Semiconductors

QUARTERLY

Research Analysts
John W. Pitzer
212 538 4610
john.pitzer@credit-suisse.com
Farhan Ahmad
415 249 7929
farhan.ahmad@credit-suisse.com
Charles Kazarian
212 538 4160
charles.kazarian@credit-suisse.com
Steven Jozkowski
212 325 2685
steven.r.jozkowski@credit-suisse.com
Darren Chen
212 325 2658
darren.chen@credit-suisse.com

C3Q/C4Q: Secular Bulls, Cyclical Skeptics

Bottom Line: For the 5th straight quarter, we expect an at least IN-LINE C3Q/C4Q with UPSIDE bias. With SOX 1200, up 35% YTD and at a 17-year high, we acknowledge that stock appreciation rarely occurs unabated but hold to our view that Semiconductors remain (1) the cheapest sector in the market, trading at a ~20% discount to the SPX on EV/FCF, and (2) structurally undervalued as growth improves from GDP-minus to GDP-plus. ***A "Data Driven Economy" will unleash deflationary and/or disruptive forces to traditional industries, while creating significant new TAM for silicon.***

While we see more upside than downside through year-end, cyclical headwinds could catch up with Semis in C1Q post CNY as AAPL builds peak and customers "feel" less anxious about availability. Our models still suggest only a deceleration of growth i.e. a Soft Landing – but we would note: (1) Our positive Secular View implies cyclicality modestly increases over time, (2) End customer chip inventory is notoriously difficult to track, (3) Semi Rev is outgrowing end markets y/y, and (4) IC units are 15-20% above LT trends. We still prefer some cyclical defense but that is achievable without giving up leverage to LT positive secular trends, and see Analog/EDA as the most interesting sectors heading into CY18. We would highlight:

- 3Q/4Q Rev is 190/60 bps above seasonal and achievable – Our checks, read-across and SIA support at least IN-LINE with UPSIDE bias.
- Y/Y Rev peaked at +15%, C3Q +12% is above end-markets but inventories in check and seasonal q/q yields soft-landing to 4-7% by mid-18.
- Despite negative sentiment on AAPL, builds for iPhone 8/X continue to support C3Q/C4Q and C1Q Street estimates with potential upside.
- China handsets are seeing some recovery into Oct Holiday especially with launch of new flagship models from Xiaomi, Huawei, Oppo and Gionee.
- PC trends point to mostly in-line C3Q with upside for NB, but downside for DT. Comparisons become more difficult into C4Q and CY18.
- Semi Auto trends remain strong. Despite difficult SAAR compare, Sep units better than expected. Post-hurricane rebuilds could help C4Q.
- Despite new server launches with Purley/Epyc, neg-pres from JNPR/AAOI and concerns of AWS pause could mute hyperscale upside in C4Q.
- Wireless CapEx continues to disappoint, albeit rate of decline slowing. 2H Semi estimates appropriate, but upside unlikely until 5G picks up in 2019.
- Increasing CY18 CapEx: We are revising CY18 WFE to $49.7bn (+10% y/y) from $46.9bn (+4% y/y) with DRAM WFE growing +36% y/y.
- Identifying early trends for CY18, we would look to 1H seasonal strength in Industrial, Electric Vehicles (EV) especially in Asia, and 5G into C2H18.

Our end of CY18 SOX target remains 1362. We remain restricted on AVGO, QCOM and NXPI but reiterate our OP on ADI, TXN, SNPS, MU and LRCX. Neutrals with positive bias into earnings include CY and ASML.

Investment Summary

Figure 1: Top Picks

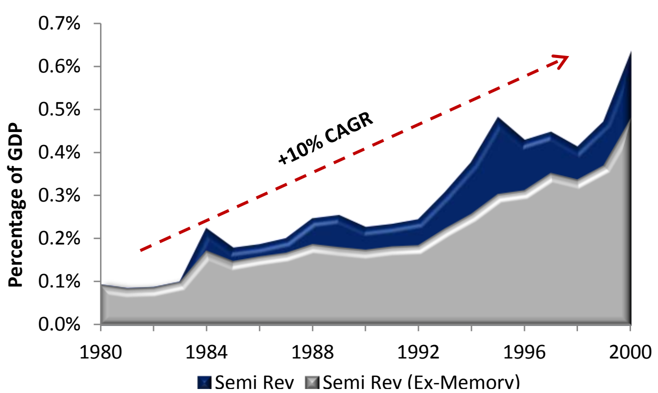
Current	C2Q17	C1Q17	Ticker	C3Q17	C4Q17TD	YTD	Commentary
				Performance			
1	1	NA	ADI	11%	3%	23%	Long duration and stable sockets with the highest B2B exposure in our coverage universe. LLTC provides scale advantages, LT FCFPS of $8+.
2	2	1	MU	32%	3%	84%	Industry supply discipline, strategic value is underappreciated. Free option on 3D NAND and XPoint.
3	3	2	TXN	17%	4%	28%	Street under-modeling Rev growth and OpM expansion. Market share leader in Analog generating sustainably strong FCF.
4	4	8	LRCX	31%	3%	80%	Well positioned to benefit from recovery in Memory CapEx. Compelling valuation - EV/EBITA at >40% disc. to Semis – likely to close w/ Tax reform.
5	5	6	MCHP	16%	2%	43%	Consistent execution and strong track record of M&A to augment organic growth.
6	9	4	MRVL	8%	2%	32%	Successfully navigating a turn-around that started with self-help/cost cutting and will ultimately end in sustainable growth/OpM leverage.
7	7	7	KLAC	16%	-1%	34%	Best positioned to benefit from Increasing CapEx to Rev for Logic/Foundry, upside to CY17 EPS, and Gen 5. Potential for 20% multiple expansion.
8	8	3	AMAT	26%	4%	67%	>10% Upside to EPS estimates, driven by growth in 3D NAND and Display CapEx. Potential for multiple expansion given > 20% discount to S&P.
9	6	13	XLNX	10%	3%	21%	At a multi-year inflection of driving operating leverage, with potential for LT OpM of 35% - incremental confidence in 4-8% Rev growth target.
10	10	9	SNPS	10%	5%	44%	Fastest growing and best quality EDA company.
11	11	NA	KEYS	7%	3%	17%	Leader in test/measurement and positioned to benefit from 5G.
12	12	16	ASML	31%	3%	57%	Long-term opportunity in EUV but trading at higher valuation to peers.
13	13	12	INTC	13%	4%	9%	Estimates look conservative albeit valuation does not, "Last-man-standing" on Moore's Law, EPS Potential of $4.
14	14	14	MXIM	6%	3%	28%	Best in class shareholder returns, execution on cost saving measures, fairly valued.
15	15	19	CY	10%	6%	39%	Rev optionality from USB Type-C and BRCM IoT, however China and Memory remain fundamental concerns.
16	16	15	AMD	2%	12%	25%	NT momentum will continue to offset many of our longer term concerns around lack of scale over at least the next several quarters.
17	17	18	TER	24%	4%	52%	Cyclical risk in 2017, but benefitting from slowing productivity improvements in Test. Potential for Acquisition by industrial company.
18	18	20	CDNS	18%	6%	67%	Solid management team but full valuations. Decelerating revenue growth and higher exposure to Semi M&A
19	20	21	BRKS	40%	4%	86%	Benefitting from Growth in WFE and increasing mix of lifesciences.
20	19	10	MLNX	9%	-5%	9%	Strong leverage to our Data Growth Paradigm, but decelerating growth at a growth multiple.
21	21	11	ON	32%	6%	53%	Typically underperforms a y/y growth peak. Valuation looks cheap on P/E but fair/full on EV/FCF.
22	22	17	RTEC	15%	2%	15%	Well Poised to outgrow the market due to growth of advanced packaging, but rich valuation.
NA	NA	NA	QCOM	-6%	2%	-19%	Restricted pending NXPI acquisition.
NA	NA	NA	AVGO	4%	2%	40%	Restricted pending BRCD acquisition.
NA	NA	NA	NXPI	3%	2%	18%	Restricted pending acquisition by QCOM.

Source: Thomson Reuters, Company data, Credit Suisse estimates

Semis Moving from "GDP-Minus" to "GDP-Plus" Growth

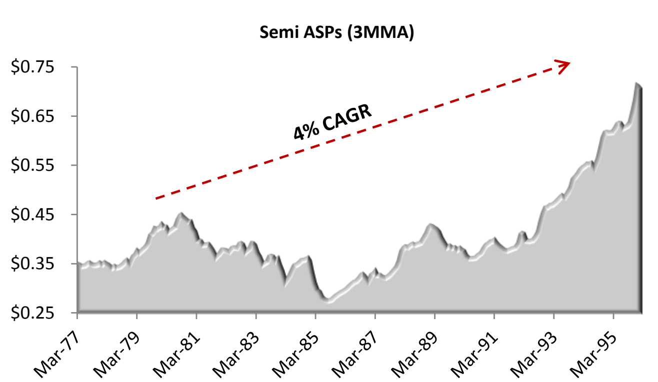
Still Structural Bulls on Semis: We continue to be Structural Bulls on the Semiconductor Sector – our argument centers on Semiconductor Revenue growth that we believe is poised to move from GDP minus to GDP plus against valuations on EV/FCF that are still 20% BELOW the SPX despite faster growth, higher margins and better cash returns. From the early 1970s through the late 1990s, the Semiconductor Industry was a GDP plus grower in large part because ASPs enjoyed a ~4% CAGR driven not by Semiconductor companies raising "like for like" pricing as much as by the Software industry developing new applications which demanded faster, more expensive chips every year.

Figure 2: Semi Rev as % of Nominal GDP Accelerated Thru 2000



Source: Company data, SIA, Bloomberg

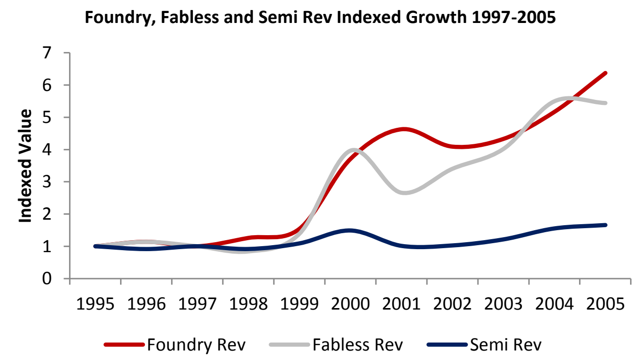
Figure 3: Semi ASPs Increased >100% from 1970-2000



Source: SIA

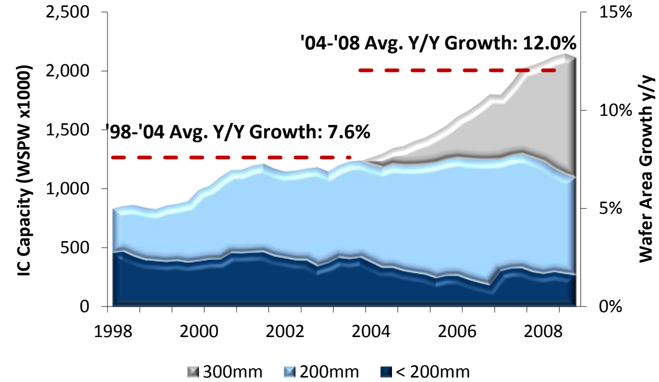
By the end of the 1990s, the industry experienced a confluence of events which upset the pricing dynamic specifically: (1) A lowering of barriers to entry with the advent of the Foundry model and a subsequent relative explosion of new entrants/IPOs in the Fabless Semi space, (2) Accelerating supply growth as Moore's Law went from a 3 year cadence to a 2 year cadence and the introduction of 300 mm wafers, and (3) A shift in the demand curve from enterprise to consumer and a software ecosystem which began to innovate at a slower pace – driving a "Good Enough" phenomenon.

Figure 4: Foundry/Fabless Outgrew Overall Semis



Source: Company data, Credit Suisse estimates, SIA

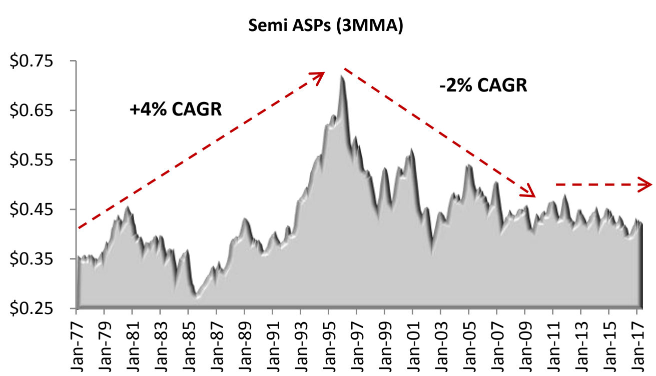
Figure 5: 300mm Drove 50% Higher Supply Growth Rate



Source: Company data, Credit Suisse estimates, SIA

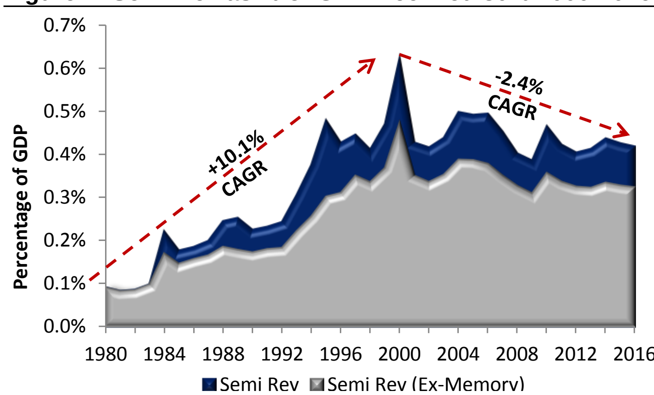
As a result, the industry was given the means (cost was coming down faster than normal) and the desire (application-led growth was slowing) to cut pricing in order to try and spur demand – i.e. price elasticity. The data is conclusive. The Semiconductor Industry is NOT price elastic – from 2000 thru 2008 ASPs declined on average 2% per year and Semi Rev as a % of Nominal Global GDP declined by 3% -- based on that measure of value, Semis are no more valuable to the Global economy today than they were in 1994/5.

Figure 6: Semi ASPs Declined 40% From 1997-Present



Source: Company data, Credit Suisse estimates, SIA

Figure 7: Semi Rev as % of GDP Declined 30% 2000-2016

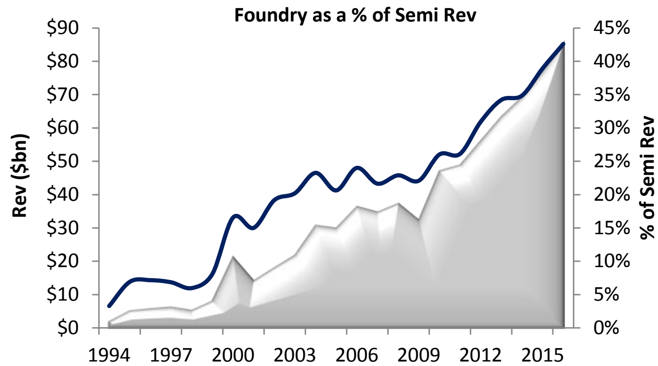


Source: Company data, Credit Suisse estimates, Bloomberg

Starting around the Financial Crisis thru today, we have seen a decided reversal of many of these dynamics – supporting stable to rising ASPs LT and the backdrop for Semi Rev to out-grow Nominal GDP; specifically:

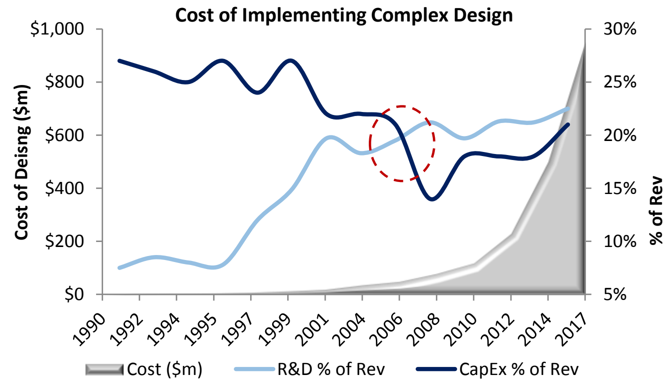
(1) Barriers to Entry are Rising: The cost of design has been growing non-linearly – driving M&A over IPOs. Over the last 8 years there have been >$300bn in M&A transactions, >3x more than in the prior 15 years. While foundries mitigated the capital cost for new entrants, R&D has become the new driver for scale. Sub-wavelength processing, multi-core, SoCs and Ecosystem Development have greatly increased the R&D burden.

