Risk Reduction Using Volatility-Weighting

Introducing the Nasdaq Victory Volatility Weighted Index Family

SEPTEMBER 2023

Executive Summary

- The NASDAQ VICTORY VOLATILITY WEIGHTED INDEX FAMILY (NQVW) is a liquid, broad-market-exposure, maximally risk-diversified benchmark framework.
- NQVW'S VOLATILITY-WEIGHTING seeks equal risk contribution from each individual stock, therefore maximizing diversification.
- Excluding unprofitable companies helps NQVW outperform with less volatility and lower drawdowns.
- NQVW is structured to offer improved return, reduced volatility and hence better Sharpe ratio than comparable market cap and equally weighted indexes over the long horizon.
- NQVW is structured to capture more of the market upside and less of the market downside; NQVW's significant advantage in outperforming benchmarks in bear markets can make it a very efficient tool for risk management.

Introduction

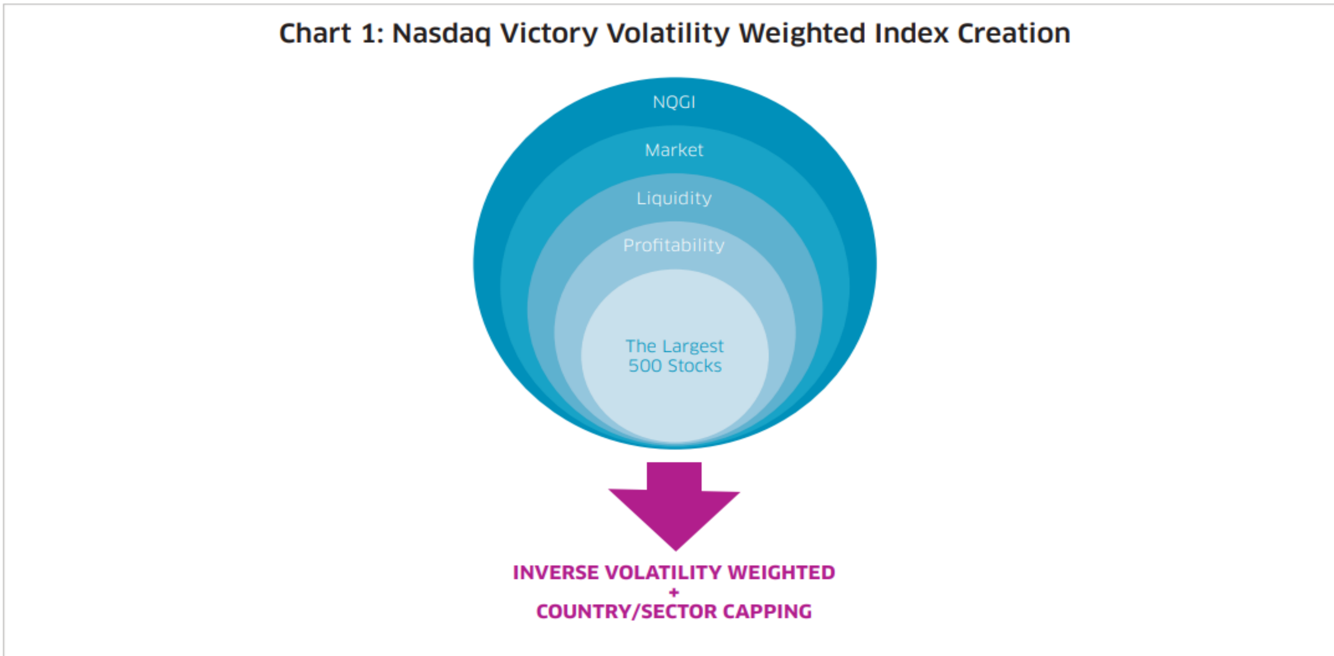
The Nasdaq Victory Volatility Weighted Index Family (NQVW) is Nasdaq and Victory Capital's practical solution for volatility-weighting within a liquid, broad market exposure and maximally risk-diversified benchmark framework. It contains 13 sub-indexes that cover four capital markets: US Large Cap, US Small Cap, International (Developed Markets excluding the US) and Emerging Markets. Appendix A provides a complete list of descriptions for the Nasdaq Victory Volatility Weighted Index Family.

The Nasdaq Victory Volatility Weighted Indexes (NQVW) are based on the Nasdaq Global Index™ (NQGI™) Family. The comprehensive NQGI family covers approximately 9,100 large/mid/small-cap securities and includes 44 individual countries designated as Developed and Emerging Markets. To be eligible for inclusion in NQGI, an index security must meet certain criteria such as exchange listing, security type, market capitalization, daily trading volume, free float and trading history[1].

For each market type, the screening process first removes any securities with insufficient liquidity, followed by another screen to remove any unprofitable[2] companies. Then, only the remaining 500 largest stocks will be utilized to construct the final portfolio. The Nasdaq Victory Volatility Weighted Indexes (NQVW) use 180-day standard deviation to measure volatility and are weighted by the inverse of each stock's volatility to ensure equal contribution of portfolio risk by each constituent. The portfolio's maximum country and sector exposures are also capped at 20% and 25%, respectively, to ensure that geographical and industry-specific risks are reasonably diversified. The final Nasdaq Victory Volatility Weighted Index is a liquid, broad-market-exposure, maximally risk-diversified benchmark with underlying stocks contributing equal amounts of risk.

[1] For more information, please refer to the NQGI methodology document for full disclosure (https://indexes.nasdaqomx.com/docs/NQGIFamilyMethodology.pdf).

[2] Profitability is measured by at least positive net earnings across the last twelve months.



Why Volatility-Weighting?

Nasdaq Volatility Weighted Indexes (NQVW) use volatility to determine constituent weights. Simply put, the weight of each stock is based on the inverse of its volatility. The most important benefit of volatility-weighting is equal risk contribution. Stocks with historically higher price volatilities are assigned lower portfolio weights with the goal that each stock will contribute an equal amount of ex-ante (estimated) risk to the portfolio. It appears to be a very intuitive way of reducing portfolio risk through enhanced diversification.

The following hypothetical three-stock portfolio example compared the portfolio risk contribution among three different weighting schemes: market cap-weighted, equal-weighted and volatility-weighted. This demonstrates how volatility weights are calculated and assigns each stock with an equal amount of portfolio risk. The volatility-weighted portfolio is the most diversified and achieves the lowest portfolio risk among the three weighting methods in our example.

