

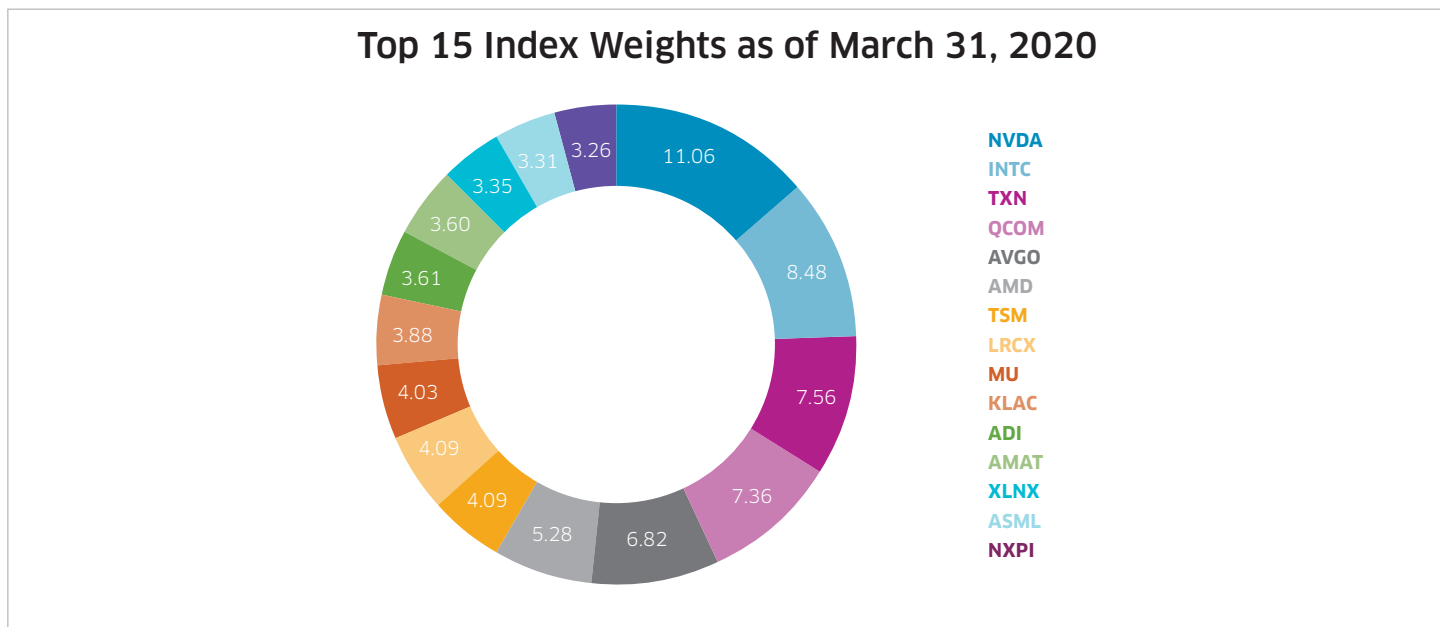
Hardware Powerhouse:

Semiconductors Revisited

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The PHLX Semiconductor Index (SOX) was launched on December 1, 1993, and has enjoyed a storied history, becoming one of the best-known and most widely-tracked subsector indexes. During the 2010s, SOX returned 513% on a total return basis, besting even the Nasdaq-100 Index which soared 426%. Its constituent basket consists of the top 30 securities by market capitalization in the semiconductor industry, and its relatively straightforward methodology has a modified market cap-weighting with a quarterly rebalancing schedule. Constituents need not be listed on The Nasdaq Stock Market (NYSE-listed names are also permitted), but do need to meet minimum requirements for market cap (\$100MM) and liquidity (1.5MM shares traded in each of the last 6 months). Let's review how SOX has performed in the recent past and what its components look like today.