Figure 8: Foundry Increased from 3% to 40% of Semi Rev



Source: Company data, Credit Suisse estimates, SIA

Figure 9: R&D is the New CapEx

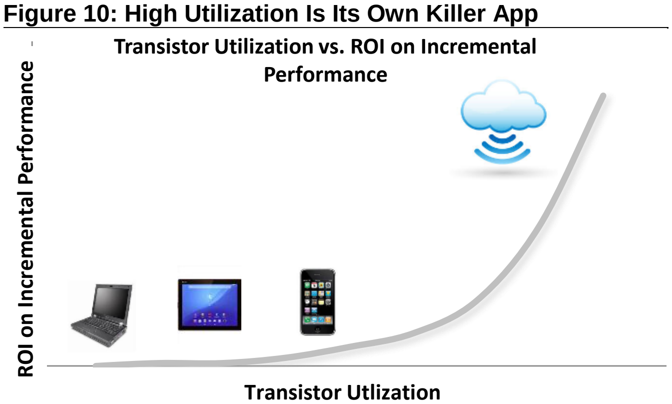


Source: Company data, Credit Suisse estimates, Bloomberg

(2) Supply Growth is Slowing: Moore's Law has become more difficult stretching back to a 3 year cadence and supply growth has slowed. Wafer size transitions occur ~10 years – implying 450 mm R&D in 2008. Litho throughput has made 450 mm "uneconomical." DRAM and Fabless consolidation caused supply growth to decelerate to just 2% from 2010-2017.

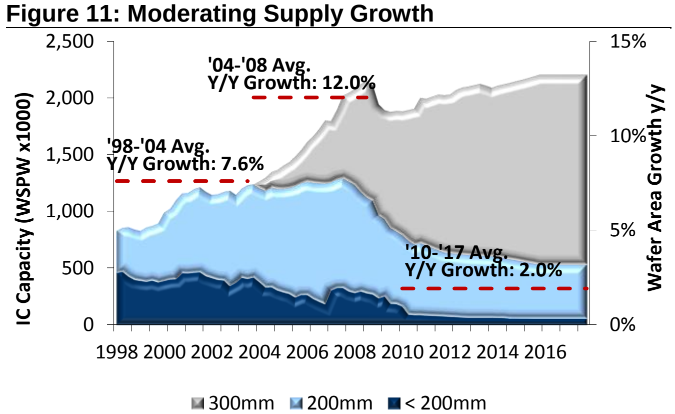
(3) End-Demand Diversifying: With handsets fully penetrated, end demand has migrated back to non-consumer. Specifically after peaking in 2011 at almost 2/3 of Semi Rev, Consumer will decline to BELOW 50% of Semi Rev in 2017. As Semi Mix moved higher, ASP declines have slowed from a -4% CAGR to flat. We see application driven growth as providing the foundation for stable to rising ASPs longer-term.

Figure 10: High Utilization Is Its Own Killer App



Source: Company data, Credit Suisse estimates, SIA

Figure 11: Moderating Supply Growth



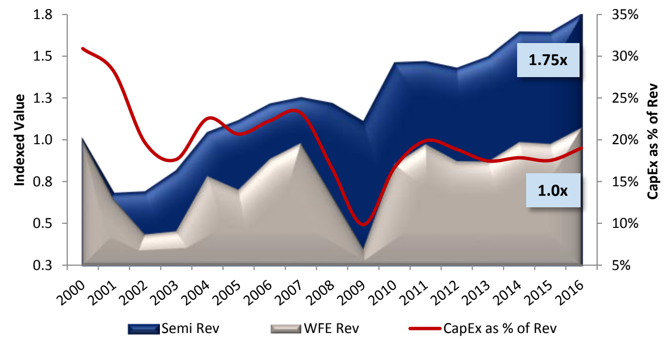
Source: Company data, Credit Suisse estimates, Bloomberg

SCE Moving From "Semi-Minus" to "Semi-Plus" Growth

Fab Productivity: Starting in 2000 a number of factors such as improved per tool throughput, automation, scheduling software and foundries helped to meaningfully increase fab productivity – i.e. 300mm productivity gains were not just a function of pi r-squared. INTC saw increased fab productivity, even against increasing Moore's Law complexity, reducing cycle times by 75%. While INTC is an outlier, it is directionally correct. As a result, from 2000-2015 Semi Rev almost doubled on flat WFE and Capital Intensity declined from ~30% to ~20%. However, the current industry dynamics are significantly different – which we believe is under-appreciated by investors as it pertains to our thesis that SCE is moving from "Semi-Minus" to "Semi-Plus" Growth. Gains from

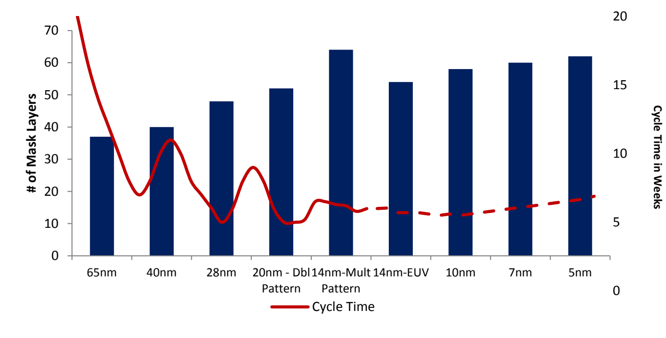
300mm have played out, complexity is increasing and will even with EUV – creating an upward bias to cycle times following ~10 years of declining cycle times. Relative to 450mm, we would note that original expectations were for a 2008 introduction (i.e. we are already ~10 years behind schedule) and we believe that litho throughput constraints might mean that 450mm will never be economical.

Figure 12: WFE Undergrew Semis



Source: Company data, Credit Suisse estimates

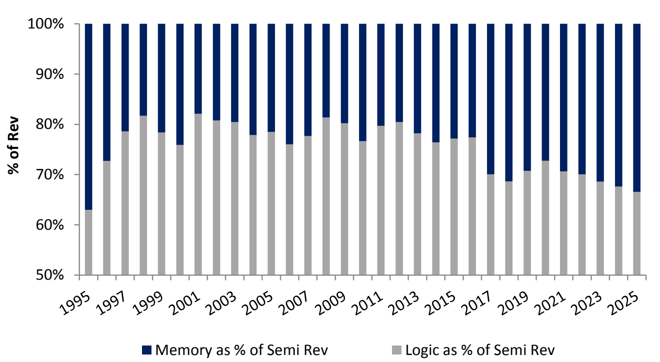
Figure 13: Cycle Times Poised to Reaccelerate



Source: Company data, Credit Suisse estimates

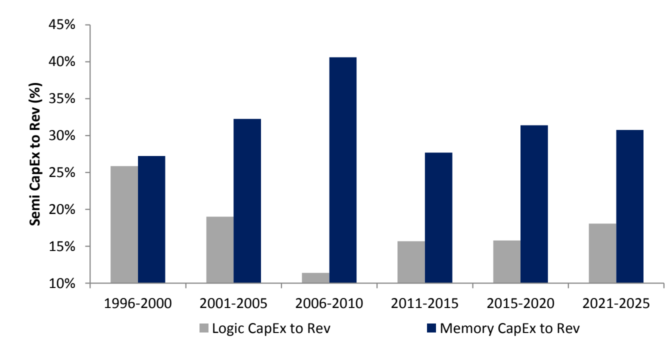
Improved Product Mix: Historically, Logic was the largest driver of Semi CapEx. Memory peaked at 37% of Semi Rev in 1995, and then fell to an average of 20% over the next 15 years even with NAND. While logic intensity was roughly on par with memory intensity in 1996-2000, it dropped as foundries drove more efficient, more highly utilized fabs. Now, we see demand mix towards higher capital intensity memory as new applications are more heavily dependent on memory – Virtual Machines, Artificial Intelligence, Autonomous Driving – and new price points should expand the TAM for SSDs. As such, we expect Memory CapEx/Rev to grow from ~25% today to ~35% by 2025. For example, if half of storage were on SSDs and half of cars sold were level 4/5 autonomous – we estimate the industry would need ~$450bn in additional CapEx.

Figure 14: Historically Logic was Largest Driver



Source: Company data, Credit Suisse estimates

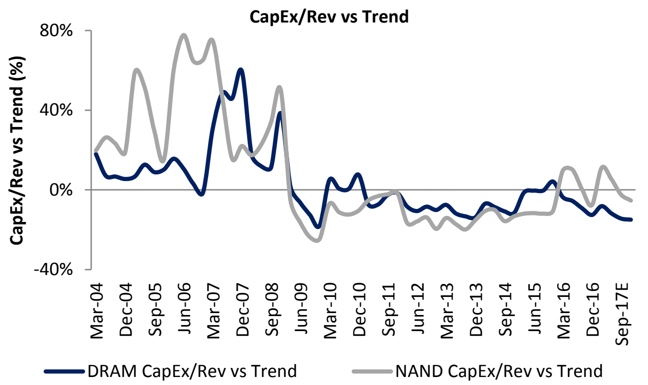
Figure 15: Mixing to Higher Cap. Intensity Memory



Source: Company data, Credit Suisse estimates

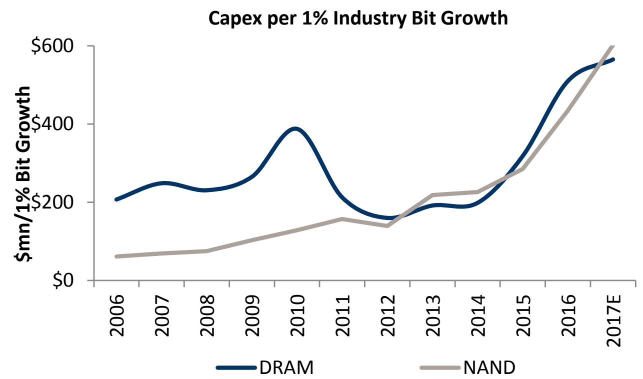
It's a Memory-Centric World: We remain structural bulls on the memory market, and would argue this cycle is likely to be "stronger-for-longer" as cyclical metrics remain in check, capital intensity is structurally increasing, and new applications (AI/DL, AD, SSDs) are supporting diversification and a demand-pull not seen since 1994-95. Relative to cyclical metrics, we would highlight that DRAM CapEx/Rev is only 20%, well below prior cycle peaks of 35%, while NAND CapEx/Rev of 50% is in-line with prior peaks. Further, the average memory cycle is 9 quarters, and we are only in quarter 5 for DRAM and 6 for NAND. Capital intensity is rising – specifically, the cost per 1% of NAND capacity has doubled over the last 3 years, while the cost per 1% of DRAM capacity has gone up 120%.

Figure 16: CapEx per Bit Decline is Slowing



Source: Company data, Credit Suisse estimates

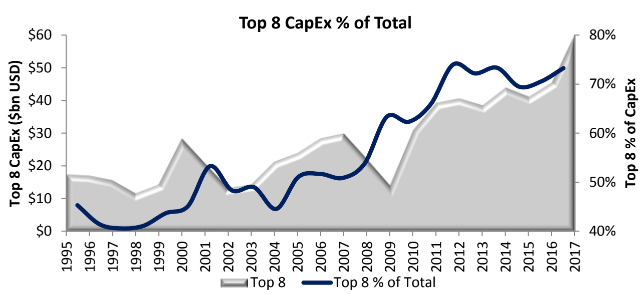
Figure 17: Capital Intensity on the Rise



Source: Company data, Credit Suisse estimates

Customer Base: Starting in 1995, foundry growth and 300mm drove CapEx consolidation. Specifically, in 1995 the top 8 Semis were >50% of CapEx, today they are >80%. Even memory saw consolidation – DRAM declined from 8 to 3 players despite outsized growth. Importantly, concentration negatively impacted SCE GMs – in the 1990s SCE GMs were regularly >50%, today they are in the mid to high 40s. However, the trend of consolidation has begun to change as the negative impact from Foundry is mostly in arrears – and without 450mm we are not likely to see additional IDM dropouts. Further, the growing strategic importance of memory has brought new players to the market – in particular China. Note – we are currently tracking 15 projects in China valued at $60bn.

Figure 18: Increasing Customer Concentration



Source: Company data, Credit Suisse estimates

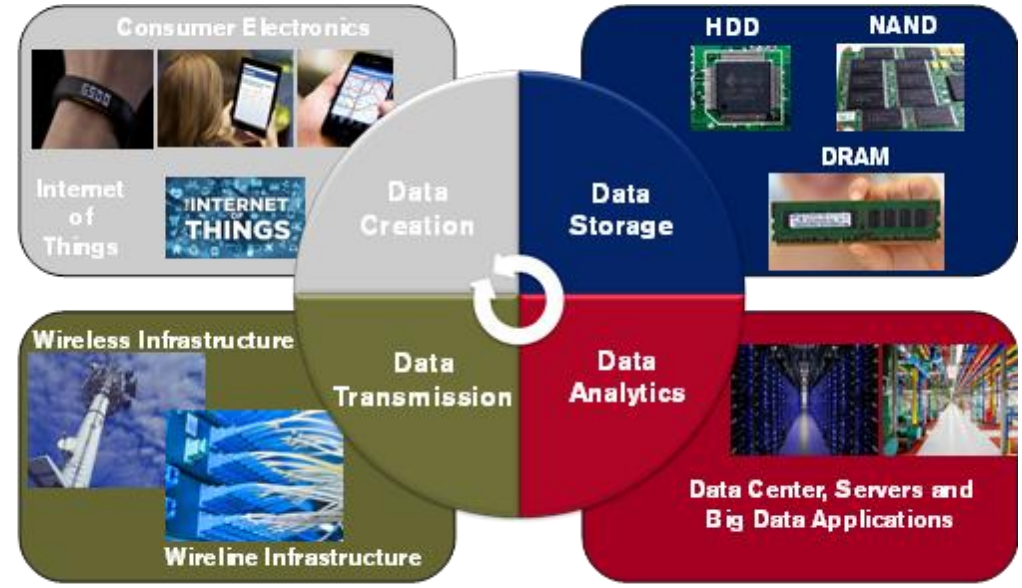
Figure 19: China Fab Projects

	City	Product	Current Capacity	Capacity by 2020
Alpha and Omega	Chongqing	Discrete		25
SITRI	Shanghai	MEMS Foundry	5	20
Fujian JinHua IC	Fujian	Foundry		60
GF Chongqing JV		Foundry		20
Nexchip (Powerchip/Heifei City JV)		Logic	5	50
Huali	Shanghai	Foundry		40
SMIC	Shanghai	Foundry	16	25
SMIC	Shanghai	Foundry		35
SMIC Beijing	Beijing	Foundry	37	45
SMIC Beijing	Beijing	Foundry	15	35
SMIC Shenzen	Shenzen	Foundry		35
UMC	Xiamen	Foundry	20	50
XMC	Wuhan	NOR	25	60
XMC	Wuhan	NAND		100
XMC	Wuhan	DRAM		100

Source: Company data, Credit Suisse estimates

Improving Growth Does Not Depend on Demand Buzz-Words: We love all the buzz words: AI, AD, AR, VR, IoT, 5G – but we tend to focus on the common thread – data growth. We continue to argue that Semiconductors are the safest and cheapest way to play what we have described as the Data Growth Paradigm in Technology. Simply, we have argued that the Data Growth is the only demand driver worth playing in technology, because it is the only driver that we are likely underestimating. Our virtuous cycle has been straightforward – there are 4 different buckets within our paradigm: Data Creation, Data Storage, Data Transmission, and Data Analytics – the most important being Analytics as it is the economic cornerstone of the model – as it provides the mechanism by which to monetize data. While Creation, Storage, and Transmission benefit from non-linear cost declines, Analytics has not yet. We would include Deep Learning/Artificial Intelligence under the Data Analytics umbrella – while not every Big Data problem is an DL/AI problem, most DL/AI problems are big data problems.

