

DRAMs Double 2017 Growth Yet Another Tempered February Decline Extends Chip Industry Resiliency

It turns out the semiconductor industry has split between the ‘grows’ and the ‘grow-nots.’ DRAM and NAND memories are expected to grow by some +30% this year on market price strength, while everything else is expected to lump along at +4%. And this explains the recent difference between overall industry statistics and my Universe that lacks representation of over three-quarters of the memory sector. Opportunities are still out there (MU in DRAMs, for example), but my take on the rest of the semiconductor sector remains one of caution at this time. I am still looking for a near-term sector share price bottoming this month as a potential entry point for investors, coincident with a seasonal 2Q recovery in business conditions.

DRAMs Drive 2017 Growth: Market researcher IC Insights raised its 2017 semiconductor industry revenue forecast to +11% from +5% last week primarily due to DRAM and NAND memory market price strength. DRAM, the largest product category at over 16% of the industry, is expected to grow by +39% due to a +37% increase in average prices, while NAND is expected to grow by +25% due to a +22% increase in prices. Excluding both DRAM and NAND, semiconductor industry growth is expected to be +4%; including only NAND growth improves to +7%; adding DRAM gets to the +11% total. Recall that prior to this update annual growth expectations for the year were in the mid-single digits primarily due to memory market price strength with IC Insights at +5%, Gartner at +7%, the SIA at +3.3%, and IBS at +4.6%. I expect upward revisions from other market researchers in time.

Well—That Explains the Spread: The under-representation of DRAM and NAND suppliers in my Tokeneke Universe appears to account for the vast majority of the difference between SIA/WSTS industry statistics and my Universe calculations. Micron Technology is the only major memory supplier in my Universe and it accounts for only 20% of DRAMs and less than 10% of the NAND market. Samsung and SK Hynix together account for nearly 75% of DRAMs, while Samsung, Toshiba and WD(SanDisk) together account for nearly 75% of the NAND market.

Recall 4Q industry statistics reported sequential growth of +5.4% while my Universe clocked in at only +2.1%. Also, my US-equities exclude a number of very large international players (Samsung, Hynix, Toshiba, MediaTek, Infineon), but also include wafer foundries (TSMC, UMC, SMIC, TowerJazz) and IP companies (Rambus, Tessera, Ceva, InterDigital and a big 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, while Micron has an August-ending year). Unreported stub-periods associated with acquisitions are also a factor.

Better-than-Average February Decline: Worldwide semiconductor industry revenue for February was a much better-than-average decline of -0.8% sequentially on a three-month rolling average basis according to statistics released by the Semiconductor Industry Association (SIA) yesterday. This is the ninth consecutive above-average month and the sixth best February in 27 years. February’s performance compares to its average loss of -2.3% with a high of +1.9%, a low of -7.7%, and 22 declines in the last 27 years—including all of the last 12 years. Previous laggard Asia-Pacific lead with the only gain of +0.5% followed by declines from Europe at -0.6%, Japan at -0.9% and China at -1.0%. The Americas trailed once again with a decline of -2.3%. I am surprised (yet again) by February’s relative strength given company guidance for a pronounced sequential seasonal decline for 1Q.

Next month’s release of March data typically reflects a nice rebound of sequential growth. March has averaged a gain of +2.3% with a high of +7.0%, a low of -6.9%, and only four declines in the last 27 years—including only one in the last 15 years. I guess there’s no reason not to assume a better-than-average March at this point—albeit primarily due to DRAM and NAND market price strength.

A Tale of Two IQs: So. Memories (DRAM and NAND) are growing on the order of +30% while everything else is stuck at +4%. Other than Micron, my Universe reflects ‘everything else.’ Micron already reported its February-ended F2Q and it kicked butt. The rest of my Universe will begin reporting 1Q in two weeks. It won’t kick butt.

From an overall chip industry perspective that includes memories, 1Q is well on-track to eke-out a gain of +1.0% given the strength we have already seen reported for January and February. And that would compare favorably with the average sequential revenue decline of -2.3% with a high of +8.8% and a low of -19.4%, and contractions 18 times in the last 26 years—including 10 of the last 12.

