

The Nasdaq-100

Tracking Innovation in Large-Cap Growth

JEFFREY W. SMITH / Nasdaq Economic Research • +1 301 978 8228 • Jeffrey.W.Smith@Nasdaq.com

EFRAM SLEN / Nasdaq Global Indexes • +1 212 231 5174 • Efram.Slen@Nasdaq.com

HIGHLIGHTS

- Since its inception over 30 years ago, the Nasdaq-100 index has become the world's preeminent large-cap growth index.
- While the Nasdaq-100 is home to some of the most well-known names in technology— including Apple, Microsoft, Alphabet, Intel, and Facebook—the index also includes category-defining companies on the forefront of innovation in other key industries such as Amgen, Starbucks, and Tesla.
- Since the introduction of index options in 1994, a wide assortment of financial products that track the Nasdaq-100 have been made available to investors. In total, notional value of all financial instruments that follow the index exceeds \$1 trillion.
- The Nasdaq-100 also serves as the basis for many investable securities, the largest being the PowerShares QQQ ETF (Nasdaq: QQQ). The current value of this and related exchange-traded products exceeds \$50 billion, making the Nasdaq-100 one of the most widely tracked indexes in the world.

INTRODUCTION /

On January 31, 1985, the Nasdaq-100 index launched. Since that time, it has become one of the most widely followed stock indexes in the world. The Nasdaq-100 helps guide the investment community on general trends in share prices. Beyond this important informational role, the index has two primary objectives: 1) to focus investor attention on the index's 100 companies and, 2) to provide a basis for investable products. Today, we can say with confidence that Nasdaq has achieved these objectives with remarkable speed and success. Products tied to the Nasdaq-100 are now available in 27 countries, more than \$50 billion of investments in exchange-traded products are tied to the index and derivatives tied to the index have a notional value of over \$1 trillion.

This paper will provide a broad overview of the Nasdaq-100, its methodology, its components and its spectacular success in generating tradable products.

GENERAL OVERVIEW /

The Nasdaq-100 index was one of two that launched in 1985. One index was launched to focus on the financial companies listed on Nasdaq (Nasdaq Financial-100) and the other to focus on the non-financial companies (Nasdaq-100). These indexes were intended to serve as the basis for possible index futures contracts to be traded on the Chicago Board of Trade. At that time, interest was more centered on the financial companies listed on Nasdaq, so the initial focus was on the Nasdaq Financial-100. However, the non-financial Nasdaq-100 index has garnered the greater attention over the years, and while both indexes currently exist, this paper will deal only with the non-financial index.

The Nasdaq-100 should not be confused with the Nasdaq Composite index. The latter was launched in conjunction with the launch of the Nasdaq Stock Market in February 1971. The Composite is made up of all Nasdaq-listed common stocks, the number of which has varied substantially over the years.¹

Interestingly, it is the Nasdaq Composite—often referred to as “the Nasdaq”—that receives greater prominence in the media, alongside the Dow-Jones Industrial Index and the S&P 500. However, it is the Nasdaq-100 that has become the basis for investable products, a point that will be covered extensively in this paper.

At its inception, the Nasdaq-100 was designed as a market capitalization-weighted index.² This means that the importance or “weight” of a given component was proportional to its market cap (current price multiplied by total shares outstanding). The index was priced by continually updating the sum of the market caps of the 100 components and dividing this sum by a divisor. The divisor was set at launch so that the index had an initial value of 250, and was periodically updated to account for changes to the index composition in line with standard practice. At the end of 1993, the index was reset to one half its current value—in essence a two-for-one split. Thus, the split-adjusted initial value of the index is now 125.

In November 1998, in order to make the Nasdaq-100 suitable for the basis of an exchange-traded fund (ETF), the index weights were modified away from market cap weights in a special rebalance. These modifications were needed to ensure that the ETF would meet the diversification standards required by the IRS for registered investment companies. In May 2011, the index underwent a second special rebalance that resulted in the index share multipliers being set to one. Greater detail on the index’s modified market cap method will be presented below.

As indicated by the index name, the companies are fixed in number to 100. The fundamental determinant of inclusion is that the issuer be a non-financial company listed on the Nasdaq Stock Market. Whether the issuer is domestic or foreign is not a factor.³ Since inclusion is based on rankings tied to ever-changing market capitalization, the components are periodically reconstituted. In its early years, the addition and removal of components were carried out at various points. However, since 1998 the rebalancing has been carried out annually, on the third Friday in December. The additions and deletions are wholly determined by the market cap rankings. There is no committee making membership determinations, as is the case with other well-known indexes. Indeed, investors determine the membership of the Nasdaq-100.

The Nasdaq-100 employs a rebalancing buffering rule. This rule reduces the number of stocks going into and out of the indexes, thereby avoiding associated transactional costs of rebalancing. If, at the time of rebalance, the market cap of a component is ranked among the top 125 eligible components (not top 100), it will remain in the index for another year; preventing another company from entering. By the following year, the stock must be in the top 100 to remain in the index. In effect, components may be granted a one-year “probation” prior to being removed from the index.

Interim index component changes can occur between the annual December events. A component can be removed due to a corporate event such as a merger or a delisting. The market cap ranking of an eligible replacement is used to determine the additions. In the case of an initial public offering (IPO), a three-month “seasoning” period is required before the issue is eligible to be in the index. Neither large IPOs nor other new listings can join the index before the annual re-ranking, regardless of their market cap, unless there is an interim vacancy.

