A New Approach to Low Volatility

Select the Best Securities First

The goal of low-volatility investing is to minimize the impact of drawdowns that occur during periods of market turbulence or bear markets. By minimizing the performance drag caused by volatility, investors aim to compound returns at higher rates over the long term.

THE PROBLEM

Some early iterations of low-volatility strategies accomplish this by simply screening for the least volatile stocks. The drawback of this approach is that these portfolios often have large sector and industry concentrations, making them less appealing to investors looking for diversified market exposure. In an attempt to address this shortcoming, a second generation of low-volatility strategies emerged. These strategies use a portfolio optimizer to construct a diversified low-volatility portfolio, rather than simply gravitating to low-volatility stocks. While this marked a step forward in the evolution of low-volatility investing, some of these strategies still lack a critical element – consideration of the fundamental profile of the stocks selected.

THE SOLUTION

The Nasdaq Victory US Multi-Factor Minimum Volatility Index (the "Index") attempts to enhance the methodology by including a multi-factor screening process that first narrows the investable universe to stocks believed to be more likely to outperform, then applies a portfolio optimizer to lower volatility and diversify the index. The combination seeks alpha from the multi-factor screen, and lower volatility stemming from the optimized portfolio construction. This results in a portfolio designed to participate in rising or bull markets, while outperforming during periods of heightened volatility or bear markets (best illustrated in the up/down market-capture ratio of the Index). Ultimately, the Index aims to provide superior risk-adjusted returns and a smoother path to long-term capital appreciation. The Index also differentiates its use of multiple factors in that they are considered in aggregate, with each security representing the appropriate exposure to all pertinent factors rather than a "bolt together" approach utilized by many other multi-factor approaches. The index launched on May 26, 2017, and has back-test data available beginning on April 20, 2001.

In this document we will describe the Index's two-step approach. We will discuss the efficacy of multi-factor investing and how it is applied in this strategy. Next, we will explain how a portfolio optimizer reduces portfolio volatility, and how it is used in this approach to provide diversified market exposure. Finally, we will review historic performance of the Index, and compare it to a number of its more traditional low-volatility peers.

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Index Highlights

- The Index offers a next-generation approach to low-volatility investing.
- It seeks to provide a smoother path to long-term capital appreciation.
- This rules-based, low-cost solution is designed to be used as a core portfolio holding, broad market replacement, or as a tactical component.
- The Index employs a two-step approach that aims to deliver superior risk-adjusted equity returns.

  Step 1: A multi-factor model is used to narrow the investment universe to companies that score well on the following attributes: quality, value, profitability, growth, and momentum.

  Step 2: A portfolio optimizer is used to minimize overall portfolio volatility by weighting stocks based on the correlation of assets and a series of constraints designed to help diversify the portfolio.
- The Index is reconstituted and rebalanced semiannually on the third Friday in April and October (using data from the end of March and September, respectively).

Index Methodology Explained

Eligibility Criteria

To be eligible for inclusion in the Nasdaq Victory Multi-Factor Minimum Volatility family of indexes, a security must first meet the following criteria:

- Be a member of its parent Nasdaq index:
  - The parent index for the Nasdaq Victory US Multi-Factor Minimum Volatility Index is the Nasdaq US Large Mid Cap Index.
    + The Nasdaq US Large Mid Cap Index is designed to track the performance of securities assigned to the United States that are included in the large/mid-cap segment. Securities eligible for the index are listed in the US on the Nasdaq or New York exchanges.
    + The number of securities in the index is close to 1,000 as of October 2017.
- One security per issuer is permitted (if an issuer has multiple securities, the security with the highest three-month average daily dollar trading volume will be selected for possible inclusion in the indexes).

Multi-Factor Investing

Prior to discussing the Index's multi-factor methodology, let's take a look at the basics of factor investing, and explain why we believe a multi-factor approach is superior to a single-factor approach.

Factor investing is not a new concept. In fact, in order to fundamentally assess any investment, multiple factors must be considered. For example: How attractively valued is the investment? How fast is it growing? Is it a high-quality investment? Is it profitable? What's different about factor investing today is the computing power available, which enables the analysis and ranking of a large universe of investments rather than analyzing each investment's factors in isolation.

Many strategies in the marketplace take the approach of single-factor investing, or pairing just a few factors together in their stock selection methodology. We believe multi-factor is a more durable long-term approach. As can be seen in the quilt chart below, there's little consistency year-to-year in factor leadership. The top performing factor in one year might be the worst performing factor in the following year. Attempting to effectively time which factor to overweight in a given market environment is also very difficult to apply with consistency.

