

Tracking US Equities

The Nasdaq US Large Mid Cap TR Index and the Nasdaq US Small Cap TR Index Prove to be Highly Correlated to their Competition

BY CHRIS MOYER AND EFRAM SLEN, NASDAQ GLOBAL INFORMATION SERVICES

Nasdaq Global Indexes has been creating innovative, market-leading, transparent indexes since 1971. Today, our index offering spans geographies and asset classes and includes diverse families such as the Dividend and Income (includes Dividend Achievers™), Dorsey Wright, Fixed Income (includes BulletShares®), AlphaDEX®, Global Equity, Green Economy, Nordic and Commodity indexes. We continuously offer new opportunities for financial product sponsors across a wide-spectrum of investable products and for asset managers to measure performance and risk. Nasdaq also provides Exchange Traded Product (ETP) listings, custom index services and design solutions to financial organizations worldwide.

The comprehensive Nasdaq Global Index Family consists of more than 40,000 indexes broken down by market segment, region, country, size, and sector. The Global Index Family includes 45 individual countries designated as Developed and Emerging Markets. It provides a transparent, rules-based benchmark for institutional investors and is specifically designed to meet the needs of institutions that face continued demands to track the global equity markets.

The primary focus of this research piece will be centered towards historic price returns of two Nasdaq Indexes which track US equities: the Nasdaq US Large Mid Cap TR Index (NQUSBLMT) and the Nasdaq US Small Cap TR Index (NQUSST). We will use the performance history to compare each index to some competing indexes: the Russell 1000 Total Return Index (RU10INTR) and the Russell 2000 Total Return Index (RU20INTR). Furthermore, we will provide a number of statistics that prove that although both Nasdaq Index performances vary from their peers during our time frame studied, the indexes are more similar than not and quite closely track the respective market segments. To confirm this, we will include examples of historical rolling volatility, correlation, beta, etc.

Although both the Nasdaq US Large Mid Cap and Nasdaq US Small Cap Indexes will closely mimic their Russell counterparts, there are some defined differences which should be of note. Perhaps one of the most important factors to consider is that both the Russell 1000 & 2000 Indexes are only rebalanced once a year in June, while evaluations for the Nasdaq US Large Mid Cap & Nasdaq US Small Cap Indexes occur twice, on the third Friday after the close of trading each March and September. We will go into a few other minor details including differences in allocations and component eligibility requirements.

US Large Mid Cap Analysis

The Nasdaq US Large Mid Cap TR Index is a float-adjusted, market capitalization-weighted index designed to track performance of securities assigned to US equities within the Large and Mid-Cap segment. The Index is calculated in USD and began on January 13, 2014, history available back to March 30, 2001. As of September 28, 2018, it had 994 components.

Methodology

The Global Index Family provides a transparent, rules-based benchmark for institutional investors. This family is specifically designed to meet the needs of institutions that are facing continued demands to track the global equity market.

The comprehensive NASDAQ Global Index Family consists of more than 40,000 Indexes broken down by market segment, region, country, size and sector. The Global Index Family includes 45 individual countries designated as Developed and Emerging Markets.

- **The NASDAQ Global Index (NQGI)** provides broad coverage of global equities with approximately 9,000 Index Securities and over 98% of the entire listed market capitalization of the global equity space.
- **The NASDAQ Developed Markets Index (NQDM)** is comprised of the indexes of 25 countries which are designated as Developed Markets.
- **The NASDAQ Emerging Markets Index (NQEM)** is comprised of the indexes of 20 countries which are designated as Emerging Markets.
- **The NASDAQ Developed Markets Index (NQDM)** and **The NASDAQ Emerging Markets Index (NQEM)** are individually segmented into the Large, Mid, Large Mid and Small Cap indexes. The combination of the Large, Mid and Small Cap indexes construct the similar global index.

In addition, a further breakdown of the Global Index Family is found in Appendix A – NASDAQ Global Index Family Breakdown Section.

More detailed information about the Methodology can be found at the following:

<https://indexes.nasdaqomx.com/Index/Overview/NQUSBLM>

Nasdaq US Large Mid Cap Index Eligibility

The basic eligibility requirements for the Nasdaq US Large Mid Cap TR Index (NQUSBLMT) index are listed below:

- The security must be an eligible security type, as described in the methodology document;
- The security must have a minimum worldwide market capitalization of USD 150 million;
- The security must have a minimum three-month average daily dollar trading volume of USD 100 thousand;
- The security must have a minimum free float of 20% and in some cases a minimum free float of 5%;
- The security must have "seasoned" for at least three months on an Index Eligible Global Stock Exchange;

More detailed information about the Eligibility Requirements can be found at the following:

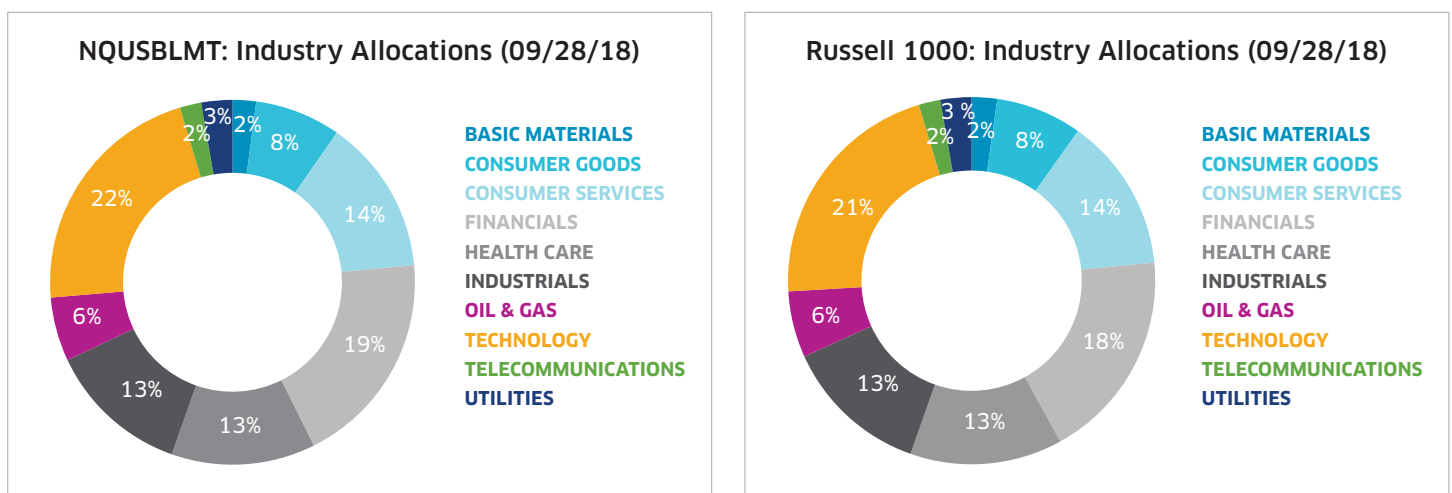
<https://indexes.nasdaqomx.com/Index/Overview/NQUSBLM>

