

Memories, Memories, Memories. Blah, blah, blah. DRAM and NAND continue to drive semiconductor industry growth

The embarrassing news is that I haven't published a monthly since last October. The pathetic news is the big picture in the semiconductor industry hasn't changed. The good news is that I can recycle much of my ancient verbiage.

Not much has changed across the semiconductor industry: DRAM and NAND market price strength continues to drive industry growth; 4Q strength was impressive and significantly exceeded expectations and norms; January business conditions declined sequentially but significantly bettered seasonal norms; 1Q guidance is calling for well-below-average seasonal weakness; and sector share prices continue to outperform broader market indices, although equity price movements within my Universe remain volatile and continue to diverge from broader SOX index performance. The good news is that equity market volatility appears to be favoring technology and valuation is back in vogue—or at least investor sensitivity is at least recognizing fundamental valuations rather than primarily considering revenue and earnings growth and share price momentum.

Memories Still Drive Growth: DRAM and NAND memories continue to drive semiconductor industry growth. Last year overall semiconductor industry revenue growth totaled +21.6% which was led by DRAM and NAND that together grew by an astonishing +61.5% primarily due to market price gains, while the rest of the industry advanced by a much less impressive +10% according to the Semiconductor Industry Association. For this year, market researcher IC Insights expects 2018 revenue growth for the overall industry of +15% primarily driven by DRAM gains of +37% and NAND growth of +17%—both due to market price increases. The rest of the semiconductor industry products *excluding* DRAMs (but including NAND) is expected to grow by +10%. *Plus ca change . . .*

Structural Differences: Recall that my US-equity-based Tokeneke Universe does NOT include some three-quarters of industry DRAM and NAND business from Samsung, Hynix and Toshiba. While my Universe does include Micron, it will more closely track growth of +10% this year rather than +15%. Other structural differences in my Universe include the lack of very large international players (Samsung, Hynix, Toshiba, MediaTek, Infineon), although it does include wafer foundries (TSMC, UMC, SMIC, TowerJazz) and IP companies (Rambus, Xperi/Tessera, Ceva, InterDigital and a chunk of Qualcomm) that, technically anyway, don't count as semiconductor industry revenues, but rather costs associated with manufacturing. I also normalize fiscal quarters to the best fitting two out of three months (Marvell, Nvidia and Semtech have January-ending fiscal years, Analog Devices and Broadcom fiscal years' end in October, while Micron's ends in August). Unreported stub-periods associated with acquisitions are also a difference.

The bigger problem is that most US-based investors in the chip sector experience the industry from the Tokeneke Universe perspective. The Philadelphia Semiconductor Index Option (SOX) is similarly under-represented in memories, although this is somewhat mitigated by the inclusion of equipment companies supplying to memory manufacturers. And even if domestic investors are adventuresome enough to travel overseas, it is still difficult to isolate and benefit from current memory market strength: less than half of Samsung's revenue comes from semiconductors (including foundry), and Toshiba's overly-dramatic restructuring thanks to its nuclear energy woes is going on its second year.

January Better-Than-Average Weakness: Worldwide semiconductor industry revenues for January declined by a better-than-average loss of -1.0% sequentially on a three-month rolling average basis, according to statistics released by the Semiconductor Industry Association (SIA) earlier this month. The relative strength was likely due to memory products given very weak 1Q guidance across the Tokeneke Universe. January averages a loss of -2.4% with a high of +1.0%, a low of -12.2%, and 24 declines in the last 27 years—including 13 of the last 15 years. Europe led with a small gain of +0.9% followed by China flat at +0.0%. The rest of the world posted declines with Asia-Pacific at -0.6%, Japan at -1.0%, and The Americas bringing up the rear at -3.6%.

Next month's release of February data typically reflects a comparable decline. February has averaged a loss of -2.2% with a high of +1.9%, a low of -7.7%, and 23 drops in the last 27 years—including every one of the last 13 years. I expect a weaker-than-January decline due to the void associated with Chinese New Year to likely be offset by memory strength, thereby resulting in an average—or slightly better-than-average—monthly decline.