FACTOR RETURNS: EXAMINING BEST PRACTICES FOR SMART BETA EXPOSURE

** Market data thru 08/31/2017, cumulative returns use a start date of 12/29/2006, all returns exclude dividends"*

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*
Value	Momen-tum	Low Vol	Value	Growth	Low Vol	Value	Value	Low Vol	Low Vol	Dividend	Growth
17.41	17.17	-23.61	49.26	26.35	10.87	22.98	45.53	14.48	1.61	26.82	17.42
Low Vol	Quality	Buyback	Growth	Momen-tum	Buyback	Momen-tum	Buyback	Quality	Growth	Value	Momen-tum
16.49	16.77	-34.27	48.43	26.26	9.07	17.16	44.56	14.06	1.48	17.05	15.43
Equal Weight	Growth	Bench-mark	Equal Weight	Value	Dividend	Equal Weight	Growth	Dividend	Momen-tum	Equal Weight	Bench-mark
14.12	5.80	-38.28	42.19	20.89	4.40	15.21	42.65	13.92	0.76	13.05	10.72
Bench-mark	Bench-mark	Growth	Buyback	Quality	Quality	Growth	Equal Weight	Growth	Quality	Quality	Quality
13.80	3.24	-39.23	29.36	19.79	4.39	13.97	33.63	13.12	-0.64	12.36	8.35
Dividend	Equal Weight	Equal Weight	Momen-tum	Equal Weight	Momen-tum	Bench-mark	Momen-tum	Equal Weight	Bench-mark	Buyback	Equal Weight
9.98	-0.34	-41.08	27.19	19.68	1.36	13.47	31.27	12.35	-0.81	11.00	7.59
Momen-tum	Low Vol	Dividend	Bench-mark	Buyback	Growth	Buyback	Quality	Momen-tum	Dividend	Bench-mark	Low Vol
7.58	-2.16	-41.49	23.49	17.52	-0.02	12.33	29.84	12.03	-1.11	9.64	9.48
Growth	Buyback	Momen-tum	Low Vol	Dividend	Bench-mark	Quality	Bench-mark	Buyback	Equal Weight	Low Vol	Buyback
6.55	-2.48	-46.35	15.52	15.82	-0.20	12.05	29.69	11.54	-4.26	7.80	7.02
Quality	Value	Quality	Quality	Bench-mark	Equal Weight	Low Vol	Dividend	Bench-mark	Buyback	Growth	Value
4.58	-6.71	-46.41	12.20	12.84	-2.18	6.75	25.93	11.29	-5.39	3.56	3.49
Buyback	Dividend	Value	Dividend	Low Vol	Value	Dividend	Low Vol	Value	Value	Momen-tum	Dividend
n/a	-18.94	-49.76	-1.77	9.79	-2.73	1.73	19.80	10.43	-10.48	1.52	-1.24

Legend of Return Factors and Proxy investments

MOMENTUM

PowerShares DWA Momentum Portfolio (PDP)

Inception: 03/01/2007

Seeks excess return thru stocks with trends of strong relative past performance

VALUE

Guggenheim S&P 500 Pure Value ETF (RPV)

Inception: 03/01/2006

Seeks excess return thrrough stocks with low prices relative to a fundamental value

LOW VOLATILITY

PowerShares S&P 500 Low Vol. Portfolio (SPLV)

Inception: 05/05/2011

Seeks excess return thru stocks with lower than average market volatility

BENCHMARK

SPDR S&P 500 ETF (SPY)

Inception: 01/22/1993

A market capitalization weighted index comprised of approximately 500 US large cap stocks

EQUAL WEIGHT

Guggenheim S&P 500 Equal Weight ETF (RPP)

Inception: 12/09/2004

An equal weighted index comprised of approximately 500 US large cap stocks

DIVIDEND ACHIEVER

PowerShares Dividend Achievers Port. (PEY)

Inception: 03/01/2007

Seeks excess return thru stocks with high dividend yields and/or history of raising dividends

GROWTH

Guggenheim S&P 500 Pure Growth ETF (RPP)

Inception: 03/01/2006

Seeks excess return thru stocks with above-average fundamental growth metrics

BUYBACK ACHIEVERS

PowerShares Buyback Achievers Port. (PKW)

Inception: 12/20/2006

Seeks excess return thru companies executing high corporate stock buyback programs