Table 1: Hypothetic Three Stock Portfolio Construction

SAMPLE	MARKET	VOLATILITY	MARKET CAP WEIGHT		EQUAL WEIGHT		VOLATILITY WEIGHT	
STOCK	CAP ($ BIL.)	(% P.A.)	% WEIGHT	POTF. RISK	% WEIGHT	POTF. RISK	% WEIGHT	POTF. RISK
Stock A	15	7.5%	50%	4%	33%	2%	57%	4%
Stock B	10	15%	33%	5%	33%	5%	29%	4%
Stock C	5	30%	17%	5%	33%	10%	14%	4%
Projected Portfolio Risk			14%		17%		13%	

Assuming all stock correlations equal to 1.[3]

[3] The paper "On the properties of equally-weighted risk contributions portfolios" by Maillard, Roncalli and Teiletche (2009) generalized the assumption with equal correlations less than 1.

Using 180-day standard deviation to measure a stock's risk

Nasdaq Volatility Weighted Indexes (NQVW) use 180-day standard deviation to measure a stock's risk. At first, this might sound too simplistic because many of us would prefer a more comprehensive, forward-looking measure to "perfectly" predict risk; unfortunately, such a measure does not exist. There are many different types of risks that can significantly impact the market – market risk, liquidity risk, interest rate risk, inflation risk, geopolitical risk, etc. As these risks fluctuate and interact with each other over time, it is extremely difficult to develop a comprehensive risk measure to precisely gauge the future impact to individual stocks as well as the broader market.

Price volatility is, however, a reliable risk measure for stocks. In comparison to historical price returns, historical price volatilities are more correlated over time, an effect known as heteroscedasticity[4]. This works especially well at the individual security level: stocks with low historical volatility are likely to be less volatile in the near future, while stocks with high historical volatility are more likely to stay volatile in the near future.

Our research further reveals that different lookback windows and return frequencies do not meaningfully impact historical performance. The 180-day volatility-weighted portfolio generated the third-lowest volatility among all tested strategies (see table 2 for details), while also delivering the highest total return and Sharpe ratio of the three portfolios with the lowest volatility. Given that the primary goal of volatility-weighting is portfolio risk reduction rather than total return, our choice of using 180-day standard deviation as a measure of volatility seems to serve its purpose very well.

Table 2: Nasdaq Volatility Weighting Research Summary

	ANNUAL RETURN	ANNUAL VOLATILITY	SHARPE RATIO	MAXIMUM DRAWDOWN	ACTIVE RETURN VS. MARKET CAP	TRACKIN G ERROR VS. MARKET CAP	INFORMATION RATIO VS. MARKET CAP	CAPM ALPHA	CAPM BETA	CORRELATION TO MARKET CAP
MARKET CAP	7.6%	20.8%	0.25	63%	-	-	-	-	1.00	1.00
DAILY 120D	7.8%	19.2%	0.28	60%	0.2%	3.5%	0.06	0.7%	0.91	0.99
DAILY 180D	8.2%	19.2%	0.30	60%	0.6%	3.4%	0.17	1.0%	0.91	0.99
DAILY 240D	8.2%	19.3%	0.30	59%	0.6%	3.4%	0.18	1.0%	0.92	0.99
DAILY 720D	8.3%	19.5%	0.30	60%	0.7%	3.3%	0.20	1.0%	0.93	0.99
DAILY 1200D	8.4%	19.5%	0.30	60%	0.8%	3.4%	0.23	1.1%	0.93	0.99
WEEKLY 120D	7.5%	19.2%	0.26	59%	-0.1%	3.6%	-0.03	0.4%	0.91	0.99
WEEKLY 180D	7.9%	19.2%	0.28	59%	0.3%	3.5%	0.09	0.8%	0.91	0.99
WEEKLY 240D	8.0%	19.3%	0.29	59%	0.4%	3.5%	0.12	0.8%	0.92	0.99
WEEKLY 720D	8.3%	19.5%	0.30	60%	0.7%	3.2%	0.22	1.0%	0.93	0.99
WEEKLY 1200D	8.3%	19.6%	0.30	61%	0.7%	3.2%	0.22	1.0%	0.93	0.99
MONTHLY 240D	7.8%	19.3%	0.28	60%	0.2%	3.8%	0.06	0.7%	0.92	0.99
MONTHLY 720D	8.2%	19.4%	0.29	61%	0.6%	3.4%	0.17	1.0%	0.92	0.99
MONTHLY 1200D	8.2%	19.5%	0.29	61%	0.6%	3.4%	0.17	1.0%	0.93	0.99

Source: Nasdaq Calculation

- Total return indexes calculated for periods from March 30, 2001, to June 30, 2023, using the largest 500 stocks by Market Cap within the Nasdaq US Benchmark™, rebalanced semiannually at the end of March and September.
- In addition to calculating results for the market cap-weighted index, we modeled 13 various approaches to weighting by volatility.
- Volatilities calculated from historical price total returns with windows of 120, 180, 240, 720, and 1200 trading days with the exception of monthly series in which the minimum calculation window is 240 days.

[4] See papers such as "Heteroscedasticity in Stock Returns" by Schwert and Seguin (1989)

- Weekly returns based on 5-trading-day adjusted-close price changes; monthly returns based on 20-trading-day adjusted-close price changes.

