

Report Parameters

Start Date	01/01/1994
End Date	01/31/2024
Resampled Inputs	No

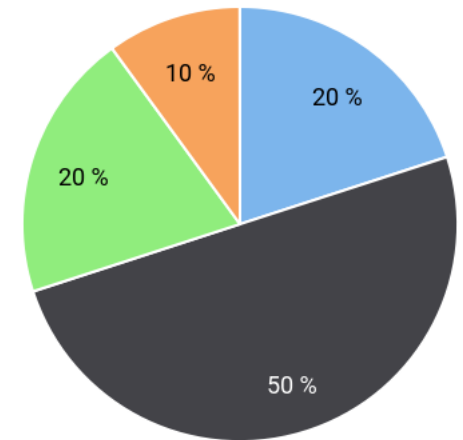
Efficient Frontier Assets

#	Asset	Expected Return	Standard Deviation	Sharpe Ratio	Min. Weight	Max. Weight
1	US Large Cap Value	9.97%	15.20%	0.502	0.00%	100.00%
2	Intermediate Term Treasury	4.31%	4.80%	0.413	0.00%	60.00%
3	REIT	10.02%	19.47%	0.395	0.00%	100.00%
4	US Small Cap Growth	10.77%	20.44%	0.413	10.00%	100.00%

Results based on historical returns. Expected return is the annualized monthly arithmetic mean return. Ex-ante Sharpe Ratio calculated using 3-month treasury bill returns as the risk-free rate.

Provided Portfolio

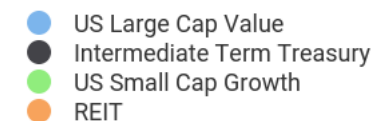
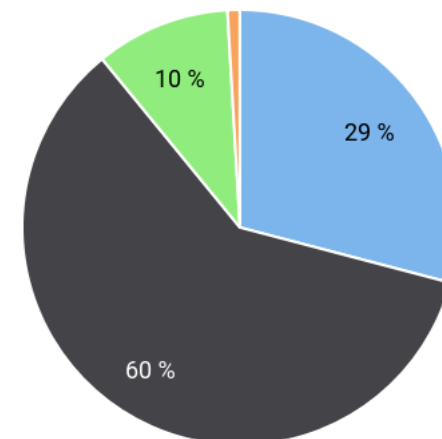
Asset Class	Allocation
US Large Cap Value	20.00%
Intermediate Term Treasury	50.00%
REIT	20.00%
US Small Cap Growth	10.00%



- US Large Cap Value
- Intermediate Term Treasury
- REIT
- US Small Cap Growth

Max Sharpe Ratio Portfolio

Asset Class	Allocation
US Large Cap Value	29.09%
Intermediate Term Treasury	60.00%
REIT	0.91%
US Small Cap Growth	10.00%



