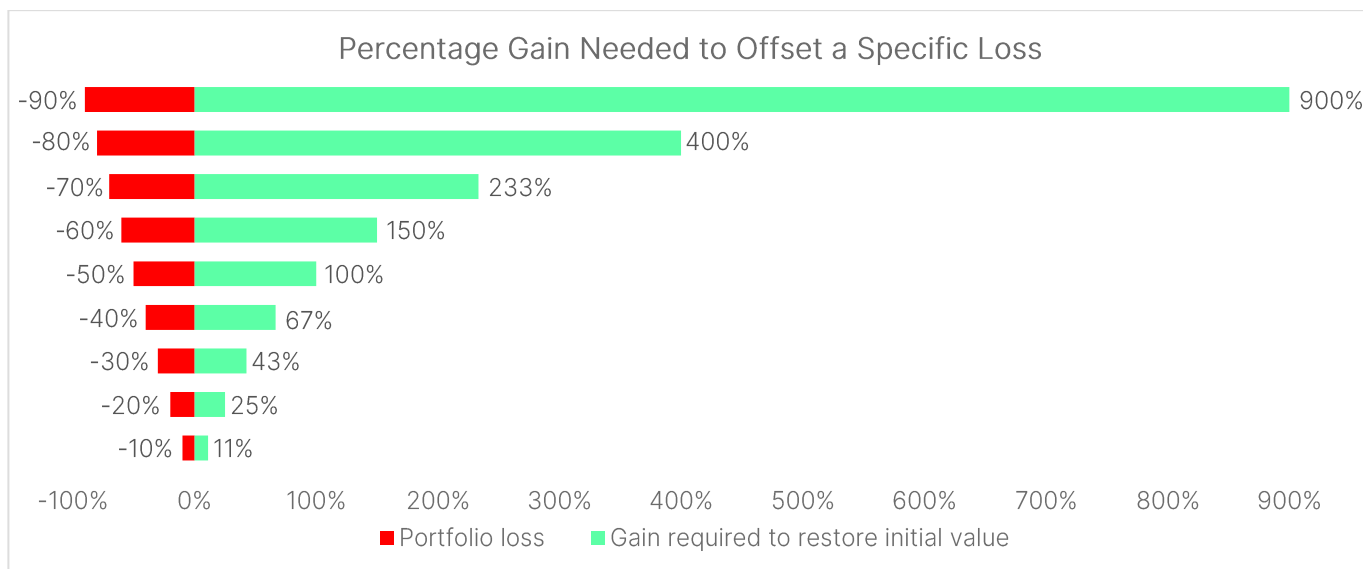


# Nasdaq-100 Low Volatility™ Index: A Tactical Complement for Investors Tracking the Nasdaq-100®

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## The importance of managing volatility