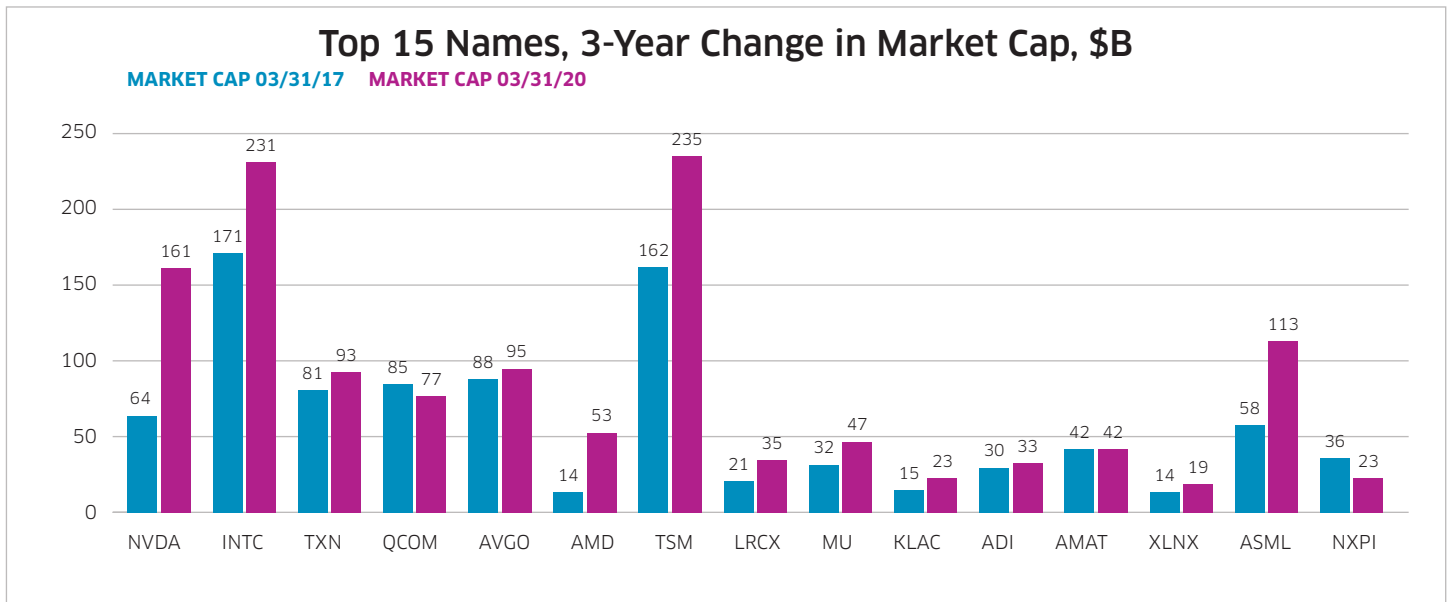
Current Composition



Of the 30 constituents in SOX, the top 15 represented 80% of the index weight as of the end of 1Q'20. The top 10 names represented approximately 63%, while the top 5 represented 42%. The largest of these was NVIDIA Corporation (NVDA), whose outsized weighting was a function of its 12% positive return YTD. Every other constituent's YTD return was negative, with an average loss of almost 22%. The second largest constituent - Intel (INTC) - was considerably larger by market capitalization (\$231Bn vs. NVDA's \$161Bn), but its quarterly return was

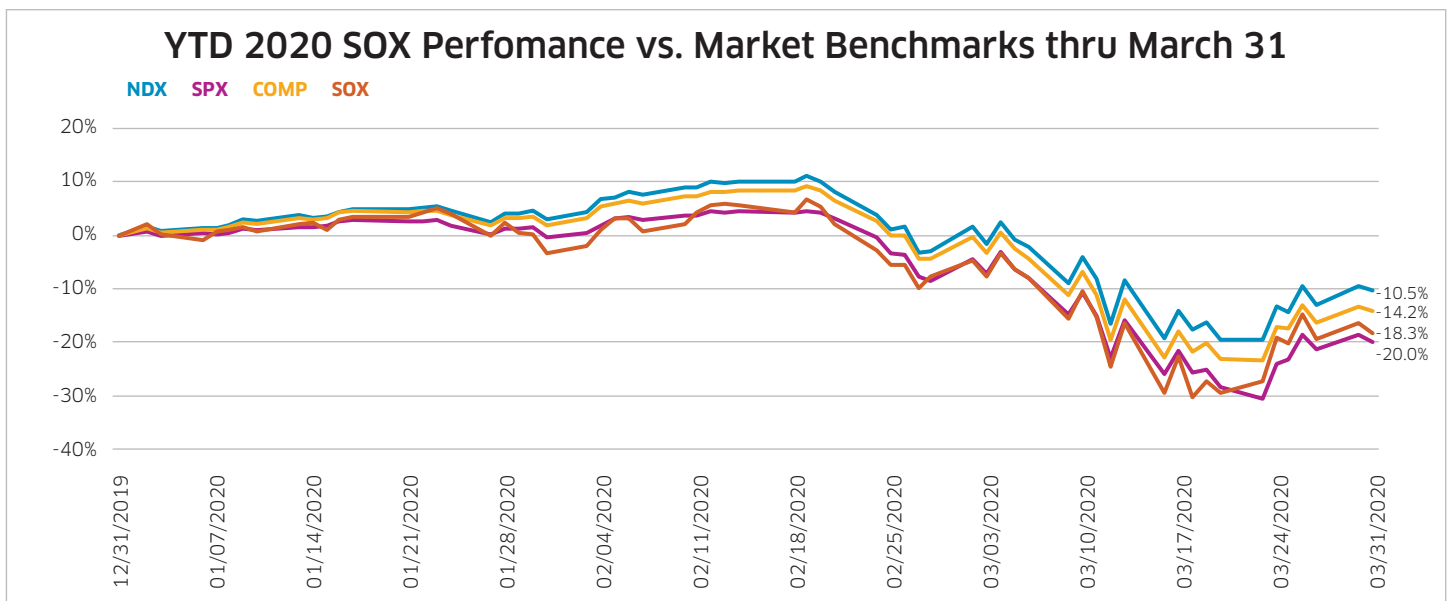
-9.6%. Since they both began the period with weights capped at 8%, NVDA's performance differential of 22% drove its weighting proportionally higher.