Figure 20: Data Growth Paradigm

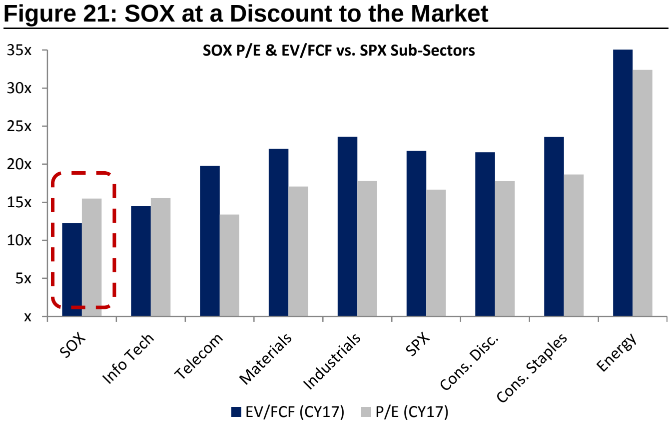


Source: Company data, Credit Suisse estimates

Once Data Analytics becomes ubiquitous, we continue to argue, that data becomes inherently valuable, and the acquisition of data becomes a high ROI endeavor, justifying the subsidizing of data collection – the most efficient mechanism by which to collect data is to digitize the economy at a faster rate. In addition, we continue to argue that the more consensus view of IoT as a "dumb" edge pushing data to a "smart" center is overly simplistic and continue to advocate a more complex tapestry where intelligence is increasingly pushed to the edge.

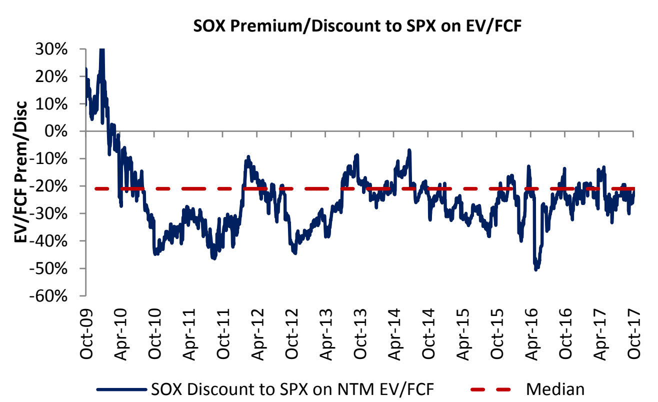
Valuation Still at a 20% Discount to SPX on EV/FCF. Based on EV/FCF, Semis are trading at 17x, vs SPX of 22x, Industrials of 19x and Consumer Staples of 25x – in line with their historical discount – despite having faster growth rates, better profitability, and higher dividend yields. Specifically – despite the SOX outperforming the market YTD (SOX up ~35% vs. the SPX up ~15%) and in C3Q (SOX up ~15% vs. the SPX up ~5%), the SOX still trades at ~20% discount to the SPX on EV/FCF. All of the Semi outperformance has been EPS/FCF driven rather than multiple expansion.

Figure 21: SOX at a Discount to the Market



Source: Company data, Credit Suisse estimates, Thomson Reuters

Figure 22: EV/FCF Below Historical Discount

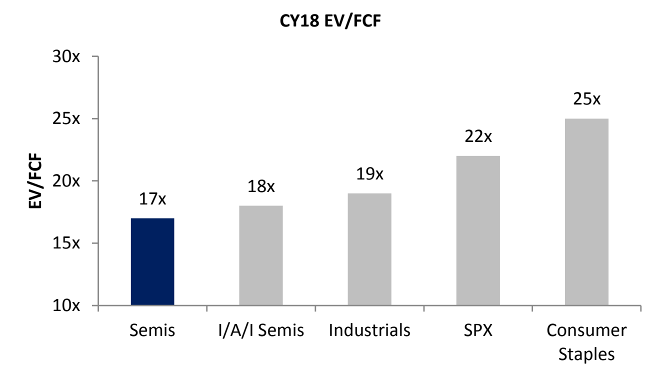


Source: Company data, Credit Suisse estimates, Thomson Reuters

Specifically, over the past 5 years relative to the SPX/Consumer Staples, Semis have exhibited faster (1) Rev growth (5% CAGR vrs 1%/3%), (2) Net Income growth (10% vrs

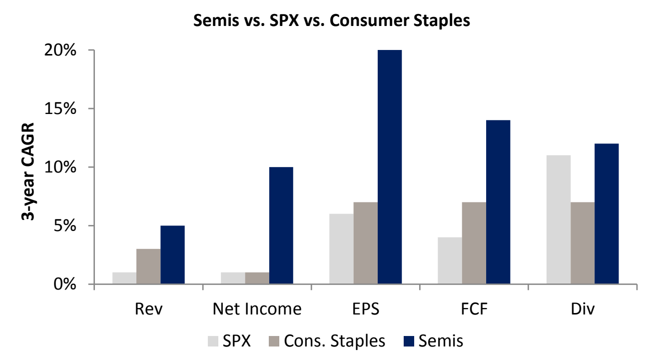
1%/1%), (3) EPS growth (20% vrs 6%/7%), (4) FCF growth (14% vrs 4%/7%) and (5) Div growth (12% vrs 11%/7%) with comparable yield (2% vs. 2%/2%). We believe the Semiconductor sector is in the midst of a secular re-rating driven by: (1) Slowing Supply Growth, (2) Rising Barriers to Entry, (3) Consolidation and (4) Positive mix shift towards I/A/I. Longer-term, the market is still significantly undervaluing the importance of (1) Data Growth, (2) 5G network architecture, (3) Data Analytics and (4) Deep Learning. These trends will drive sustainably higher growth rates, returns, and ultimately equity valuations for Semiconductor Stocks.

Figure 23: Semis Undervalued on EV/FCF



Source: Company data, Credit Suisse estimates, Thomson Reuters

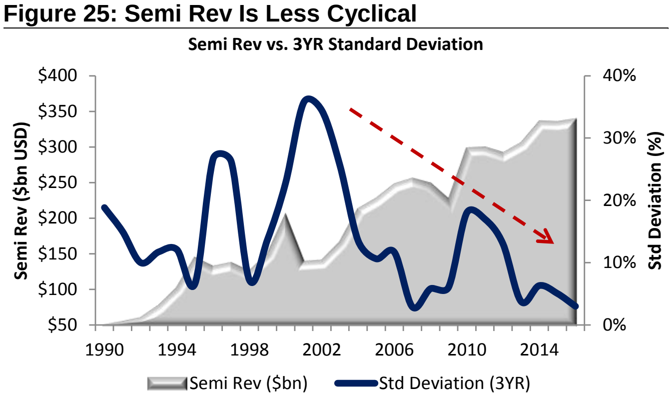
Figure 24: Despite Stronger Growth and Returns



Source: Company data, Credit Suisse estimates, Thomson Reuters

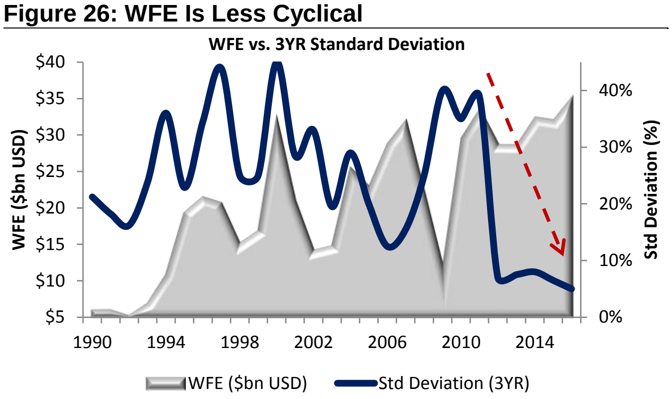
Faster Growth Drives Modestly Higher Cyclicality: Compared to the 1990s, the Semiconductor Industry is significantly less cyclical – Specifically, Y/Y volatility in Semi Rev has declined from what had regularly been ~2,000 bps to less than ~400 bps. Similarly, Y/Y volatility in WFE has declined from what had regularly been ~2,500 bps to less than ~500 bps. We argue that the industry will remain less cyclical than in the 1990s for a host of reasons: **(1) Positive Mix Shift** – towards longer-lived product cycles has made Semis less dependent on short-duration Consumer, **(2) More Concentrated Spending** – The Top 8 customers are expected to spend 90% of CY17 WFE vs. only 57% in 2009, and **(3) Better ERP and Distribution** – channel expansion vastly improved inventory management and reduced short-term fluctuations. However, cyclicality is likely to modestly increase from here given: **(1) Stable-to-Rising ASPs and Tight Supply** – inventory is an asset, **(2) More Diverse End-Demand** – It's easy to track semi inventory, relatively easy to track disti inventory, near impossible to track customer inventory, and **(3) China is a Double-Edged Sword –** New entrants always create increased cyclicality – albeit nothing like the 1990s.

Figure 25: Semi Rev Is Less Cyclical



Source: Company data, SIA

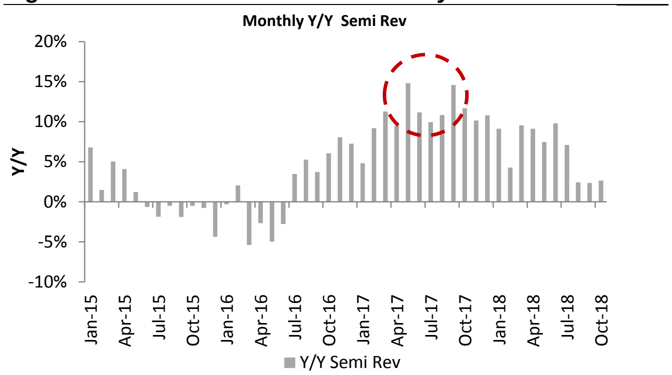
Figure 26: WFE Is Less Cyclical



Source: Company data, SIA

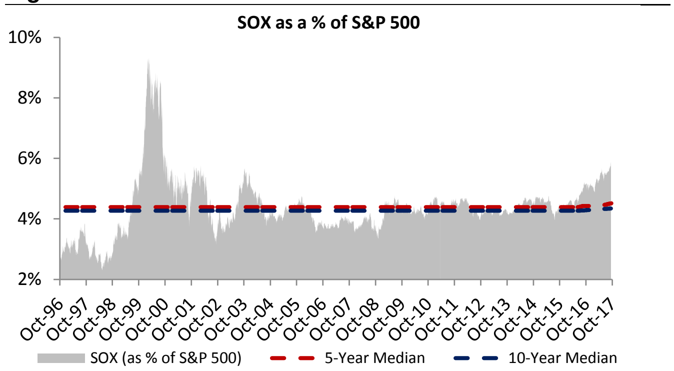
Market Seems to Have Digested the Cyclical Peak: Since 06/30 the SOX has increased ~15% ABOVE the SPX up ~5% – the market appears to have digested Cyclical Peak concerns following Semi Rev peaking in May at up 25% y/y. Unlike prior peaks we see only a slowing of growth, NOT a contraction but would continue to highlight "yellow-flags": (1) Lead-times stretching, (2) Semis outgrowing end demand, (3) Distribution outperforming direct and (4) Sell-in outperforming sell-thru. We would note that the SOX as a % of the SPX has grown from 5.3% to 5.9% – the highest since 2000. The next tactical hurdle will occur post peak iPhone X builds (Feb/Mar 2018) – the first opportunity to see end demand ex-concerns of AAPL monopolizing supply, when growth prospects look more subdued unless structural pricing improves, especially in MCU and Analog.

Figure 27: Y/Y Semi Rev Peaked in May



Source: Company data, Thomson Reuters

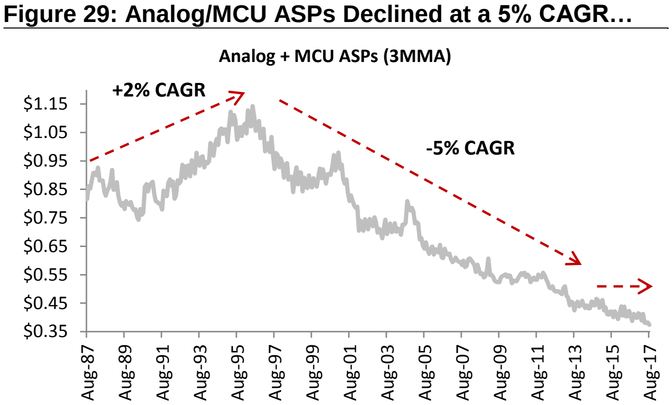
Figure 28: SOX as % of SPX



Source: Company data

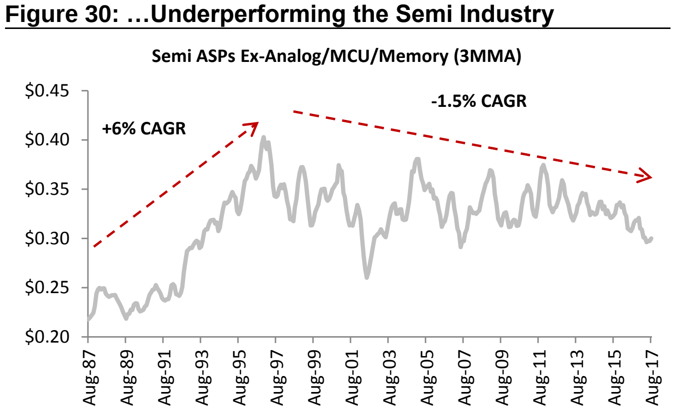
We would note that since Semi ASPs peaked in the late 1990s, Analog and MCU ASPs have declined faster than the overall market (-5% / -7% CAGR below Semis Ex-Memory which declined at a -4% CAGR) – pricing declines coincided with new application growth in Consumer at the low-end (PCs, smartphones). Importantly, ASP declines in Analog/MCU have slowed over the past 3 years and improved relative to Semis coincidental with content growth in non-traditional B2B applications. Since 2014, Analog/MCU have seen better pricing declines (ASPs declining at a 3% CAGR), in-line with Semis Ex-Memory/Analog/MCU. With handsets now mostly fully penetrated, end demand has migrated from consumer back to non-consumer, providing the foundation for stable to rising ASPs moving forward.

