The Power of Mean Reversion in Factor-Based Investing

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Factors: An Overview

While factor-based investing has long been a hallmark of the active management framework, the proliferation of factor-based ETFs in recent years has elicited a flurry of opinion and research from analysts, investors, and academics. Amongst their proponents, factor-based strategies offer investors exposure to a concentrated portfolio of securities that create a desired deviation from the risk-return profile of generic market capitalization-weighted strategies. Amongst their detractors, this deviation from traditional market capitalization strategies leaves investors exposed to the heightened volatility that results from a given factor moving in and out of favor.

While it is true that no factor-based strategy perpetually outperforms, many investors endeavor to find the right combination of factor exposure that will generate consistent alpha. For the vast majority of investors, the perfect combination or timing in factor-based approaches remains elusive. Regardless of where one stands on the virtue or vice of factors, the simple truth is that periods of factor-specific outperformance relative to the broader market are inevitably followed by periods of underperformance, and vice-versa. There has been ample research as to why these observable phenomena persist, and the results are largely mixed even amongst the most objective and indifferent of commentators.

The Challenges of Factor Allocation

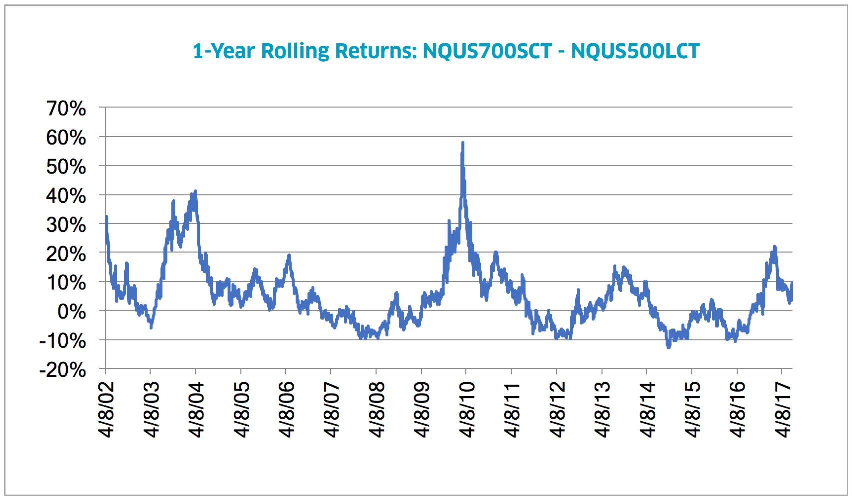
We at Nasdaq have a long history of incorporating factors into our index offerings, and we have dedicated considerable time and resources to deepening our understanding of the broader conversation taking place around these strategies. Oftentimes the most illuminating and engaging of these conversations raise doubts about, or outright reject, the viability of factor-based approaches to generate long-term alpha.

One such critique of factor-based investing is the notion of herding within factor-specific strategies. This theory suggests that the underlying power of a given factor is effectively a double-edged sword. When the alpha-generating qualities of a factor result in conspicuous outperformance, investors recognize this dynamic and proceed to crowd into that particular factor. This crowding effect dampens the power of the particular factor, and eventually the waning enthusiasm leads to large bouts of downward price pressure and sustained underperformance.

A notable example of this phenomenon is the variable return premium attributable to small capitalization securities. As knowledge of the size factor spread across the investment landscape, the observed outperformance began to erode as investors targeted the size factor in earnest. Recent research has found the size effect to be inconsistent in recent decades. One of the most notable uses of the size factor is in the Fama-French three-factor model through the "SMB" (Small – Big) factor. The SMB factor accounts for size effect by measuring the excess return generated by small capitalization securities relative to their large capitalization counterparts. In comparing the daily 1-year rolling returns of the Nasdaq US 700 Small Cap Index (NQUS700SCT) and the Nasdaq US 500 Large Cap Index (NQUS500LC), the size factor has oscillated between periods of outperformance and underperformance throughout the 21st century.

1. "A literature review of the size effect," October 29, 2011, Michael A. Crain.
2. "Common Risk Factors in the Returns on Stocks and Bonds," Journal of Financial Economics (1993), Eugene F. Fama and Kenneth R. French.