In terms of market capitalization for the overall group, the average was \$46.7Bn, while the weighted average was \$83.3Bn. The median was \$17.8Bn. For the same group of companies, the average market cap was \$33.7Bn on March 31, 2017, with a median of \$14.7Bn.¹ Thus on average, market caps grew by 38%, while the median increased by 22%, over this three-year period. NVDA's increased by 151%, second only to Advanced Micro Device (AMD)'s 289% increase. Of these 30 companies, only 5 registered a decrease in market cap over the entire 3-year period, despite the material pullbacks observed across the financial markets in 1Q'20.



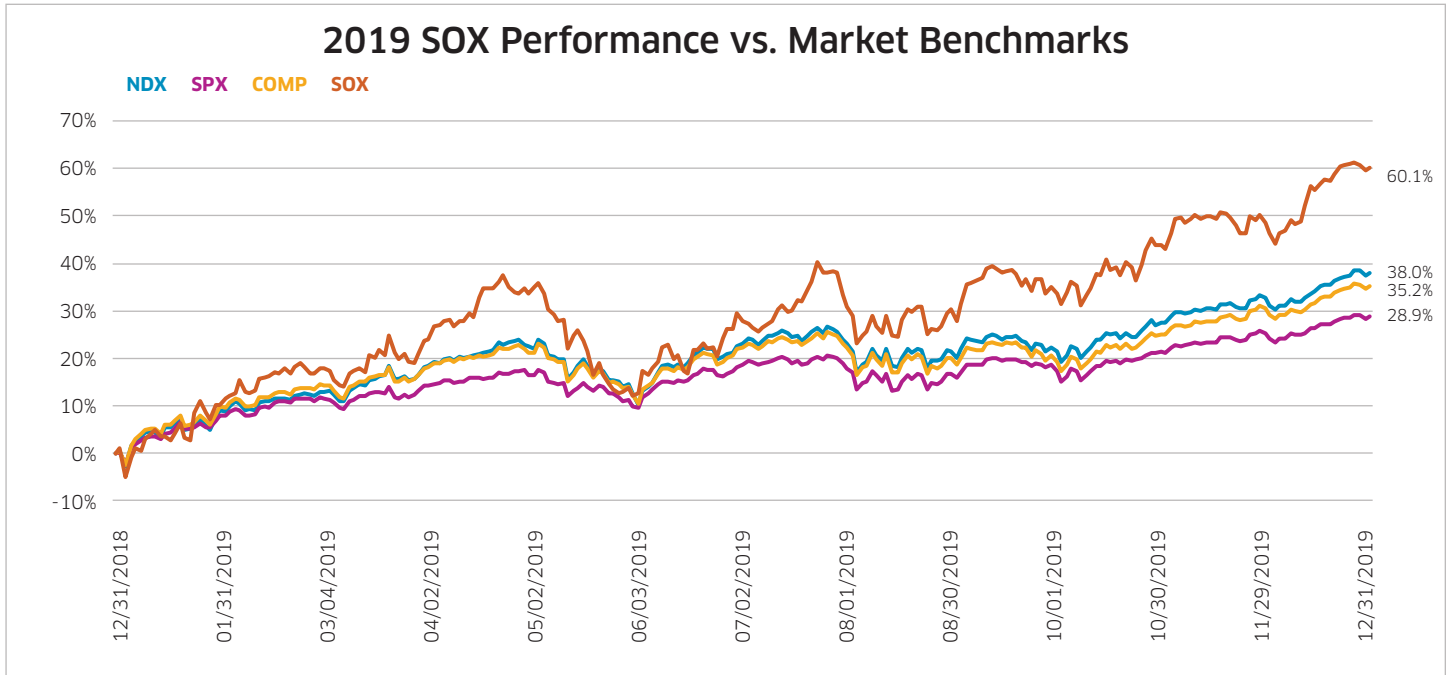
Recent Performance

SOX underperformed both the Nasdaq-100 (NDX) and the broader Nasdaq Composite (COMP) in the first quarter of 2020, with a loss of 18.3% (price-return basis). That still, however, was good enough to beat the S&P500 (SPX) by almost 200 basis points.