Figure 29: Analog/MCU ASPs Declined at a 5% CAGR…



Source: Company data, SIA

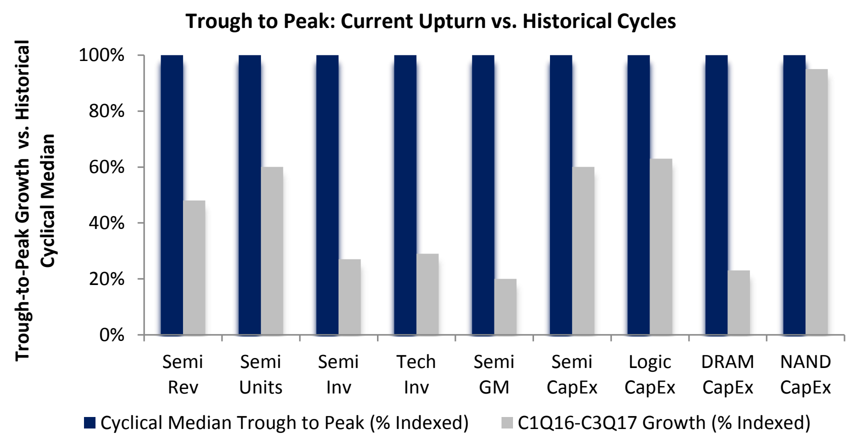
Figure 30: …Underperforming the Semi Industry



Source: Company data, SIA

Trough-to-Peak Metrics Behaved vs. History… If one were looking at the sector thru only a cyclical lens, current 2017 estimated profitability levels would equate nicely to prior peaks. However, over the last several years profitability improvements have been driven more by secular than cyclical improvements – we base this conclusion on our view that current cyclical dynamics have been muted vs. prior cycles. We would note that we are peaking at levels that still do not represent over-exuberance in the context of all the cyclical metrics we monitor. Specifically, if measured based on trough to peak metrics – the current upturn (to-date) is well below prior cyclical peaks: IC Rev (ex-Memory) is ~21 pct pnts below prior periods, IC Units (ex-Memory) are ~13 pct pnts below, Semi Inv is ~24 pct pnts below, Tech Inv is ~25 pct pnts below, GM expansion is ~8 pct pnts below, and OpM expansion is ~5 pct pnts below. Semi/Tech Inventory levels exiting C2Q remain within historical ranges, supportive of our view for a deceleration in y/y growth post May without negative growth. Similarly despite NAND CapEx growing ~95% of prior cycles from trough-to-peak, DRAM CapEx has only grown ~23% and Logic CapEx ~63%, driving total Semi CapEx growth that is only ~60% of prior cycles.

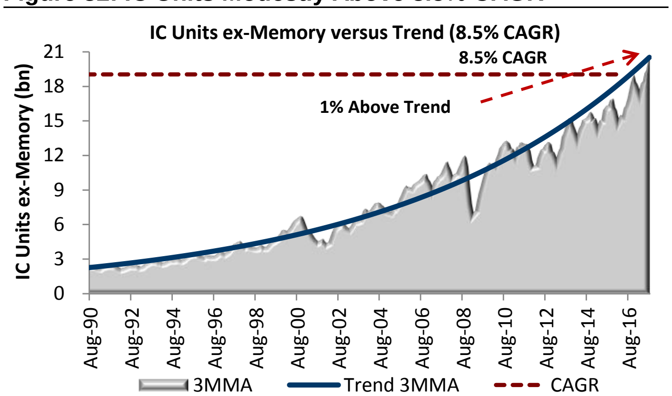
Figure 31: Cycle Well-Behaved Relative to Trough-to-Peak History



Source: Company data, Credit Suisse estimates

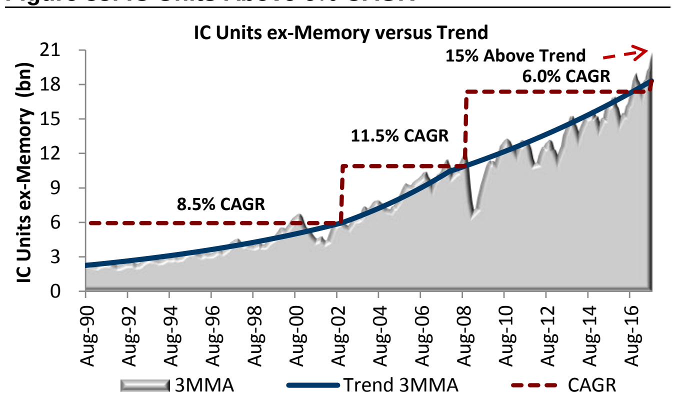
…But Units Above LT Trend: While we see more upside than downside thru year-end, cyclical headwinds could catch up with Semis in C1Q post CNY as AAPL builds peak and customers "feel" less anxious about availability. Our models still suggest only a deceleration of growth i.e. a Soft Landing – but we would note: (1) Our positive Secular View implies cyclicality modestly increases over time, (2) End customer chip inventory is notoriously difficult to track, (3) Semi Rev is outgrowing end markets y/y, and (4) IC units are 15-20% above LT trends. Specifically, IC units ex-Memory have rebounded ~54% off the C1Q16 trough and while units are only 1.4% above the 8.5% trend line, they are ~15% above the 2008-16 CAGR of 6%.

Figure 32: IC Units Modestly Above 8.5% CAGR



Source: Company data, Credit Suisse estimates

Figure 33: IC Units Above 6% CAGR



Source: Company data, Credit Suisse estimates

Figure 34: Semi Trough to Peak Cyclical Analysis – Rev, Units, Inventory, and Margins

Cycle Analysis	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Avg.	Current	vs Avg.
Quarters									
Trough	C2Q96	C3Q98	C3Q01	C1Q07	C1Q09	C1Q13	--	C1Q16	--
Peak	C3Q97	C3Q00	C4Q05	C3Q08	C3Q11	C4Q14	--	C3Q17	--
Delta (# of Qtrs)	**5.0**	**8.0**	**17.0**	**6.0**	**10.0**	**7.0**	**8.8**	**6.0**	**-2.8**
SIA Rev ($bn)									
Trough	$18.7	$21.4	$21.4	$36.7	$29.2	$43.4	--	$47.2	--
Peak	$22.9	$33.7	$37.9	$45.5	$49.2	$51.5	--	$58.3	--
Delta (% Chng)	**22.2%**	**57.2%**	**77.5%**	**24.2%**	**68.3%**	**18.7%**	**44.7%**	**23.4%**	**-21.3%**
SIA Units (bn)									
Trough	10.0	12.3	14.0	29.4	21.8	37.0	--	46.6	--
Peak	13.6	20.2	27.9	36.1	39.1	45.8	--	65.6	--
Delta (% Chng)	**34.8%**	**64.7%**	**100.0%**	**22.7%**	**79.3%**	**23.8%**	**54.2%**	**40.9%**	**-13.4%**
Semi Inv ($bn)									
Trough	$5.1	$6.2	$11.1	$23.8	$18.1	$29.5	--	$34.0	--
Peak	$5.1	$11.0	$17.8	$23.4	$27.7	$32.0	--	$37.1	--
Delta (% Chng)	**0.8%**	**77.9%**	**60.7%**	**-1.6%**	**53.1%**	**8.5%**	**33.2%**	**9.1%**	**-24.1%**
Tech Inv ($bn)									
Trough	$37.9	$57.4	$100.4	$129.8	$131.1	$184.6	--	$175.2	--
Peak	$50.8	$104.7	$111.9	$171.0	$198.5	$184.4	--	$193.2	--
Delta (% Chng)	**34.2%**	**82.3%**	**11.5%**	**31.7%**	**51.5%**	**-0.1%**	**35.2%**	**10.3%**	**-24.9%**
Semi GM (%)									
Trough	43.2%	48.8%	39.0%	47.9%	42.1%	53.2%	--	58.5%	--
Peak	51.2%	57.4%	54.5%	51.9%	57.0%	58.6%	--	59.6%	--
Delta (Pct Pnts)	**8.0%**	**8.6%**	**15.4%**	**4.1%**	**14.9%**	**5.4%**	**9.4%**	**1.1%**	**-8.2%**
Semi OpM (%)									
Trough	19.5%	24.5%	5.9%	14.1%	2.4%	17.8%	--	24.1%	--
Peak	27.7%	31.8%	25.0%	21.2%	27.6%	27.0%	--	31.3%	--
Delta (Pct Pnts)	**8.2%**	**7.3%**	**19.0%**	**7.1%**	**25.1%**	**9.3%**	**12.7%**	**7.2%**	**-5.4%**

Source: Company data, Credit Suisse estimates

C3Q17 Earnings – At Least In-Line w/ Upside Bias

C3Q Street Estimates vs. Seasonal Imply Conservative Setup: We track 45 publicly-traded U.S. Semiconductor companies in our dataset. Our analysis suggests that C3Q aggregate Street Rev estimates are conservative, tracking only 190 bps above seasonal vs. SIA which is tracking 610 bps above seasonal through August. Specifically, C3Q aggregate Street Rev estimates including Memory are tracking up 6.7% q/q, 190 bps ABOVE seasonal of up 4.8% q/q – this compares to C3Q SIA total Semi Rev which is tracking up 12.6% q/q through August, 610 bps ABOVE seasonal of up 6.5% q/q. Similarly, C3Q aggregate Street Rev estimates ex-Memory are tracking up 6.3% q/q, only 170 bps ABOVE seasonal of up 4.6% q/q – this compares to C3Q SIA Rev ex-Memory which is tracking up 9.9% q/q through August, 510 bps above seasonal of up 4.8% q/q.

Figure 35: Street Rev Estimate Revisions Since June

Street Est. Delta	C3Q17		
Revenue Q/Q	Jun-17	Oct-17	Delta
MU	1.9%	10.3%	**8.4%**
AMD	19.8%	23.2%	**3.4%**
DIOD	3.1%	6.2%	**3.1%**
VSH	-0.8%	2.2%	**3.0%**
QCOM	6.0%	8.0%	**2.1%**
MPWR	11.2%	12.4%	**1.3%**
MCHP	1.8%	3.1%	**1.2%**
CRUS	27.0%	27.9%	**0.9%**
AOSL	4.3%	5.2%	**0.9%**
XLNX	0.2%	0.9%	**0.7%**
STM	8.0%	8.6%	**0.6%**
MSCC	3.2%	3.7%	**0.5%**
ADI	2.6%	2.8%	**0.2%**
ST	-4.6%	-4.3%	**0.2%**
NXPI	3.7%	3.9%	**0.2%**
INTC	6.5%	6.5%	**0.0%**
AVGO	7.6%	7.5%	**-0.1%**
SLAB	3.3%	3.2%	**-0.1%**
IDTI	2.4%	2.2%	**-0.2%**
SWKS	9.3%	8.9%	**-0.4%**
CAVM	3.8%	3.3%	**-0.5%**
ON	2.7%	2.2%	**-0.6%**
TXN	6.7%	5.9%	**-0.8%**
IFX	1.6%	0.7%	**-0.9%**
POWI	5.1%	4.0%	**-1.1%**
MXIM	-2.8%	-4.2%	**-1.4%**
MRVL	2.5%	0.9%	**-1.6%**
DLG	44.1%	42.4%	**-1.7%**
DSPG	11.3%	8.6%	**-2.7%**
NVDA	8.9%	5.9%	**-3.0%**
SMTC	3.1%	0.1%	**-3.1%**
IPHI	3.8%	0.6%	**-3.2%**
MXL	14.8%	11.1%	**-3.7%**
CY	5.8%	1.5%	**-4.3%**
MLNX	11.5%	7.0%	**-4.5%**
QRVO	34.0%	26.9%	**-7.1%**
LSCC	8.0%	0.0%	**-8.0%**
AMBA	25.6%	15.7%	**-9.9%**
SYNA	4.2%	-6.5%	**-10.7%**
KN	27.8%	16.0%	**-11.8%**
SIMO	10.0%	-4.1%	**-14.1%**
MTSI	4.6%	-12.6%	**-17.2%**
Total Semi	6.3%	6.7%	**0.4%**
Semi ex-Memory	5.7%	6.3%	**0.6%**
Semi ex-INTC	6.3%	6.7%	**0.4%**
Semi ex-INTC/Memory	5.7%	6.2%	**0.5%**

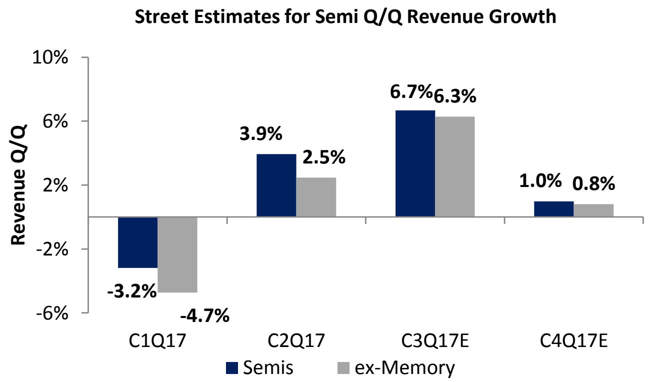
Source: Thomson Reuters, Company data

Figure 36: CS and Street Estimates vs. Seasonal

C3Q CS/Street Estimates vs. Seasonal					
Revenue Q/Q	Seasonal	CS	Delta	Street	Delta
DLG	28.2%	39.2%	**11.0%**	42.4%	**14.2%**
DSPG	-5.4%	--	**--**	8.6%	**14.1%**
QRVO	13.8%	--	**--**	26.9%	**13.1%**
AMD	12.6%	23.0%	**10.4%**	23.2%	**10.6%**
KN	7.0%	--	**--**	16.0%	**8.9%**
STM	0.8%	9.0%	**8.2%**	8.6%	**7.8%**
QCOM	2.3%	--	**--**	8.0%	**5.7%**
MXL	6.7%	--	**--**	11.1%	**4.4%**
MU	6.2%	10.3%	**4.1%**	10.3%	**4.1%**
MCHP	0.5%	3.0%	**2.5%**	3.1%	**2.6%**
NXPI	1.6%	--	**--**	3.9%	**2.3%**
XLNX	-1.4%	0.7%	**2.1%**	0.9%	**2.3%**
AVGO	5.2%	--	**--**	7.5%	**2.3%**
VSH	0.3%	--	**--**	2.2%	**1.9%**
DIOD	4.6%	--	**--**	6.2%	**1.6%**
CAVM	2.0%	--	**--**	3.3%	**1.3%**
INTC	5.2%	6.3%	**1.1%**	6.5%	**1.2%**
SLAB	2.1%	--	**--**	3.2%	**1.1%**
MLNX	6.0%	7.1%	**1.1%**	7.0%	**1.0%**
ON	1.6%	2.0%	**0.4%**	2.2%	**0.6%**
ST	-4.6%	--	**--**	-4.3%	**0.2%**
MSCC	3.7%	--	**--**	3.7%	**0.0%**
POWI	4.2%	--	**--**	4.0%	**-0.3%**
TXN	6.3%	5.6%	**-0.7%**	5.9%	**-0.5%**
SWKS	9.4%	--	**--**	8.9%	**-0.5%**
MRVL	1.5%	0.9%	**-0.6%**	0.9%	**-0.6%**
MPWR	13.2%	--	**--**	12.4%	**-0.7%**
MXIM	-3.4%	-1.4%	**2.0%**	-1.1%	**2.3%**
SMTC	0.9%	--	**--**	0.1%	**-0.9%**
AOSL	6.5%	--	**--**	5.2%	**-1.3%**
CY	3.5%	1.0%	**-2.5%**	1.5%	**-2.0%**
IFX	3.6%	0.0%	**-3.6%**	0.7%	**-2.9%**
LSCC	2.9%	--	**--**	0.0%	**-2.9%**
IDTI	5.3%	--	**--**	2.2%	**-3.1%**
SYNA	-3.3%	--	**--**	-6.5%	**-3.2%**
ADI	8.1%	2.8%	**-5.3%**	3.0%	**-5.1%**
IPHI	6.9%	--	**--**	0.6%	**-6.3%**
NVDA	13.2%	--	**--**	5.9%	**-7.3%**
CRUS	37.8%	--	**--**	27.9%	**-9.8%**
AMBA	27.6%	--	**--**	15.7%	**-11.9%**
MTSI	1.7%	--	**--**	-12.6%	**-14.4%**
SIMO	10.6%	--	**--**	-4.1%	**-14.7%**
Total Semi	4.8%	6.5%	**1.7%**	6.7%	**1.9%**
Semi ex-Memory	4.6%	6.0%	**1.3%**	6.3%	**1.7%**
Semi ex-INTC	4.7%	6.5%	**1.9%**	6.7%	**2.1%**
Semi ex-INTC/Memory	4.4%	6.0%	**1.6%**	6.2%	**1.8%**

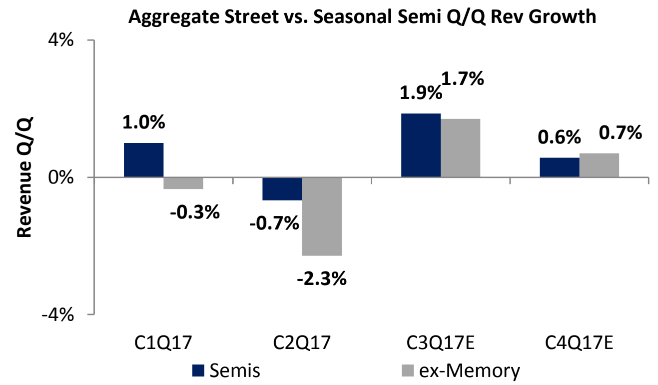
Source: Thomson Reuters, Company data

Figure 37: Aggregate Bottom-up Street Rev Est. Q/Q



Source: Thomson Reuters, Company data

Figure 38: Aggregate Bottom-up Rev Seasonality



Source: Thomson Reuters, Company data

SIA C3Q Rev Tracking WELL ABOVE Seasonal: Through August, C3Q Rev is tracking to $110.2bn, up 12.6% q/q which is WELL ABOVE seasonal of up ~6.5% q/q. C3Q Rev is tracking up 24.8% y/y, an acceleration from up 17.9% y/y in C2Q17 and would mark the 5th consecutive quarter of improvement off of the trough in C2Q16 (down 5.7% y/y). Excluding Memory, C3Q Semi Rev is tracking to $76.4bn or up 9.9% q/q, WELL ABOVE seasonal of up 4.8% q/q, which would represent y/y growth of 11.9%, in-line with C2Q Rev which grew 11.8% y/y. Assuming seasonal growth, CY17 Semi Rev is tracking to $413bn, up 21.9% y/y and a marked improvement from 2015/2016 of -0.2%/1.1%. Ex-Memory, Semi Rev is tracking to $290bn, up 10.8% y/y vs. 2015/2016 of 0.5%/1.6%. More importantly, while y/y Semi Rev growth peaked in May (up 25.0% y/y), unlike prior peaks we expect ONLY a slowing of growth and NOT outright contraction – seasonal growth from here implies Semi Rev ex-Memory decelerates to mid-single digit y/y by mid-2018.

