



Nasdaq-100[®] Index:

The Benchmark of the 21st Century

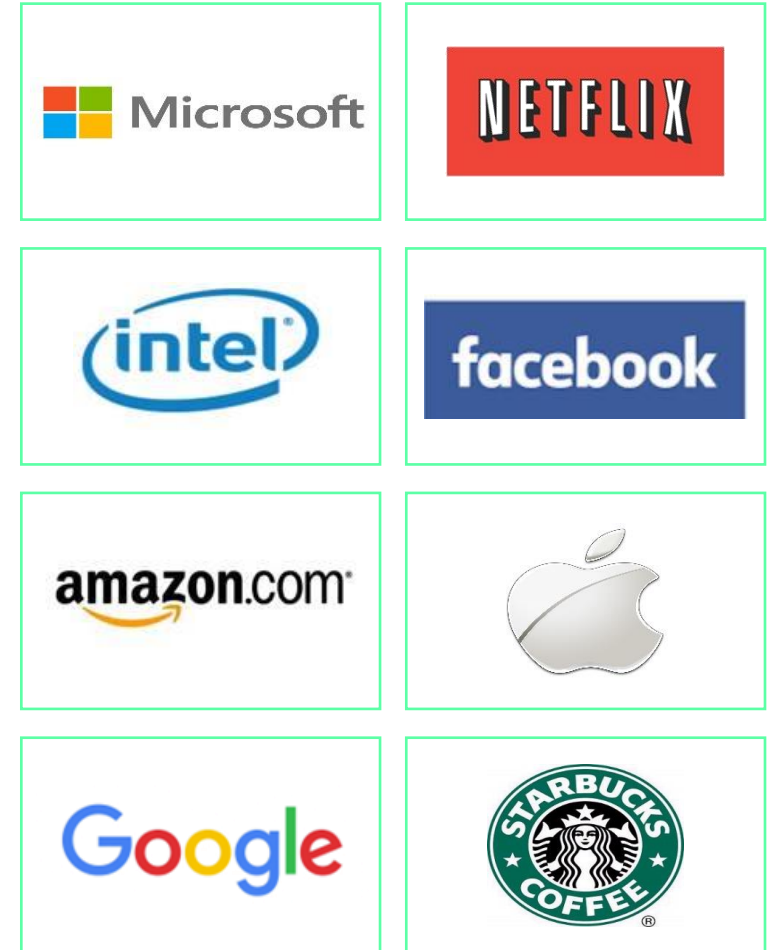
December 2022

Nasdaq-100 Index: Overview

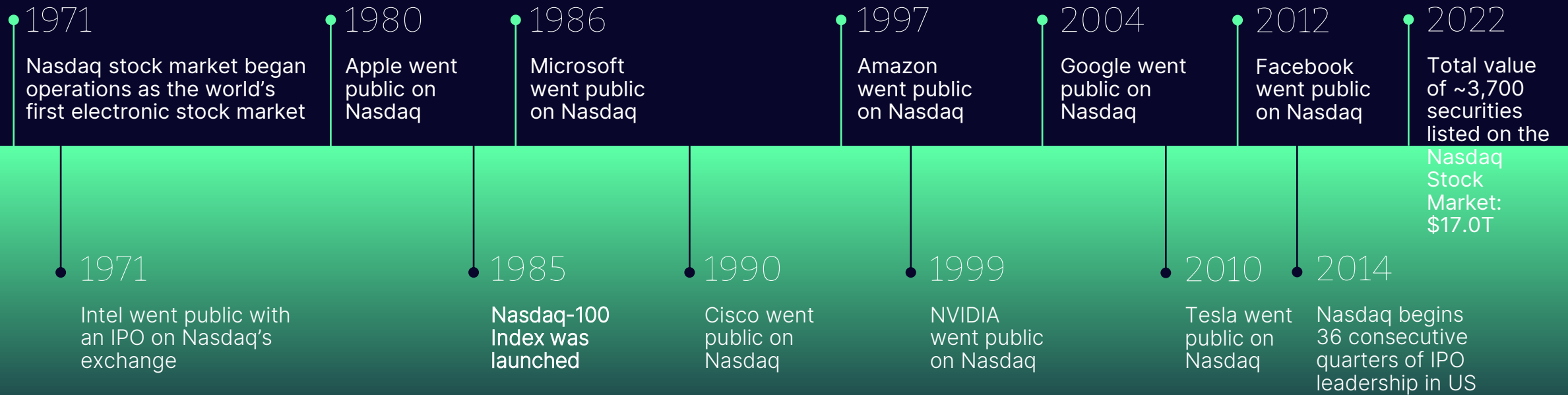
The disruptors; the game-changers; the forward-thinkers.

Companies that influence our lives daily, in multiple areas.

- GE, Chicago Gas Company, American Sugar Company, and the other original Dow Industrials accelerated the growth of the US economy at the turn of the 20th century, and helped spur its transformation from agricultural to industrial.
- By mid-century, GE was still one of the nation's 10 largest companies by market cap, joined by the automakers (GM/Ford/Chrysler), Big Oil (Exxon Mobil, Texaco, Gulf Oil), and other large, diversified industrial companies like DuPont.
- At the turn of the 21st century, the Internet/Tech Bubble heralded the transformation of the economy from industrial to technological; from analog to digital; from hardware to software.
- Today, Apple, Amazon, Google, Facebook and Microsoft have become global leaders in the technology sector by creating products and services that are essential to both individual consumers and enterprise customers. From software, computing, and communications, to entertainment, advertising, and e-commerce, their platforms represent the new "diversified industrials" of the 21st century.
- Beyond the biggest names, companies like Intel and Netflix specialize in narrower applications of technology, while the rest of the Nasdaq-100 encompasses innovation-driven companies in other sectors, like Starbucks.

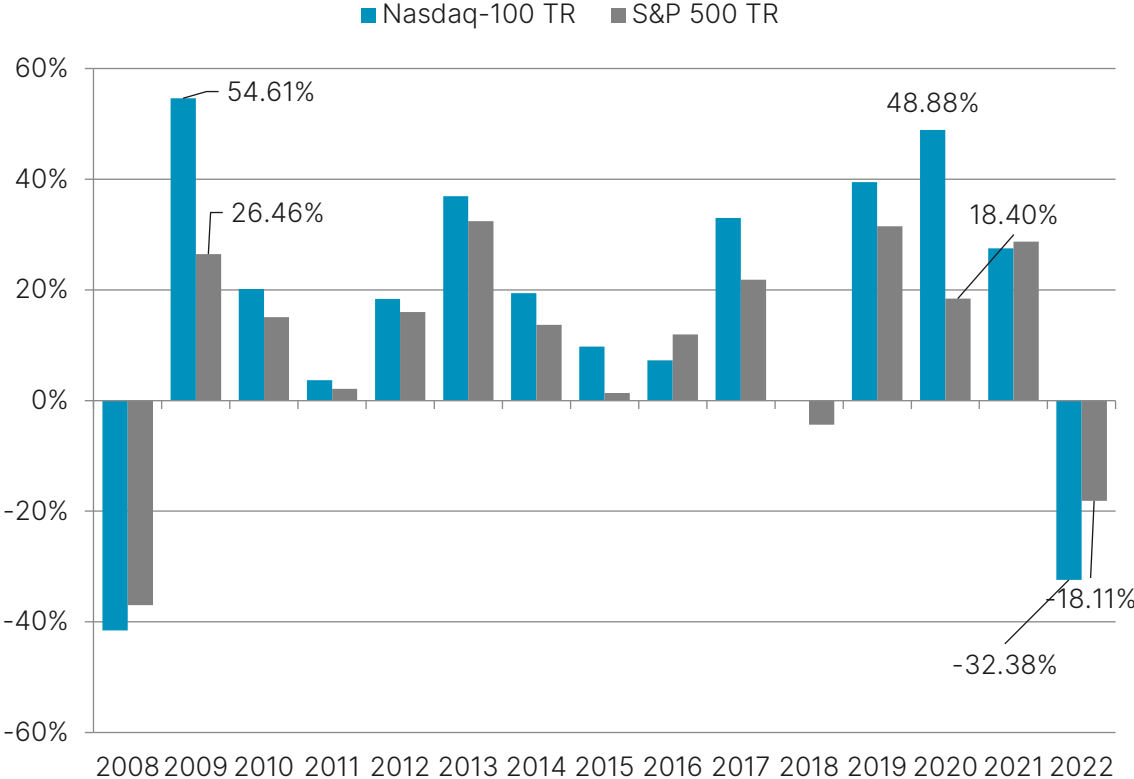


Nasdaq: A Leading US and Global Exchange Operator with World-Class Indexing Capabilities

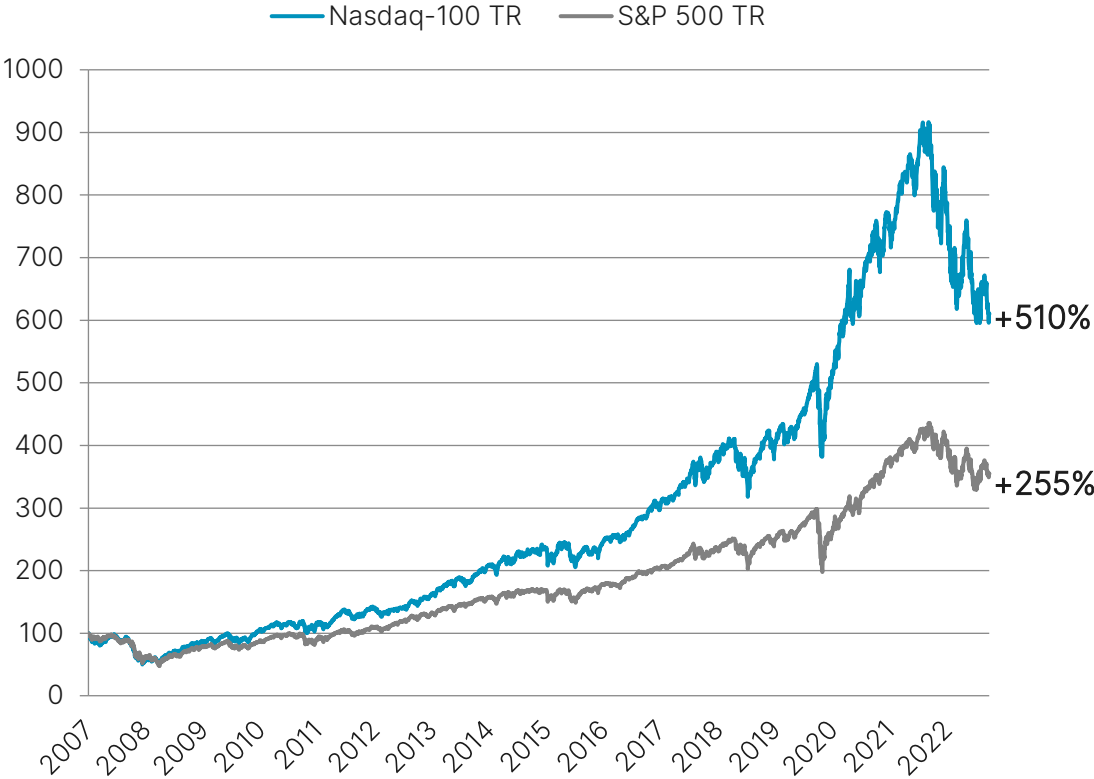


Nasdaq-100 Index: Performance vs. S&P 500

INDEX ANNUAL TOTAL RETURNS



INDEX PERFORMANCE SINCE DECEMBER 31, 2007



- NDX has outperformed SPX in 11 of the past 15 calendar years, including by more than 30% in 2020; underperformance in 2022 was ~13%