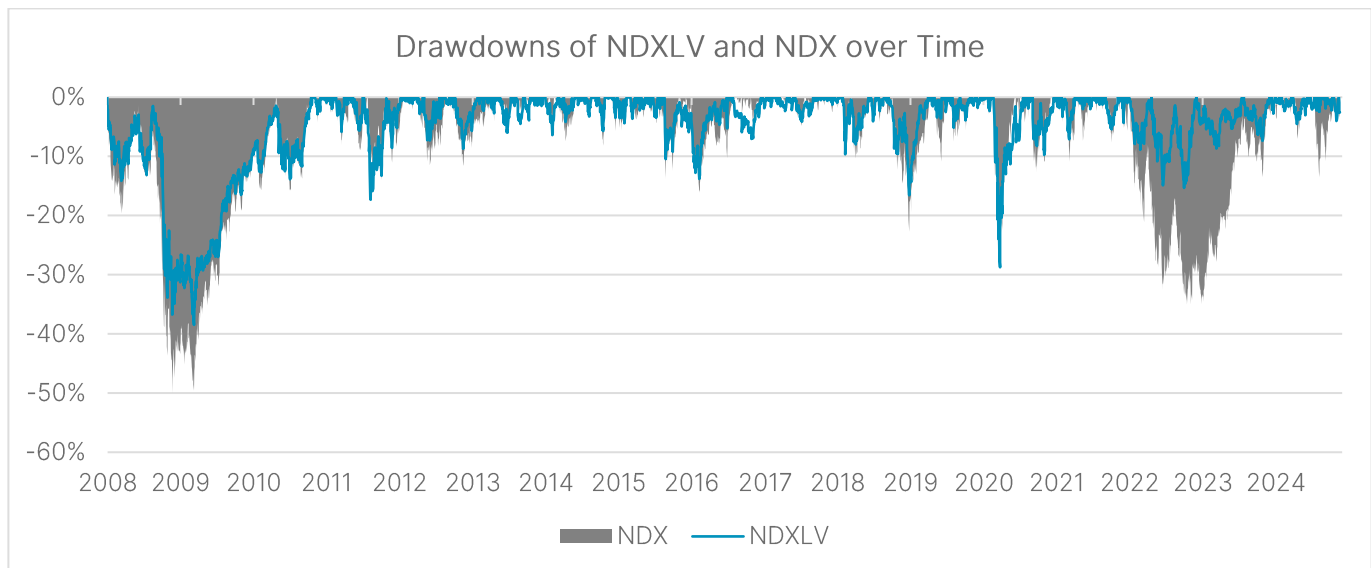
Loss mitigation is vital for long-term portfolio performance. Low-volatility stocks are inherently less exposed to market volatility due to their traditionally lower downside capture ratios<sup>1</sup>, meaning they tend to outperform the broader market during downturns. For any given percentage loss, a larger percentage gain is needed to restore a portfolio to its initial value. Tactical exposure to the low-volatility factor may help investors limit their losses, obviating the need to take high-risk moves following market drawdowns to produce large enough offsetting gains. For investors tracking the Nasdaq-100 Index® (NDX®), a complementary solution now exists to deliver tactical low-volatility exposure when needed.



## Nasdaq-100 Low Volatility Index (NDXLV™)

Launched on September 23, 2024, the Nasdaq-100 Low Volatility™ Index (NDXLV™) is designed to track the performance of the bottom quartile of NDX based on 12-month realized volatility. The 25 constituents of NDXLV are weighted by the inverse of their trailing 12-month volatility, favoring stocks with lower price fluctuations. The final index weights are calibrated so that no individual constituent surpasses 10%, and the combined weights of constituents above 4.75% do not exceed 50%. The index is reconstituted and rebalanced every quarter in March, June, September and December. For the full index methodology, please visit [here](#).

<sup>1</sup> Downside capture ratio gauges a strategy's performance in down markets compared to its benchmark. A value below 100% signifies that a strategy has declined less than its benchmark during periods of negative returns for the benchmark.



Source: Nasdaq Global Indexes. As of November 29, 2024. The period from December 31, 2007 to September 20, 2024 represents backtested performance.

