



NORTHERN TRUST

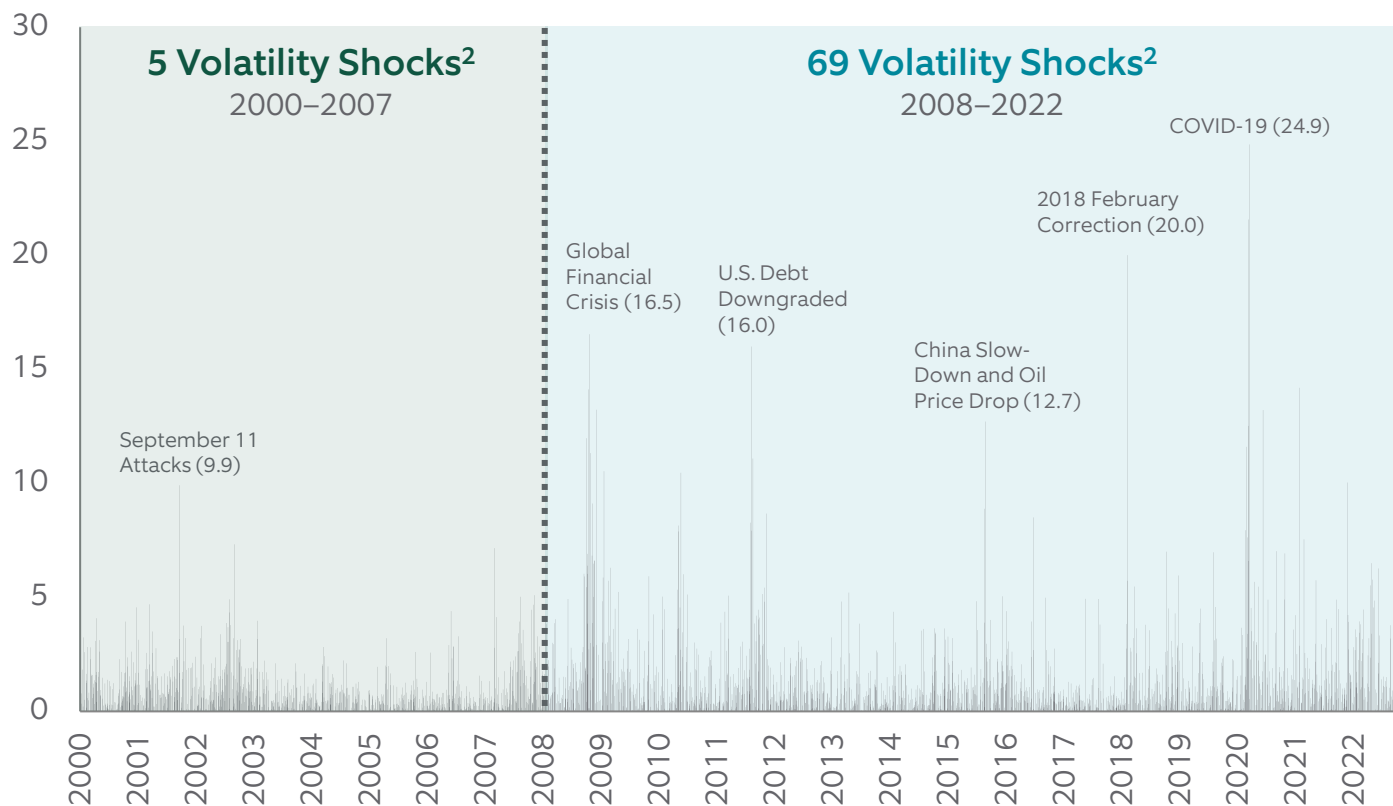
ASSET MANAGEMENT

RISK INSIGHTS SERIES

NAVIGATING EXTENDED PERIODS OF MARKET VOLATILITY

The New Normal: More Frequent and Extreme Volatility

DAILY POINT INCREASE¹ IN THE VIX



We are in a new era of extreme volatility that is leaving investors searching for new ways to achieve the same portfolio objectives.

In an environment marked by rapid market swings, investors looking to consistently outperform may have to increase their emphasis on downside protection while maintaining their upside participation.