Russell 1000 Index Eligibility

Just for comparison, let's also discuss some of the basics regarding component eligibility for the Russell 1000 Total Return Index (RU10INTR). To determine the holdings of the Russell 1000, FTSE Russell ranks all of the stocks included in the Russell 3000 by market capitalization and identifies the market cap breakpoint of the 1,000th stock ranking. This breakpoint is the primary market capitalization used to determine index eligibility. Many stocks are swapped between the Russell 1000 and Russell 2000 at the annual reconstitution. However variation around the market cap breakpoint is the determining factor. As of September 28, 2018, the Index had 986 holdings.

NQUSBLMT & RU10INTR: Industry Allocations as of September 28, 2018

Industry allocations can also have a profound effect on performance during any given market cycle. Given the difference in rebalancing mandates of each index, it's not alarming the industry weights between the NQUSBLMT and RU10INTR can be somewhat different at specific times of the year. Furthermore, this can also contribute to performance differences between the indexes during certain years even though over the longer term they are highly correlated. The largest allocations within NQUSBLMT as of September 28, 2018, were geared towards Technology and Financials. For the Russell 1000, the largest allocations were extremely similar and geared towards the same industries. Rounded to the nearest percent, it appears that the indexes have basically the same industry allocations.

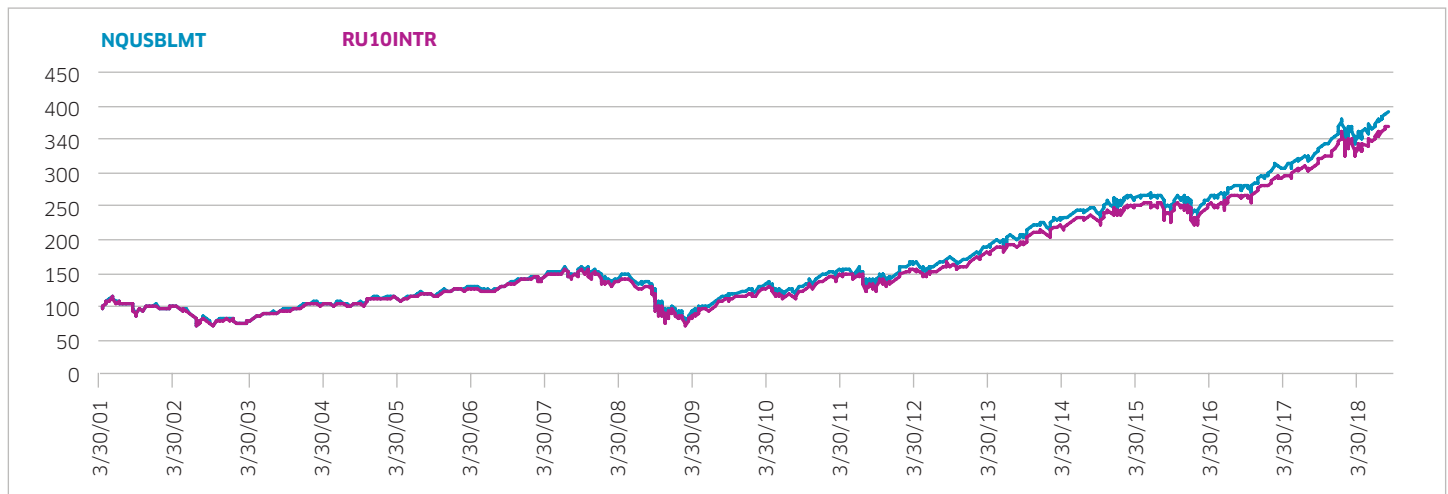


Historical Performance

The table below displays historical performance figures for the Nasdaq US Large Mid Cap TR Index (NQUSBLMT) compared with the Russell 1000 Total Return Index (RU10INTR) between March 30, 2001, and September 28, 2018. These figures confirm that performance has varied between the NQUSBLMT vs the RU10INTR, incidentally it was accomplished with a lower annualized volatility. As we mentioned previously, the differences in re-balancing mandates can lead to the distortion of ICB Allocations between each index. The NQUSBLMT rebalances twice a year, while the RU10INTR only does so once. As mentioned previously, the difference in rebalancing schedules can then contribute to performance discrepancies during certain years.

	NQUSBLMT	RU10INTR
Cumulative Return	290.99%	271.23%
Annualized Return	8.10%	7.78%
Annualized Vol	18.63%	18.83%

The historical price chart below confirms the thesis of how closely correlated both NQUSBLMT and the RU10INTR have been over time.



Yearly Comparison: (December 31, 2002 – September 28, 2018)

A year-by-year summary helps display what time periods have seen differences in performance. For the most part, performance of each index has been extremely similar annually. To confirm this we've added a final column that shows the difference in performance at the end of each calendar year. Generally, performance has been within +/- 1% each year. However, notice the differences between years 2007 and 2009 which are the outliers in terms of performance differences. The largest difference was in 2008, which saw NQUSBLMT outperform RU10INTR by 1.61%. The next large difference was 2007, which saw NQUSBLMT outperform by 1.45%.

