

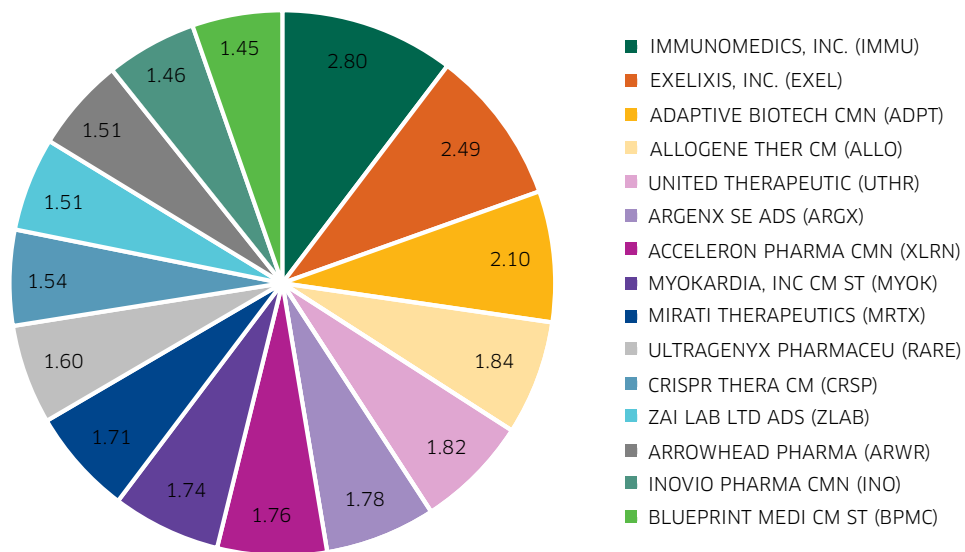
The Launch of Nasdaq Junior Biotech

The Nasdaq Junior Biotechnology Index (NBIJR) was launched on April 30, 2020, in the midst of the Coronavirus pandemic, perhaps the most consequential backdrop imaginable for the overall Biotech industry. NBIJR's methodology is rather straightforward, taking the existing membership of the Nasdaq Biotechnology Index (NBI) and limiting constituents by placing a cap on market capitalization of \$5bn. NBIJR most recently numbered 177 components (30 fewer than NBI), with the following derived constraints: minimum market capitalization of \$200MM; average daily trading volume of at least 100,000 shares; classified as Biotechnology & Pharmaceuticals by ICB (Industry Classification Benchmark); and Nasdaq-listed. The index is modified market capitalization-weighted such that constituents are capped at 8% (for the top 5) and at 4% (for the remaining) at each quarterly index rebalance. The entire index is reviewed and reconstituted annually in December, which is also the reference date for the \$5bn maximum market cap screen.

Let's examine how NBIJR has performed in the recent past and what its components look like today, followed by a consideration of the drivers of future performance - all in the context of the Coronavirus pandemic.

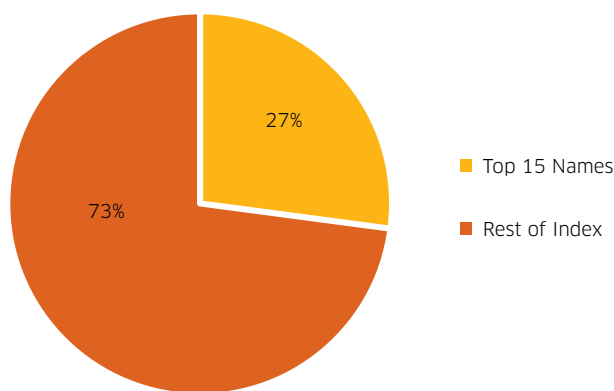
Current Composition

NBIJR: Top 15 Index Weights



(As of June 30, 2020)