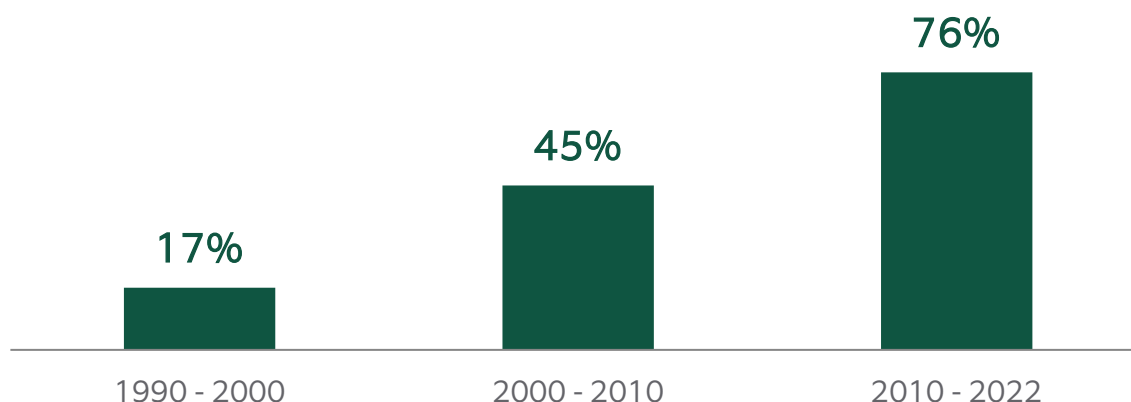
¹Volatility increases are represented by any increase in the VIX daily, as of 12/31/2022.

²Volatility shocks are any increase in the VIX daily greater than five points.

Source: Northern Trust Asset Management, Bloomberg. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index.

The Volatility Gap in Down and Up Markets is Growing — Causing More Extreme Market Swings

VOLATILITY DIFFERENCE (STANDARD DEVIATION) DURING DOWN AND UP MARKETS



Volatility in
Down Markets

14.0%

23.5%

21.1%

Volatility in
Up Markets

11.9%

16.1%

12.0%

Down/Up
Volatility Ratio

1.17

1.46

1.76

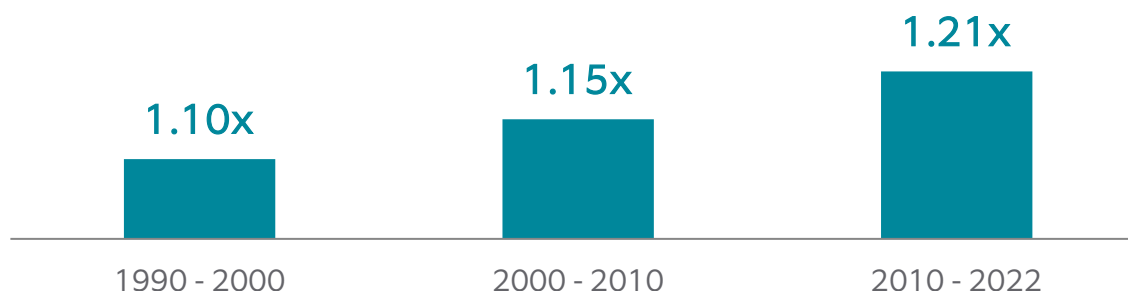
The ratio of volatility in down markets vs. up markets has been trending upward over the past 30 years. Simply put, markets are declining more rapidly than when they move up.

This fundamental shift in market behavior is leading investors to reassess their portfolios' readiness for this new volatility paradigm.

Source: Northern Trust Quantitative Research, FactSet. Russell 1000 Index. Data from 12/31/1989 to 12/31/2022. Chart shows the realized monthly volatility in up and down markets, as well as the ratio. Monthly volatilities calculated using daily return data in each month. Values annualized and averaged across selected time horizons. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index.

Generating Alpha Will Likely Require Investment Strategies With a Similar Asymmetric Risk Profile

UP/DOWN CAPTURE RATIO OF LOW VOLATILITY EQUITIES¹



	1990 - 2000	2000 - 2010	2010 - 2022
Up Market Capture Ratio	83%	58%	85%
Down Market Capture Ratio	75%	50%	70%
Up/Down Capture Ratio	1.10	1.15	1.21

¹Low Volatility research portfolios are formed by selecting the bottom 20% of securities ranked by MSCI Barra Volatility. Research portfolios are capitalization weighted and rebalanced quarterly.

