

PHLX Semiconductor Sector Index™

Investing in the Next Generation of Technology Innovators

 Nasdaq | REWRITE TOMORROW

Acceleration in Demand Due to Covid-19

ComputerWeekly.com IT Management Industry Sectors Technology Topics Search Computer Weekly

MarketWatch Latest Coronavirus Watchlist Markets Investing Barron's Personal Finance Economy Retire

Videogames are a bigger industry than movies and North American sports combined, thanks to the pandemic

Last Updated: Jan. 2, 2021 at 10:27 a.m. ET
First Published: Dec. 22, 2020 at 11:36 a.m. ET


By Wallace Witkowski

COVID-19 lockdowns expected to help global gaming sales rise 20% to nearly \$180 billion in 2020, and experts don't see growth taking a hit in 2021 after release of next-gen Playstation, Xbox



Sources: MarketWatch, The Verge.

1. <https://www.marketwatch.com/story/videogames-are-a-bigger-industry-than-sports-and-movies-combined-thanks-to-the-pandemic-11608654990>
2. <https://www.theverge.com/2021/1/11/22225356/pc-sales-shipments-2020-growth-idc-canalys-remote-work>



Smartphone industry roars back in Q4 2020 as iPhone propels Apple to new heights

The past 12 months as a whole may have been challenging for the smartphone industry, but the industry enjoyed an end-of-year renaissance driven by a staggering \$66bn worth of iPhone sales

The PC market just had its first big growth in 10 years

The PC is far from dead


By Tom Warren | @tomwarren | Jan 11, 2021, 2:33pm EST

f t SHARE



Photo by Amelia Holowaty Krates / The Verge

CNBC MARKETS BUSINESS INVESTING TECH POLITICS CNBC TV WATCHLIST PRO



AUTOR

How Covid led to a \$60 billion global chip shortage for the auto industry

PUBLISHED THU, FEB 11 2021 7:17 AM EST

Michael Wayland @MICHAELWAYLAND

SHARE f t in

KEY POINTS

- Automakers are expected to lose billions of dollars in earnings this year due to a shortage of highly important semiconductor chips.
- Consulting firm AliPartners expects that the shortage will cut \$60.6 billion in revenue from the global automotive industry this year.
- Semiconductor chips are used in new vehicles for areas including infotainment systems, power steering and brakes.

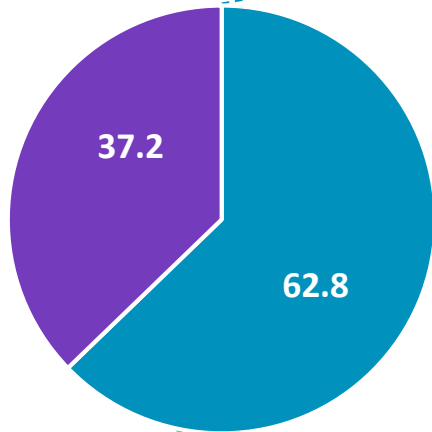
Sources: CNBC, ComputerWeekly.com

1. <https://www.cnbc.com/2021/02/11/how-covid-led-to-a-60-billion-global-chip-shortage-for-automakers.html>
2. <https://www.computerweekly.com/news/252495507/Smartphone-industry-roars-back-in-Q4-2020-as-iPhone-propels-Apple-to-new-heights>

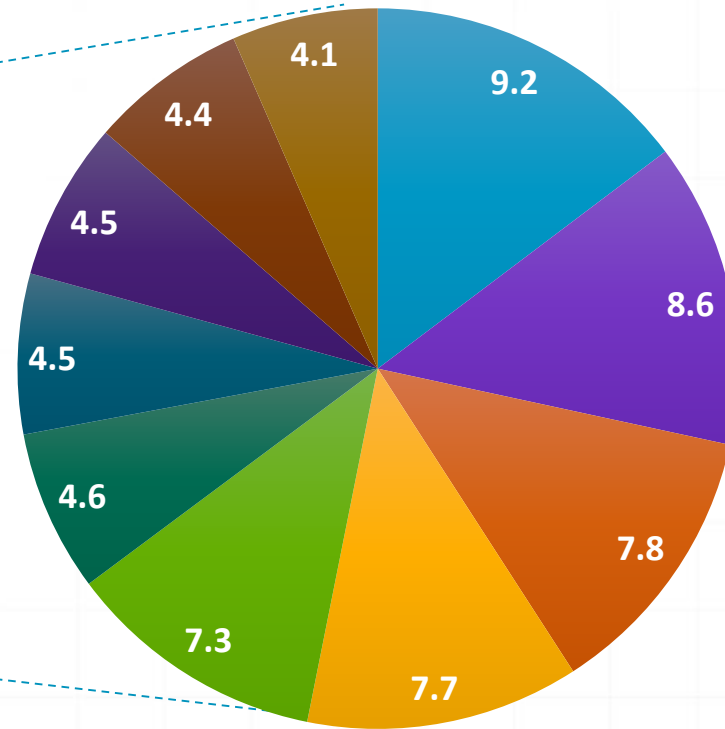
SOX™ Index Composition

Top 10 Index % Weights as of May 28, 2021

Top 10 vs. Rest of Index



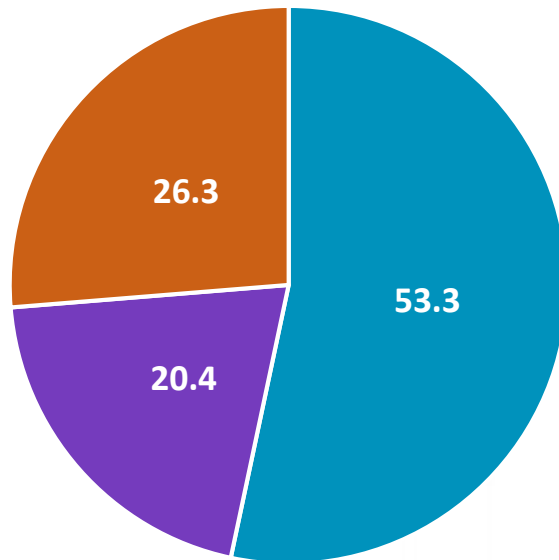
■ Top 10 ■ Rest of Index



- NVIDIA CORPORATION
- TEXAS INSTRUMENTS
- BROADCOM INC.
- QUALCOMM INC
- INTEL CORP
- APPLIED MATERIALS
- NXP SEMICONDUCTORS
- LAM RESEARCH CORP
- ASML HLDG NY REG
- ANALOG DEVICES CMN