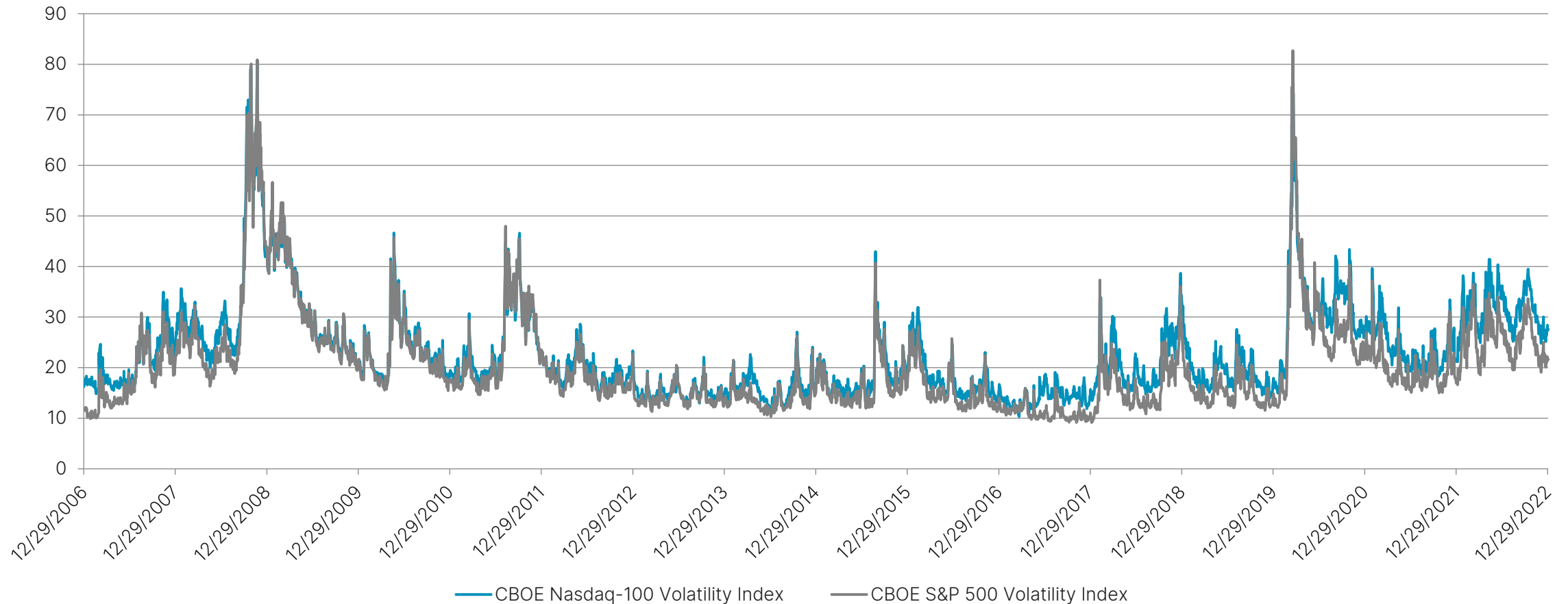
- Cumulative total returns through December 30, 2022 were 510% for NDX – doubling the returns of 255% for SPX.

Performance Data (Total Return)

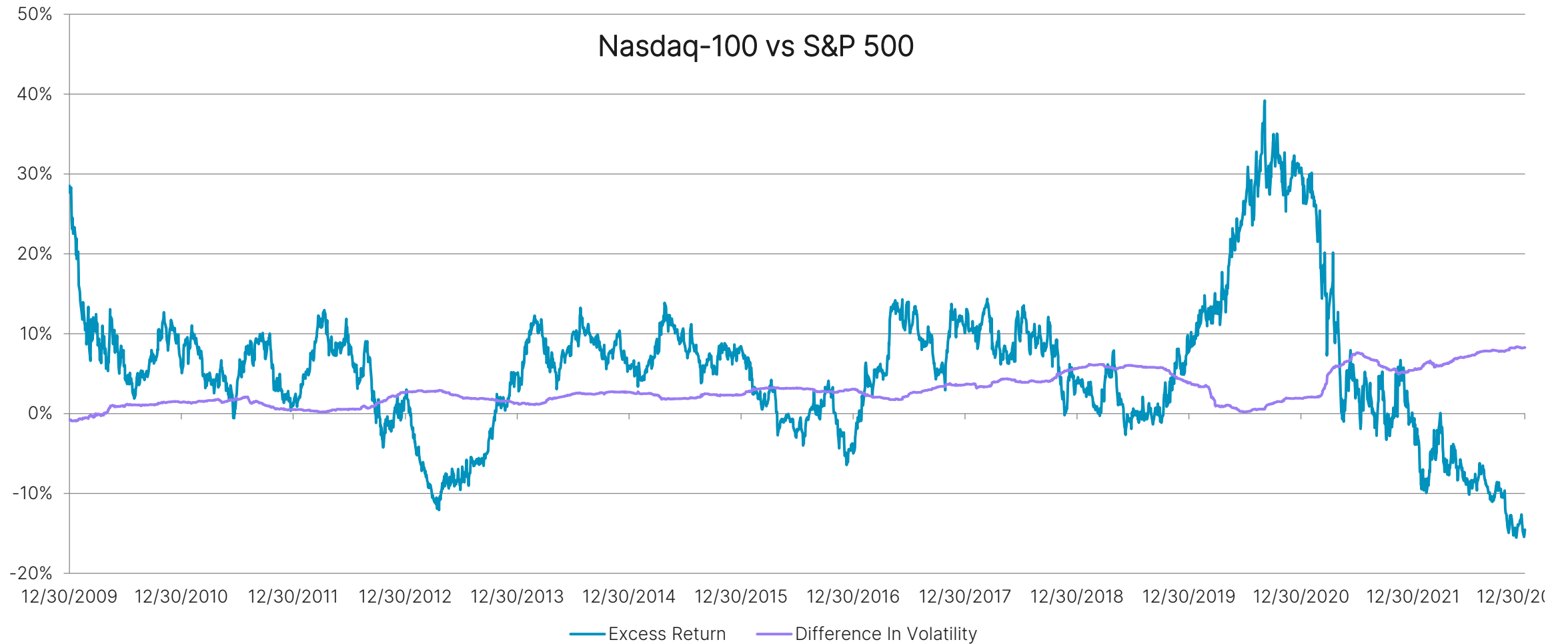
Year	Calendar Year Return		Correlation	Calendar Year Volatility	
	Nasdaq-100	S&P 500	NDX + SPX	Nasdaq-100	S&P 500
2007	19.24%	5.49%	0.890	18.68%	15.99%
2008	-41.57%	-37.00%	0.945	42.22%	40.89%
2009	54.61%	26.46%	0.935	26.47%	27.25%
2010	20.14%	15.06%	0.949	19.48%	18.06%
2011	3.66%	2.11%	0.948	23.75%	23.24%
2012	18.35%	16.00%	0.920	15.44%	12.74%
2013	36.92%	32.39%	0.901	12.49%	11.16%
2014	19.40%	13.69%	0.924	14.06%	11.36%
2015	9.75%	1.38%	0.947	17.85%	15.50%
2016	7.27%	11.96%	0.916	16.17%	13.11%
2017	32.99%	21.83%	0.801	10.32%	6.69%
2018	0.04%	-4.38%	0.949	22.70%	17.04%
2019	39.46%	31.49%	0.950	16.31%	12.46%
2020	48.88%	18.40%	0.937	36.29%	34.37%
2021	27.51%	28.71%	0.877	18.52%	13.08%
2022	-32.38%	-18.11%	0.967	32.43%	24.13%

Historical Volatility

- Both the Nasdaq-100 and the S&P 500 have had very similar volatility over last 15+ years