For the rest of the industry (read: my Tokeneke Universe), seasonality is now unfavorable amid the 1Q trough, and management guidance indicates weakness will be pronounced this year. Management guidance during

the 4Q earnings season for 1Q across the Tokeneke Universe is calling for a weighted average revenue decline centered at -5.2%, ranging from -7.7% to -2.7% as of this writing. The higher-end of the range of guidance (let's call it -3%) is more consistent with seasonal norms and may well be a better proxy for expectations than the centered statistical mean given managements' increasingly skillful propensity to exceed their own guidance. Recall that tempered macroeconomic conditions since 2008 have accentuated the relative impact of seasonal business fluctuations, and the rise of the cell phone—and triumph over the PC in terms of total chip sales—has shifted industry seasonality to be more consistent with the traditional consumer market pattern of a 1Q trough, 2Q recovery, 3Q peak and then 4Q decline. DRAM and NAND appear to be raising the tide under such seasonality this year.

Chip Stock Gains Resume Outperformance: Semiconductor sector stocks continued to rally and resumed their outperformance to broader equity markets during March for the fourth time in five months—after underperforming gains during February—as the last of 4Q earnings reports continued to exceed expectations. Last month the Philadelphia Semiconductor Index Option (SOX) advanced by +4.3% while the average stock in the Tokeneke Universe gained +4.9% with 51 out of 67 issues advancing, compared to a gain from the NASDAQ at +1.5%, a flat S&P500, and a down DOW at -0.7%. See the tables below.

March				1Q				Indices		
Winners (51/67)		Losers		Winners (48/67)		Losers		Mar	1Q	
MBLY	34.9%	MOSY	-18.7%	IOTS	124.3%	XPER	-23.2%	SOX	4.3%	11.6%
HIMX	34.5%	MRAM	-14.3%	PXLW	66.4%	AOSL	-19.2%	SMH	4.3%	11.3%
MX	29.9%	NPTN	-11.2%	MBLY	61.1%	SMI	-17.6%	NASDAQ	1.5%	9.8%
GSIT	24.5%	AOSL	-10.7%	MX	54.0%	NPTN	-16.7%	S&P500	0.0%	5.5%
EXAR	24.4%	AMBA	-7.2%	HIMX	51.0%	PI	-14.3%	DOW	-0.7%	4.6%
average stock +4.9%				SOX +4.3%		average stock +13.9%		SOX +11.6%		

