

Report Parameters

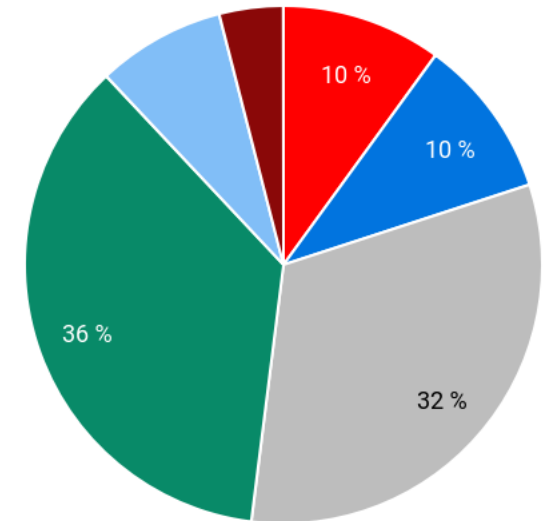
Initial Amount	\$100,000
External Cashflows	No contributions or withdrawals
Simulation Period	35
Simulation Model	Historical Returns
Bootstrap Model	Single Year
Tax Treatment	Pre-tax Returns
Sequence of Return Risk	No Adjustments
Inflation Model	Parameterized Inflation
Annual Inflation Mean	2.00%
Annual Inflation Stdev	3.00%

Simulation Description

Monte Carlo simulation results for 10000 portfolios with \$100,000 initial portfolio balance using available historical returns data from Jan 1995 to Dec 2023 with annual sampling. The historical pre-tax return for the selected portfolio for this period was 9.98% mean return (8.19% CAGR) with 15.07% standard deviation of annual returns. The simulated inflation model used normal distribution with 2.00% mean and 3.00% standard deviation based on the parameters. The generated inflation samples were uncorrelated with simulated asset returns. The available historical data for the simulation inputs was constrained by ACWI SMALL CAP [Jun 1994 - Mar 2024].