This critique is by no means unique to the size factor; ample research has found variable long-term performance across an array of factors. As a thought experiment, we aimed to extrapolate that theory across the entire universe of factors simultaneously, and an interesting counterpoint to the factor-specific herding critique began to emerge. If investing in today's winning factor is doomed to fall prey to downward mean reversion, perhaps the opposite holds true for today's loser.



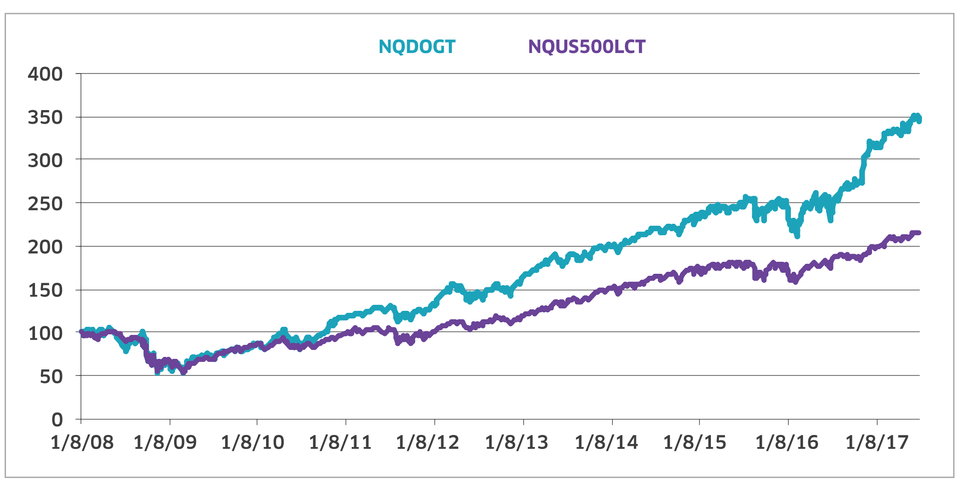
Mean Reversion: The Factor Allocation Solution

The Nasdaq Factor Dog Index seeks to select a portfolio of securities exhibiting certain characteristics reflective of an investment factor that has underperformed its peer group in the past calendar year. The Index tracks the underlying index components and weights of one factor-specific index from the Nasdaq Factor Family of Indexes based on relative returns over a trailing twelve month period. The Nasdaq Factor Family of Indexes is comprised of the following six indexes:

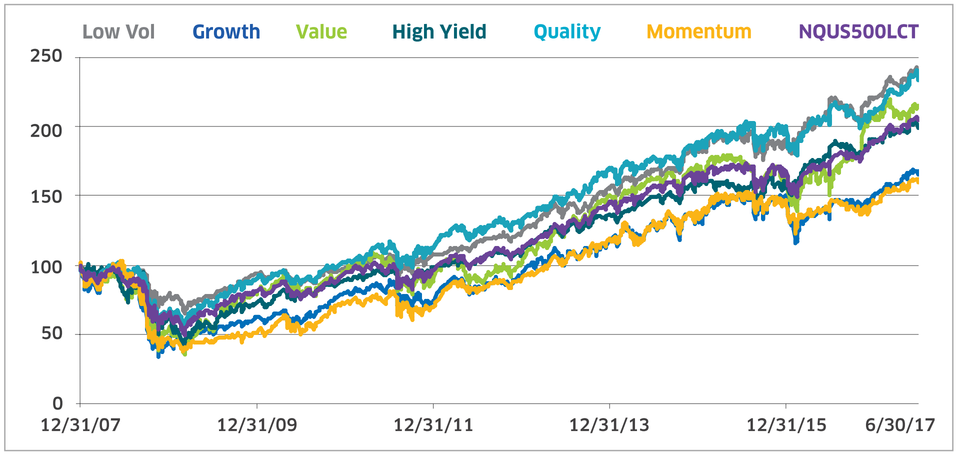
- Nasdaq Factor Family US Momentum – NQFFUSM
- Nasdaq Factor Family US High Yield – NQFFUSHY
- Nasdaq Factor Family US Growth – NQFFUSG
- Nasdaq Factor Family US Value – NQFFUSV
- Nasdaq Factor Family US Low Vol – NQFFUSLV
- Nasdaq Factor Family US Quality - NQFFUSQ

The six Nasdaq Factor Family Indexes are evaluated based on their trailing twelve month returns at the end of each calendar year. The returns used in the evaluation are reflective of a total return pricing method that reinvests cash dividends on the ex-date. The Nasdaq Factor Dog Index fully replicates the components and weights of the index with the lowest trailing twelve month return at the time of the evaluation. The Index continues to fully replicate the Selected Index until the next evaluation following the close of the last trading day of the next calendar year.

