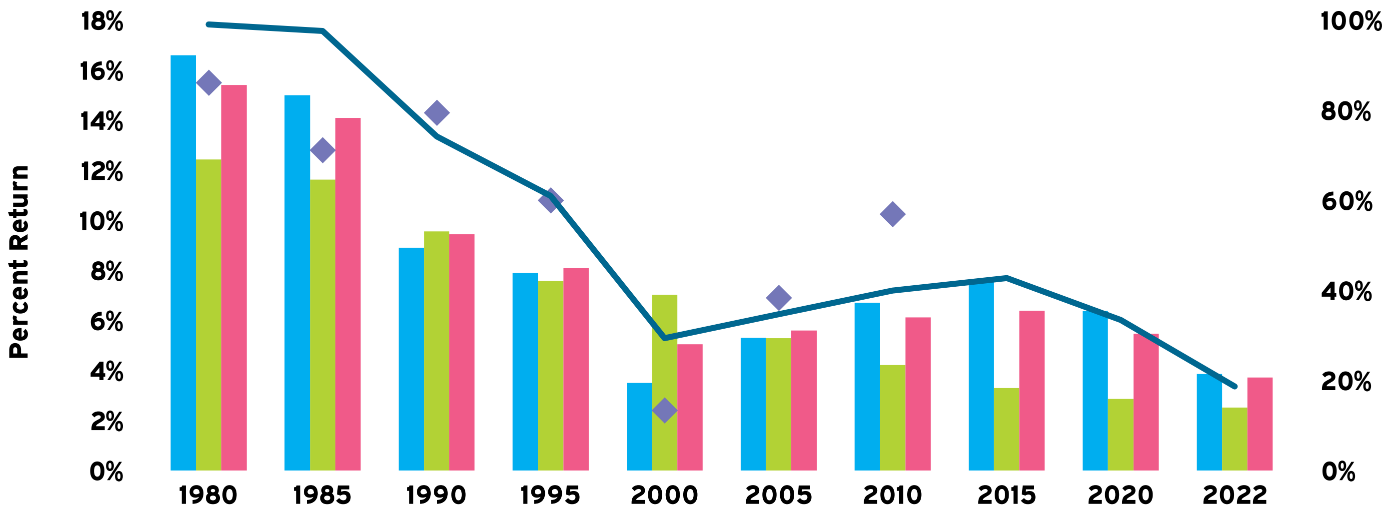
→ This document reviews updated capital market expectations, evaluates the current asset allocation policy, and presents an alternative asset allocation option for the Health Care Trust.

→ While the current market environment remains characterized by historically high equity valuations, interest rate expectations are higher than they were at this time last year, so expectations for asset class returns have increased slightly. Meketa Investment Group expects that the Health Care Trust's long-term (20-year) expected return remains above the actuarial assumed rate of return of 6.0%.

→ The asset allocation review process highlights the natural tension between long-term goals and short-term risks, and should allow the Trust's decision-makers to make more informed decisions regarding portfolio positioning. Meketa Investment Group has worked with San Jose Staff and the Investment Committee Chair to develop and analyze a potential alternative asset allocation policy, along with a 60% global equity/40% bond allocation from our optimizer, for your information.

→ Throughout the following slides, we provide various approaches to assessing risk in order to provide a "mosaic" of the risks faced by the Trust, including mean-variance analysis using Meketa's capital markets expectations, historical scenario analysis, and forward-looking stress testing and Economic Regime Management® analysis. The goal of this review is not to declare one portfolio the "right" choice or the only prudent choice, but to highlight the risk and return tradeoffs of different policy portfolios.