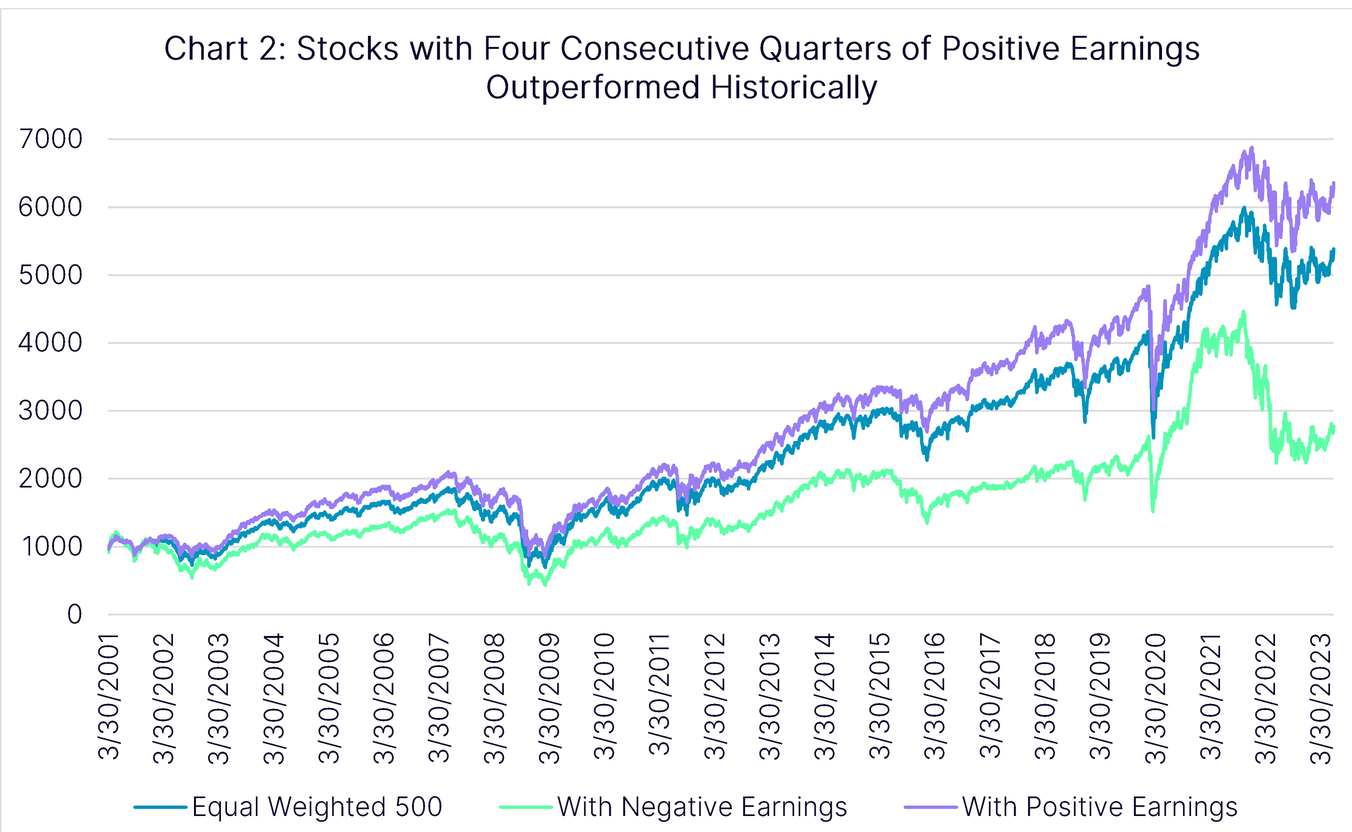
Fundamentals Make a Difference

Nasdaq Volatility Weighted Indexes (NQVW) implement a fundamental screen to include only securities with positive net earnings across the last twelve months. Conventional wisdom expects that capital markets will reward profitable companies in the long run. To validate that claim, we conducted similar research with two equal-weight portfolios: the first portfolio containing only stocks with positive net earnings reported in the last twelve months; the second, all remaining stocks in the Nasdaq US Benchmark top 500 list. Our research demonstrated that negative-earnings stocks as a group not only underperformed, but also exhibited higher volatility and experienced much larger drawdowns than the positive-earnings stock portfolio. NQVW's implementation of a fundamental screen to remove negative-earnings stocks provides another effective way of reducing portfolio risk at the stock selection level.

Table 3: Fundamental Screen Improved Performance

Benchmark is the equally-weighted Nasdaq US Benchmark top 500 stocks. Positive-earnings portfolio contains stocks with positive net earnings within the top 500 list. Negative-earnings portfolio contains all remaining stocks in the top 500 list. Both portfolios are equally weighted.

	EQUAL WEIGHTED 500	WITH POSITIVE EARNINGS	WITH NEGATIVE EARNINGS
Annual Return	7.86%	8.66%	4.69%
Annual Volatility	21.25%	20.03%	25.98%
Sharpe Ratio	0.25	0.31	0.08
Maximum Drawdown	62.94%	59.46%	71.99%
Avg. # of Stocks	500	439	58



Source: Nasdaq Calculation

Total return indexes calculated for periods from March 30, 2001, to June 30, 2023, using the largest 500 stocks by Market Cap within the Nasdaq US Benchmark, reconstituted semiannually at the end of March and September.

Sector and Country Constraints Further Ensure Diversification

The eligible universe of the NQVW indexes is the Nasdaq Global Index Family (NQGI) – a comprehensive index family covering approximately 9,100 large/mid/small-cap securities from 44 countries, designated as Developed or Emerging Markets[5]. After screening eligible securities and weighting them by the inverse of their volatilities, one last critical step is to check the portfolios' country and/or sector weights. If any one of the country and/or sector weights is above the maximum level, namely 20% per country and 25% per sector, excess weights are reallocated to other countries and/or sectors until all the rules have been satisfied. This capping process ensures that none of the individual country and/or sector exposures can dominate, thus sufficiently diversifying geographical and industrial risks at the portfolio level.

Chart 3: Nasdaq Victory U.S. Large Cap 500 Volatility Weighted Index (NQVWLCT) ICB Sector Breakdown as of June 30, 2023