1-Year Excess Return vs. Volatility

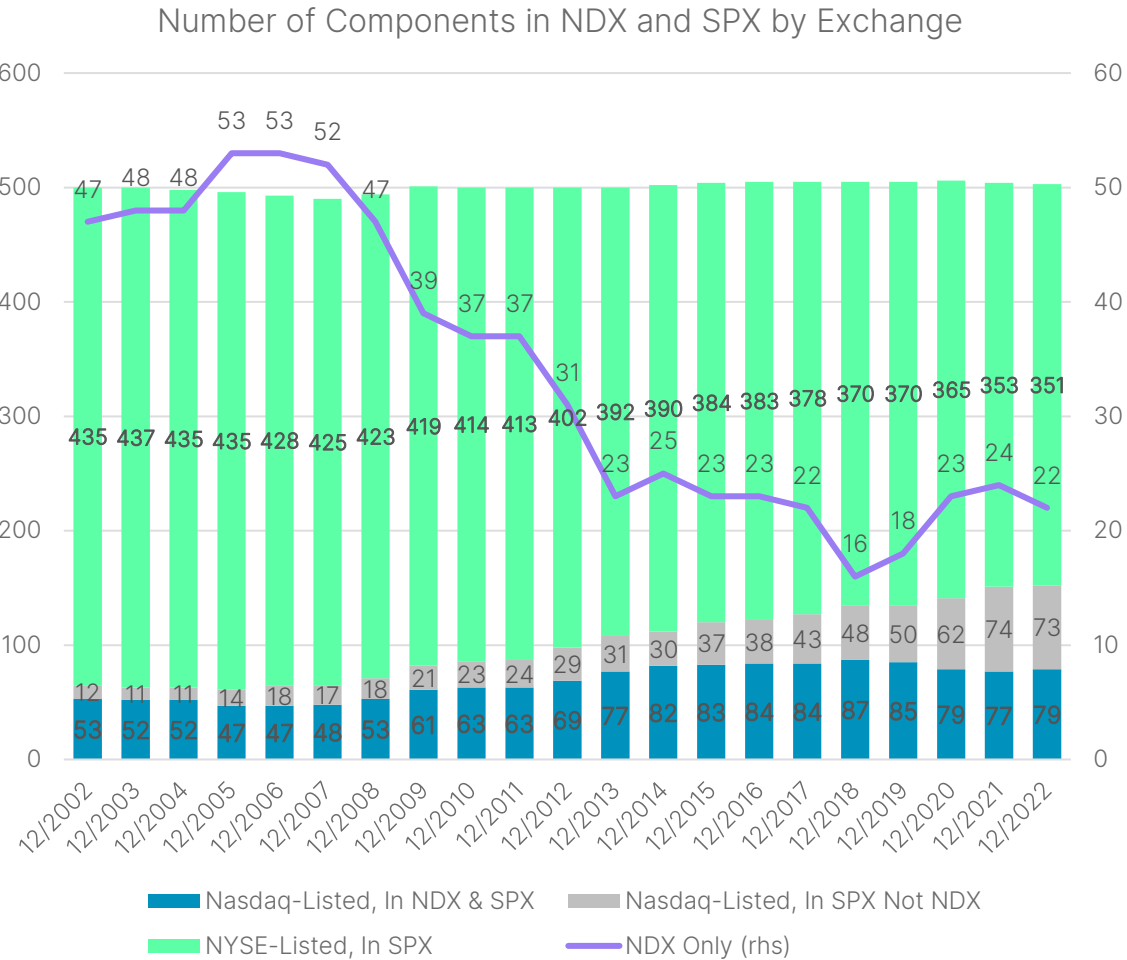
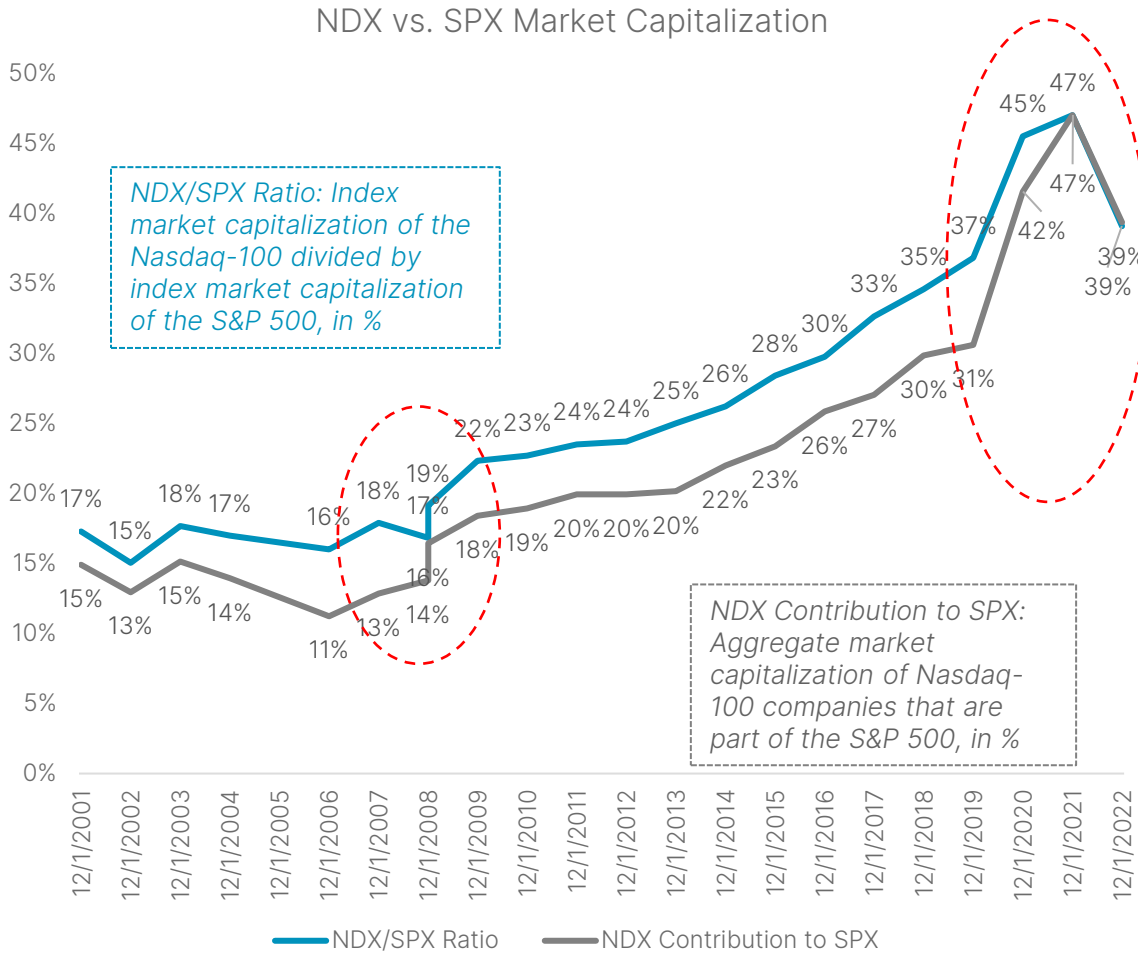


Coveted Placement

The 100 that Make the Index



Nasdaq-100 vs. S&P 500: Composition Over Time



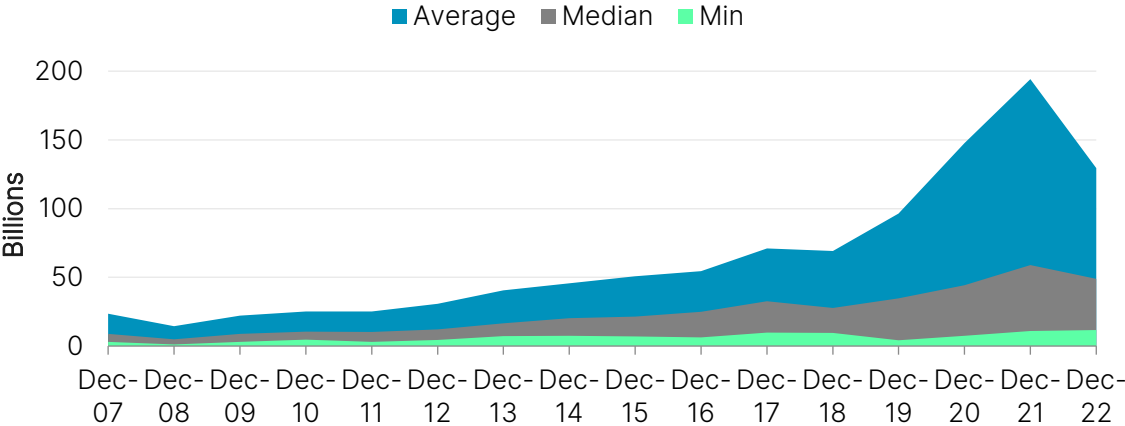
Source: Nasdaq Global Indexes, Bloomberg. Data as of 12/31/2022.

Nasdaq-100 Index: Constituent Size vs. S&P 500

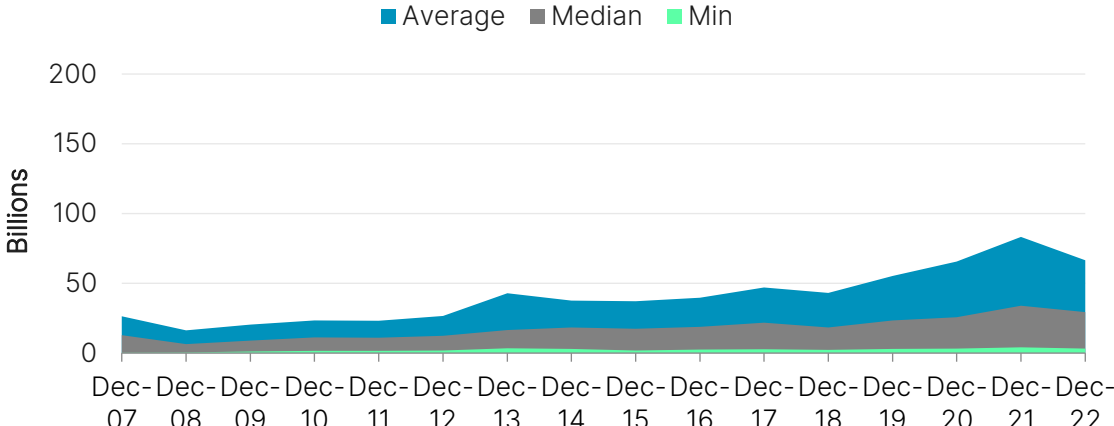
Average, median and minimum market caps of the NASDAQ-100 and the S&P 500

- All figures dropped during the financial crisis and had been steadily rebounding until year-end 2021. In 2022, a highly unfavorable macroeconomic environment of elevated inflation, rising interest rates, and geopolitical uncertainty led to the first broad-based annual losses in markets since 2008.
- Thirteen of the last fourteen years the average market cap has been higher in NDX than SPX. As of year-end 2022, NDX: \$130B, SPX: \$66B.
- The median market cap has been higher for NDX than SPX in each of the last ten years — as of year-end 2022 the medians were \$48.8B for NDX and \$29.4B for SPX. Despite any large companies, the market cap of NDX tends to be truer to large cap than SPX.
- The smallest company in NDX (\$11.5B) has been larger than the smallest company in SPX (\$3.1B) for the last fourteen years.

NASDAQ-100: MARKET CAP



S&P 500: MARKET CAP



Nasdaq-100 Additions in 2022

Effective Date	Ticker	Company Name	ICB Industry	ICB sector	Market Cap, \$Bn	YTD'22 Return, %
12/19/2022	BKR	Baker Hughes	Energy	Oil, Gas and Coal	29.1	20.7
12/19/2022	CSGP	CoStar Group	Real Estate	Real Estate Investment and Services	31.7	-1.5
12/19/2022	FANG	Diamondback Energy	Energy	Oil, Gas and Coal	24.2	27.4
12/19/2022	GFS	GlobalFoundries	Technology	Technology Hardware and Equipment	33.4	-4.8
12/19/2022	RIVN	Rivian Automotive	Consumer Discretionary	Automobiles and Parts	21.9	-76.9
12/19/2022	WBD	Discovery, Inc.	Consumer Discretionary	Media	24.3	-57.5
11/21/2022	ENPH	Enphase Energy	Energy	Alternative Energy	42.7	71.7
1/24/2022	ODFL	Old Dominion Freight Line, Inc.	Industrials	Industrial Transportation	33.0	-16.5
2/22/2022	AZN	AstraZeneca PLC	Health Care	Pharmaceuticals and Biotechnology	215.1	19.7

Nasdaq-100 Deletions in 2022

Effective Date	Ticker	Company Name	ICB Industry	ICB sector	Market Cap, \$Bn	YTD'22 Return, %
12/19/2022	BIDU	Baidu, Inc.	Technology	Software and Computer Services	33.1	-23.6
12/19/2022	DOCU	DocuSign, Inc.	Technology	Software and Computer Services	11.3	-63.0
12/19/2022	MTCH	Match Group, Inc.	Technology	Software and Computer Services	11.7	-68.3
12/19/2022	NTES	NetEase, Inc.	Consumer Discretionary	Leisure Goods	47.0	-29.9
12/19/2022	SPLK	Splunk Inc.	Technology	Software and Computer Services	14.3	-24.4
12/19/2022	SWKS	Skyworks Solutions, Inc.	Technology	Technology Hardware and Equipment	15.0	-39.6
12/19/2022	VRSN	VeriSign, Inc.	Technology	Software and Computer Services	21.2	-21.3
1/24/2022	PTON	Peloton Interactive, Inc.	Consumer Discretionary	Travel and Leisure	3.6	-68.2
2/14/2022	XLNX	Xilinx, Inc.	Technology	Technology Hardware and Equipment	48.4	-8.1
11/21/2022	OKTA	Okta, Inc.	Technology	Software and Computer Services	10.4	-69.7