4Q Better with Memory: The difference between official industry statistics (with memories) and my Universe (without) was significant, with the SIA reporting a 4Q sequential gain of +5.7% compared to my Universe at +4.8%.

Industry statistics for 4Q came in with strong sequential quarterly revenue growth of +5.7% that compares very favorably with average growth of +1.4%, a high of +16.0%, a low of -24.2%, and declines 12 times in the last 27 years—including eight of the last 10.

However, 4Q for my Tokeneke Universe was a different story, with weighted average sales reflecting a sequential quarterly gain of +4.8%. This was much better than company guidance of +1.8% ranging from -0.8% to +4.3% after a couple handfuls of relatively uneventful preannouncements. When I exclude Micron's memory strength the weighted average fell to a gain of +4.2%. A plurality of 48% of 61 companies reported 'mixed' results that simultaneously missed, met, and/or exceeded expectations for 4Q results and 1Q guidance. Some 10% were underperformers who missed and/or met those expectations, while 43% met and/or exceeded expectations.

Below-Average 1Q Seasonal Weakness: The 1Q revenue outlook based on management guidance across my Universe during the 4Q earnings season reflects a weaker-than-average seasonal decline. The specific weighted average guidance for revenue was -6.2% ranging from -8.6% to -3.8%. If I exclude Micron from the mix the center decreases to -7.5% ranging from -10.1% to -5.0%. The chip industry has averaged a 1Q sequential revenue decline of -2.2% with a high of +8.8% and a low of -19.4%, and has declined 18 of the last 27 years—including 11 of the last 13 years, according to industry statistics. While memories will likely result in a cumulative metric above the average, clearly my Universe is positioned to underperform.

Chip Sector Share Price Divergence: Chip sector share prices have diverged through February, with the SOX significantly outperforming broader equity markets while the average of my Universe has significantly underperformed. During February, the Philadelphia Semiconductor Index Option (SOX) was flat at +0.0% with 44 out of 63 stocks in my Universe dropping by an average of -3.8% compared to declines from the NASDAQ, S&P500 and DOW at -1.9%, -3.9%, and -4.3%, respectively. While the SOX outperformed broader equity markets on a year-to-date basis through the end of February, my Universe has significantly underperformed with an average stock decline of -0.3% as noted below.