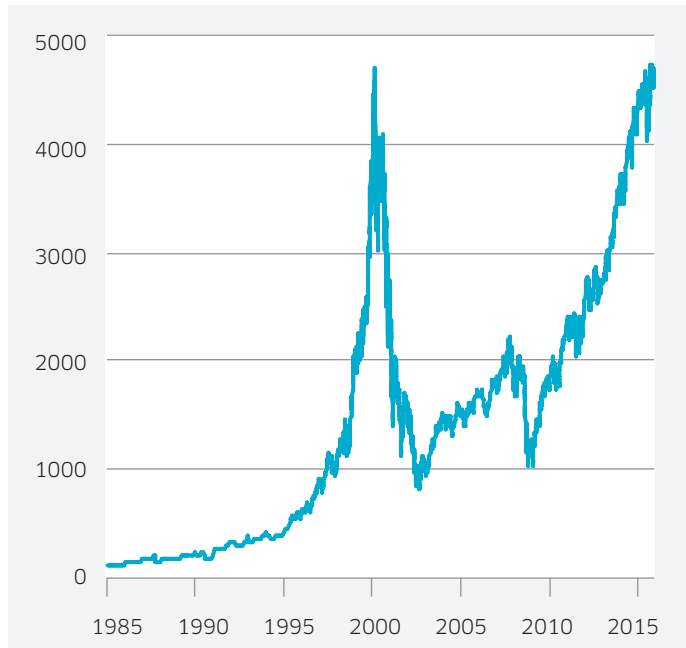
Since inception, the Nasdaq-100 has had 455 members. Some of these companies exited then later rejoined the index. Of the original members at launch, seven are in the current index.⁴ In recent years, between seven and 15 component changes have been made per year, and in the December 2015 rebalance, seven components were changed.

In April 2014, Nasdaq changed its policy concerning the number of components. Traditionally, the index has been limited to 100 common-stock issues, with only one issue allowed per issuer. Now, the index is limited to 100 issuers, some of which may have multiple issues as index components. The most prominent current example involves Google, which in spring 2014 essentially executed a two-for-one stock split by issuing a new class of common shares. Both issues are in the current index. At the December 2014 rebalance, all eligible issues from the top 100 issuers became fully represented in the index. As a result of the December 2015 rebalance, the current index contains 106 component stocks, representing 100 issuers.

INDEX PERFORMANCE /

It is useful to revisit the trajectory of the Nasdaq-100 over the past 30 years, which is represented in the following graph.

Nasdaq-100 Index: Launch to Present



The graph shows solid and steady growth from launch to 1995, when the index increased about 12% per year. This growth accelerated through the remainder of the 1990s to an astounding average rate in excess of 40% per year. The peak occurred on March 27, 2000, with an index value of 4705. During the next few years, the index fell as fast as it had grown, bottoming out at a value of 805 in October 2002.

After its October 2002 nadir, the index began a long recovery, but again suffered serious losses with the financial crisis of 2008, when it dropped to almost 1000. By 2011, these losses had been recovered. Since the start of 2012 the index has increased fairly steadily at an annual rate of about 25%. The index reached an all-time high in the fourth quarter of 2015.

THE NATURE OF THE INDEX COMPONENTS /

Interest in the Nasdaq-100 index stems from the special nature of its components. This section reviews the characteristics of the components in a variety of dimensions.

Size

Today's Nasdaq-100 is rightly considered a large cap index. However, this was not always the case. It is interesting to look back at the market cap of the index's components over time. The aggregate market cap of Nasdaq-100 components at launch and at selected points in time is shown in the following table. Also in the table, for purposes of comparison, is the ratio of the Nasdaq-100 total market cap to the total market cap of all NYSE-listed domestic stocks.⁵ This comparison allows one to see the remarkable relative growth in the size of the Nasdaq-100 components.

Aggregate Market Cap of Nasdaq-100 Index Components

DATE	TOTAL NQ-100 MKT CAP (\$BILLIONS)	AS PCT OF TOTAL NYSE MKT CAP
Launch Feb 1985	\$58	3.0%
Dec 1990	\$109	4.0%
Dec 1995	\$409	7.2%
Dec 2000	\$2,218	19.4%
Dec 2005	\$1,932	14.5%
Dec 2010	\$2,498	18.7%
Dec 2015	\$5,284	25.9%

Since the index is made up of 100 companies, it is easy to calculate the average size of each company. At the 1985 launch, the average component size was only about \$580 million, compared with a current value of about \$53 billion; a 90-fold increase. In its early days, Nasdaq was in the process of moving beyond a trading utility for non-listed, over-the-counter (OTC) stocks into a distinctly recognized and branded stock market. Companies listed on Nasdaq tended to be either fairly new, or chose not to list on the New York Stock Exchange (NYSE) or American Stock Exchange (Amex). In any case, these companies were not large. Nasdaq's largest company, Intel, was relatively new (IPO in 1980) with a market cap of \$3.5 billion. MCI was the second largest and

Apple the third largest, with market caps of \$2.3 billion and \$1.8 billion, respectively. The smallest index components had market caps in the range of \$200 million. (By contrast, the smallest issuers in the current index have market caps exceeding \$7 billion.)

This situation would change in two fundamental ways, which can be seen by comparing changes in the market cap of the components with changes in the Nasdaq-100 index. From launch to the end of 1995, the aggregate market cap rose by a factor of 7.0. The price index, however, rose by a factor of 4.6 (125 to 576, split adjusted). The difference is a factor of 1.5, which is due to additional issuances of shares by existing components and by replacing larger companies for smaller ones at index rebalances. The early growth in the size of the Nasdaq-100 components is due to both pure price appreciation and these other factors. Since the end of the tech bubble, increases in the market cap of the index have been driven primarily by price appreciation, with the other factors only contributing about 5% to the growth in market cap.