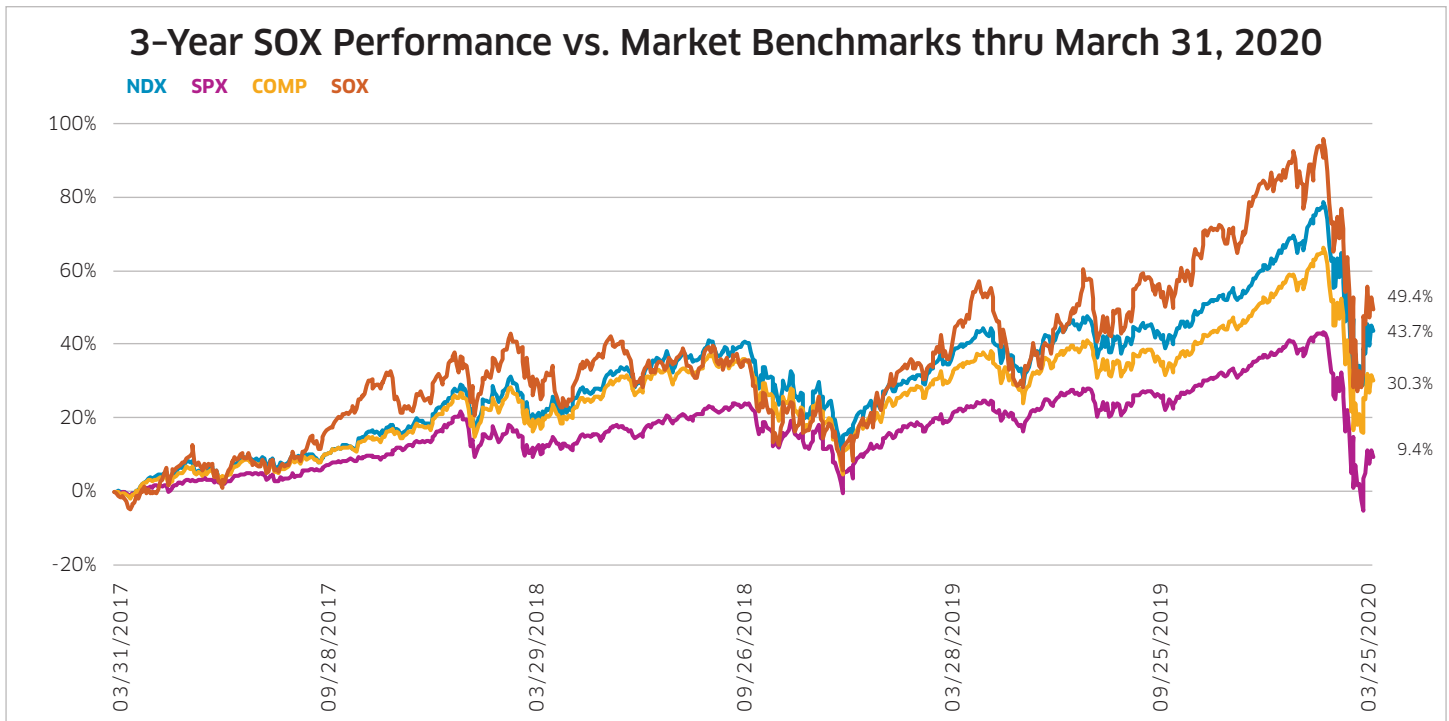


1. Note: only 6 out of the 30 firms analyzed were not also SOX constituents on March 31, 2017. The average and median for the index constituents on that date were not materially different - \$32.5Bn and \$13.2Bn, respectively.

Unlike in the first quarter of 2020, full-year performance in 2019 was incredibly strong, more than doubling the S&P500 and easily outpacing both the Nasdaq-100 and the Nasdaq Composite.