Portfolio Statistics

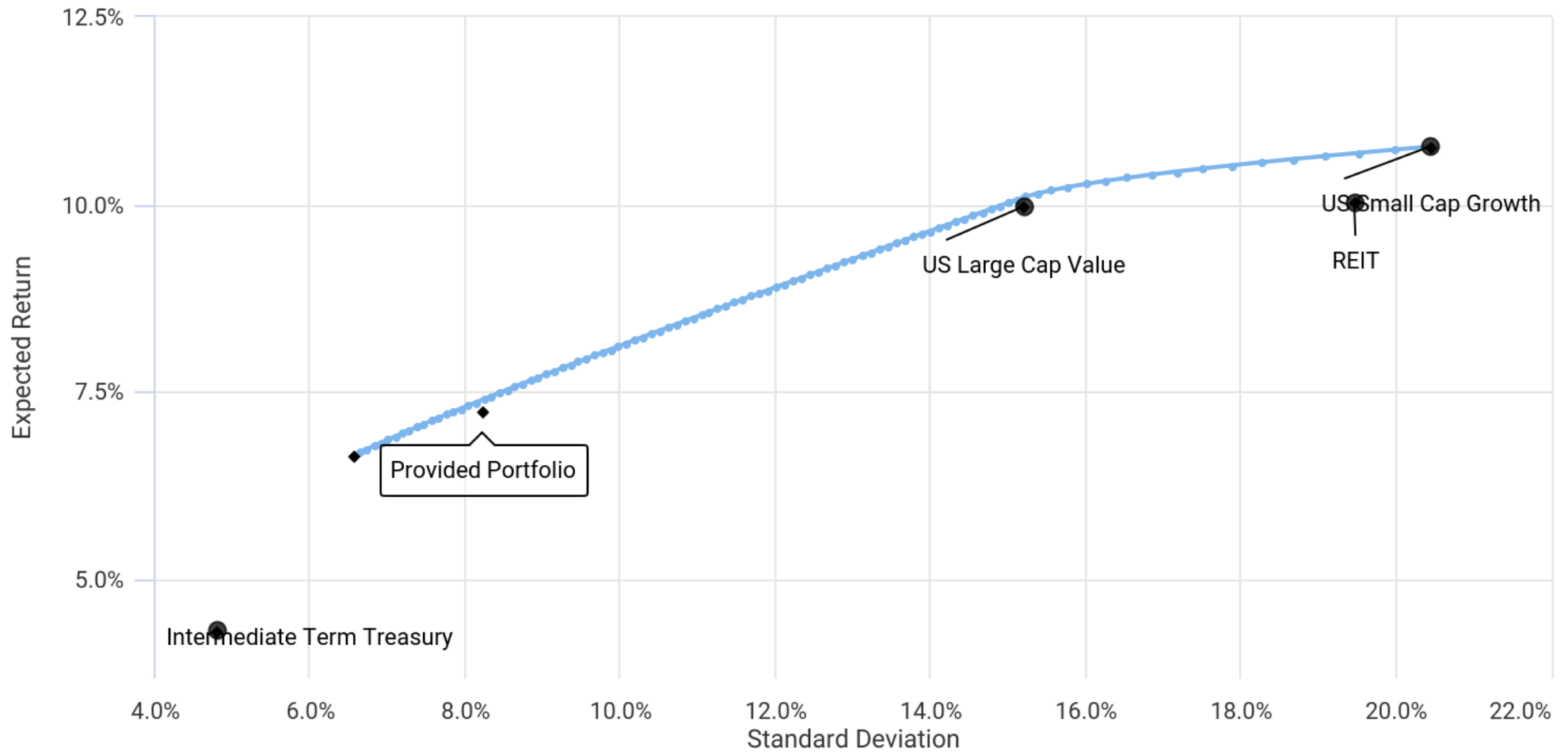
Portfolio	Expected Return	Standard Deviation	Sharpe Ratio
Provided Portfolio	7.23%	8.21%	0.60
Max Sharpe Ratio Portfolio	6.66%	6.56%	0.66

Asset Correlations

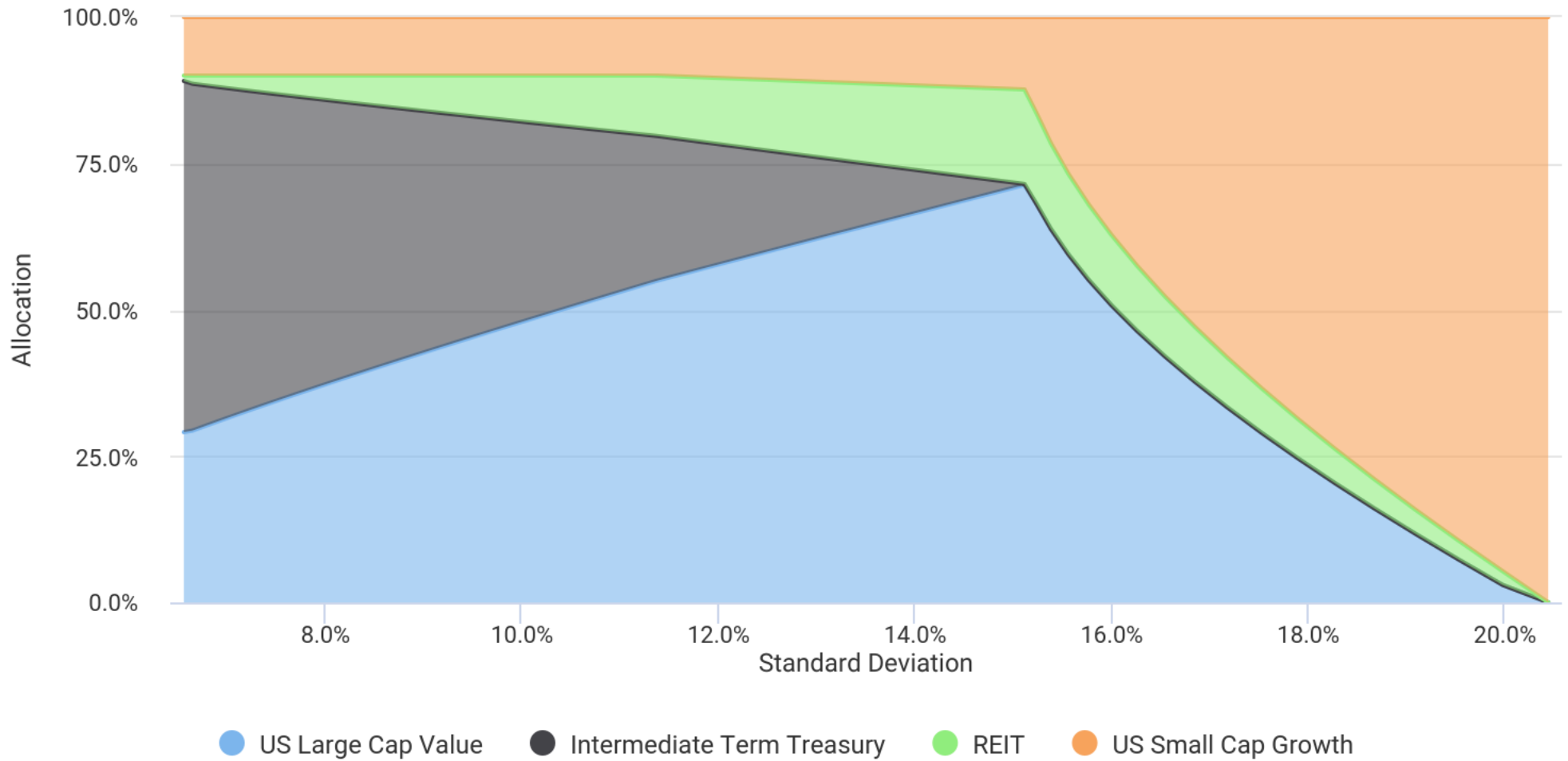
Asset	US Large Cap Value	Intermediate Term Treasury	REIT	US Small Cap Growth
US Large Cap Value	1.00	-0.10	0.64	0.75
Intermediate Term Treasury	-0.10	1.00	0.09	-0.13
REIT	0.64	0.09	1.00	0.61
US Small Cap Growth	0.75	-0.13	0.61	1.00