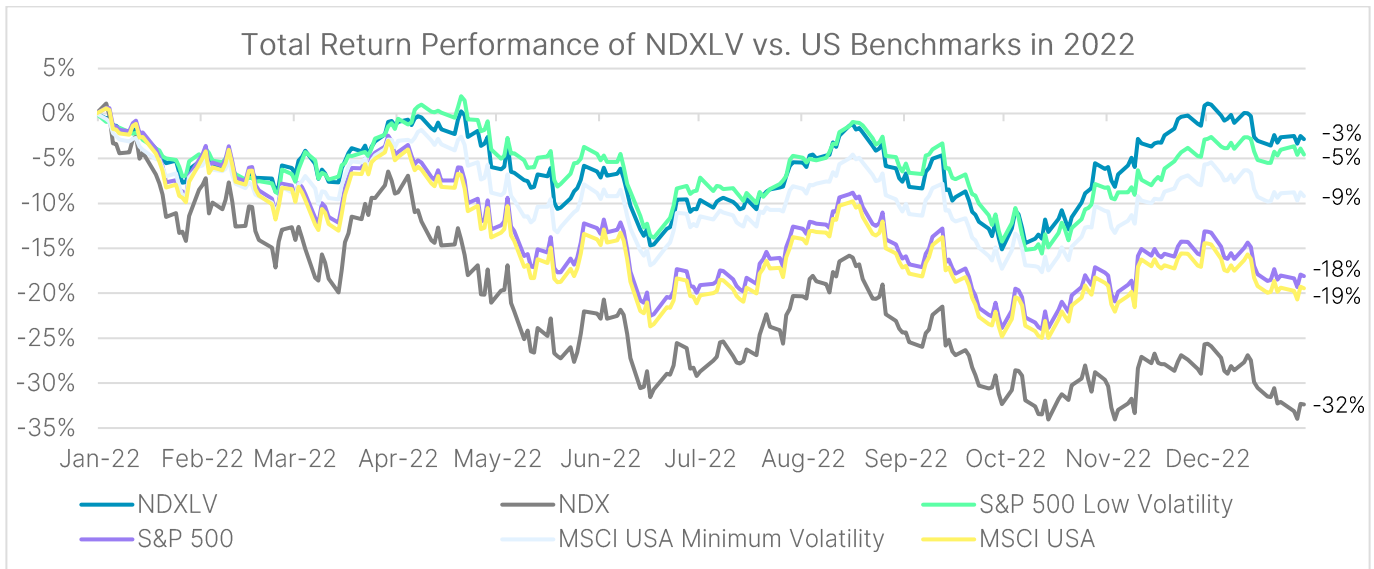
The chart above shows the drawdowns of NDXLV and NDX since the beginning of 2008, with each new index peak reset to 0% to focus on drawdowns. The graph reveals that NDXLV's drawdowns have generally been milder than those of NDX, especially in 2022's bear market. In 2022, NDXLV's average drawdown over the course of the year was only -6%, compared to -23% for NDX.

### Low volatility has shielded investors from the full extent of prior drawdowns

Market Event	Start Date	End Date	Total Return of NDX	Total Return of NDXLV	Downside Capture
European debt crisis	Apr 23, 2010	July 2, 2010	-15.8%	-12.6%	80.1%
US debt downgrade	Apr 29, 2011	Oct 3, 2011	-12.9%	-9.8%	75.8%
China and oil collapse	Jul 20, 2015	Feb 11, 2016	-14.7%	-11.3%	76.9%
Q4 2018 bear market	Oct 3, 2018	Dec 24, 2018	-22.6%	-14.8%	65.8%
COVID-19 pandemic	Feb 19, 2020	Mar 23, 2020	-27.8%	-28.7%	103.2%
Inflation spike	Jan 3, 2022	Oct 12, 2022	-34.2%	-13.4%	39.3%

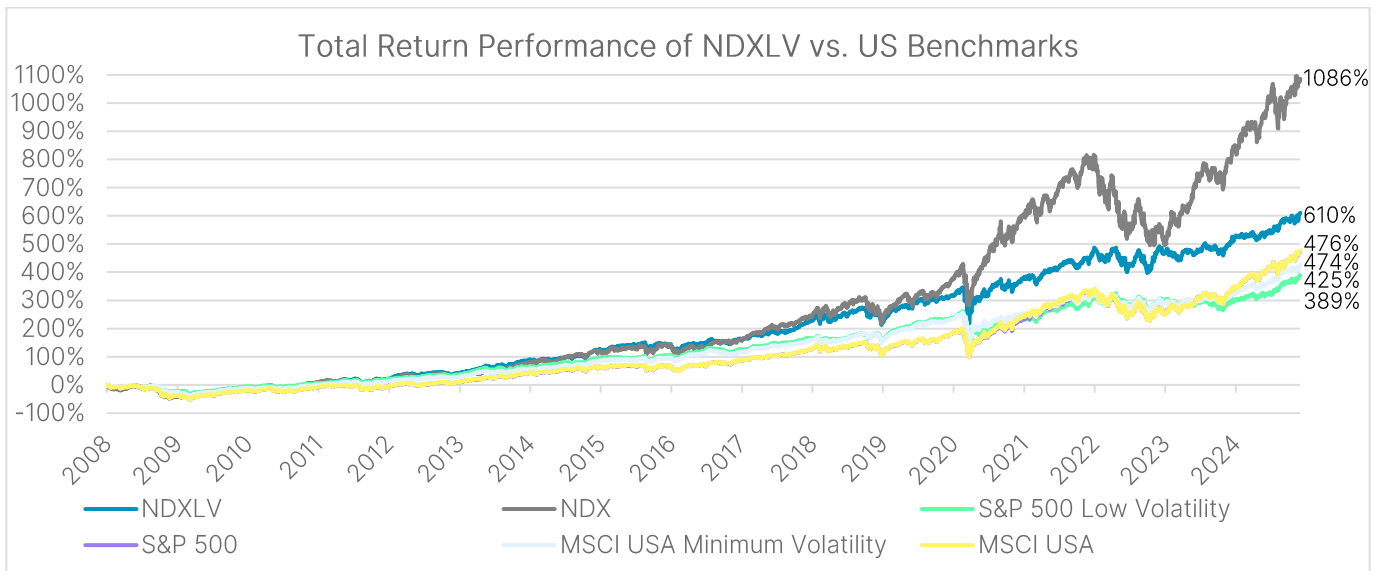
Source: Nasdaq Global Indexes.