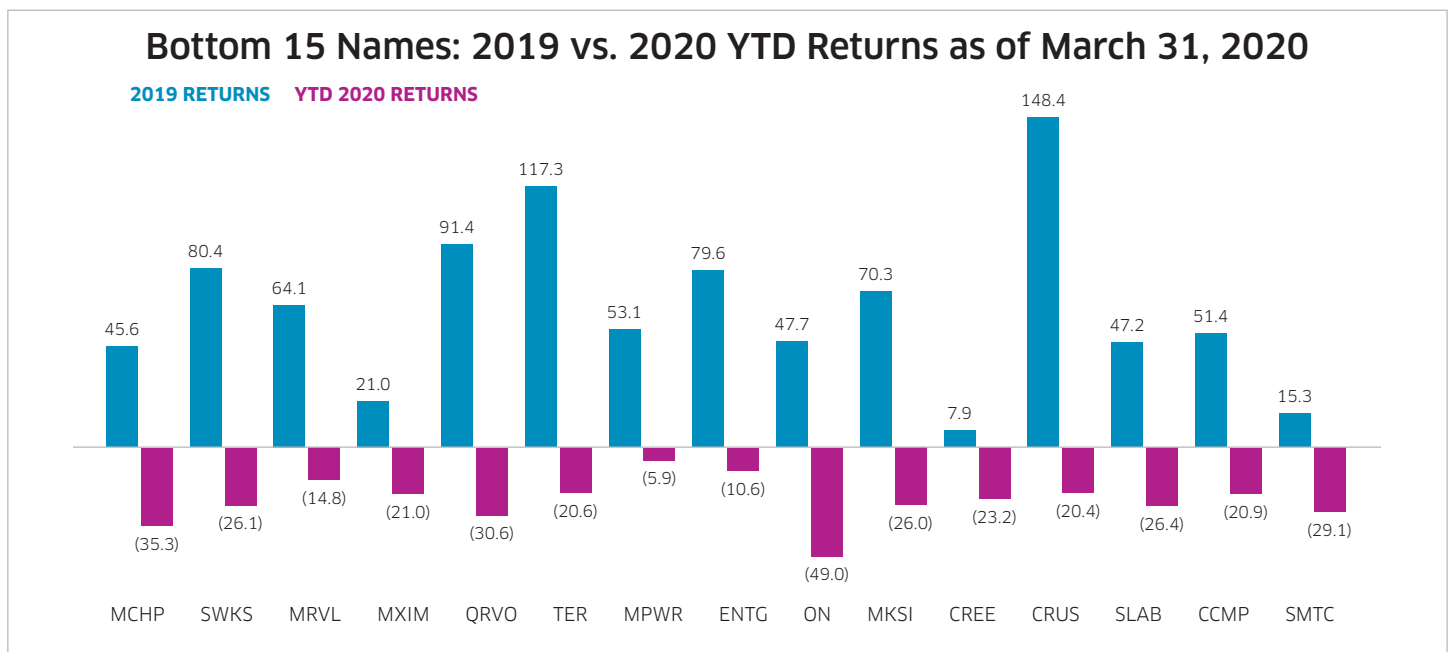
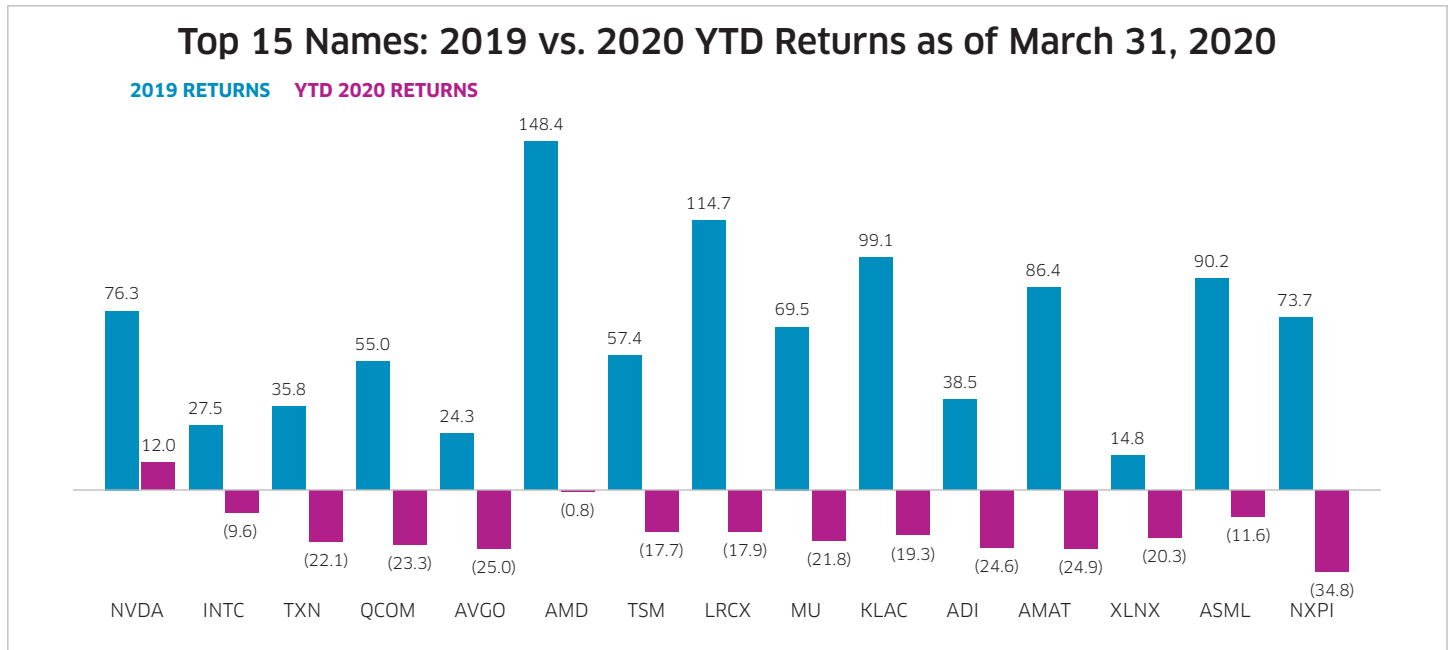


Putting it all together, SOX leads all 3 benchmarks on a trailing 3-year basis, and has outperformed the S&P500 by 40% (approximately 5x) on a price-return basis.