Market Cap/Subsector/Globality Profile

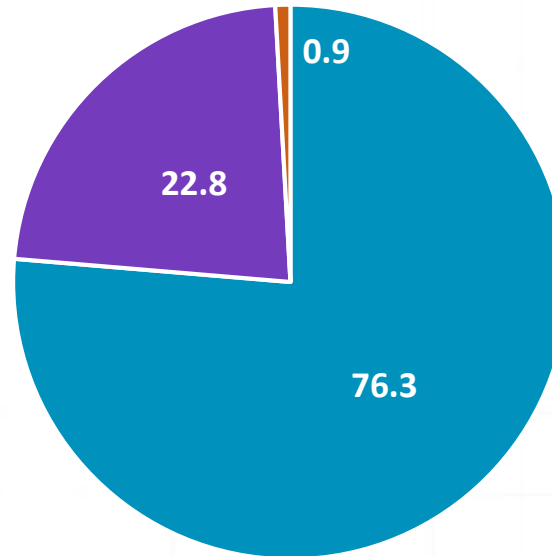
Index % Weights by Market Cap



- \$100B+
- \$50~100B
- <\$50B

of \$100B+ Companies: 5
 # of \$50-100B Companies: 12
 # of <\$50B Companies: 13

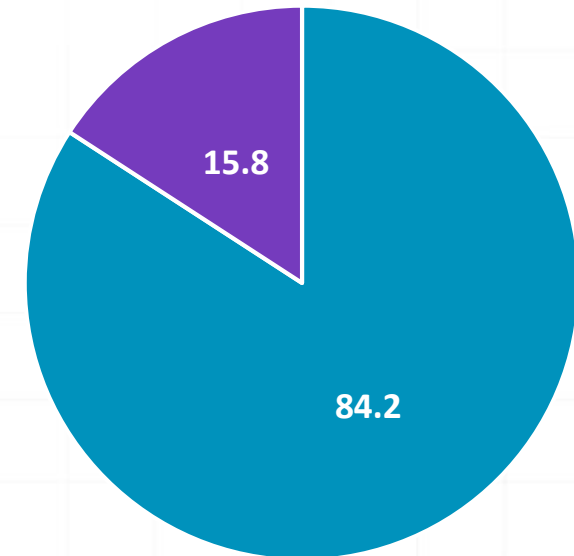
Index % Weights by ICB Subsector



- Semiconductors
- Production Technology Equipment
- Electronic Equipment: Control and Filter

of Semiconductors: 20
 # of Other Subsectors: 10

Index % Weights by Domicile Country



- US
- International

of US-Domiciled: 26
 # of International: 4

SOX vs. Competitors: Highlights

Index Name	Index Ticker	Weighting Description	Weighting Constraints	Industry Classification	Launch Year	Count	Listing Venue
PHLX Semiconductor Sector Index	SOX	Modified Market Cap-Weighted	8% cap for Top 5; 4% cap for rest	ICB: Semiconductors and Production Technology Equipment	1993	30	Nasdaq/ NYSE/ CBOE
MVIS US Listed Semiconductor 25 Index	MVSMHTR	Modified Free Float Market Cap-Weighted	4.5%/20%/50% capping*	At least 50% revenues from Semiconductors and semiconductor equipment	2011	25	Nasdaq/ NYSE/ CBOE
ICE Semiconductor Index	ICESEMI	Modified Float Market Cap-Weighted	8% cap for Top 5; 4% cap for rest	ICE: Semiconductors	2021	30	Nasdaq/ NYSE/ CBOE

* Small weights stock 0~4.5%; large weights stock 5~20%; split between small and large weights groups 50%:50%

SOX vs. Competitors: Methodology Details

Index Name	Index Ticker	Reconstitution Schedule	Rebalance Schedule	Minimum Market Cap Constraints	Minimum Liquidity Constraints
PHLX Semiconductor Sector Index	SOX	Annually in September	Quarterly in Mar., Jun., Sept. Dec.	\$100M	1.5M shares in each of 6 months including reference date
MVIS US Listed Semiconductor 25 Index	MVSMHTR	Semi-annually in March and September	Quarterly in Feb., May, Aug., Nov.	\$150M	250k shares per month and \$1M average daily dollar trading volume in each of 6 months
ICE Semiconductor Index	ICESEMI	Annually in September	Quarterly in Mar., Jun., Sept. Dec.	\$100M	1.5M shares in each of 6 months including reference date

MVIS Semiconductor Index (SMH) vs. SOX Overlap

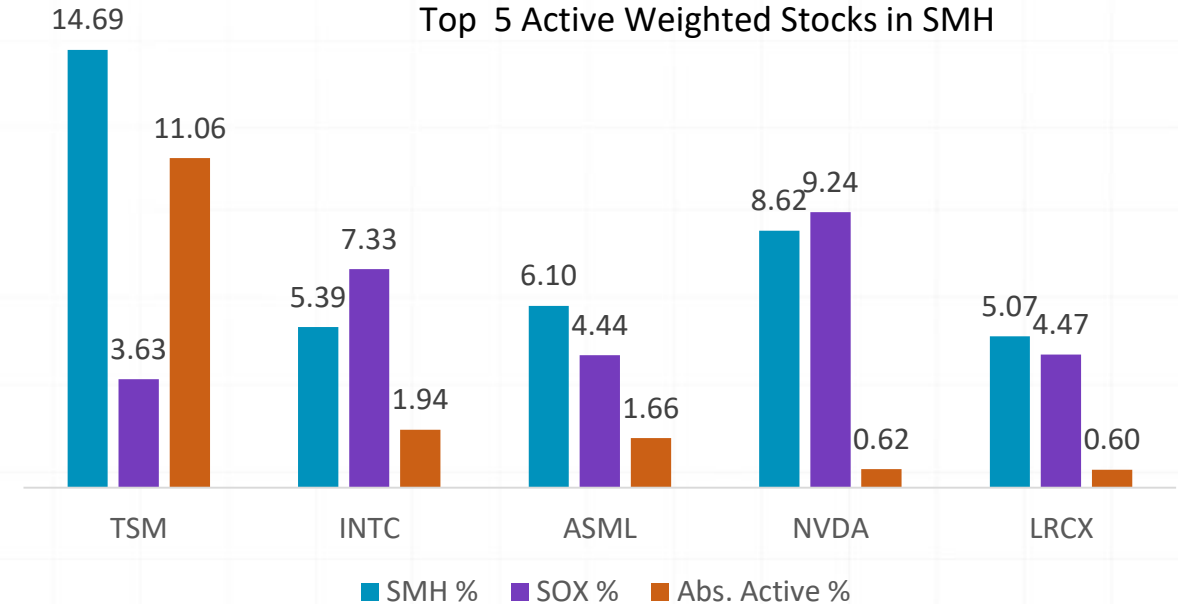
SMH Only:

Symbol	Company Name	SMH %	SOX %
XLNX	Xilinx Inc	2.36	-
CDNS	Cadence Design Systems Inc	2.25	-
STM	Stmicroelectronics Nv	2.00	-
MXIM	Maxim Integrated Products Inc	1.82	-
OLED	Universal Display Corp	0.70	-

	% Weight	# Security
SMH Only	9.1	5
Overlapping in SMH	90.9	20
Overlapping in SOX	91.9	20
SOX Only	8.1	10

SOX Only:

Symbol	Company Name	SMH %	SOX %
MPWR	MONOLITHIC POWER SYS	-	1.31
ENTG	ENTEGRIS INC	-	1.31
IPGP	IPG PHOTONICS CORP	-	0.95
CREE	CREE, INC.	-	0.94
MKSI	MKS INSTRUMENTS INC	-	0.88
BRKS	BROOKS AUTOMATION	-	0.64
LSCC	LATTICE SEMICOND	-	0.61
IIVI	I I V I INC	-	0.60
SLAB	SILICON LABS INC	-	0.51
CCMP	CMC MATERIALS, INC.	-	0.38



