

Backtest Portfolio Asset Allocation

Portfolio Backtesting Overview

This portfolio backtesting tool allows you to construct one or more portfolios based on the selected mutual funds, ETFs, and stocks. You can analyze and backtest portfolio returns, risk characteristics, style exposures, and drawdowns. The results cover both returns and fund fundamentals based portfolio style analysis along with risk and return decomposition by each portfolio asset. You can compare up to three different portfolios against the selected benchmark, and you can also specify any periodic contribution or withdrawal cashflows and the preferred portfolio rebalancing strategy.

The related [asset class level portfolio modeling tool](#) allows you to analyze and compare asset class level portfolios with a longer time horizon starting from 1972, and you can use the [dynamic allocation backtest tool](#) to analyze portfolios where assets or their weights have been adjusted over time.

Portfolio Analysis Results (Jan 2016 - Mar 2025) [Link](#)

[PDF](#) [Excel](#)

Note:

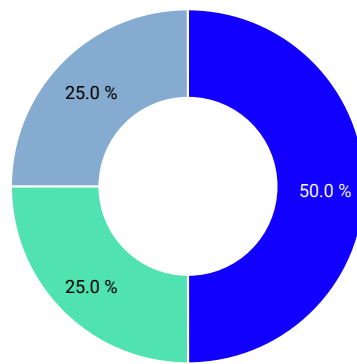
- The time period was constrained by the available data for Vanguard S&P 500 ETF (VOO) [Oct 2010 - Mar 2025]. You can extend the available time period by using Vanguard 500 Index Investor (VFINX), which is the oldest share class of the fund.
- The time period of the results is limited to 10 years for free tier accounts.

Portfolio 1

Ticker	Name	Allocation
VOO	Vanguard S&P 500 ETF	50.00%
SCHF	Schwab International Equity ETF	25.00%
VYM	Vanguard High Dividend Yield ETF	25.00%

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Highlights

Return

Annualized Return

Portfolio Return

11.3%

Risk

Volatility and Drawdown

Standard Deviation

14.6%

Drawdown

22.1%

Portfolio Growth

\$10,000 invested in January 1, 2016 would be worth \$26,977 as of March 31, 2025, which represents a cumulative return of 169.77%.

Return

Over the period, the portfolio generated a return of 11.33% per year, with 77 out of 111 or 69.37% of months positive. The best year for the portfolio was 2019 with 27.26% return ([💡 Insights Available](#)) and the worst year over the period was 2022 with -12.91% return ([💡 Insights Available](#)).

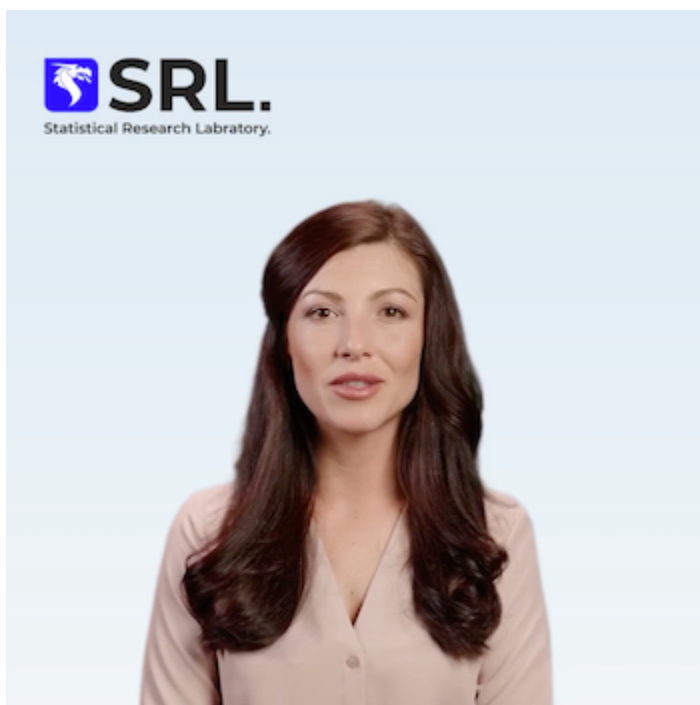
Risk

The maximum drawdown of the portfolio was 22.08% from January 1, 2022 to September 30, 2022 ([💡 Insights Available](#)) with a recovery time of 10 months. The risk adjusted

return of the portfolio, measured by the Sharpe Ratio, was 0.67.