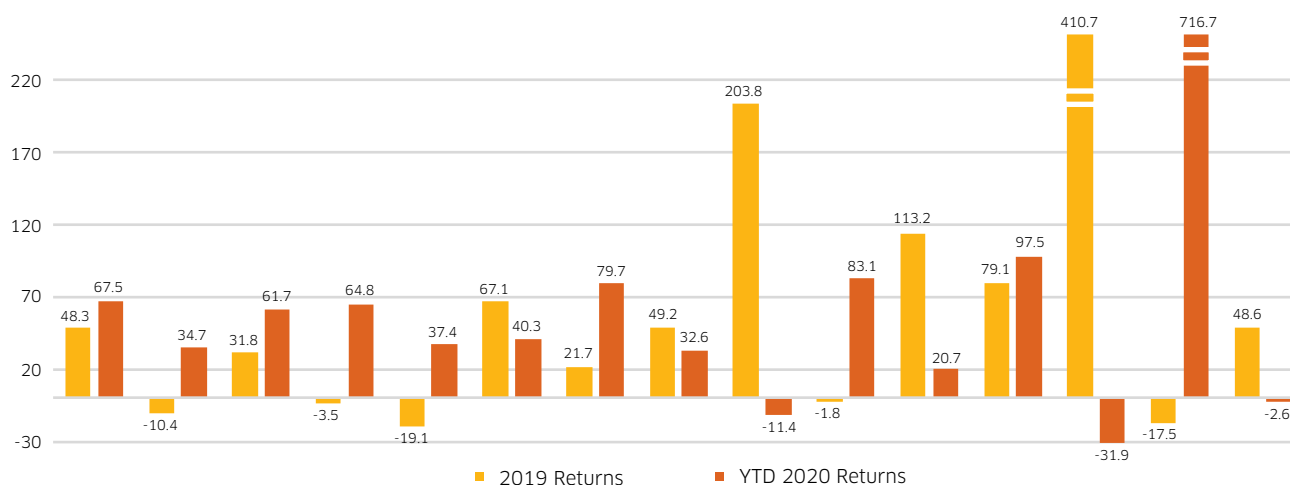
NBIJR: Top 15 vs. Rest of Index



(As of June 30, 2020)

As of the end of June 2020, of the 177 constituents in NBIJR, the top 15 represented 27% of the index weight. The top 30 names represented approximately 47%, and the top 5 represented 11%. The largest of these was Immunomedics (IMMU), with a market cap of \$8.2bn, followed closely by Exelixis (EXEL/\$7.3bn), and Adaptive Biotech (ADPT/\$6.2bn) – the only constituents with weights exceeding 2%. Their YTD returns were 67.5%, 34.7%, and 61.7%, respectively. The majority of constituents in the top 15 have seen positive YTD returns in the context of the Coronavirus pandemic, with an average YTD return of nearly 86% as of June 30, 2020. Only Mirati Therapeutics (MRTX) and Arrowhead Pharma (ARWR) have registered negative YTD returns thus far. Most notably, the clear standout has been Inovio Pharmaceuticals (INO, up over 700%) thanks to its efforts in developing a DNA-based vaccine for Covid-19.

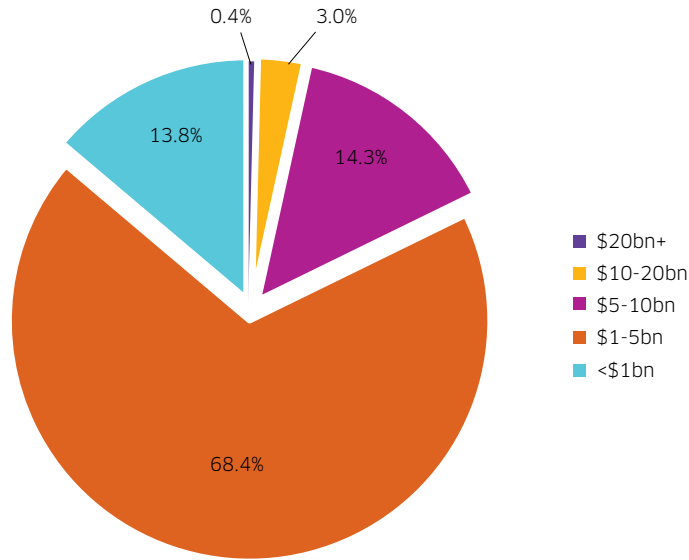
NBIJR: Top 15 2019 vs. 2020 YTD Returns (%)



(As of June 30, 2020)

In terms of market capitalization for the overall group, the average was \$2.0bn, while the weighted average was \$3.5bn. Conversely, the median was only \$1.2bn. This is reflective of the substantial representation of smaller stocks in the index, with 80 components under \$1bn of market cap comprising 14% of the index weight.