Performance Since Inception of ICESEMI Backtest

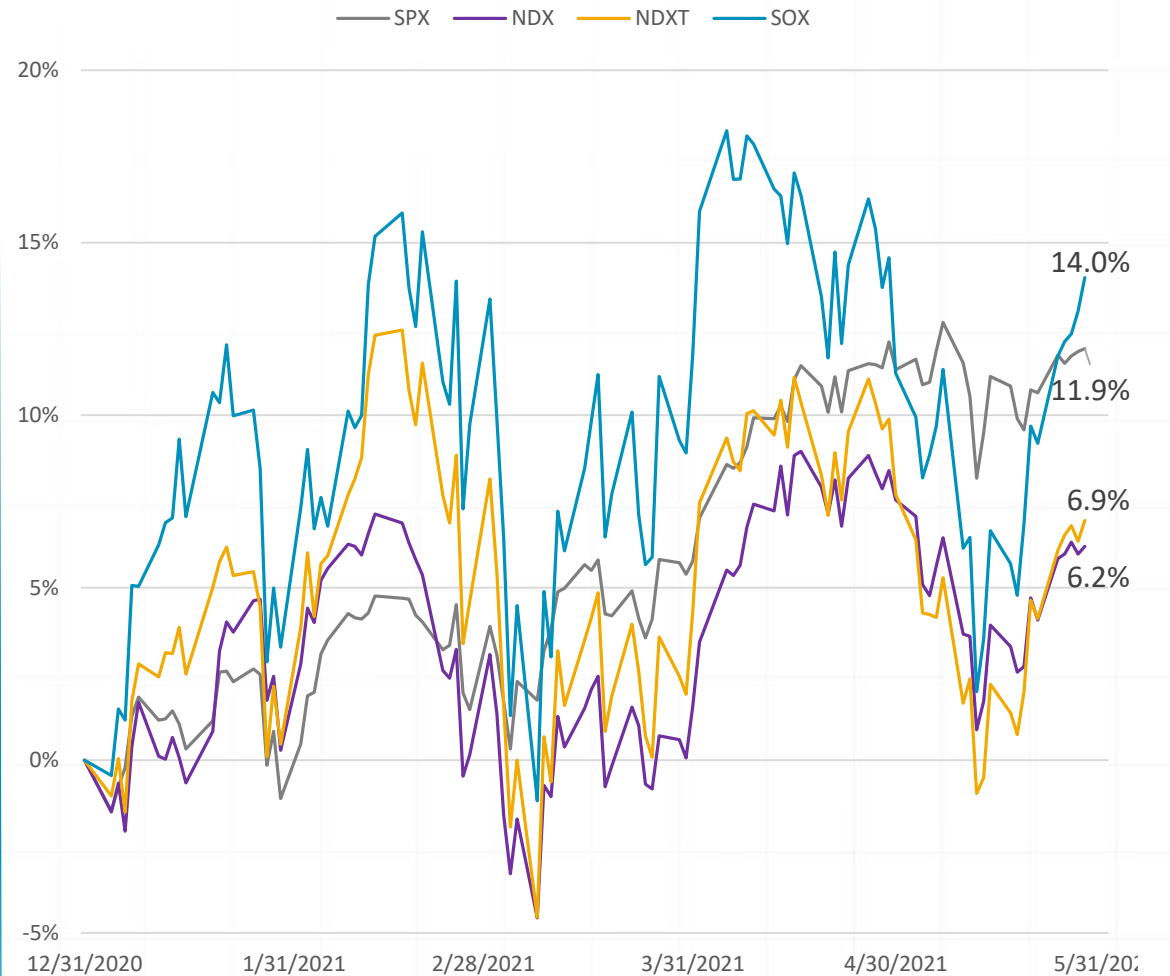


YTD 2021 Performance

Total Return Performance vs. Competitor Indexes

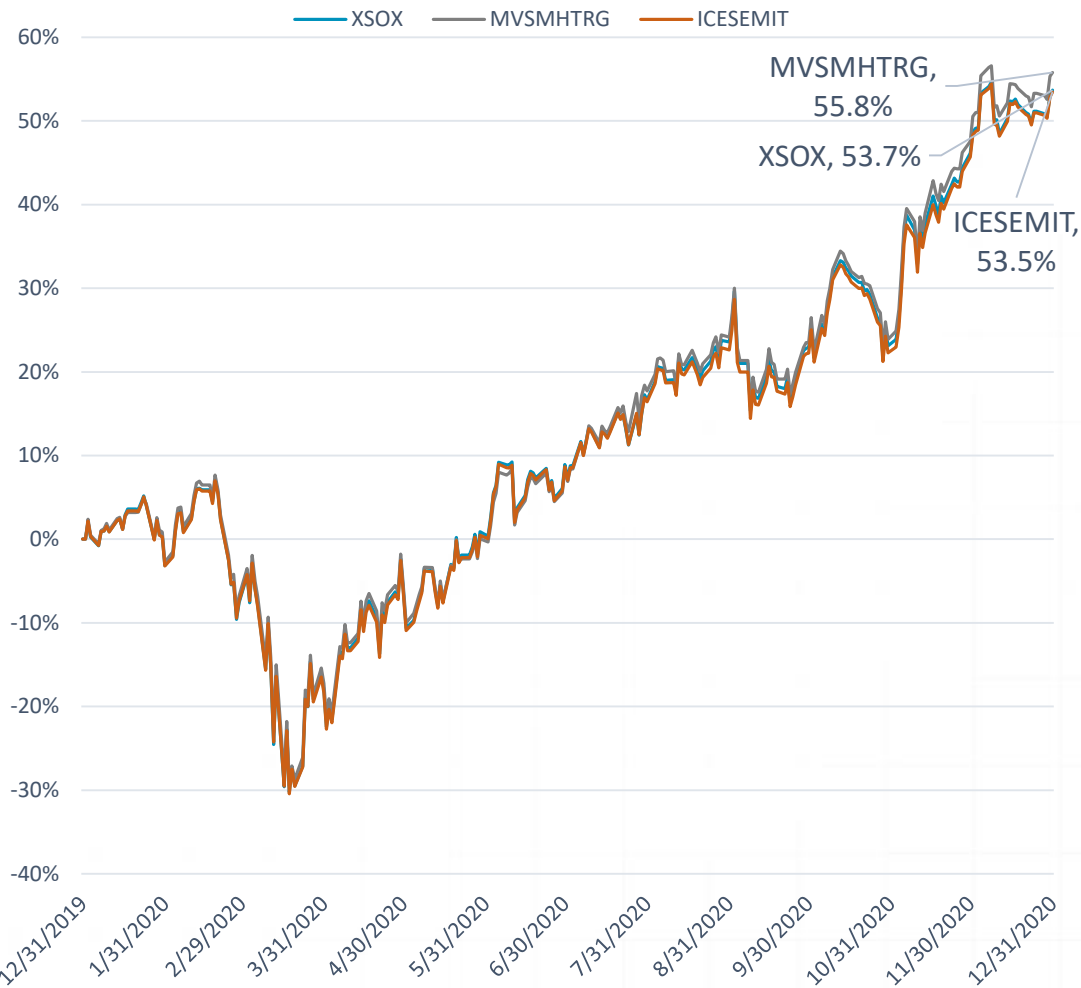


Price Performance vs. Market Benchmarks

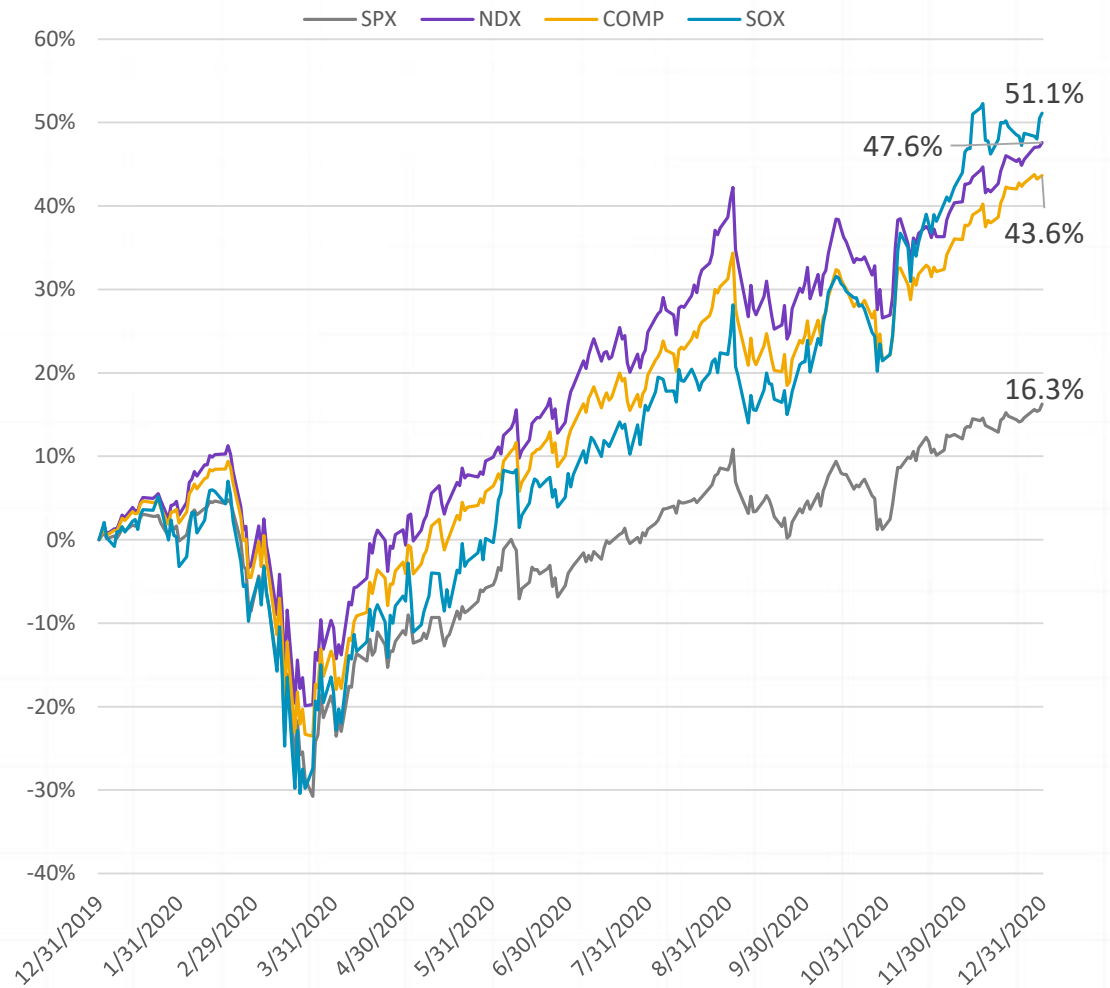


Full-Year 2020 Performance