QTD Semi Pre-announcements: QTD 6 Semi companies have pre-announced or reiterated guidance for C3Q. Specifically 3 companies revised Rev guidance modestly upward (Samsung, SIMO and RMBS) – Samsung pre'd C3Q Rev mostly in-line with Street and Operating Profit modestly above – partially driven by better DRAM/NAND – and SIMO positively pre'd C3Q Rev likely on modestly better NAND supply. MCHP reiterated F2Q guidance, noting that the business environment remains strong and lead times have begun to stabilize (reflective of both industry conditions and MCHP-specific initiatives) – most importantly the Company expects a "soft landing" by mid-CY18 and for inventories and lead times to return to normal levels. Although the Company did not raise guidance, MCHP has either positively pre'd or reiterated/narrowed guidance for the past 5 quarters – and despite only reiterating the midpoint of EPS guidance in F4Q17/F2Q17, MCHP beat the high end by 5%/6% respectively. Fingerprint Cards revised C3Q guidance below Street expectations driven by distributors and module houses reducing inventory ahead of the iPhone X ramp, along with weaker than expected ASPs (down 30% y/y vs. previous expectations for down 20% y/y) and FX impact.

Figure 39: Summary of C3Q17 Semi Guidance Revisions

		C3Q17 Revenue Guide ($m)			C3Q17 Revenue Guide Q/Q			
Ticker	Date	Prior	New	($ Delta)	Prior	New	(% Delta)	Quarterly Commentary
RMBS	09/21/17	$99	$99	$0	4.5%	4.5%	0.0%	Raised Rev and narrowed EPS guidance - continued performance across legacy and acquired businesses, also noted C4Q Rev tracking with prior expectations.
MCHP	09/05/17	$1,000	$1,000	$0	2.9%	2.9%	0.0%	Reaffirmed Rev/EPS guidance. MCHP noted business environment continues to be good/lead times have stabilized, and expects a soft landing into CY18.
FING	09/18/17	SEK 1,000.0	SEK 820.0	-SEK 180.0	21.4%	(0.4%)	(21.9%)	Guided C3Q Rev BELOW Street - experiencing cautious market as distributors minimize inventory ahead of AAPL ramp, along with weaker ASPs and FX.
SIMO	10/06/17	$126	$127	$2	(5.4%)	(4.3%)	1.1%	Raised Rev guidance to upper half of original range $122-129M, reiterated GM of 45-47%.
LSCC	10/12/17	$94	$92	($2)	(0.3%)	(2.2%)	(1.9%)	Ahead of Analyst Day guided C3Q Rev BELOW Street and FY17 Rev $383-388m BELOW Street $391m - also guided FY18 Rev up double digits y/y.
Samsung	10/12/17	₩62T	₩62T	₩0	1.4%	1.6%	0.2%	Samsung guided C3Q Sales of KRW 62tn IN-LINE with Street, and C3Q OpPof KRW 14.5tn modestly ABOVE Street at 14.3t won - in part driven by better DRAM/NAND.
Average					**4.6%**	**0.1%**	**(4.5%)**	
Median					**2.9%**	**(0.4%)**	**0.0%**	
Aggregate		**$58,438.3**	**$58,616.4**	**$178.1**	**6.2%**	**5.8%**	**0.3%**	

Source: Company data, Thomson Reuters

QTD SemiCap Pre-announcements: Relative to SemiCap, Disco noted that SepQ orders were ¥41.0bn, above guidance for ¥36-37bn. NANO negatively pre'd C3Q Rev/EPS due to delay of revenue recognition on multiple systems into Japan that require customer acceptance – a company specific issue – and provided preliminary C4Q guidance that was ABOVE Street. During C3Q KLAC also noted that business conditions remain strong and that C3Q is shaping up about how the Company expected. KLAC also noted it expects strength in DRAM and Foundry/Logic to continue into next year – specifically its current bookings funnel is 10-15% higher than what the Company expected in July driven mostly by Memory investments.

Figure 40: Summary of C3Q17 SemiCap Guidance Revisions

		C3Q17 Guide ($m)			C3Q17 Guide Q/Q			
Ticker	Date	Prior	New	($ Delta)	Prior	New	(% Delta)	Quarterly Commentary
DISCO	09/15/17	¥ 37	¥ 41	¥ 5	(17.8%)	(7.7%)	10.1%	Better than expected SepQ orders of ¥41bn, above guidance for ¥36-37bn.
NANO	10/13/17	$62.0	$56.5	($5.5)	(3.7%)	(12.3%)	-8.5%	C3Q Rev/EPS BELOW prior guide due to delay of revenue recognition on multiple systems – company specific issue. Provided prelim C4Q guide ABOVE Street.
Average					**-17.8%**	**-7.7%**	**10.1%**	
Median					**-17.8%**	**-7.7%**	**10.1%**	
Aggregate		**$386.9**	**$421.4**	**$34.6**	**-17.8%**	**-7.7%**	**10.1%**	

Source: Company data, Thomson Reuters

C4Q17 – Expect At Least In-Line Guidance

C4Q Street Modestly Above Seasonal Despite Multiple Tailwinds: Relative to the 45 publicly-traded Semiconductor companies that we track in our dataset, bottoms-up Street Rev estimates for C4Q17 currently embed growth that is only 60 bps above seasonal despite tailwinds from the iPhone X ramp, continued strong I/A/I fundamentals, and favorable Memory supply/demand dynamics through C1H18. Specifically, current C4Q Street Rev estimates for all Semis in our dataset embed 1.0% q/q growth, 60 bps above seasonal of up 0.4% q/q. Excluding Memory, aggregate Street Rev estimates are tracking up 0.8% q/q, 70 bps above seasonal of up 0.1% q/q. Further, we would note that peak iPhone X builds being pushed out to Jan/Feb could provide upside to C1Q18 Rev which is currently being modeled 70 bps BELOW seasonal.

Figure 41: Street Rev Estimate Revisions Since June

Street Est. Delta	C4Q17		
Revenue Q/Q	Jun-17	Oct-17	Delta
KN	7.0%	21.3%	14.3%
MTSI	-7.3%	1.2%	8.5%
MU	-2.5%	2.6%	5.1%
SYNA	4.5%	9.6%	5.1%
SIMO	1.9%	6.4%	4.5%
QRVO	7.4%	10.6%	3.2%
MXIM	-1.8%	0.9%	2.7%
SMTC	-3.1%	-0.5%	2.6%
CY	-3.0%	-1.5%	1.5%
ADI	-3.4%	-2.2%	1.3%
MCHP	-3.1%	-1.9%	1.2%
DLG	30.2%	31.2%	1.0%
CAVM	2.0%	3.0%	1.0%
STM	2.0%	3.0%	1.0%
INTC	1.6%	2.5%	0.8%
ON	-3.6%	-2.9%	0.7%
CRUS	27.9%	28.4%	0.6%
AVGO	-1.7%	-1.2%	0.5%
MPWR	-2.8%	-2.5%	0.3%
IFX	-3.2%	-2.9%	0.3%
NXPI	-1.1%	-0.9%	0.2%
SWKS	7.4%	7.5%	0.1%
MRVL	-3.4%	-3.3%	0.1%
ST	0.5%	0.6%	0.1%
TXN	-6.6%	-6.5%	0.1%
DSPG	1.7%	1.8%	0.0%
DIOD	-5.2%	-5.3%	-0.1%
XLNX	1.0%	0.8%	-0.1%
MXL	2.6%	2.2%	-0.4%
IDTI	5.6%	5.2%	-0.4%
MSCC	-2.6%	-3.1%	-0.4%
SLAB	1.2%	0.7%	-0.5%
VSH	-1.3%	-2.0%	-0.7%
MLNX	7.0%	6.3%	-0.7%
POWI	0.7%	0.0%	-0.7%
NVDA	4.7%	2.9%	-1.8%
LSCC	8.7%	5.7%	-3.0%
AMBA	-4.3%	-7.5%	-3.2%
QCOM	5.3%	2.0%	-3.3%
AMD	-7.9%	-11.3%	-3.4%
AOSL	2.0%	-3.0%	-5.0%
IPHI	14.9%	3.2%	-11.7%
Total Semi	0.1%	1.0%	0.9%
Semi ex-Memory	0.1%	0.8%	0.7%
Semi ex-INTC	0.3%	0.5%	0.2%
Semi ex-INTC/Memory	0.0%	0.1%	0.1%

Source: Thomson Reuters, Company data,

Figure 42: CS and Street Estimates vs. Seasonal

C4Q CS/Street Estimates vs. Seasonal					
Revenue Q/Q	Seasonal	CS	Delta	Street	Delta
KN	-1.0%	--	--	21.3%	22.3%
SIMO	-8.1%	--	--	6.4%	14.5%
QRVO	-0.9%	--	--	10.6%	11.5%
LSCC	-3.4%	--	--	5.7%	9.1%
CRUS	22.0%	--	--	28.4%	6.4%
SMTC	-6.4%	--	--	-0.5%	5.9%
AMBA	-12.9%	--	--	-7.5%	5.4%
IDTI	0.0%	--	--	5.2%	5.2%
MLNX	1.4%	5.1%	3.7%	6.3%	4.9%
AOSL	-6.6%	--	--	-3.0%	3.6%
ADI	-5.5%	0.3%	5.8%	-2.2%	3.3%
STM	-0.2%	5.2%	5.4%	3.0%	3.1%
MXL	-0.6%	--	--	2.2%	2.8%
MRVL	-6.0%	-4.1%	1.9%	-3.3%	2.7%
XLNX	-1.8%	0.7%	2.5%	0.8%	2.6%
IFX	-5.2%	-2.7%	2.5%	-2.9%	2.3%
CY	-3.5%	-1.0%	2.5%	-1.5%	2.0%
DSPG	-0.1%	--	--	1.8%	1.9%
NXPI	-2.8%	--	--	-0.9%	1.9%
POWI	-1.8%	--	--	0.0%	1.7%
VSH	-3.6%	--	--	-2.0%	1.6%
AVGO	-2.7%	--	--	-1.2%	1.5%
MCHP	-3.0%	-2.7%	0.3%	-1.9%	1.1%
MPWR	-3.4%	--	--	-2.5%	0.8%
ST	-0.1%	--	--	0.6%	0.7%
MTSI	0.5%	--	--	1.2%	0.7%
TXN	-7.0%	-6.8%	0.2%	-6.5%	0.5%
MXIM	-2.3%	-2.0%	0.3%	-2.2%	0.1%
INTC	2.6%	2.2%	-0.4%	2.5%	-0.1%
SWKS	7.7%	--	--	7.5%	-0.2%
ON	-2.0%	-2.9%	-0.9%	-2.9%	-0.9%
DIOD	-4.3%	--	--	-5.3%	-1.0%
AMD	-9.7%	-10.2%	-0.5%	-11.3%	-1.6%
CAVM	4.6%	--	--	3.0%	-1.6%
SLAB	2.4%	--	--	0.7%	-1.7%
SYNA	12.6%	--	--	9.6%	-3.0%
MSCC	0.1%	--	--	-3.1%	-3.1%
QCOM	5.7%	--	--	2.0%	-3.7%
NVDA	7.4%	--	--	2.9%	-4.5%
MU	8.2%	2.6%	-5.6%	2.6%	-5.5%
IPHI	9.5%	--	--	3.2%	-6.3%
DLG	48.7%	30.0%	-18.7%	31.2%	-17.5%
Total Semi	0.4%	0.7%	0.2%	1.0%	0.5%
Semi ex-Memory	0.1%	0.5%	0.4%	0.8%	0.7%
Semi ex-INTC	0.5%	0.3%	-0.2%	0.5%	0.0%
Semi ex-INTC/Memory	-1.3%	0.0%	1.3%	0.1%	1.4%

Source: Thomson Reuters, Company data

2017/2018 Estimates Updated

We are modeling Semi Rev growth of 20% y/y in CY17, embedding 10% growth ex-Memory and 53% growth in Memory. Our expectation for 10% y/y growth ex-Memory is driven by mostly seasonal quarterly growth through the remainder of 2017 and is above bottoms-up Street estimates of up 8% y/y – we would note that ex-memory y/y Rev growth peaked in May at ~15% and will decel to ~5% by mid-CY18. We are modeling Semi Rev growth of 7% in CY18, embedding 6% growth ex-Memory and 10% growth in Memory – above the 2013-16 3-year CAGR of 4% and 3% ex-Memory, respectively.