	NQUSBLMT	RU10INTR	DIFFERENCE
2002	-21.73%	-21.65%	-0.07%
2003	29.94%	29.89%	0.05%
2004	11.73%	11.40%	0.33%
2005	6.90%	6.27%	0.63%
2006	15.71%	15.46%	0.24%
2007	7.22%	5.77%	1.45%
2008	-35.99%	-37.60%	1.61%
2009	27.40%	28.43%	-1.03%
2010	16.41%	16.10%	0.31%
2011	1.70%	1.50%	0.20%
2012	16.23%	16.42%	-0.19%
2013	32.97%	33.11%	-0.14%
2014	12.97%	13.24%	-0.27%
2015	0.88%	0.92%	-0.04%
2016	12.21%	12.05%	0.16%
2017	21.83%	21.69%	0.14%
2018 (YTD)	10.36%	10.49%	-0.13%

Additional performance analysis below shows a number of statistics including average gain/loss and largest gain/loss between December 31, 2002 and December 29, 2017.

	NQUSBLMT	RU10INTR
Total Years	16	16
Average Gain	15.29%	15.16%
Average Loss	-28.86%	-29.62%
Largest Gain	32.97%	33.11%
Largest Loss	-35.99%	-37.60%

Performance Analysis: Top Allocated Names

To reaffirm our view that the differences in rebalancing mandates between the two indexes can lead to deviations in industry weights and performance at certain times of the year, we analyzed four of the top weighted names in each index over the last six quarters (MSFT, AAPL, AMZN, BRK/B). The below tables provide respective weights for the start of each quarter, individual stock returns, and weighted (contributed) returns. What we found on a consistent basis is NQUSBLM tended to have slightly higher allocations to three of the four names (AAPL, AMZN, and MSFT) when compared to the Russell 1000 Index. NQUSBLM also had a slightly smaller allocation to BRK/B (which typically underperformed the other names). The details for the last six quarters can be found below. In summary, through each of them you find the below themes consistent throughout most the periods we studied:

- NQUSBLM being more heavily allocated to AAPL, AMZN, and MSFT on a consistent basis
- These larger allocations helped produce slightly higher weighted returns during the majority of the periods
- NQUSBLM was primarily underweight BRK/B when compared to the Russell 1000 which typically lagged in performance vs the other holdings
- On a final note, NQUSBLM also maintains an allocation to BRK/A, while the Russell 1000 doesn't. This is also another reason the BRK/B allocation is much lower than the Russell 1000.

12/30/2016 - 3/31/2017

NQUSBLM	12/30/16 WEIGHT (%)	12/30/16 CLOSING PRICE	03/31/17 CLOSING PRICE	STOCK RETURN	WEIGHTED RE- TURN
MSFT	2.3625	62.14	65.86	6.0%	0.1414
AAPL	3.0522	115.82	143.66	24.0%	0.7337
AMZN	1.4612	749.87	886.54	18.2%	0.2663
BRK/B	0.8837	162.98	166.68	2.3%	0.0201
BRK/A	0.6244	244121	249850	2.3%	0.0147

RUSSELL 1000	12/30/16 WEIGHT (%)	12/30/16 CLOSING PRICE	03/31/17 CLOSING PRICE	STOCK RETURN	WEIGHTED RE- TURN
MSFT	2.1800	62.14	65.86	6.0%	0.1305
AAPL	2.9400	115.82	143.66	24.0%	0.7067
AMZN	1.3500	749.87	886.54	18.2%	0.2460
BRK/B	1.4300		166.68	2.3%	0.0325

3/31/2017 - 6/30/2017

NQUSBLM	03/31/17 WEIGHT (%)	03/31/17 CLOSING PRICE	06/30/17 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.3766	65.86	68.93	4.7%	0.1108
AAPL	3.5575	143.66	144.02	0.3%	0.0089
AMZN	1.6568	886.54	968	9.2%	0.1522
BRK/B	0.8739	166.68	169.37	1.6%	0.0141
BRK/A	.5997	249850	254700	1.9%	0.0116

RUSSELL 1000	03/31/17 WEIGHT (%)	03/31/17 CLOSING PRICE	06/30/17 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.2000	65.86	68.93	4.7%	0.1026
AAPL	3.4800	143.66	144.02	0.3%	0.0087
AMZN	1.5200	886.54	968	9.2%	0.1397
BRK/B	1.3900	166.68	169.37	1.6%	0.0224

6/30/17 - 9/29/2017

NQUSBLM	06/30/17 WEIGHT (%)	06/30/17 CLOSING PRICE	09/29/17 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.4611	68.93	74.49	8.1%	0.1985
AAPL	3.4726	144.02	154.12	7.0%	0.2435
AMZN	1.7946	968	961.35	-0.7%	-0.0123
BRK/B	0.9228	169.37	183.32	8.2%	0.0760
BRK/A	0.6038	254700	274740	7.9%	0.0475

RUSSELL 1000	06/30/17 WEIGHT (%)	06/30/17 CLOSING PRICE	09/29/17 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.2200	68.93	74.49	8.1%	0.1791
AAPL	3.2300	144.02	154.12	7.0%	0.2265
AMZN	1.6500	968	961.35	-0.7%	-0.0113
BRK/B	4000	169.37	183.32	8.2%	0.1153

9/29/17 - 12/29/2017

NQUSBLM	09/29/17 WEIGHT (%)	09/29/17 CLOSING PRICE	12/29/17 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.5635	74.49	85.54	14.8%	0.3803
AAPL	3.5568	154.12	169.23	9.8%	0.3487
AMZN	1.7084	961.35	1169.47	21.6%	0.3698
BRK/B	0.9650	183.32	198.22	8.1%	0.0784
BRK/A	0.6282	274740	297600	8.3%	0.0523
RUSSELL 1000	09/29/17 WEIGHT (%)	09/29/17 CLOSING PRICE	12/29/17 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.3200	74.49	85.54	14.8%	0.3442
AAPL	3.3400	154.12	169.23	9.8%	0.3275
AMZN	1.5900	961.35	1169.47	21.6%	0.3442
BRK/B	1.4700	183.32	198.22	8.1%	0.1195