Source: Northern Trust Asset Management, FactSet. Russell 1000 Universe, 12/31/1989 through 12/31/2022. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index.

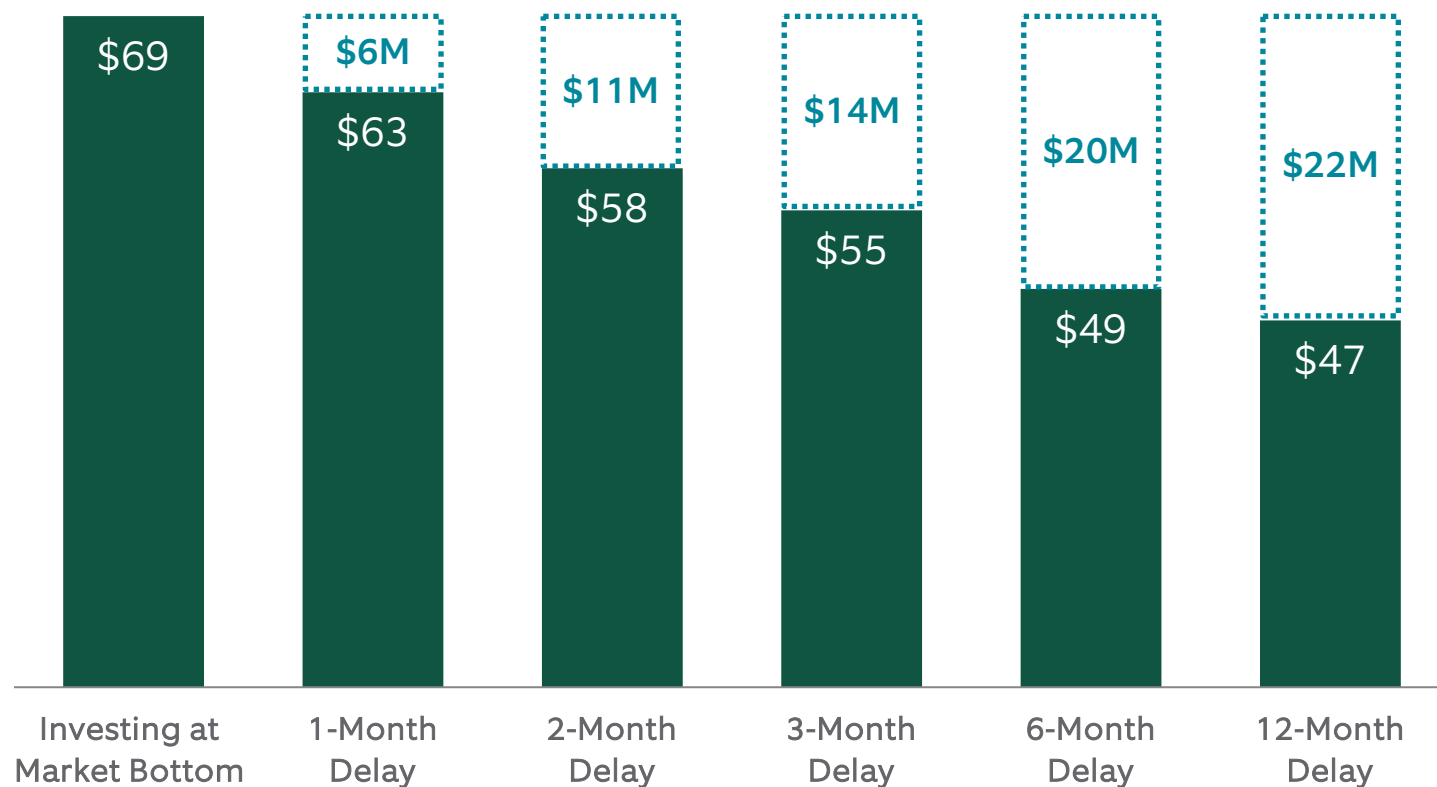
This pattern of asymmetric volatility is likely to continue.

While increased volatility is never welcomed, here's an essential truth: lower volatility equities have historically performed very well in turbulent markets.

Continuing to achieve portfolio objectives in this environment will likely require a greater use of investment strategies with a similar risk and return profile.