Based on monthly returns from Jan 1994 to Jan 2024

Efficient Frontier (Jan 1994 - Jan 2024)



Efficient Frontier Transition Map



Efficient Frontier Points

#	US Large Cap Value	Intermediate Term Treasury	REIT	US Small Cap Growth	Expected Return (*)	Standard Deviation (*)	Sharpe Ratio (*)
1	29.09%	60.00%	0.91%	10.00%	6.66%	6.56%	0.659
2	29.34%	59.27%	1.39%	10.00%	6.70%	6.64%	0.657
3	29.88%	58.54%	1.58%	10.00%	6.74%	6.73%	0.654
4	30.43%	57.80%	1.77%	10.00%	6.78%	6.82%	0.652
5	30.97%	57.07%	1.96%	10.00%	6.82%	6.91%	0.650
6	31.52%	56.33%	2.15%	10.00%	6.86%	7.00%	0.647
7	32.06%	55.60%	2.34%	10.00%	6.90%	7.09%	0.645
8	32.60%	54.87%	2.53%	10.00%	6.95%	7.18%	0.642
9	33.15%	54.13%	2.72%	10.00%	6.99%	7.28%	0.640
10	33.69%	53.40%	2.91%	10.00%	7.03%	7.37%	0.637
11	34.24%	52.67%	3.10%	10.00%	7.07%	7.46%	0.635
12	34.78%	51.93%	3.29%	10.00%	7.11%	7.56%	0.632
13	35.32%	51.20%	3.48%	10.00%	7.15%	7.66%	0.630
14	35.87%	50.47%	3.67%	10.00%	7.20%	7.75%	0.628
15	36.41%	49.73%	3.86%	10.00%	7.24%	7.85%	0.625
16	36.96%	49.00%	4.05%	10.00%	7.28%	7.94%	0.623
17	37.50%	48.26%	4.24%	10.00%	7.32%	8.04%	0.620
18	38.04%	47.53%	4.42%	10.00%	7.36%	8.14%	0.618
19	38.59%	46.80%	4.61%	10.00%	7.40%	8.24%	0.616
20	39.13%	46.06%	4.80%	10.00%	7.45%	8.34%	0.613
21	39.68%	45.33%	4.99%	10.00%	7.49%	8.44%	0.611
22	40.22%	44.60%	5.18%	10.00%	7.53%	8.54%	0.609
23	40.77%	43.86%	5.37%	10.00%	7.57%	8.64%	0.606
24	41.31%	43.13%	5.56%	10.00%	7.61%	8.74%	0.604
25	41.85%	42.39%	5.75%	10.00%	7.65%	8.84%	0.602
26	42.40%	41.66%	5.94%	10.00%	7.69%	8.94%	0.600
27	42.94%	40.93%	6.13%	10.00%	7.74%	9.04%	0.598
28	43.49%	40.19%	6.32%	10.00%	7.78%	9.15%	0.595
29	44.03%	39.46%	6.51%	10.00%	7.82%	9.25%	0.593
30	44.57%	38.73%	6.70%	10.00%	7.86%	9.35%	0.591
31	45.12%	37.99%	6.89%	10.00%	7.90%	9.46%	0.589
32	45.66%	37.26%	7.08%	10.00%	7.94%	9.56%	0.587