QUALITY

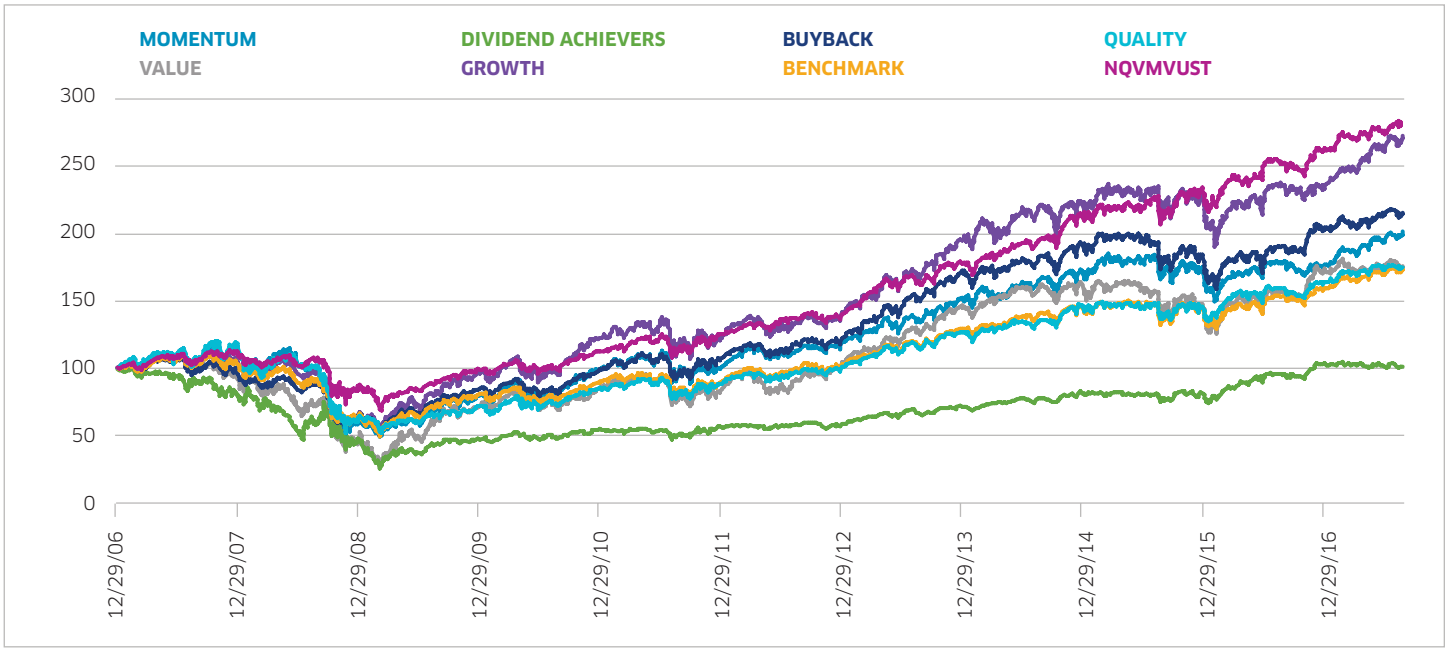
PowerShares S&P 500 Quality Portfolio (SPHQ)

Inception: 12/06/2005

Seeks excess return thru companies with relatively low debt and/or stable earnings growth metrics

A multi-factor approach attempts to outperform over the long term by providing diversified factor exposure. The chart below shows how the Nasdaq Victory US Multi-Factor Minimum Volatility Index (NQVMVUST) has performed vs. a number of popular well-known smart beta factor ETFs during the allotted time frame 12/29/2006 – 8/31/17. The factors in the study are as follows: Momentum (PDP), Value (RPV), Dividend (PEY), Growth (RPG), Low Volatility (SPLV), Buyback (PKW), Benchmark (SPY), and Quality (SPHQ). Both the table and chart below paint a clear picture that multi-factor was the clear winner, with the highest absolute and risk-adjusted return.

	MOMENTUM	VALUE	DIVIDEND ACHIEVERS	GROWTH	BUYBACK	BENCHMARK	QUALITY	NQVMVUST
Return	102%	76%	2%	174%	116%	75%	76%	182%
Annualized Return	7%	5%	0%	10%	7%	5%	5%	10%
Volatility	22%	27%	26%	22%	19%	20%	19%	15%



The Index's Multi-Factor Methodology

The objective of the multi-factor model is to narrow the Nasdaq US Large Mid Cap Index from approximately 1,000 stocks to a refined list of stocks believed to have a higher likelihood of outperforming over the longer term time horizon. Alternative low-volatility strategies apply the portfolio optimizer to the entire starting universe; however, in this approach only the narrowed list of attractive companies is included in the optimization. It is this element of the process that differentiates this Index from other low-volatility strategies.

The multi-factor model ranks stocks by calculating a composite score for each security by using its quality, profitability, valuation, growth, and momentum score. After composite scores are calculated for each eligible security in the universe (all 1,000), the securities are placed into five evenly distributed quintiles with the best 20% ranking securities in quintile 1, the next 20% in quintile 2, and so on until the worst ranking securities are in quintile 5. During portfolio optimization (which will be described in greater detail later), only stocks in quintile 1 can be purchased or added to. If an existing position in the Index falls to quintile 2 the optimizer is permitted to hold the position at its current weight, but cannot add to it. Stocks in quintiles 3, 4, and 5 may not be held in the Index.

The chart below shows the factors and weights used in the Multi-Factor Model to calculate the composite scores.

PRIMARY FACTORS	SUB-FACTORS AND WEIGHT		SEEKS TO IDENTIFY
Quality	Stability EPS Quality Credit/Leverage	10% 10% 10%	History of delivering consistent results, with clean accounting and low levels of debt.
Profitability	Profitability Capital Spending	10% 10%	Businesses that are less capital intensive with above-average returns on capital.
Value	Valuation	20%	Stocks that are attractively valued.
Growth	Growth Capital Deployment	10% 10%	Companies that are growing sales, cash flow, and dividends.
Momentum	Momentum	10%	Positive price momentum and positive earnings revisions.