The table above highlights the consistent downside protection offered by NDXLV during past market downturns. It has outperformed NDX in all drawdown periods listed, except the COVID-19 drawdown, when it lagged by 0.9% over a one-month period. The market environment from February to March 2020 was highly unusual from a historical perspective. During that brief period, sectors usually known for low volatility became more volatile, while those with higher expected volatility, like technology, were seen by investors as defensive in the shift to remote work. In the other five periods, the average downside capture was only 68% of NDX. During the most recent bear market in 2022, driven by the post-COVID inflation spike, NDXLV outperformed NDX significantly by 20.8%, with a downside capture of under 40%. This trend highlights NDXLV's ability to shield investors tracking NDX from the full extent of its downside risk, while preserving some exposure to the broader index universe.



Source: Nasdaq Global Indexes, FactSet. As of December 30, 2022.

2022 saw pronounced market losses due to historically high inflation in the US, aggressive Fed rate hikes to curb that inflation, the Russia-Ukraine war, and continued macroeconomic disruptions from the ongoing pandemic. All these factors contributed to widespread recession fears. The annual declines for NDX, S&P 500, and MSCI USA were the largest since the 2008 financial crisis, driven by a sell-off in growth stocks as worries over the Fed's rapid rate hikes pushed US Treasury yields higher. In contrast, NDXLV fell by only 3% in 2022, offering better performance compared to the low-volatility benchmarks from S&P and MSCI. The performance of NDXLV in 2022 serves as an especially powerful reminder of the value proposition of the index in today's market environment, given that many investors still anticipate a higher-for-longer interest rate regime, with an elevated likelihood of additional inflationary episodes in the years ahead.