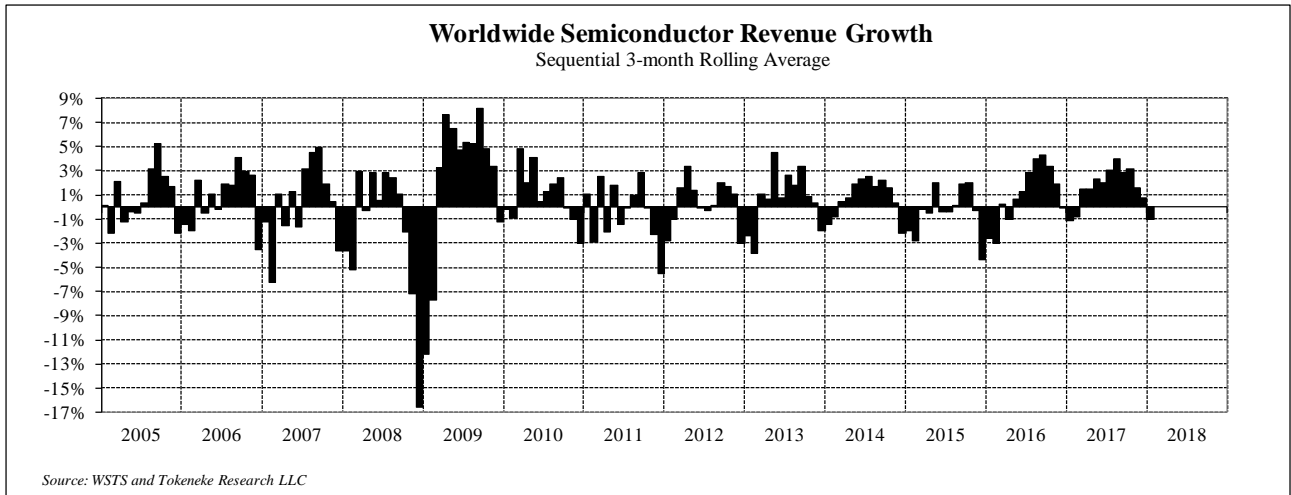
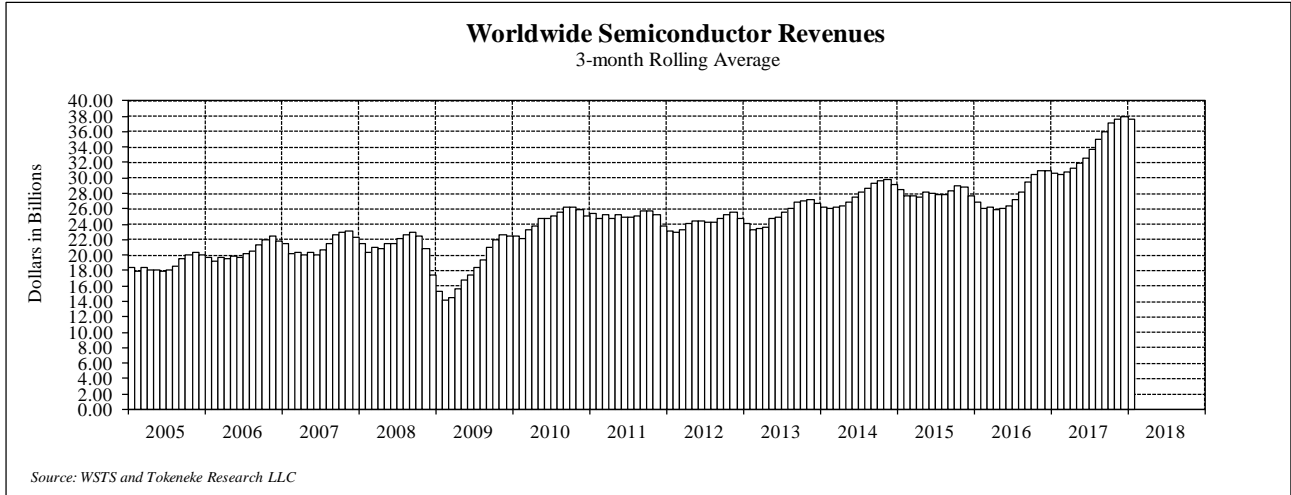
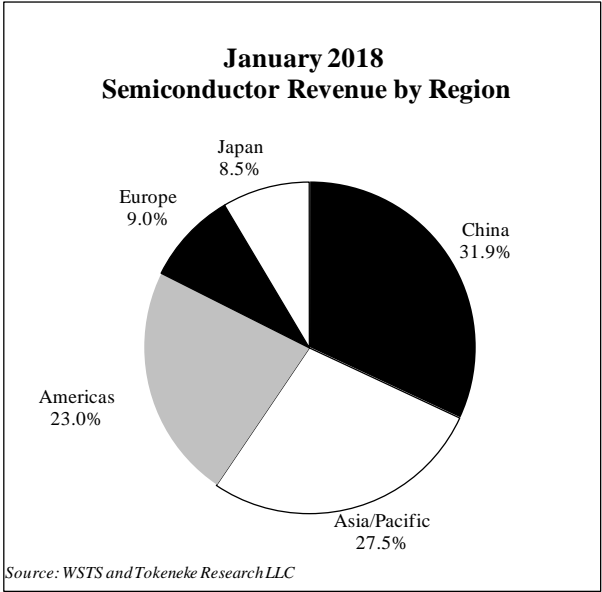
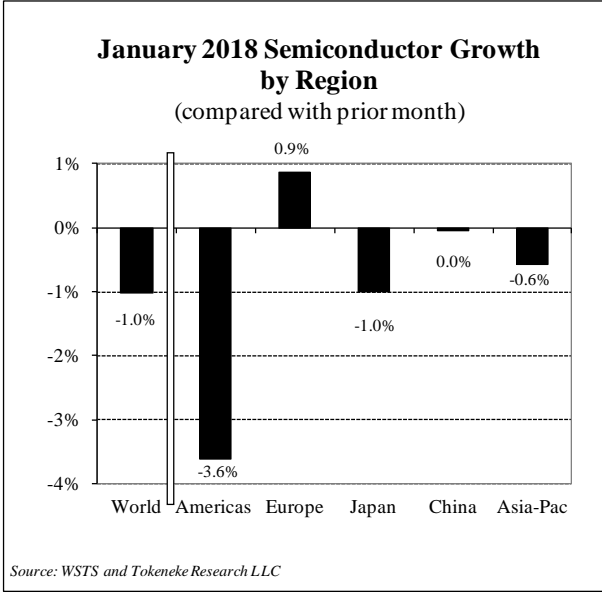
February				YTD				Indices		
Winners (19/63)		Losers		Winners (33/63)		Losers			Feb	YTD
INFN	53.8%	PI	-43.0%	INFN	57.2%	PI	-43.5%	SOX	0.0%	8.7%
MOSY	15.4%	MTSI	-31.4%	MOSY	27.9%	MTSI	-34.4%	SMH	0.0%	8.9%
QRVO	12.5%	PXLW	-27.8%	MSCC	25.7%	PXLW	-30.5%	NASDAQ	-1.9%	5.4%
SWKS	12.4%	QUIK	-26.5%	NVDA	25.1%	IPHI	-24.2%	S&P500	-3.9%	1.5%
MU	11.6%	MX	-23.6%	AQ	21.8%	SMI	-23.2%	DOW	-4.3%	1.3%
average stock -3.8%		SOX +0.0%		average stock -0.3%		SOX +8.7%				

