



Asset Allocation Review

Santa Barbara County Employees' Retirement System

April 26, 2023

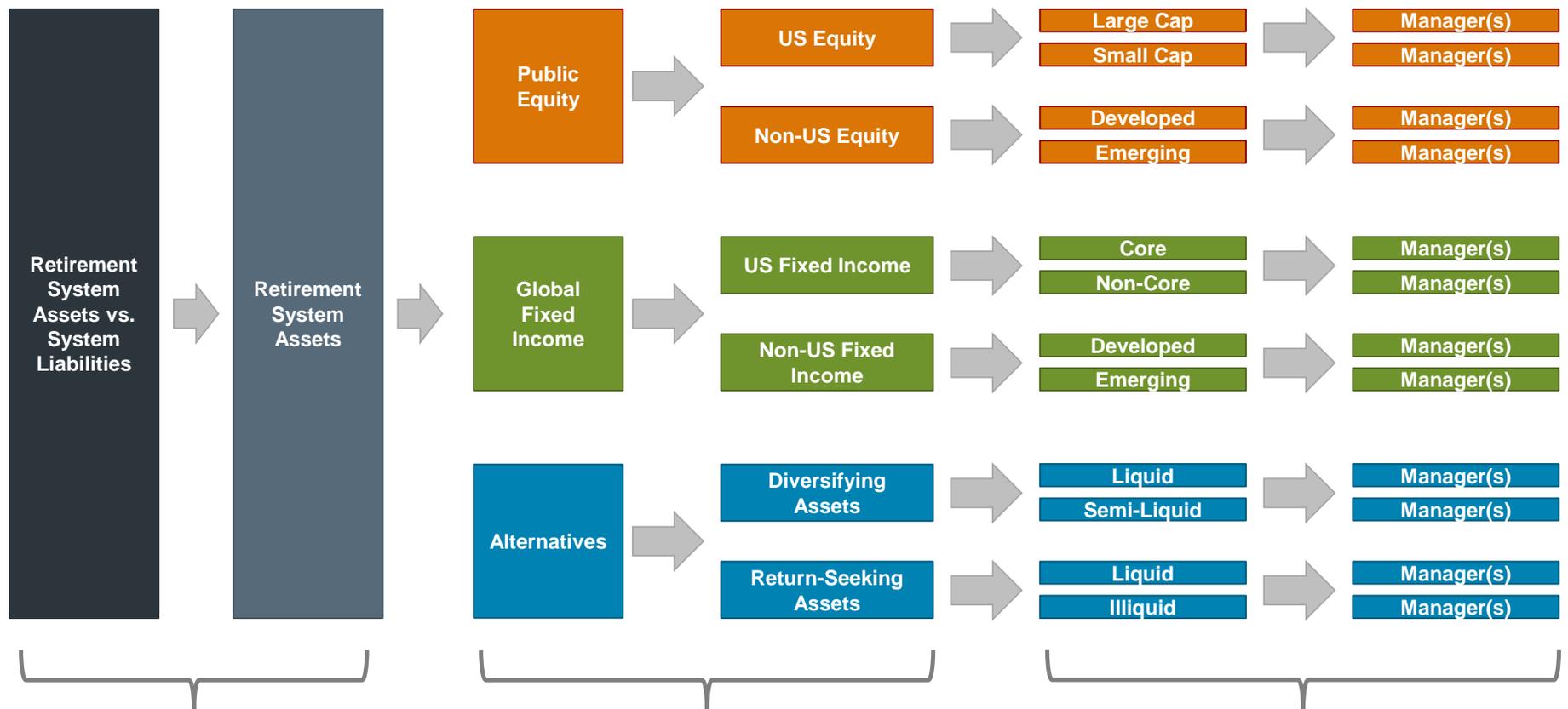


Introduction



Introduction

Investment Decision Process



Asset/Liability Study

- Assesses health of Plan
- Models general risk and return parameters
- Links Investment Policy, Contribution Policy, and Benefit Policy

Asset Allocation Study

- Models specific targets to asset classes
- Used to select overall target allocation
- Uses passive assumptions

Asset Class Structure Studies

- Implementation guide with targets to sub-asset classes
- Mix of active and passive investments determined
- Optimal mix of managers

Introduction

Asset/Liability Summary

- “The System can best meet its objectives through the continued use of a well-diversified investment portfolio. However, positive outcomes are extremely dependent on the contribution policy. This study does not suggest changes to the long-term strategic target allocation. The incremental cost of additional volatility does not justify the potential increase in median outcomes. Additionally, reducing volatility increases contributions and does not improve the expected median outcome.”

20 Years	Probability of Full Funding in 2042	Probability of < 83% (Current) Funding in 2042	Probability of < 50% Funding in 2042	Maximum 1 Year Investment Loss
100% Fixed Income	0%	98%	2%	-18%
Lower Risk	18%	56%	2%	-26%
Target Allocation	30%	45%	3%	-30%
Higher Risk	39%	41%	5%	-36%
100% Equity	50%	36%	8%	-47%

20 Years	Market Funded Ratio in Year 20			Cumulative Employer Contributions in Year 20 (Billions)			Payout Ratios		
	50th	5th	95th	Year 20 Median			Years 1 to 20		
				50th	5th	95th	Peak	Trough	
100% Fixed Income	65%	53%	79%	\$6.1	\$7.5	\$4.7	9%	12%	6%
Lower Risk	80%	55%	124%	\$4.4	\$6.9	\$2.2	8%	11%	5%
Target Allocation	86%	53%	158%	\$3.9	\$7.0	\$2.0	7%	12%	4%
Higher Risk	90%	50%	199%	\$3.7	\$7.3	\$1.9	7%	12%	3%
100% Equity	100%	46%	303%	\$3.4	\$7.9	\$1.7	6%	14%	2%

Introduction

Asset Allocation Overview

- **Selecting an asset allocation is one of the most important investment decisions a fiduciary can make.**
- **There are two steps to the asset allocation decision:**
 1. Identification of the asset classes to be considered
 2. Selection of the portfolio mix that best meets plan objectives
- **Strategic asset allocation is the most powerful determinant of total fund performance in the long run:**
 - While good manager evaluation decisions will unquestionably add to performance over a full market cycle, they cannot make up for a poorly diversified, inefficient allocation
- **Multiple studies have shown asset allocation's effect on portfolio returns can be a significant driver of performance over a full market cycle.**

Introduction

Current Target Allocation

- **The current Target Allocation was adopted in late-2016**
 - The A/L study indicated through low payout ratios that liquidity is not a concern. This suggested that additional illiquidity could be assumed with private assets to achieve a better return/risk ratio.
 - The following asset class targets were decreased: US Equity (23% > 19%), Emerging Markets Equity (11% > 7%) and Core Fixed Income (21% > 17%)
 - The following asset class targets were increased: Developed Non-US Equity (9% > 11%), Non-Core Fixed Income (9% > 11%), Real Return (12 > 15%), Real Estate (8% > 10%) and Private Equity (7 > 10%)

	SBCERS Target
Broad US Equity	19
Dev'd Market Non-US Equity	11
Emerging Markets Equity	7
Core Fixed Income	17
Custom Non-Core Fixed Income	11
Custom Real Return	15
Custom Real Estate	10
Private Equity	10
Capital Appreciation	58
Capital Preservation	17
Alpha	0
Inflation	25
Expected Arithmetic Return	7.1
Expected Compound Return	6.6
Expected Risk (Std. Dev.)	10.5
Expected Return (Arithmetic)/Risk Ratio	0.67
Expected Equity Beta (S&P 500)	0.48
1-Year Max Drawdown	-29.71
RVK Liquidity Metric (T-Bills = 100)	61