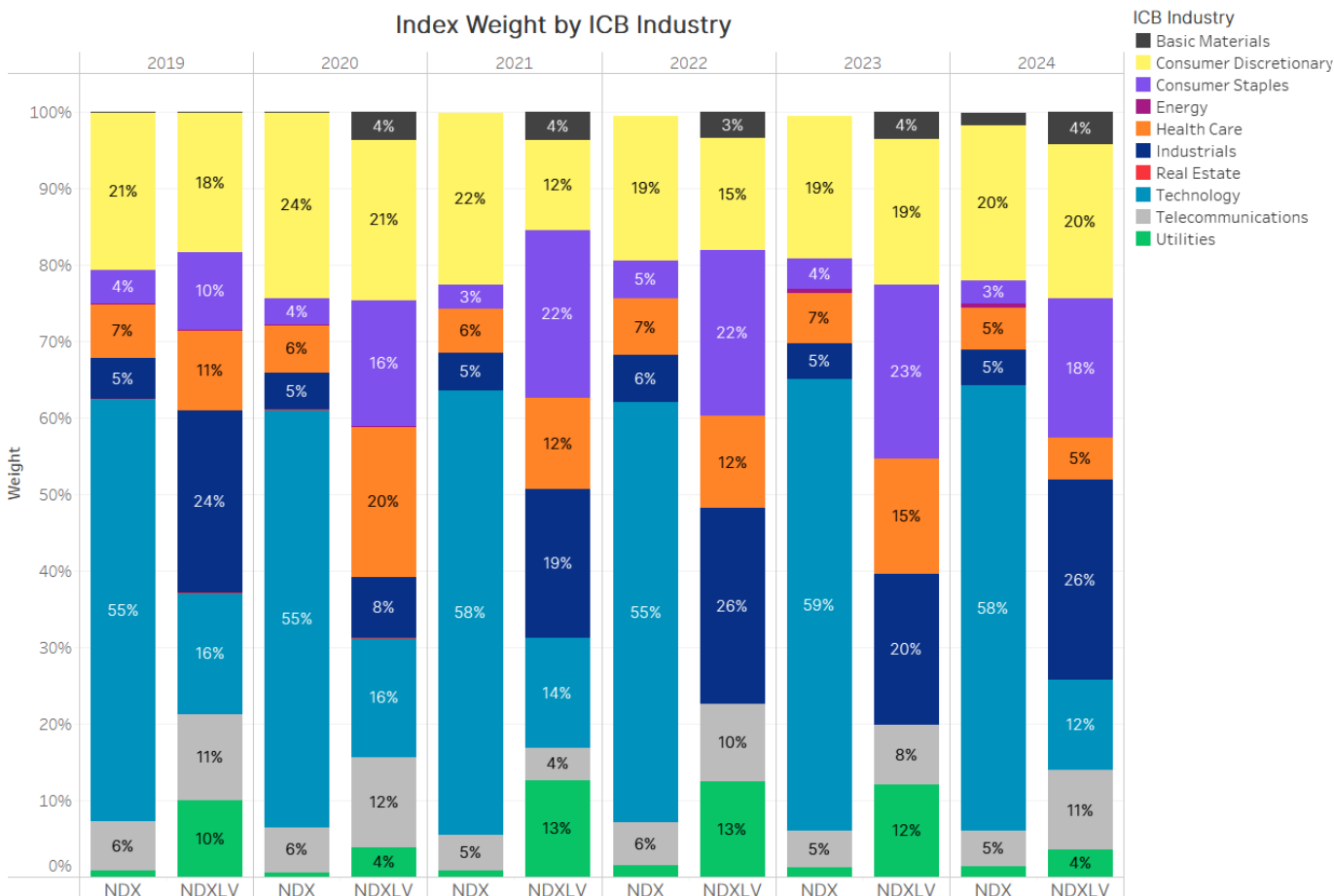
Source: Nasdaq Global Indexes, FactSet. For the period from December 31, 2007 to November 29, 2024.

Name of Index	Annualized Return	Standard Deviation	Maximum Drawdown	Sharpe Ratio
Nasdaq-100 Low Volatility	12.3%	17.9%	39%	0.61
Nasdaq-100	15.7%	22.9%	50%	0.63
S&P 500 Low Volatility	9.8%	15.8%	37%	0.54
S&P 500	10.9%	20.2%	53%	0.47
MSCI USA Minimum Volatility	10.3%	16.6%	44%	0.54
MSCI USA	10.9%	20.2%	52%	0.47

Source: Nasdaq Global Indexes, FactSet. For the period from December 31, 2007 to November 29, 2024. The average yield on US Treasury securities at 1-year constant maturity for the entire period (1.3%) is used as the risk-free rate to calculate Sharpe ratios.

Since the beginning of 2008, NDXLV has achieved an annualized return of 12.3%, approximately 20% lower than NDX's performance. In exchange, NDXLV exhibited approximately 20% lower volatility and maximum drawdown than NDX, maintaining nearly the same Sharpe ratio over the past 17 years. Compared to the S&P 500 Low Volatility Index and MSCI USA Minimum Volatility Index, NDXLV demonstrated a superior Sharpe ratio of 0.61 (versus 0.54) since 2008.

### Portfolio composition



Source: Nasdaq Global Indexes, FactSet. As of November 29, 2024. ICB Industry breakdowns are as of end of November of each year.