The table indicates that, at launch, the total size of the Nasdaq-100 components was only about 3% of the value of NYSE-listed stocks. This percentage grew substantially during the 1990s, reaching 19% at the peak of the tech bubble. After falling during the 2000s, it has since rebounded to a level of about 26%, demonstrating from index launch to present, the size of the top 100 Nasdaq-listed stocks relative to the size of the entire NYSE list has grown by a factor greater than eight.

For reference, the current average size of the S&P 500 is \$37 billion and the Dow Jones Industrial Average has an average size of \$176 billion. To reiterate, the current average size of Nasdaq-100 is \$53 billion. These data points help solidly establish the Nasdaq-100 as a large cap, though not a “mega cap,” index.

Technology Orientation

The Nasdaq-100 is commonly viewed as a “technology” index. This section examines how this came to be, and specifically how technology stocks drove the evolution of the index and vice versa. The most reliable way to gauge this evolution is through the Industry Classification Benchmark (ICB) scheme for categorizing index components. Since the ICB system was not implemented until 2001, older Nasdaq-100 components were manually categorized into one of the 10 ICB top-level industries for the purposes of classification.

In 1985, Technology was the largest single ICB industry in the Nasdaq-100, but the 23 Technology components only made up 25% of the market cap of the index. Technology was followed by Consumer Services at 21% and Industrials at 15%. The largest stock was Intel, followed by Telecommunications firm MCI, then by Apple Computer. Other components of interest from the launch date include Adolph Coors, Chi Chi’s Restaurants, HBO, Liz Claiborne, Mack Trucks, and McCormick Spices. These components illustrate the sector diversity of the Nasdaq list in the mid-1980s. The following table shows, for selected dates, the percentage of index weight made up by Technology stocks. Also shown is the second largest industry (and its corresponding weight).

Technology Weighting in the Nasdaq-100

DATE	INDEX WEIGHT IN TECHNOLOGY	NO. 2 INDUSTRY	NO. 2 WEIGHT
Launch 1985	25.1%	Consumer Services	20.6%
End 1990	30.6%	Consumer Services	18.8%
End 1995 (tech boom)	56.7%	Telecommunications	14.6%
Nov 1998 (modified mkt cap)	61.0%	Telecommunications	11.4%
Jan 2003 (market trough)	68.7%	Health Care	15.1%
Sept 2007 (market peak)	58.5%	Consumer Services	17.6%
Feb 2009 (market trough)	53.5%	Health Care	20.3%
May 2011 (special rebalance)	61.6%	Consumer Services	18.3%
End 2015	51.7%	Consumer Services	24.3%

At the dawn of the 1990s, the Technology weight had increased to 31%, and by the middle of the decade, when the tech boom was well underway, it was up to 57%. November 1998 is noteworthy for two reasons: the continued acceleration of the bull market and the special rebalance of index weights mentioned above. At that time, Technology stocks accounted for 70% of the market cap of the index. The rebalancing reduced that weight to 61%, the value shown in the table.

It is also important to note that the 1990s witnessed a boom in Telecom stocks, which represented a distant but solid second place in terms of index weightings.

The next part of the table presents weighting for the start of 2003, by which time the market bubble had fully disappeared. While the weight of Technology stocks remained high, the Telecommunications industry was represented by only two companies with combined weight of 2%. The largest casualty in the Telecommunications industry was WorldCom, though other telecom firms such as Global Crossing and Sycamore Networks saw much of their value disappear.

September 2007 indicated the market peak prior to the financial crisis. Also shown is the post-crisis trough in February 2009. During both periods, the index weight in technology stocks had declined somewhat from the peak, but still represented a clear majority of index weight.

May 2011 marked the special rebalance that restored the index back to market cap weights. At the rebalance, Technology represented 61.6% of market cap, a comparatively small increase from the 59.2% of the index weight prior to the rebalance.

The current index is still solidly technology weighted, led by issuers such as Apple, Microsoft, Alphabet, Intel and Facebook. Still, the Nasdaq-100 is by no means a pure technology index. In fact, the current technology weight is comparatively low by historical standards. The top non-technology components include:

- Biotech: Gilead Sciences, Amgen, Celgene
- Retail: Amazon, Starbucks
- Media: Comcast, Twenty-First Century Fox
- Industrials: Tesla

These components clearly represent growing, category-defining companies that are on the forefront of innovation in their respective industries.

COMPARATIVE ANALYSIS OF COMPONENT CHARACTERISTICS /

In this section we compare the components of the Nasdaq-100 with those of two other widely followed indexes, the S&P 500 (SP500) and Dow-Jones Industrial Average (DJIA).

Industry

The technology orientation of the Nasdaq-100 was discussed above. It is interesting to contrast the complete industry breakdown for the three major indexes. The following table shows the breakdown of index weight into the 10 ICB Industries. Recall that the DJIA is price, not market cap weighted.