Asset Allocation Study



Asset Allocation Study

Key Inputs

Return/Risk Assumptions

	Nominal Return (Geo.)	Standard Deviation Assumption	Nominal Return (Arith.)	Return/Risk Ratio (Geo.)	RVK Liquidity Metric	Thematic Bucket
Broad US Equity	6.61	16.10	6.80	0.35	95	Capital Appreciation
Dev'd Market Non-US Equity	7.19	17.00	8.50	0.42	90	Capital Appreciation
Emerging Markets Equity	8.54	25.00	11.25	0.34	85	Capital Appreciation
Core Fixed Income	3.88	5.00	4.00	0.78	85	Capital Preservation
Custom Non-Core Fixed Income	6.61	7.24	6.85	0.91	35	Capital Appreciation
Custom Real Return	6.33	8.70	6.68	0.73	45	Inflation
Custom Real Estate	5.58	14.39	6.54	0.39	17	Inflation
Private Equity	7.86	22.00	10.00	0.36	5	Capital Appreciation

Correlations

	Broad US Equity	Dev'd Market Non-US Equity	Emerging Market Equity	Custom Core Fixed Income	Custom Non-Core Fixed Income	Custom Real Return	Custom Real Estate	Private Equity
Broad US Equity	1.00	0.85	0.73	0.21	0.83	0.84	0.17	0.78
Dev'd Market Non-US Equity	0.85	1.00	0.80	0.12	0.86	0.87	0.15	0.77
Emerging Market Equity	0.73	0.80	1.00	0.10	0.88	0.85	0.04	0.66
Core Fixed Income	0.21	0.12	0.10	1.00	0.09	0.08	-0.21	-0.06
Custom Non-Core Fixed Income	0.83	0.86	0.88	0.09	1.00	0.87	0.11	0.79
Custom Real Return	0.84	0.87	0.85	0.08	0.87	1.00	0.22	0.78
Custom Real Estate	0.17	0.15	0.04	-0.21	0.11	0.22	1.00	0.34
Private Equity	0.78	0.77	0.66	-0.06	0.79	0.78	0.34	1.00

Asset Allocation Study

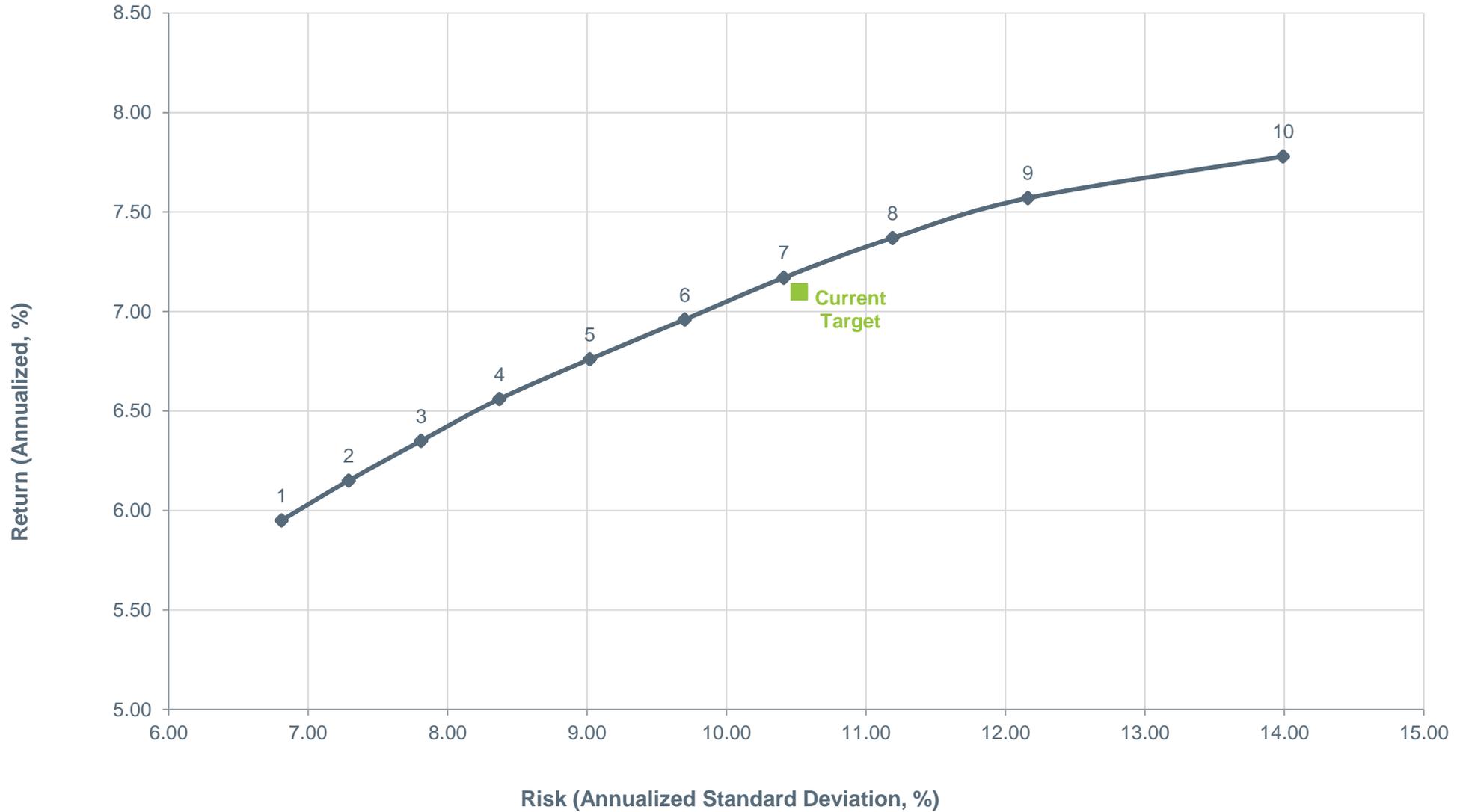
Efficient Portfolios

	Min	Max	1	2	3	4	5	6	7	8	9	10	Current Target
Broad US Equity	15	30	15	15	15	15	15	15	15	17	22	30	19
Dev'd Market Non-US Equity	10	30	10	10	10	10	10	10	10	10	13	20	11
Emerging Markets Equity	0	10	0	1	4	5	5	5	5	7	9	10	7
Core Fixed Income	10	35	35	29	26	23	20	18	15	12	10	10	17
Custom Non-Core Fixed Income	0	15	15	15	15	15	14	12	10	8	7	7	11
Custom Real Return	0	15	10	15	15	15	15	15	15	15	9	8	15
Custom Real Estate	0	15	15	15	15	15	15	15	15	15	15	0	10
Private Equity	0	15	0	0	0	2	6	10	14	15	15	15	10
Total			100	100	100	100	100	100	100	100	100	100	0
Capital Appreciation			40	41	44	47	50	52	55	58	66	82	58
Capital Preservation			35	29	26	23	20	18	15	12	10	10	17
Alpha			0	0	0	0	0	0	0	0	0	0	0
Inflation			25	30	30	30	30	30	30	30	24	8	25
Expected Return			5.95	6.15	6.35	6.56	6.76	6.96	7.17	7.37	7.57	7.78	7.10
Risk (Standard Deviation)			6.81	7.29	7.81	8.37	9.02	9.70	10.41	11.19	12.16	13.99	10.52
Return (Compound)			5.73	5.90	6.06	6.23	6.38	6.52	6.67	6.79	6.89	6.88	6.59
Return/Risk Ratio			0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.62	0.56	0.67
RVK Expected Eq Beta			0.26	0.27	0.30	0.33	0.37	0.41	0.46	0.51	0.61	0.76	0.48
RVK Liquidity Metric			65	63	63	62	59	57	54	55	59	70	61

Allocations shown may not sum up to 100% exactly due to rounding.
 Total International Equity cannot exceed Broad US Equity allocation.
 Custom Non-Core Fixed Income cannot exceed 2/3 Core Fixed Income allocation.
 Emerging Markets Equity cannot exceed 2/3 Developed International Equity allocation.