The Potential Cost of Delaying Your Re-Balance

HYPOTHETICAL GROWTH OF \$10 MILLION AT GLOBAL FINANCIAL CRISIS MARKET BOTTOM¹



As the speed of market corrections increases and general volatility becomes more pervasive, timing becomes everything.

While it's nearly impossible to time the bottom of any correction perfectly, the cost of delaying the decision to re-balance equity allocations for several months can have material long-term effects.

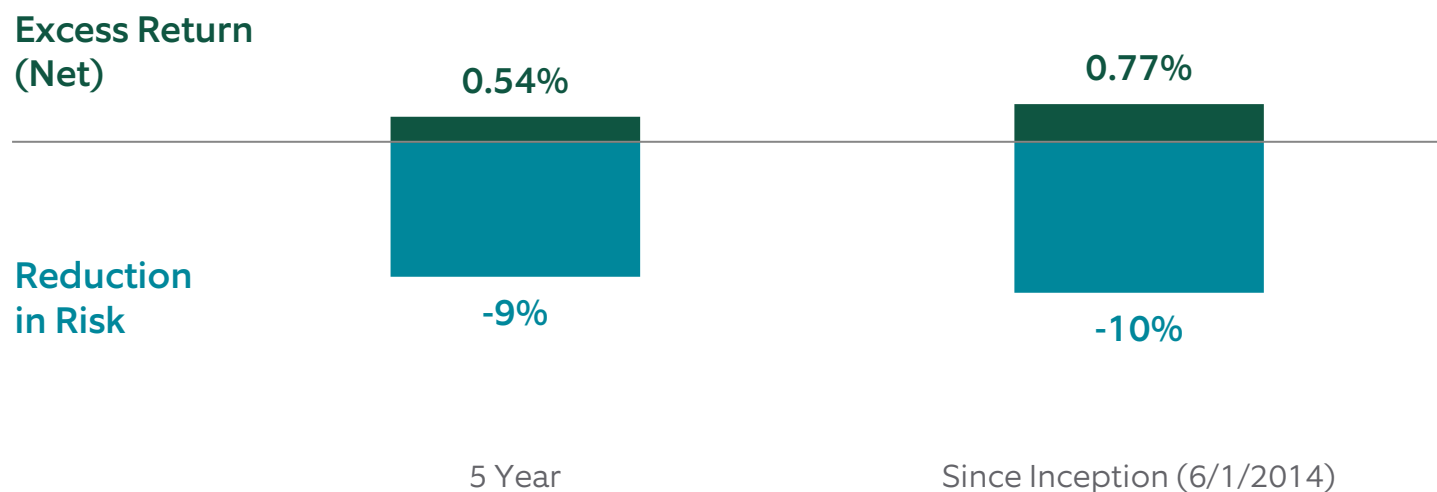
¹Market bottom was March 2009 for the S&P 500 Index.

Source: Northern Trust Asset Management, eVestment. Data from 3/1/2009 to 12/31/2022. Graph represents the hypothetical growth of \$10M using the S&P 500 Index. "Investing at Market Bottom" time period is from 3/1/2009 – 12/31/2022 and each subsequent beginning period is moved up by the "delay" amount. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index.

Northern Trust Quality Low Volatility: A Core Equity Allocation With Strong Market Upside Potential While Seeking to Reduce Downside Risk

NORTHERN TRUST QUALITY LOW VOLATILITY U.S. STRATEGY (NET)

- Excess Return vs. eVestment US Large Cap Core Equity Universe Median
- Risk Reduction vs. eVestment US Large Cap Core Universe Median