Breakdown of Index Weight by ICB Industry

INDUSTRY	NQ-100	SP500	DJIA
Basic Materials	0.00%	2.12%	2.62%
Consumer Goods	5.30%	11.33%	7.27%
Consumer Services	24.26%	14.95%	16.38%
Financials	0.00%	17.49%	19.90%
Health Care	14.35%	14.13%	12.01%
Industrials	3.31%	11.15%	19.27%
Oil & Gas	0.00%	6.33%	6.60%
Technology	51.67%	17.25%	14.15%
Telecommunications	1.10%	2.35%	1.82%
Utilities	0.00%	2.90%	0.00%

Again, the Nasdaq-100 clearly stands out for its high Technology weighting. It is also heavily weighted in Consumer Services and Health Care, the latter being due primarily to the presence of bio-tech companies. Also noteworthy is what the Nasdaq-100 does not contain. Financials, of course, are not included by design, but they make up a substantial portion of the weight of the other indexes. In addition, there are no Utilities, Oil & Gas, and Basic Materials stocks in the Nasdaq-100.

Age

Nasdaq, itself a relatively new market, is generally thought of as the home for younger companies. The following table reinforces this point, and reflects the fact that the Nasdaq-100 (launched 1985) is comparatively a much newer index than the S&P 500 (1957) and the DJIA (1896). For each index component, the incorporation date was determined along with its weight within the index.⁶ The table shows the percentiles of year of incorporation, weighted by the index weight. For example, 25% of the index weight for the Nasdaq-100 is from components incorporated before 1985. Half the index weight is from components incorporated after 1993, and 25% of the weight from companies incorporated after 2000.

Company Age

PERCENTILES OF YEAR OF INCORPORATION

INDEX	25TH	50TH	75TH
Nq-100	1985	1993	2000
SP500	1966	1986	1998
DJIA	1919	1968	1993

The table indicates that even the oldest of the Nasdaq-100 components are much younger than the older components of the other indexes.

Growth

Nasdaq also has a reputation as a home to growth-oriented companies. The following table shows summary statistics for the three-year average revenue growth of the index components.⁷ Shown are both the index-weighted average growth rates, as well as the 25th and 75th percentiles of the average growth rates.

Three-Year Average Sales Growth Rates

	NQ-100	SP500	DJIA
Index Weighted Average	17.83%	5.45%	0.44%
25th Percentile	3.34%	-0.67%	-3.50%
75th Percentile	20.40%	8.71%	5.26%

The sales growth of the Nasdaq-100 components is much higher on average than that of the other indexes. The Nasdaq-100 contains eight components whose sales growth has averaged more than 50% over the last three years. The DJIA has no components with this level of growth and the S&P 500 has only four.

Dividend Yield

The dividend yield of a company is useful for measuring growth prospects. Companies with substantial internal growth opportunities tend to retain more earnings, paying little or no dividends. The following table shows the fraction of index components that currently pay a dividend, and the index-weighted dividend yield; including the companies with no dividend.⁸

Current Dividend Yields

	NQ-100	SP500	DJIA
Pct of Components with Dividend	44%	82%	100%
Weighted Div. Yield	1.2%	2.1%	2.6%

Only half of Nasdaq-100 index components pay dividends. By contrast, all of the 30 DJIA components do, as do 419 of the SP500 components (83%). Correspondingly, the aggregate dividend yield of the Nasdaq-100 is about half that of the DJIA. It is worth noting that while the dividend yield of the Nasdaq-100 is lower than that of the other indexes, it has been growing. For example, ten years ago the dividend yield was only 0.18%; one-sixth of today's level. The last ten years have seen steady growth in the dividend yield to today's level.

Trends in Dividend Yields

YEAR	NQ-100	SP500
2003	0.10%	1.25%
2004	0.18%	1.30%
2005	0.43%	1.61%
2006	0.55%	1.67%
2007	0.48%	1.82%
2008	0.89%	3.00%
2009	0.74%	1.97%
2010	0.74%	1.81%
2011	0.93%	2.10%
2012	1.20%	2.14%
2013	1.19%	1.48%
2014	1.11%	1.90%
2015	1.15%	2.08%

The top Nasdaq stocks, while solidly growth oriented, are in fact substantially more mature and profitable than they were at the height of the tech bubble, and far more likely to pay a dividend. Of note are Microsoft's special dividend in 2004 and the recent initiation of dividend payments by Apple in 2012.

Collectively, the comparative metrics shown above paint a consistent picture: the Nasdaq-100, compared to the other broad indexes, is much more oriented towards younger, growth-oriented companies, particularly technology companies. Indeed, the Nasdaq-100 may aptly be characterized as the world's leading large cap growth index.

THE NASDAQ-100 AS BASIS FOR TRADABLE PRODUCTS /

As mentioned above, while the Nasdaq Composite index enjoys a higher profile in the media, the Nasdaq-100 is more widely used as the basis for tradable products. Indeed, the index has been specifically structured to promote the creation of tradable products. There are two reasons for this. First, the index has a comparatively small number of components, each of which is itself a highly liquid security (compared with indexes of 500 or 2000 components). Second, to meet IRS diversification standards, the weighting scheme uses an as-needed modified market cap approach to prevent a single stock or group of stocks from having too much weight.

Derivatives

The first product tied to the index was an index option contract introduced by the Chicago Board Options Exchange (CBOE) in February 1994. Under ticker symbol "NDX," this contract is cash-settled; the settlement value of the contract is \$100 times the value of the index. A subsequent offering, the Mini-Nasdaq-100 index option (ticker "MNX") has a contract multiplier of \$10.

Futures contracts based on the Nasdaq-100 were introduced on the Chicago Mercantile Exchange (CME) in April 1996 under ticker symbol "ND."⁹ The size of the contract was set at \$100 times the value of the index. In June 1999, the CME introduced the "E-Mini" contract on the index (ticker "NQ"), which was traded exclusively on the Globex electronic system, and which had a smaller contract value of \$20 times the index. In addition to the futures contracts, the CME also offers options on the futures.