Asset Allocation Study

Efficient Frontier



Asset Allocation Study

Monte Carlo Analysis: Expected Compound Return by Percentile

Time Period	Percentile	1	2	3	4	5	6	7	8	9	10	Current Target
1 Year	1st Percentile	-23.22	-25.95	-26.79	-28.24	-29.43	-30.77	-31.56	-33.30	-34.67	-35.48	-29.71
	5th Percentile	-8.06	-8.76	-9.64	-10.34	-10.99	-11.63	-12.36	-13.63	-14.97	-17.72	-12.98
	25th Percentile	1.60	1.33	1.06	0.86	0.65	0.45	0.20	-0.34	-0.99	-2.79	-0.38
	50th Percentile	6.49	6.70	6.84	6.99	7.18	7.34	7.57	7.65	7.69	7.47	7.20
	75th Percentile	11.29	11.99	12.56	13.05	13.62	14.18	14.77	15.55	16.39	17.83	14.91
	95th Percentile	18.54	19.90	21.29	22.52	23.67	24.89	26.22	28.13	30.33	34.58	27.12
	99th Percentile	23.74	25.81	28.03	29.81	31.60	33.49	35.38	38.19	41.70	48.29	36.70
3 Years	1st Percentile	-12.04	-13.79	-14.79	-15.84	-16.71	-17.28	-18.09	-19.25	-20.40	-21.24	-17.64
	5th Percentile	-3.50	-4.13	-4.59	-4.98	-5.35	-5.66	-6.11	-6.81	-7.59	-9.11	-6.24
	25th Percentile	2.95	2.88	2.79	2.71	2.61	2.54	2.42	2.14	1.78	0.87	2.13
	50th Percentile	6.16	6.35	6.45	6.58	6.76	6.91	7.05	7.11	7.12	6.88	6.79
	75th Percentile	9.12	9.62	10.03	10.42	10.80	11.21	11.61	12.14	12.60	13.35	11.65
	95th Percentile	13.40	14.36	15.24	16.03	16.79	17.55	18.28	19.42	20.73	22.77	18.70
	99th Percentile	16.59	17.73	18.81	19.79	20.74	21.87	22.91	24.45	26.13	29.79	23.42
5 Years	1st Percentile	-7.86	-9.24	-10.00	-10.69	-11.22	-11.91	-12.53	-13.61	-14.78	-15.23	-12.33
	5th Percentile	-1.80	-2.35	-2.68	-2.97	-3.23	-3.62	-3.96	-4.57	-5.11	-6.28	-4.04
	25th Percentile	3.34	3.28	3.22	3.18	3.16	3.12	3.07	2.86	2.60	1.86	2.85
	50th Percentile	5.96	6.15	6.29	6.45	6.58	6.73	6.89	6.98	7.00	6.87	6.72
	75th Percentile	8.36	8.75	9.10	9.44	9.77	10.10	10.45	10.84	11.23	11.78	10.39
	95th Percentile	11.66	12.35	13.05	13.69	14.26	14.86	15.45	16.37	17.30	18.81	15.74
	99th Percentile	13.93	14.85	15.78	16.54	17.37	18.24	18.92	20.16	21.51	24.23	19.47
10 Years	1st Percentile	-3.78	-4.64	-5.17	-5.67	-6.10	-6.58	-7.21	-7.92	-8.59	-9.32	-6.82
	5th Percentile	0.24	-0.10	-0.37	-0.58	-0.73	-0.94	-1.17	-1.61	-2.04	-2.93	-1.31
	25th Percentile	3.90	3.90	3.88	3.91	3.93	3.95	3.97	3.88	3.70	3.20	3.81
	50th Percentile	5.85	6.00	6.13	6.28	6.44	6.60	6.74	6.83	6.87	6.77	6.55
	75th Percentile	7.63	7.97	8.24	8.53	8.81	9.09	9.36	9.67	9.94	10.20	9.27
	95th Percentile	9.96	10.48	10.99	11.44	11.88	12.35	12.83	13.46	14.07	15.13	12.91
	99th Percentile	11.57	12.38	12.97	13.61	14.27	14.89	15.54	16.41	17.33	18.94	15.72

Monte Carlo simulation results shown for the Current Target and efficient portfolios as detailed on page 9.

Asset Allocation Study

Monte Carlo Analysis: Expected Gain/Loss by Percentile

Time Period	Percentile	1	2	3	4	5	6	7	8	9	10	Current Target
1 Year	1st Percentile	-880.4	-961.2	-1,004.9	-1,065.9	-1,108.4	-1,146.2	-1,200.2	-1,263.3	-1,322.5	-1,340.7	-1,159.4
	5th Percentile	-320.8	-358.5	-390.5	-417.0	-443.5	-467.7	-499.6	-542.5	-593.5	-692.7	-496.7
	25th Percentile	66.6	59.3	50.0	42.8	35.4	26.1	15.7	-2.6	-29.7	-97.8	-5.4
	50th Percentile	261.8	271.3	277.9	284.3	291.0	297.9	304.1	309.1	307.6	294.7	289.8
	75th Percentile	445.8	471.4	495.4	518.4	541.9	563.9	587.6	618.9	652.9	706.2	590.7
	95th Percentile	726.2	782.6	836.3	885.8	930.9	979.4	1,031.4	1,107.7	1,191.4	1,369.7	1,065.5
	99th Percentile	943.6	1,031.6	1,116.8	1,190.2	1,254.4	1,313.9	1,379.5	1,501.2	1,633.8	1,929.8	1,456.3
3 Years	1st Percentile	-1,171.6	-1,335.5	-1,416.6	-1,500.5	-1,554.6	-1,599.8	-1,675.4	-1,779.0	-1,856.3	-1,899.2	-1,669.6
	5th Percentile	-387.9	-450.5	-492.3	-540.5	-581.8	-629.2	-670.8	-743.4	-818.2	-946.7	-670.4
	25th Percentile	360.5	349.6	338.4	330.9	320.9	312.1	299.7	262.0	222.6	128.8	265.7
	50th Percentile	778.7	805.8	823.9	847.5	865.7	883.5	901.3	911.7	921.1	905.3	877.8
	75th Percentile	1,187.0	1,249.1	1,307.9	1,362.9	1,418.8	1,480.4	1,535.6	1,611.2	1,680.2	1,778.8	1,529.4
	95th Percentile	1,789.5	1,920.9	2,049.3	2,165.9	2,282.9	2,397.6	2,533.8	2,710.9	2,912.2	3,319.6	2,583.0
	99th Percentile	2,209.4	2,406.8	2,590.8	2,761.3	2,915.5	3,094.5	3,292.7	3,552.7	3,891.5	4,571.5	3,373.1
5 Years	1st Percentile	-1,235.3	-1,409.1	-1,511.5	-1,609.3	-1,684.2	-1,762.7	-1,820.7	-1,922.4	-2,028.6	-2,098.5	-1,780.7
	5th Percentile	-306.8	-396.1	-462.6	-515.7	-563.4	-617.8	-667.0	-766.8	-849.2	-1,030.2	-655.6
	25th Percentile	735.1	722.8	717.2	714.8	712.8	704.3	692.8	655.5	603.4	432.7	646.0
	50th Percentile	1,339.6	1,381.2	1,421.5	1,460.8	1,502.3	1,545.3	1,580.1	1,600.3	1,611.3	1,570.7	1,524.1
	75th Percentile	1,954.1	2,069.4	2,166.8	2,259.1	2,353.2	2,450.2	2,549.6	2,669.6	2,784.4	2,937.5	2,542.5
	95th Percentile	2,874.0	3,093.7	3,291.6	3,490.3	3,683.7	3,878.6	4,079.8	4,393.8	4,716.6	5,344.5	4,180.9
	99th Percentile	3,598.2	3,906.4	4,265.6	4,571.7	4,834.2	5,123.9	5,427.7	5,872.4	6,397.8	7,411.9	5,565.0
10 Years	1st Percentile	-1,174.0	-1,435.2	-1,548.9	-1,703.9	-1,826.3	-1,929.7	-1,999.0	-2,166.0	-2,302.5	-2,401.6	-1,954.1
	5th Percentile	109.8	-45.3	-126.4	-208.4	-282.7	-355.3	-425.3	-579.4	-713.7	-919.0	-419.5
	25th Percentile	1,824.3	1,813.5	1,816.4	1,836.7	1,837.0	1,839.8	1,847.0	1,770.1	1,690.0	1,413.2	1,766.3
	50th Percentile	3,012.7	3,113.2	3,212.6	3,313.2	3,420.6	3,517.1	3,605.4	3,662.6	3,695.0	3,597.9	3,494.1
	75th Percentile	4,243.2	4,494.4	4,720.6	4,945.9	5,177.6	5,413.8	5,648.1	5,919.1	6,180.2	6,467.5	5,598.8
	95th Percentile	6,240.2	6,720.9	7,220.8	7,678.3	8,157.1	8,667.1	9,198.5	9,939.7	10,752.8	12,234.3	9,287.0
	99th Percentile	7,798.2	8,583.3	9,412.5	10,110.0	10,815.3	11,580.0	12,366.0	13,546.2	15,226.6	17,686.1	12,734.6