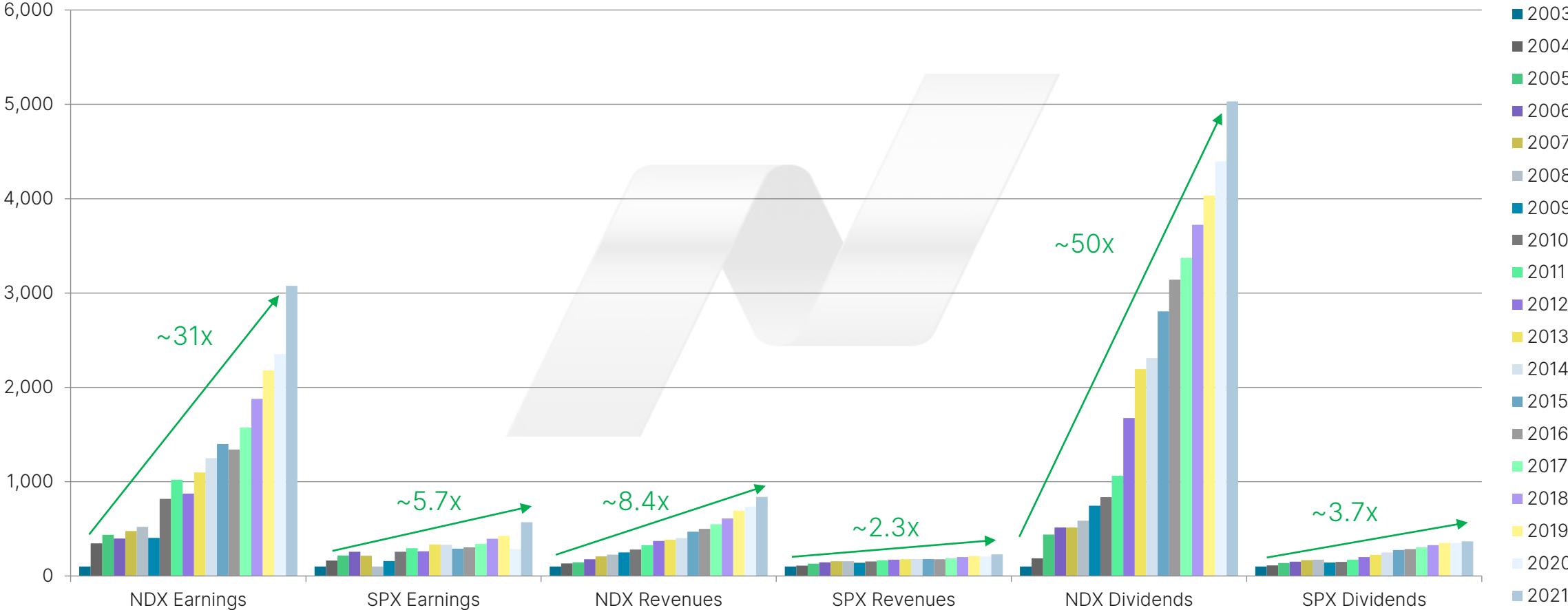


Source: Nasdaq Global Indexes, Factset as of December 15, 2022

Fundamentals Drive Performance



Nasdaq-100 vs. S&P 500: Fundamentals Over Time



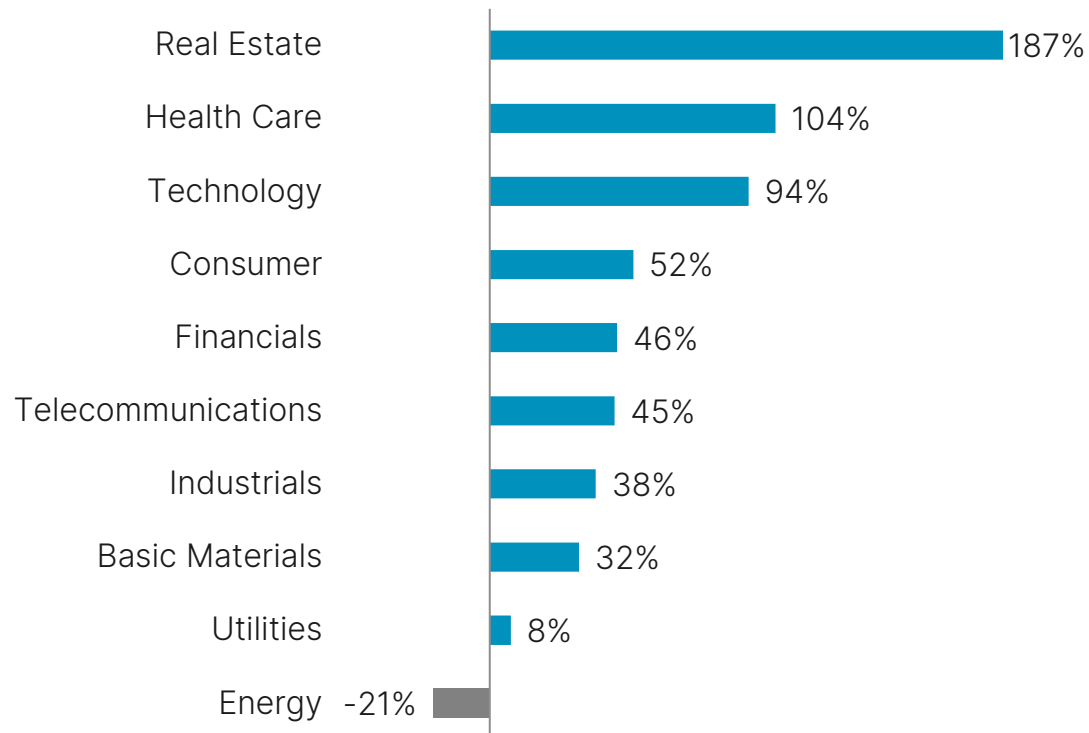
Current TTM Dividend Yield: 0.81% (NDX) vs. 1.55% (SPX)

Source: Nasdaq, Factset, Bloomberg. Data as of 12/31/2021. Current TTM Dividend Yields as of 8/3/2022.

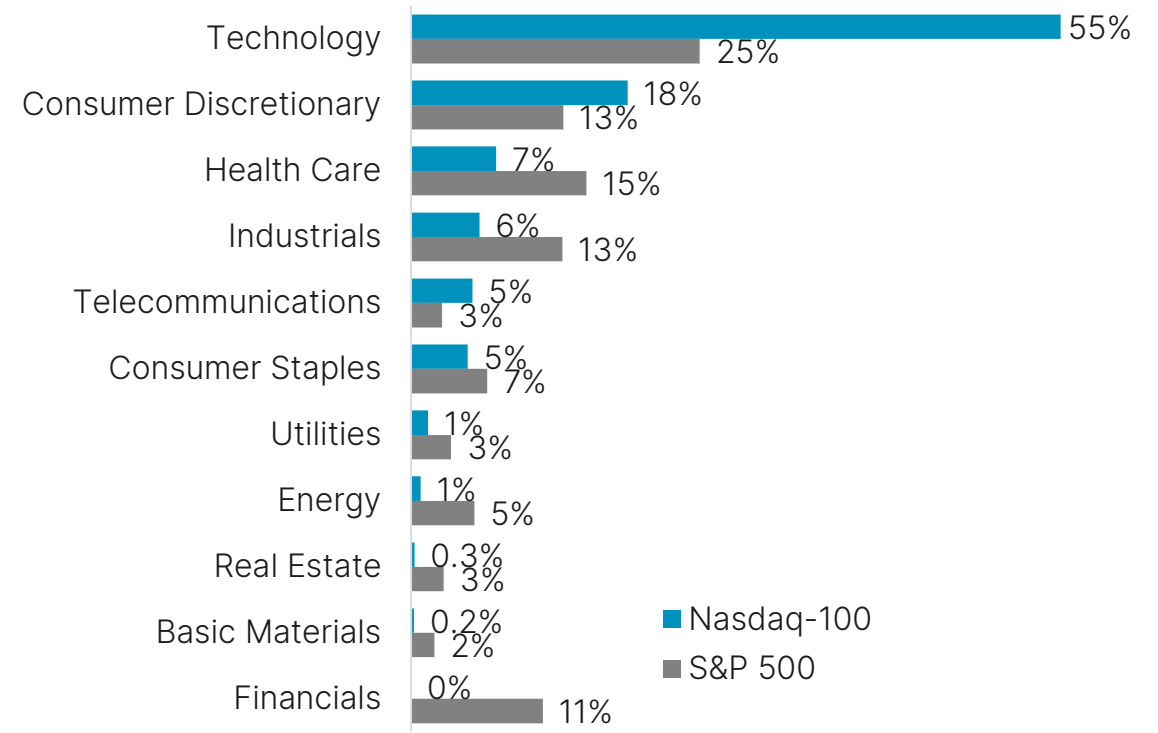
The Decade of the Nasdaq-100

The underlying story for the rise in the Nasdaq-100 is that the U.S.'s economic growth is shifting from capital-intensive, traditional industries (Industrials, Materials & Energy) to the “new-economy” sectors such as Health Care, Technology & Consumer. (Note: Real Estate was by far the smallest sector, representing ~1% of aggregate revenue.)

10-Year Sales Growth Across Industries in US Large & Midcaps



Industry (ICB) Weights (%) of Nasdaq-100 vs. S&P 500



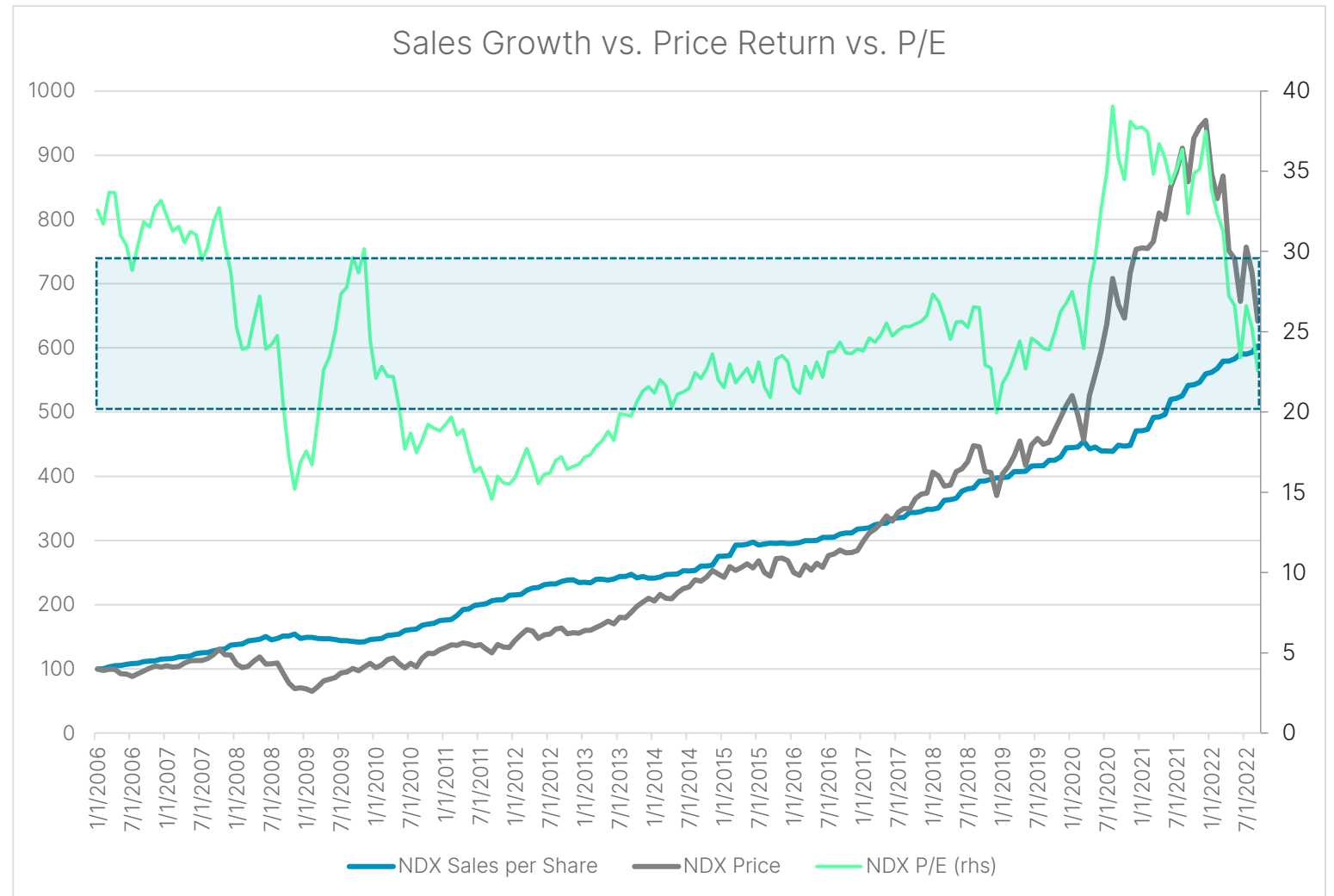
Nasdaq-100 Index: Fundamentals

- The fundamental data behind the NASDAQ-100 has drastically improved over the past decade despite a volatile economy and the greatest financial market collapse since the Great Depression.
- Earnings, the most basic number to value a company, have skyrocketed, showing maturation of the companies as they increase revenues but reduce costs. Costs have been controlled, shares were bought back, dividends have increased and P/E has contracted.
- Since 2003, NDX has had a Compound Annual Growth Rate (CAGR) of:
 - + 21% in earnings
 - + 13% in revenues
 - + 24% in dividend value
 - - 7% in P/E
- The shift in NDX fundamentals has resulted in significant outperformance over other US large cap indexes.