Total Return Performance vs. Competitor Indexes

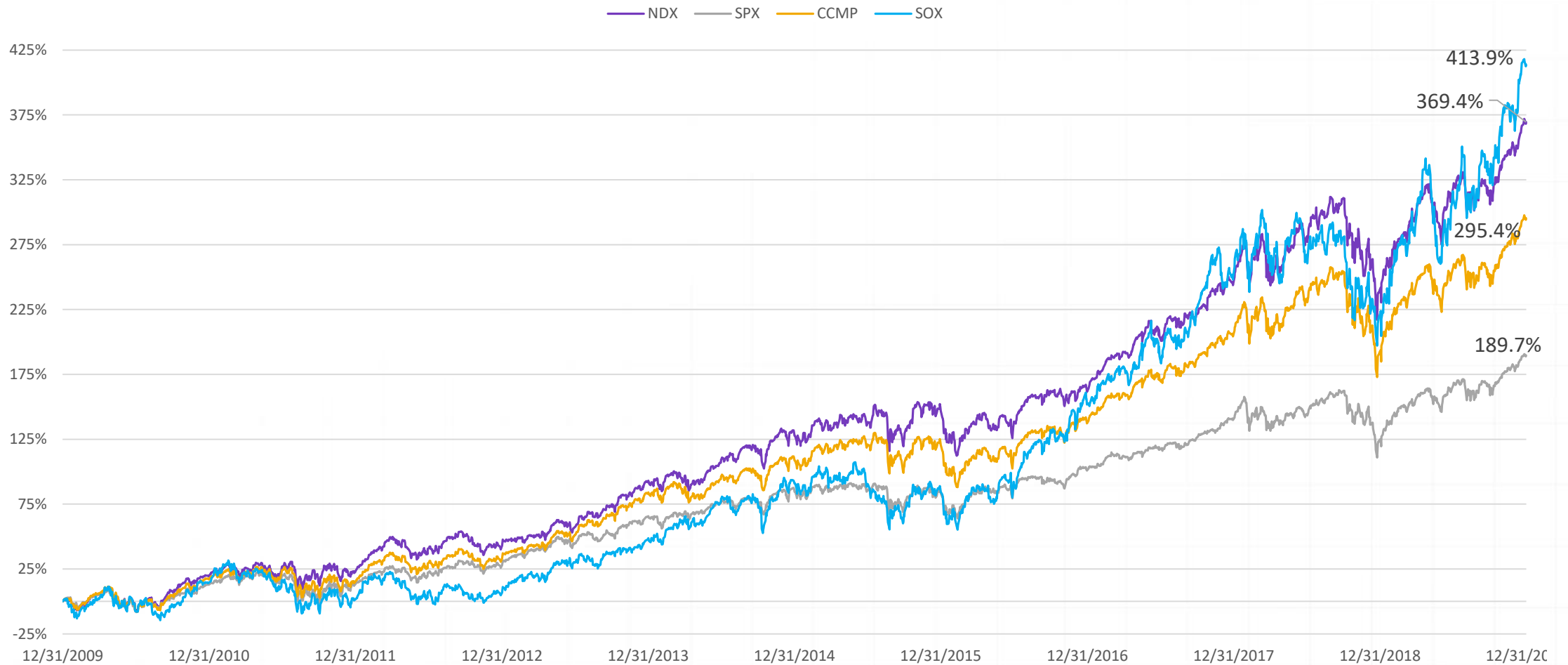


Price Performance vs. Market Benchmarks



Performance Throughout the 2010s

2010-2019 Performance vs. Market Benchmarks



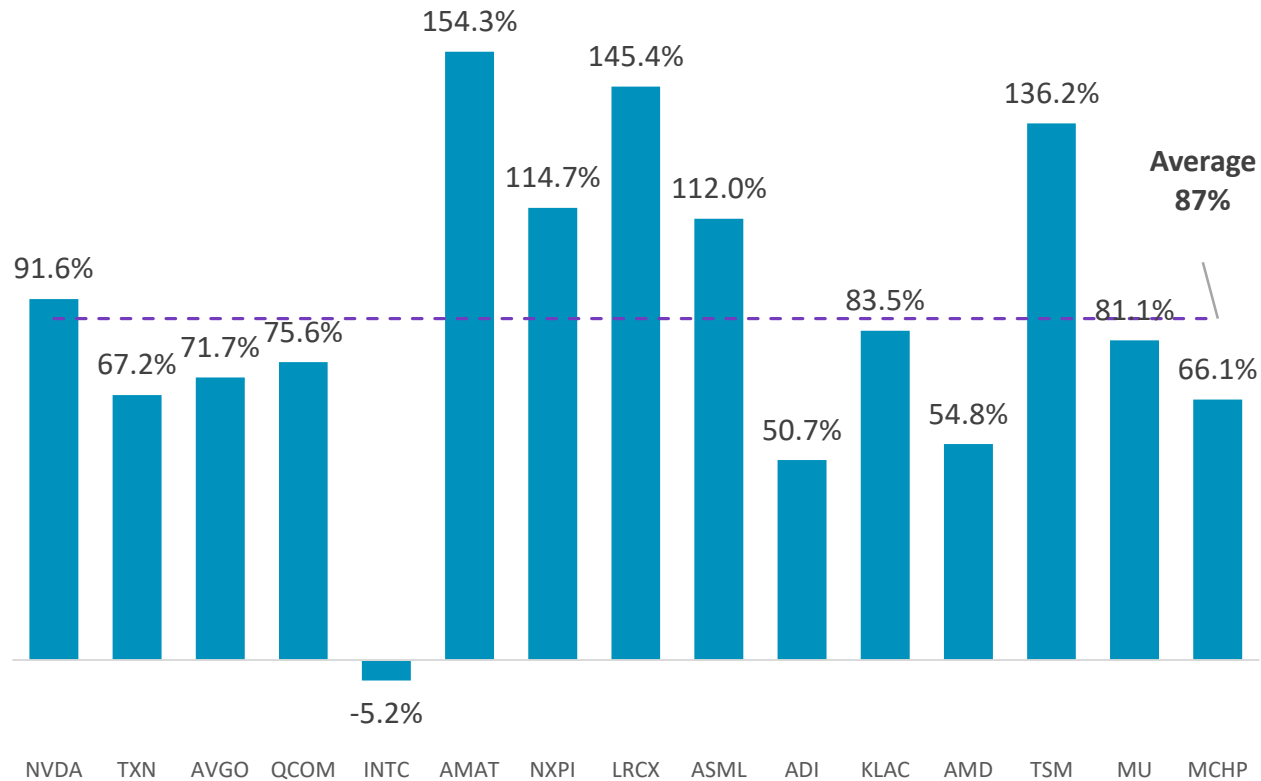
SOX ETF AUM Trend

3-Year Global ETF AUM thru May 31, 2021 (\$Bn)