Monte Carlo simulation results shown for the Current Target and efficient portfolios as detailed on page 9.

Gain/Loss projections assume no cash flows and a starting market value of \$4.0B. Gain/Loss projections shown in millions and are in nominal terms.

Asset Allocation Study

Monte Carlo Analysis: Percentage Chance of Achieving Target Return

Time Period	Target Return	1	2	3	4	5	6	7	8	9	10	Current Target	
1 Year	Target 0%	81	80	79	78	77	76	76	74	72	69	74	
	Target 6.25%	51	52	53	53	54	54	55	55	54	53	53	
	Target 6.5%	50	51	52	52	53	53	54	54	54	52	52	
	Target 6.75%	48	50	50	51	52	52	53	53	53	52	52	
	Target 7%	47	48	49	50	51	51	52	52	52	52	51	51
	Target 7.25%	46	47	48	49	50	50	51	51	51	51	51	50
3 Years	Target 0%	88	87	86	86	85	85	84	83	81	78	83	
	Target 6.25%	49	51	52	53	54	54	55	55	55	53	53	
	Target 6.5%	47	48	50	51	52	53	53	53	53	52	52	
	Target 6.75%	45	46	48	49	50	51	52	52	52	51	50	
	Target 7%	42	45	46	47	48	49	50	51	51	49	49	49
	Target 7.25%	40	42	44	45	47	48	49	49	49	49	48	47
5 Years	Target 0%	91	90	90	89	89	88	88	86	85	82	87	
	Target 6.25%	47	49	50	52	53	54	55	55	55	54	53	
	Target 6.5%	45	47	48	50	51	52	53	53	53	52	51	
	Target 6.75%	42	44	46	47	49	50	51	52	52	51	50	
	Target 7%	39	42	44	45	47	48	49	50	50	49	48	48
	Target 7.25%	36	40	42	43	45	46	47	48	49	49	48	46
10 Years	Target 0%	95	95	94	94	93	93	92	92	91	89	92	
	Target 6.25%	44	47	48	50	52	53	55	55	55	54	53	
	Target 6.5%	40	43	46	47	49	51	52	53	53	52	50	
	Target 6.75%	37	40	43	45	47	48	50	51	51	50	48	
	Target 7%	33	37	39	42	44	46	47	48	49	48	46	46
	Target 7.25%	30	34	36	39	41	43	45	46	47	46	43	

*SBCERS current actuarial assumed rate of return is 7.0%

Monte Carlo simulation results shown for the Current Target and efficient portfolios as detailed on page 9.

Appendix



Custom Assumption Definitions

Custom Non-Core Fixed Income		
SBCERS Target Structure		RVK Assumption Index
45.0%	Private Credit (Senior Secured Direct Lending)	Cambridge Private Credit Index
25.0%	EMD Blend	50% JPM GBI EM Global Div./50% JPM EMBI Global Div.
30.0%	Bank Loans	CS Leveraged Loan
100.0%		

Custom Real Return		
SBCERS Target Structure		RVK Assumption Index
32.0%	Diversified Inflation Strategies	33.3% Bloomberg US TIPS/33.3% Bloomberg Comdty/33.3% MSCI Gbl Real Estate (Gross)
8.0%	TIPS	Bloomberg US Treasury: US TIPS
34.8%	Private Infrastructure	S&P Global Infrastructure
25.2%	Private Natural Resources	45% Alerian MLP/39% NCREIF Farmland/16% S&P Global NR
100.0%		

Custom Real Estate		
SBCERS Target Structure		RVK Assumption Index
65.0%	Core Real Estate	NCREIF ODCE (Gross) (AWA)
35.0%	Non-Core Real Estate	Preqin Non-Core Real Estate
100.0%		

Current Policy Target and Ranges

Asset Class	Target Allocation (%)	Target Range (%)
US Equity	19	15 - 23
Developed Market non-U.S. Equity	11	8 - 14
Emerging Market Equity	7	4 - 10
Investment Grade Fixed Income	17	14 - 20
Non-Investment Grade Fixed Income	11	8 - 14
Real Return	15	8 - 22
Real Estate	10	5 - 15
Private Equity	10	5 - 15
Cash	0	0 - 2

Active/Passive and Liquidity Profile

Composite	Target	Active/Passive	Liquidity
Total Fund	100%	82% Active/18% Passive	66% Liquid
U.S. Equity	19%	10% Active/90% Passive	100% Liquid
Dev'd Mkt. Non-U.S. Equity	11%	100% Active	100% Liquid
Emerging Mkt. Equity	7%	100% Active	100% Liquid
Core Fixed Income	17%	100% Active	100% Liquid
Non-Core Fixed Income	11%	100% Active	55% Liquid
Real Return	15%	92% Active/8% Passive	40% Liquid
Real Estate	10%	100% Active	0% Liquid
Private Equity	10%	100% Active	0% Liquid

All figures shown represent target allocations not actual allocations. Liquidity figures are illustrative of expected liquidity but do not represent a quantitative measure. The characteristics considered when determining relative liquidity include trading volume, gates for redemption, leverage, nature of transactions, and pricing mechanisms. The RVK liquidity metric is calculated using target investment weights applied to each corresponding asset class liquidity rating.