💡 Insights

Gain valuable insights into key market drivers that likely impacted performance during the period.

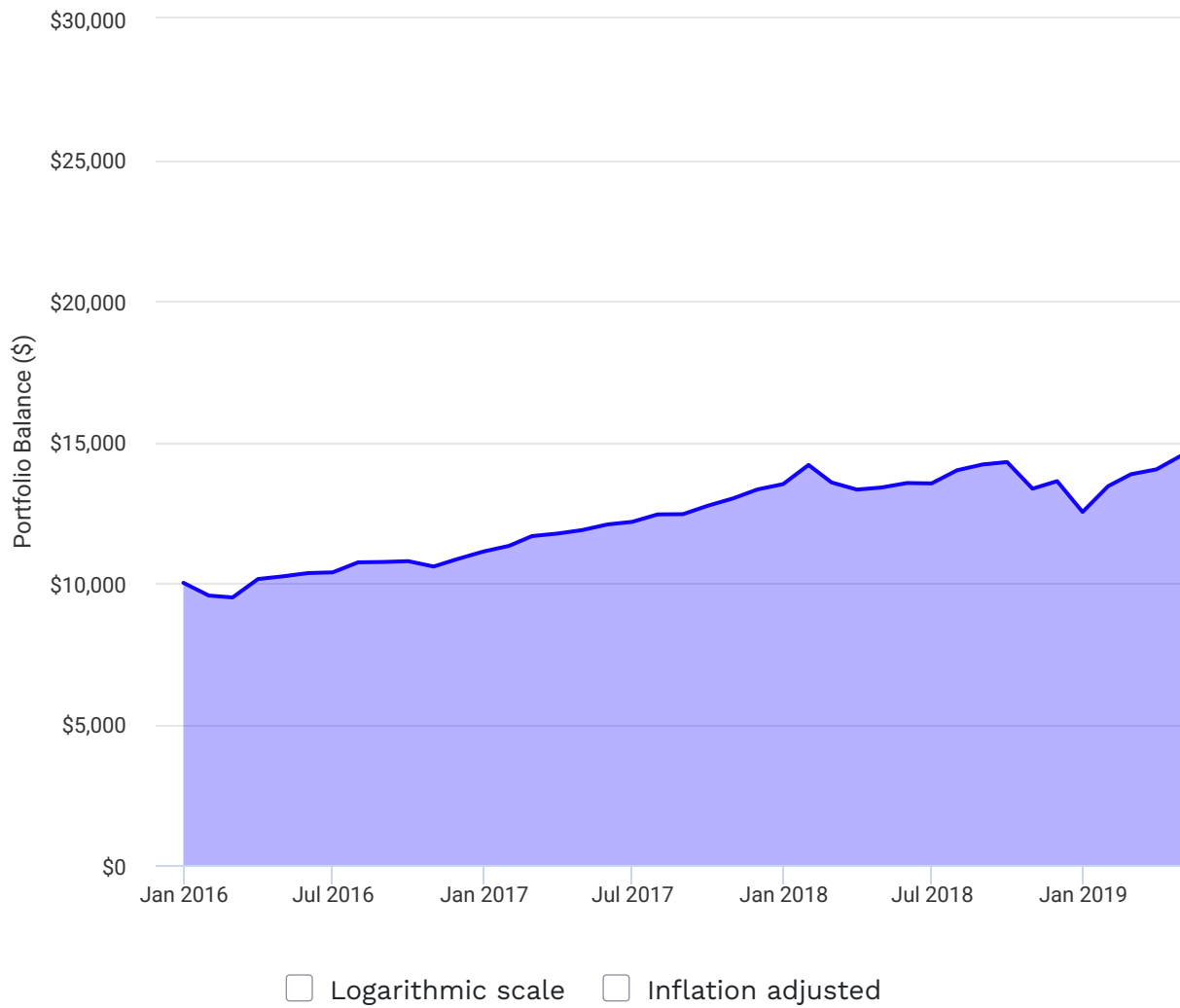


To view insights, click the insight links in the summary

Performance Summary

Metric	Portfolio 1
Start Balance	\$10,000
End Balance	📊 \$26,977
Annualized Return (CAGR)	📊 11.33%
Standard Deviation	14.60%
Best Year	27.26%
Worst Year	-12.91%
Maximum Drawdown	📊 -22.08%
Sharpe Ratio	0.67
Sortino Ratio	1.02