Portfolio

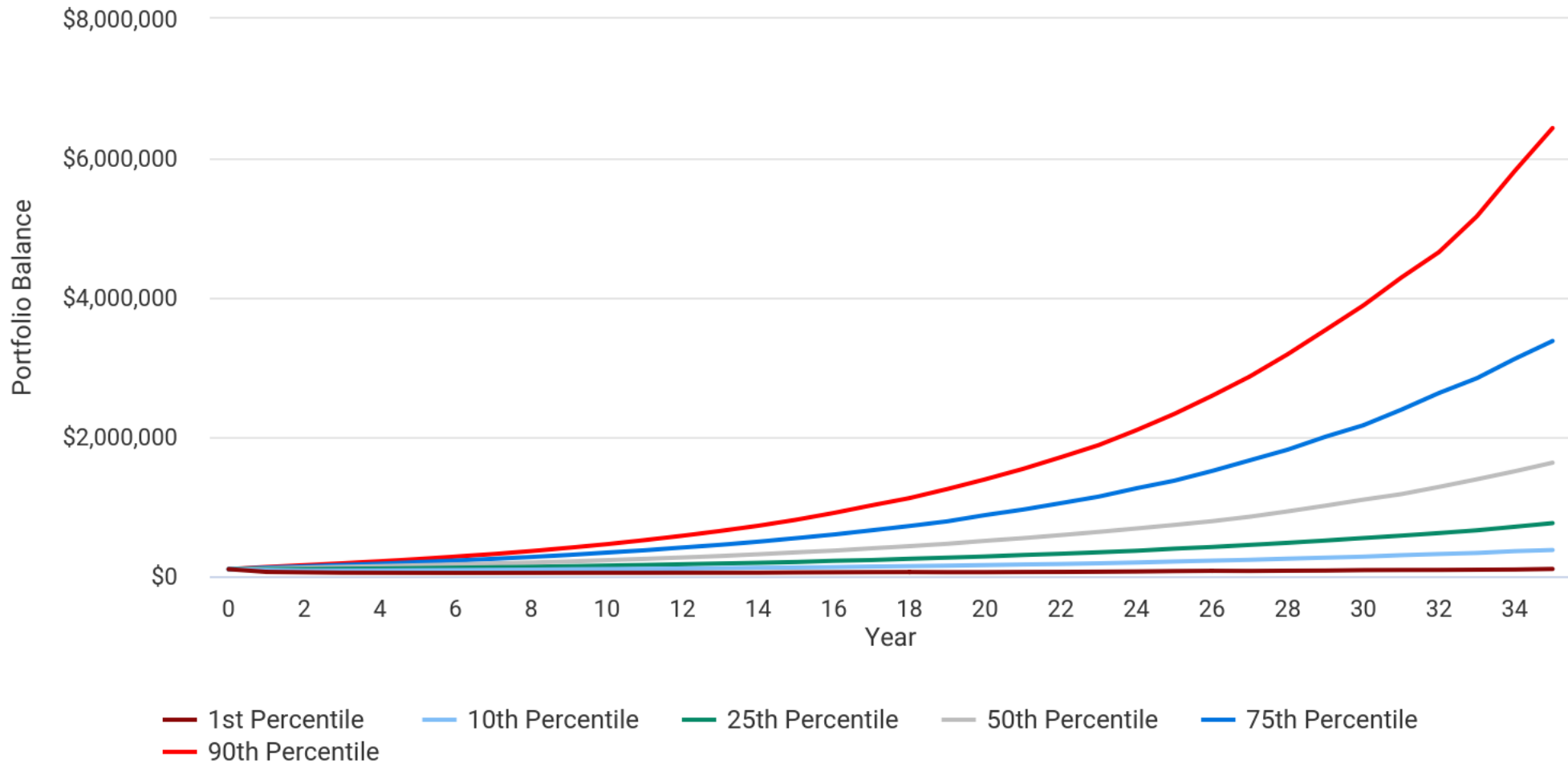
Asset Class	Allocation	CAGR	Expected Annual Return	Annualized Volatility
ACWI SMALL CAP	10.00%	8.26%	9.79%	16.69%
EM IMI	10.00%	4.64%	6.97%	20.80%
EUROPE	32.00%	7.31%	8.63%	15.63%
NORTH AMERICA	36.00%	10.27%	11.71%	16.14%
JAPAN	8.00%	2.24%	3.81%	17.55%
PACIFIC ex JAPAN	4.00%	6.52%	8.50%	19.10%