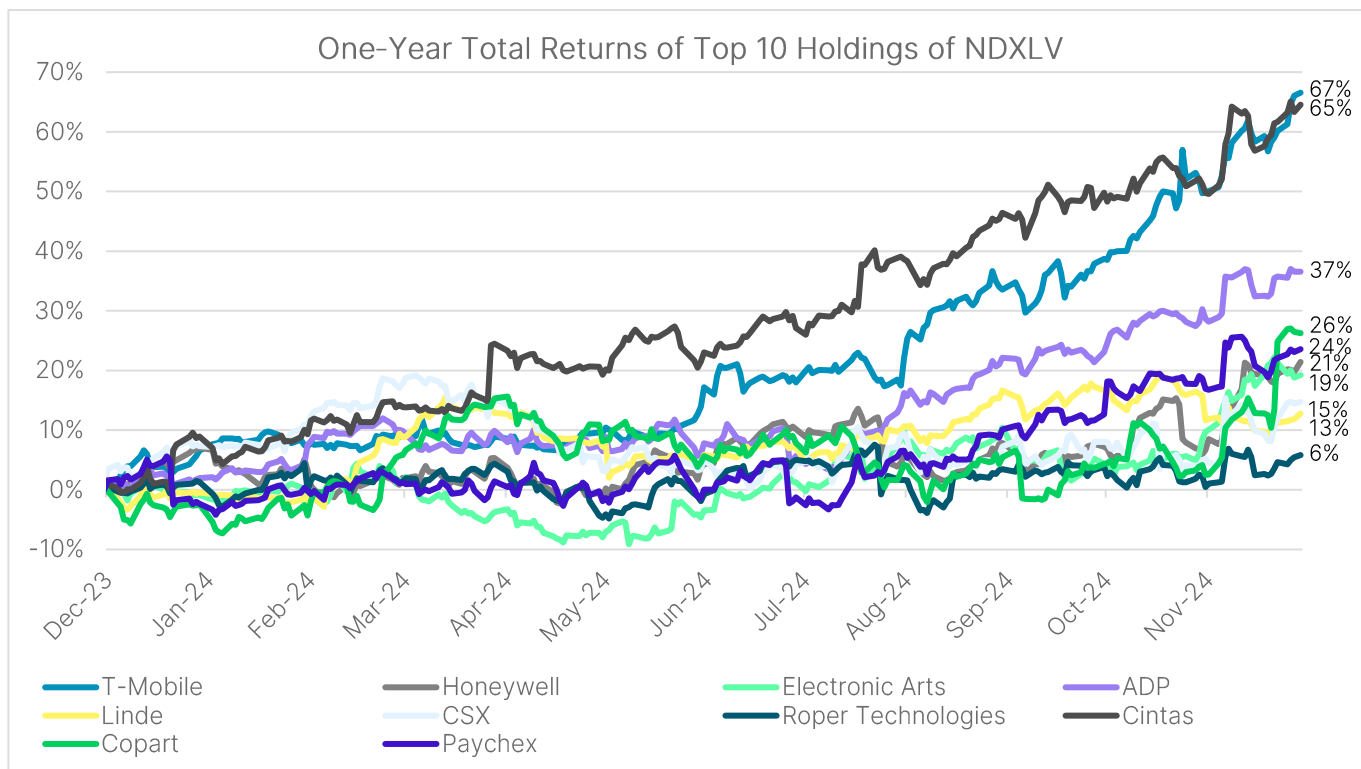
The sector exposure (per ICB Industry) of NDXLV differs significantly from that of NDX. While Technology typically accounts for 55% to 60% of NDX's weight, it struggles to rank in the top three of NDXLV and can even see zero exposure, as was the case in 2022 and 2023. Consumer Discretionary typically ranks among the largest three for NDXLV as well as NDX. Together with Industrials and Consumer Staples, these three have comprised around 60% of the index weight of NDXLV in recent years. Industrial stocks have accounted for 19% to 26% of the index weight since 2021, compared to 5 to 6% for NDX. Consumer Staples rarely exceeded 5% for NDX but have represented more than 20% of NDXLV's exposure in recent years.