The Secular Decline in Investment Returns[1]



	1980	1985	1990	1995	2000	2005	2010	2015	2020	2022
Equity Expected Return	16.6%	15.0%	8.9%	7.9%	3.5%	5.3%	6.7%	7.6%	6.4%	3.9%
Bond Expected Return	12.4%	11.6%	9.6%	7.6%	7.0%	5.3%	4.2%	3.3%	2.9%	2.5%
65/35 Eq/Bond Exp. Ret.	15.4%	14.1%	9.4%	8.1%	5.0%	5.6%	6.1%	6.4%	5.5%	3.7%
Actual 10-year Return	15.5%	12.8%	14.3%	10.8%	2.4%	6.9%	10.3%			
Probability of Earning 7.0%	99%	98%	74%	61%	29%	35%	40%	43%	33%	19%

→ The chart above illustrates that a portfolio made up of 65% domestic stocks and 35% investment grade bonds has produced diminishing expected 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")

→ 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:

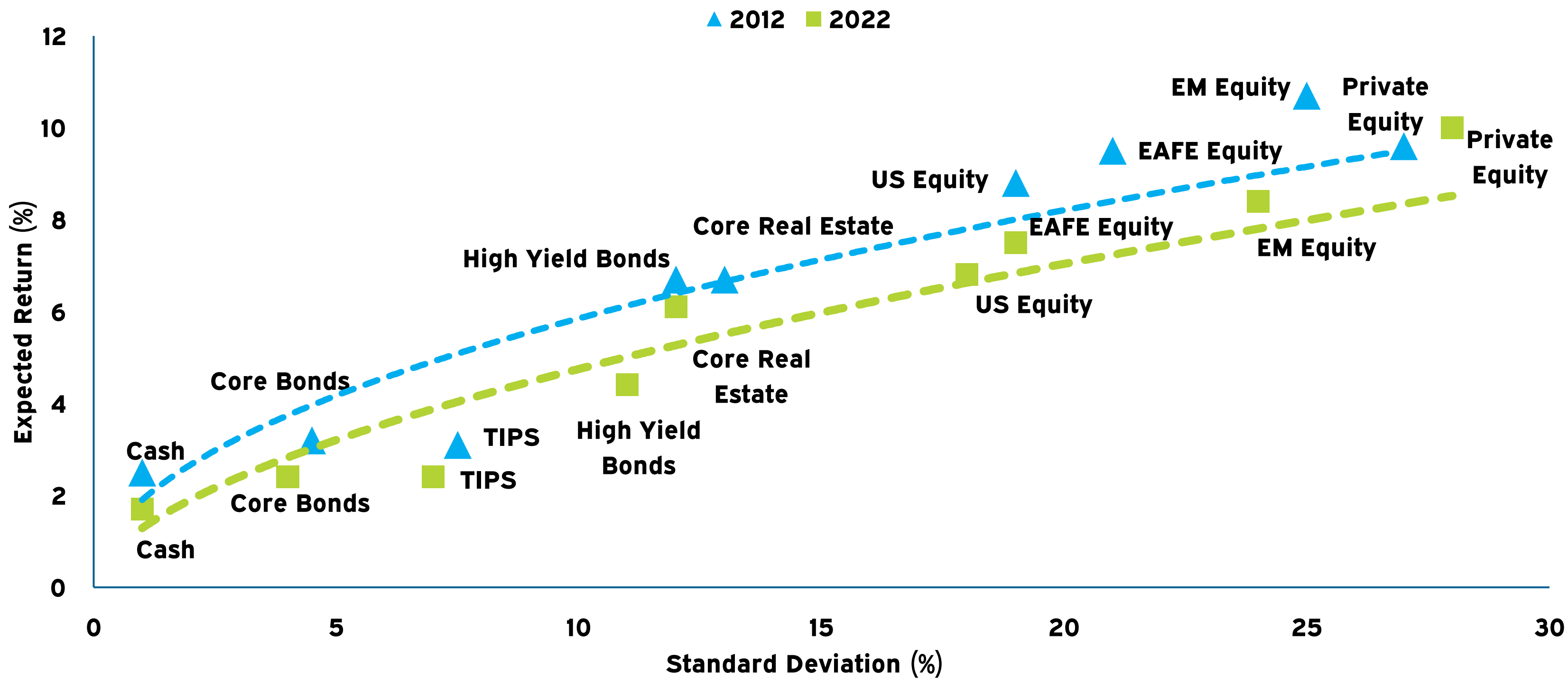
- Expected return
- Expected volatility
- Expected covariance with all other assets

→ 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 Risk[1]



→ 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.