Companies in the financial sector use a slightly different calculation methodology. It is well-documented that analyzing cash flow metrics for financial companies poses many challenges, creating a less reliable picture of their true operating performance. For this reason, slight adjustments are made to the model for calculating the composite scores of financial companies. The model and weights applied to companies in the financial sector are reflected in the chart below.

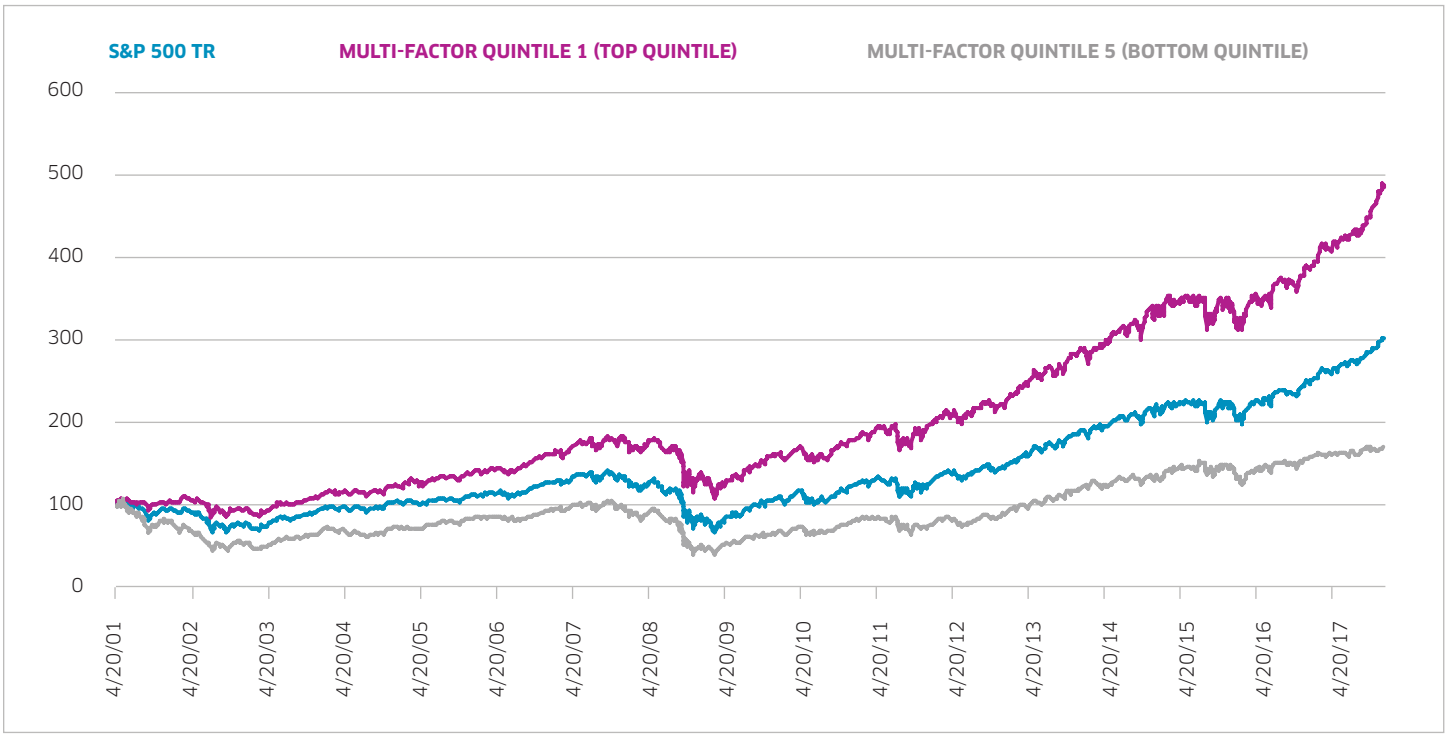
PRIMARY FACTORS	SUB-FACTORS AND WEIGHT		SEEKS TO IDENTIFY
Quality	EPS Quality Credit/Leverage	14.3% 14.3%	History of clean accounting, with low levels of debt.
Profitability	Profitability	14.3%	Businesses with above-average returns on capital.
Value	Valuation	28.6%	Stocks that are attractively valued.
Growth	Capital Deployment	14.3%	Companies that are growing dividends or buying back stock.
Momentum	Momentum	14.3%	Positive price momentum and positive earnings revisions.