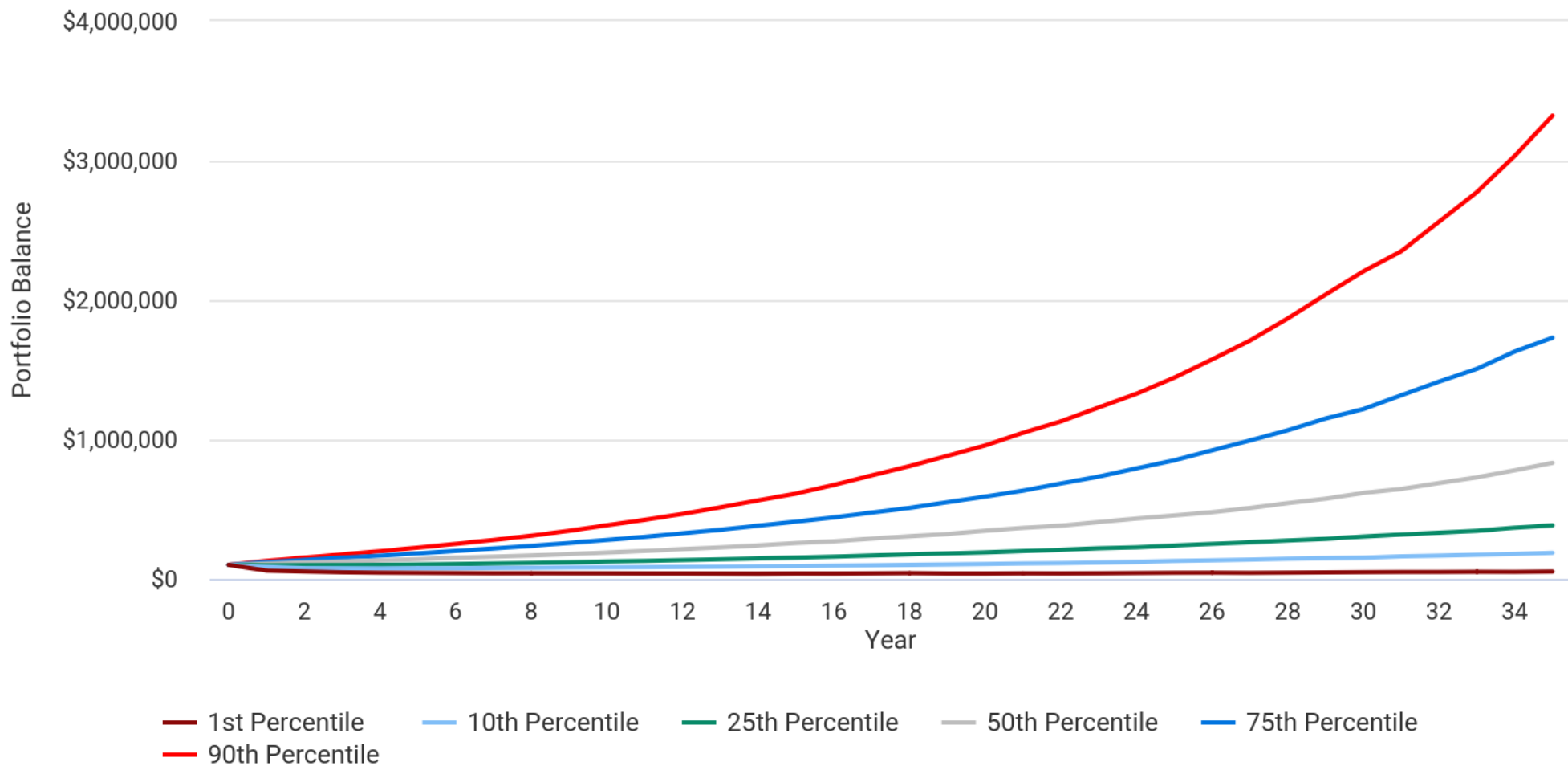
Summary Statistics

	1st Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Time Weighted Rate of Return (nominal)	0.09%	3.85%	5.97%	8.30%	10.58%	12.63%
Time Weighted Rate of Return (real)	-1.94%	1.71%	3.83%	6.16%	8.42%	10.45%
Portfolio End Balance (nominal)	\$103,235	\$375,287	\$760,761	\$1,628,335	\$3,375,577	\$6,432,302
Portfolio End Balance (real)	\$52,007	\$186,630	\$383,081	\$832,000	\$1,729,812	\$3,323,249
Annual Mean Return (nominal)	2.46%	5.90%	7.90%	10.00%	12.10%	14.03%
Annualized Volatility	12.63%	13.75%	14.35%	15.02%	15.68%	16.27%
Sharpe Ratio	-0.05	0.18	0.31	0.46	0.61	0.75
Sortino Ratio	-0.07	0.24	0.43	0.66	0.91	1.15
Maximum Drawdown	-81.75%	-67.73%	-58.70%	-48.51%	-40.35%	-33.17%
Safe Withdrawal Rate	1.47%	3.06%	4.63%	6.77%	9.46%	12.08%
Perpetual Withdrawal Rate	0.00%	1.77%	3.76%	5.87%	7.82%	9.52%

Portfolio Balance (nominal)



Portfolio Balance (inflation adjusted)



Portfolio Balances (nominal)