Portfolio Growth



Annual Returns



Trailing Returns

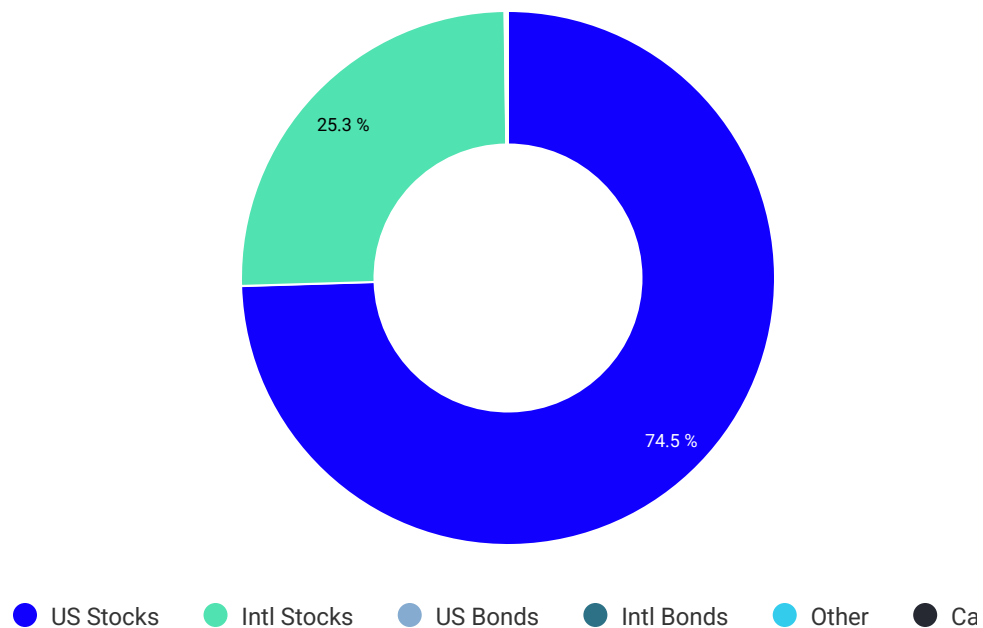
Name	Total Return			Annualized Return			Annualized Standard Deviation	
	3 Month	Year To Date	1 year	3 year	5 year	Full	3 year	5 year
Portfolio 1	0.02%	0.02%	8.17%	8.25%	16.66%	11.33%	16.18%	15.58%

Trailing return and volatility are as of last calendar month ending March 2025

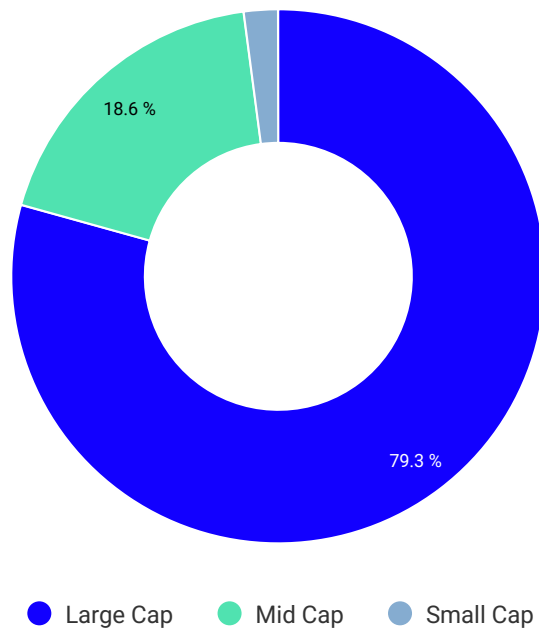
Holdings Based Style Analysis for Portfolio 1