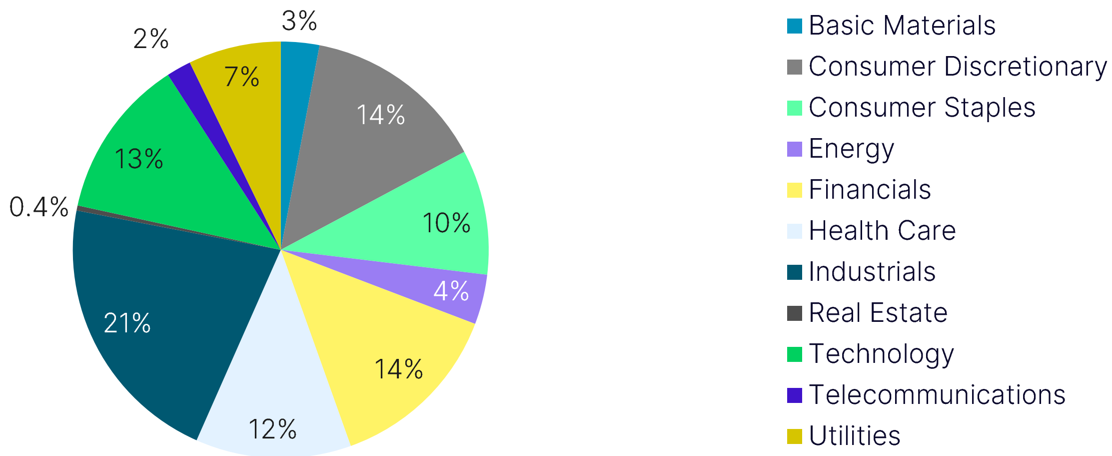
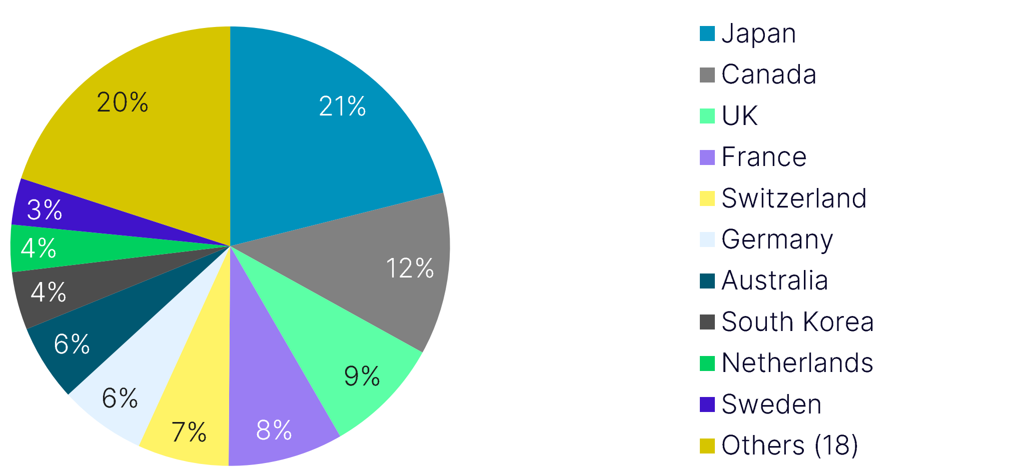


Chart 4: Nasdaq Victory International 500 Volatility Weighted Index (NQVWILT) Country Breakdown of as of June 30, 2023



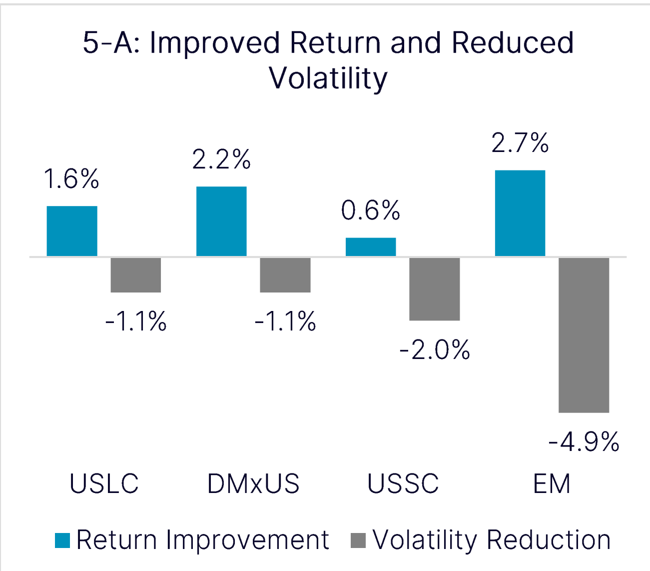
Source: Nasdaq. Based on country of domicile.

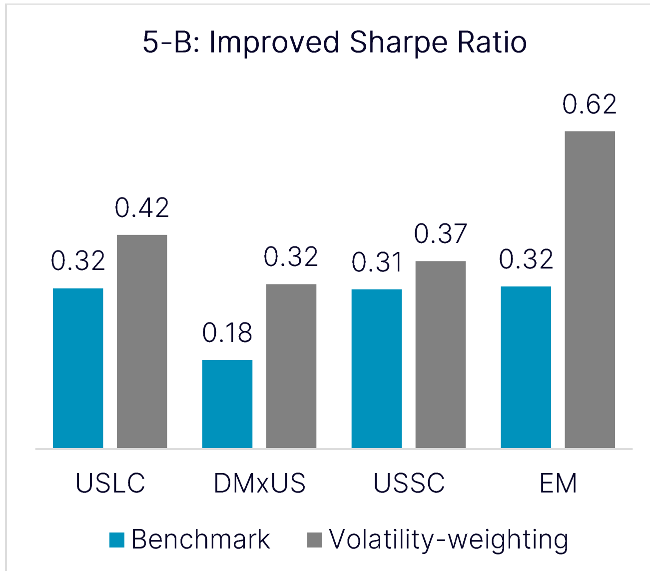
[5] See NQGI Family Methodology (https://indexes.nasdaqomx.com/docs/NQGIFamilyMethodology.pdf)

Performance and Scenario Analysis

Appendix B compares the historical performance of the NQVW indexes and their market cap-weighted benchmarks over a period of over 22 years and across four market segments: US Large Cap (USLC), US Small Cap (USSC), Developed Markets excluding the US (DMxUS) and Emerging Markets (EM). As we can see from the following charts, volatility-weighting improved returns and reduced volatility over the long run (Chart 5-A). Thus, the risk-adjusted performance, measured by the Sharpe ratio, improved in all four market segments (Chart 5-B). We also observe that overall, **volatility-weighting improved returns to a greater extent (on an absolute basis) than it reduced volatility in more liquid markets** such as US Large Cap and Developed Markets ex-US (Chart 5-A). **The opposite is true for less liquid, riskier markets** where volatility-weighting reduced volatility to a greater extent than it improved returns in US Small Cap and Emerging Markets.

Chart 5: Volatility-weighting helped improve performance and reduced risk across all regions





Source: Nasdaq

Sharpe Ratio assumed a global risk-free annual rate of 2.5%.
Performance history based on March 30, 2001, to June 30, 2023. For all other details please see Appendix B.