Year	1st Percentile Balance	10th Percentile Balance	25th Percentile Balance	50th Percentile Balance	75th Percentile Balance	90th Percentile Balance
1	\$60,588	\$87,850	\$100,681	\$110,340	\$122,130	\$131,609
2	\$54,653	\$79,739	\$101,898	\$121,424	\$140,304	\$156,934
3	\$48,970	\$80,321	\$105,419	\$132,963	\$159,557	\$184,301
4	\$47,795	\$81,282	\$108,608	\$143,663	\$178,698	\$213,130
5	\$46,785	\$83,989	\$114,066	\$155,357	\$200,555	\$244,618
6	\$46,286	\$86,001	\$120,367	\$168,640	\$223,893	\$280,514
7	\$46,622	\$89,479	\$126,394	\$181,980	\$248,155	\$317,454
8	\$47,221	\$92,871	\$133,885	\$195,508	\$275,127	\$359,463
9	\$47,842	\$97,653	\$142,422	\$209,835	\$304,118	\$407,641
10	\$48,384	\$100,970	\$151,540	\$229,658	\$338,192	\$458,904
11	\$48,430	\$104,498	\$160,097	\$247,812	\$371,294	\$517,324
12	\$49,027	\$108,614	\$170,609	\$267,536	\$410,880	\$579,898
13	\$49,302	\$113,933	\$181,511	\$288,653	\$449,372	\$648,847
14	\$49,497	\$120,176	\$191,378	\$313,607	\$494,387	\$723,131
15	\$53,091	\$123,710	\$202,293	\$341,252	\$545,198	\$809,072
16	\$55,318	\$129,220	\$219,938	\$366,338	\$597,503	\$907,326
17	\$57,481	\$137,196	\$231,088	\$399,582	\$658,202	\$1,016,411
18	\$58,453	\$143,471	\$249,161	\$430,377	\$719,685	\$1,120,458
19	\$56,546	\$150,035	\$265,269	\$464,365	\$786,788	\$1,250,519
20	\$56,654	\$158,413	\$282,222	\$506,842	\$876,388	\$1,389,908
21	\$59,099	\$167,298	\$303,133	\$545,192	\$955,455	\$1,539,531
22	\$60,498	\$174,181	\$321,449	\$589,167	\$1,047,589	\$1,707,039
23	\$63,145	\$184,242	\$342,108	\$634,958	\$1,141,385	\$1,881,022
24	\$66,652	\$195,781	\$364,017	\$684,212	\$1,261,396	\$2,095,986
25	\$72,123	\$209,688	\$394,245	\$734,902	\$1,370,341	\$2,328,702
26	\$75,815	\$222,349	\$418,499	\$788,735	\$1,509,974	\$2,589,592
27	\$73,934	\$234,394	\$448,121	\$853,061	\$1,663,195	\$2,867,188
28	\$77,441	\$250,568	\$478,267	\$929,984	\$1,816,080	\$3,186,512
29	\$79,817	\$264,889	\$511,252	\$1,011,751	\$2,001,987	\$3,534,542
30	\$86,320	\$279,570	\$546,834	\$1,098,136	\$2,166,468	\$3,886,768
31	\$88,286	\$300,351	\$581,123	\$1,177,064	\$2,388,844	\$4,285,612

Year	1st Percentile Balance	10th Percentile Balance	25th Percentile Balance	50th Percentile Balance	75th Percentile Balance	90th Percentile Balance
32	\$89,052	\$317,531	\$618,109	\$1,280,906	\$2,629,453	\$4,652,978
33	\$92,067	\$332,574	\$657,848	\$1,390,606	\$2,841,428	\$5,165,809
34	\$94,796	\$358,412	\$708,740	\$1,505,127	\$3,119,018	\$5,815,760
35	\$103,235	\$375,287	\$760,761	\$1,628,335	\$3,375,577	\$6,432,302

Portfolio Balances (inflation adjusted)