In terms of current activity, it is interesting to note the full-size NDX contract (multiplier \$100) has the vast majority of volume among index options, while for index futures, it is the E-Mini contract (multiplier \$20) that has the majority of volume. For both types of instruments, the Nasdaq-100 contracts are among the most actively traded products.

Average daily volumes for 2015 are shown in the following table, which includes the top five contracts for the indicated type of derivative instruments. Though far below those based on the S&P 500, derivatives tied to the Nasdaq-100 are among the top traded index-based products.

2015 Avg Daily Volumes: Top Five Derivative Contracts

Equity Index Options		Equity Index Futures	
S&P 500 (SPX)	932,493	E-Mini S&P 500	1,698,827
S&P Volatility (VIX)	570,223	E-Mini Nasdaq-100	266,049
Russell 2000 (RUT)	80,626	Mini \$5 Dow	160,479
Nasdaq-100 (NDX)	24,698	Nikkei 225	52,777
S&P 500 PM (SPXPM)	7,769	E-Mini MidCap	21,269

Modified Market Cap Methodology

In the late 1990s, Nasdaq began to consider the possibility of developing an exchange-traded fund (ETF) patterned after the successful SPDR S&P 500 ETF that was launched in 1993. In the case of the Nasdaq-100, however, a special circumstance arose. Under IRS rules, a registered investment company (RIC) must exhibit a certain level of diversification in order to qualify for the tax pass-through provisions common to RICs. Given the growth in valuations during the tech boom of the 1990s, the Nasdaq-100 was at risk of not meeting these diversification rules, due primarily to the high valuations of Microsoft and Intel.

As a result, Nasdaq developed a methodology for adjusting index weights in order to ensure compliance with IRS RIC diversification rules. The methodology is used to ensure that both of the following conditions are met:

- The largest stock has less than 24% of the total index weight, and
- The cumulative weight of all stocks with weight over 4.5% is less than 48%.

These conditions are more restrictive than the IRS rules, meaning that ETFs based on the index comfortably meet the IRS conditions. In early November 1998, Microsoft's weight was 22.3%. There were five stocks with weight greater than 4.5% and their cumulative weight was 60%. The new method was therefore implemented starting on November 4, 1998. After implementation, Microsoft's weight was reduced to 14.6%, and the cumulative weight of the top five stocks was reduced to 40%. These changes paved the way for the launch of the Nasdaq-100 ETF the following spring, in March 1999.

The methodology works by replacing a component's total shares outstanding (TSO) with a new quantity, termed the Depositary Receipt Multiplier (DRM). All index calculations and adjustments would be the same, except that DRMs would be used instead of TSOs. Larger stocks would receive DRMs less than their TSOs, while smaller stocks would have the reverse, DRM exceeding TSO. Since the index contained 100 components, a weight of 1% is a natural focal point—stocks with TSO-based weights greater than 1% are deemed “large,” those with weights less than 1% are deemed “small.”

As the market worked through multiple cycles, the relative valuation of the companies within the index had changed significantly. Therefore, a second special rebalance was implemented to reset the modified market capitalization weights. As a result of this special rebalance, which went into effect on May 2, 2011, DRMs were set to be equal to TSOs. Should the need arise, Nasdaq can alter DRMs away from TSOs to maintain appropriate levels of diversification.

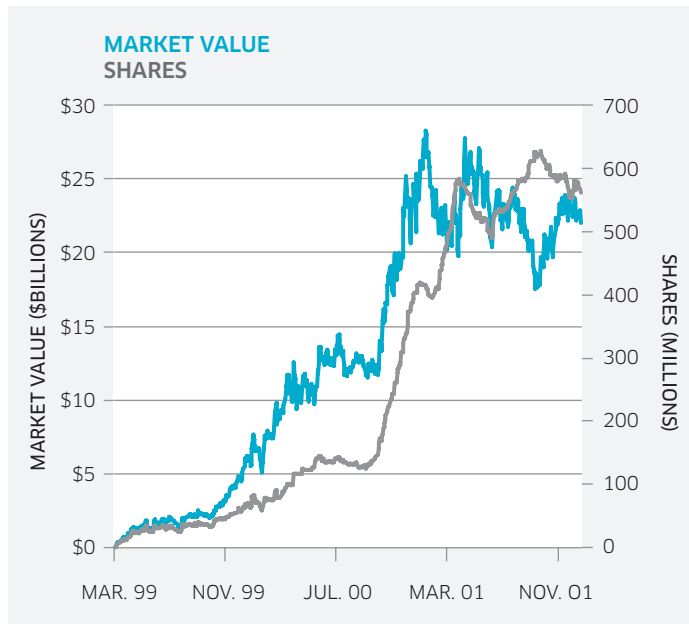
Launch of QQQ ETF

With the modified market cap methodology in place, an ETF tied to the index was introduced in March 1999. At launch, the ETF had ticker symbol QQQ, and was listed on the American Stock Exchange.¹⁰ This listing venue was chosen for two reasons. First, the Amex had already listed the path-breaking ETF that tracked the S&P 500 (SPY). Second, at the time, Amex was part of a NASD subsidiary that included both Amex and the Nasdaq Stock Market.