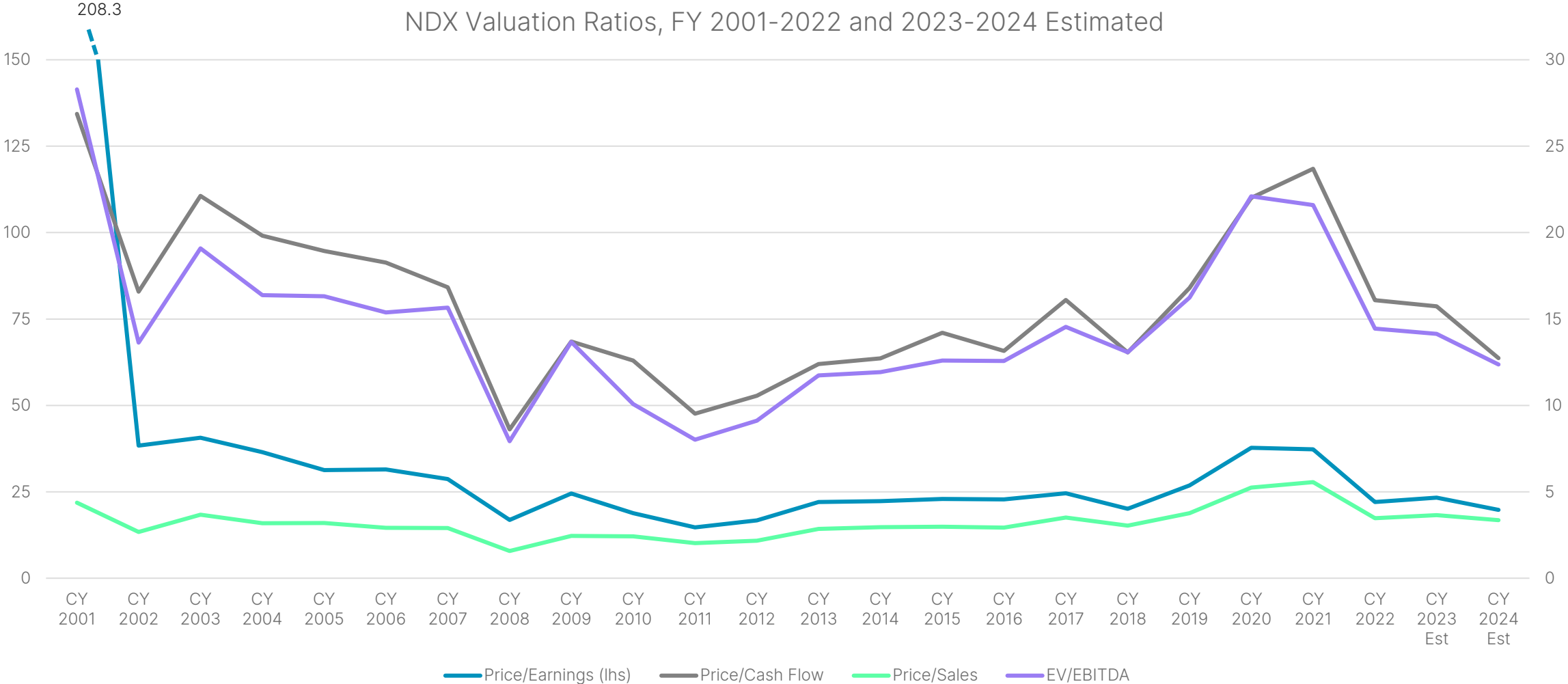
Nasdaq-100 Index: Valuation vs. Sales Growth

- From 2014-2019, NDX P/E ratio (TTM basis) had stabilized in the low-to-mid 20s, below where it was in the mid-2000s
- The trend briefly diverged during 2020-2021, with P/E climbing to a range in the mid-to-upper 30s
- Fundamental story has been the main driver of long-run recovery, rewarding the growth of NDX companies
- Sales: +503%
Price: +539%
Valuation: -27%



Nasdaq-100 Index: Valuations vs. Long-Run History

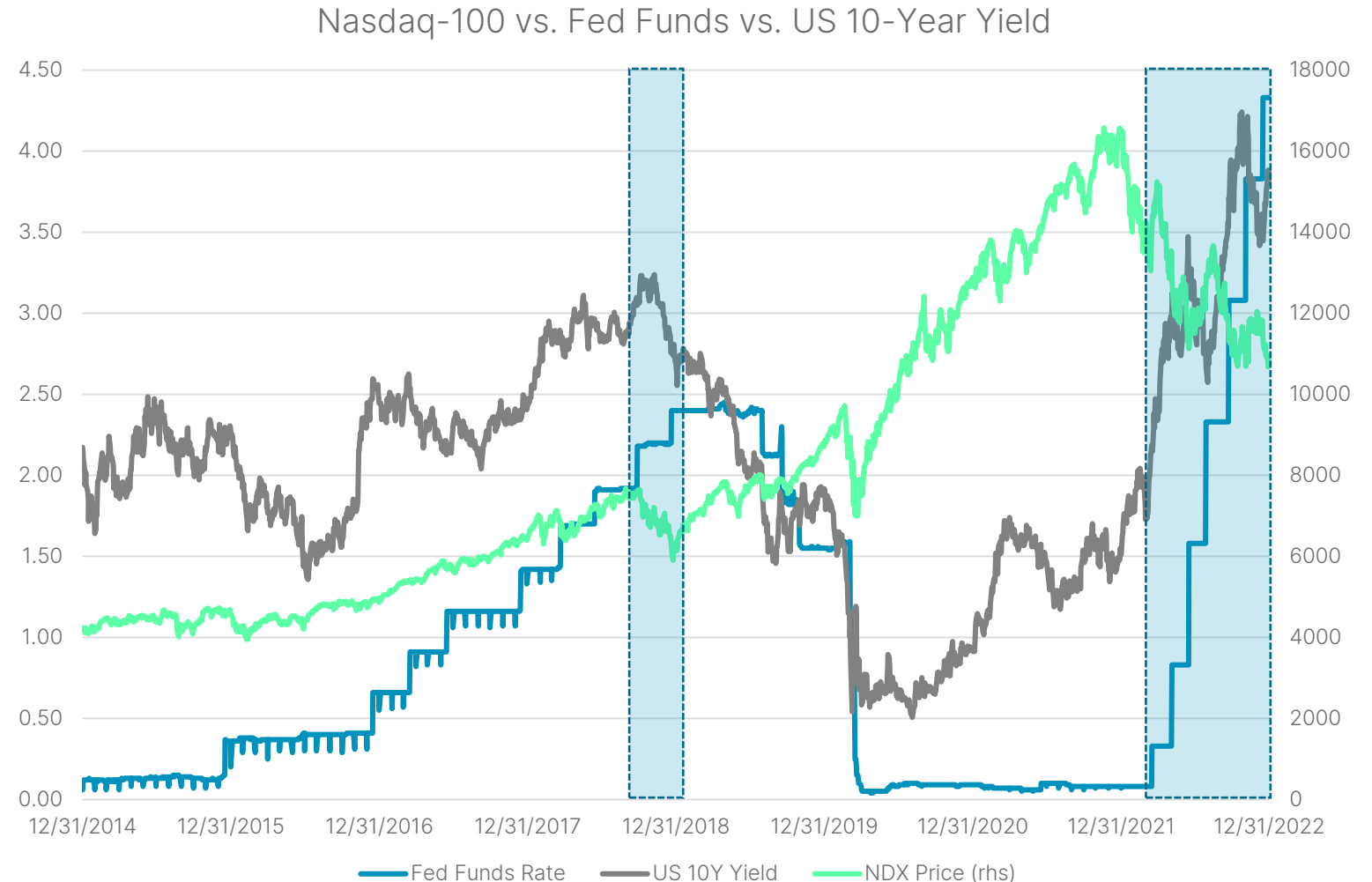
NDX Valuation Ratios, FY 2001-2022 and 2023-2024 Estimated



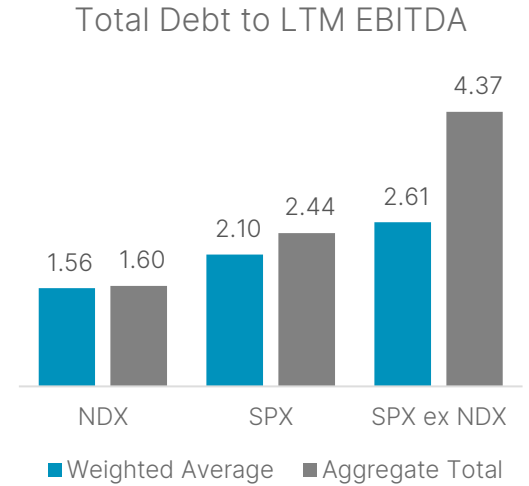
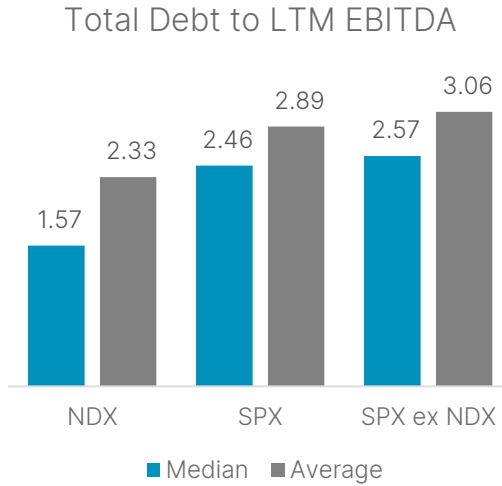
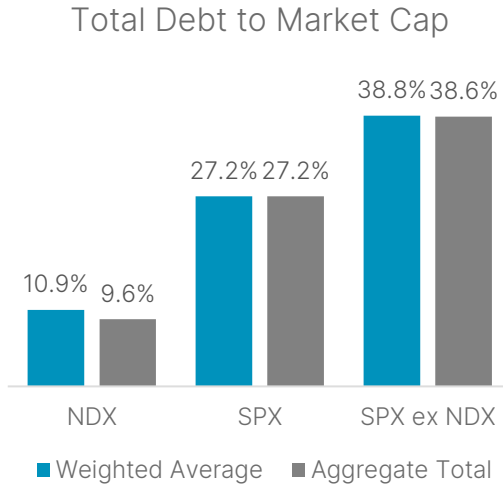
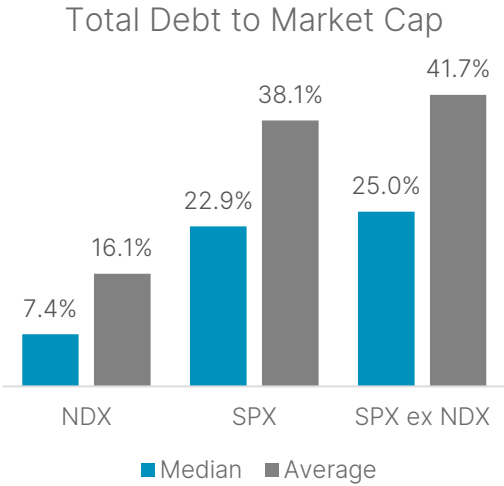
Source: Nasdaq, FactSet, Bloomberg. Data as of 12/30/2022.