Asset Allocation Policy Comparison[1]

	Fed HCT Current (%)	Mix A (%)	60-40 (%)
Growth	**59**	**58**	**60**
US Equity	30	30	0
Dev. Market Equity (non-US)	14	16	0
Emerging Market Equity	15	12	0
Global Equity	0	0	60
Low Beta	**5**	**6**	**40**
Short-Term Investment Grade Bonds	5	6	0
Investment Grade Bonds	0	0	40
Other	**36**	**36**	**0**
Core Real Estate	12	12	0
Commodities	5	5	0
Investment Grade Bonds	14	14	0
Long-term Govt Bonds	5	5	0
Meketa Expected Return (10 years)	*5.5*	*5.4*	*4.7*
Meketa Expected Return (20 years)	*6.4*	*6.4*	*5.6*
Meketa Standard Deviation	*12.2*	*11.9*	*11.0*
Split between Growth/Income & Diversification[2]	*71/29*	*70/30*	*60/40*

[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.

[2] Growth includes all asset classes listed under "Growth", plus core real estate.

Review of Proposed Asset Allocation Policies

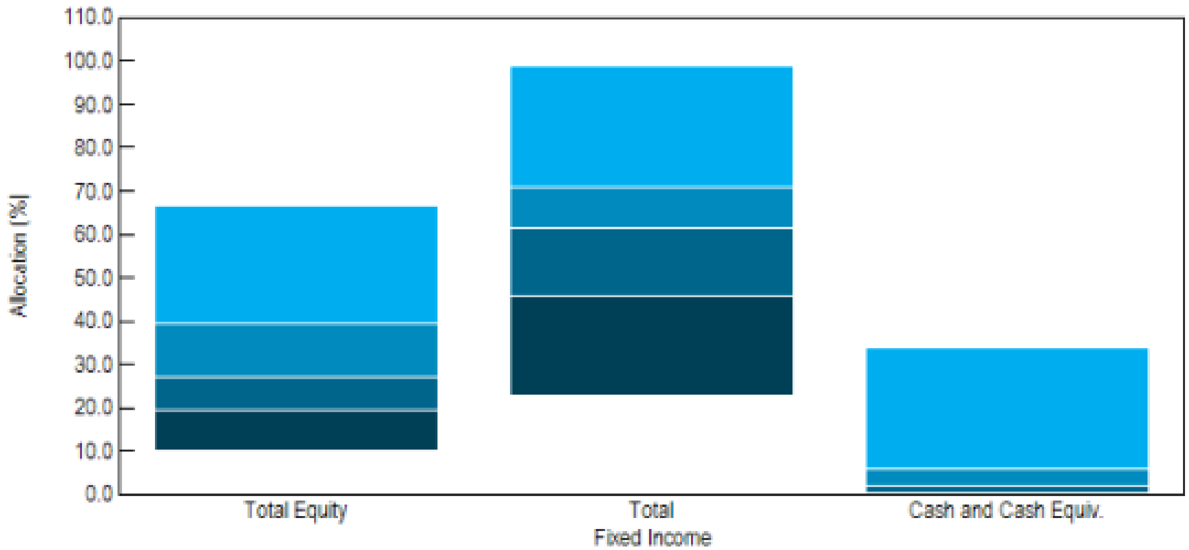
→ San Jose Staff and Meketa Investment Group discussed one alternative policy.

→ We show the following allocations:

- The Federated Current Policy, and then:
  - Mix A shows a portfolio with less risk and the same 20-year return expectation as the current policy, by reallocating from emerging market equity assets to international equity and short-term investment grade bond assets.