By selecting and weighting towards the factor that is currently most out of favor, the index seeks to capture the future upward mean reversion attributable to the "dog" factor. The annual factor evaluation and bi-annual reconstitution processes aims to provide consistent, timely exposure to the "dog" factor as the strategies move in and out of favor.

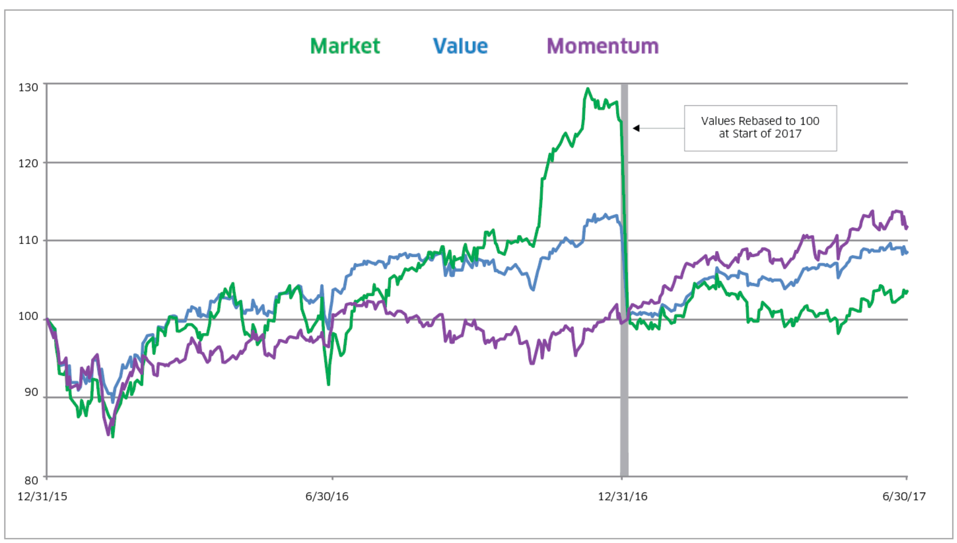


The index's ability to generate year-on-year deviation in risk-return profile relative to the broader market is rooted in the dispersion in performance across the underlying Nasdaq Factor Family of Indexes. These indexes are selected and weighted to maximize the factor-specific exposure realized by each index. Rather than maximize the risk-adjusted return of each factor-specific index, the methodologies aim to most accurately isolate the performance of each factor, regardless of where a particular factor resides in its mean reversion cycle. This way the Nasdaq Factor Dog Index maximizes its ability to evaluate the dispersion of each factor in isolation and harness the power of the mean reversion phenomenon.



Year	Worst Performance	Worst Performer	Dog Selection	Dog Return	Dog Return Rank
2007	-6.09%	High Yield			
2008	-56.04%	Growth	High Yield	-37.78%	3
2009	5.42%	Momentum	Growth	41.06%	2
2010	4.84%	Low Vol	Momentum	40.65%	1
2011	-7.46%	Growth	Low Vol	10.49%	2
2012	11.00%	High Yield	Growth	26.60%	2
2013	26.38%	High Yield	High Yield	26.38%	6
2014	9.43%	Quality	High Yield	15.70%	2
2015	-4.58%	Value	Quality	5.96%	2
2016	-0.49%	Momentum	Value	25.16%	1
2017	1.09%	Value	Momentum	11.71%	1

The performance of the Nasdaq Factor Dog Index in the first half of 2017 is emblematic of the mean reversion phenomenon that the index aims to capture. The Nasdaq Factor Family US Value Index substantially outpaced its peer group and the broader market in 2016, while also serving as the "dog" factor, returning 25.16% on a total return basis. In contrast, the Nasdaq Factor Family US Momentum Index significantly lagged behind its peer group in returning -0.49% during the same period. However, the first half of 2017 has played out in much the opposite fashion. Momentum has generated the second highest return within the Factor Family by returning 11.71% through June 30, 2017. Compared to the broader market's return of 9.42% and Value's worst-in-group 4.97% return, the observed 2017 performance offers a prime example of the alpha-generating power that can be realized through well-timed, tactical factor allocation.