Figure 43: CS Semi Industry Forecast

Detailed Forecast Revenue ($bn)	Mar-16 C1Q	Jun-16 C2Q	Sep-16 C3Q	Dec-16 C4Q	Mar-17 C1Q	Jun-17 C2Q	Sep-17 C3QE	Dec-17 C4QE	Mar-18 C1QE	Jun-18 C2QE	Sep-18 C3QE	Dec-18 C4QE	2015	2016	2017E	2018E
Disc, Opto, Sensors	$14.9	$14.9	$16.2	$16.3	$16.2	$16.8	$18.0	$17.8	$17.6	$18.7	$19.6	$19.2	$60.7	$62.2	$68.8	$75.0
IC's ex-Memory	$47.2	$47.3	$52.1	$53.3	$51.2	$52.7	$57.8	$57.7	$55.0	$55.8	$59.2	$59.0	$197.3	$199.9	$219.3	$229.0
Memory	$16.3	$17.0	$20.0	$23.4	$25.1	$28.4	$31.2	$32.4	$31.5	$32.2	$33.2	$32.5	$77.2	$76.8	$117.2	$129.4
Total Semi	**$78.5**	**$79.2**	**$88.3**	**$93.0**	**$92.5**	**$97.9**	**$107.0**	**$107.9**	**$104.1**	**$106.7**	**$111.9**	**$110.7**	**$335.2**	**$338.9**	**$405.3**	**$433.4**
Semi ex-Memory	**$62.1**	**$62.2**	**$68.3**	**$69.6**	**$67.4**	**$69.5**	**$75.8**	**$75.5**	**$72.6**	**$74.5**	**$78.7**	**$78.2**	**$258.0**	**$262.2**	**$288.1**	**$303.9**
% of Revenue	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**	**2015**	**2016**	**2017E**	**2018E**
Disc, Opto, Sensors	19.0%	18.8%	18.3%	17.5%	17.5%	17.1%	16.8%	16.5%	16.9%	17.5%	17.5%	17.3%	18.1%	18.4%	17.0%	17.3%
IC's ex-Memory	60.2%	59.8%	59.0%	57.3%	55.3%	53.8%	54.0%	53.5%	52.8%	52.3%	52.9%	53.3%	58.9%	59.0%	54.1%	52.8%
Memory	20.8%	21.5%	22.7%	25.2%	27.2%	29.0%	29.2%	30.0%	30.3%	30.2%	29.7%	29.3%	23.0%	22.6%	28.9%	29.9%
Total Semi	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Semi ex-Memory	**79.2%**	**78.5%**	**77.3%**	**74.8%**	**72.8%**	**71.0%**	**70.8%**	**70.0%**	**69.7%**	**69.8%**	**70.3%**	**70.7%**	**77.0%**	**77.4%**	**71.1%**	**70.1%**
Q/Q	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**				
Disc, Opto, Sensors	-1.0%	-0.4%	8.7%	0.8%	-0.6%	3.7%	7.2%	-1.1%	-1.4%	6.3%	4.8%	-1.9%				
IC's ex-Memory	-5.4%	0.2%	10.1%	2.4%	-4.0%	3.0%	9.7%	-0.2%	-4.6%	1.4%	6.0%	-0.3%				
Memory	-8.5%	4.0%	17.9%	16.8%	7.4%	13.0%	10.0%	3.7%	-2.6%	2.1%	3.1%	-2.3%				
Total Semi	**-5.3%**	**0.9%**	**11.6%**	**5.4%**	**-0.5%**	**5.8%**	**9.3%**	**0.8%**	**-3.5%**	**2.5%**	**4.9%**	**-1.1%**				
Semi ex-Memory	**-4.4%**	**0.1%**	**9.8%**	**2.0%**	**-3.2%**	**3.1%**	**9.1%**	**-0.4%**	**-3.8%**	**2.6%**	**5.7%**	**-0.7%**				
Y/Y	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**	**2015**	**2016**	**2017E**	**2018E**
Disc, Opto, Sensors	2.5%	-3.9%	3.7%	8.1%	8.5%	12.9%	11.4%	9.4%	8.4%	11.2%	8.6%	7.7%	3.7%	2.6%	10.5%	9.0%
IC's ex-Memory	-2.6%	-3.3%	4.3%	6.8%	8.4%	11.4%	10.9%	8.1%	7.5%	5.9%	2.4%	2.3%	-0.4%	1.3%	9.7%	4.4%
Memory	-18.6%	-13.3%	1.8%	31.1%	53.9%	67.2%	55.9%	38.3%	25.4%	13.4%	6.3%	0.2%	-2.6%	-0.6%	52.6%	10.4%
Total Semi	**-5.6%**	**-5.7%**	**3.6%**	**12.3%**	**17.9%**	**23.7%**	**21.2%**	**15.9%**	**12.5%**	**9.0%**	**4.6%**	**2.6%**	**-0.2%**	**1.1%**	**19.6%**	**6.9%**
Semi ex-Memory	**-1.4%**	**-3.4%**	**4.1%**	**7.1%**	**8.5%**	**11.8%**	**11.0%**	**8.4%**	**7.7%**	**7.2%**	**3.9%**	**3.6%**	**0.5%**	**1.6%**	**9.9%**	**5.5%**

Source: SIA, Company data, Credit Suisse estimates

SCE - 2018 CapEx Raised

SCE – 2017 WFE unchanged at +30.8% y/y; 2018 WFE estimates raised to grow at +10.1% y/y. We are maintaining CY17 WFE estimates of $45.1bn (+30.8% y/y), and increasing CY18 WFE estimates from $46.9bn (+4.0% y/y) to $49.7bn (+10.1% y/y). We are incrementally more positive on 2018 Capex following recent channel checks. Specifically Samsung Memory CapEx is now expected to be flat in 2018, versus investor concerns that Samsung Memory CapEx could be down >20% y/y. We also expect higher growth from TSMC and INTC. In addition, memory margins are at a record high level, and memory companies will exit the year with the best balance sheets they have had in recent times. We think this will drive higher CapEx next year, particularly in DRAM where node transitions are more expensive but not enough to meet demand. Note that DRAM pricing is expected to healthy till middle of next year. Overall, the DRAM market has continued to remain in tight supply, and the severe shortage in DRAM should lead to higher growth next year. We also continue to expect a healthy demand for NAND, driven by growth from enterprise.

Figure 44: Old and New WFE estimates ($bn)

WFE By Device ($bn)	2016	2017 E Old	2017 E New	2018 E Old	2018 E New
DRAM	$5.4	$8.8	$8.5	$9.5	$11.6
y/y Changes %	-38.0%	45.7%	57.2%	9.1%	36.1%
NAND	$10.6	$15.1	$16.0	$15.8	$15.8
y/y Changes %	49.4%	37.4%	50.7%	4.2%	-1.0%
Foundry	$12.8	$14.6	$14.4	$15.0	$15.5
y/y Changes %	27.8%	23.2%	12.6%	3.1%	7.9%
Logic	$5.7	$6.7	$6.2	$6.6	$6.7
y/y Changes %	3.0%	17.9%	9.7%	-1.2%	7.9%
Total WFE	**$34.5**	**$45.1**	**$45.1**	**$46.9**	**$49.7**
Y/y Changes	10.0%	30.8%	30.8%	4.0%	10.1%

Source: Company data, Credit Suisse estimates

Figure 45: Old and New CapEx estimates ($bn)

Capex By Device ($bn)	2016	2017 E Old	2017 E New	2018 E Old	2018 E New
DRAM	$9.3	$13.3	$13.9	$15.1	$19.5
y/y Changes %	-34%	43%	49%	13%	40%
NAND	$16.6	$24.1	$24.7	$25.1	$25.2
y/y Changes %	50%	45%	49%	4%	2%
Foundry	$20.8	$24.3	$24.6	$24.2	$25.6
y/y Changes %	20%	17%	19%	0%	4%
Logic	$17.7	$20.7	$20.4	$20.8	$22.4
y/y Changes %	2%	17%	16%	0%	10%
Total	**$64.4**	**$82.4**	**$83.7**	**$85.2**	**$92.7**
Y/y Changes	7.5%	27.7%	30.0%	3.4%	10.7%

Source: Company data, Credit Suisse estimates

CapEx Forecast by Company: We are expecting growth in 2017 CapEx for Samsung driven by 3D NAND conversions. We are also modeling a sharp increase in CapEx for INTC for its 10nm ramp up, but expecting a decline for MU. In 2017, we expect that there could be a recovery in CapEx growth for DRAM companies while NAND CapEx would continue to grow. We are modeling CapEx to remain flat for TSMC as the Company can reuse some of the equipment installed for 10nm this year. In-line with MU's guidance we expect CapEx to decline for MU (inclusive of Inotera). For 2018, we are modeling CapEx to increase primarily driven by China while ROW Capex declines.

Figure 46: CapEx by Company

Detailed Capex Forecast by Company	2011	2012	2013	2014	2015	2016	2017E	2018E
Samsung	$11,700	$12,290	$11,616	$13,501	$13,035	$11,409	$23,500	$21,000
Intel	$9,418	$11,027	$10,711	$10,105	$7,326	$9,625	$11,000	$13,000
TSMC & Affiliates	$7,286	$8,322	$9,688	$9,522	$8,123	$10,186	$10,000	$11,000
Company H	$3,074	$3,409	$3,228	$4,564	$6,018	$5,186	$8,496	$11,150
Global Foundries	$4,700	$3,800	$3,700	$3,800	$2,300	$1,900	$2,500	$3,700
Micron (Incl. IMFT)	$3,434	$1,663	$1,804	$3,926	$6,222	$6,288	$5,677	$7,500
Company T	$3,049	$2,094	$2,170	$3,153	$3,236	$4,073	$4,913	$4,913
UMC	$1,600	$1,750	$1,103	$1,367	$1,892	$2,832	$1,700	$1,000
Sony	$1,563	$1,280	$686	$661	$1,681	$1,234	$1,049	$1,049
Others	$13,744	$9,325	$8,678	$9,346	$9,304	$11,701	$14,903	$18,361
Total	$59,567	$54,961	$53,384	$59,945	$59,137	$64,433	$83,737	$92,673

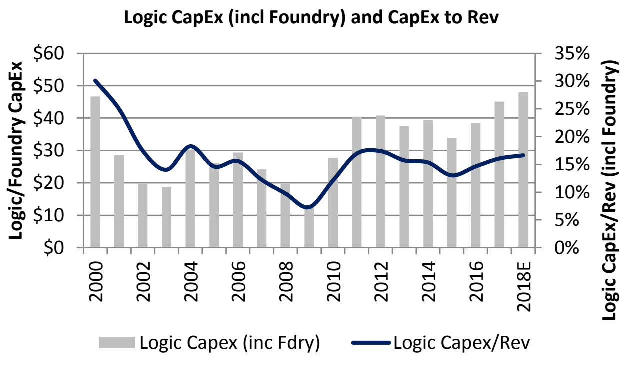
% of Total	2011	2012	2013	2014	2015	2016	2017E	2018E
Samsung	19.6%	22.4%	21.8%	22.5%	22.0%	17.7%	28.1%	22.7%
Intel	15.8%	20.1%	20.1%	16.9%	12.4%	14.9%	13.1%	14.0%
TSMC & Affiliates	12.2%	15.1%	18.1%	15.9%	13.7%	15.8%	11.9%	11.9%
Company H	5.2%	6.2%	6.0%	7.6%	10.2%	8.0%	10.1%	12.0%
Global Foundries	7.9%	6.9%	6.9%	6.3%	3.9%	2.9%	3.0%	4.0%
Micron (Incl. IMFT)	5.8%	3.0%	3.4%	6.5%	10.5%	9.8%	6.8%	8.1%
Company T	5.1%	3.8%	4.1%	5.3%	5.5%	6.3%	5.9%	5.3%
UMC	2.7%	3.2%	2.1%	2.3%	3.2%	4.4%	2.0%	1.1%
Sony	2.6%	2.3%	1.3%	1.1%	2.8%	1.9%	1.3%	1.1%
Others	23.1%	17.0%	16.3%	15.6%	15.7%	18.2%	17.8%	19.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Y/Y	2011	2012	2013	2014	2015	2016	2017E	2018E
Samsung	2.6%	5.0%	-5.5%	16.2%	-3.5%	-12.5%	106.0%	-10.6%
Intel	81.1%	17.1%	-2.9%	-5.7%	-27.5%	31.4%	14.3%	18.2%
TSMC & Affiliates	25.9%	14.2%	16.4%	-1.7%	-14.7%	25.4%	-1.8%	10.0%
Company H	0.9%	10.9%	-5.3%	41.4%	31.9%	-13.8%	63.8%	31.3%
Global Foundries	74.1%	-19.1%	-2.6%	2.7%	-39.5%	-17.4%	31.6%	48.0%
Micron (Incl. IMFT)	22.0%	-51.6%	8.5%	117.6%	58.5%	1.1%	-9.7%	32.1%
Company T	10.7%	-31.3%	3.6%	45.3%	2.6%	25.9%	20.6%	0.0%
UMC	-11.1%	9.4%	-37.0%	23.9%	38.4%	49.7%	-40.0%	-41.2%
Sony	229.6%	-18.0%	-46.4%	-3.7%	154.2%	-26.6%	-15.0%	0.0%
Others	0.3%	-32.2%	-6.9%	7.7%	-0.4%	25.8%	27.4%	23.2%
Total	19.9%	-7.7%	-2.9%	12.3%	-1.3%	9.0%	30.0%	10.7%

Source: Company data, Credit Suisse estimates

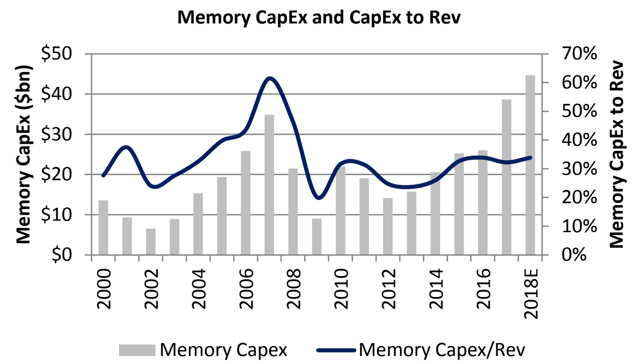
CapEx to Rev Suggests Both Logic and Memory CapEx Are Reasonable: Over the last 5 years Smartphone growth has led to strong growth for Foundries, and has required higher than historic levels of investment in Foundry. We see enterprise spending on memory as a continued driver for memory growth and for NAND/DRAM demand. We expect Memory CapEx as 32% of Rev in 2017, slightly above average of 33% over last 15 years. We expect Logic/Foundry CapEx to Rev ratio to increase to 16.1% in 2017 above the last 15 year average of 14.6%.

Figure 47: Logic CapEx (Inc. Foundry) and CapEx/Rev



Source: Company data, Credit Suisse estimates

Figure 48: Memory CapEx and CapEx/Rev



Source: Company data, Credit Suisse estimates

In terms of CapEx linearity for 2018, we expect a relatively balanced year with memory stronger in C1H18 (~60% of total) and slightly lower in C2H18 (~50% of total). In addition, we expect foundry spending to increase in C2H18.