Nasdaq-100 Index: Performance vs. Interest Rates

- The last Fed rate hiking cycle began in December 2015, and consisted of 9 hikes of 25 bps each (total = 225 bps)
- The Nasdaq-100 dropped 23% during Q4 of 2018, until the Fed began telegraphing a pause in hikes
- In 2022, the Fed raised rates by 425 bps, and is expected to hike by increments of 25 bps until inflation cools permanently
- US 10-year Treasury yield suggests rates peaking around 4.5-5.0%



Nasdaq-100 vs. S&P 500: Debt Ratios



The median company in the Nasdaq-100 Index has a debt-to-market-cap ratio that is **68% lower** than the median for the S&P 500 Index. The average ratio is **58% lower** for NDX

The weighted average ratio of debt-to-market cap in the Nasdaq-100 is **60% lower** than the S&P 500 Index; on an aggregate basis, NDX debt-to-market-cap is **65% lower**

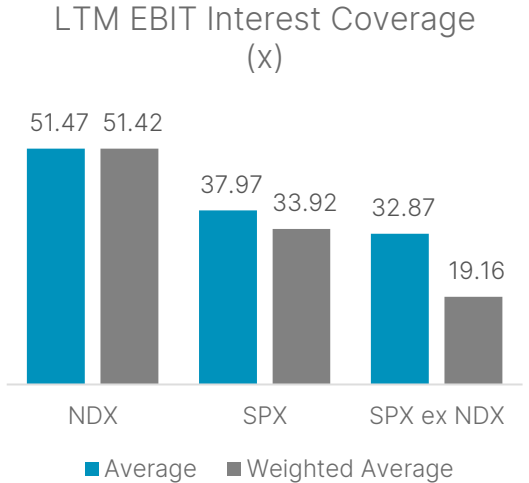
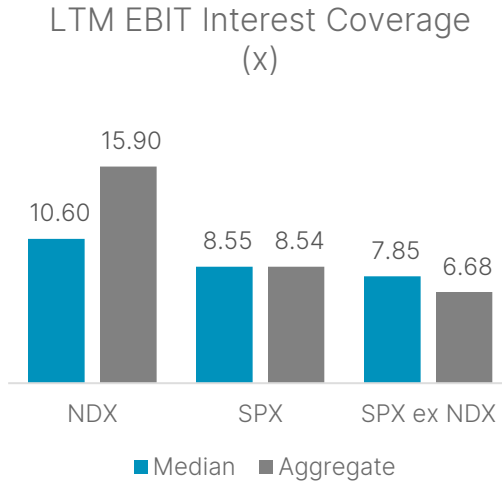
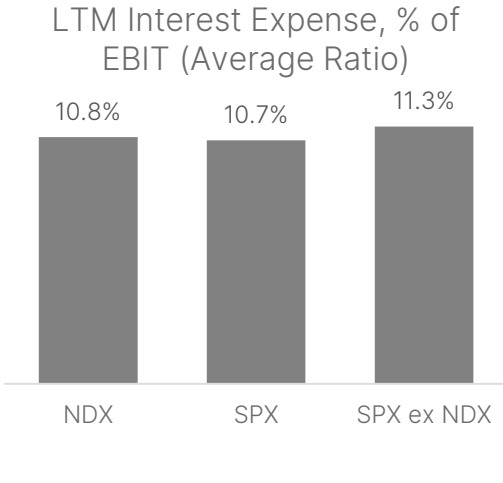
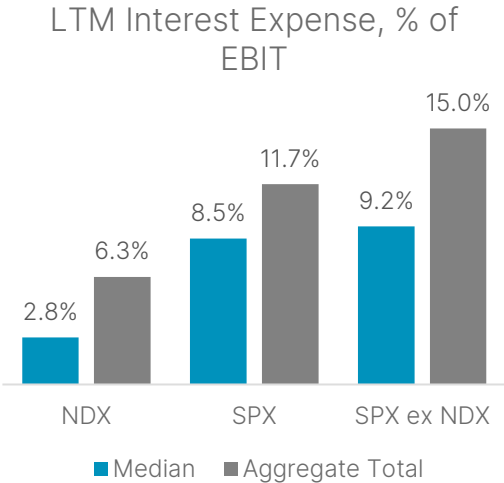
The median company in the Nasdaq-100 has a debt-to-EBITDA ratio that is **36% lower** than the median for the S&P 500 Index (ex-Financials). The average ratio is **19% lower**

The weighted average ratio of debt-to-EBITDA in the Nasdaq-100 is **25% lower** than the S&P 500 Index (**40% lower** vs. SPX ex NDX); on an aggregate basis, NDX debt-to-EBITDA is **34% lower** (**60% lower** vs. SPX ex NDX)



Source: Nasdaq Global Indexes, Factset, Bloomberg. Financial data based on latest available as of 5/19/2022. Market caps as of 4/29/2022.

Nasdaq-100 vs. S&P 500: Debt Service Ratios



The median company in the Nasdaq-100 Index has an interest expense burden (as a % of EBIT) that is **68% lower** than the median for the S&P 500 Index. The aggregate ratio for the index is **46% lower** for NDX

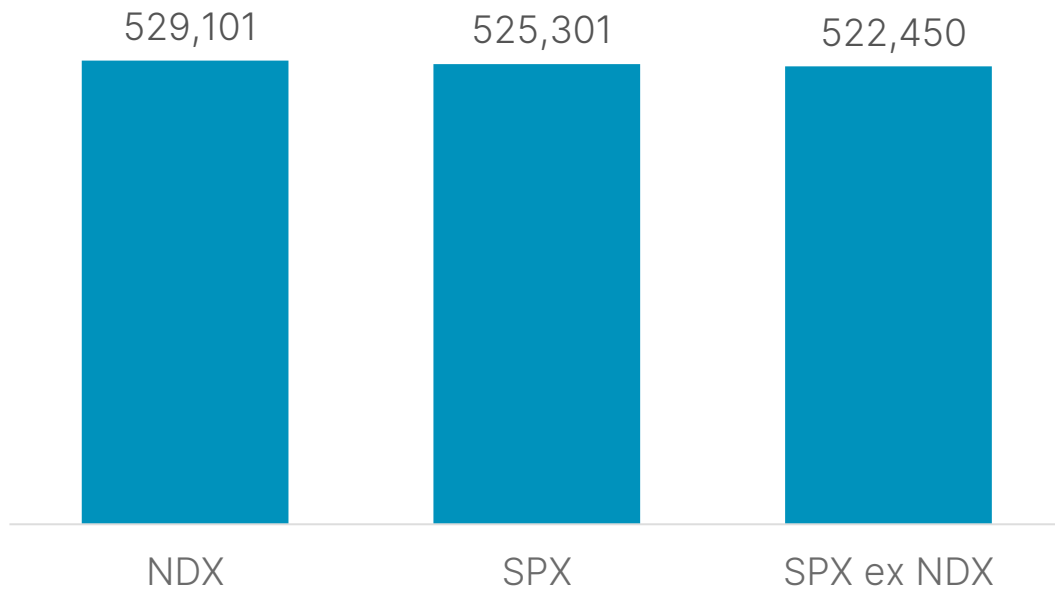
The average company in the Nasdaq-100 Index with nonzero interest expense and positive EBIT had a ratio of 10.8%, in-line with the averages for both SPX and SPX ex NDX

The median company in the Nasdaq-100 has a EBIT Interest Coverage ratio that is **24% higher (better)** than the median for the S&P 500 Index (ex-Financials). The aggregate index ratio is **86% higher**

The average EBIT Interest Coverage ratio of the Nasdaq-100 is **36% higher** than the S&P 500 Index, and **52% higher** on a weighted average basis (**168% higher** vs. SPX ex NDX)

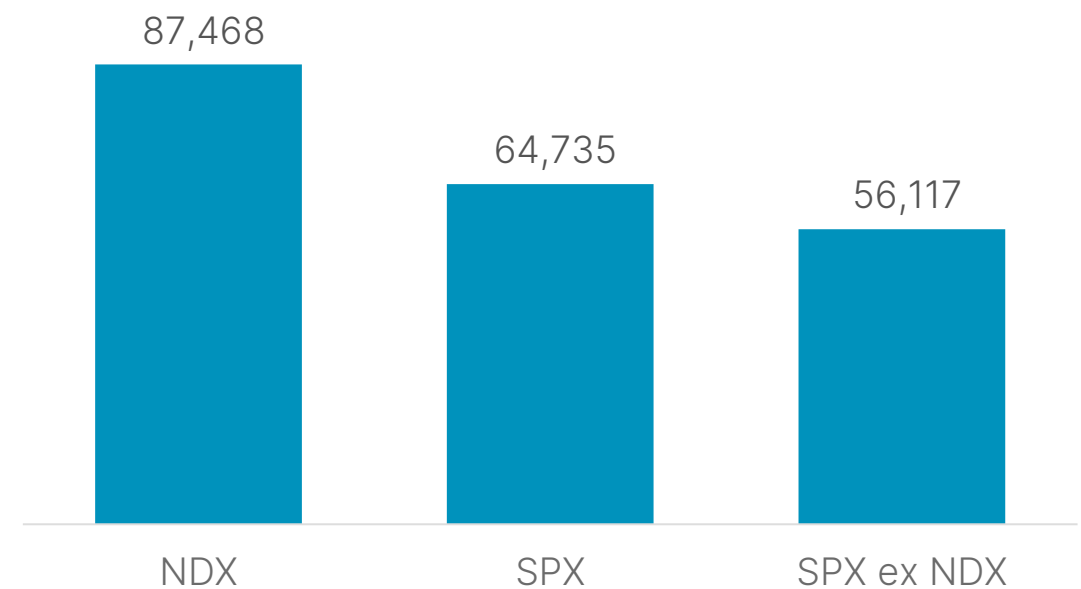
Nasdaq-100 vs. S&P 500: Employee Efficiency