Ticker	Name	Category	Weight	Yield		Expense Ratio		P/E	Contribution	
				SEC	TTM	Net	Gross		Return	
VOO	Vanguard S&P 500 ETF	Large Blend	50.00%	1.30%	1.36%	0.03%	0.03%	24.92	\$10,298	52
SCHF	Schwab International Equity ETF	Foreign Large Blend	25.00%	2.56%	3.07%	0.06%	0.06%	16.04	\$2,616	24
VYM	Vanguard High Dividend Yield ETF	Large Value	25.00%	2.67%	2.86%	0.06%	0.06%	19.16	\$4,062	23
			100.00%	1.96%	2.16%	0.04%	0.04%	21.26	\$16,977	100

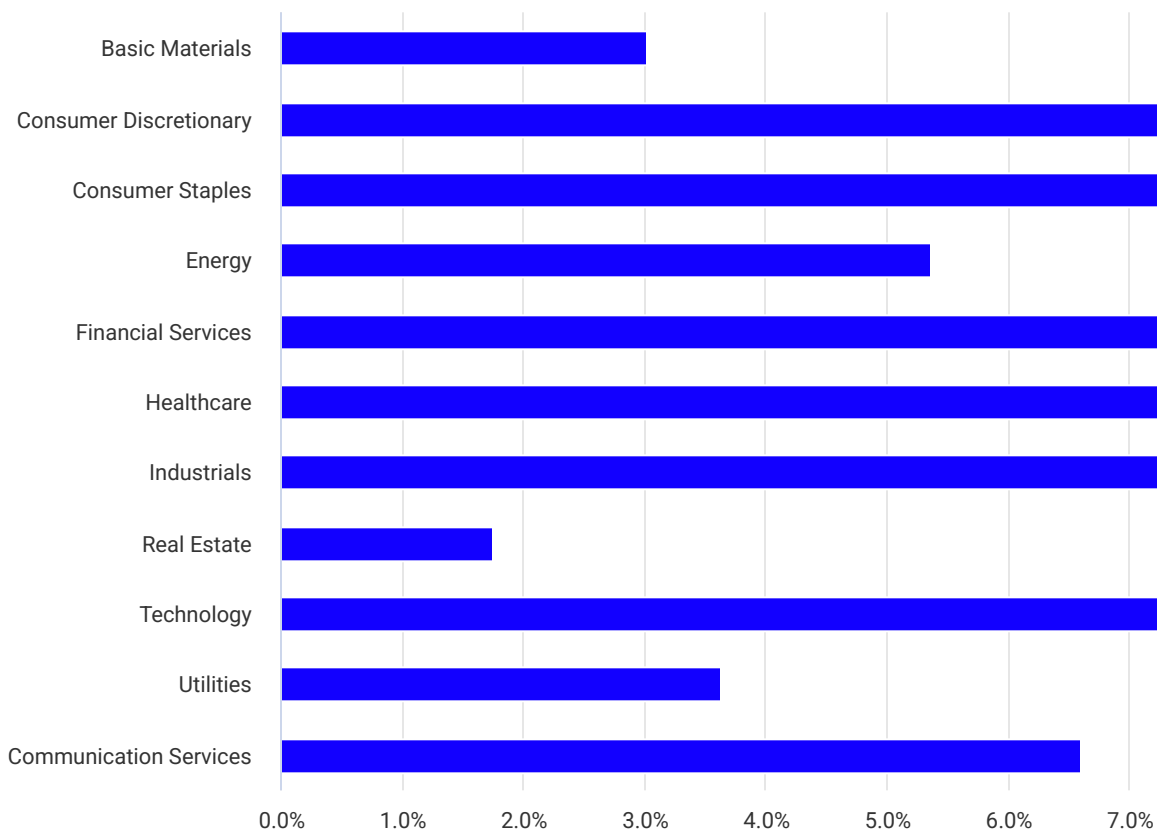
Asset Allocation



Equity Market Capitalization



Equity Sectors



Fund fundamentals data as of 04/25/2025. (c) 2025 Morningstar. All Rights Reserved. The fund fundamentals information contained herein: (1) is proprietary to Morningstar and/or its content providers; (2) may not be copied or distributed; and (3) is not warranted to be accurate, complete or timely. Neither Morningstar nor its content providers are responsible for any damages or losses arising from any use of this information.