Market Scenario Analysis

In our scenario analysis, we examine how volatility-weighting performed differently during upside and downside market scenarios (Table 5). The upside and downside scenarios for each of the four market segments were determined by positive and negative performances, respectively, by each benchmark on a monthly basis. We present performance both by scale – which is the ratio of the average return of the volatility-weighted indexes vs. their benchmarks – as well as by frequency (i.e., how many months the volatility-weighting index outperformed its benchmark). Our observations confirm most empirical research on the topic: **volatility-weighting captures most of the market upside while meaningfully limiting its downside.** On average, our volatility-weighted indexes captured 93% of the benchmark returns in months when markets rose and lost only 83% as much in months when markets fell (top panel in Table 4). Furthermore, looking at the frequency of outperformance, **volatility-weighting observed an overwhelmingly higher probability to outperform benchmarks during downside scenario.** On average, volatility weighting outperformed during 72% of the time in downside scenario but only 43% of the time in upside scenario (bottom panel in Table 4). [It is worth noting that the empirically lower beta of US Small Cap and Emerging Markets volatility weighting indexes, and the consequent better risk reduction performance in downside scenario, still result in the overall outperformance of volatility-weighting, despite the fact that the majority of our observation periods from March 2001 to June 2023 occurred during “bull” markets.]

Table 4: Upside / Downside Capture Ratios and Outperformance Frequency

The top panel shows the average monthly return of volatility-weighted indexes (VW) and their respective benchmarks (BMK). The capture ratio is calculated as the ratio of VW to BMK. VW captures most of the upside in BMK returns while reducing downside losses.

The bottom panel shows the total number of months when VW or BMK outperform. The outperformance frequency ratio measures the number of months that VW outperformed as a percent of the total period. Our research shows that VW has an overwhelmingly higher probability to outperform BMK during downside scenario.

	UPSIDE					DOWNSIDE				
	USLC	DMxUS	USSC	EM	Avg.	USLC	DMxUS	USSC	EM	Avg.
Average Monthly Total Return										
Vol-Weight (VW)	3.1%	3.8%	4.0%	3.9%	3.7%	-3.4%	-3.5%	-4.2%	-3.2%	-3.6%
Benchmark (BMK)	3.2%	3.8%	4.4%	4.6%	4.0%	-4.0%	-3.8%	-5.0%	-4.6%	-4.4%
VW as % of BMK	**97%**	**102%**	**89%**	**84%**	**93%**	**86%**	**92%**	**84%**	**68%**	**83%**
Number of Months to Outperform										
Vol-Weight (VW)	92	82	62	50	72	65	74	68	88	74
Benchmark (BMK)	85	72	107	109	93	25	39	30	20	29
VW as % of Total	**52%**	**53%**	**37%**	**31%**	**43%**	**72%**	**65%**	**69%**	**81%**	**72%**

Source: Nasdaq

Upside and downside market scenarios are defined by the positive and negative benchmark monthly returns.
Performance history calculated from March 30, 2001, to June 30, 2023. For all other details please see Appendix B.

Summary and Conclusions

The Nasdaq Victory Volatility Weighted Index Family (NQVW) is Nasdaq and Victory Capital’s practical solution for volatility-weighting with a liquid, broad-market-exposure, maximally risk-diversified benchmark framework. It contains 13 sub-indexes that cover four capital markets: US Large Cap, US Small Cap, International (Developed Markets excluding the US) and Emerging Markets.

The NQVW Indexes originate from the Nasdaq Global Index Family (NQGI). For each market type, the screening process first removes any securities with insufficient liquidity, followed by another screen to remove any unprofitable companies. Then, only the remaining top 500 stocks by market cap are selected. The final indexes are weighted by the inverse of volatility and capped with maximum country and sector exposures at 20% and 25%, respectively.

The major benefits of NQVW’s volatility-weighting schema include:

- Equal contribution of portfolio risk by individual stocks, as well as maximized diversification
- 180-day standard deviation utilized to determine a stock’s volatility, which reduces overall portfolio risk without sacrificing total return (and actually improves Sharpe ratios)
- Lower portfolio volatility and smaller drawdowns as a result of excluding unprofitable companies
- Enhanced diversification due to sector and country constraints

Our discussion of historical performance and scenario analysis focused on Appendix B, which details the annual and cumulative performance of all four NQVW indexes and their benchmarks. We found that NQVW demonstrated superior returns and reduced volatility over the long run; notably, Sharpe ratios improved in all four market segments. NQVW improved returns to a greater extent than it reduced volatility across US Large

Cap and Developed Markets, and vice versa in US Small Cap and Emerging Markets. In our market scenario analysis, we showed that NQVW captures, on average, 93% of the market upside and just 83% of the market downside across the four market segments. If measured by frequency of outperformance, NQVW has, on average, a 72% probability of beating the benchmark in a downside market – making it a very efficient tool for risk management.

Appendix A lists the symbols and descriptions of all 13 NQVW indexes. These include the 4 major NQVW indexes for US Large Cap, US Small Cap, International and Emerging Markets, as well as the 6 High Dividend and 4 Long/ Cash variations of the NQVW indexes. The NQVW High Dividend indexes include the highest 100 dividend-yielding stocks within the selected NQVW screen. The NQVW Long/Cash indexes are designed to tactically reduce equity exposure during periods of significant market decline, while reinvesting when market prices have either further declined or rebounded. Both are very innovative extensions of the NQVW framework and satisfy investors' specific preferences for sustainable dividends and/or rigorous tail-risk management.