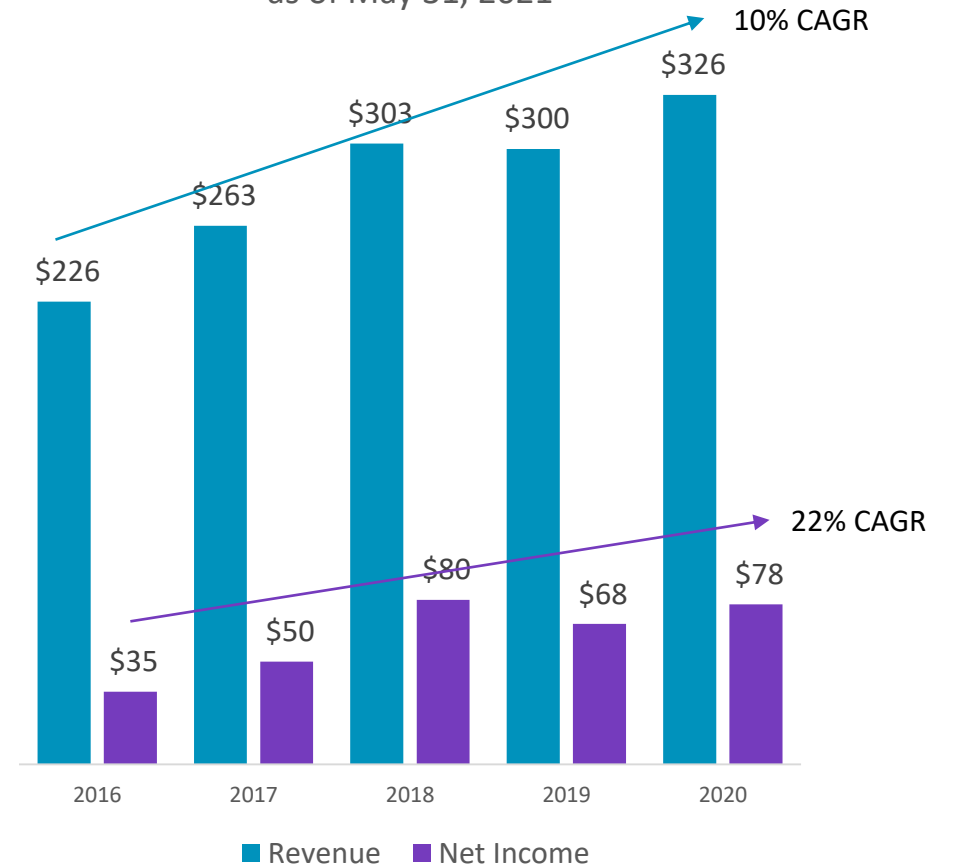


SOX Performance Driven by Fundamentals

Top 15 Index Weights: Last 12 Months Performance as of May 31, 2021



5-Year Trend in Revenue & Net Income, \$B as of May 31, 2021



Semiconductors in 2021

7 Semiconductor Component Types:

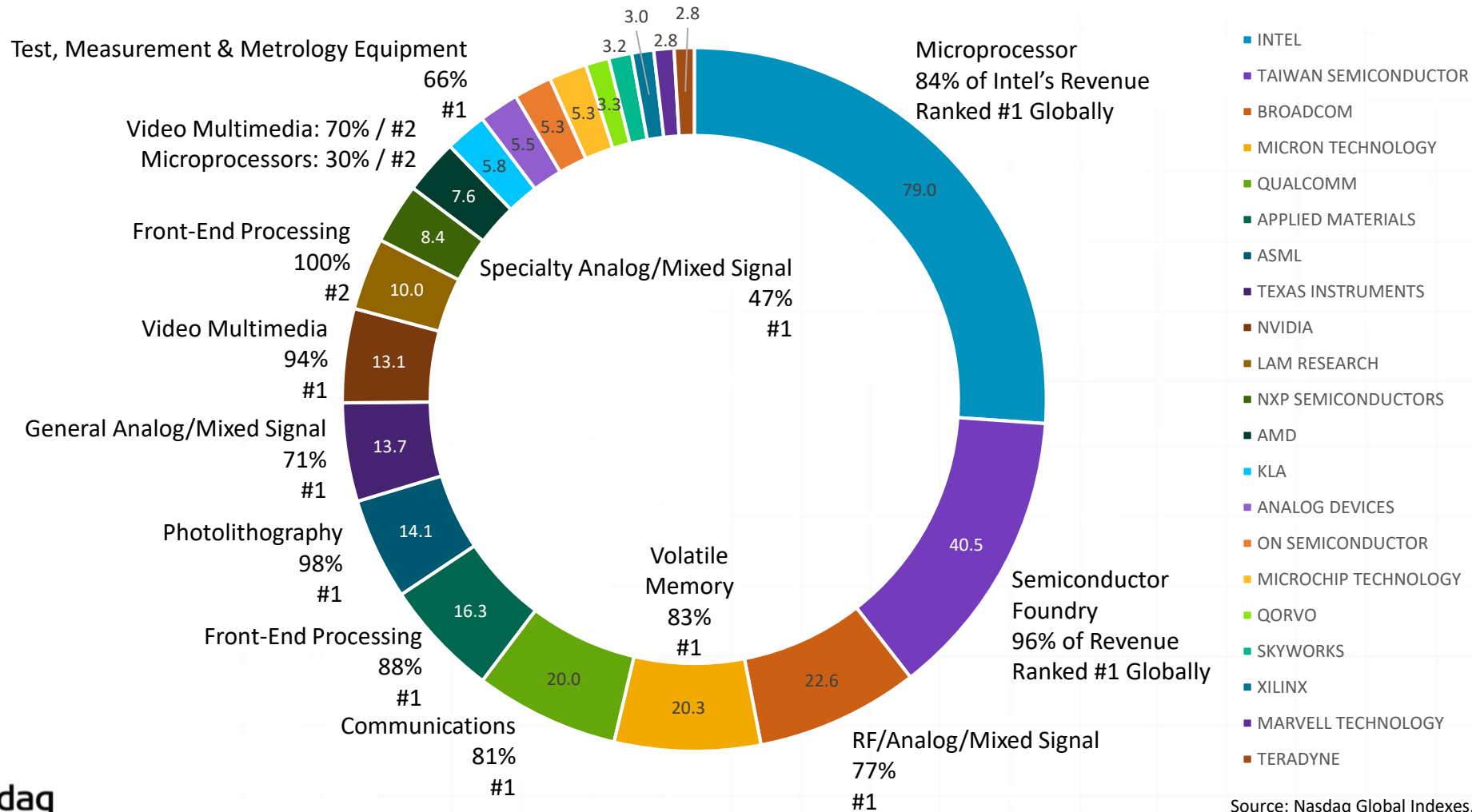
- Memory (largest share of industry, ~25%)
 - Cloud Computing/Virtual Reality
- Microcomponent (every electronic device)
- Logic
 - ASIC (application-specific integrated circuits) + ASSP (application-specific logic chips)
- Analog
 - Power Management/Signal Conversion/Automotive
- Optoelectronic
 - Image Recognition/Internet of Things/Solid-State Lighting/Machine Vision/Smart-Grid Energy
- Sensor
 - Automated Controls / IoT Applications
- Discrete

Top Drivers / Sources of Growth:

- Automotive (Autonomous/EV/Hybrid): 11.9% CAGR
- Industrial (Security/Healthcare): 10.8% CAGR
- Communications (Smartphones, 5G, EM): 2.2% CAGR
- Consumer Electronics (TVs/Gaming/Handhelds): 6.0% CAGR
 - Wearables (21.0% CAGR)
- Data Processing (Servers/Storage Devices): 2.1%
- Internet of Things (IoT)
- Artificial Intelligence & Machine Learning: ~50%
- LEDs