12/29/17 - 3/29/2018

NQUSBLM	12/29/2017 WEIGHT (%)	03/29/18 CLOSING PRICE	06/29/18 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.7292	85.54	91.27	6.7%	0.1828
AAPL	3.5934	169.23	167.78	-0.9%	-0.0308
AMZN	1.9547	1169.47	1447.34	23.8%	0.4644
BRK/B	0.9772	198.22	199.48	0.6%	0.0062
BRK/A	0.6283	297600	299100	0.5%	0.0032
RUSSELL 1000	12/29/2017 WEIGHT (%)	03/29/18 CLOSING PRICE	06/29/18 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.5200	85.54	91.27	6.7%	0.1688
AAPL	3.4200	169.23	167.78	-0.9%	-0.0293
AMZN	1.8300	1169.47	1447.34	23.8%	0.4348
BRK/B	1.5000	198.22	199.48	0.6%	0.0095

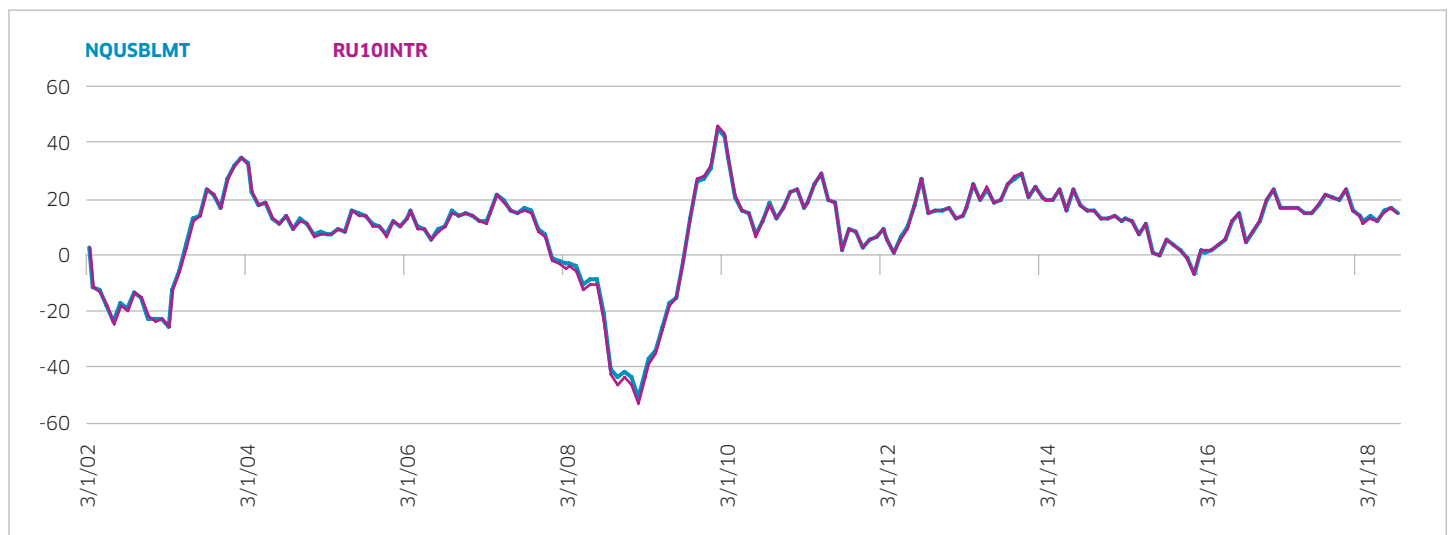
3/29/18 - 6/29/2018

NQUSBLM	12/29/2017 WEIGHT (%)	03/29/18 CLOSING PRICE	06/29/18 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.9460	91.27	98.61	8.0%	0.2369
AAPL	3.6075	167.78	185.11	10.3%	0.3726
AMZN	2.4903	1447.34	1699.8	17.4%	0.4344
BRK/B	0.9959	199.48	186.65	-6.4%	-0.0641
BRK/A	0.6323	299100	282040	-5.7%	-0.0361

RUSSELL 1000	12/29/2017 WEIGHT (%)	03/29/18 CLOSING PRICE	06/29/18 CLOSING PRICE	STOCK RETURN	WEIGHTED RETURN
MSFT	2.7300	91.27	98.61	8.0%	0.2195
AAPL	3.4000	167.78	185.11	10.3%	0.3512
AMZN	2.3300	1447.34	1699.8	17.4%	0.4064
BRK/B	1.5300	199.48	186.65	-6.4%	-0.0984

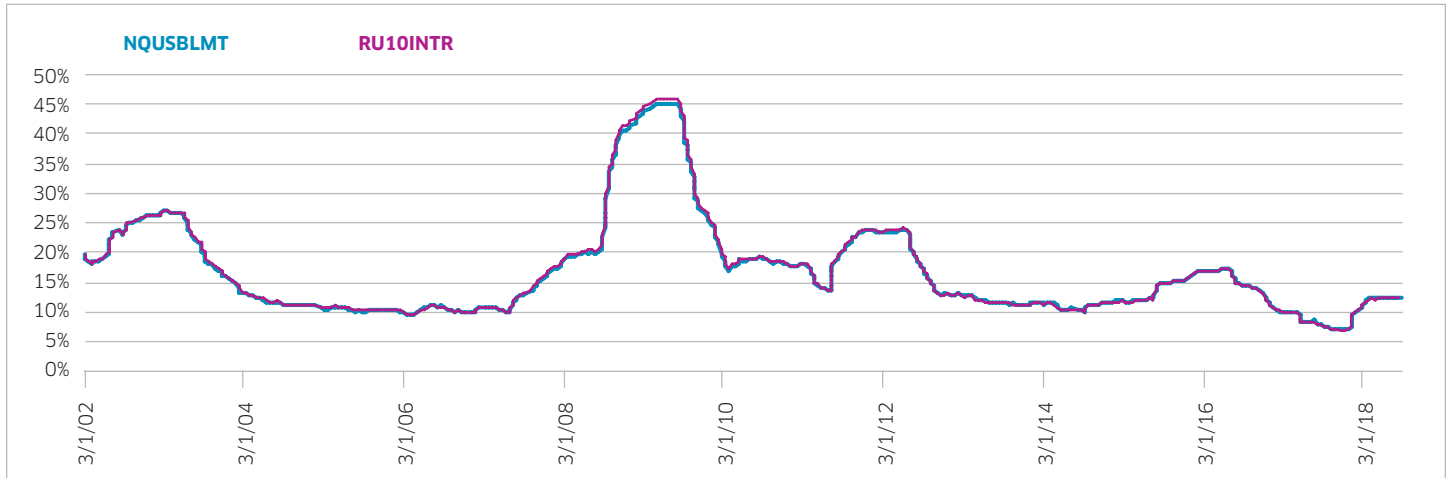
Rolling Returns (1 Year - Monthly)