Year	1st Percentile Balance	10th Percentile Balance	25th Percentile Balance	50th Percentile Balance	75th Percentile Balance	90th Percentile Balance
1	\$58,599	\$86,576	\$96,607	\$109,355	\$120,192	\$129,199
2	\$52,289	\$76,244	\$97,833	\$117,380	\$135,692	\$152,161
3	\$46,782	\$75,277	\$98,729	\$124,989	\$151,482	\$175,177
4	\$43,921	\$74,515	\$99,932	\$132,446	\$165,969	\$198,126
5	\$42,498	\$75,790	\$102,718	\$140,905	\$182,428	\$223,733
6	\$41,202	\$75,503	\$106,267	\$151,082	\$200,012	\$250,741
7	\$39,967	\$77,672	\$109,928	\$159,156	\$217,671	\$278,924
8	\$40,106	\$79,250	\$113,788	\$167,391	\$236,494	\$309,227
9	\$39,596	\$81,600	\$118,572	\$177,159	\$257,217	\$344,487
10	\$39,153	\$82,602	\$124,526	\$188,433	\$279,093	\$384,233
11	\$38,556	\$83,642	\$128,433	\$200,117	\$301,165	\$423,328
12	\$38,493	\$85,406	\$134,223	\$213,137	\$326,461	\$465,685
13	\$37,800	\$87,515	\$140,052	\$225,204	\$352,037	\$512,876
14	\$36,994	\$90,395	\$145,945	\$239,702	\$381,102	\$562,805
15	\$38,338	\$92,106	\$151,905	\$256,848	\$410,406	\$611,697
16	\$37,982	\$94,350	\$159,135	\$269,055	\$440,721	\$673,468
17	\$39,226	\$96,683	\$167,418	\$288,655	\$475,223	\$741,947
18	\$40,761	\$99,919	\$175,273	\$305,277	\$508,719	\$808,679
19	\$38,498	\$102,947	\$182,112	\$321,497	\$549,467	\$882,115
20	\$38,260	\$106,118	\$189,653	\$344,772	\$589,866	\$956,930
21	\$39,421	\$110,047	\$199,300	\$365,485	\$632,575	\$1,047,760
22	\$38,805	\$112,611	\$208,191	\$381,011	\$683,844	\$1,129,652
23	\$39,607	\$116,844	\$219,030	\$407,084	\$733,388	\$1,229,329
24	\$41,534	\$121,938	\$225,831	\$432,216	\$792,599	\$1,327,700
25	\$43,366	\$127,957	\$238,892	\$454,743	\$850,333	\$1,443,413
26	\$43,828	\$132,475	\$250,793	\$478,159	\$921,819	\$1,574,408
27	\$42,805	\$137,713	\$261,951	\$508,089	\$992,587	\$1,708,905
28	\$44,346	\$144,016	\$275,187	\$542,889	\$1,065,884	\$1,868,472
29	\$46,109	\$147,629	\$286,793	\$574,569	\$1,150,432	\$2,038,848
30	\$47,720	\$150,977	\$303,240	\$616,341	\$1,217,733	\$2,206,382
31	\$48,900	\$161,296	\$317,893	\$644,767	\$1,316,701	\$2,350,518

Year	1st Percentile Balance	10th Percentile Balance	25th Percentile Balance	50th Percentile Balance	75th Percentile Balance	90th Percentile Balance
32	\$49,062	\$166,400	\$330,743	\$687,087	\$1,414,779	\$2,562,214
33	\$50,295	\$172,872	\$344,209	\$727,977	\$1,506,839	\$2,774,352
34	\$49,667	\$177,750	\$366,728	\$778,673	\$1,630,945	\$3,034,407
35	\$52,007	\$186,630	\$383,081	\$832,000	\$1,729,812	\$3,323,249

Asset Correlations

Name	ACWI SMALL CAP	EM IMI	EUROPE	NORTH AMERICA	JAPAN	PACIFIC ex JAPAN	Inflation
ACWI SMALL CAP	1.00	0.81	0.84	0.86	0.69	0.81	0.00
EM IMI	0.81	1.00	0.73	0.70	0.58	0.87	-0.00
EUROPE	0.84	0.73	1.00	0.82	0.57	0.75	-0.02
NORTH AMERICA	0.86	0.70	0.82	1.00	0.62	0.72	-0.01
JAPAN	0.69	0.58	0.57	0.62	1.00	0.59	-0.01
PACIFIC ex JAPAN	0.81	0.87	0.75	0.72	0.59	1.00	0.02
Inflation	0.00	-0.00	-0.02	-0.01	-0.01	0.02	1.00

Asset correlations are based on monthly returns from Jan 1995 to Dec 2023

Expected Annual Return

Percentile	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
1st Percentile	-39.41%	-21.18%	-14.09%	-7.00%	-4.13%	-2.80%	-1.30%	-0.49%
10th Percentile	-12.15%	-7.04%	-3.43%	0.10%	1.43%	2.33%	3.01%	3.49%
25th Percentile	0.68%	1.77%	2.67%	4.24%	4.81%	5.32%	5.64%	5.83%
50th Percentile	10.34%	9.96%	9.21%	8.67%	8.53%	8.45%	8.31%	8.31%
75th Percentile	22.13%	16.85%	14.93%	12.96%	11.97%	11.46%	11.04%	10.80%
90th Percentile	31.61%	22.61%	19.59%	16.46%	14.96%	14.06%	13.42%	12.98%