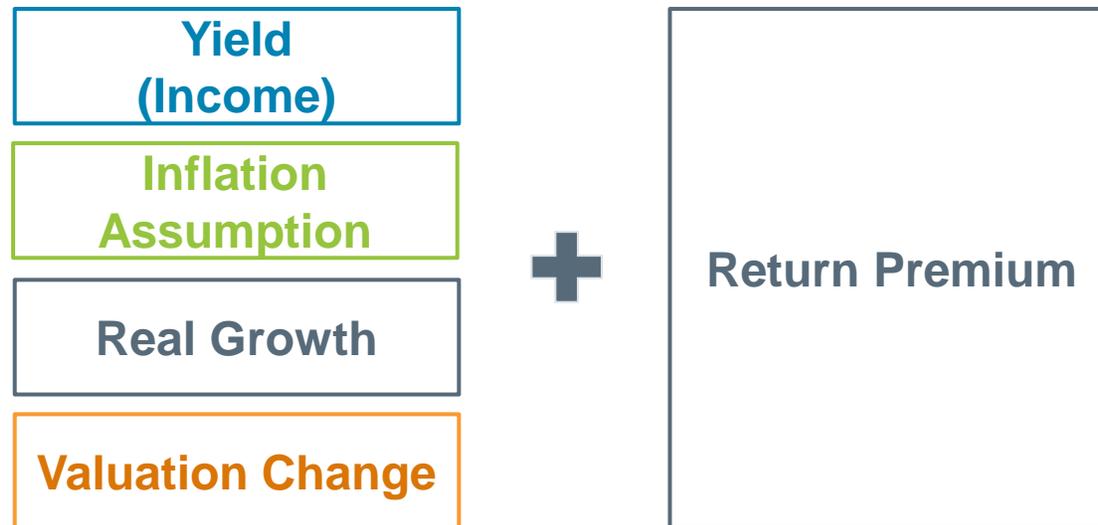
Summary of Expected Return Methodology

Building Block Methodology	Yield	+	Inflation	+	Real Growth	±	Valuation Change
Cash Equivalents	Income						
Fixed Income	Income + OAS change + Expected interest rate changes (and duration impact)						
TIPS	Real Income + Inflation						
Public Equity	Income + Inflation + Real GDP/earnings growth + / - Valuation						
Core Real Estate	Income + Inflation + / - Valuation – Investment fees						
Hedge Funds	Income (collateral return, cash) + Beta return + Alpha return						
Commodities	Collateral return (cash assumption) + Spot return (inflation assumption) + Roll return						
Build-Up/Spread Methodology	Beta assumption	+	Illiquidity premium				
Private Credit	Bank loan assumption + Return premium						
Private Equity	US large/mid cap equity assumption + Return premium						
Asset Blend Methodology							
GTAA	30% global equity + 25% US Agg fixed income + 5% int'l developed fixed income + 10% EMD (local) + 10% TIPS + 10% high yield + 10% commodities						
Diversified Inflation Strategies	1/3 TIPS + 1/3 commodities + 1/3 global REITs						

While the above factors generally inform the direction and magnitude of the capital market assumptions, RVK also considers qualitative, triangulation, and other factors as needed, when arriving at final assumption values.

Build-Up/Spread Methodology

Output: The sum of the building blocks equals expected return



Expected Return Inputs

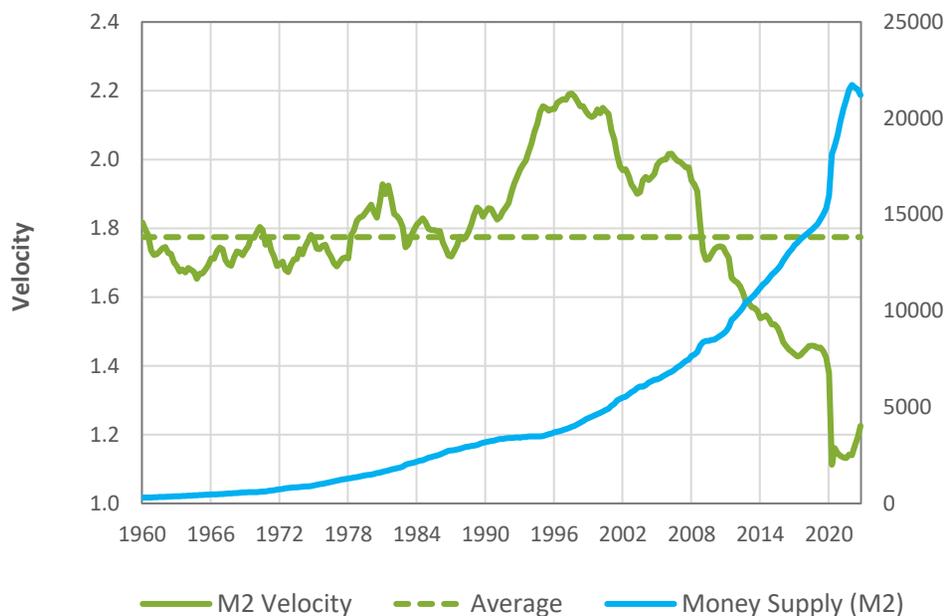
For illustrative purposes only. While the above factors generally inform the direction and magnitude of the capital market assumptions, RVK also considers qualitative, triangulation, and other factors as needed, when arriving at final assumption values. Real Growth includes GDP and profit margin growth.

US Inflation & Cash Equivalents

US Inflation & Cash Equivalents									
Asset Class	2022			2023			One Year Adjustment		
	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)
US Inflation	2.50%	2.50%	2.47%	2.50%	2.50%	2.47%	--	--	--
Cash Equivalents	1.50%	2.00%	1.48%	2.50%	2.00%	2.48%	+1.00%	--	+1.00%

As of December 30, 2022	5-Year	7-Year	10-Year	20-Year	30-Year
Treasury Yield	3.99%	3.96%	3.88%	4.14%	3.97%
TIPS Yield	1.66%	1.61%	1.58%	1.62%	1.67%
Implied Expected Inflation	2.33%	2.35%	2.30%	2.52%	2.30%

Supply and Velocity of Money



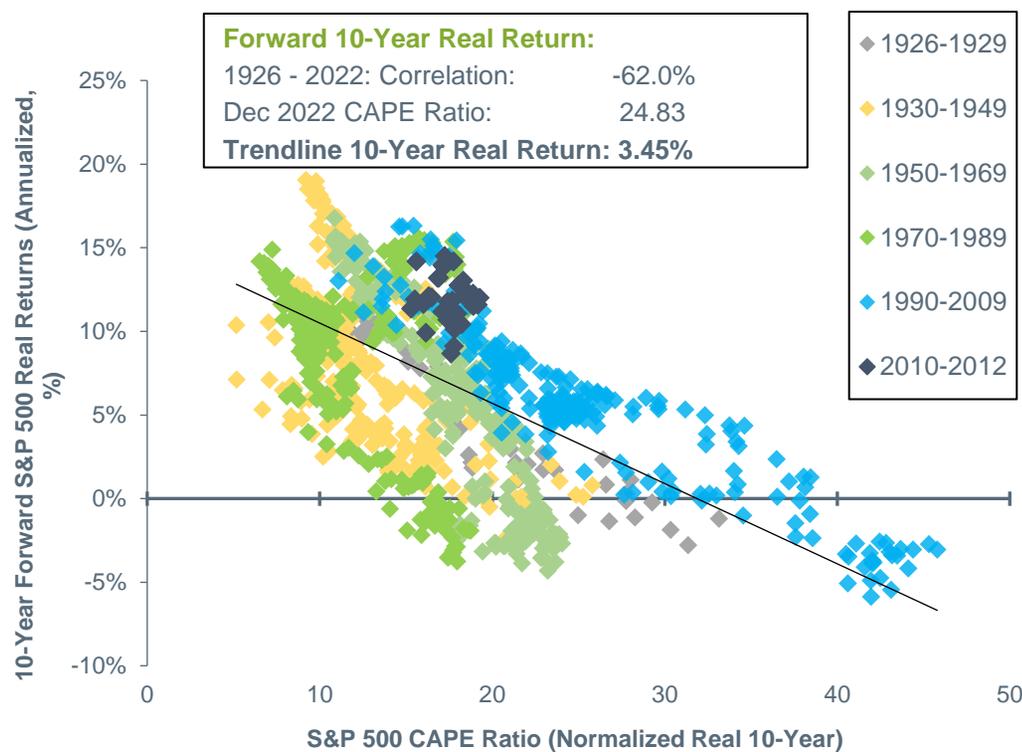
- The inflation assumption remained constant, to align with break-even inflation rates (as shown below), as well as to balance between near-term inflationary pressures and long-term deflationary factors.
- The cash assumption was increased to reflect increased yields.

Source: FactSet (2023).