While the Nasdaq Stock Market served as the initial ETF sponsor, this role would be transferred to Invesco PowerShares in 2007. As is the case with the SPDR S&P 500 ETF, QQQ employs a system by which shares could be created or redeemed by authorized participants. Arbitrage opportunities would ensure that the ETF tracks the index. The ETF experienced astonishing growth during its first few months of operation, a signal of the demand for this particular product as well as a harbinger of the forthcoming explosive growth in the number of exchange-traded products. On March 10, 1999, QQQ was launched with a per-share net asset value of about \$100. At the close of that day, the fund had about \$15 million in assets. By the end of March that figure had risen to \$658 million. Fund assets surpassed \$1 billion by the mid-April, and \$2 billion by mid-August. By the time of the market peak in March 2000, fund assets reached \$10 billion. The ETF did a two-for-one split at that time, an interesting irony in light of the forthcoming market drop.

The following chart shows the shares outstanding and market value of the fund from launch through the end of 2001.

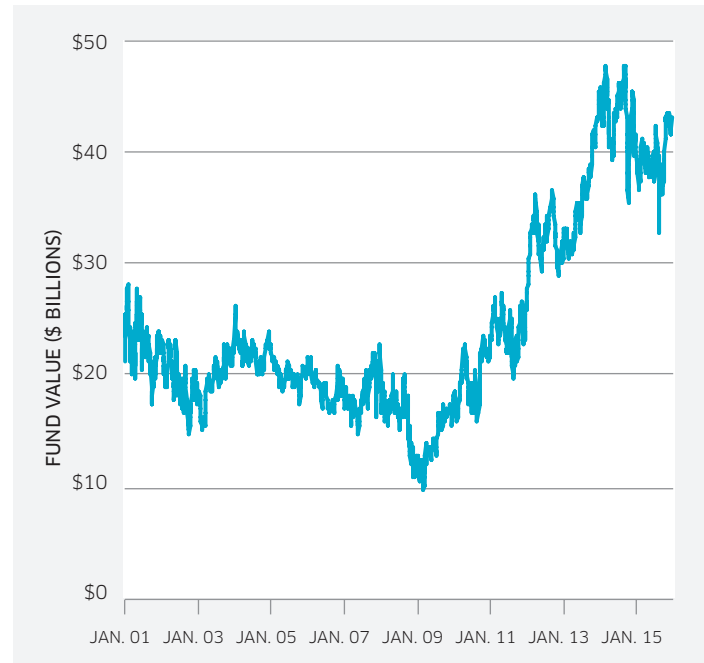
Market Value and Shares Outstanding of QQQ Launch to End of 2001



The remarkable growth of the fund between fall 2000 through spring 2001, in spite of the market meltdown occurring at the time, is demonstrated in the graph. It is reasonable to conjecture that the demand from investors for the ETF was far beyond that as a buy-and-hold investment vehicle. The ETF ended up being used as a hedging or speculation vehicle for traders wanting exposure to “tech” stocks. Evidence of this can be seen by looking at the “turnover” or “velocity” of trading, defined as the average daily dollar value of trading divided by the value of the fund. From September 2000 through April 2001, the daily turnover of the ETF averaged about 17%, an astonishingly high number for a single security. (By comparison, the daily turnover of the most active common stocks may average only 1-2%.) It is clear that QQQ, as has been the case for some other ETFs, has become a useful trading vehicle as well as investment vehicle.

The value of QQQ from 2001 forward is shown in the following chart. It was remarkably consistent at around \$20 billion for most of the decade of the 2000s, until the bear market of the financial crisis. In early 2009 it fell to a low of \$10 billion, but since that time it has increased more than three-fold to its current value of about \$40 billion. This increase is mostly driven by changes in market value (factor of 3.0 increase), with a negligible change in the number of shares.¹¹

Value of QQQ Fund: 2001-2015



Currently, QQQ is among the largest and most liquid ETFs, as indicated by the following table.

Top 10 ETFs by Market Value: 2015 Daily Averages

ETF	Avg Market Value (\$M)	Avg Share Volume (M)	Turnover
SPDR S&P 500 (SPY)	180,339	123.62	14.13%
iShares Core S&P 500 (IVV)	69,101	4.42	1.33%
iShares MSCI EAFE (EFA)	58,038	20.67	2.23%
Vanguard Total Market (VTI)	55,537	3.03	0.58%
Vanguard FTSE Emerging Markets (VWO)	43,128	15.76	1.41%
PowerShares QQQ (QQQ)	39,629	32.44	8.86%
Vanguard S&P 500 (VOO)	33,636	2.04	1.15%
iShares Russell 1000 Growth (IWF)	29,482	2.08	0.70%
iShares Russell 2000 (IWM)	28,212	32.47	13.79%
Vanguard FTSE Developed (VEA)	27,259	6.27	0.90%

The size and turnover of QQQ, compared with that of other ETFs, again point to its dual role as an investment and trading vehicle. For example, both Vanguard Total Market (VTI) and iShares Core S&P 500 (IVV) have higher market value than QQQ, but trade far less. Regarding turnover, it is interesting to note that during 2015 the average turnover of the Nasdaq-100 components was about 1%. Thus, the turnover of QQQ is more than eight times that of its components.

The success of QQQ has spawned the development of other securities. For example, in the exchange-listed options arena, options on QQQ are among the most actively traded equity options contracts. The most active five equity option classes for 2015 are shown as follows:

Top Five Most Active Exchange-Listed Equity Options

Underlying	2015 Avg Daily Volume
SPDR S&P 500 ETF (SPY)	2,520,187
Apple (AAPL)	904,661
iShares Russell 2000 ETF (IWM)	542,058
PowerShares QQQ ETF (QQQ)	458,913
iShares MSCI Emerging Markets (EEM)	311,016

Although the options on QQQ have a much higher average daily volume than the NDX index option, the latter has substantially more volume from a notional perspective. The NDX currently has ADV of about 25,000 contracts, each of which has notional value of 100 times the level of the index, currently around 4600. The QQQ option has ADV of about 416,000 contracts, also has a multiplier of 100, but the value of the instrument is about \$110. Overall, the notional volume of the NDX contract is about \$11.5 billion compared to the QQQ option's \$4.6 billion.