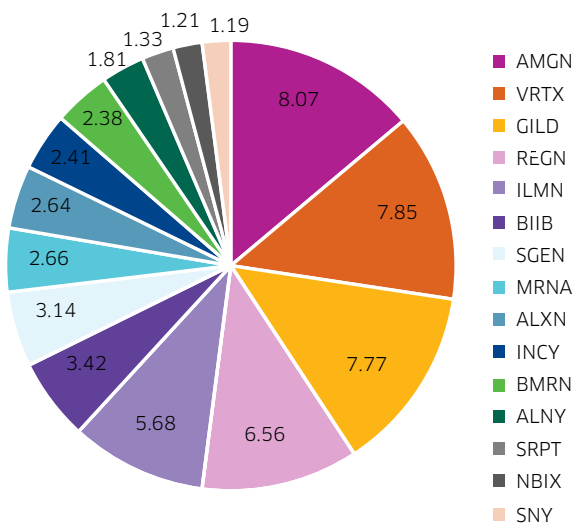
NBIJR: Index Weight by Market Cap



(As of June 30, 2020)

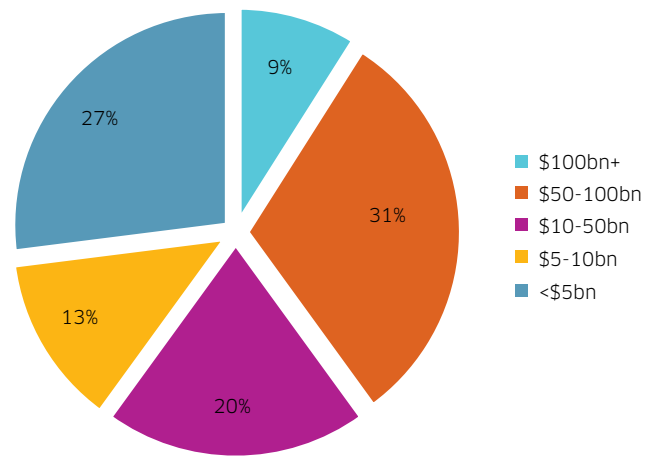
(As a point of comparison, below we show the NBI weight distribution by market cap as well as its top 15 constituents, illustrating the much larger size skew at the upper end of the biotech spectrum.)

NBI: Top 15 Index Weights



(As of June 30, 2020)