#	US Large Cap Value	Intermediate Term Treasury	REIT	US Small Cap Growth	Expected Return (*)	Standard Deviation (*)	Sharpe Ratio (*)
33	46.21%	36.53%	7.27%	10.00%	7.99%	9.66%	0.585
34	46.75%	35.79%	7.46%	10.00%	8.03%	9.77%	0.583
35	47.29%	35.06%	7.65%	10.00%	8.07%	9.87%	0.581
36	47.84%	34.32%	7.84%	10.00%	8.11%	9.98%	0.579
37	48.38%	33.59%	8.03%	10.00%	8.15%	10.08%	0.577
38	48.93%	32.86%	8.22%	10.00%	8.19%	10.19%	0.575
39	49.47%	32.12%	8.41%	10.00%	8.24%	10.29%	0.573
40	50.01%	31.39%	8.60%	10.00%	8.28%	10.40%	0.572
41	50.56%	30.66%	8.79%	10.00%	8.32%	10.51%	0.570
42	51.10%	29.92%	8.98%	10.00%	8.36%	10.61%	0.568
43	51.65%	29.19%	9.16%	10.00%	8.40%	10.72%	0.566
44	52.19%	28.45%	9.35%	10.00%	8.44%	10.83%	0.564
45	52.73%	27.72%	9.54%	10.00%	8.48%	10.93%	0.563
46	53.28%	26.99%	9.73%	10.00%	8.53%	11.04%	0.561
47	53.82%	26.25%	9.92%	10.00%	8.57%	11.15%	0.559
48	54.37%	25.52%	10.11%	10.00%	8.61%	11.26%	0.558
49	54.91%	24.79%	10.30%	10.00%	8.65%	11.36%	0.556
50	55.40%	24.06%	10.48%	10.06%	8.69%	11.47%	0.554
51	55.89%	23.34%	10.65%	10.13%	8.73%	11.58%	0.553
52	56.37%	22.61%	10.82%	10.20%	8.78%	11.69%	0.551
53	56.85%	21.89%	10.99%	10.27%	8.82%	11.80%	0.550
54	57.33%	21.17%	11.16%	10.34%	8.86%	11.90%	0.548
55	57.81%	20.44%	11.34%	10.41%	8.90%	12.01%	0.547
56	58.30%	19.72%	11.51%	10.48%	8.94%	12.12%	0.545
57	58.78%	18.99%	11.68%	10.55%	8.98%	12.23%	0.544
58	59.26%	18.27%	11.85%	10.62%	9.03%	12.34%	0.542
59	59.74%	17.55%	12.02%	10.69%	9.07%	12.45%	0.541
60	60.22%	16.82%	12.20%	10.76%	9.11%	12.56%	0.539
61	60.71%	16.10%	12.37%	10.83%	9.15%	12.67%	0.538
62	61.19%	15.37%	12.54%	10.90%	9.19%	12.78%	0.537
63	61.67%	14.65%	12.71%	10.97%	9.23%	12.89%	0.535
64	62.15%	13.93%	12.88%	11.04%	9.27%	13.00%	0.534
65	62.63%	13.20%	13.06%	11.11%	9.32%	13.11%	0.533
66	63.12%	12.48%	13.23%	11.18%	9.36%	13.22%	0.531