LTM Revenue per Employee



In aggregate, Nasdaq-100 companies generated similar revenue per employee vs. other S&P 500 companies

LTM Profit per Employee



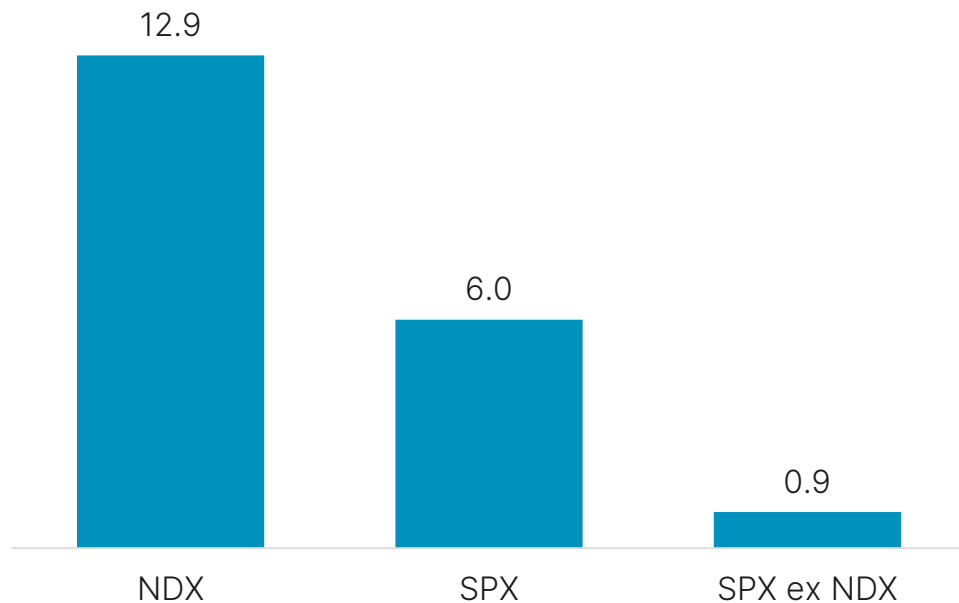
In aggregate, Nasdaq-100 companies generated **35% higher** profit per employee than S&P 500 companies and **56% higher** than SPX ex NDX

Quantifying Innovation

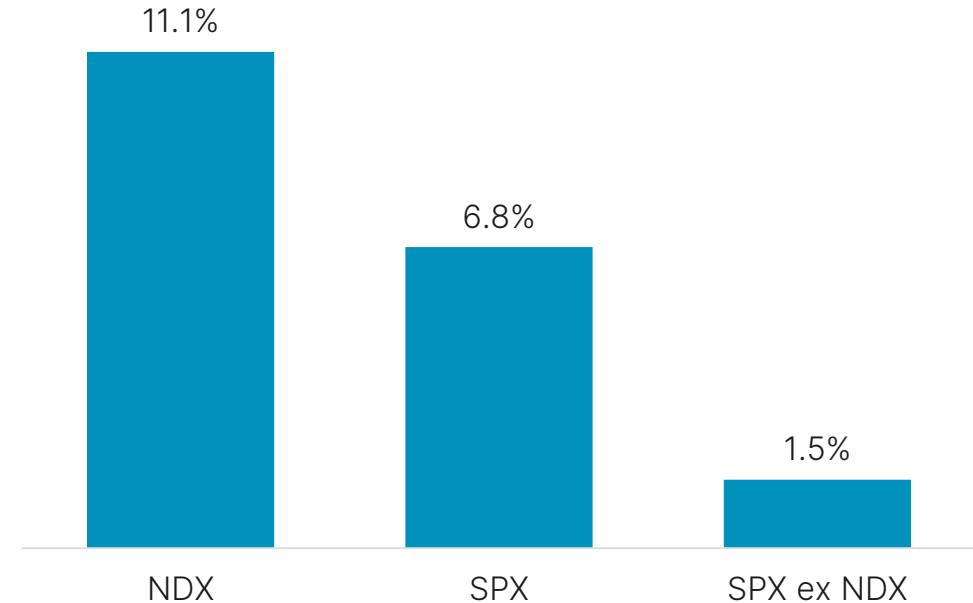
Research and Development Powerhouse

- R&D is a key driver of innovation and economic growth
- Companies in the Nasdaq-100 spend more than twice as much in R&D, on average, compared to those in the S&P 500; 80 of the Nasdaq-100 are currently part of the S&P 500
- Calculating R&D as a percent of sales in the last 12 months, Nasdaq-100 companies averaged 63% higher than S&P 500

Weighted Average Annual R&D Expense, \$Bn

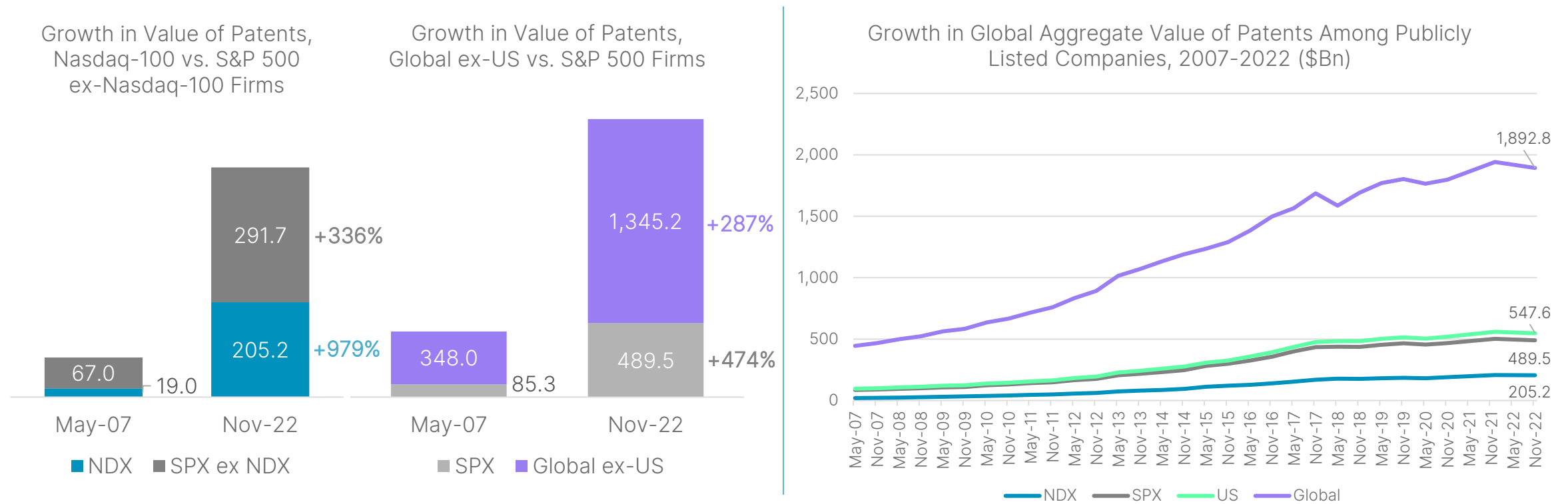


Weighted Average R&D as % Sales



Accelerating Growth of Intangible Assets

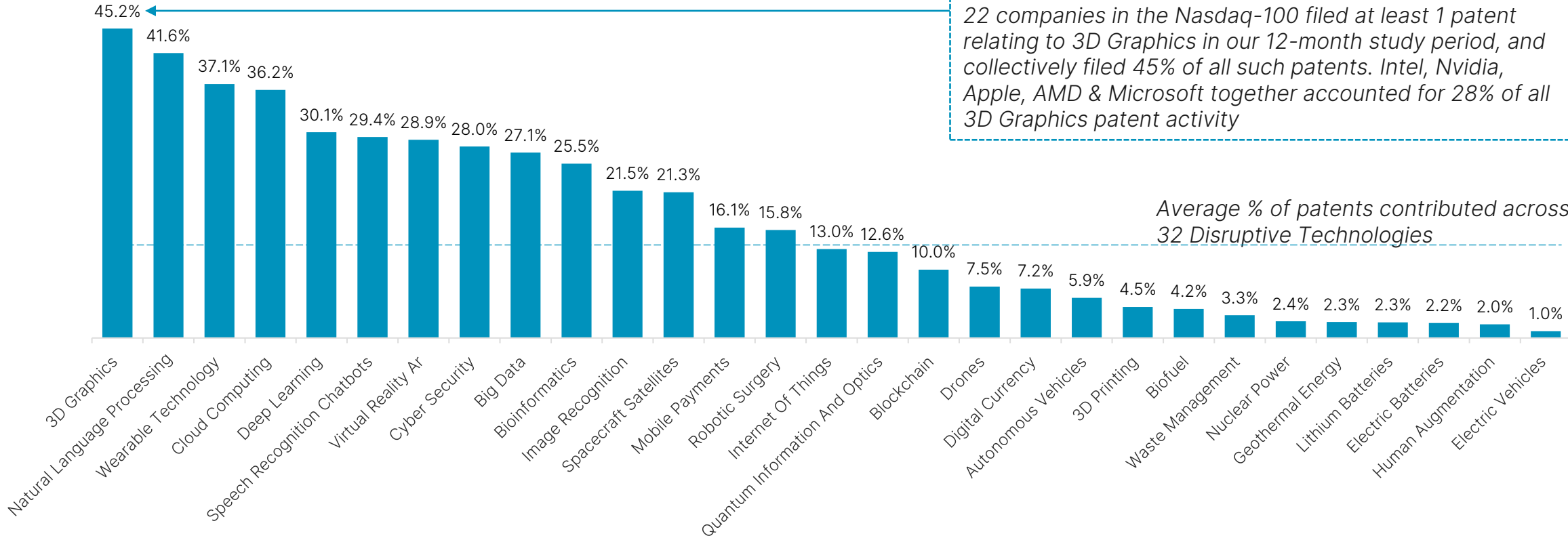
The current crop of Nasdaq-100 constituents has grown the value of their patents by ~10x since May 2007, vs. ~3.3x across all publicly-listed, tracked companies globally. Growth for the S&P 500 overall was ~5x, but only ~3.4x excluding the contribution of overlapping Nasdaq-100 firms. Global growth ex-US was only ~3x



Source: Nasdaq, IPR Strategies via Nasdaq Data Link. Based on index constituents as of 12/31/2022. IPR Data as of 11/30/2022.