Given the similar cumulative performance listed above, it's not surprising the 12-month rolling return between the two indexes was also closely correlated during our time frame studied. Perhaps the most interesting thing to consider when looking at the below visual is that there are only a very few times when you can even see both Indexes rolling returns (which confirms what we mentioned above during 2007-2009).



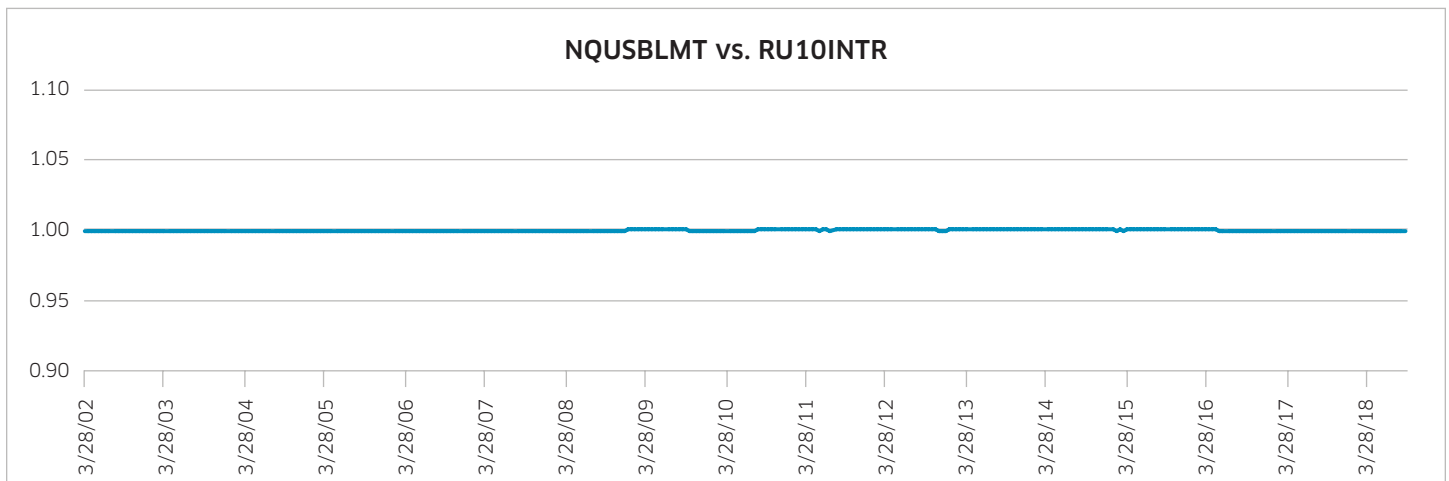
Rolling Volatility (1 Year - Daily)

Similarly, one year rolling volatility (on a daily basis) was closely correlated as evidenced by the ability to only see both lines below very few times. The range of rolling volatility during our time frame studied was for the most part between 10% and 45%. The peak on our graphic occurred during the financial crisis or shortly after due to the nature of the way rolling volatility is calculated. As of 9/28/2018, the 1-year volatility was hovering near 10%.



Rolling Correlation (1 Year - Daily)

A rolling correlation calculation tracks the consistency in returns between two indexes and continues to look back over the same time frame throughout the time period studied. The below chart is a rolling correlation (1-year on a daily basis) between the NQUSBLMT and RU10INTR. The rolling correlation chart between the two indexes helps confirm the similarities in price returns of each index during our time frame studied, which has historically remained right near 1.00 since 2002.



Daily Correlation & Beta

The beta (defined as measure of systematic risk) of NQUSBLMT compared to RU10INTR was 0.99, while the correlation figure was 1.00. This helps confirm a few of our previous charts above that gave us the same visual.

INDEX COMPARISON	BETA	INDEX COMPARISON	CORRELATION
NQUSBLMT vs. RU10INTR	0.99	NQUSBLMT vs. RU10INTR	1.00

US Small Cap Analysis

The Nasdaq US Small Cap TR Index (NQUSST) is a float-adjusted, market capitalization-weighted index designed to track the performance of securities assigned to the US Small Cap segment. The Index is calculated in USD. It was launched on May 16, 2011, with back-test data available back to March 30, 2001. As of September 28, 2018, it had 1,890 components. Evaluations occur on the third Friday after the close of trading each March and September. The Nasdaq US Small Cap TR Index closely mimics the Russell 2000 Total Return Index.

Methodology

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The NASDAQ Developed Markets Index (NQDM) and **The NASDAQ Emerging Markets Index (NQEM)** are individually segmented into the Large, Mid, Large Mid and Small Cap indexes. The combination of the Large, Mid and Small Cap indexes construct the similar global index.

In addition, a further breakdown of the Global Index Family is found in Appendix A – NASDAQ Global Index Family Breakdown Section.