Figure 49: CapEx Forecast by quarter

Detailed Forecasts Total WFE by Device ($bn)	Mar-16 1Q16	Jun-16 2Q16	Sep-16 3Q16	Dec-16 4Q16	Mar-17 1Q17	Jun-17 2Q17	Sep-17 3Q17	Dec-17 4Q17E	Mar-18 1Q17E	Jun-18 2Q17E	Sep-18 3Q17E	Dec-18 4Q17E	2016	2017E	2018 E
DRAM	$1.75	$1.26	$1.55	$1.70	$2.11	$1.93	$2.31	$2.17	$2.89	$2.56	$3.09	$3.05	$5.4	$8.5	$11.6
NAND	$2.11	$2.63	$1.81	$2.40	$4.25	$4.41	$3.55	$3.77	$4.68	$4.86	$3.55	$2.75	$10.6	$16.0	$15.8
Foundry	$2.60	$3.60	$4.25	$3.60	$3.17	$3.14	$3.66	$4.44	$3.17	$3.14	$4.00	$5.24	$12.8	$14.4	$15.5
Logic	$1.20	$1.46	$1.38	$1.21	$1.47	$1.73	$1.69	$1.34	$1.62	$1.90	$1.70	$1.50	$5.7	$6.2	$6.7
Total WFE ($bn)	$7.66	$8.95	$8.99	$8.91	$11.01	$11.21	$11.67	$11.26	$12.36	$12.46	$12.34	$12.54	$34.5	$45.1	$49.7
% of Total	**1Q16**	**2Q16**	**3Q16**	**4Q16**	**1Q17**	**2Q17**	**3Q17**	**4Q17E**	**1Q17E**	**2Q17E**	**3Q17E**	**4Q17E**	**2016**	**2017E**	**2018 E**
DRAM	22.9%	14.1%	17.2%	19.0%	19.2%	17.2%	19.8%	19.3%	23.4%	20.5%	25.0%	24.4%	15.7%	18.9%	23.3%
NAND	27.5%	29.3%	20.1%	26.9%	38.6%	39.4%	30.4%	33.5%	37.8%	39.0%	28.8%	21.9%	30.7%	35.4%	31.9%
Foundry	33.9%	40.2%	47.3%	40.5%	28.8%	28.0%	31.4%	39.4%	25.6%	25.2%	32.4%	41.7%	37.1%	31.9%	31.3%
Logic	15.7%	16.4%	15.4%	13.6%	13.4%	15.4%	14.5%	11.9%	13.1%	15.3%	13.8%	12.0%	16.5%	13.8%	13.5%
Total WFE ($bn)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Q/Q	**1Q16**	**2Q16**	**3Q16**	**4Q16**	**1Q17**	**2Q17**	**3Q17**	**4Q17E**	**1Q17E**	**2Q17E**	**3Q17E**	**4Q17E**			
DRAM	-13.3%	-28.2%	23.0%	9.7%	24.3%	-8.6%	19.6%	-5.7%	33.2%	-11.6%	20.6%	-1.0%			
NAND	22.6%	24.5%	-31.2%	32.5%	77.5%	3.8%	-19.6%	6.3%	24.0%	3.8%	-26.9%	-22.5%			
Foundry	13.3%	38.6%	18.2%	-15.2%	-12.1%	-1.0%	16.7%	21.4%	-28.7%	-1.0%	27.5%	30.9%			
Logic	15.3%	22.0%	-5.5%	-12.4%	21.5%	17.4%	-2.5%	-20.5%	20.8%	17.4%	-10.7%	-11.6%			
Total WFE ($bn)	8.3%	16.8%	0.5%	-0.9%	23.5%	1.9%	4.1%	-3.5%	9.8%	0.8%	-1.0%	1.7%			
Y/Y	**1Q16**	**2Q16**	**3Q16**	**4Q16**	**1Q17**	**2Q17**	**3Q17**	**4Q17E**	**1Q17E**	**2Q17E**	**3Q17E**	**4Q17E**	**2016**	**2017E**	**2018 E**
DRAM	-30.7%	-49.0%	-35.2%	-16.0%	20.4%	53.2%	49.0%	28.1%	37.2%	32.8%	33.9%	40.5%	-38.0%	57.2%	36.1%
NAND	43.3%	59.3%	-5.5%	39.2%	101.6%	68.1%	96.4%	57.5%	10.0%	10.0%	0.0%	-27.1%	49.4%	50.7%	-1.0%
Foundry	-16.2%	49.4%	87.9%	57.3%	22.1%	-12.8%	-13.9%	23.3%	0.0%	0.0%	9.3%	17.9%	27.8%	12.6%	7.9%
Logic	-7.6%	4.0%	-4.2%	16.5%	22.8%	18.1%	21.9%	10.6%	10.0%	10.0%	0.7%	12.0%	2.8%	9.7%	7.9%
Total WFE ($bn)	-8.8%	12.8%	12.3%	26.0%	43.7%	25.3%	29.8%	26.4%	12.3%	11.1%	5.7%	11.4%	9.9%	30.8%	10.1%

Source: Company data, Credit Suisse estimates

End-Market Expectations

Smartphones: We are currently modeling for global smartphone unit builds to be up 1% y/y in CY17, a deceleration from up 4% in CY16 and well below the 3/5 year unit CAGRs of 14%/25%. We expect the Semi AAPL Supply Chain to report C3Q Rev from AAPL largely consistent with our view of ~65m builds in C3Q, followed by a strong C4Q and better than seasonal C1Q decline driven by the push-out in iPhone X builds. Apart from AAPL, we expect a q/q re-acceleration in China Handsets into C4Q which should drive overall CY17 builds modestly down y/y, and a mostly seasonal decline in GS8/GN8 ahead of the GS9 ramp in C1Q18.

Figure 50: CS Smartphone Model

Smartphone Production Units (m)	Mar-15 1Q	Jun-15 2Q	Sep-15 3Q	Dec-15 4Q	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17 3QE	Dec-17 4QE	CY15	CY16	CY17
Apple	58.0	60.0	55.0	75.0	40.0	41.0	57.5	88.2	46.9	45.1	64.2	100.0	248.0	226.7	256.1
Samsung	81.7	70.3	82.2	84.3	80.5	75.7	75.1	79.4	80.4	79.5	86.9	68.6	318.5	310.7	315.4
LG	14.4	15.3	14.7	14.6	14.5	15.0	14.0	12.6	14.7	15.5	13.6	12.5	59.1	56.1	56.3
Others	58.1	62.9	62.7	64.9	46.5	53.6	50.1	60.4	44.3	52.0	53.0	59.0	248.6	210.6	208.3
China Smartphones	130.0	160.0	155.0	160.0	165.0	183.3	188.0	198.0	152.0	165.0	179.0	212.0	605.0	734.3	708.0
Total	**342.2**	**368.5**	**369.7**	**398.8**	**346.5**	**368.6**	**384.7**	**438.6**	**338.3**	**357.1**	**396.7**	**452.1**	**1,479.2**	**1,538.3**	**1,544.0**

% of Total Units	Mar-15	Jun-15	Sep-15	Dec-15	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	CY15	CY16	CY17
Apple	17%	16%	15%	19%	12%	11%	15%	20%	14%	13%	16%	22%	17%	15%	17%
Samsung	24%	19%	22%	21%	23%	21%	20%	18%	24%	22%	22%	15%	22%	20%	20%
LG	4%	4%	4%	4%	4%	4%	4%	3%	4%	4%	3%	3%	4%	4%	4%
Others	17%	17%	17%	16%	13%	15%	13%	14%	13%	15%	13%	13%	17%	14%	13%
China Smartphones	38%	43%	42%	40%	48%	50%	49%	45%	45%	46%	45%	47%	41%	48%	46%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Q/Q	Mar-15	Jun-15	Sep-15	Dec-15	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17
Apple	-28%	3%	-8%	36%	-47%	2%	40%	53%	-47%	-4%	42%	56%
Samsung	11%	-14%	17%	3%	-5%	-6%	-1%	6%	1%	-1%	9%	-21%
LG	-17%	6%	-4%	-1%	-1%	3%	-7%	-10%	17%	5%	-12%	-8%
Others	-7%	8%	0%	3%	-28%	15%	-6%	21%	-27%	17%	2%	11%
China Smartphones	-7%	23%	-3%	3%	3%	11%	3%	5%	-23%	9%	8%	18%
Total	**-10%**	**8%**	**0%**	**8%**	**-13%**	**6%**	**4%**	**14%**	**-23%**	**6%**	**11%**	**14%**

Y/Y	Mar-15	Jun-15	Sep-15	Dec-15	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	CY15	CY16	CY17
Apple	81%	114%	10%	-6%	-31%	-32%	5%	18%	17%	10%	12%	13%	31%	-9%	13%
Samsung	-6%	-8%	3%	15%	-1%	8%	-9%	-6%	0%	5%	16%	-14%	0%	-2%	2%
LG	18%	2%	-12%	-16%	0%	-2%	-5%	-14%	1%	3%	-3%	-1%	-4%	-5%	0%
Others	41%	31%	11%	4%	-20%	-15%	-20%	-7%	-5%	-3%	6%	-2%	19%	-15%	-1%
China Smartphones	27%	24%	15%	15%	27%	15%	21%	24%	-8%	-10%	-5%	7%	20%	21%	-4%
Total	**23%**	**22%**	**7%**	**5%**	**1%**	**0%**	**4%**	**10%**	**-2%**	**-3%**	**3%**	**3%**	**13%**	**4%**	**0%**

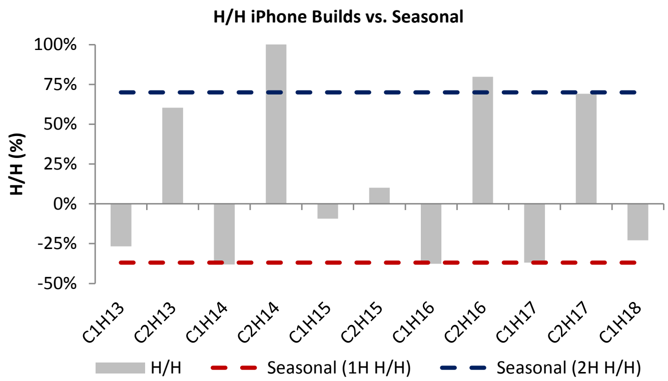
Source: Company data, Credit Suisse estimates

C3Q/C4Q AAPL In-Line, Better than Seasonal C1Q

We expect the Semi AAPL Supply Chain to report C3Q Rev from AAPL largely consistent with our view of ~65m builds in C3Q, up 45% q/q (in-line with seasonal) and up ~10% y/y despite a pushout in peak iPhone X builds from late C3Q17/early C4Q17 to C1Q18. Note the Taiwan AAPL Supply Chain grew Sept. Rev ~43% m/m, ~350 bps below seasonal, the 2nd consecutive month of below seasonal as the iPhone X is still experiencing yield/component supply constraints. We expect ~100m builds in C4Q (up 55% q/q and up 13% y/y) – embedding 40m iPhone 8 builds (up from only 5m in C3Q) and 50m iPhone 8 builds (up 70% q/q).

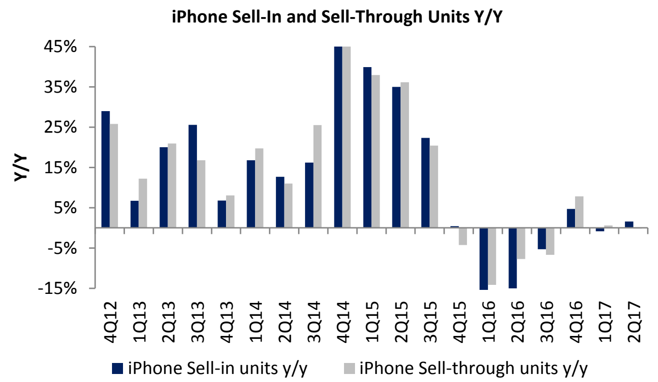
- **iPhone X Timeline Drives Above-Seasonal C1Q:** The initial iPhone X ship date of 11/03 is supportive of a better than seasonal C1Q for the AAPL supply chain and a soft landing for AAPL plays which are up ~40% YTD vs. the SOX up ~30%. We are currently modeling C1Q iPhone builds of ~60m, down ~40% q/q which is ABOVE seasonal of down ~50% q/q – specifically embedding 32m iPhone X builds (only down ~4% q/q) and 20m iPhone 8 builds (down 50% q/q). The next tactical hurdle will occur post peak iPhone X builds in C1Q18 – the first opportunity to see end demand ex-concerns of AAPL monopolizing supply.

Figure 51: Better than Seasonal C1H18 Build Decline



Source: Company data, Credit Suisse estimates

Figure 52: Production More In-Line with Consumption



Source: Company data, Credit Suisse estimates

US Semis iPhone 8/X Implications

Despite a significant focus on new technologies in the iPhone X, we would highlight that AAPL is only ~5-6% of Total Rev on average across our coverage universe. We would highlight the following:

- **A11 Processor Improvements:** Both the iPhone 8 and X contain an A11 processor featuring up to 70% performance improvement gen-on-gen – positive for Semi Caps. The A11 features the first AAPL-designed GPU, indicative of AAPL's push to design its own chips – recall AAPL severed ties with IMG in 02/17.
- **Increased NAND Mostly Positive for Memory:** The iPhone 8/X both feature 64/256 GB NAND options vs. 32/128/256GB for the iPhone 7 – implying NAND content up 20% y/y. While the upper bound of 256GB might disappoint those thinking 512GB, it was in-line with our expectation and the lack of a 128 GB offering probably forces a mix-up. The iPhone 8/8 Plus feature 2/3GB of DRAM respectively, in-line with the 7/7 Plus and we suspect all variants of the X will feature 3GB as well.
- **OLED and Wireless Charging Driving Higher AVGO Content:** Wireless Charging was adopted for both the iPhone 8 and X driving higher AVGO content. Relative to the OLED iPhone X, ADI's loss of Force Touch is already embedded in estimates (FY18 AAPL Rev down 30% Y/Y).
- **Baseband Dual-Sourcing to Continue:** Following dual-sourcing of modems last year, we suspect INTC will gain share in the iPhone 8. INTC had ~20% market share in the iPhone 7 which should increase to ~30-40% – implying ~$400m of C2H Rev.

Figure 53: Semi Exposure to AAPL by Company

Company	AAPL % of Rev	Product / Functional Exposure	Company	AAPL % of Rev	Product / Functional Exposure
CRUS	70% -75%	Audio Codec	TER	10%	Wireless Test
DLG	70% - 75%	Power Management	TXN	8% - 10%	iPhone Touch Controller, Analog
AMS	30% - 50%	Ambient light sensor	ADI	~7%	Force Touch, Camera Stabilization
SWKS	30% - 45%	Power Amplifier & RF	INTC	5% - 7%	Baseband/Mac MPUs
QRVO	25% - 35%	RF	ON	4% - 6%	iPhone + Mac Analog
QCOM	20% - 25%	Baseband/Connectivity/PMIC	AMD	4% - 6%	Graphics
AVGO	20% - 25%	FBAR/Connectivity	NXPI	4%	NFC/Secure Element + Interface
MU	10% - 15%	NOR Memory, mDRAM	MXIM	3% - 5%	Power Management
STM	5% - 15%	ToF/3D sensor	CY	<1%	USB Type-C

Source: Company data, Credit Suisse estimates

Samsung: Modest GN8 Upside in C3Q/C4Q

We believe Samsung smartphone production is tracking to ~315m units for CY17 (up 2% y/y), embedding 70m GS8/GN8 builds (up 4% y/y). Relative to the GN8 we expect production of ~12m units thru December (5m builds in C3Q, 7m builds in C4Q) – note Samsung acknowledged on 09/12 that GN8 preorders exceeded expectations and that first-week preorders were 5x higher than those for the GN7 which could drive modest upside to our build estimates. Relative to total smartphone quarterly output, we expect Samsung to produce 87m total units in C3Q (up 9% q/q and up 15% y/y) embedding 18m GS8/GN8 builds (down 37% q/q but up 30% y/y), and 70m total units for C4Q (down 20% q/q and 5% y/y) embedding 17m GS8/GN8 builds (down 5% q/q but up 3% y/y) – ahead of the GS9 which we expect to launch at MWC 2019 – featuring the Snapdragon 845, 6GB of DRAM and 64/128/256GB of NAND. Companies in our coverage universe with Samsung exposure include MXIM (~8% of Rev), AVGO (high-single digit exposure), ON (~4-5% exposure), and CY given their 4-socket Type-C solution in the Samsung DeX station.

China Handsets: C4Q Re-Acceleration, Easy Comps into CY18

We expect ~180m China smartphone builds in C3Q, up 8% q/q which is modestly above the 5-year median of up 5% q/q – marking the second quarter of recovery off the C1Q17 trough. However, we would note that on a y/y basis C3Q China handset builds are still down 5%. We are modeling for a return to y/y growth in C4Q for the first time in 4 quarters driven by new model launches from Xiaomi, Huawei, Oppo and Gionee – specifically, we expect ~212m builds in C4Q, up 18% q/q, which is above seasonal of up 5% q/q and marks a return to y/y growth of up 7%. While the magnitude of the C2H recovery could vary for different companies depending on the starting point of inventories, we are modeling for total CY17 units of 708m, down 4% y/y and a steep deceleration from up 20%/21% in CY15/16. By OEM: we expect better than seasonal growth at Xiaomi, Huawei and Oppo and seasonal growth at Vivo. Lastly, we would highlight that y/y compares become significantly easier into C1Q18. Names in our coverage universe with exposure to China smartphones include QCOM, ON (~9% of Rev) and MXIM (<5% of Rev).