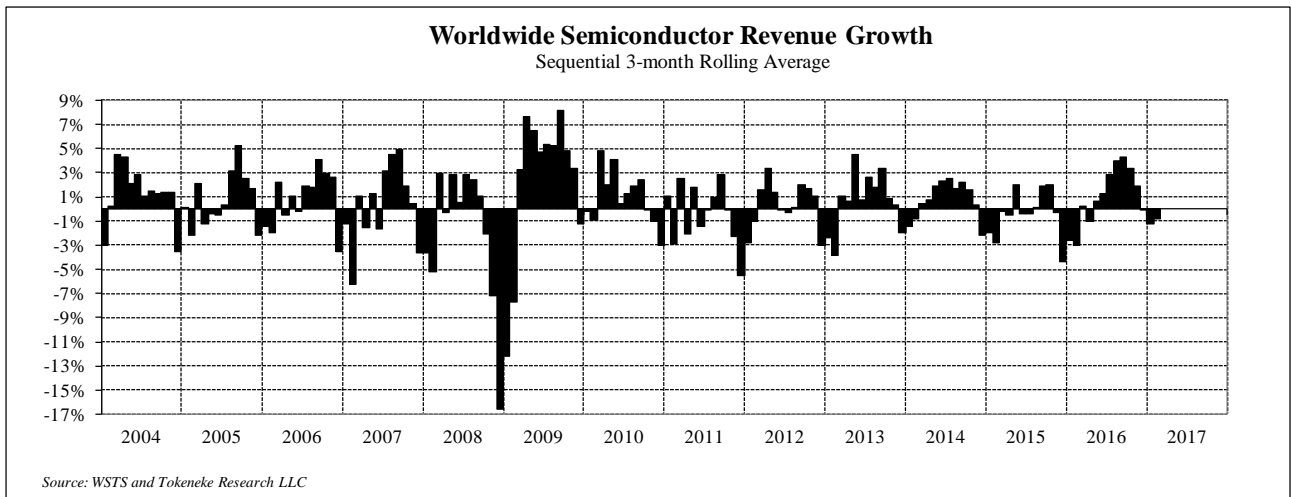
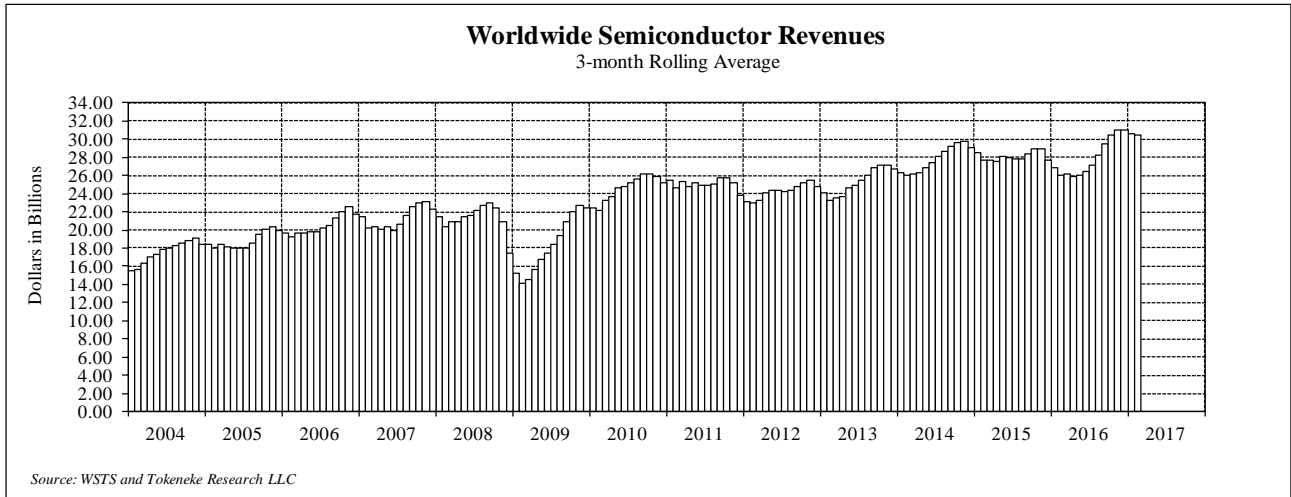
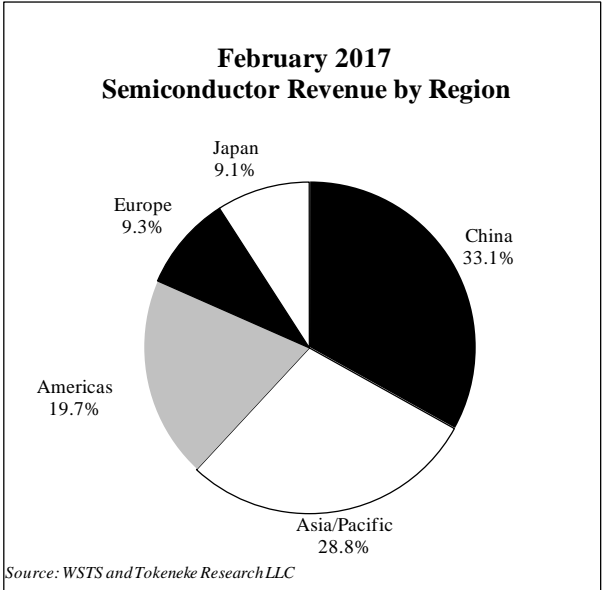
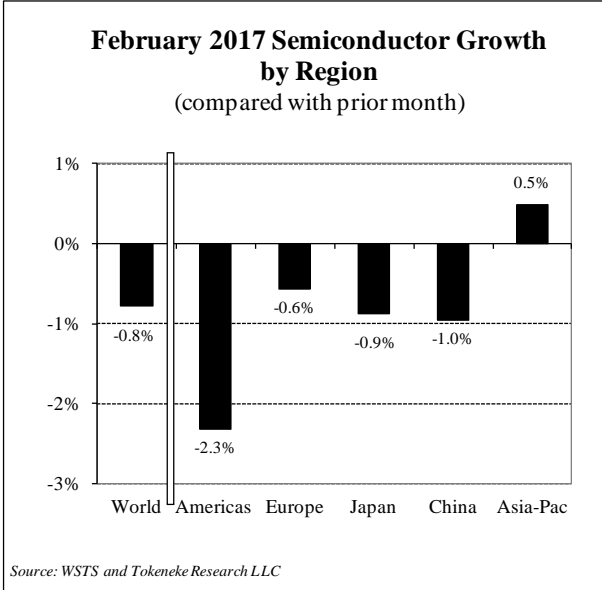
M&A Continues: Mergers and acquisitions have been running at a fever pitch driven primarily by the lack of broader sector and macroeconomic growth, in my opinion. And I think it will continue, although the specifics in terms of buyers, targets, timing and price will be difficult to forecast with any precision. Recent losses to my Universe include: ACTS going private in China, AMCC sold to MTSI, ISIL going to Renesas in Japan, and LLTC going to ADI. Pending takeovers include: EXAR going to MXL (new), GIG going to IDTI, INVN going to TDK in Japan, LSCC going private (Chinese money), and NXPI going to QCOM.