More detailed information about the Methodology can be found at the following:

<https://indexes.nasdaqomx.com/Index/Overview/NQUSS>

Nasdaq US Small Cap Index Eligibility

The basic eligibility requirements for the Nasdaq US Small Cap TR Index (NQUSST) index are listed below:

- The security must be an eligible security type, as described in the methodology document;
- The security must have a minimum worldwide market capitalization of USD 150 million;
- The security must have a minimum three-month average daily dollar trading volume of USD 100 thousand;
- The security must have a minimum free float of 20% and in some cases a minimum free float of 5%;
- The security must have "seasoned" for at least three months on an Index Eligible Global Stock Exchange;
- The security must be within a country classified as developed or Emerging Markets;

More detailed information about the Eligibility Requirements can be found at the following:

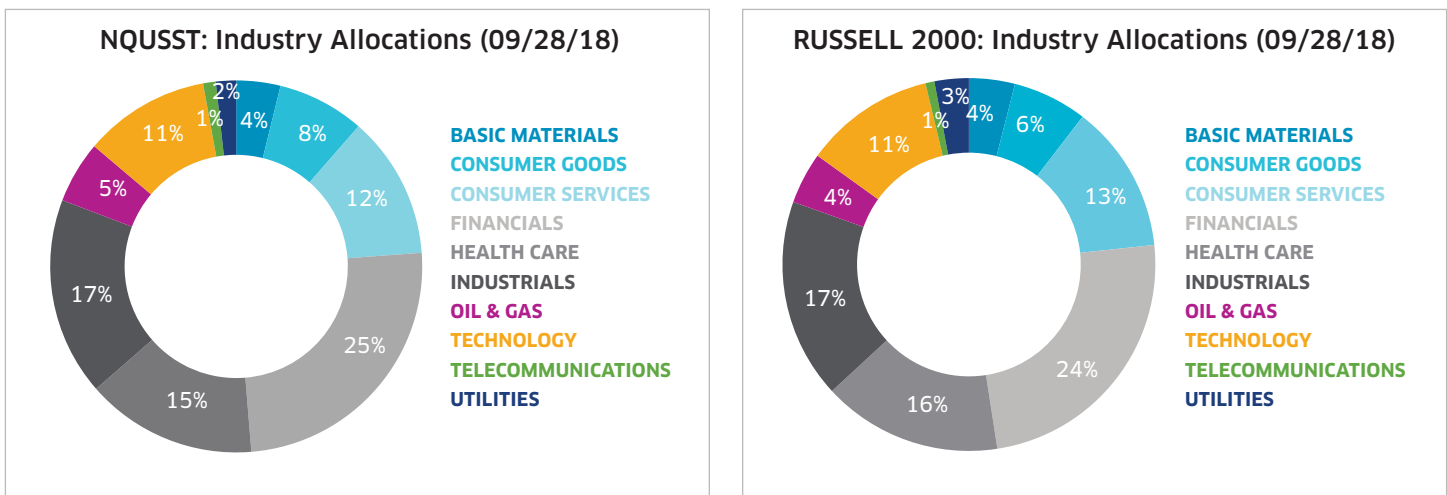
<https://indexes.nasdaqomx.com/Index/Overview/NQUSS>

Russell 2000 Index Eligibility

For comparison, we will discuss some of the basics of component eligibility for the Russell 2000 Total Return Index (RU20INTR). The index measures the performance of about 2,000 small cap companies (generally those with a market cap between \$300 million and \$2 billion) that are in the bottom two-thirds of the Russell 3000 Index – which is made up of 3,000 of the biggest U.S.-traded stocks (all Russell US Indexes are subsets of the Russell 3000). Small cap companies from various industries with a closing price of at least \$1.00 on rank day in May. Bulletin boards, pink sheets and over-the-counter traded securities are not eligible. The index is evaluated once a year in June.

NQUSST & RU20INTR: Industry Allocations as of September 28, 2018

The largest allocations within NQUSST were geared towards Financials, Industrials, and Health Care. For RU20INTR, the largest allocations were also Financials, Industrials, and Health Care. Similar to what we mentioned previously during our Large/Mid Cap Analysis, the difference in rebalancing mandates can affect the industry weights during a particular time of year can lead to performance differences. Furthermore, given the elevated volatility often associated with small caps, the differences in performance between the NQUSST & RU20INTR might also be larger during specific years than what we experienced with the Large/Mid Cap index comparison.