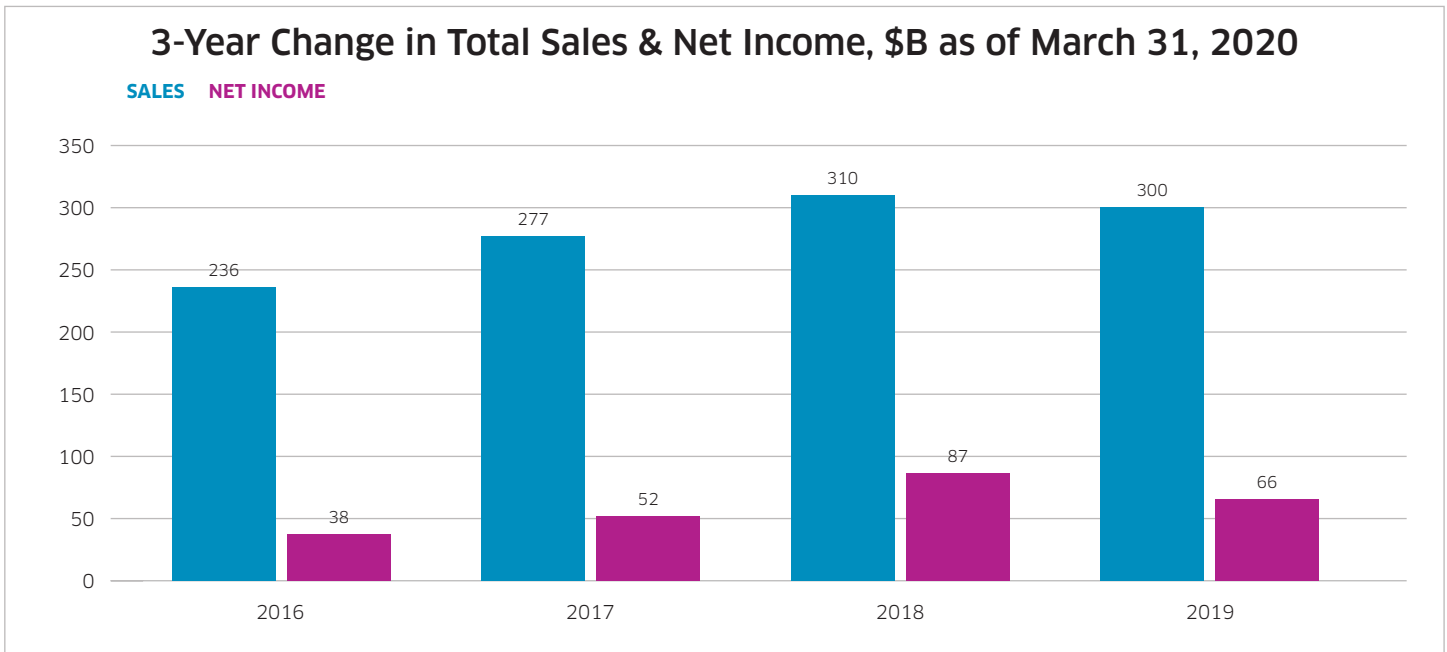
Year-Over-Year Performance Drivers

As one can easily see in the charts below, performance differentials were consistently wide across all constituents from this year versus 2019, with an average drop in performance of 86% and a minimum decrease of 31%. Even NVDA, the one constituent in the green so far in 2020, is on pace to substantially underperform its 2019 returns. The severity of the return differential did not vary much across firm size, as the top 15 constituents by Index Weight were down by almost as much as the Bottom 15 (85% vs 87% YoY average return differential).