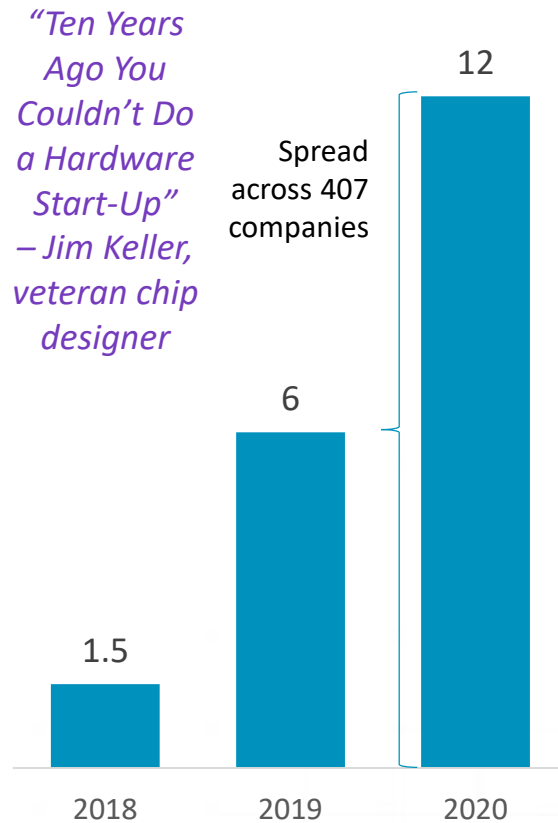
Semiconductor Diversity

Last 12 Months of Total Revenue by Company, \$Bn, as of August 31, 2020

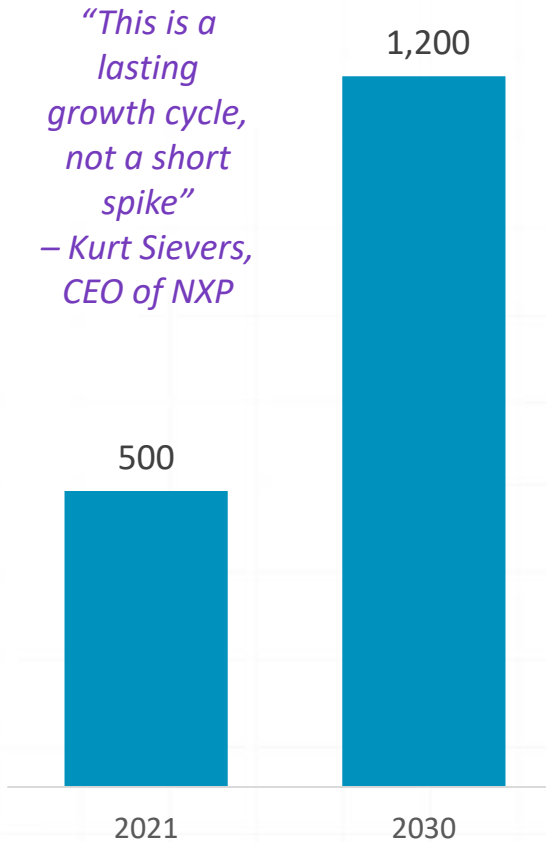


A New Era of Semiconductor Investment

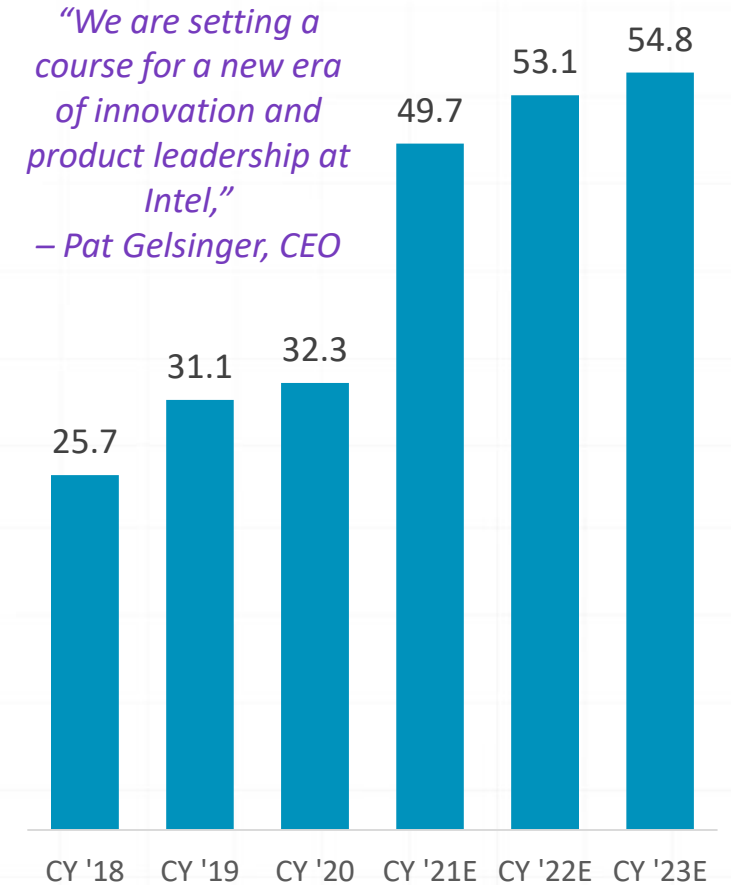
Estimated US Venture Capital Investments into Semiconductor Startups, \$Bn