Peer Information - InvestorForce Health & Welfare Net Peer Universe

Total Plan Allocation vs. InvMetrics Health & Welfare Net
As of December 31, 2021



	Allocation (Rank)		
5th Percentile	66.5	99.1	33.9
25th Percentile	39.6	71.0	5.7
Median	27.3	61.4	2.1
75th Percentile	19.4	45.8	0.5
95th Percentile	10.3	23.0	0.0
# of Portfolios	173	203	158

MVO-Based Risk Analysis

Scenario	Fed HCT Current (%)	Mix A (%)	60/40 (%)
Worst Case Returns (1)			
One Year	-18.2	-17.8	-17.0
Three Years (annualized)	-8.6	-8.4	-8.1
Five Years (annualized)	-5.4	-5.2	-5.2
Ten Years (annualized)	-2.1	-2.0	-2.2
Twenty Years (annualized)	0.3	0.4	0.0
Probability of Experiencing Negative Returns			
One Year	29.2	29.0	30.0
Three Years	17.1	16.9	18.2
Five Years	11.0	10.8	12.1
Ten Years	4.1	4.0	4.9
Twenty Years	0.7	0.7	1.0
Probability of Achieving at least a 6.0% Return			
One Year	51.4	51.1	48.5
Three Years	52.4	51.9	47.4
Five Years	53.0	52.4	46.6
Ten Years	54.3	53.4	45.2
Twenty Years	56.0	54.8	43.2

Historical Negative Scenario Analysis[1]
(*Cumulative* Return)

Scenario	Fed HCT Current (%)	Mix A (%)	60/40 (%)
COVID-19 Market Shock (Feb 2020 - Mar 2020)	-20.8	-20.5	-20.6
Taper Tantrum (May - Aug 2013)	-1.6	-1.4	-1.9
Global Financial Crisis (Oct 2007 - Mar 2009)	-29.0	-28.5	-26.2
Popping of the TMT Bubble (Apr 2000 - Sep 2002)	-15.6	-15.0	-16.6
LTCM (Jul - Aug 1998)	-10.0	-9.4	-7.7
Rate spike (1994 Calendar Year)	1.2	1.6	1.8
Crash of 1987 (Sep - Nov 1987)	-13.8	-13.3	-12.0
Strong dollar (Jan 1981 - Sep 1982)	4.2	4.5	5.3
Volcker Recession (Jan - Mar 1980)	-5.0	-5.0	-7.0
Stagflation (Jan 1973 - Sep 1974)	-16.8	-16.2	-20.4

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

Historical Positive Scenario Analysis[1]
(*Cumulative* Return)

Scenario	Fed HCT Current (%)	Mix A (%)	60/40 (%)
Global Financial Crisis Recovery (Mar 2009 - Nov 2009)	39.7	38.1	39.5
Best of Great Moderation (Apr 2003 - Feb 2004)	34.6	33.4	29.5
Peak of the TMT Bubble (Oct 1998 - Mar 2000)	41.1	39.2	33.6
Plummeting Dollar (Jan 1986 - Aug 1987)	64.4	63.5	70.8
Volcker Recovery (Aug 1982 - Apr 1983)	37.0	36.2	36.3
Bretton Wood Recovery (Oct 1974 - Jun 1975)	31.0	30.2	30.5

[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	Fed HCT Current (%)	Mix A (%)	60/40 (%)
10-year Treasury Bond rates rise 100 bps	4.6	4.5	3.0
10-year Treasury Bond rates rise 200 bps	-0.1	-0.2	-2.1
10-year Treasury Bond rates rise 300 bps	-2.7	-2.8	-5.1
Baa Spreads widen by 50 bps, High Yield by 200 bps	0.6	0.7	1.2
Baa Spreads widen by 300 bps, High Yield by 1000 bps	-22.7	-22.1	-20.3
Trade Weighted Dollar gains 10%	-4.5	-4.3	-4.3
Trade Weighted Dollar gains 20%	-1.9	-1.6	-1.8
US Equities decline 10%	-5.4	-5.2	-4.9
US Equities decline 25%	-17.2	-16.7	-14.9
US Equities decline 40%	-29.1	-28.5	-25.3