Annual Return Probabilities

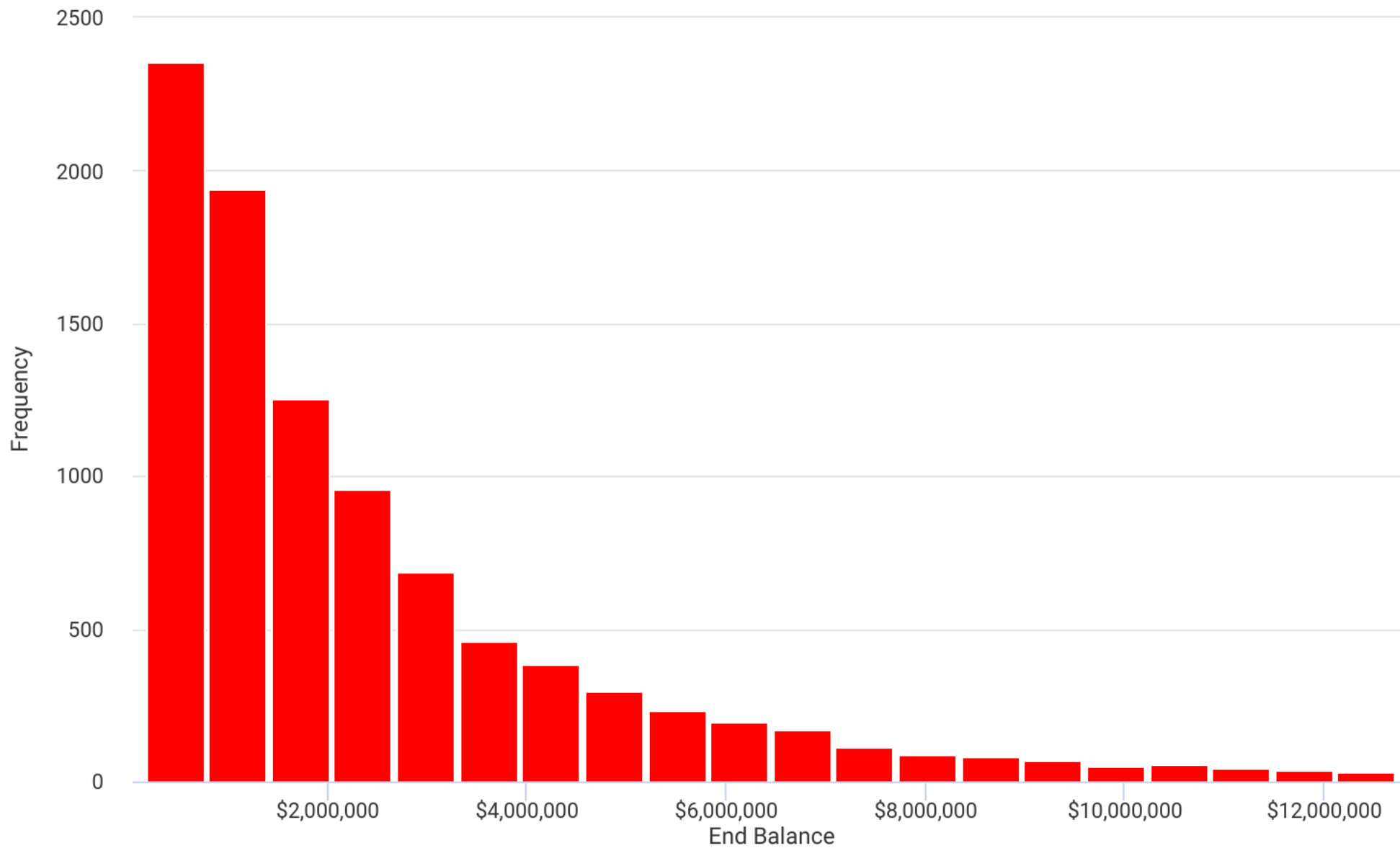
Return	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
>= 0.00%	75.45%	78.63%	82.60%	90.29%	93.90%	96.07%	97.55%	98.50%
>= 2.50%	71.81%	73.04%	75.56%	82.48%	86.65%	89.36%	91.90%	93.66%
>= 5.00%	68.44%	66.23%	67.13%	71.12%	73.94%	76.93%	79.49%	81.47%
>= 7.50%	68.44%	58.73%	57.21%	56.45%	57.60%	58.42%	58.06%	59.23%
>= 10.00%	54.94%	49.85%	46.45%	41.54%	38.68%	36.32%	34.11%	32.39%
>= 12.50%	44.83%	40.17%	35.39%	27.40%	21.90%	17.63%	14.85%	12.36%