Risk and Return Metrics

Metric	Portfolio 1
Arithmetic Mean (monthly)	0.99%
Arithmetic Mean (annualized)	12.50%
Geometric Mean (monthly)	0.90%
Geometric Mean (annualized)	11.33%
Standard Deviation (monthly)	4.21%
Standard Deviation (annualized)	14.60%
Downside Deviation (monthly)	2.71%
Maximum Drawdown	-22.08%
Benchmark Correlation	0.98
Beta ^(*)	0.89
Alpha (annualized)	-0.07%
R ²	95.89%
Sharpe Ratio	0.67
Sortino Ratio	1.02
Treynor Ratio (%)	11.06
Calmar Ratio	0.43
Modigliani–Modigliani Measure	12.84%
Active Return	-1.47%
Tracking Error	3.46%
Information Ratio	-0.43
Skewness	-0.49
Excess Kurtosis	0.92
Historical Value-at-Risk (5%)	6.86%
Analytical Value-at-Risk (5%)	5.92%
Conditional Value-at-Risk (5%)	9.00%

* U.S. Stock Market is used as the benchmark for calculations. Value-at-risk metrics are monthly values.

Metric	Portfolio 1
Upside Capture Ratio (%)	88.64
Downside Capture Ratio (%)	91.30
Safe Withdrawal Rate	16.42%
Perpetual Withdrawal Rate	7.39%
Positive Periods	77 out of 111 (69.37%)
Gain/Loss Ratio	0.80

* U.S. Stock Market is used as the benchmark for calculations. Value-at-risk metrics are monthly values.

Annual Returns

Year	Inflation	Portfolio 1 Return	Portfolio 1 Balance	Vanguard S&P 500 ETF (VOO)	Schwab International Equity ETF (SCHF)	Vanguard High Dividend Yield ETF (VYM)
2025	1.33%	0.02%	\$26,977	-4.29%	6.92%	1.74%
2024	2.89%	17.71%	\$26,971	24.98%	3.29%	17.59%
2023	3.35%	19.39%	\$22,913	26.32%	18.34%	6.57%
2022	6.45%	-12.91%	\$19,192	-18.19%	-14.79%	-0.46%
2021	7.04%	23.79%	\$22,036	28.78%	11.41%	26.21%
2020	1.36%	11.81%	\$17,801	18.29%	9.50%	1.14%
2019	2.29%	27.26%	\$15,921	31.35%	22.24%	24.07%
2018	1.91%	-7.31%	\$12,511	-4.50%	-14.32%	-5.91%
2017	2.11%	21.49%	\$13,498	21.77%	26.00%	16.42%
2016	2.07%	11.11%	\$11,111	12.17%	3.03%	17.05%