Sector Correction: The relative outperformance of the semiconductor sector compared to broader equity markets continues to worry me. The spread between the SOX and S&P500 is increasingly being stretched as noted in the graph on Page 4.

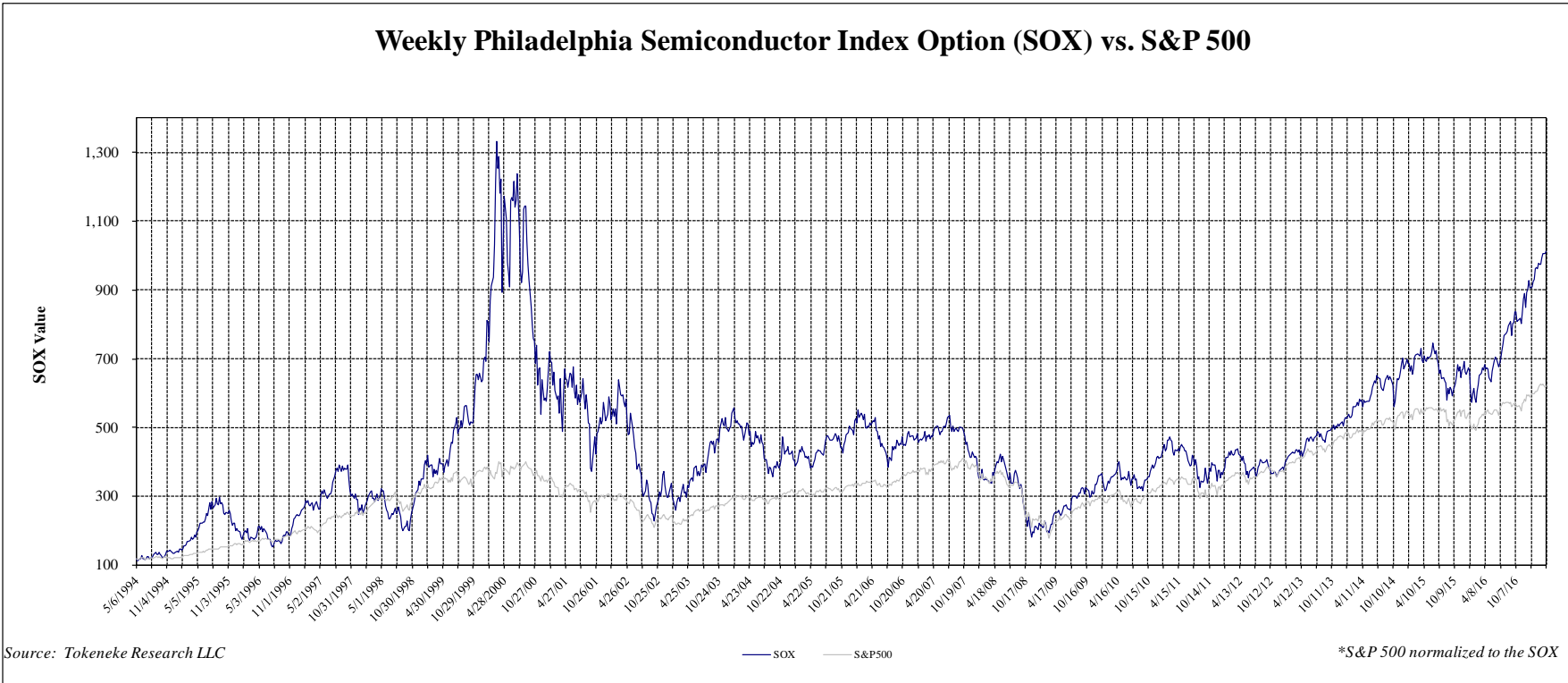
Macro Optimism: The good news is that equity market action since the election seems to indicate investors are more excited about the potential for economic growth associated with regulatory and tax cuts than fears of a slowdown from international trade wars. While I share such macroeconomic optimism, details are sorely lacking. I continue to think 2017 will prove to be a year of staging and real growth is unlikely to occur before 2018.