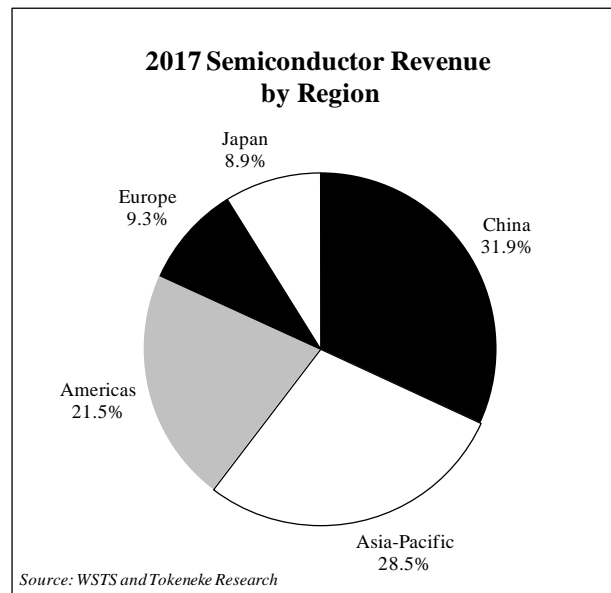
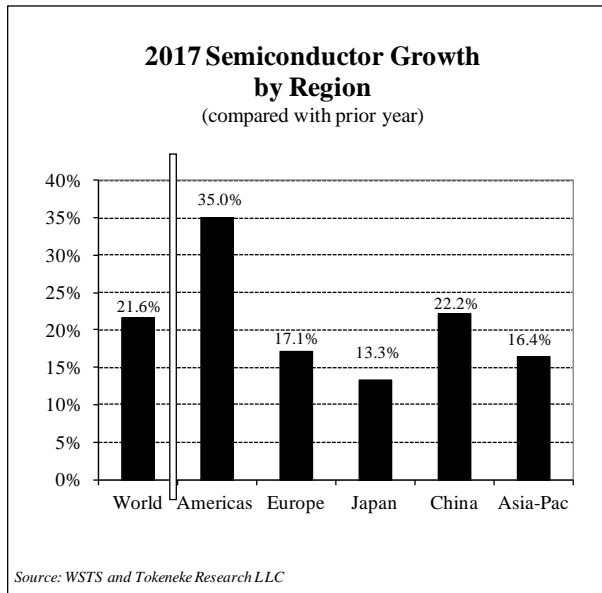
M&A Setbacks: Mergers and acquisitions activity has experienced setbacks of late with the US administration disallowing the acquisition of Lattice by Chinese investors and the hostile bid by Broadcom of Qualcomm. Losses to my Universe last year included: MBLV going to INTC, INVN going to TDK in Japan, EXAR going to MXL, GIG going to IDTI, ACTS going private in China, AMCC going to MTSI, ISIL going to Renesas in Japan, and LLTC going to ADI. This year we have already seen IXYS go to Littlefuse and most of what was left of SIGM go to SLAB. Pending deals include NXPI going to QCOM (with lots of drama), CAVM going to MRVL, and MSCC going to MCHP. MOSY continues to pursue 'strategic alternatives.'