Annual return for 2025 is from 01/01/2025 to 03/31/2025

Monthly Returns

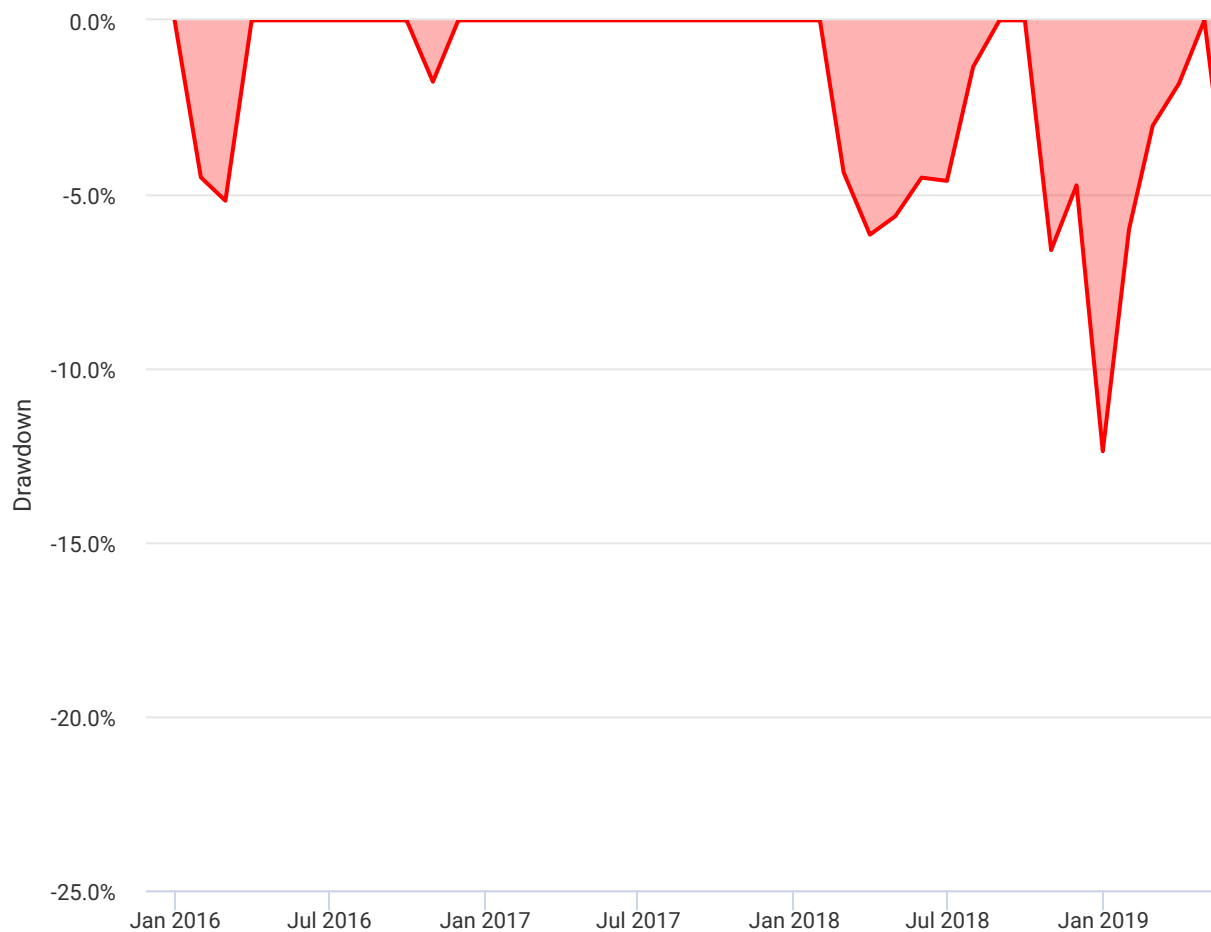
Year	Month	Portfolio 1 Return	Portfolio 1 Balance	Vanguard S&P 500 ETF (VOO)	Schwab International Equity ETF (SCHF)	Vanguard High Dividend Yield ETF (VYM)
2025	3	-3.55%	\$26,977	-5.61%	-0.05%	-3.16%
2025	2	0.31%	\$27,971	-1.27%	2.43%	1.28%
2025	1	3.39%	\$27,885	2.69%	4.43%	3.74%
2024	12	-3.18%	\$26,971	-2.34%	-3.57%	-4.59%
2024	11	4.52%	\$27,857	5.89%	0.41%	5.45%
2024	10	-1.76%	\$26,651	-0.95%	-5.01%	-0.33%
2024	9	1.65%	\$27,128	2.18%	0.86%	1.33%
2024	8	2.59%	\$26,687	2.39%	3.16%	2.44%
2024	7	2.46%	\$26,014	1.16%	2.86%	4.83%
2024	6	1.35%	\$25,391	3.57%	-1.59%	-0.32%
2024	5	4.43%	\$25,052	5.03%	4.62%	3.03%
2024	4	-3.81%	\$23,990	-4.01%	-3.46%	-3.74%