Multi-Factor Model Performance Stats: April 20, 2001 – December 29, 2017

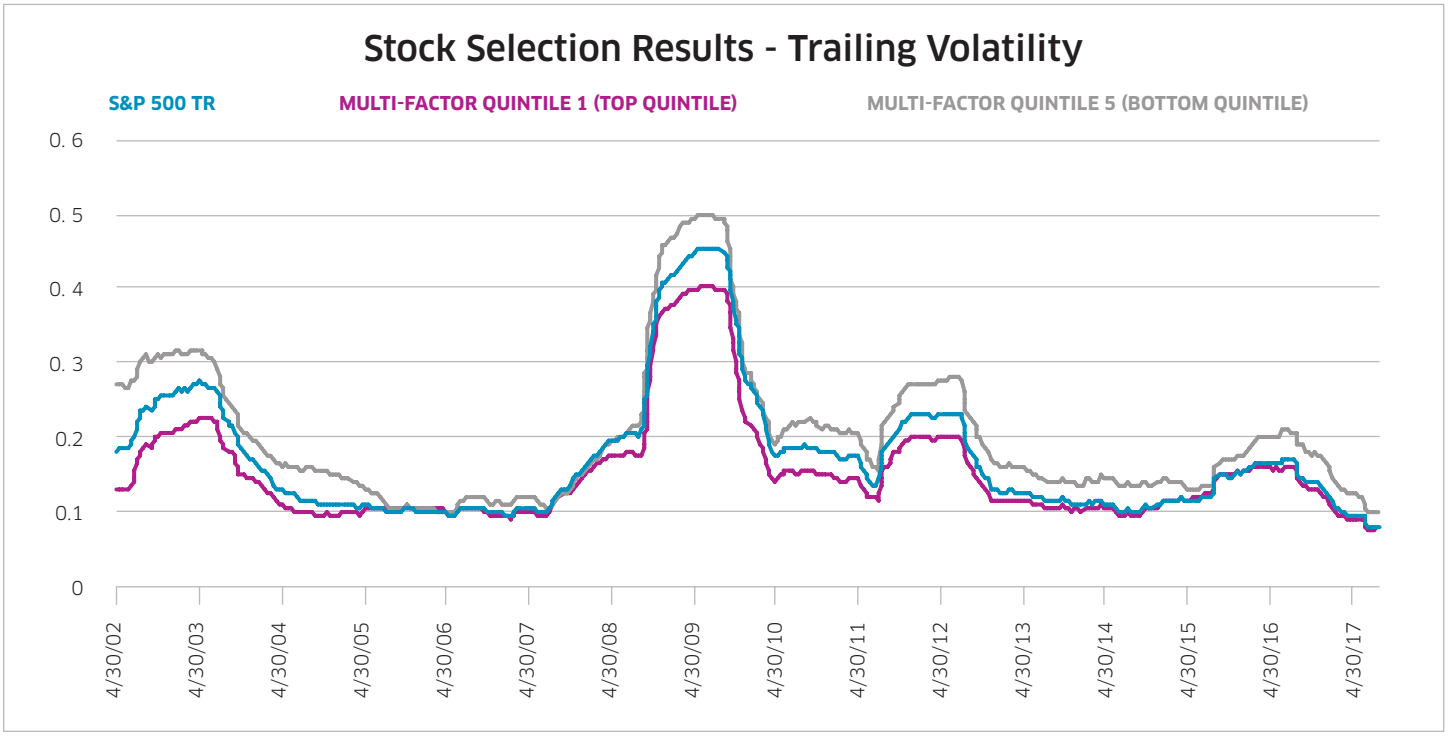
We will start by looking at individual quintile performance and compare it to the S&P 500 Total Return Index. The intention behind this analysis is to show that quintile 1 securities perform the best, while securities ranked in the fifth quintile perform the worst. While not shown, performance for Multi-Factor Quintiles two, three, and four all fall in between Multi-Factor Quintiles one and five.

The table below confirms the benefits of the multi-factor quintile ranking approach. Selecting those equities in the top quintile provides significant outperformance over those in the fifth quintile, as well as the S&P 500 Total Return Index.

	MULTI-FACTOR QUINTILE 1	MULTI-FACTOR QUINTILE 5	S&P 500 TR
Cumulative Return	386%	71%	200%
Annualized Return	10%	3%	7%
Annualized Volatility	17%	22%	19%



To complete our analysis, the chart below confirms the outperformance of the top quintile is achieved with lower volatility than quintile 5 and the S&P 500. This provides additional evidence that selecting a "better basket" of securities to create a low-volatility solution is quite compelling.



Optimization

Allocation Optimization

As we've already discussed, prior to inputting securities into the optimization framework, we first run the multi-factor screening process.

After the assets for the Index have been selected, there is still more work to do. The Index must determine what percentage of the total holdings should be allocated to each stock. An analysis of the relationships between the holdings can enable us to further reduce the volatility of the portfolio by carefully setting the allocation to each stock. The process of selecting these allocations to minimize volatility is called portfolio optimization.

It isn't necessarily obvious why one set of allocations would provide lower volatility than another. The reason is that the daily movements of certain stocks might be inversely correlated, meaning that on any particular day they tend to move in different directions: When one goes up, the other goes down. It is advantageous to include stocks like this in a portfolio because one can cancel out the volatility of another. Most financial analysts agree that a lower volatility portfolio is also a lower risk portfolio, so minimizing volatility can reduce the risk of an Index.

The Objective Function

The optimizer works by choosing a set of candidate allocations to each stock, evaluating the resulting candidate portfolio, then adjusting the allocations and reevaluating. The process repeats until a certain objective is attained. This adjusting and testing is conducted thousands of times until the most favorable, or optimal, result is reached.