APPENDIX A

NASDAQ VICTORY VOLATILITY WEIGHTED INDEX FAMILY DESCRIPTIONS

SYMBOL	INDEX NAME	DESCRIPTION
NQVWLC™	Nasdaq Victory U.S. Large Cap 500 Volatility Weighted Index™	The Nasdaq Victory U.S. Large Cap 500 Volatility Weighted Index contains the 500 largest publicly traded stocks within the Nasdaq Global Index universe, has a Nasdaq country definition as United States, have positive net earnings across the last twelve months and met all other eligibility criteria.
NQVWLCT™	Nasdaq Victory U.S. Large Cap 500 Volatility Weighted Total Return Index™	
NQVWLCN™	Nasdaq Victory U.S. Large Cap 500 Volatility Weighted Net Total Return Index™	
NQVWLCC™	Nasdaq Victory U.S. Large Cap 500 Long/Cash Volatility Weighted Index™	The Nasdaq Victory U.S. Large Cap 500 Long/Cash Volatility Weighted Index is based on the Nasdaq Victory U.S. Large Cap 500 Volatility Weighted Index and has the ability to tactically reduce its exposure to the equity markets during periods of significant market decline and reinvests when market prices have further declined or rebounded.
NQVWLCCT™	Nasdaq Victory U.S. Large Cap 500 Long/Cash Volatility Weighted Total Return Index™	
NQVWLCCN™	Nasdaq Victory U.S. Large Cap 500 Long/Cash Volatility Weighted Net Total Return Index™	
NQVWLD™	Nasdaq Victory U.S. Large Cap High Dividend 100 Volatility Weighted Index™	The Nasdaq Victory U.S. Large Cap High Dividend 100 Volatility Weighted Index begins with the highest 100 dividend-yielding stocks within the Nasdaq Victory U.S. Large Cap 500 Volatility Weighted Index.
NQVWLDT™	Nasdaq Victory U.S. Large Cap High Dividend 100 Volatility Weighted Total Return Index™	
NQVWLDN™	Nasdaq Victory U.S. Large Cap High Dividend 100 Volatility Weighted Net Total Return Index™	
NQVWLDC™	Nasdaq Victory U.S. Large Cap High Dividend 100 Long/Cash Volatility Weighted Index™	The Nasdaq Victory U.S. Large Cap High Dividend 100 Long/Cash Volatility Weighted Index is based on the Nasdaq Victory U.S. Large Cap High Dividend 100 Volatility Weighted Index and has the ability to tactically reduce its exposure to the equity markets during periods of significant market decline and reinvests when market prices have further declined or rebounded.
NQVWLDCT™	Nasdaq Victory U.S. Large Cap High Dividend 100 Long/Cash Volatility Weighted Total Return Index™	
NQVWLDCN™	Nasdaq Victory U.S. Large Cap High Dividend 100 Long/Cash Volatility Weighted Net Total Return Index™	
NQVWSC™	Nasdaq Victory U.S. Small Cap 500 Volatility Weighted Index™	The Nasdaq Victory U.S. Small Cap 500 Volatility Weighted Index contains the 500 largest publicly traded stocks within the Nasdaq US Small Cap Index, have positive net earnings across the last twelve months and met all other eligibility criteria.
NQVWSCT™	Nasdaq Victory U.S. Small Cap 500 Volatility Weighted Total Return Index™	
NQVWSCN™	Nasdaq Victory U.S. Small Cap 500 Volatility Weighted Net Total Return Index™	

NQVWSCC™	Nasdaq Victory U.S. Small Cap 500 Long/Cash Volatility Weighted Index™	The Nasdaq Victory U.S. Small Cap 500 Long/Cash Volatility Weighted Index is based on the Nasdaq Victory U.S. Small Cap 500 Volatility Weighted Index and has the ability to tactically reduce its exposure to the equity markets during periods of significant market decline and reinvests when market prices have further declined or rebounded.
NQVWSCCT™	Nasdaq Victory U.S. Small Cap 500 Long/Cash Volatility Weighted Total Return Index™	
NQVWSCCN™	Nasdaq Victory U.S. Small Cap 500 Long/Cash Volatility Weighted Net Total Return Index™	
NQVWSD™	Nasdaq Victory U.S. Small Cap High Dividend 100 Volatility Weighted Index™	The Nasdaq Victory U.S. Small Cap High Dividend 100 Volatility Weighted Index begins with the highest 100 dividend-yielding stocks within the Nasdaq Victory U.S. Small Cap 500 Volatility Weighted Index.
NQVWSDT™	Nasdaq Victory U.S. Small Cap High Dividend 100 Volatility Weighted Total Return Index™	
NQVWSDN™	Nasdaq Victory U.S. Small Cap High Dividend 100 Volatility Weighted Net Total Return Index™	
NQVWIL™	Nasdaq Victory International 500 Volatility Weighted Index™	The Nasdaq Victory International 500 Volatility Weighted Index contains the 500 largest publicly traded stocks within the Nasdaq Global Index universe, with Nasdaq classified region as developed market excluding the United States, have positive net earnings across the last twelve months and met all other eligibility criteria.
NQVWILT™	Nasdaq Victory International 500 Volatility Weighted Total Return Index™	
NQVWILN™	Nasdaq Victory International 500 Volatility Weighted Net Total Return Index™	
NQVWILC™	Nasdaq Victory International 500 Long/Cash Volatility Weighted Index™	The Nasdaq Victory International 500 Long/Cash Volatility Weighted Index is based on the Nasdaq Victory International 500 Volatility Weighted Index and has the ability to tactically reduce its exposure to the equity markets during periods of significant market decline and reinvests when market prices have further declined or rebounded.
NQVWILCT™	Nasdaq Victory International 500 Long/Cash Volatility Weighted Total Return Index™	
NQVWILCN™	Nasdaq Victory International 500 Long/Cash Volatility Weighted Net Total Return Index™	
NQVWID™	Nasdaq Victory International High Dividend 100 Volatility Weighted Index™	The Nasdaq Victory International High Dividend 100 Volatility Weighted Index begins with the highest 100 dividend-yielding stocks within the Nasdaq Victory International 500 Volatility Weighted Index.
NQVWIDT™	Nasdaq Victory International High Dividend 100 Volatility Weighted Total Return Index™	
NQVWIDN™	Nasdaq Victory International High Dividend 100 Volatility Weighted Net Total Return Index™	
NQVWJDJ™	Nasdaq Victory Japan High Dividend 100 Volatility Weighted JPY Index™	The Nasdaq Victory Japan High Dividend 100 Volatility Weighted JPY Index contains the highest 100 dividend-yielding stocks within the 300 largest publicly traded stocks that are within the Nasdaq Global Index universe, has a Nasdaq country definition as Japan, have positive net earnings across the last months and met all other eligibility criteria.
NQVWJDJT™	Nasdaq Victory Japan High Dividend 100 Volatility Weighted JPY Total Return Index™	
NQVWJDJN™	Nasdaq Victory Japan High Dividend 100 Volatility Weighted JPY Net Total Return Index™	
NQVWEM™	Nasdaq Victory Emerging Markets 500 Volatility Weighted Index™	The Nasdaq Victory Emerging Markets 500 Volatility Weighted Index contains the 500 largest publicly traded stocks within the Nasdaq Global Index universe, with a Nasdaq classified region as emerging markets, have positive net earnings across the last twelve months and met all other eligibility criteria.
NQVWEMN™	Nasdaq Victory Emerging Markets 500 Volatility Weighted Total Return Index™	
NQVWEM™	Nasdaq Victory Emerging Markets 500 Volatility Weighted Net Total Return Index™	
NQVWED™	Nasdaq Victory Emerging Markets High Dividend 100 Volatility Weighted Index™	The Nasdaq Victory Emerging Markets High Dividend 100 Volatility Weighted Index begins with the highest 100 dividend-yielding stocks within the Nasdaq Victory Emerging Markets 500 Volatility Weighted Index.
NQVWEDT™	Nasdaq Victory Emerging Markets High Dividend 100 Volatility Weighted Total Return Index™	
NQVWEDN™	Nasdaq Victory Emerging Markets High Dividend 100 Volatility Weighted Net Total Return Index™	