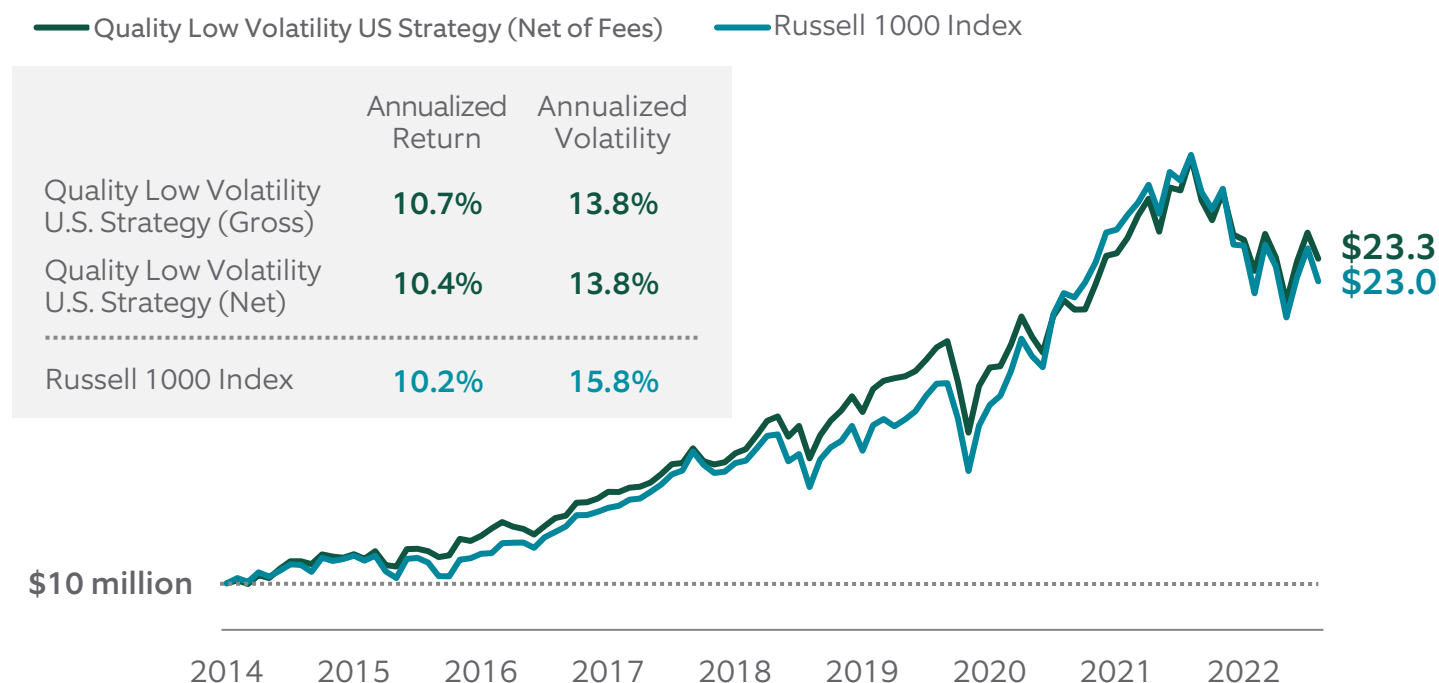


As you look to re-balance equity holdings amidst the market correction, it is an opportune time to take a fresh look at large-cap equity allocations to ensure they are built to withstand a volatile and slow growth environment.

Source: Northern Trust Asset Management, eVestment. Data as of 12/31/2022. Returns for periods greater than one year are annualized. Net performance returns are reduced by investment management fees and other expenses relating to the management of the account. Net-of-fee returns are calculated based upon model fees. For periods 2020 and prior, the model fee reflects the composite's highest actual client fee rate (or the highest rate on the applicable fee schedule for the given time period if actual rates could not be identified), applied monthly. For periods after 1/1/2021, the highest rate on the applicable fee schedule is used. Past performance is not indicative of future results. Investment management/advisory fees are described in Northern Trust Investments, Inc. Form ADV Part 2A.

A Purposeful Focus on Navigating Both Up and Down Markets Has Resulted in More Value With Less Risk

HYPOTHETICAL GROWTH OF \$10 MILLION – QUALITY LOW VOLATILITY U.S. STRATEGY (NET OF FEES) SINCE INCEPTION



Source: Northern Trust Asset Management, eVestment. Data is from 6/1/2014 to 12/31/2022. Returns for periods greater than one year are annualized. Gross performance returns shown do not reflect the deduction of investment management/advisory fees, assume the reinvestment of dividends and capital gains, and are net of transaction costs and other expenses. Performance results will be reduced by the fees incurred in the management of the account. Net performance returns are reduced by investment management fees and other expenses relating to the management of the account. Net-of-fee returns are calculated based upon model fees. For periods 2020 and prior, the model fee reflects the composite's highest actual client fee rate (or the highest rate on the applicable fee schedule for the given time period if actual rates could not be identified), applied monthly. For periods after 1/1/2021, the highest rate on the applicable fee schedule is used. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Past performance is not indicative of future results. Investment management/advisory fees are described in Northern Trust Investments, Inc. Form ADV Part 2A.