[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	Fed HCT Current (%)	Mix A (%)	60/40 (%)
10-year Treasury Bond rates drop 100 bps	2.1	2.0	2.2
10-year Treasury Bond rates drop 200 bps	12.4	12.3	12.8
Baa Spreads narrow by 30bps, High Yield by 100 bps	7.1	7.0	6.3
Baa Spreads narrow by 100bps, High Yield by 300 bps	14.0	13.4	13.3
Trade Weighted Dollar drops 10%	8.5	8.2	7.7
Trade Weighted Dollar drops 20%	24.4	24.0	25.3
US Equities rise 10%	6.4	6.3	5.9
US Equities rise 30%	18.0	17.6	16.9

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

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:

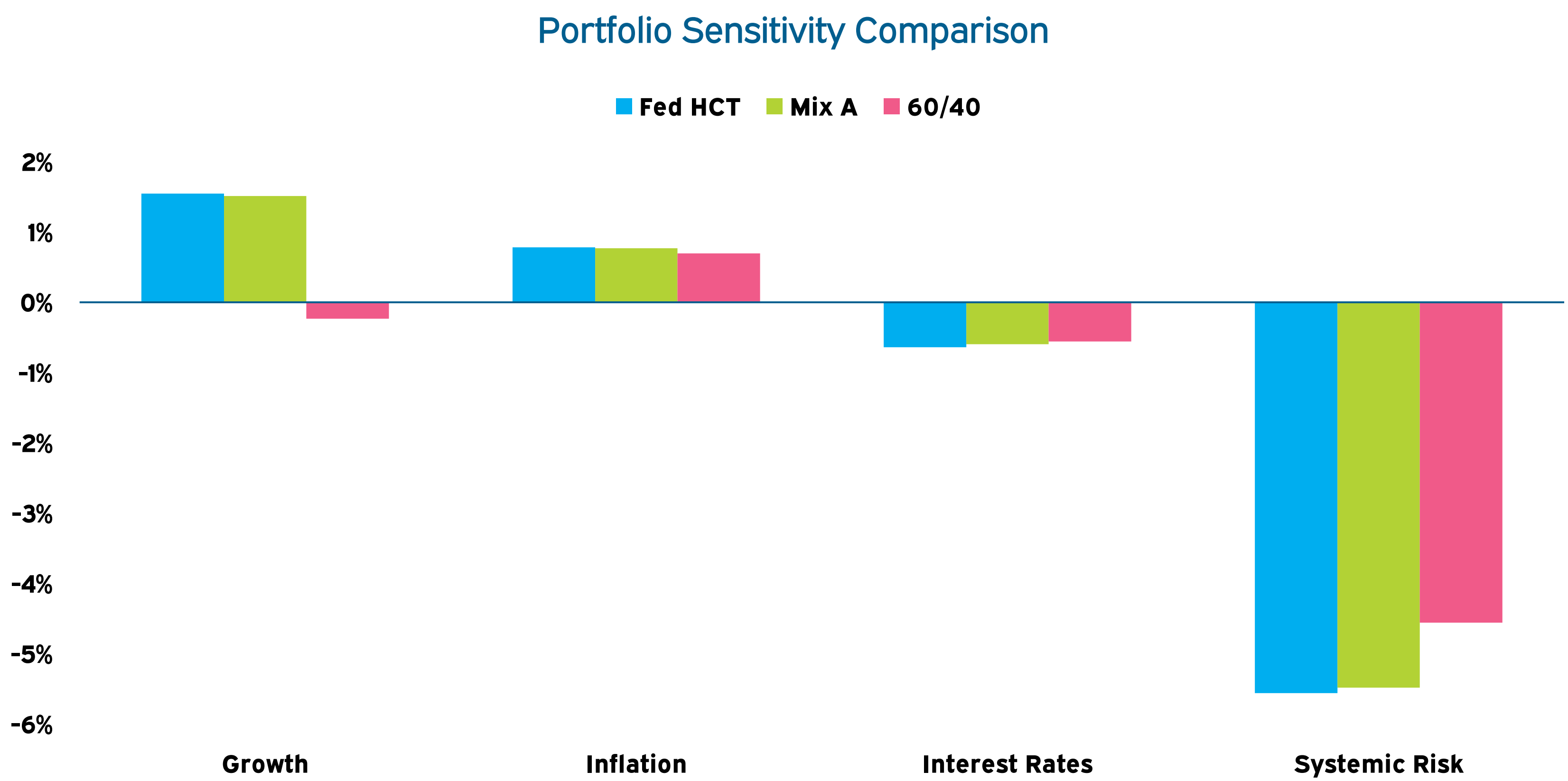
- Interest Rate Surprise – Unexpected changes in the 10 year interest rate (related to Duration).
- Inflation Surprise – Unexpected changes in the CPI growth rate.
- Growth Surprise – Unexpected changes in the Real GDP growth rate.
- Systemic Risk – "System-wide" risk that propagates through all asset 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."