Public Equity – United States

Public Equity: US									
Asset Class	2022			2023			One Year Adjustment		
	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)
Large/Mid Cap US	5.75%	16.00%	4.56%	6.75%	16.00%	5.57%	+1.00%	--	+1.01%
Small Cap US	6.25%	19.00%	4.59%	7.25%	19.00%	5.61%	+1.00%	--	+1.01%
Broad US Equity	5.80%	16.00%	4.61%	6.80%	16.10%	5.61%	+1.00%	+0.10%	+1.00%

Relationship between Valuations and Forward 10 Year Returns



- US equity return forecasts all increased relative to 2022.
- The increase was yield and valuation driven, as domestic equity returns dropped in 2022 with the Fed raising interest rates to combat inflation.
- Despite the drop in returns, the LC US valuation, as represented by the Shiller CAPE, stilled ranked in the 89th percentile of historical values.
- Thus, return assumptions remain lower than historical averages.

RVK Broad US Equity assumption is a combination of 94.0% Large/Mid Cap US Equity and 6.0% Small Cap US Equity.

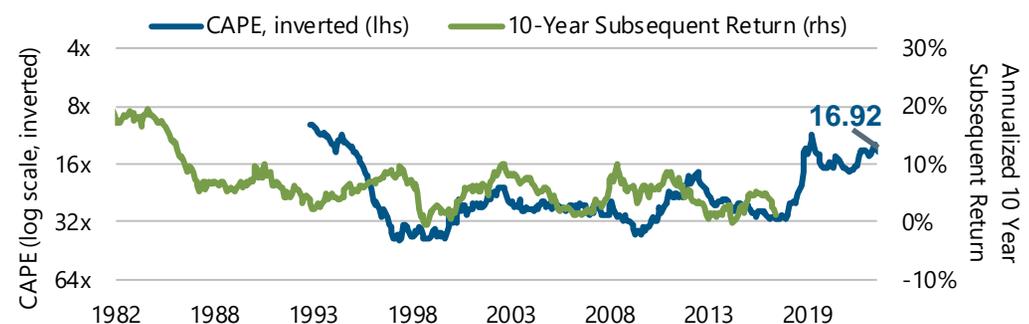
Source: RVK, based on data from FactSet (2023). December 2022 CAPE ratio uses the S&P 500 earnings estimate for the Q4 2022.

Public Equity – International

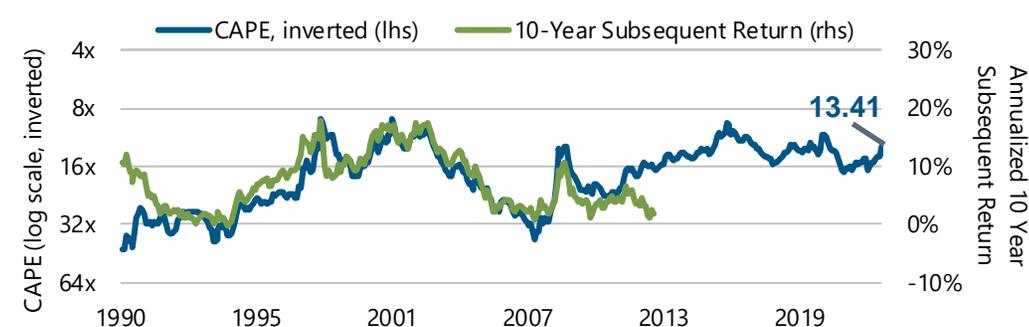
Public Equity: International									
Asset Class	2022			2023			One Year Adjustment		
	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)
Intl Large/Mid Equity	7.50%	17.00%	6.18%	8.50%	17.00%	7.19%	+1.00%	--	+1.01%
Dev'd Small Cap	8.00%	20.00%	6.19%	9.25%	20.00%	7.46%	+1.25%	--	+1.27%
Emerging Markets	10.25%	25.00%	7.52%	11.25%	25.00%	8.54%	+1.00%	--	+1.02%
Broad International	8.35%	18.65%	6.78%	9.35%	18.70%	7.79%	+1.00%	+0.05%	+1.01%

Valuations: Cyclically-adjusted P/E

EAFE valuations



Emerging markets valuations



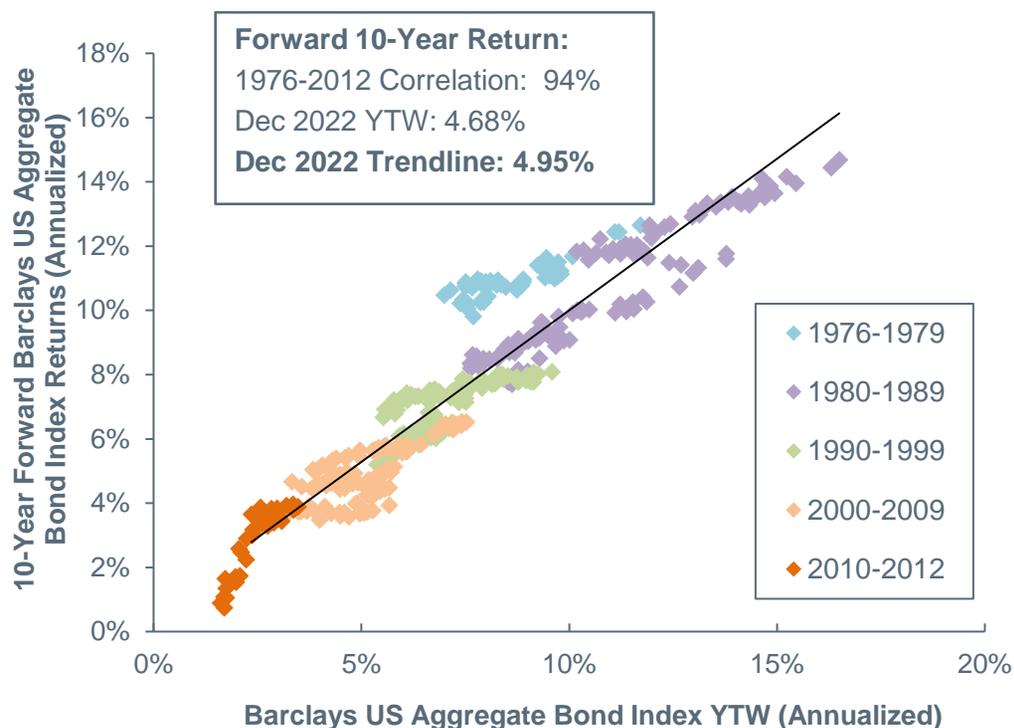
- International equity assumptions all increase due to higher dividend yields, improved valuations and currency expectations; but these were offset by lower inflation and real growth/earnings expectations.
- International developed inflation expectations remain below US expectations. However, all non-US valuations remain better than their US counterparts.

RVK Broad International Equity is a mix of 61.6% Dev'd Large/Mid Cap Int'l Equity, 10.3% Dev'd Small Cap Int'l Equity, and 28.1% Emerging Markets Equity. Source: Research Affiliates (RA); EAFE valuations represented by MSCI EAFE CAPE calculations by RA since December 1982; EM represented by MSCI EM CAPE calculations by RA since Jan 1990. Data as of December 31, 2022.