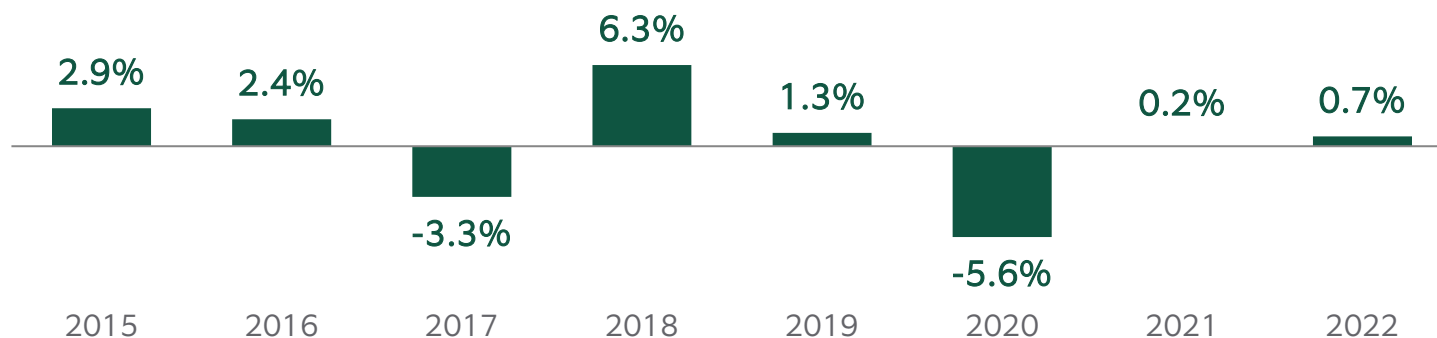
During periods of extended volatility, solely focusing on reducing risk to mitigate the effects of large drawdowns is expected to chip away at portfolio returns over time.

Our proprietary approach to portfolio construction is designed to find securities with beneficial attributes – in up and down markets – to consistently add value over time.

When Bad Years Hit You Need Your Core Equity Portfolio to Provide a Tailwind, Not a Headwind

NORTHERN TRUST QUALITY LOW VOLATILITY U.S. STRATEGY EXCESS RETURNS

■ vs. eVestment U.S. Large Cap Core Equity Universe Median (Net of Fees)



NUMBER OF TRADING DAYS WITH RETURNS < -1% (RUSSELL 1000 INDEX)

2015	31	2016	21	2017	4	2018	32	2019	15	2020	45	2021	20	2022	65
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¹“U.S. equity market” is represented by the Russell 1000 index.

Source: Northern Trust Asset Management, eVestment, Russell. Gross performance returns shown do not reflect the deduction of investment management/advisory fees, assume the reinvestment of dividends and capital gains, and are net of transaction costs and other expenses. Performance results will be reduced by the fees incurred in the management of the account. Net performance returns are reduced by investment management fees and other expenses relating to the management of the account. Net-of-fee returns are calculated based upon model fees. For periods 2020 and prior, the model fee reflects the composite’s highest actual client fee rate (or the highest rate on the applicable fee schedule for the given time period if actual rates could not be identified), applied monthly. For periods after 1/1/2021, the highest rate on the applicable fee schedule is used. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Past performance is not indicative of future results. Investment management/advisory fees are described in Northern Trust Investments, Inc. Form ADV Part 2A.

The U.S. equity market experiences 29 trading days per year when the market returns -1% or worse, on average.¹ While 2017 was an exception, with only four large down days, we anticipate a far more volatile future.

And, if your core equity holdings are not equipped to deliver alpha during such volatility, it may be challenging to meet investment objectives.

Quality Low Volatility U.S. Strategy Standardized Performance

NORTHERN TRUST QUALITY LOW VOLATILITY U.S. STRATEGY PERFORMANCE AS OF 12/31/2022

	4Q	YTD	1 YR	3 YR	5 YR	Since Inception 6/1/2014
Quality Low Volatility Strategy (Gross of Fees)	8.35%	-15.45%	-15.45%	5.95%	9.57%	10.72%
Quality Low Volatility Strategy (Net of Fees)	8.21%	-15.87%	-15.87%	5.50%	9.18%	10.36%
Russell 1000 Index	7.24%	-19.13%	-19.13%	7.35%	9.13%	10.19%

Since the strategy's inception of 6/1/2014, QLV has outperformed the Russell 1000 Index by 17 bps, net of fees with 12% less volatility.