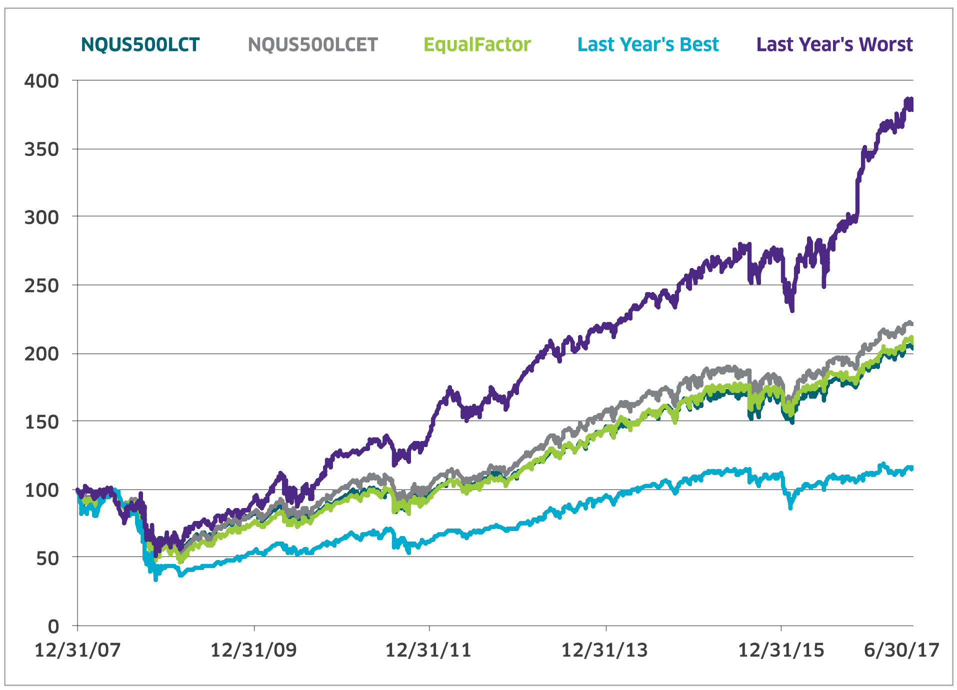


The Hot Factor, All Factors, and The Dog Factor

Given its mean reversion focus, the Nasdaq Factor Dog Index is an inherently contrarian viewpoint. The index purposefully shuns that which is currently outperforming in favor of that which is currently underperforming. At first glance, many investors deem such logic counterintuitive. Yet, when comparing this contrarian approach to its conformist counterpart, the perils of long-term performance chasing are laid bare. The chart below compares two hypothetical portfolios that each rotate between the Nasdaq Factor Family of Indexes. Each selects a new factor index at the start of the calendar year based on the performance of the six factors in the preceding year and rebalances in accordance with the index it is tracking. The "Last Year's Best" portfolio selects the factor index with the highest return in the previous calendar year. The "Last Year's Worst" portfolio does the exact opposite in selecting the factor index with the lowest return in the previous calendar year.

A final but critical point in understanding factors is the importance of concentration. Given the myriad of factors available in the market, some investors are inclined to seek out simultaneous exposure to multiple factors. However, given the dispersion in factor-isolated performance, any potential outperformance generated by one or more factors is nullified by the underperformance of others. To illustrate the point, the chart below tracks the "Equal Factor" portfolio performance that is generated by equally weighting the daily returns of all six members of the Nasdaq Factor Family of Indexes. The resulting cross-winds from exposure to the disparate factor-oriented returns effectively results in market-neutral returns. While a single factor may only outperform for a period of time, a combination of all factors never does.

A consistent, disciplined targeting of the "dog" factor provides exposure to the persistent power of factor-level mean reversion. The Nasdaq Factor Dog Index offers a transparent, rules-based approach to factor-based allocation that is both strategic and dynamic in its creation of factor-driven outperformance.



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