Show entries

Showing 1 to 12 of 111 entries

[First](#)[Previous](#)[Next](#)[Last](#)

Drawdowns



Historical Market Stress Periods

Stress Period	Start	End	Portfolio 1
COVID-19 Start	Jan 2020	Mar 2020	-21.58%

Drawdowns for Portfolio 1

Rank	Start	End	Length	Recovery By	Recovery Time	Underwater Period	Drawdown
1	Jan 2022	Sep 2022	9 months	Jul 2023	10 months	1 year 7 months	-22.08%
2	Jan 2020	Mar 2020	3 months	Aug 2020	5 months	8 months	-21.58%
3	Oct 2018	Dec 2018	3 months	Apr 2019	4 months	7 months	-12.38%
4	Aug 2023	Oct 2023	3 months	Dec 2023	2 months	5 months	-8.85%
5	Feb 2018	Mar 2018	2 months	Aug 2018	5 months	7 months	-6.16%
6	May 2019	May 2019	1 month	Jun 2019	1 month	2 months	-6.06%
7	Sep 2020	Oct 2020	2 months	Nov 2020	1 month	3 months	-5.52%
8	Jan 2016	Feb 2016	2 months	Mar 2016	1 month	3 months	-5.19%
9	Sep 2021	Sep 2021	1 month	Oct 2021	1 month	2 months	-3.99%
10	Apr 2024	Apr 2024	1 month	May 2024	1 month	2 months	-3.81%

Worst 10 drawdowns included above

Portfolio Assets

Ticker	Name	CAGR	Stdev	Best Year	Worst Year	Max Drawdown	Sharpe Ratio	Sortino Ratio
VOO	Vanguard S&P 500 ETF	13.50%	15.50%	31.35%	-18.19%	-23.91%	0.77	1.18
SCHF	Schwab International Equity ETF	6.86%	15.34%	26.00%	-14.79%	-27.49%	0.38	0.56
VYM	Vanguard High Dividend Yield ETF	10.78%	14.41%	26.21%	-5.91%	-23.97%	0.64	0.99

Portfolio Asset Performance

Name	Total Return			Annualized Return		Expense Ratio	
	3 Month	Year To Date	1 year	3 year	5 year	Net	Gross
Vanguard S&P 500 ETF	-4.29%	-4.29%	8.34%	9.02%	18.55%	0.03%	0.03%
Schwab International Equity ETF	6.92%	6.92%	4.61%	5.64%	12.07%	0.06%	0.06%
Vanguard High Dividend Yield ETF	1.74%	1.74%	9.77%	8.01%	16.34%	0.06%	0.06%

Trailing returns as of last calendar month ending March 2025

Monthly Correlations

Ticker	Name	VOO	SCHF	VYM	Portfolio 1
VOO	Vanguard S&P 500 ETF	1.00	0.86	0.90	0.98
SCHF	Schwab International Equity ETF	0.86	1.00	0.86	0.93
VYM	Vanguard High Dividend Yield ETF	0.90	0.86	1.00	0.95

Portfolio Return Decomposition

Ticker	Name	Portfolio 1
VOO	Vanguard S&P 500 ETF	\$10,298
SCHF	Schwab International Equity ETF	\$2,616
VYM	Vanguard High Dividend Yield ETF	\$4,062