Source: Northern Trust. Returns for periods greater than one year are annualized. Gross performance returns shown do not reflect the deduction of investment management/advisory fees, assume the reinvestment of dividends and capital gains, and are net of transaction costs and other expenses. Performance results will be reduced by the fees incurred in the management of the account. Net performance returns are reduced by investment management fees and other expenses relating to the management of the account. Net-of-fee returns are calculated based upon model fees. For periods 2020 and prior, the model fee reflects the composite's highest actual client fee rate (or the highest rate on the applicable fee schedule for the given time period if actual rates could not be identified), applied monthly. For periods after 1/1/2021, the highest rate on the applicable fee schedule is used. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Past performance is not indicative of future results. GIPS Composite Reports available upon request.

Quality Low Volatility U.S. Strategy Risk-Adjusted Performance

NORTHERN TRUST QUALITY LOW VOLATILITY U.S. STRATEGY SHARPE RATIOS AS OF 12/31/2022

	Sharpe Ratio 5 Year	Ranking 5 Year	Sharpe Ratio Since Inception	Ranking Since Inception
Quality Low Volatility Strategy (Gross of Fees)	0.49	31 st	0.71	14 th
Quality Low Volatility Strategy (Net of Fees)	0.47	26 th	0.69	10 th
U.S. Low Volatility Equity eVestment Universe Median (Gross of Fees)	0.39	66 th	0.63	36 th
U.S. Large Cap Core Equity eVestment Universe Median (Gross of Fees)	0.44	49 th	0.61	48 th
Russell 1000 Index (Gross of Fees)	0.41	60 th	0.59	57 th

Northern Trust QLV has achieved 10th percentile Sharpe Ratio peer since the strategy's inception of June 2014.

This strategy has demonstrated better risk-adjusted returns than the U.S. Low Volatility universe median, U.S. Large Cap Core universe median, and the Russell 1000 benchmark.

Source: eVestment, U.S. Large Cap Core Equity Universe. Inception date June 1, 2014. Returns for periods greater than one year are annualized. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Past performance is not indicative of future results.

QLV- Russell 1000 composite | Portfolio Benchmark: Russell 1000 Index

GIPS® REPORT

Year	Annual Returns (%)			3-Year Annualized Standard Deviation		Internal Dispersion	Number of Accounts	Composite Assets (\$ Millions)	Total Firm Assets (\$ Millions)
	Gross	Net	Index	Composite	Index				
2022	-15.45	-15.87	-19.13	19.2%	21.3%	n/a	9	2,431.1	974,306.7
2021	27.79	27.15	26.45	15.9%	17.7%	0.10	10	3,461.1	1,271,837.0
2020	10.06	9.78	20.96	16.3%	19.1%	0.28	10	781.4	1,095,069.0
2019	31.03	30.70	31.43	9.9%	12.1%	0.11	9	696.7	949,692.4
2018	1.35	1.08	-4.78	9.5%	11.0%	0.09	10	400.4	826,717.8
2017	18.45	18.12	21.69	8.3%	10.0%	0.06	8	281.6	906,664.4
2016	12.54	12.26	12.05	n/a	n/a	n/a	1	42.7	766,932.4
2015	3.96	3.62	0.92	n/a	n/a	n/a	2	63.2	721,422.8
2014	9.52*	9.29*	7.97*	n/a	n/a	n/a	1	54.2	776,690.6
2013	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Partial Year Return

IMPORTANT INFORMATION: For Institutional Investors/Financial Professionals Only. Not For Retail Use.