The success of QQQ has spawned the creation of similar exchange-traded products. At present there are 48 such products, whose aggregate market value is over \$10 billion. These ETPs differ from the QQQ in a number of dimensions:

- Leverage and direction (examples ProShares TQQQ with +3x leverage and SQQQ with -3x leverage);
- Currency-hedged (example iShares XQQ hedged against the Canadian Dollar)
- Alternative weighting (example First Trust Nasdaq-100 Equal Weight (QQEW))
- Listed in alternative geographies: QQQ-like products licensed in 12 countries outside of the United States (example Guotai Nasdaq-100 in China)
- Specific sectors (example First Trust Nasdaq-100 ex- Technology (QQXT))

SUMMARY /

Over thirty years ago, Nasdaq set out to create a liquid, tradable version of the Nasdaq Composite Index for use in the financial markets. The Nasdaq-100 index, made up of the top 100, non-financial companies listed on the Nasdaq Stock Market, has since become the world's preeminent large cap growth index. In addition to serving as an indicator of the value of its components, the index has been highly successful as the basis for tradable products. With offerings in 27 countries worldwide, derivatives tied to the index having notional value in excess of \$1 trillion, and exchange-traded products having value in excess of \$50 billion, it is clear that Nasdaq has succeeded spectacularly in its mission.

ENDNOTES /

1. For more information on the Nasdaq Composite Index, see the white paper. <https://indexes.Nasdaqomx.com/IndexBlog/Post/Nasdaq-Composite-How-Today's-4000-is-Different-from-1999>.
2. A complete discussion of the index methodology for the Nasdaq-100 is available on the Nasdaq index website: https://indexes.Nasdaqomx.com/docs/methodology_NDX.pdf.
3. There are a number of additional technical requirements that each component must satisfy. For example, each issue must have average daily volume of 200,000 shares per day or more. In addition, its index weight must be greater than 0.1%.
4. The seven are Apple, Micron Technology, Intel, KLA-Tencor, PACCAR, Costco, and Seagate Technology. Costco is on this list because of the index membership of Price Club, one of the companies that merged to create the current Costco. Of this group, Apple, Intel, PACCAR and Costco/Price Club have been index members continuously during the entire 30-year period.
5. Source: World Federation of Exchanges statistics archive.
6. Source Bloomberg. It is worth noting that the date of incorporation may be reflective of recent corporate actions such as mergers or restructuring. Therefore, the date of incorporation may be much later than the founding date of the parent company. A good example is Visa, the youngest company in the DJIA. Though the parent company was founded in 1958, the current company, formed from four geographical divisions, was incorporated in 2007.
7. Source of revenue growth rates: Bloomberg.
8. Dividend yield sources: Bloomberg, FactSet.
9. ND futures closed June 2015.
10. The QQQ transferred its listing to the Nasdaq Stock Market in November 2004. At that time, ticker symbols on Nasdaq had four characters, so the ticker changed to QQQQ. The ticker reverted back to QQQ in March 2011 following a change in symbology practices, allowing Nasdaq to have tickers less than four characters.
11. Figures mentioned here utilize average shares outstanding and AUM for QQQ from 2009 and 2015 in order to calculate these observations.
12. All data is through 12/31/2015, unless otherwise indicated.

DISCLAIMER /

Nasdaq® is a registered trademark of Nasdaq, Inc. The information contained above is provided for informational and educational purposes only, and nothing contained herein should be construed as investment advice, either on behalf of a particular security or an overall investment strategy. Neither Nasdaq, Inc. nor any of its affiliates makes any recommendation to buy or sell any security or any representation about the financial condition of any company. Statements regarding Nasdaq-listed companies or Nasdaq proprietary indexes are not guarantees of future performance. Actual results may differ materially from those expressed or implied. Past performance is not indicative of future results. Investors should undertake their own due diligence and carefully evaluate companies before investing. **ADVICE FROM A SECURITIES PROFESSIONAL IS STRONGLY ADVISED.**

Reprinted with permission from Nasdaq. While Invesco believes the information presented in this article to be reliable and current, Invesco was not involved in writing the article and cannot guarantee its accuracy. Further circulation, disclosure, or dissemination of all or any part of this material is prohibited. This article is provided for educational & informational purposes only and is not an offer of investment advice or financial products. The opinions expressed are those of the author, are based on current market conditions and are subject to change without notice. These opinions may differ from those of other Invesco investment professionals.

Notional value is the total value of a leveraged position's assets.

Bull market is a financial market of a group of securities in which prices are rising or are expected to rise.

Market peak is the stage of the economy's business cycle that marks the end of a period of incline.

Market tough is the stage of the economy's business cycle that marks the end of a period of decline.

Average growth rates is the average increase in the value of an investment.

Index option contract is a financial derivative that gives the holder the right, but not the obligation, to buy or sell the value of an underlying index.

Globex electronic system is an electronic trading platform used for derivatives, futures and commodity contracts.

Shares outstanding refers to a company's stock currently held by all its shareholders.

Depository receipts Multiplier (DRM) is an element of the modified market cap methodology that replaces a component's total shares outstanding (TSO) with a new quantity to maintain appropriate levels of diversification.

S&P Volatility Index is an index considered representative of the implied volatility of S&P 500 Index options.