Loss Probabilities

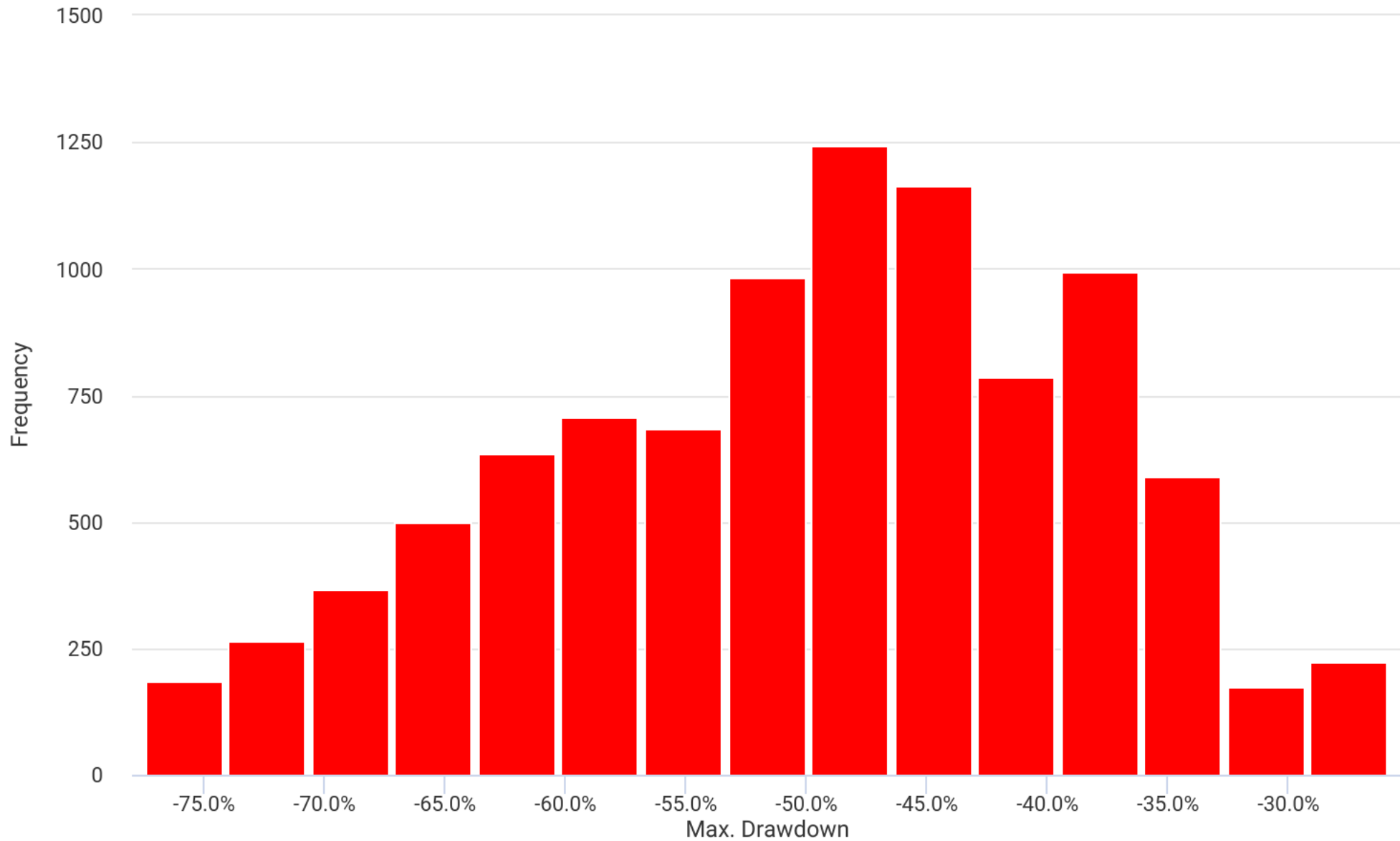
Loss	Within Time Period	End of Time Period
>= 2.50%		64.15%
>= 5.00%		63.07%
>= 7.50%		58.25%
>= 10.00%		45.59%
>= 12.50%		43.85%
>= 15.00%		39.85%
>= 17.50%		36.12%
>= 20.00%		33.83%
>= 22.50%		27.27%
>= 25.00%		25.31%
>= 27.50%		23.37%
>= 30.00%		21.53%
>= 32.50%		18.71%
>= 35.00%		17.07%
>= 37.50%		14.91%
>= 40.00%		12.65%