Sector Risk and Divergence: The outperformance of the chip sector continues to worry me as noted by the spread between the SOX and S&P500 in the graph on Page 5—as well as the volatility and divergence between the SOX index and my Universe as noted above.

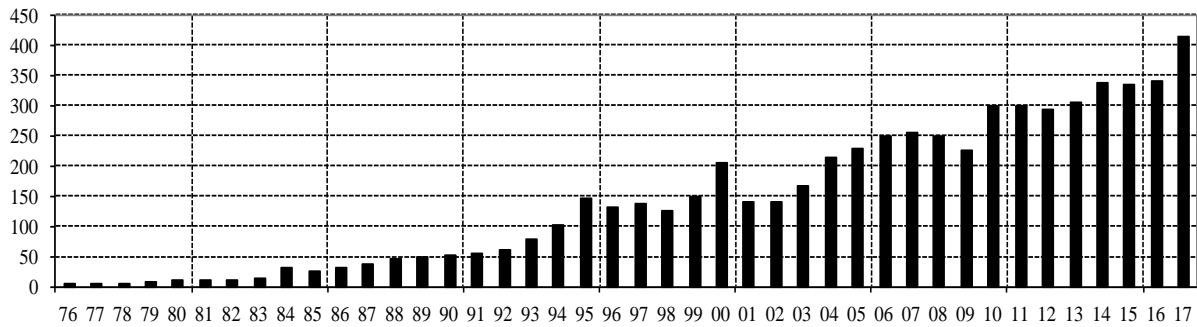
Valuation Making a Comeback? I have found it difficult to generalize semiconductor sector characteristics given the significant outperformance of DRAM and NAND product revenue growth as well as the divergence in equity performance between the SOX and my Universe, as noted above. While this top-down approach is problematic, the bottoms-up approach reflected in my Investment Ideas probably offers better insight. Opportunities continue to exist, and it appears to me that equity markets are finally recognizing fundamental valuations rather than just growth and momentum. See my latest Semiconductor Investment Ideas publication for specific potential opportunities.