### Top 10 Securities of NDXLV and NDX

No.	NDXLV			NDX		
	Company name	Weight	ICB Industry	Company name	Weight	ICB Industry
1	T-Mobile	6.4%	Telecommunications	Apple	8.8%	Technology
2	Honeywell	5.0%	Industrials	NVIDIA	8.2%	Technology
3	Electronic Arts	4.5%	Consumer Discretionary	Microsoft	7.6%	Technology
4	ADP	4.4%	Industrials	Amazon	5.3%	Consumer Discretionary
5	Linde	4.3%	Basic Materials	Meta Platforms	4.9%	Technology
6	CSX	4.3%	Industrials	Alphabet	4.7%	Technology
7	Roper Technologies	4.3%	Technology	Broadcom	4.7%	Technology
8	Cintas	4.3%	Industrials	Tesla	4.1%	Consumer Discretionary
9	Copart	4.2%	Consumer Discretionary	Costco	2.7%	Consumer Discretionary
10	Paychex	4.2%	Industrials	Netflix	2.4%	Consumer Discretionary
	<b>Total</b>	<b>45.9%</b>		<b>Total</b>	<b>53.4%</b>	

Source: Nasdaq Global Indexes. As of November 29, 2024. The weights of Class A and C shares of Alphabet are combined.

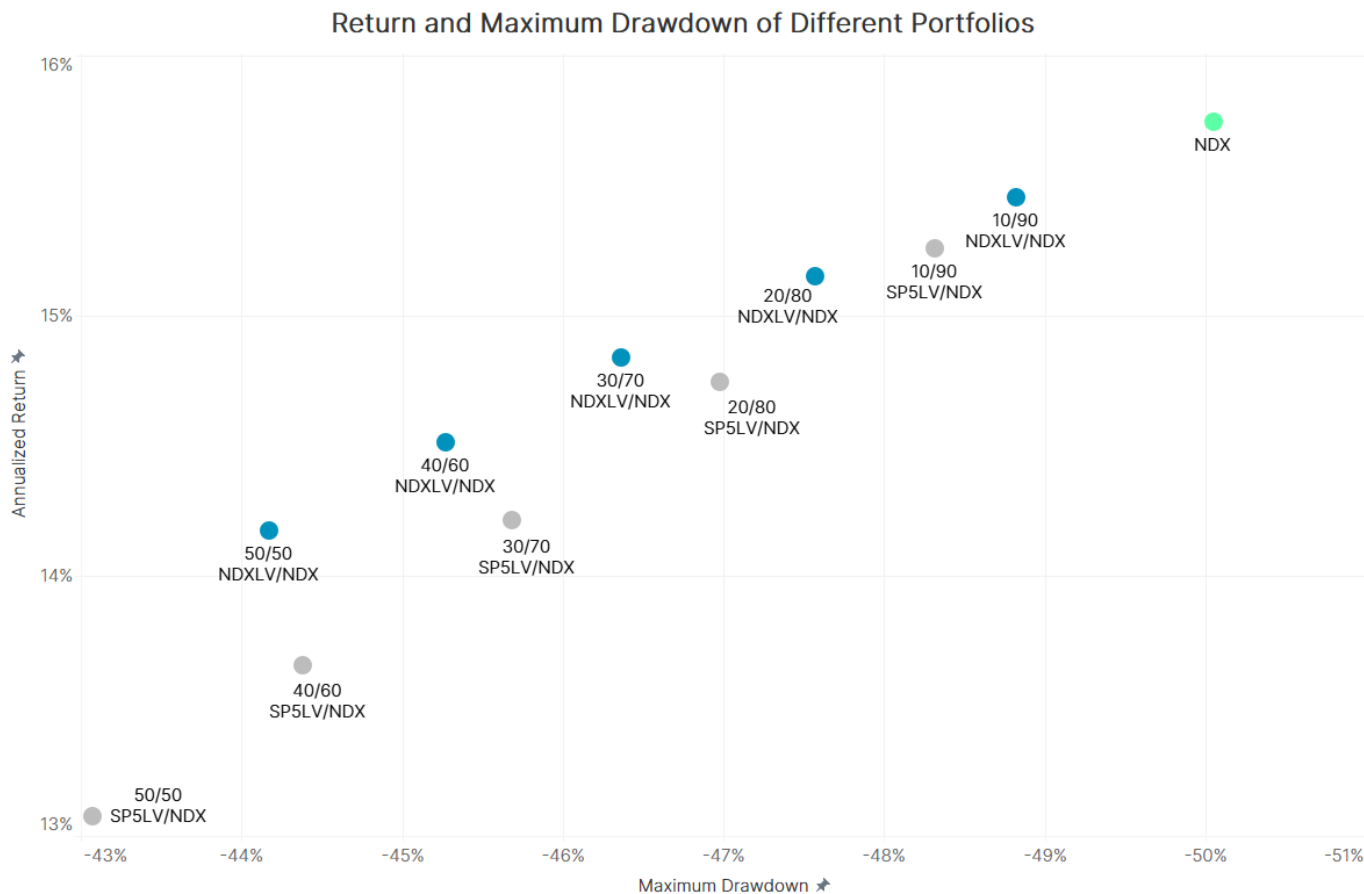
In addition to less sector concentration overall, NDXLV boasts better sector diversification among its top 10 constituents compared to NDX. As of the end of November 2024, half of NDXLV's top 10 holdings were Industrials, with the remainder in Consumer Discretionary, Telecommunications, Basic Materials and Technology. Conversely, all 10 largest NDX constituents were Technology and Consumer Discretionary stocks. None of the top 10 holdings of NDXLV currently overlap with those of NDX.