Forecasted Growth of Global Chip Revenues, \$Bn

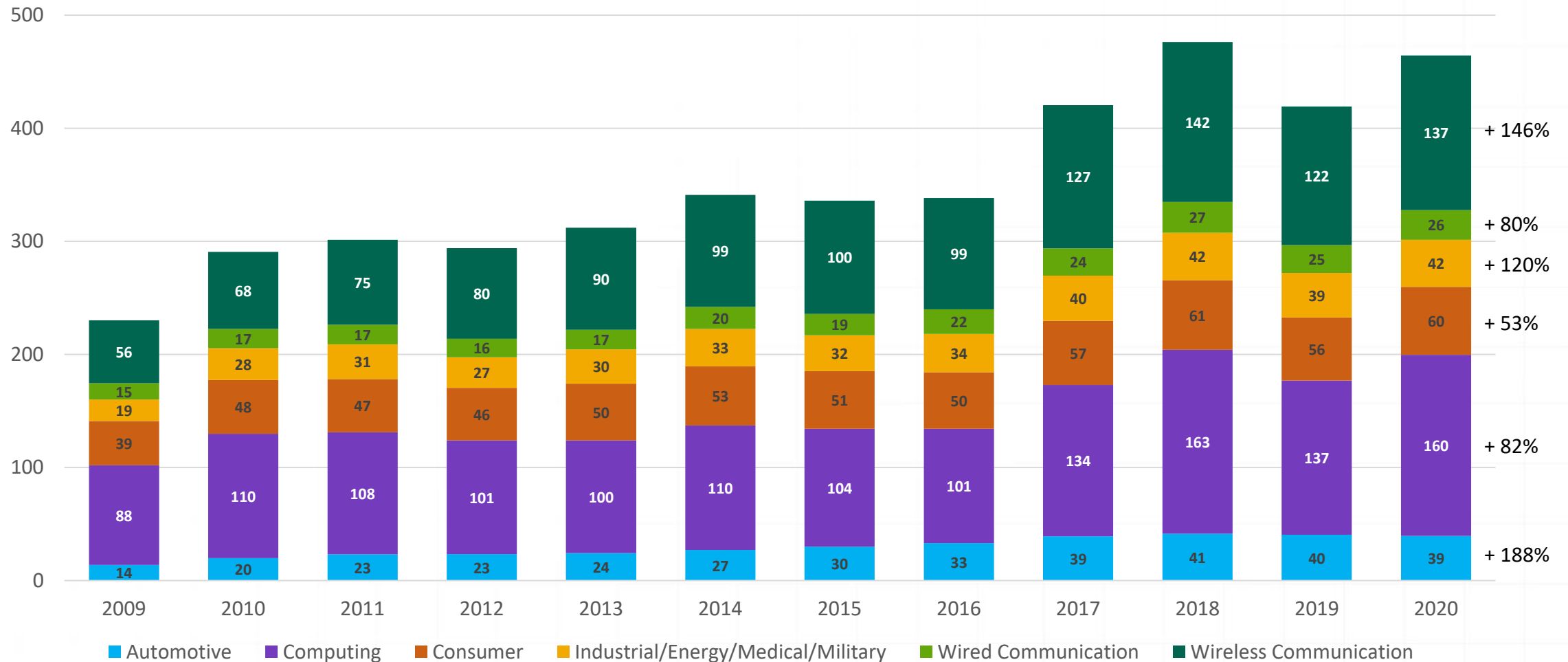


Intel + Taiwan Semiconductor Annual CapEx, \$Bn



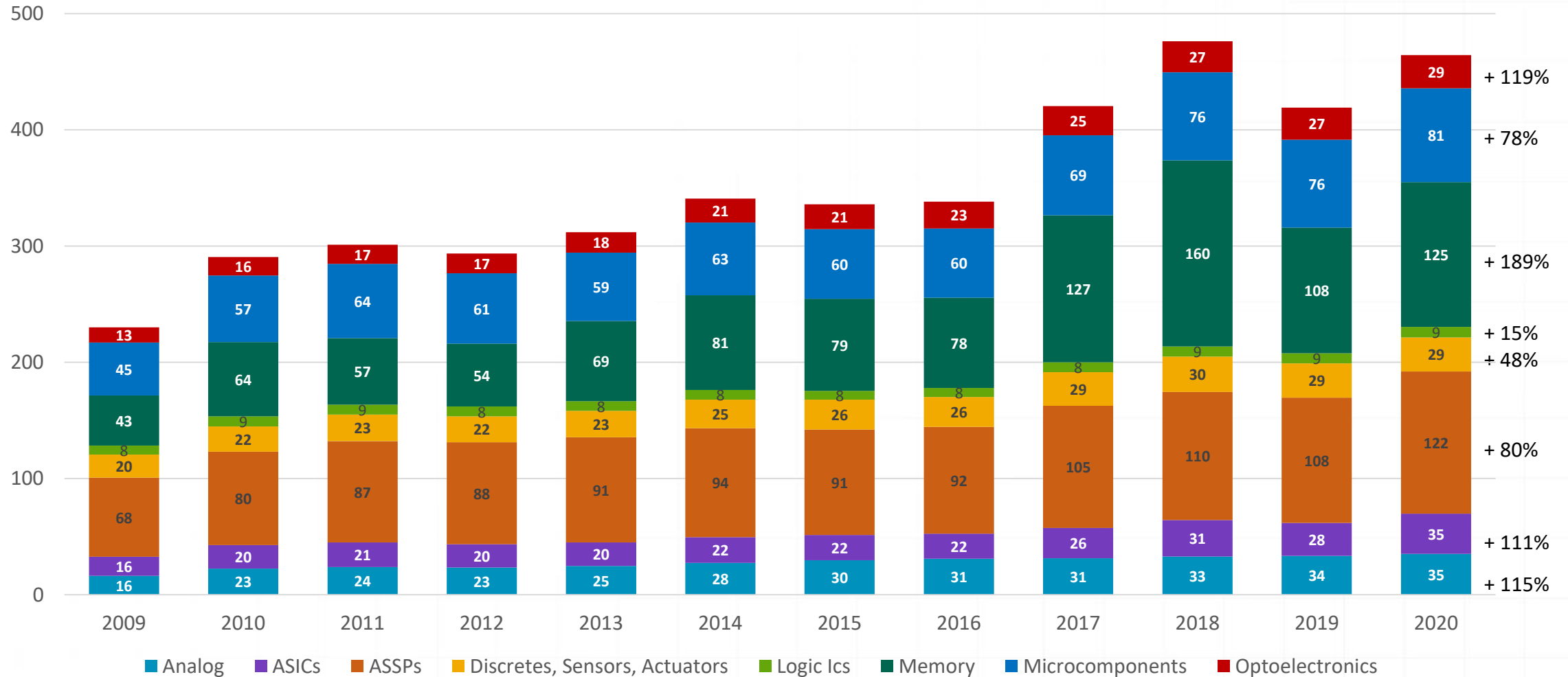
Semiconductor Revenues up 100% Since 2009

Growth in Semiconductor Revenue by Industry of Usage, \$Bn

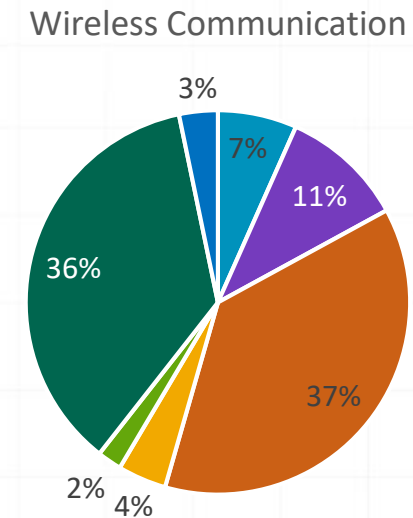
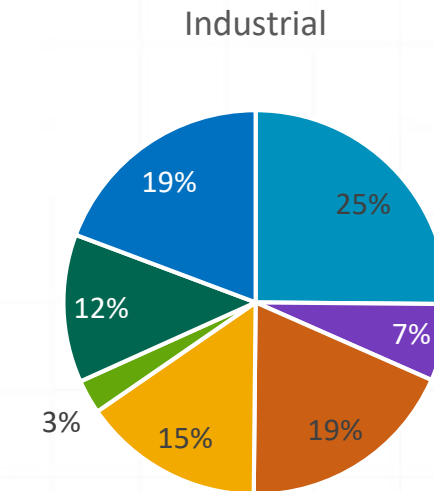
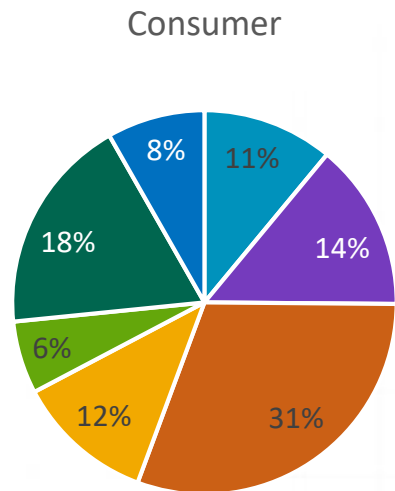
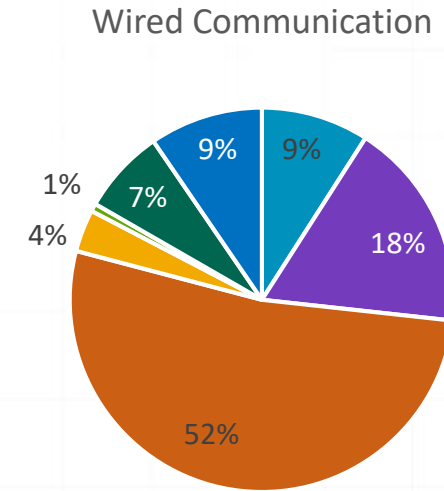