Fixed Income

Fixed Income									
Asset Class	2022			2023			One Year Adjustment		
	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)
US Aggregate	2.50%	5.00%	2.38%	4.00%	5.00%	3.88%	+1.50%	--	+1.50%
Non-US Dev. Sovereign	1.25%	8.50%	0.90%	2.25%	8.50%	1.90%	+1.00%	--	+1.00%
Low Duration	2.00%	2.50%	1.97%	3.25%	2.50%	3.22%	+1.25%	--	+1.25%
Long Duration	2.75%	10.00%	2.27%	5.00%	10.00%	4.53%	+2.25%	--	+2.26%
TIPS	2.00%	5.50%	1.85%	4.00%	5.50%	3.85%	+2.00%	--	+2.00%

Relationship between YTW and Forward 10 Year Returns

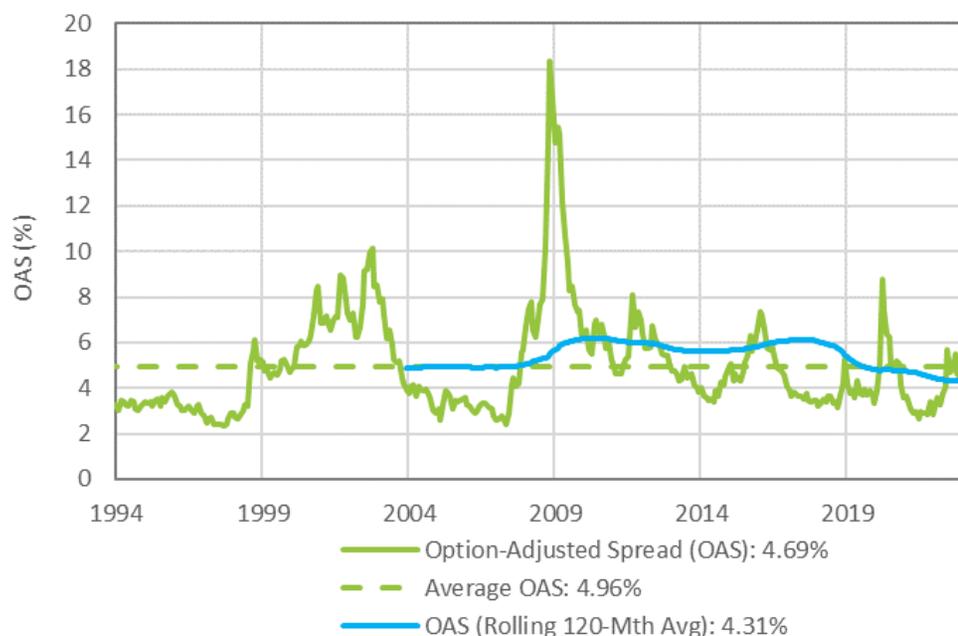


- Starting yields have historically been a reasonable starting point when forecasting future bond returns.
- Therefore, most bond return assumptions increased based on higher starting yields, and an expectation that the yield curve inversion corrects over time.
- Changes in spreads and durations were mostly nominal and thus did not generally have material impacts on the return forecasts.

Fixed Income – Spread Assets

Fixed Income: Spread Sectors									
Asset Class	2022			2023			One Year Adjustment		
	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)
High Yield	5.50%	10.00%	5.03%	7.25%	10.50%	6.74%	+1.75%	+0.50%	+1.71%
Emerging Markets Debt (HC)	6.00%	10.00%	5.53%	7.50%	10.00%	7.04%	+1.50%	--	+1.51%
Emerging Markets Debt (LC)	5.75%	11.50%	5.13%	6.50%	11.50%	5.88%	+0.75%	--	+0.75%
Bank Loans	5.00%	8.00%	4.70%	6.50%	8.50%	6.16%	+1.50%	+0.50%	+1.47%

BB US Corporate High Yield Index Option-Adjusted Spread (OAS)

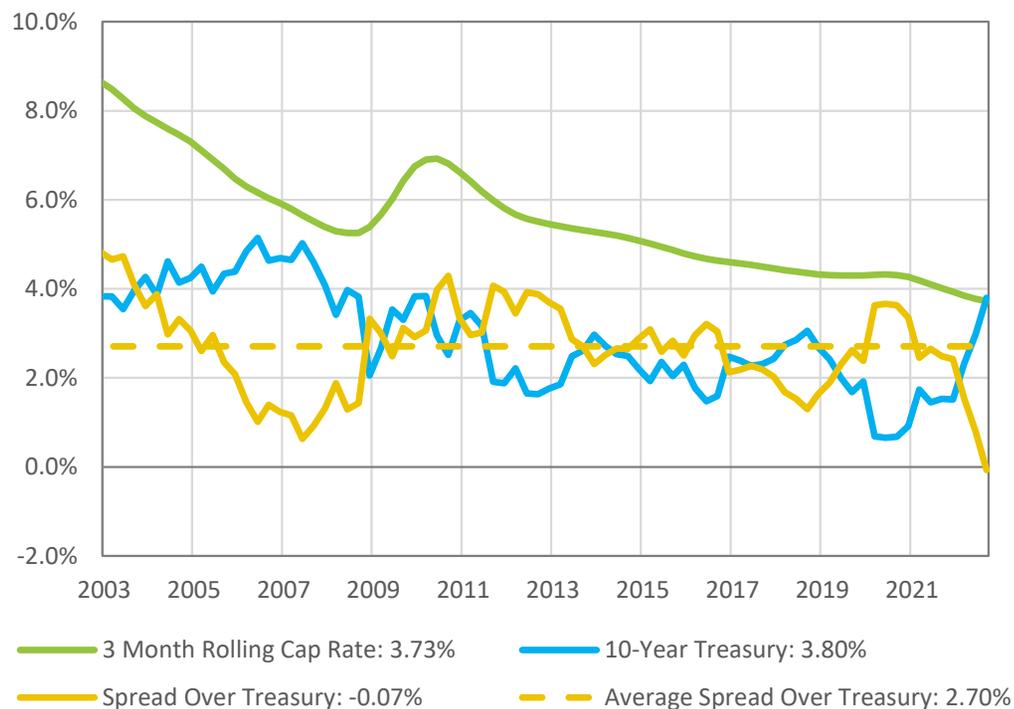


- Significantly increased our long-term return expectations for all fixed income spread sectors.
- Higher starting yields for the emerging market debt (both hard and local currency) led to higher expected long-term returns.
- Rising rates and widening spreads will—over the long run—help returns for low duration assets such as bank loans and high yield bonds.

Real Estate

Real Estate									
Asset Class	2022			2023			One Year Adjustment		
	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)
Core Real Estate	6.00%	12.50%	5.27%	5.75%	12.50%	5.02%	-0.25%	--	-0.25%
Global REITs	6.50%	21.00%	4.49%	7.75%	21.00%	5.76%	+1.25%	--	+1.27%