NBI: Index Weight by Market Cap

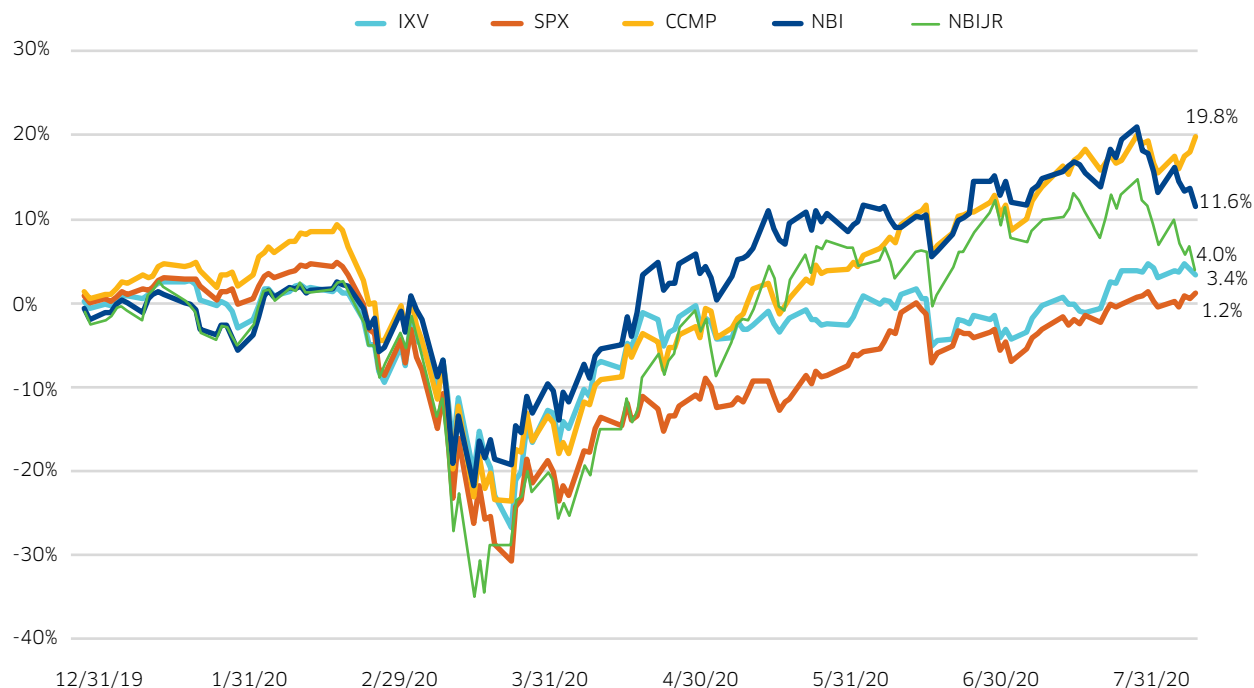


(As of June 30, 2020)

Recent Performance

NBIJR is up 4% YTD through July 31, 2020, and 5.9% since official launch on April 30, 2020.

YTD 2020 NBIJR Performance vs. NBI & Benchmarks



(Performance through July 31, 2020)

R&D Intensity

As one might reasonably expect, constituents of NBIJR tend to engage in above-average levels of Research & Development. For the group as a whole, R&D expense totaled \$19.6bn in 2019, a stunning 63% of these companies' total revenues - vs. "only" 28% on an equivalent basis for NBI. (As a reference point, weighted average R&D expense, as a percentage of total sales, was 10.5% for the Nasdaq-100, and 4.8% for the S&P 500 in 2019.) To some extent, this is a distorted measure to consider given that over 20% (37) of these firms did not record any revenues in 2019; 42 of NBIJR constituents IPO'ed in either 2018 or 2019, contributing to roughly half of this population of zero-revenue companies. Even for those that did report some level of sales, 73 (more than 40% of the constituent count of the index, totaling nearly 47% of the index weights) of them recorded R&D expense that exceeded their revenues - clearly an indicator of the unique business models at play in the space. Inovio serves as a useful example of the tradeoffs investors accept with Biotech: R&D expenses in 2019 totaled \$95MM, far exceeding revenues of \$4MM. Yet that wager on future revenue has already paid off handsomely, to the tune of \$4.3bn in market capitalization as of June 30, 2020. Its investment in DNA vaccine technology has positioned Inovio as one of the leading candidates for an eventual Covid-19 vaccine.

Summary

The Coronavirus pandemic continues to pose significant risks to both the macroeconomic and physical health of the entire planet. The Nasdaq Biotechnology Index, the universe on which the Nasdaq Junior Biotechnology Index is based, currently captures 30 additional companies with far greater market capitalizations, and accordingly, much larger individual weights at the top end. On the other hand, the Nasdaq Junior Biotechnology Index – with its greater emphasis on smaller, less mature companies – represents more of a pure play on biotech R&D. NBI's weightings among these more established firms exceed 70% of the index, while NBIJR is somewhat of a mirror image with more than 80% of its weightings driven by sub-\$5bn firms. (Numbers as of June 30, 2020. Please note, market cap screens are applied once annually, allowing companies that have exceeded the threshold to potentially remain in the index for many months.) As a result of this straightforward limit on market capitalization, NBIJR offers a less concentrated, but ultimately more speculative, way to track companies driving the future of the biotech industry.

For further reading on NBI and the biotech industry more generally, please find our long-form research paper here: <https://www.nasdaq.com/articles/biotech-in-the-age-of-coronavirus-2020-07-13>

ETFs currently tracking NBIJR include the Defiance Nasdaq Junior Biotechnology ETF (Nasdaq: IBBJ).

Sources: Nasdaq Global Indexes, FactSet, Bloomberg.

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