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Northern Trust Asset Management Services claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Northern Trust Asset Management Services has been independently verified for the periods 1/1/1993 to 12/31/2021. The verification report(s) is/are available upon request. A firm that claims compliance with the GIPS standards must establish policies and procedures for complying with all the applicable requirements of the GIPS standards. Verification provides assurance on whether the firm's policies and procedures related to composite and pooled fund maintenance, as well as the calculation, presentation, and distribution of performance, have been designed in compliance with the GIPS standards and have been implemented on a firm-wide basis. Verification does not provide assurance on the accuracy of any specific performance report. Returns presented are time-weighted returns. Valuations are computed and performance is reported in US dollars. Information regarding policies for valuing investments, calculating performance, and preparing GIPS Reports are available upon request. A complete list of Northern Trust Asset Management Services composite descriptions, limited distribution pooled funds descriptions and list of broad distribution pooled funds are available upon request. GIPS® is a registered trademark of CFA Institute. CFA Institute does not endorse or promote this organization, nor does it warrant the accuracy or quality of the content contained herein. Returns for periods greater than one year are annualized. Gross performance returns shown do not reflect the deduction of investment management/advisory fees, assume the reinvestment of dividends and capital gains where applicable, and are net of transaction costs and other expenses. Performance results will be reduced by the fees incurred in the management of the account. Net performance returns are reduced by investment management fees and other expenses relating to the management of the account. Net-of-fee returns are calculated based upon model fees. For periods 2020 and prior, the model fee reflects the composite's highest actual client fee rate (or the highest rate on the applicable fee schedule for the given time period if actual rates could not be identified), applied monthly. For periods after 1/1/2021, the highest rate on the applicable fee schedule is used for the applicable period. The below annual fee schedule, expense ratios and investment management fees reflects the current fees. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Past performance is not indicative of future results. Investment management/advisory fees are described in Northern Trust Investments, Inc. Form ADV Part 2A. The annual fee schedule for standard institutional accounts is: First \$50 million = 0.30%, Next \$50 million = 0.25%, Balance = 0.20%. Customized accounts, including those with tax-management, may charge a fee up to 0.50%. This composite includes a common and collective (C&C) pooled fund. The highest investment management fee for the C&C fund is 0.27%, and the highest total fee including administrative expenses is 0.29%.

The Quality Low Volatility U.S. composite consists of all fee-paying, fully discretionary portfolios that use a quantitative approach to actively seek companies with favorable Quality and Low Volatility characteristics, capturing broad U.S. large cap equity exposure. The strategy is designed for investors seeking long-term capital appreciation at a lower risk profile than the market benchmark. This composite may include accounts that restrict the reinvestment of income. The primary benchmark for this composite is the Russell 1000® Index. The index is unmanaged and measures the performance of the 1,000 largest companies in the Russell 3000® Index, based on market capitalization. Prior to December 31, 2022, this composite was named Quality Low Volatility Russell 1000. Financial leverage is not employed as a part of the overall investment strategy of this composite. Financial derivatives, in the form of futures contracts, options and ETFs may be utilized for the purposes of liquidity, market exposure, or investment opportunity. The internal dispersion of annual gross returns is measured by the standard deviation across asset-weighted portfolio returns represented in the composite for the full year. The three-year annualized standard deviation is calculated using monthly gross returns. If the composite has been open for less than three years, the three-year annualized standard deviation is deemed not applicable. If fewer than 5 portfolios are in the composite for a full year, internal dispersion is deemed not applicable. The composite was created in October of 2014, and the inception date is June 01, 2014. The minimum asset size of a portfolio for initial inclusion in the composite is \$5 million.

LEARN MORE

About Northern Trust Asset Management’s portfolio construction expertise. Please visit our website ([click here](#)) or contact one of our experts:

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Glossary

VIX: The CBOE Volatility Index (VIX) reflects a market estimate of expected S&P 500 volatility for the next 30 days.

Up Market Capture Ratio shows how a portfolio has performed relative to the benchmark during months of positive benchmark returns (up markets). A value over 100% indicates that the portfolio has outperformed the benchmark during up markets, while a value under 100% indicates that the portfolio has underperformed the benchmark during up markets.

Down Market Capture Ratio shows how a portfolio has performed relative to the benchmark during months of negative benchmark returns (down markets). A value over 100% indicates that the portfolio has underperformed the benchmark during down markets, while a value under 100% indicates that the portfolio has outperformed the benchmark during down markets.

The S&P 500® Index is a widely recognized, unmanaged index that measures the performance of the large-cap sector of the U.S. stock market.

The Russell 1000 Index measures the performance of the large-cap segment of the U.S. equity universe. The Russell 1000 represents approximately 92% of the U.S. market.

The Northern Trust Quality Low Volatility Index tracks a portfolio of is designed to reflect the performance of a selection of companies that, in aggregate, possess lower overall absolute volatility characteristics relative to the Northern Trust 1250 Index. The Northern Trust 1250 Index is designed to provide broad-based exposure to the US equity markets, with a bias towards large and mid-capitalization companies.



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