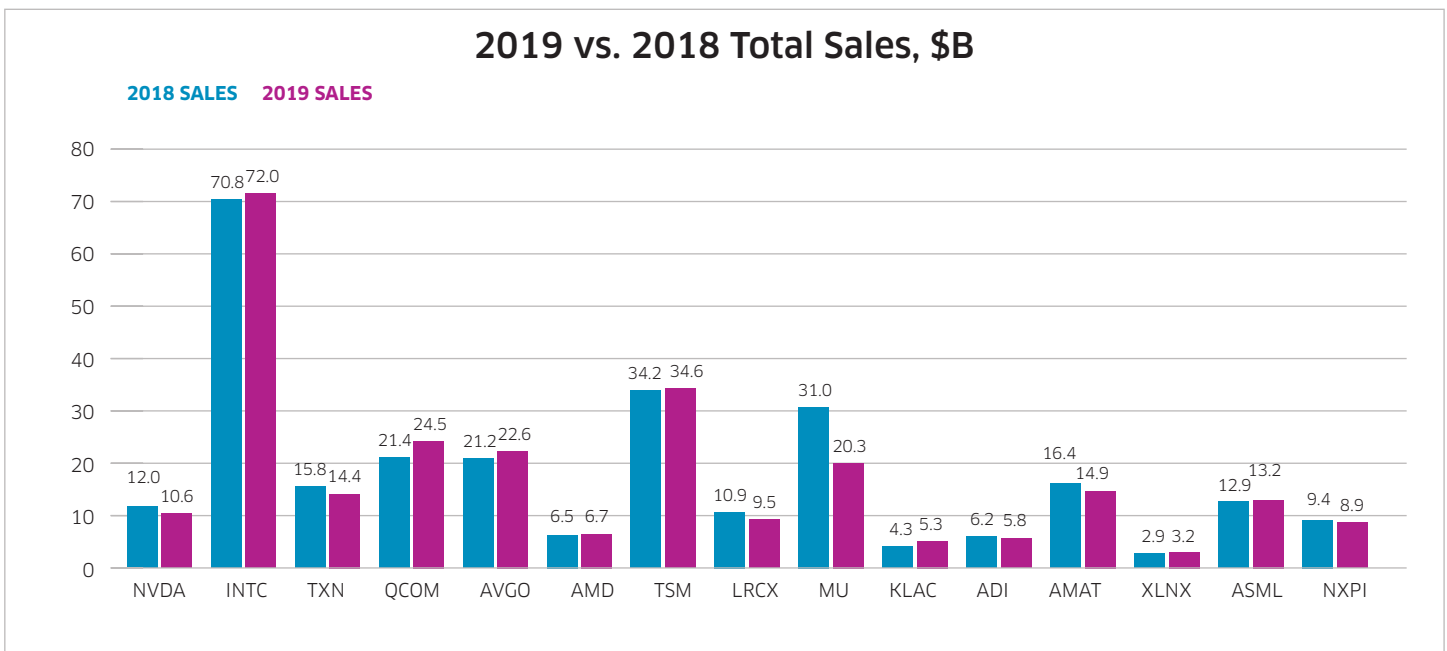


What drove SOX's stellar performance in 2019 and in years prior? These semiconductor firms have been riding a wave of increasing demand for their products, which power an ever wider array of devices thanks to the rise of Cloud Computing and the Internet of Things (IoT). As more devices connect to the cloud, there will continue to be a

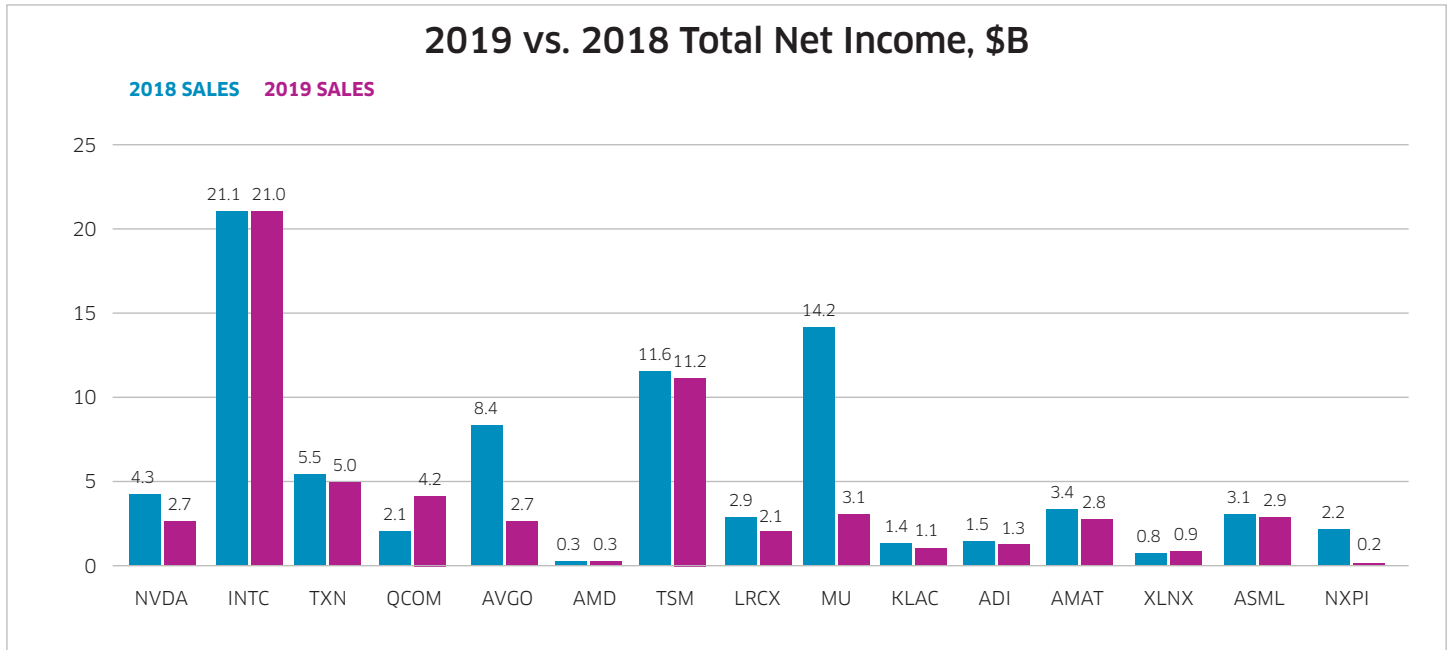
need for ever smaller and more powerful computer chips and processors. Continuous advances in mobile phones, gaming and media entertainment, cryptocurrency, and new machinery such as drones, robots, and autonomous vehicles will spur further innovation in this competitive field. With that comes growing revenues, but also the necessity of ongoing investment in raw manufacturing capacity as well as research and development. Over the past three years, global sales for SOX firms have grown by a rate of nearly 8% compounded annually – despite a slight dip in 2019. Global net income, meanwhile, has grown by nearly 20% compounded annually – even with a notable drop in 2019.