—Dan K. Scovel
Semiconductor Analyst

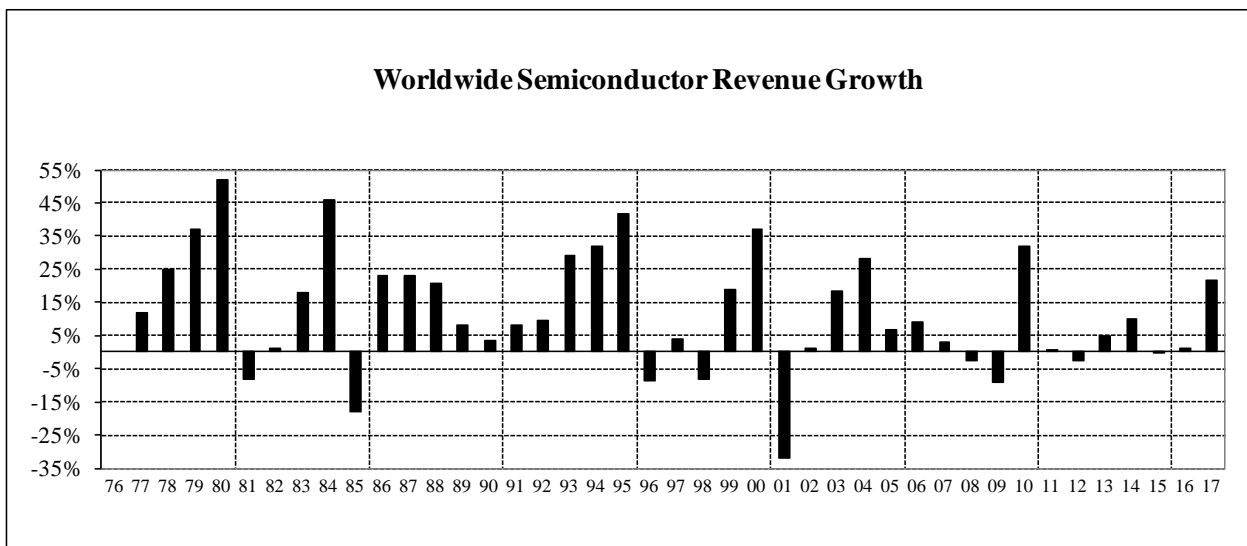




Worldwide Semiconductor Revenue (\$ billions)



Worldwide Semiconductor Revenue Growth



Weekly Philadelphia Semiconductor Index Option (SOX) vs. S&P 500



Source: Tokeneke Research LLC

*S&P 500 normalized to the SOX

The Company

Tokeneke Research is an independent research firm specializing in semiconductor industry business issues, providing fundamental research focused on US equities across all market capitalizations within the sector to investors. The company was founded in 2005 and is based in Connecticut.

The Offering

- *Monthly Newsletter:* A summarized review of noteworthy industry business developments, sales statistics, and sector equity market performance, as well as a near-term and annual outlook for sector business fundamentals and share prices. This report typically includes two pages of text and a handful of recurring charts and tables. It is intended for relatively broad-based distribution.
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My Background

I have an electrical engineering background, nearly 12 years of semiconductor industry experience, and was on Wall Street for nearly eight years where I was selected as the Best On The Street semiconductor analyst for 2002 by The Wall Street Journal, and third-rated Best of the Best across all sectors.

I obtained my undergraduate BS degree in electrical engineering from the University of Washington, and my MBA from Santa Clara University. My industry experience consists of nearly 12 years in various technical sales and marketing roles at four different semiconductor firms located in Silicon Valley beginning with Advanced Micro Devices in 1984, followed by two small start-up companies, and ending at Cirrus Logic where I supported the firm's Japanese market development. I joined Fahnestock & Co. as a senior semiconductor analyst in 1996 and was recruited by Needham & Co. in April 2000.

My formal coverage list as a sell-side analyst included the following equities: AMD, ALSC, ALTR, ARTI, ATML, CUBE, CY, ESST, GNSS, INTC, ISSI, LSI, MOSY, MU, OIIM, OVTI, RMTR, SIII, SMSC, STEC, SVTG, TDFX, TSRA, TXN, and ZRAN.

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