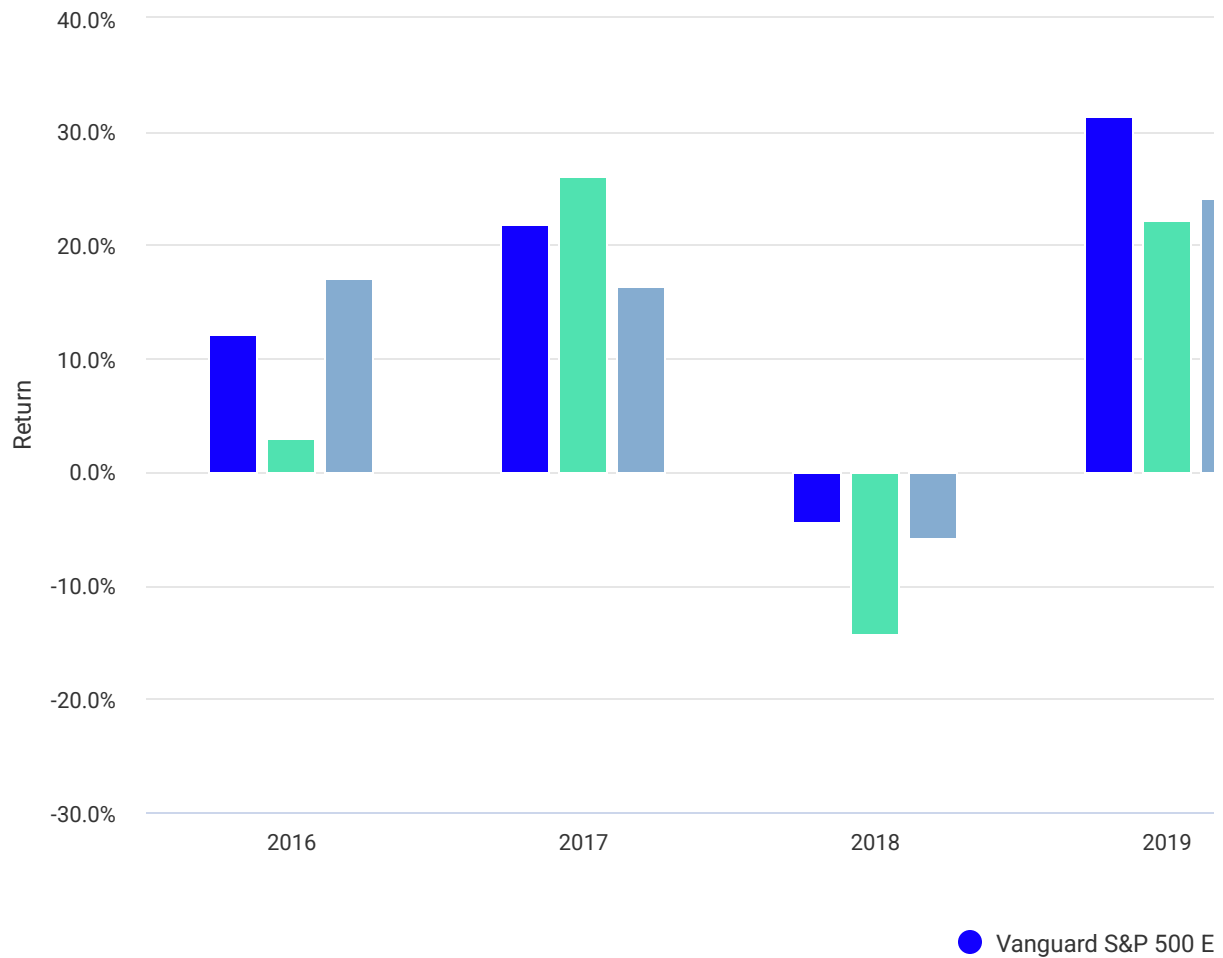
Return attribution decomposes portfolio gains into its constituent parts and identifies the contribution to returns by each of the assets.

Portfolio Risk Decomposition

Ticker	Name	Portfolio 1
VOO	Vanguard S&P 500 ETF	52.06%
SCHF	Schwab International Equity ETF	24.44%
VYM	Vanguard High Dividend Yield ETF	23.50%

Risk attribution decomposes portfolio risk into its constituent parts and identifies the contribution to overall volatility by each of the assets.

Annual Asset Returns



Rolling Returns

Roll Period	Average	High	Low
1 year	12.77%	52.68%	-15.31%
3 years	10.45%	20.77%	2.06%
5 years	11.42%	16.66%	6.17%
7 years	10.71%	11.53%	9.62%

Annualized Rolling Return - 3 Years



Annualized Rolling Return - 5 Years



Notes and Disclosures

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