Source: Nasdaq Global Indexes, FactSet. As of November 29, 2024.

Each of the top 10 holdings of NDXLV achieved positive total returns in the past 12 months, averaging 29%. T-Mobile, the largest constituent weighting at 6.4%, delivered an impressive total return of 67%. With the largest 5G network in the US, T-Mobile exceeded expectations for wireless subscriber additions in Q3 2024. With a postpaid phone churn rate of 0.86%, the company is retaining its customers.<sup>2</sup> The carrier announced plans to buy back up to US\$14 billion of shares by the end of 2025.<sup>3</sup>

### A natural complement to any Nasdaq-100 investor's portfolio



Source: Nasdaq Global Indexes, FactSet. For the period from December 31, 2007 to November 29, 2024.

Low-volatility strategies are known as natural complements to broad equity market portfolios, given their varied return profiles and tendency to outperform at different times. For investors already tracking NDX, NDXLV offers a similarly compelling complement, even more so than a leading competitor in the low-volatility benchmarking space. The chart above illustrates hypothetical portfolios blending NDX with NDXLV (and separately, with the S&P 500 Low Volatility Index (SP5LV)) in various proportions. Each NDXLV/NDX blended portfolio exhibited a higher Calmar ratio<sup>4</sup> than the respective SP5LV/NDX portfolio with the same NDX allocation. A higher Calmar ratio indicates that the investment strategy has delivered stronger returns relative to the risk undertaken. Higher allocations to NDXLV typically offered an improvement in risk-adjusted returns.

<sup>2</sup> <https://www.bloomberg.com/news/articles/2024-10-23/t-mobile-adds-mobile-broadband-subscribers-raises-guidance>

<sup>3</sup> <https://www.reuters.com/business/media-telecom/t-mobile-announces-14-bln-buyback-2024-12-13/>

<sup>4</sup> The Calmar ratio is often used as a risk measure that considers maximum drawdown. It is defined as the annualized return divided by the maximum drawdown over the same period.

## Conclusion

Investors repeatedly strive to mitigate losses and manage risks while building diversified portfolios that maximize the potential for outperformance. A well-proportioned strategic allocation to low-volatility equities can help investors minimize losses during downturns and achieve the long-term competitive returns they desire without enduring the full extent of the market's fluctuations. In the case of NDX investors in particular, the value proposition of NDXLV is clear: a reduction in volatility and downside capture in direct proportion to performance, which succeeds in maintaining NDX's highly compelling risk-return tradeoff with a nearly identical Sharpe ratio. With a clear history of effective downside mitigation in prior market downturns, NDXLV serves as an effective tracking solution for investors seeking a tactical, low-volatility complement to NDX.

The Nasdaq-100 Low Volatility Index (NDXLV) tracks the performance of the bottom quartile of the Nasdaq-100 (NDX) based on 12-month realized volatility. The Invesco QQQ Low Volatility ETF (Nasdaq: QQLV) tracks NDXLV.

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