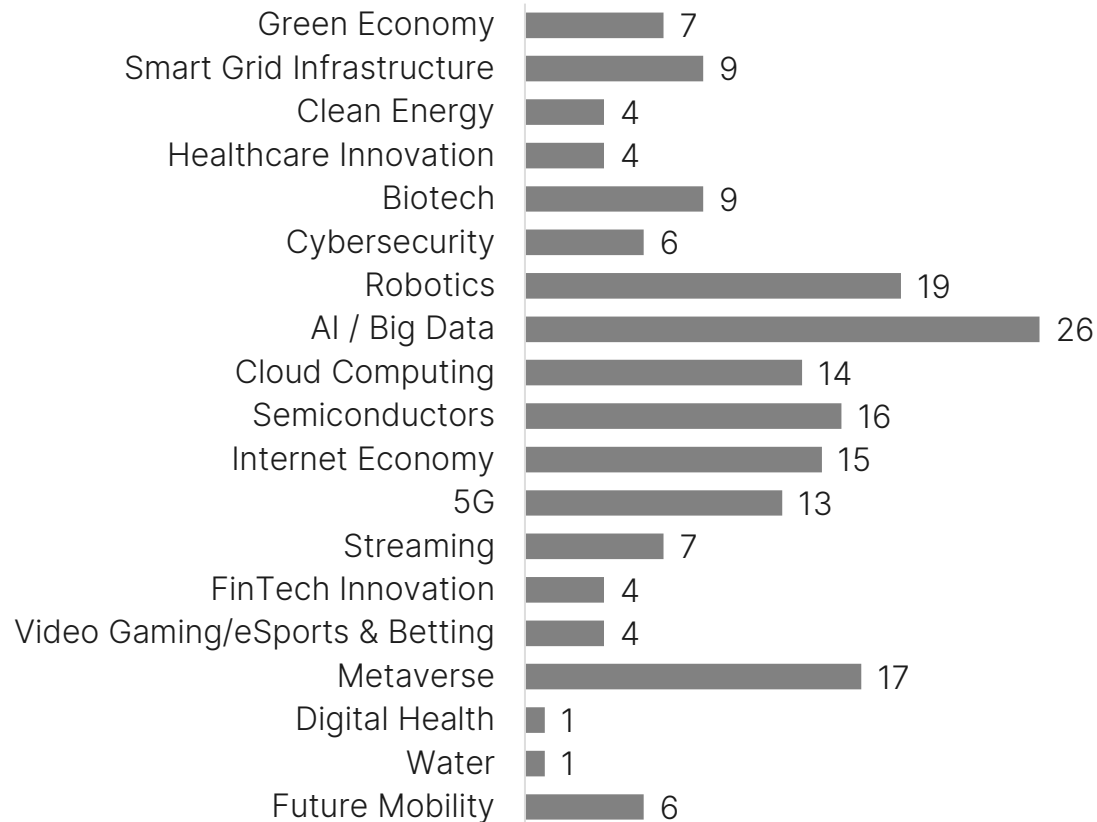
Disruptive Technology and R&D: Nasdaq 100

- 56 companies in the Nasdaq-100 (representing 80.4% of index weight) recently filed patents across one or more of 35 key areas of Disruptive Technology such as Artificial Intelligence, Clean Energy, or Blockchain

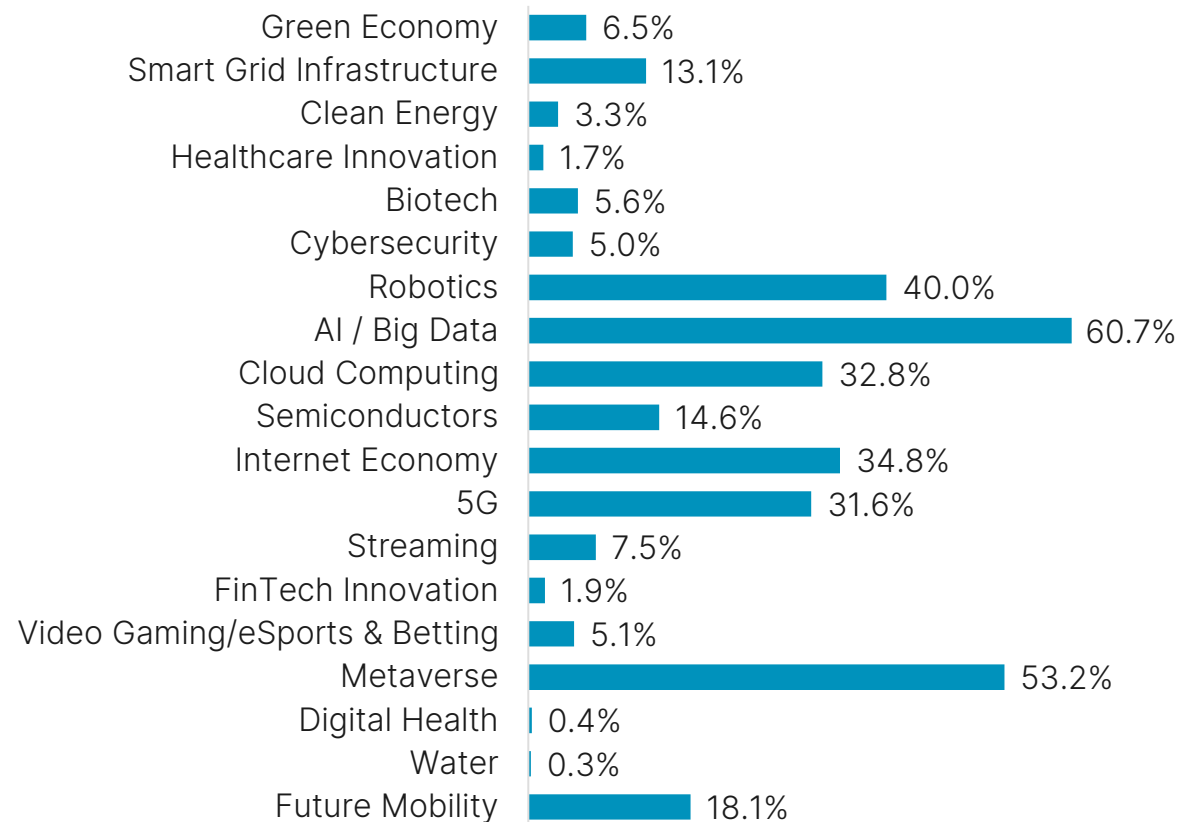


Nasdaq-100 by Thematic Exposures

of Constituents per Theme



Index Weight per Theme

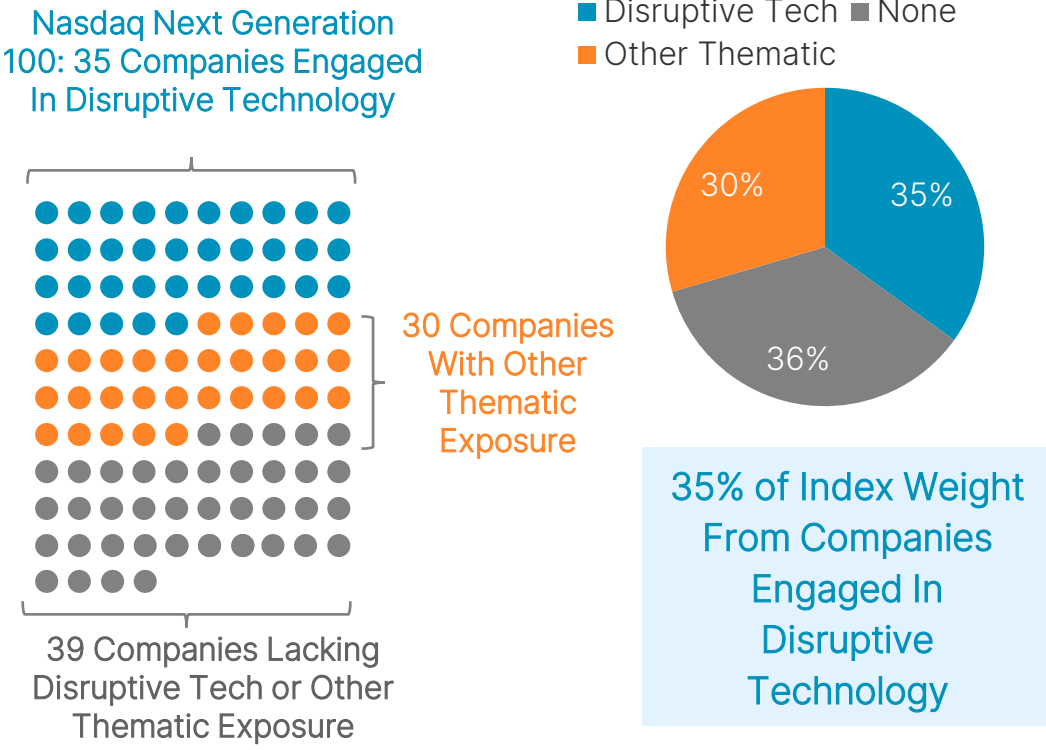
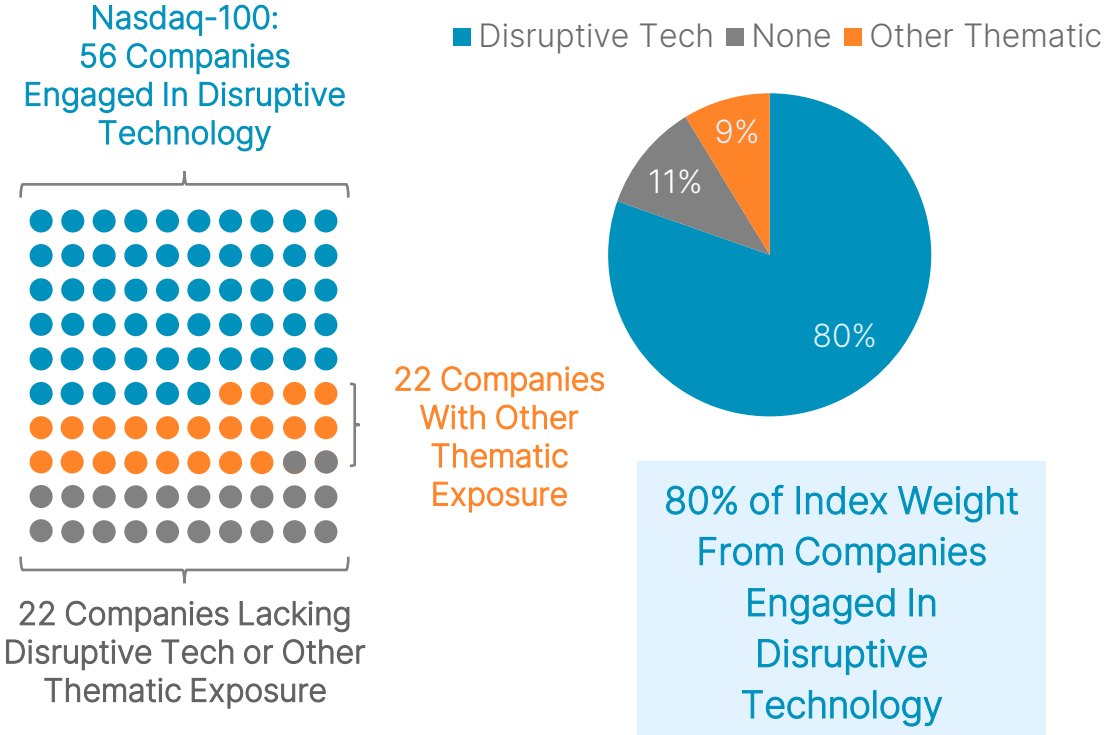


Source: Nasdaq, FactSet. Data as of 12/30/2022.

Based on overlap with existing Nasdaq Thematic Indexes, except for 5G, Streaming, and Video Gaming/eSports & Betting where competitor products were analyzed.

Nasdaq Innovation Suite & Disruptive Tech

The Nasdaq-100 Index and the Nasdaq Next Generation 100 Index (collectively, the “Innovation Suite”) both contain substantial exposures to multiple relevant investment themes, particularly within Disruptive Technology as defined by the patent-driven methodology of the Nasdaq Yewno Global Disruptive Tech Benchmark Index



Source: Nasdaq, FactSet. Data as of 12/30/2022. Based on overlap with Nasdaq Yewno Global Disruptive Technology Benchmark Index.

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