APPENDIX B

PERFORMANCE SUMMARY

ANNUAL TOTAL RETURN												
YEAR	NQUSBLMT	NQVWLCT	ANNTR DIFF	NQUSST	NQVWSCT	ANNTR DIFF	NQDMXUSN	NQVWILN	ANNTR DIFF	NQEMN	NQVWEMN	ANNTR DIFF
2001	1.1%	7.4%	6.2%	18.8%	16.9%	-1.9%	-7.9%	-3.7%	4.2%	0.3%	15.0%	14.7%
2002	-21.7%	-7.5%	14.2%	-17.1%	-6.3%	10.8%	-14.9%	-8.6%	6.3%	-7.2%	6.3%	13.6%
2003	29.9%	32.2%	2.3%	52.6%	38.1%	-14.5%	41.7%	54.7%	13.0%	54.6%	52.0%	-2.5%
2004	11.7%	18.1%	6.3%	20.5%	24.3%	3.8%	20.9%	28.1%	7.2%	24.8%	11.2%	-13.6%
2005	6.9%	9.5%	2.6%	7.5%	6.1%	-1.3%	15.9%	17.3%	1.4%	35.8%	13.0%	-22.8%
2006	15.7%	15.2%	-0.5%	19.1%	16.1%	-3.0%	24.8%	35.5%	10.7%	38.0%	50.2%	12.2%
2007	7.2%	5.5%	-1.7%	0.4%	-1.0%	-1.4%	12.7%	12.3%	-0.4%	40.2%	69.7%	29.5%
2008	-36.0%	-34.3%	1.7%	-37.1%	-29.3%	7.8%	-43.9%	-44.4%	-0.4%	-53.8%	-48.3%	5.5%
2009	27.4%	29.7%	2.3%	43.0%	25.6%	-17.4%	35.8%	41.3%	5.5%	82.7%	87.6%	5.0%
2010	16.4%	21.8%	5.4%	30.5%	26.0%	-4.5%	11.1%	14.2%	3.2%	21.8%	28.8%	7.0%
2011	1.7%	3.8%	2.1%	-5.8%	3.8%	9.7%	-12.8%	-14.3%	-1.4%	-19.5%	-15.3%	4.2%
2012	16.2%	15.3%	-0.9%	18.7%	15.2%	-3.5%	18.5%	21.0%	2.4%	20.6%	20.0%	-0.6%
2013	33.0%	34.1%	1.1%	39.8%	43.8%	4.0%	21.2%	23.9%	2.6%	-3.0%	-1.0%	2.0%
2014	13.0%	13.0%	0.0%	5.5%	5.3%	-0.2%	-4.4%	0.0%	4.4%	-0.2%	4.1%	4.3%
2015	0.9%	0.0%	-0.9%	-4.9%	-2.4%	2.5%	-1.9%	-1.6%	0.3%	-13.7%	-13.0%	0.7%
2016	12.2%	14.8%	2.6%	24.0%	28.4%	4.3%	3.0%	-0.3%	-3.3%	12.8%	5.7%	-7.0%
2017	21.8%	22.8%	1.0%	15.0%	12.4%	-2.6%	25.4%	27.1%	1.8%	34.2%	30.4%	-3.8%
2018	-5.1%	-8.3%	-3.2%	-10.7%	-10.2%	0.6%	-15.0%	-12.8%	2.3%	-11.2%	-10.8%	0.4%
2019	31.6%	30.8%	-0.8%	24.2%	24.0%	-0.3%	21.7%	20.0%	-1.7%	18.1%	12.7%	-5.4%
2020	21.1%	12.3%	-8.8%	23.3%	10.8%	-12.5%	9.6%	6.5%	-3.2%	10.2%	7.2%	-3.1%
2021	26.3%	26.5%	0.2%	17.4%	30.2%	12.7%	11.0%	12.6%	1.5%	0.2%	11.3%	11.1%
2022	-19.7%	-11.0%	8.7%	-21.0%	-14.2%	6.8%	-15.5%	-15.4%	0.1%	-15.3%	-10.3%	5.1%
2023	17.1%	5.8%	-11.3%	8.4%	5.2%	-3.1%	10.6%	9.9%	-0.7%	5.6%	6.0%	0.4%
1Y	19.5%	13.0%	-6.5%	12.3%	9.3%	-3.0%	16.2%	13.4%	-2.8%	5.1%	9.9%	4.9%
3Y	13.9%	14.0%	0.1%	12.3%	16.8%	4.5%	8.7%	8.3%	-0.4%	4.3%	10.0%	5.7%
5Y	11.8%	9.5%	-2.3%	4.9%	6.4%	1.6%	3.9%	3.5%	-0.5%	2.2%	4.3%	2.2%
7Y	13.1%	11.6%	-1.5%	9.5%	10.3%	0.8%	6.5%	6.2%	-0.3%	5.5%	5.6%	0.1%
10Y	12.6%	11.5%	-1.0%	8.9%	10.2%	1.3%	5.3%	5.5%	0.2%	3.7%	4.0%	0.3%
Inception	8.7%	10.3%	1.6%	10.0%	10.6%	0.6%	5.5%	7.7%	2.2%	8.5%	11.2%	2.7%

Performances are compared across four market segments:

- US Large Cap - Benchmark is NQUSBLMT™; Volatility Weighted Index is NQVWLCT™.
- US Small Cap - Benchmark is NQUSST™; Volatility Weighted Index is NQVWSCT™.
- Developed Market (Excluded US) - Benchmark is NQDMXUSN™; Volatility Weighted Index is NQVWILN™.
- Emerging Market - Benchmark is NQEMN™; Volatility Weighted Index is NQVWEMN™.