The goal for the optimizer is defined by the objective function. The objective function is an equation we can use to evaluate the quality of the portfolio. For the Index, our objective function is a sum of two components: volatility and turnover. Turnover refers to the degree to which the portfolio is moved from one set of assets to another during a rebalancing period. One hundred percent turnover would represent the situation where all assets are sold and an entirely new set of positions are entered. Significant turnover can result in higher transaction costs and tax implications that reduce the performance of the portfolio.

Overall, we seek to minimize the sum of volatility and turnover. The degree to which one factor predominates over the other depends on the importance of the weights that we set. We have determined these weights over thousands of simulations aimed at finding the optimal risk-adjusted return.

At each rebalancing period we apply the optimizer to the list of assets in the portfolio and quintile 1 to find the set of allocations that minimizes the sum of volatility and turnover. We determine these weights over thousands of simulations aimed at finding the optimal risk-adjusted return.

Constraints

There are some limits to the adjustments the optimizer can make to the portfolio. These limits are called constraints. Overall, the optimization portion of the Index is intended to ensure that the Index tracks the performance of the Nasdaq US Large Mid Cap Index but with lower volatility. In order to help ensure the Nasdaq Victory US Multi-Factor Minimum Volatility Index does not diverge too significantly from the performance of the Nasdaq US Large Mid Cap Index, we limit the degree to which allocations can differ from the index. You can see the allocation constraint maximum differences listed in the Index Methodology Explained section. These constraints help mitigate significant idiosyncratic or sector risk.

As the optimizer seeks to minimize the objective function (volatility and turnover), it must not violate any of these constraints. The result is a portfolio that seeks to minimize risk in three ways: low volatility, low turnover, and limited exposure to sector and individual stock risk.

Index Rebalancing

The Index is reconstituted and rebalanced semiannually on the third Friday in April and October (using data from the end of March and September, respectively).

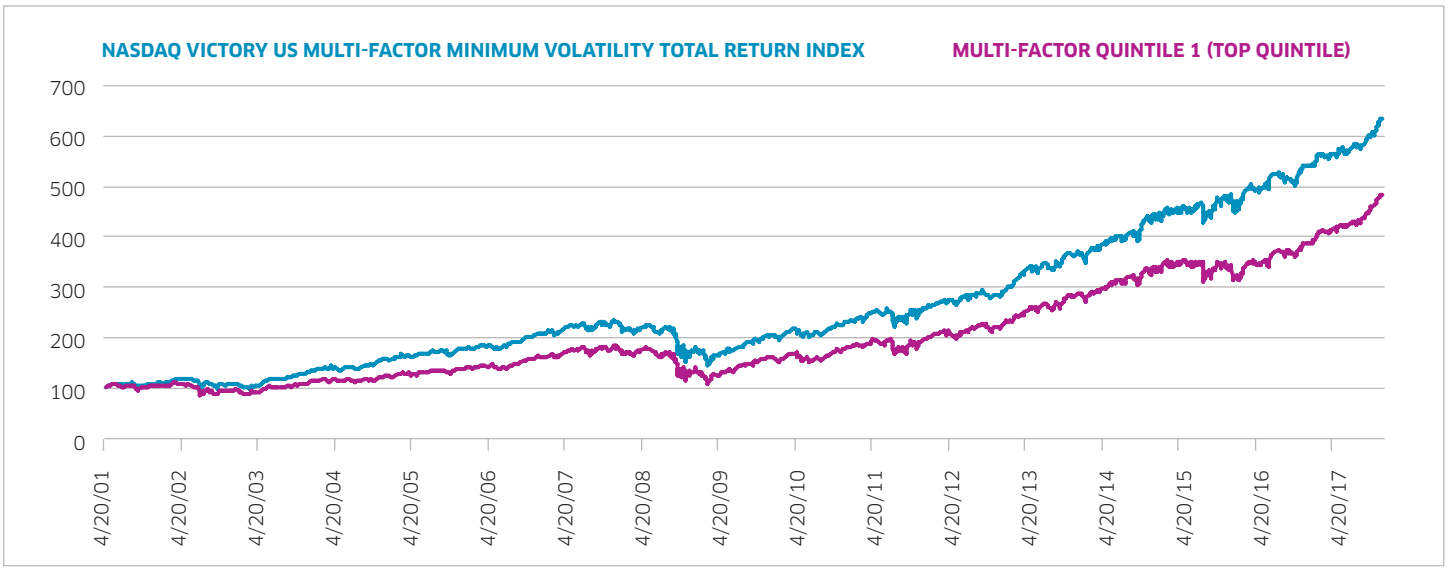
The Index employs a modified market capitalization weighting methodology. At each semiannual evaluation, the Index is rebalanced using an optimization process. The following constraints are applied:

- Securities that are in the first quintile are eligible for purchase.
- Securities that are in the second quintile are only eligible for inclusion if they were in the Index during the prior period, and their weight cannot increase as of the Index Evaluation reference date.
- Industry weights must be +/- 5.0% of the parent Nasdaq index.
- Growth, Value and Size style factors are constrained to +/- 0.5 standard deviations of the parent Nasdaq index.
- The maximum individual security weight is 2.5% greater than the weight of the security in its parent Nasdaq index at time of initial inclusion and 3% greater than the weight of the security in its parent Nasdaq index if it is already a component in the Index.
- The minimum individual security weight is 0.10% at time of initial inclusion and 0.05% once it is already a component in the Index.
- Individual security weights are additionally constrained to a maximum weight as defined by the security's liquidity (20-day ADDTV/$500 million).