Russell 2000 Index is a trademark/service mark of the Frank Russell Co.[®], is an unmanaged index considered representative of small-cap stocks.

S&P 500 PM Index is an unmanaged index considered representative of the US stock market.

Nikkei 225 Index is a price-weighted average of 225 top-rated Japanese companies listed in the first section of the Tokyo Stock Exchange.

Mini-Nasdaq-100 index is based on the underlying Nasdaq 100index that offers smaller-sized, liquid benchmark contracts.

American Stock Exchange (AMEX) is a US stock and options exchange and is located in New York.

Dividend Yield is represented as a percentage and can be calculated by dividing the dollar value of dividends paid in a given year per share of stock held by the dollar value of one share of stock.

PowerShares QQQ™ is an exchange-traded fund based on the Nasdaq-100 Index[®]. The Fund will, under most circumstances, consist of all of stocks in the Index.

PowerShares QQQ has exposure as of June 30, 2016 to the following companies mentioned within the article:

Apple Inc. 10.23%, Microsoft Corp. 7.86%, Alphabet Inc. Class C 4.64%, Alphabet Inc. Class A 4.04%, Intel Corp. 3.03%, Facebook Inc. 6.60%, Amgen Inc. 2.23%, Starbucks Corp. 1.63%, Tesla Motors Inc. 0.61%, Sycamore Networks 0%, Global Crossing 0%, WorldCom 0%, Gilead Sciences Inc. 2.17%, Celgene Corp. 1.49%, Amazon.com Inc. 6.60%, Comcast Corp. 3.08%, Twenty-First Century Fox 0.58%, MCI, Google (Alphabet Inc. Class C 4.64% and Alphabet Inc. Class A 4.04%), Adolph Coors 0%, Chi Chi's Restaurants 0%, HBO 0%, Liz Claiborne 0%, Mack Trucks 0%, McCormick Spices 0%, Visa 0%, Micron Technology Inc. 0.28%, KLA-Tencor, PACCAR Inc. 0.36%, Costco Wholesale Corp. 1.35% and Seagate Technology 0.14%.

There are risks involved with investing in ETFs, including possible loss of money. Shares are not actively managed and are subject to risks similar to those of stocks, including those regarding short selling and margin maintenance requirements. Ordinary brokerage commissions apply. The Fund's return may not match the return of the Underlying Index. The Fund is subject to certain other risks. Please see the current prospectus for more information regarding the risk associated with an investment in the Fund.

Invesco is not affiliated with Nasdaq.

Past performance is no guarantee of future results.

The Global Industry Classification Standard was developed by and is the exclusive property and service mark of MSCI, Inc. and Standard & Poor's.

An investor cannot invest directly in an index.

Common stocks do not assure dividend payments and the amount of a dividend if any, may vary over time. There can be no guarantee or assurance that companies will declare dividends in the future of that if declared, they will remain at current levels or increase over time.

Investments focused in a particular industry or sector are subject to greater risk, and are more greatly impacted by market volatility, than more diversified investments.

Derivatives may be more volatile and less liquid than traditional investments and are subject to market, interest rate, credit, leverage, counterparty and management risks. An investment in a derivative could lose more than the cash amount invested.

A decision as to whether, when and how to use futures involves the exercise of skill and judgment and even a well conceived futures transaction may be unsuccessful because of market behavior or unexpected events. Futures are generally volatile and are not suitable for all investors.

Risks of futures contracts include: an imperfect correlation between the value of the futures contract and the underlying commodity; possible lack of a liquid secondary market; inability to close a futures contract when desired; losses due to unanticipated market movements; obligation for the Fund to make daily cash payments to maintain its required margin; failure to close a position may result in the Fund receiving an illiquid commodity; and unfavorable execution prices.

A decision as to whether, when and how to use options involves the exercise of skill and judgment and even a well conceived option transaction may be unsuccessful because of market behavior or unexpected events. The prices of options can be highly volatile and the use of options can lower total returns. Prior to buying or selling an option, a person must receive a copy of Characteristics and Risks of Standardized Options. Copies of this document may be obtained from your broker, from any exchange on which options are traded or by contacting The Options Clearing Corporation, One North Wacker Dr., Suite 500, Chicago, IL 60606 (investorservices@theocc.com).

Investing in securities of large-cap companies may involve less risk than is customarily associated with investing in stocks of smaller companies.

The sponsor of the NASDAQ-100 TrustSM, a unit investment trust, is Invesco PowerShares Capital Management LLC (Invesco PowerShares). NASDAQ, NASDAQ-100 Index, NASDAQ-100 Index Tracking Stock and QQQ are trade/service marks of the NASDAQ Stock Market, Inc. and have been licensed for use by Invesco PowerShares Capital Management.

PowerShares[®] is a registered trademark of Invesco PowerShares Capital Management LLC, investment adviser. Invesco PowerShares Capital Management LLC (Invesco PowerShares) and Invesco Distributors, Inc., ETF distributor, are indirect, wholly owned subsidiaries of Invesco Ltd.

Note: Not all products are available through all firms.

Shares are not individually redeemable and owners of the Shares may acquire those Shares from the Funds and tender those shares for redemption to the Funds in Creation Unit aggregations only, typically consisting of 50,000, 75,000, 100,000 or 200,000 Shares.

Shares are not FDIC insured, may lose value and have no bank guarantee.

Before investing, investors should carefully read the prospectus/summary prospectus and carefully consider the investment objectives, risks, charges and expenses. For this and more complete information about the Fund call 800 983 0903 or visit invescopowershares.com for the prospectus/summary prospectus.