Loss is measured against the original portfolio balance.

Portfolio End Balance Histogram (95% of results)



Maximum Drawdown Histogram (95% of results)



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- 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.
- A Monte Carlo simulation is a mathematical technique used to provide a range of possible outcomes and to approximate the probability of certain outcomes by running multiple trial runs, called simulations, using random variables. The simulation results are displayed by percentile, a 5th percentile result means that 5% of the simulated portfolios did worse and 95% of simulated portfolios did better for the given return or risk metric. At the median point (50th percentile), half of the simulated portfolios did better and half did worse.
- The results are based on the total return of assets and assume that all received dividends and distributions are reinvested.
- Compound annualized growth rate (CAGR) is the annualized geometric mean return of the portfolio. It is calculated from the portfolio start and end balance and is thus impacted by any cashflows.
- The time-weighted rate of return (TWRR) is a measure of the compound rate of growth in a portfolio. This is calculated from the holding period returns (e.g. monthly returns), and TWRR will thus not be impacted by cashflows. If there are no external cashflows, TWRR will equal CAGR.
- The money-weighted rate of return (MWRR) is the internal rate of return (IRR) taking into account cashflows. This is the discount rate at which the present value of cash inflows equals the present value of cash outflows.
- Real return and balance are inflation adjusted values and show the growth of the purchasing power of the portfolio. Nominal return and balance show the portfolio gains without accounting for inflation.
- Standard deviation (Stdev) is used to measure the dispersion of returns around the mean and is often used as a measure of risk. A higher standard deviation implies greater the dispersion of data points around the mean.
- Correlation measures to what degree the returns of the two assets move in relation to each other. Correlation coefficient is a numerical value between -1 and +1. If one variable goes up by a certain amount, the correlation coefficient indicates which way the other variable moves and by how much. Asset correlations are calculated based on monthly returns.
- A drawdown refers to the decline in value of a single investment or an investment portfolio from a relative peak value to a relative trough. A maximum drawdown (Max Drawdown) is the maximum observed loss from a peak to a trough of a portfolio before a new peak is attained. Drawdown statistics are calculated from simulated monthly returns.
- All risk measures for the portfolio and portfolio assets are calculated based on monthly returns.
- The results are based on simulating 10000 portfolio return paths.
- The probability of success is based on the number of simulations the portfolio survives with a positive end balance.
- Safe withdrawal rate is the percentage of the original portfolio balance that can be withdrawn at the end of each year with inflation adjustment without the portfolio running out of money (dollar amount withdrawal).
- Perpetual withdrawal rate is the percentage of portfolio balance that can be withdrawn at the end of each year while retaining the inflation adjusted portfolio balance (percentage withdrawal).
- The results assume annual rebalancing of portfolio assets.
- Contributions and withdrawals are done at the end of each specified time period.
- Sharpe and Sortino ratios are calculated against the historical average 2.31% risk-free rate.