Cap Rates and Spread to Treasuries

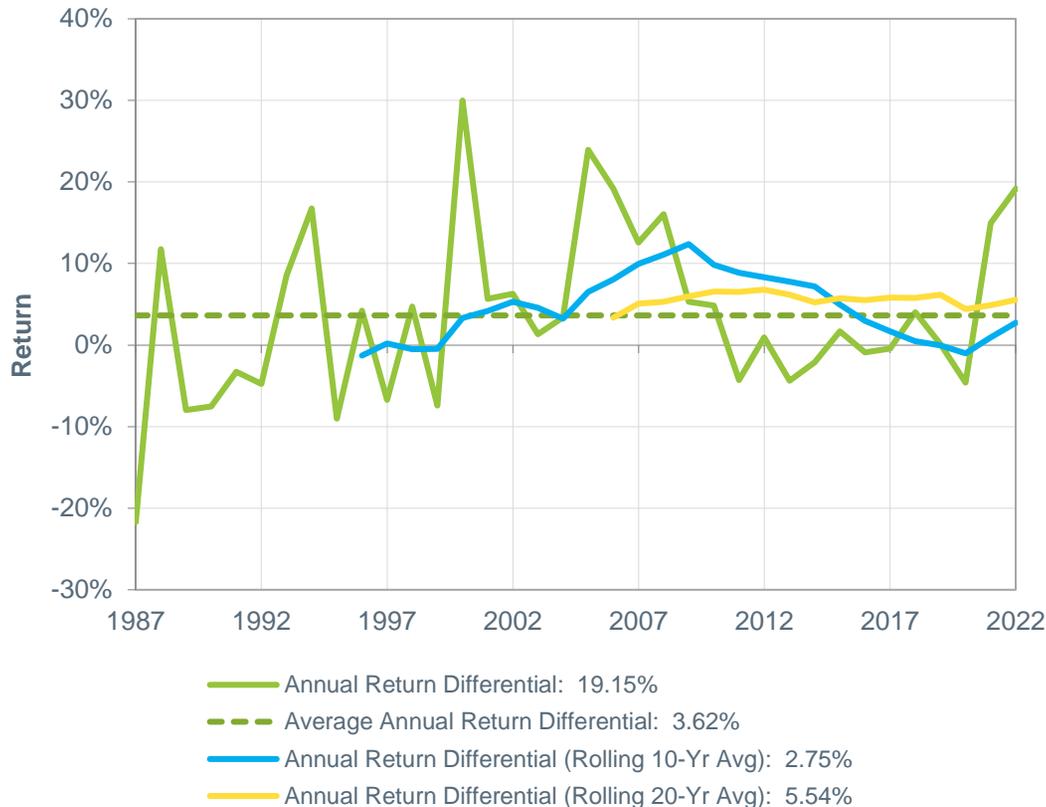


- Cap rates dropped to historic lows real estate performed well in 2022.
- However, on a relative basis – with Treasury rates materially increased – income yields for core real estate assets are relatively less attractive than in the recent past.
- RVK decreased our long-term core real estate assumption given falling net income yields.
- Global REITs assumption increased due to a significant increase in yield, as well as improved valuations.

Private Equity

Private Equity									
Asset Class	2022			2023			One Year Adjustment		
	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)	Nominal Return	Risk (StDev)	Nominal Return (Geo.)
Private Equity	9.00%	22.00%	6.85%	10.00%	22.00%	7.86%	+1.00%	--	+1.02%

**Annual Return Differential:
Cambridge US Private Equity Index vs. S&P 500 Index**



- Our spread assumption increased to 225 basis points (geometric) above Large/Mid Cap US Equities.
- This spread differential is similar to the historical spread differential.
- The PE return increase was due to the increase in the underlying public market returns forecast. The Large/Mid Cap US Equity assumption was decreased by 1.00% due to reduced dividend yields and improved valuations.

Source: Cambridge Associates LLC and FactSet (2023). Data as of June 30, 2022. Cambridge index is pooled horizon internal rates of return, net of fees, expenses, and carried interest.

RVK 2023 Assumptions vs 2022

Asset Class	Benchmark	2022			2023			Change		
		Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Geo.)
Large/Mid Cap US Equity	S&P 500 (Cap Weighted)	5.75%	16.00%	4.56%	6.75%	16.00%	5.57%	1.00%	0.00%	1.01%
Small Cap US Equity	Russell 2000	6.25%	19.00%	4.59%	7.25%	19.00%	5.61%	1.00%	0.00%	1.01%
Broad US Equity	Russell 3000	5.80%	16.00%	4.61%	6.80%	16.10%	5.61%	1.00%	0.10%	1.00%
Dev'd Large/Mid Cap Int'l Equity	MSCI EAFE (Gross)	7.50%	17.00%	6.18%	8.50%	17.00%	7.19%	1.00%	0.00%	1.01%
Dev'd Small Cap Int'l Equity	MSCI EAFE Small Cap (Gross)	8.00%	20.00%	6.19%	9.25%	20.00%	7.46%	1.25%	0.00%	1.27%
Emerging Markets Equity	MSCI Emerging Markets (Gross)	10.25%	25.00%	7.52%	11.25%	25.00%	8.54%	1.00%	0.00%	1.02%
Broad International Equity	MSCI ACW Ex US IMI (Gross)	8.35%	18.65%	6.78%	9.35%	18.70%	7.79%	1.00%	0.05%	1.01%
Global Equity	MSCI ACW IMI (Gross)	6.80%	16.40%	5.56%	7.85%	16.40%	6.62%	1.05%	0.00%	1.06%
US Aggregate Fixed Income	Bloomberg US Aggregate Bond	2.50%	5.00%	2.38%	4.00%	5.00%	3.88%	1.50%	0.00%	1.50%
Non-US Dev'd Sov'n Fixed Income UH	Citi Non-US World Gov't Bond	1.25%	8.50%	0.90%	2.25%	8.50%	1.90%	1.00%	0.00%	1.00%
Emerging Markets Debt Hard Currency	JPM EMBI Global Diversified	6.00%	10.00%	5.53%	7.50%	10.00%	7.04%	1.50%	0.00%	1.51%
Emerging Markets Debt Local Currency	JPM GBI EM Global Diversified	5.75%	11.50%	5.13%	6.50%	11.50%	5.88%	0.75%	0.00%	0.75%
TIPS	Bloomberg US Treasury: US TIPS	2.00%	5.50%	1.85%	4.00%	5.50%	3.85%	2.00%	0.00%	2.00%
Low Duration Fixed Income	Bloomberg US Gov't/Cred: 1-3 Year	2.00%	2.50%	1.97%	3.25%	2.50%	3.22%	1.25%	0.00%	1.25%
Long Duration Fixed Income	Bloomberg US Gov't/Cred: LT Bond	2.75%	10.00%	2.27%	5.00%	10.00%	4.53%	2.25%	0.00%	2.26%
High Yield	Bloomberg US Corp: High Yield	5.50%	10.00%	5.03%	7.25%	10.50%	6.74%	1.75%	0.50%	1.71%
Bank Loans	CS Leveraged Loan	5.00%	8.00%	4.70%	6.50%	8.50%	6.16%	1.50%	0.50%	1.47%
Core Real Estate	NCREIF ODCE (Gross) (AWA)	6.00%	12.50%	5.27%	5.75%	12.50%	5.02%	-0.25%	0.00%	-0.25%
Global REITs	MSCI World Real Estate (Gross)	6.50%	21.00%	4.49%	7.75%	21.00%	5.76%	1.25%	0.00%	1.27%
MLPs	Alerian MLP	8.75%	23.00%	6.40%	8.25%	23.00%	5.89%	-0.50%	0.00%	-0.51%
Funds of Hedge Funds	HFRI Fund of Funds Composite	4.25%	9.50%	3.82%	5.00%	9.50%	4.57%	0.75%	0.00%	0.75%
Multi-Strategy Hedge Funds	HFRI RV Multi-Strat	5.00%	8.50%	4.66%	5.75%	8.50%	5.41%	0.75%	0.00%	0.75%
GTAA	Custom GTAA Index	5.00%	9.00%	4.62%	6.00%	9.00%	5.62%	1.00%	0.00%	1.00%
Private Credit	Cambridge Private Credit Index	7.25%	13.00%	6.47%	8.00%	13.00%	7.23%	0.75%	0.00%	0.76%
Senior Secured Direct Lending	--	6.00%	9.00%	5.62%	7.00%	9.00%	6.62%	1.00%	0.00%	1.00%
Private Equity	Cambridge US Private Equity	9.00%	22.00%	6.85%	10.00%	22.00%	7.86%	1.00%	0.00%	1.02%
Commodities	Bloomberg Commodity	5.50%	17.50%	4.08%	6.00%	17.50%	4.58%	0.50%	0.00%	0.51%
Diversified Inflation Strategies	Custom DIS Index	4.70%	11.55%	4.07%	5.90%	11.60%	5.27%	1.20%	0.05%	1.20%
US Inflation	Consumer Price Index	2.50%	2.50%	2.47%	2.50%	2.50%	2.47%	0.00%	0.00%	0.00%
Cash Equivalents	BofA ML 3 Mo US T-Bill	1.50%	2.00%	1.48%	2.50%	2.00%	2.48%	1.00%	0.00%	1.00%

PORTLAND

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RVK