Springtime for Semiconductors: Opportunities are still out there (MU with its DRAMs, for example), but my take on the semiconductor sector is one of caution amid the seasonal business trough and sector share-price outperformance over the last several months. Nevertheless, much of the qualitative information shared during 4Q earnings conference calls was quite positive regarding current and expected business conditions for this year overall—despite the weak guidance for 1Q. I am looking for a near-term share price bottoming across the chip sector sometime this month as an entry point coincident with a seasonal 2Q recovery. See my most recent Semiconductor Investment Ideas update for specific potential opportunities.

—Dan K. Scovel
Semiconductor Analyst



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



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.
- *Industry Reports:* Publications offering insight and perspective to industry-wide, multi-year forecast updates; periodic sub-sector product type and end-market reviews; fundamental and valuation perspectives on sector equity relationships; and industry introductory overview. These are more detailed reports with varying shelf-lives, and are intended for narrow distribution to interested clients.
- *Company Reports:* Fundamental equity research including earnings estimates and customized valuation analysis.
- *Consulting:* Special projects of limited or extended duration, as well as periodic access of varying frequency.

Publications are distributed via email in .pdf format, unless otherwise requested. Client confidentiality and customized research exclusivity accommodated. Rates vary with the nature, duration, and terms of offerings.

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 Farnestock & 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.

—**Dan K. Scovel**
Semiconductor Analyst

Tokeneke Research LLC

Rowayton, CT 06853

dscovel@tokenekeresearch.com

www.tokenekeresearch.com

203-554-4621

Copyright © 2017 Tokeneke Research LLC. All rights reserved. This report is for information purposes only and does not constitute a solicitation or an offer to buy or sell any security or to participate in any investment or trading strategy. Opinions expressed in this report reflect the judgment of Tokeneke Research LLC on the topics addressed as of the date of the report, and are subject to change without notice. Tokeneke Research LLC makes every effort to use reliable and comprehensive information but makes no representation that the information in this report is accurate or complete, nor does it undertake to update or revise this report at any time or for any reason. This report contains forward-looking statements that involve risks and uncertainties, both known and unknown, as well as assumptions that, if they do not fully materialize or prove incorrect, could cause actual results to differ materially from those expressed or implied by such forward-looking statements. Actual results and trends may differ materially from historical results or those projected in any such forward-looking statements depending on a variety of factors. This report does not provide individually tailored investment advice and has been prepared without regard to the specific individual financial situation, objectives and needs of those who receive it. Securities discussed in this report may not be suitable for the reader. Tokeneke Research LLC and/or Dan Scovel may have a long or short position in the securities of a company or companies mentioned in this report and, at any time, may change that position. Tokeneke Research LLC accepts no liability whatsoever for any loss or damage of any kind arising out of the use of any part, or all, of this report. All company and product names mentioned in this report may be trademarks or registered trademarks of their respective holders and are used for identification purposes only. Reproduction or distribution of this report, even for internal distribution, is strictly prohibited unless specifically authorized by Tokeneke Research LLC.