#	US Large Cap Value	Intermediate Term Treasury	REIT	US Small Cap Growth	Expected Return (*)	Standard Deviation (*)	Sharpe Ratio (*)
67	63.60%	11.76%	13.40%	11.25%	9.40%	13.33%	0.530
68	64.08%	11.03%	13.57%	11.32%	9.44%	13.44%	0.529
69	64.56%	10.31%	13.74%	11.39%	9.48%	13.55%	0.528
70	65.04%	9.58%	13.91%	11.46%	9.52%	13.66%	0.526
71	65.53%	8.86%	14.09%	11.53%	9.57%	13.77%	0.525
72	66.01%	8.14%	14.26%	11.60%	9.61%	13.88%	0.524
73	66.49%	7.41%	14.43%	11.67%	9.65%	13.99%	0.523
74	66.97%	6.69%	14.60%	11.74%	9.69%	14.11%	0.522
75	67.45%	5.96%	14.77%	11.81%	9.73%	14.22%	0.520
76	67.94%	5.24%	14.95%	11.88%	9.77%	14.33%	0.519
77	68.42%	4.52%	15.12%	11.95%	9.82%	14.44%	0.518
78	68.90%	3.79%	15.29%	12.02%	9.86%	14.55%	0.517
79	69.38%	3.07%	15.46%	12.09%	9.90%	14.66%	0.516
80	69.86%	2.34%	15.63%	12.16%	9.94%	14.77%	0.515
81	70.35%	1.62%	15.81%	12.23%	9.98%	14.89%	0.514
82	70.83%	0.90%	15.98%	12.30%	10.02%	15.00%	0.513
83	71.31%	0.17%	16.15%	12.37%	10.06%	15.11%	0.512
84	68.12%	0.00%	15.52%	16.36%	10.11%	15.23%	0.510
85	63.78%	0.00%	14.64%	21.58%	10.15%	15.38%	0.508
86	59.44%	0.00%	13.76%	26.80%	10.19%	15.56%	0.505
87	55.09%	0.00%	12.89%	32.02%	10.23%	15.76%	0.501
88	50.75%	0.00%	12.01%	37.24%	10.27%	16.00%	0.496
89	46.41%	0.00%	11.13%	42.46%	10.31%	16.25%	0.491
90	42.06%	0.00%	10.25%	47.69%	10.36%	16.54%	0.485
91	37.72%	0.00%	9.37%	52.91%	10.40%	16.84%	0.479
92	33.38%	0.00%	8.49%	58.13%	10.44%	17.17%	0.472
93	29.03%	0.00%	7.62%	63.35%	10.48%	17.52%	0.465
94	24.69%	0.00%	6.74%	68.57%	10.52%	17.89%	0.458
95	20.35%	0.00%	5.86%	73.79%	10.56%	18.27%	0.450
96	16.00%	0.00%	4.98%	79.02%	10.60%	18.67%	0.443
97	11.66%	0.00%	4.10%	84.24%	10.65%	19.09%	0.435
98	7.32%	0.00%	3.22%	89.46%	10.69%	19.53%	0.428
99	2.98%	0.00%	2.34%	94.68%	10.73%	19.98%	0.420
100	0.00%	0.00%	0.00%	100.00%	10.77%	20.44%	0.413

(*) Annualized ex-ante values shown for portfolio return and volatility. Ex-ante Sharpe Ratio calculated using historical 3-month treasury bill returns as the risk-free rate.

Notes:

- **IMPORTANT:** The projections or other information generated by Portfolio Visualizer regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results. Results may vary with each use and over time.
- The results do not constitute investment advice or recommendation, are provided solely for informational purposes, and are not an offer to buy or sell any securities. All use is subject to terms of service.
- Investing involves risk, including possible loss of principal. Past performance is not a guarantee of future results.
- Asset allocation and diversification strategies do not guarantee a profit or protect against a loss.
- Hypothetical returns do not reflect trading costs, transaction fees, commissions, or actual taxes due on investment returns.
- The results are based on information from a variety of sources we consider reliable, but we do not represent that the information is accurate or complete.
- Refer to the related documentation sections for more details on terms and definitions, methodology, and data sources.
- Portfolio optimization is a process of choosing the proportions of various assets to be held in a portfolio in such a way as to make the portfolio better than any other combination according to the selected objective function such as maximizing risk-adjusted return. Portfolio optimization determines target weights for portfolio assets based on mathematical models that can use either historical or forecasted data as inputs. Optimization results are not guarantees of future performance.
- The results are based on the total return of assets and assume that all received dividends and distributions are reinvested.
- Historical asset statistics are based on monthly returns from Jan 1994 to Jan 2024
- The efficient frontier is based on the monthly returns, volatilities, and correlations of the specified assets
- The displayed standard deviation and expected return in the efficient frontier are annualized from the monthly returns
- Ex-ante Sharpe Ratio for the efficient frontier data points is calculated using historical 3-month treasury bill returns as the risk free rate