ROBOGLOBAL
INVESTING IN THE ROBOTICS & AI REVOLUTION

FOURTH QUARTER IN REVIEW

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SUMMARY

After returning a total 51% in the prior two years, the ROBO Global Robotics & Automation Index declined 22% during the 4Q18 global equity rout that was caused by a perfect storm of monetary tightening, geopolitical uncertainty, and renewed fears of a US economy that is "as good as it gets." This was the largest quarterly decline since inception, and all 12 subsectors within the index suffered double-digit losses. In many respects the current situation appears comparable to 4Q15. Once again, best-in-class robotics and AI stocks are trading on valuations unseen since the inception of the index in 2013—just as adoption across the sector is accelerating rapidly.

Robotics, automation, and AI market experiences déjà vu and the potential for surprise upside

Global equities suffered their worst quarterly decline since 2008, with US stocks reversing earlier gains and international equities extending losses, including the MSCI AC World Index 13.9% drop. 2018 delivered a brutal combination of monetary tightening, yield curve flattening, the escalation of geopolitical risks around US-China trade and Brexit, and slowing capital investments. Looking at internal dynamics, the market appears to be pricing in a heightened risk of a US recession, with early-cycle sectors such as housing, banks, and autos down more than 25% for the year.

The ROBO Global Robotics & Automation Index declined 21.7% in 4Q18. By region, industrial and engineering powerhouses Germany (-27%), Switzerland (-29%), and Japan (-18%) were the largest detractors, as investors continued to trim exposure to industrial export companies. All 12 index subsectors declined, led by energy (-52%), security (-47%), and 3D printing (-40%). Healthcare (-10%) showed its more defensive nature. At ROBO Global we believe the current situation is comparable to late 2015, when markets across the board were hit by a nasty combination of a contracting monetary base, an oil-bust-led industrial recession, and China panic.

While a near 22% quarterly decline is sharp by any standard, it must be put in the perspective of the tremendous returns delivered by the ROBO index in recent years, most notably a total 72.9% in 2016 and 2017, compared to 26.7% for the MSCI AC World Index over the same period. This marked the third time the index declined more than 20% in the past fifteen years (4Q08, 3Q11 and 4Q18).

4Q PERFORMANCE

Total return by subsector (%)	Q4 2018	Past 12m
INDEX TOTAL	**-22%**	**-20%**
3D Printing	-40%	-26%
Actuation	-17%	-36%
Computing, Processing, & AI	-23%	-13%
Consumer Products	-24%	9%
Energy	-52%	-37%
Food & Agriculture	-23%	-28%
Healthcare	-10%	15%
Integration	-18%	-22%
Logistics Automation	-17%	-12%
Manufacturing & Industrial Automation	-23%	-34%
Security	-47%	-32%
Sensing	-21%	-20%

MOVERS & SHAKERS

Top contributors in 4Q included BioTelemetry (+12%) and Xilinx (+7%).

BioTelemetry is the leading provider of mobile cardiac monitoring technology and a recent addition to the ROBO index in the healthcare subsector. The development of wireless mobile health monitoring solutions is revolutionizing medicine, and BioTelemetry has built the largest cardiac data network to date, working with physicians to provide cardiac monitoring to more than 1 million people per year. In 2018, BioTelemetry worked with Apple and Stanford Medicine on the largest ever heart study and received FDA approval for its telemetric glucometer with real-time transmission and cloud storage.

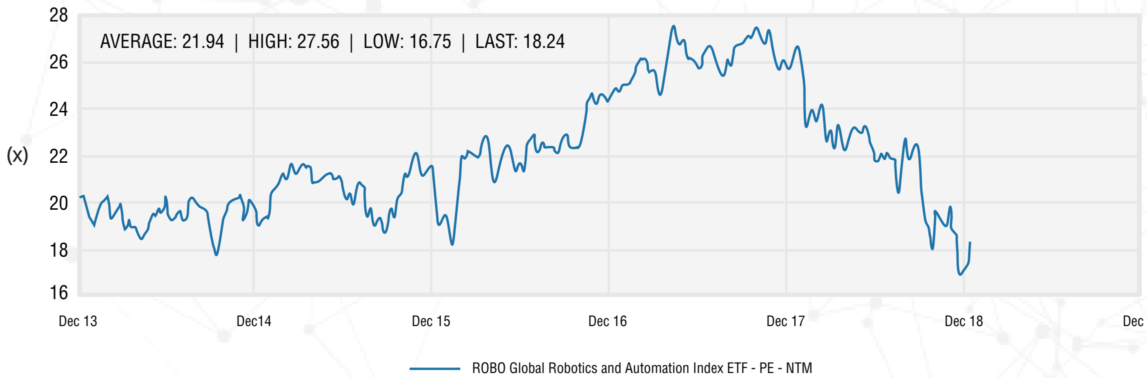
Xilinx (+7%) reported better than expected earnings and raised its full-year outlook. As the leading provider of FPGAs, the company is seeing direct benefits from 5G deployments and widespread adoption of FPGAs by data centers. Artificial intelligence is a major opportunity for Xilinx as the market shifts from 'training' to 'inference' applications.

Top detractors were Oceaneering (-56%) and Nvidia (-52%). Oceaneering, the leading provider of Remotely Operated Vehicles (ROVs) for subsea applications, saw its shares collapse under the weight of a 38% decline in the price of oil, which drives oil and gas CAPEX. NVIDIA reported much weaker than expected results. The company guided to a 7% decline in 4Q sales in anticipation of a major unwind of excess inventory of mid-range gaming GPUs, primarily due to the collapse in crypto mining activity. However, Nvidia continues to benefit from the boom in demand for AI applications, where the company enjoys significant competitive advantages.

MOVING FORWARD

Perhaps most importantly, for investors looking for bargains, the ROBO index closed 2018 at valuations unseen since its inception in 2013, with a median forward P/E of 17.1x—a 22% discount to the five-year average of 21.9x. Indeed, losses in 2018 were entirely attributable to multiple compressions, with the forward P/E peaking in October 2017 at 27.5x, while EPS growth is likely to have exceeded 17% in 2018. This comes on the heels of more than 20% in 2017, according to Factset estimates. Looking out to 2019, earnings estimates have come down with the stock market and are now looking for 8% EPS growth.

Forward P/E Ratio



As we enter 2019, inflation has already peaked, and while global CAPEX indicators continue to deteriorate, they are already back in bottoming territory. If trade conflicts are resolved and the US consumer continues on its robust upward trajectory, we think earnings could surprise to the upside.