Importance of Optimization: Additional Comparisons

Optimizing the multi-factor model helps result in even stronger returns and lower volatility. An additional comparison that demonstrates the added benefit of the optimization process can be seen below. For the period between April 2001 and December 2017, the NQVMVUST Index provided significant outperformance (+537%) vs. a market-cap-weighted basket of multi-factor quintile 1 stocks (+386%). Even more impressive is that it did so with lower volatility (14% vs. 17%). Remember that the multi-factor quintile 1 securities as a stand-alone model outperformed the S&P 500, and now the optimized multi-factor model – the Nasdaq Victory US Multi-Factor Minimum Volatility Index – outperformed even the best of the quintiles during this period.

	NQVMVUST	MULTI-FACTOR QUINTILE 1 (TOP QUINTILE)
Cumulative Return	537%	386%
Annualized Return	12%	10%
Annualized Volatility	14%	17%

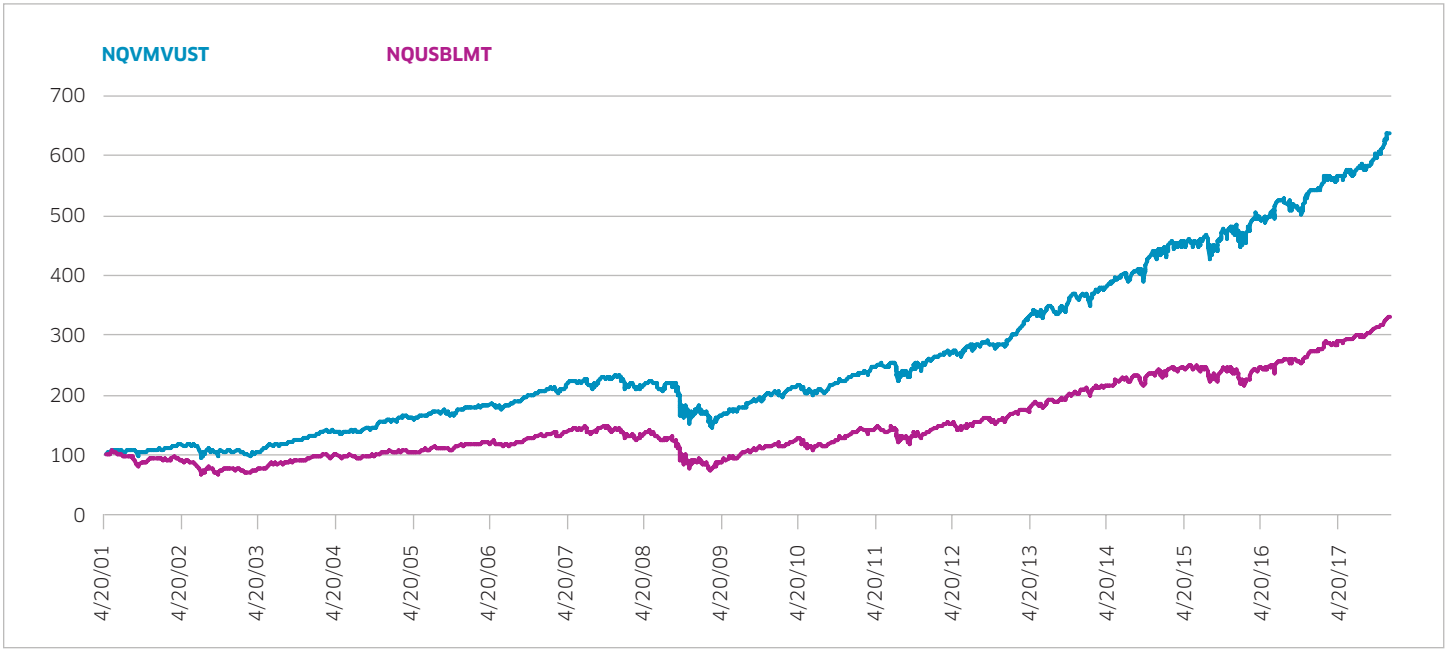


Index Performance

Performance History: April 20, 2001 – December 29, 2017

Let's begin by taking a look at the overall performance between the Nasdaq Victory US Multi-Factor Minimum Volatility Total Return Index (NQVMVUST) and the Nasdaq US Large Mid Cap Total Return Index (NQUSBLMT) through December 31, 2017. Over the time frame studied, the Nasdaq Victory Multi-Factor Minimum Volatility Index returned 537% on a cumulative level with a 12% annualized return and 14% annualized volatility, which as we can see outperformed NQUSBLMT and also did so with lower volatility.