→ 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.

Summary

→ Meketa Investment Group believes that the current Trust allocation, adopted in March 2021, remains reasonable. The Board could also consider the other mix presented.

→ We look forward to discussing this analysis with the members of the Board.

Appendix

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 - First Lien	Cliffwater Direct Lending Index
Direct Lending - Second Lien	Cliffwater Direct Lending Index
Mezzanine Debt	Cambridge Associates Mezzanine
Distressed Debt	Cambridge Associates 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	Cambridge Associates 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)	Pre-Recession (Jun - Oct 1990)	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	3.3	10.0	6.0	4.5
Short-term Investment Grade Bonds	4.3	2.8	5.3	4.5	13.2	15.4	5.0
Investment Grade Bonds	9.0	4.6	1.7	3.8	14.4	26.4	9.2
Long-term Corporate Bonds	28.8	11.3	-3.1	1.5	15.9	42.1	17.5
Long-term Government Bonds	2.0	4.9	-2.3	2.4	15.4	33.6	11.8
TIPS	14.3	9.1	6.3	2.2	10.2	11.5	4.1
Global ILBs	24.7	9.6	6.6	2.3	10.8	12.1	4.3
High Yield Bonds	49.1	21.8	2.1	-12.9	24.9	23.3	19.3
Bank Loans	32.9	10.1	6.1	-6.1	11.1	10.4	8.7
Direct Lending - First Lien	10.6	5.7	1.1	-1.9	5.8	5.0	5.1
Direct Lending - Second Lien	14.3	7.7	1.4	-2.5	7.8	6.7	6.8
Foreign Bonds	23.4	15.2	-7.0	15.8	44.5	32.3	17.9
Mezzanine Debt	30.8	23.7	26.8	0.7	5.4	8.2	8.3
Distressed Debt	30.8	23.7	26.8	0.7	5.4	8.2	8.3
Emerging Market Bonds (major)	27.0	20.6	49.0	-8.7	38.9	21.6	21.0
Emerging Market Bonds (local)	37.5	25.2	61.0	-10.5	48.4	26.5	25.7
US Equity	51.6	37.2	50.2	-14.7	64.8	59.3	55.1
Developed Market Equity (non-US)	60.5	56.7	53.0	-9.7	140.0	29.6	34.6
Emerging Market Equity	94.6	79.4	101.3	-15.9	126.5	52.1	53.4
Global Equity	59.9	46.2	54.8	-11.1	108.4	43.0	44.6
Private Equity/Debt	15.4	23.3	84.6	4.6	19.1	13.7	18.4
Private Equity	13.0	23.7	92.1	5.5	21.7	14.8	20.2
Private Debt Composite	27.5	20.4	21.4	0.1	5.9	7.9	8.0
REITs	82.5	44.6	-5.2	-15.6	51.8	47.4	42.5
Core Private Real Estate	-16.4	9.0	18.1	1.9	13.1	6.8	4.5
Value-Added Real Estate	-32.7	11.4	19.6	3.2	23.6	11.9	7.8
Opportunistic Real Estate	-19.0	13.6	27.9	0.4	16.7	8.6	5.7
Natural Resources (Private)	57.8	36.1	22.2	6.0	78.3	30.2	14.8
Timberland	-3.3	8.5	20.5	5.7	28.6	20.0	8.7
Farmland	5.4	9.6	10.4	3.3	15.9	11.3	5.0
Commodities (naïve)	28.9	30.6	17.1	43.5	27.6	6.2	-20.2
Core Infrastructure	2.1	8.5	33.0	0.0	1.4	0.6	0.6
Hedge Funds	20.1	22.4	52.8	-1.9	30.6	13.8	14.5
Long-Short	25.9	25.3	81.4	5.1	40.8	18.0	18.9
Hedge Fund of Funds	10.3	13.3	36.8	11.9	21.3	9.7	10.3