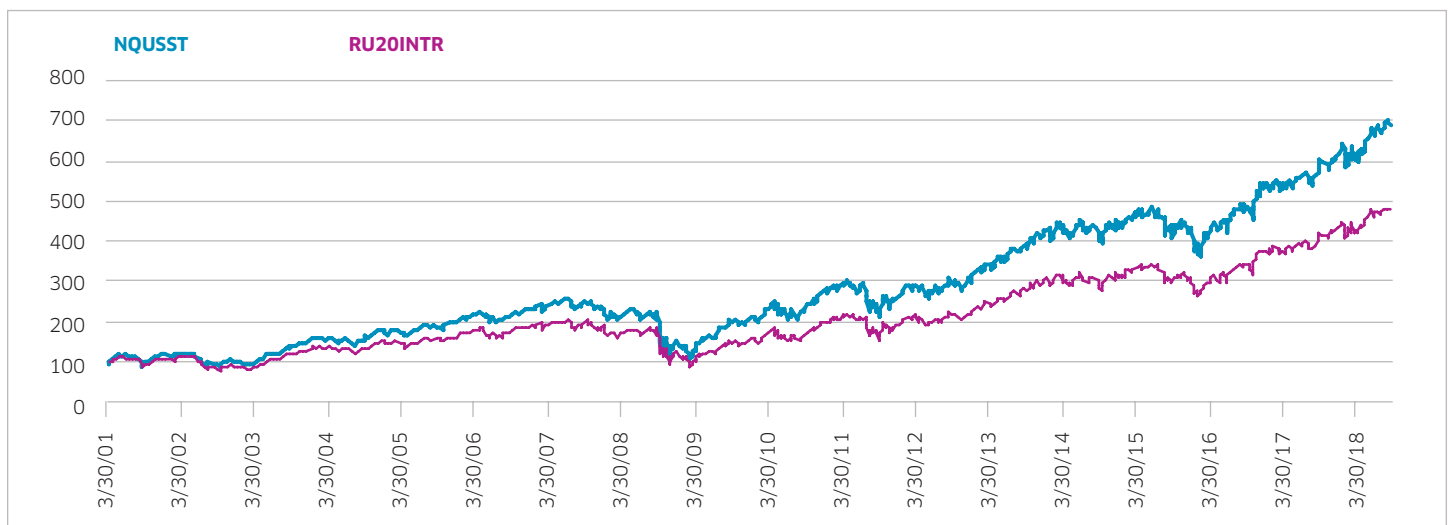


Historical Performance

The table below displays historical performance figures for the Nasdaq US Small Cap TR Index (NQUSST) compared with the Russell 2000 Total Return Index (RU20INTR) between March 30, 2001, and September 28, 2018. The below table displays the variance in performance by NQUSST, as we mentioned previously, this is likely due to the fact that NQUSST rebalances twice a year, while the RU20INTR only does so once. Thinking about the impact of having a rebalance only once a year, let alone the timing of the rebalances differing is far more impactful the smaller you go in capitalization size. Mid cap stocks staying in an index for a longer period rather than being rebalanced out will generally cause an index to have lower performance than an index that rebalances out to more appropriately have only the small cap names. This is because mid cap stocks will have higher weights with generally lower performance. Rather, smaller cap stocks generally outperform mid cap stocks and the smaller size of the largest small cap stock vs the smallest mid cap stocks can change the relative performance further. Further analysis of some of the return differences will be explained later in the document.

	NQUSST	RU20INTR
Cumulative Return	588.58%	375.64%
Annualized Return	11.65%	9.32%
Annualized Vol	22.83%	23.35%

The historical price history chart below confirms the performance figures stated in the table above.



Yearly Comparison (12/31/02 - 09/28/18)

A year-by-year summary helps display what time periods have seen differences in performance. For the most part, the performance difference ranged between +/-5%. However, notice that the largest difference was 15.83%, which occurred in 2009. This is rather significant considering the next largest outlier was 5.34% during 2003.

	NQUSST	RU20INTR	DIFFERENCE
2002	-17.10%	-20.48%	3.38%
2003	52.59%	47.25%	5.34%
2004	20.54%	18.33%	2.21%
2005	7.48%	4.55%	2.93%
2006	19.13%	18.37%	0.77%
2007	0.40%	-1.57%	1.97%
2008	-37.07%	-33.79%	-3.28%
2009	43.01%	27.17%	15.83%
2010	30.49%	26.85%	3.63%
2011	-5.82%	-4.18%	-1.65%
2012	18.70%	16.35%	2.35%
2013	39.83%	38.82%	1.00%
2014	5.50%	4.89%	0.61%
2015	-4.92%	-4.41%	-0.50%
2016	24.05%	21.31%	2.74%
2017	15.05%	14.65%	0.40%
2018	12.56%	11.51%	1.04%

Monthly Performance Comparison: 3/31/09 - 3/31/10

The largest outlier months for NQUSST were April (5.12%) and May (1.77%). Given the rebalancing mandates of each index we mentioned earlier, this is likely a major factor in the performance differentials since the NQUSST had just been rebalanced. There were also some large differences in both August and September of 2009.

	NQUSST	RU20INTR	DIFFERENCE
3/31/2009	9.56%	8.93%	0.63%
4/30/2009	20.58%	15.46%	5.12%
5/29/2009	4.79%	3.01%	1.77%
6/30/2009	1.02%	1.47%	-0.45%
7/31/2009	10.04%	9.63%	0.41%
8/31/2009	4.29%	2.87%	1.42%
9/30/2009	7.14%	5.77%	1.38%
10/30/2009	-6.67%	-6.79%	0.12%
11/30/2009	3.20%	3.14%	0.06%
12/31/2009	8.21%	8.05%	0.16%
1/29/2010	-2.81%	-3.68%	0.87%
2/26/2010	4.75%	4.50%	0.25%
3/31/2010	8.12%	8.14%	-0.02%

Top Performers in NQUSST: 3/31/09 - 3/31/10

The table below gives a breakdown at some of the top performers between March 31, 2009, and March 31, 2010. Given the rebalancing dates, we've also broken the table down into two separate time periods.

TOP 10 PERFORMERS IN NQUSST (3/31/09 - 9/30/09)		PRICE PERFORMANCE	
GGP	583%	REV	206%
DNDN	566%	ITMN	180%
GNW	529%	OCLR	149%
SOA	519%	ETM	133%
CNO	472%	EXXI	131%
GCI	469%	PWER	114%
MTG	422%	UAL	112%
TRW	420%	SKX	112%
MGM	417%	EWBC	110%
THC	407%	AHT	107%

Additional analysis below shows a number of statistics including average gain and average loss during the time period studied. The yearly average gain comparisons were NQUSST (23.06%) vs RU20INTR (21.69%). Largest yearly gain/loss statistics are also listed below.

	NQUSST	RU20INTR
Total Years	16	16
Average Gain	23.06%	21.69%
Average Loss	-16.23%	-12.89%
Largest Gain	52.59%	47.25%
Largest Loss	-37.07%	-33.79%