	NQVMVUST	NQUSBLMT
Cumulative Return	537%	229%
Annualized Return	12%	7%
Annualized Volatility	14%	19%



Performance Stats: Beta, Correlation, Sharpe Ratio

The Beta calculation over the time period studied was 0.70.

INDEX COMPARISON	BETA
NQVMVUST vs. NQUSBLMT	0.70

Correlation between the two indexes was 0.94.

INDEX COMPARISON	CORRELATION
NQVMVUST vs. NQUSBLMT	0.94

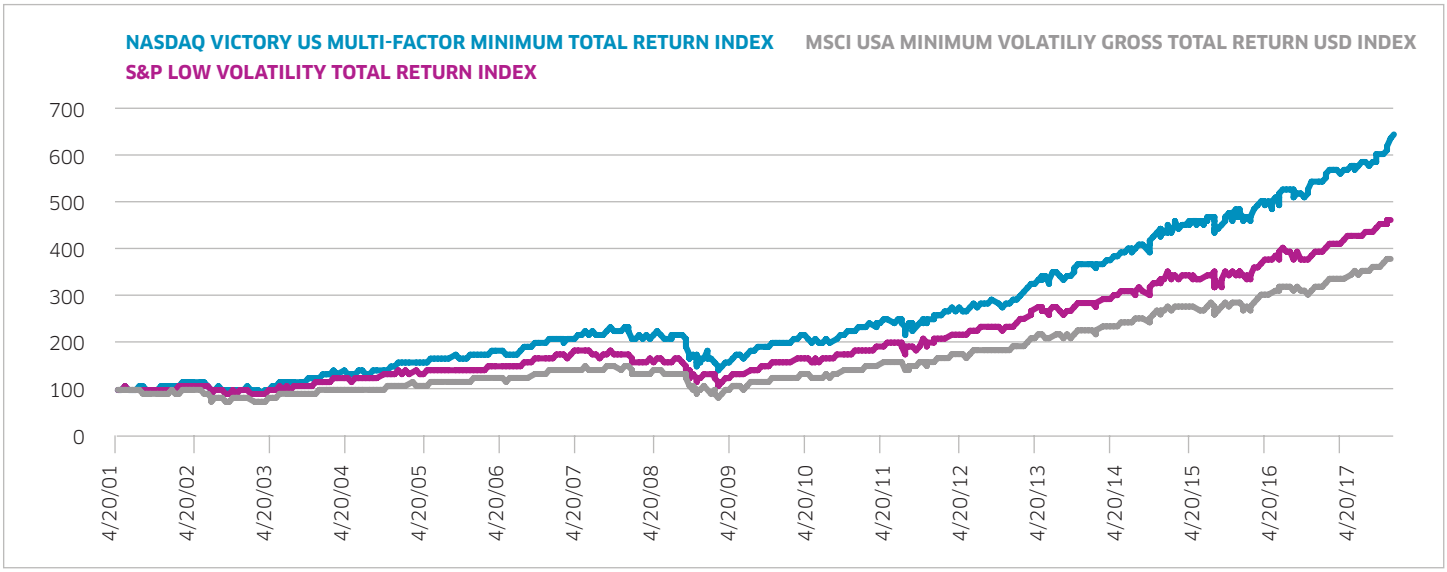
The Sharpe ratio for the indices came in at 0.70 and 0.29, respectively.

INDEX COMPARISON	SHARPE RATIO
NQVMVUST	NQUSBLMT
0.70	0.29

Performance History – Peer Comparison: April 20, 2001 – December 29, 2017

Finally, let's compare the NQVMVUST Index to two other popular low-volatility indexes currently in the marketplace: the S&P 500 Low Volatility Total Return Index and the MSCI USA Minimum Volatility Gross Total Return Index. Again, the quintile ranking system and the optimization process which is then applied demonstrate impressive outperformance during the time frame studied, with lower or the same volatility and higher returns than both of the other indexes.

	NASDAQ	S&P	MSCI
Cumulative Return	537%	356%	274%
Annualized Return	12%	10%	8%
Annualized Volatility	14%	14%	16%



Conclusion

The Nasdaq Victory US Multi-Factor Minimum Volatility Index was designed to improve upon existing low-volatility strategies in the marketplace. Rather than select securities based upon low volatility and then weight them as such, or take the entire US marketplace and optimize for a low-volatility solution, the Index employs a two-step approach that is in the index name. In the first step, a multi-factor process is run to select the best securities in the US marketplace. After the best securities are selected, in the second step these securities are put through an optimizer to create weights that have expectations for minimizing volatility while also meeting other constraints that keep the index from leaning too far in any direction away from the market. As shown in the graphics, the multi-factor model alone produced better performance with lower volatility than the S&P 500. After running the securities with their multi-factor composite scores through the optimizer, the historical results show how applying an optimization process allowed for even better performance while limiting volatility.

Market participants can gain exposure to this Index through the VictoryShares US Multi-Factor Minimum Volatility ETF (VSMV).