US Large Cap and Small Cap are total return indexes; Developed and Emerging Markets are net total return indexes.

Index history from March 30, 2001, to June 30, 2023.

Source: Nasdaq

APPENDIX B: Continued

PERFORMANCE SUMMARY

ANNUAL VOLATILITY												
YEAR	NQUSBLMT	NQVWLCT	VOL DIFF	NQUSST	NQVWSCT	VOL DIFF	NQDMXUSN	NQVWILN	VOL DIFF	NQEMN	NQVWEMN	VOL DIFF
2001	20.8%	16.4%	-4.4%	25.0%	18.9%	-6.1%	17.0%	17.8%	0.8%	22.9%	15.5%	-7.4%
2002	25.6%	21.3%	-4.3%	25.0%	21.8%	-3.2%	19.5%	14.0%	-5.5%	17.3%	8.5%	-8.8%
2003	16.6%	14.4%	-2.2%	18.5%	15.1%	-3.4%	13.7%	10.5%	-3.1%	13.7%	7.0%	-6.7%
2004	11.0%	10.5%	-0.5%	16.7%	14.3%	-2.4%	12.3%	11.6%	-0.7%	15.7%	9.2%	-6.4%
2005	10.2%	10.5%	0.3%	14.9%	14.8%	0.0%	9.8%	9.6%	-0.1%	11.5%	7.5%	-4.1%
2006	10.2%	10.3%	0.1%	15.9%	15.5%	-0.3%	13.4%	14.0%	0.6%	17.8%	11.6%	-6.2%
2007	15.5%	15.4%	-0.2%	18.5%	19.4%	0.9%	14.5%	14.2%	-0.2%	20.2%	16.5%	-3.7%
2008	40.2%	38.0%	-2.2%	44.4%	40.6%	-3.8%	35.5%	32.6%	-2.9%	40.3%	26.5%	-13.8%
2009	27.0%	25.3%	-1.7%	36.6%	29.9%	-6.7%	24.9%	23.9%	-1.0%	26.6%	18.8%	-7.8%
2010	18.2%	16.7%	-1.5%	23.8%	20.6%	-3.2%	18.5%	16.9%	-1.6%	17.5%	13.8%	-3.7%
2011	23.6%	23.1%	-0.5%	32.5%	30.3%	-2.2%	23.3%	23.1%	-0.2%	21.3%	16.3%	-5.0%
2012	12.8%	12.3%	-0.5%	16.7%	15.8%	-0.9%	15.5%	15.0%	-0.5%	14.1%	11.1%	-2.9%
2013	11.0%	11.1%	0.1%	14.2%	13.7%	-0.5%	11.5%	11.2%	-0.3%	12.5%	12.4%	-0.1%
2014	11.5%	11.6%	0.0%	15.5%	14.8%	-0.7%	9.5%	9.0%	-0.6%	10.3%	9.2%	-1.1%
2015	15.4%	14.7%	-0.7%	16.5%	15.8%	-0.7%	13.4%	12.6%	-0.8%	15.7%	14.3%	-1.4%
2016	13.3%	13.6%	0.3%	18.9%	17.3%	-1.6%	16.4%	15.1%	-1.3%	16.6%	13.8%	-2.7%
2017	6.8%	7.3%	0.5%	12.1%	12.6%	0.5%	7.2%	6.6%	-0.6%	8.8%	7.1%	-1.7%
2018	17.1%	15.4%	-1.7%	17.8%	16.4%	-1.4%	14.0%	11.3%	-2.8%	14.6%	12.0%	-2.6%
2019	12.6%	12.3%	-0.3%	16.3%	15.8%	-0.5%	8.6%	8.6%	0.0%	10.5%	9.1%	-1.4%
2020	34.7%	35.4%	0.8%	42.9%	43.5%	0.7%	24.0%	23.6%	-0.4%	25.2%	22.6%	-2.6%
2021	13.5%	13.0%	-0.5%	21.6%	20.3%	-1.3%	11.5%	10.7%	-0.8%	15.4%	10.9%	-4.5%
2022	24.9%	21.6%	-3.3%	28.4%	23.5%	-4.9%	19.3%	18.1%	-1.2%	21.0%	15.0%	-6.0%
2023	14.9%	14.3%	-0.6%	21.0%	20.3%	-0.7%	11.9%	10.8%	-1.1%	12.4%	8.9%	-3.4%
1Y	19.8%	18.1%	-1.8%	24.4%	21.8%	-2.6%	15.8%	14.9%	-0.9%	15.7%	11.0%	-4.7%
3Y	18.7%	16.8%	-1.9%	24.2%	22.0%	-2.3%	15.0%	14.0%	-1.0%	17.2%	12.5%	-4.7%
5Y	22.1%	21.3%	-0.8%	27.5%	26.4%	-1.2%	16.5%	15.5%	-1.0%	18.0%	14.6%	-3.4%
7Y	19.5%	18.8%	-0.7%	24.4%	23.4%	-1.0%	14.8%	13.9%	-0.9%	16.4%	13.3%	-3.1%
10Y	17.9%	17.3%	-0.5%	22.4%	21.4%	-1.0%	14.4%	13.5%	-0.9%	15.8%	13.2%	-2.6%
Inception	19.5%	18.4%	-1.1%	24.0%	22.1%	-2.0%	17.2%	16.1%	-1.1%	18.8%	14.0%	-4.9%

Performances are compared across four market segments:

- US Large Cap - Benchmark is NQUSBLMT; Volatility Weighted Index is NQVWLCT.
- US Small Cap - Benchmark is NQUSST; Volatility Weighted Index is NQVWSCT.
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- Emerging Market - Benchmark is NQEMN; Volatility Weighted Index is NQVWEMN.

US Large Cap and Small Cap are total return indexes; Developed and Emerging Markets are net total return indexes.

Index history from March 30, 2001, to June 30, 2023.

Source: Nasdaq