'Anti' Stress Test Return Assumptions - Sample Inputs[1]

	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.

Stress Test Return Assumptions - Sample Inputs[1]

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

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

Meketa Investment Group 2022 Annual Asset Study
Twenty-Year Annualized Return and Volatility Expectations for Major Asset Classes

Asset Class	Expected Return (%)	Volatility (%)
Cash Equivalents	1.7	1.0
Investment Grade Bonds	2.4	4.0
Long-term Government Bonds	2.8	12.0
TIPS	2.4	7.0
High Yield Bonds	4.4	11.0
Private Debt	7.3	16.0
Emerging Market Bonds (major)	4.2	12.0
Emerging Market Bonds (local)	4.6	13.0
US Equity	6.8	18.0
Developed Market Equity (non-US)	7.5	19.0
Emerging Market Equity	8.4	24.0
Buyouts	9.8	25.0
Venture Capital	10.3	36.0
Core Private Real Estate	6.1	12.0
Value-Added Real Estate	8.1	20.0
Opportunistic Real Estate	9.6	26.0
Natural Resources (Private)	8.5	24.0
Commodities (naive)	4.6	17.0
Infrastructure (Core Private)	7.3	14.0
Hedge Funds	4.4	7.0

Other Firm Long-Term Capital Markets Expectations

Expected Return	BlackRock 20 Yr (%)	GMO[1] 7 Yr (%)	Goldman Sachs 10 Yr (%)	Morgan Stanley 10 Yr (%)	Verus[2] 10 Yr (%)	Meketa 10 Yr (%)	Meketa 20 Yr (%)
Global Equity	N/A	N/A	N/A	3.4	5.7	6.1	7.2
US Equity	7.2	-5.1	6.8	-0.1	5.3	5.4	6.8
Emerging Markets Equity	9.3	4.4	8.9	5.8	6.1	8.1	8.4
Private Equity	16.9	N/A	11.9	5.0	9.5	8.9	10.0
US Fixed Income	2.5	-1.9	2.0	N/A	2.2	1.7	2.4
Emerging Markets Debt	4.9	0.5	4.5	6.0	5.2	3.6	4.2
TIPS	3.0	-1.5	2.7	2.6	1.7	1.6	2.4
Real Estate	6.6	N/A	7.6	N/A	6.5	6.4	7.4
Hedge Funds	6.1	N/A	4.8	2.0	3.8	3.4	4.4
Commodities	N/A	N/A	4.7	-0.6	3.0	4.3	4.6

→ The table above compares recently released capital markets assumptions (expected returns per year) from a variety of investment firms. Unsurprisingly, the short-term return expectations for most asset classes tend to be lower than the long-term expectations.

[1] GMO inflation estimate of 2.2% has been added to real return expectation assumptions.
[2] Source: Verus' 2022 10-year geometric capital markets assumptions.

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