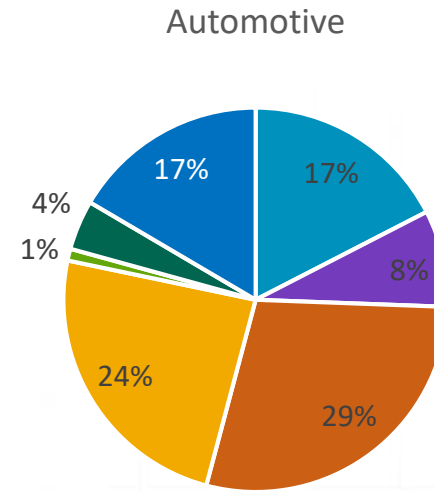
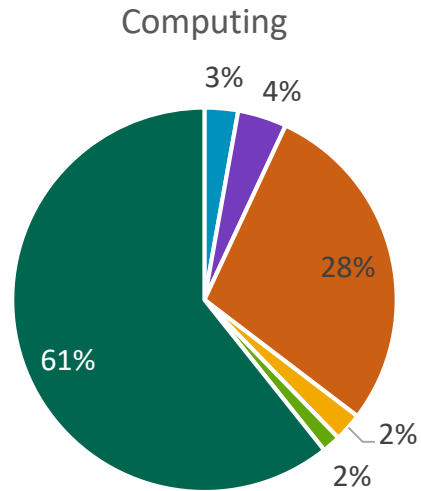


Semiconductor Revenues up 100% Since 2009

Growth in Semiconductor Revenue by Component Type



Revenue by Industry & Semiconductor Type



Disclaimer

Nasdaq®, PHLX® are registered trademarks of Nasdaq, Inc. PHLX Semiconductor Index™ and SOX™ are trademarks 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.**

© 2021. Nasdaq, Inc. All Rights Reserved.