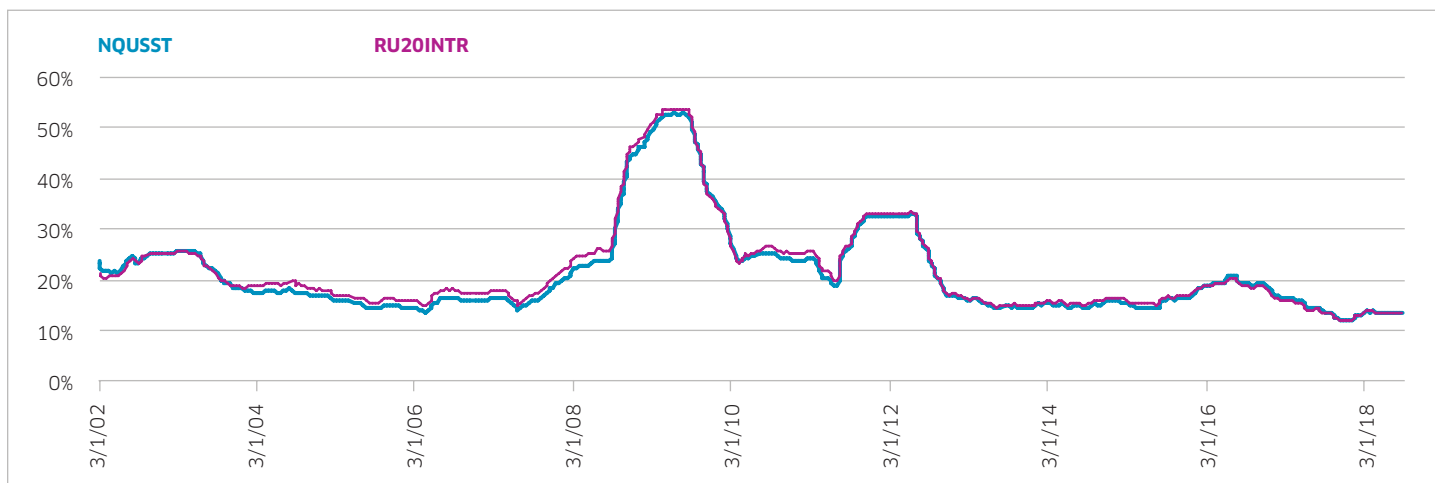
Rolling Returns (1 Year - Monthly)

The 12 month rolling return for each index is listed below. Both index lines separate much more often than during our previous study, which is not surprising given the outperformance NQUSST has displayed over RU20INTR. However, the similarity in returns is quite apparent.



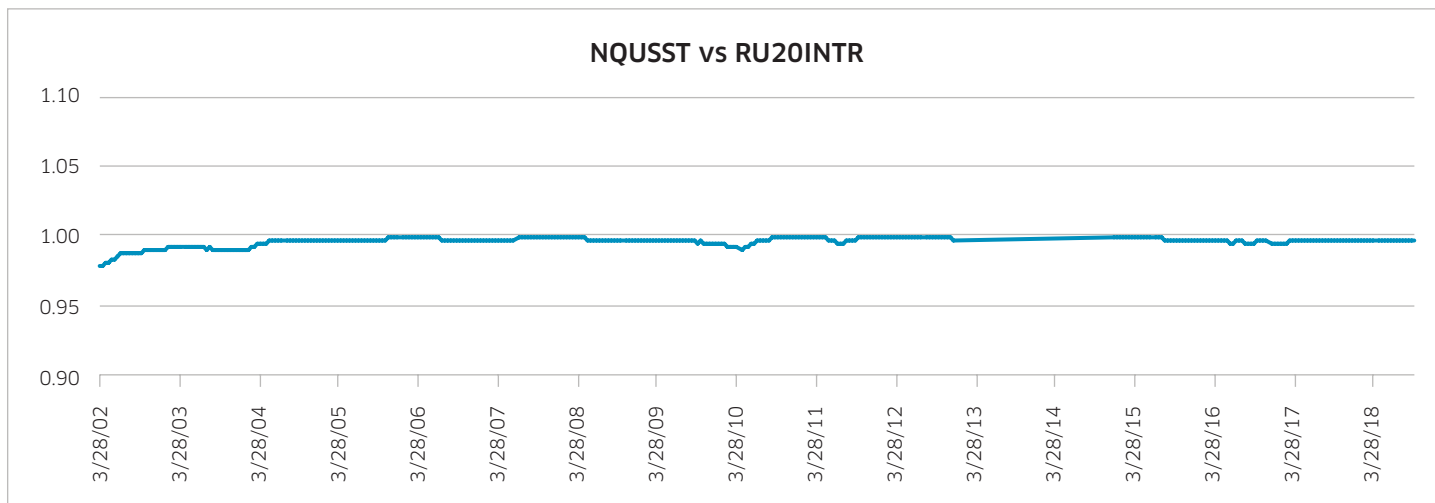
Rolling Volatility (1 Year - Daily)

One year rolling volatility (on a daily basis) was closely correlated. The range during our time frame studied was between roughly 10% and just over 50%. The peak on our graphic occurred during the financial crisis or shortly after due to the nature of the way rolling volatility is calculated. Currently, it's back near the lowest levels seen since 2005 just above 10%. Similarly to the returns shown above, historical volatility of each index is almost identical.



Rolling Correlation (1 Year - Daily)

A rolling correlation calculation tracks the consistency in returns between two indexes and continues to look back over the same time frame through the time period studied. The below chart is a rolling correlation (1 Year- Daily) between the NQUSST and RU20INTR. The rolling correlation chart between the two indexes helps confirm the similarities in price returns of each index during our time frame studied, which has historically remained right near 1.00 since 2002.



Daily Correlation & Beta

The Beta of NQUSST compared to RU20INTR was 0.97, while the correlation figure was 0.99. This helps confirm a few of our previous charts above that gave us the same visual.

INDEX COMPARISON	BETA	INDEX COMPARISON	CORRELATION
NQUSST vs RU20INTR	0.97	NQUSST vs RU20INTR	0.99

Conclusion

The research piece focused on two Nasdaq Indexes which collectively track all US equities and compared them to their Russell counterparts. The first index covered was the Nasdaq US Large Mid Cap TR Index (NQUSBLMT), followed by the Nasdaq US Small Cap TR Index (NQUSST). We provided some historical performance figures for each, and compared performance history and statistics with the Russell 1000 TR Index (RU10INTR) and the Russell 2000 TR Index (RU20INTR), respectively. The figures confirmed the Indexes are very correlated over the time period studied. We also confirmed both indexes have different methodologies, such as rebalancing policies, eligibility requirements, and historical allocations. These factors likely helped contribute to the differences in performance during certain years. Although each Nasdaq Index outperforms its Russell Index peer during our time frame studied, the other statistics shown (rolling correlation, volatility, etc.) point to the similarities and ability to substitute one index for the other.

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