Looking again at the Top 15 names by Index Weight, we can see that the drop in Sales in 2019 was primarily driven by one firm – Micron Technologies (MU):

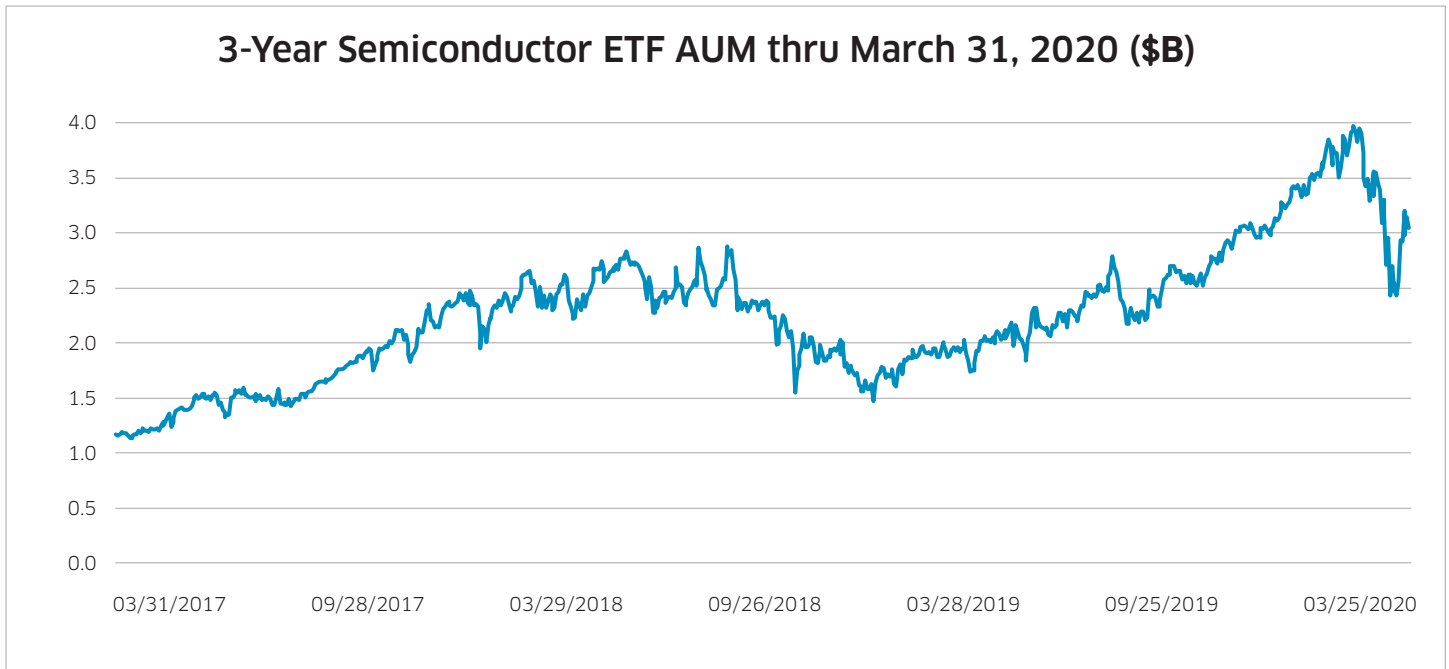


In terms of Net Income, it's a similar story - Micron drove more than half of the group's overall decline, with Broadcom (AVGO) contributing almost one-third. Together, the 2 firms were responsible for 80% of the \$21Bn YoY decrease.



SOX ETF Assets

Finally, we look at how assets under management (AUM) have grown over the last 3 years within the exchange-traded product universe tracking SOX, including the iShares PHLX Semiconductor ETF and the Direxion Daily Semiconductor 3x Bull / 3x Bear Shares ETFs. Prior to the most recent downturn, AUM peaked at almost \$4Bn in February 2020, which was more than three times larger than our reference point from the end of 1Q'17.



Summary

SOX continues to demonstrate its importance as one of the most widely-followed subsector indexes. Similar to the Nasdaq-100, it has outperformed broader market benchmarks such as the S&P500 and the Nasdaq Composite in recent years, despite being less diversified on a sector basis. It tracks constituent firms that are both household names (e.g. Intel) as well as the lesser-known, but equally vital players in the Tech ecosystem. It is heavily tilted towards US firms, but not restricted by geography. Taiwan Semiconductor and NXP Semiconductors, among others, are US-listed, foreign companies with substantial weights in the index. There is ultimately very strong overlap with the Nasdaq-100; 17 of the index's 30 constituents did so as of March 31, 2020, representing 83% of SOX's index weights. Given the Nasdaq-100's global reputation for innovation-leading, high-growth companies, it should thus come as no surprise that SOX ranks highly in performance when compared to many other leading index benchmarks.

ETFs currently tracking SOX include the iShares PHLX Semiconductor ETF (Ticker: SOXX), the Direxion Daily Semiconductor Bear 3x Shares (Ticker: SOXS), the Direxion Daily Semiconductor Bull 3x Shares (Ticker: SOXL) and in Asia, the Cathay U.S. PHLX Semiconductor Sector ETF (Ticker: 00830), listed in Taiwan.

Sources: FactSet, Bloomberg, Nasdaq Global Indexes.

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