Figure 54: China Smartphone Growth Negative in CY17

China Smartphone Production Units (m)	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17 3QE	Dec-17 4QE	CY16	CY17
Huawei	25	35	35	45	32	35	38	50	140	155
Oppo	18	26	26	30	23	25	28	34	100	110
Vivo	16	21	22	28	20	22	25	29	87	96
Xiaomi, TCL, Coolpad, ZTE, Lenovo	61	57	55	45	42	48	53	58	218	201
Others	45	45	50	50	35	35	35	40	190	145
Total	**165**	**183**	**188**	**198**	**152**	**165**	**179**	**211**	**734**	**707**

% of Total	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	CY16	CY17
Huawei	15%	19%	19%	23%	21%	21%	21%	24%	19%	22%
Oppo	11%	14%	14%	15%	15%	15%	16%	16%	14%	16%
Vivo	10%	11%	12%	14%	13%	13%	14%	14%	12%	14%
Xiaomi, TCL, Coolpad, ZTE, Lenovo	37%	31%	29%	23%	28%	29%	30%	27%	30%	28%
Others	27%	25%	27%	25%	23%	21%	20%	19%	26%	21%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Q/Q	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	CY16	CY17
Huawei	-28.6%	38.0%	1.4%	28.6%	-28.9%	9.4%	8.6%	31.6%	26.8%	11.1%
Oppo	20.7%	43.6%	0.0%	15.4%	-23.3%	8.7%	12.0%	21.4%	122.4%	9.9%
Vivo	26.4%	31.6%	5.8%	27.3%	-28.6%	10.0%	13.6%	16.0%	116.5%	10.9%
Xiaomi, TCL, Coolpad, ZTE, Lenovo	6.3%	-6.7%	-3.5%	-18.2%	-6.7%	14.3%	10.4%	9.4%	-19.2%	-7.8%
Others	12.5%	0.0%	11.1%	0.0%	-30.0%	0.0%	0.0%	14.3%	35.7%	-23.7%
Total	**3.1%**	**11.1%**	**2.6%**	**5.3%**	**-23.2%**	**8.6%**	**8.5%**	**17.9%**	**21.4%**	**-3.7%**

Source: Company data, Credit Suisse estimates, MIIT

PCs: Better than Expected C3Q, Enterprise Refresh Cycle in 2018

C3Q Units Better than Expected: PCs were better than expected in C3Q and sufficient to support our modeled estimates for INTC and AMD – Gartner/IDC reported C3Q PC shipments down 3.6% y/y/down 0.5% y/y, both modesty better than expected (note IDC includes Chromebooks and shipments to end-users and distribution vs. Gartner which does not). C3Q TW NB units of 33.4m increased 6.7% q/q, BELOW seasonal of 10.3% q/q – but 220 bps ABOVE CS forecast of 4.5%. Importantly C3Q NB ODM shipments grew on a y/y basis (up 2.1%) for the fourth quarter in a row. We are currently estimating INTC CCG Rev to increase 4% q/q in C3Q with NB units up ~6% q/q, below TW NB Units of up 6.7% - despite INTC typically out-shipping TW NB units in C3Q by ~150 bps. For C3Q TW NB units and INTC PC units have an r-squared of 0.81 – the highest quarter of the year.

C4Q Estimates Achievable: Our CY17 NB unit estimate of 126m (+3% q/q) appears conservative as it embeds C4Q declining 3.5% q/q well below seasonal of +1.0% q/q. Relative to C4Q, we are modeling for a 4.5% q/q decline in total PC units vs. seasonal of up 1.1% q/q and IDC which expects a modest q/q and y/y decline – supported by Ryzen and Coffee Lake. Relative to the full year CY17, our Hardware Team expects sell-thru units down 2.5% y/y.

Despite More Difficult Compares, Expect CY18 PC Units to Grow Y/Y: We expect CY17 unit sales down ~3% y/y, versus down ~6% y/y in CY16, as Consumer moderates from down ~11% to down ~7% y/y and Enterprise goes from down ~2% y/y to flat y/y. We expect CY18 units to grow 1% y/y with Consumer down ~1% y/y and Enterprise up ~2% y/y. Importantly, we expect growth despite tougher y/y comps – assuming Y/Y declines moderate in C4Q implies 2017 will be down ~2% y/y versus down ~8% y/y in 2016.

- **CY18 Expected to Be Up for First Time Since 2011:** Industry expectations are for CY18 to see 1% y/y unit sales growth, marking the first year of y/y growth since 2011. Specifically, Enterprise up 2.4% y/y will offset Consumer down 0.9% y/y. While replacement rates for PCs have gone from ~4 years in the past to ~5-6 years today, the PC market should benefit from a replacement cycle in CY18/CY19 that will drive positive y/y unit growth for the first time since 2011.

- **Enterprise and Consumer Trends:** Enterprise unit growth will be driven by an OS refresh cycle – with Windows 10 enterprise penetration only at ~27% as of July 17th, per a CS Software Survey, with expectations for ~48% more to adopt Windows 10 over the next 24 months (ending July 2019). Moderating consumer unit declines will be driven by higher sales of lower priced PCs, with increased competition from AMD, which should entice some to upgrade.
- **HPQ Guided FY18 Above Street Supports Relatively Stable PCs:** On 10/12 HPQ guided FY18 Non-GAAP EPS to $1.74-$1.84 with the midpoint $1.79 ABOVE Street at $1.76, and FY18 FCF of at least $3.0bn ABOVE Street at $2.8bn. While HPQ continues to outgrow the PC TAM primarily due to market share gains and ASP increases towards higher-end models – guidance supports a relatively stable PC TAM. Note HPQ was the number one PC vendor in C3Q for the third quarter in a row with 22.8% market share.

Autos: Accelerating Units but More Difficult Comps Ahead

C3Q/C4Q Semi Auto Rev Modeled Conservatively, Hurricane Replacements Could Drive Upside: Semi Auto Rev for companies that explicitly disclose (~50% of the market) is being modeled up ~10% y/y in C3Q and ~7% y/y in C4Q which appears achievable. Specifically, Street is modeling C3Q Semi Auto Rev down 1% q/q, ~130 bps below seasonal, reflecting a more cautious demand outlook vs Auto unit sales tracking ~280 bps above seasonal. Street is modeling C4Q Semi Auto Rev down 1% q/q, in-line with seasonal. Furthermore, post-hurricane Auto rebuilds related to Harvey and Irma could provide another tailwind to Auto Rev into CY18 although our checks suggest the Auto Semi supply chain has seen no hurricane-related impact yet.

Global Auto Sales Remain Steady: Sep Monthly Global Auto Sales grew ~23% m/m, better than seasonal of up ~16% m/m, with y/y growth of 3.5% mostly in-line with August up 3.7% y/y. Global YTD sales are tracking up 2.5% y/y, mostly in-line with our CY17 estimate of ~3% y/y.

- **U.S. Y/Y Rebounds and Hurricane Damage Could Drive Replacements:** US sales increased 6.1% y/y, accelerating from down 1.8% y/y in August – and the first month of y/y growth in CY17. YTD sales are now tracking down 1.8% y/y, but economists expect that 300-500k vehicles need to be replaced due to Hurricane Harvey and 200-400k due to Hurricane Irma (~5% of CY17 demand) – albeit we have not yet seen an impact to the Semi supply chain.
- **China Y/Y Growth Stable:** China y/y growth has been on an upward trend, accelerating from down low-single digits y/y in Apr to up ~6% y/y in July and August, and growth only saw a modest y/y deceleration to up 3.3% y/y in Sep – albeit the y/y decel can mostly be explained by more difficult y/y comps.
- **Europe Y/Y Turns Negative:** Europe was down 2.8% y/y, decelerating from up 6.0% y/y in August, largely due to weakness in the U.K. and Germany. Further, we would note that y/y comps ease thru CY17 with Sep16-Dec16 up ~4% y/y vs. Jan16-Aug16 up ~8% y/y.

Longer-term we continue to argue that annual Auto units in the mid-to-high teens in the US and 80-90 mm globally are supportive of a Semi Auto Rev CAGR of ~6-7% as silicon content in Autos will continue to move higher from ~$350 per car today, to an expected $1,000 per car in coming years.

Figure 55: CY17 Auto Units Tracking up ~2.5% y/y

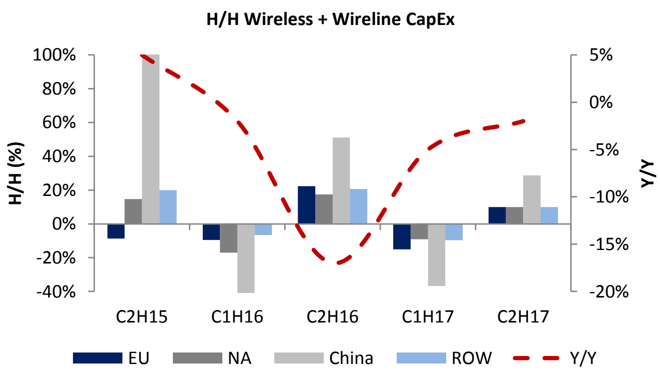
Monthly Units	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17
United States	1,143,549	1,333,637	1,555,859	1,426,126	1,519,175	1,474,360	1,415,139	1,483,330	**1,523,867**
Asia	2,879,278	2,382,854	3,071,146	2,357,708	2,397,168	2,566,120	2,419,525	2,523,641	**3,125,906**
Europe	1,197,099	1,100,520	1,924,421	1,213,858	1,425,315	1,499,741	1,183,384	895,269	**1,437,033**
ROW	230,392	256,392	356,385	327,255	363,459	368,700	339,614	353,748	**373,498**
Total	**5,450,318**	**5,073,403**	**6,907,811**	**5,324,947**	**5,705,117**	**5,908,921**	**5,357,662**	**5,255,988**	**6,460,304**
% of Total	**Jan-17**	**Feb-17**	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Jul-17**	**Aug-17**	**Sep-17**
United States	21.0%	23.5%	23.1%	24.0%	24.5%	24.6%	24.8%	25.2%	**25.0%**
Asia	52.8%	50.0%	47.8%	47.0%	46.0%	45.5%	45.5%	45.8%	**46.1%**
Europe	22.0%	21.8%	24.2%	23.9%	24.1%	24.3%	24.0%	23.2%	**23.1%**
ROW	4.2%	4.6%	4.8%	5.1%	5.4%	5.5%	5.6%	5.8%	**5.8%**
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
M/M	**Jan-17**	**Feb-17**	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Jul-17**	**Aug-17**	**Sep-17**
United States	-32.4%	16.6%	16.7%	-8.3%	6.5%	-2.9%	-4.0%	4.8%	**2.7%**
Asia	-13.8%	-17.2%	28.9%	-23.2%	1.7%	7.0%	-5.7%	4.3%	**23.9%**
Europe	-1.9%	-8.1%	74.9%	-36.9%	17.4%	5.2%	-21.1%	-24.3%	**60.5%**
ROW	-34.4%	11.3%	39.0%	-8.2%	11.1%	1.4%	-7.9%	4.2%	**5.6%**
Total	**-17.5%**	**-6.9%**	**36.2%**	**-22.9%**	**7.1%**	**3.6%**	**-9.3%**	**-1.9%**	**22.9%**
YTD Y/Y	**Jan-17**	**Feb-17**	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Jul-17**	**Aug-17**	**Sep-17**
United States	-1.8%	-1.4%	-1.5%	-2.5%	-2.1%	-2.2%	-2.9%	-2.8%	**-1.8%**
Asia	1.7%	7.6%	6.2%	4.9%	4.1%	4.0%	4.2%	4.4%	**4.3%**
Europe	9.5%	5.1%	7.4%	3.5%	4.2%	3.7%	3.4%	3.7%	**2.8%**
ROW	-6.7%	-6.3%	-1.2%	-0.7%	2.5%	4.3%	4.9%	5.6%	**7.1%**
Total	**2.1%**	**4.1%**	**4.2%**	**2.4%**	**2.4%**	**2.3%**	**2.2%**	**2.4%**	**2.5%**

Source: Company data, Credit Suisse estimates

Wireless/Wireline CapEx Declines to Moderate Ahead of 5G

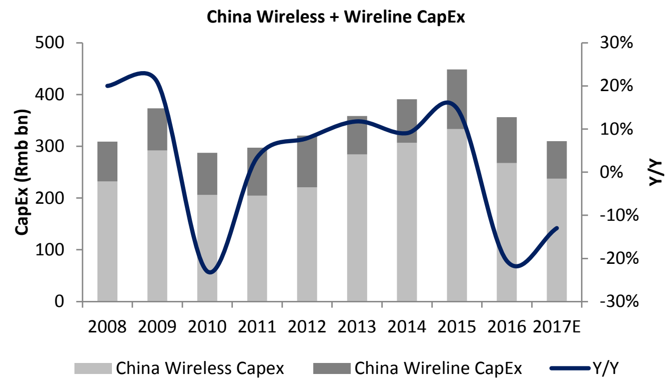
Our proprietary telecom operator CapEx model suggests that global Wireless/Wireline Capex is likely to be down ~4% in 2017, a moderation from down 11% in 2016 – with signs of stabilization in North America (up 4% y/y) and Korea/Japan (flat y/y). While it is still early to determine 2018 given telco companies have not yet announced CapEx budgets for next year, we estimate 2018 could end up flat to down ~2% y/y ahead of the 5G cycle, driven in part by Massive MIMO deployments – we would highlight ADI (potential for 5x incremental content and further share gains) and XLNX as well positioned. Heading into 2018, easy y/y compares and 5G trials could make this segment more "investable". While it still remains early to determine the timing and impact from mass 5G rollouts, commentary from most telco operators suggest that 5G trials could begin starting from 2018/19, with commercial rollouts from 2019/20.

Figure 56: CY17 Rebound in Carrier CapEx



Source: Company data, Credit Suisse estimates

Figure 57: China CapEx Declines Moderating



Source: Company data, Credit Suisse estimates

Cloud CapEx and Architectural Shifts Re-Accelerating in CY18 Despite NT Relative Pause

CY18 Growth Accelerating: Our proprietary Cloud CapEx model tracks bottom-up spend by the top 15 cloud vendors including INTC's Super 7. We are modeling CapEx up 13.3% in CY17, a deceleration from up 19.9% in CY16 but expect a significant re-acceleration to up 18.3% y/y in CY18 – it is clear that architectural shifts around acceleration and smart switching/routing are accelerating. Specifically despite y/y growth troughing in C1Q at up 9.1% y/y, we expect CapEx to grow 12.7% y/y in C3Q and 20.0% y/y in C4Q – growth should continue into CY18 driven by increasing Xeon Scalable adoption.

Expect In-Line C3Q/C4Q Despite AWS Pause: We expect continued growth in Data Center to drive mostly in-line Semi results – note while JNPR and AAOI attributed negative pre's to cloud weakness, this was attributed primarily to to AMZN, with continued strong demand from other top Datacenter customers. Specifically JNPR negatively pre'd C3Q Rev/EPS at $1,250m/$0.55 BELOW prior guidance for $1,320m/$0.58 driven by Cloud weakness – likely at AMZN (JNPR's largest cloud customer, followed by FB) and in part driven by share loss to ANET which uses AVGO silicon. AAOI negatively pre'd C3Q Rev/EPS at $89m/$1.07 BELOW prior guidance for $111m/$1.37 driven by lower than expected sales to a large datacenter customer related to the transition from 40G to 100G and not AAOI-specific – also AMZN (47% of AAOI Rev in C2Q but only 10% in C3Q).

FPGA Adoption Accelerating in CY18: Specifically we see evidence of progress on FPGA software ease of use and would expect AWS, MSFT, BABA and BIDU to continue to accelerate deployments into CY18. We have been impressed by the pace of PLD adoption inside of the Data Center for Acceleration applications. Initially, we had thought software-ease-of-use issues would significantly slow rate of adoption but recent announcements for F1 instances have occurred earlier than we would have expected. Lastly, we would note the most recent TOP500 Supercomputer list was published in June and we would highlight that entry-level performance has increased 51% over the last year from 285.0 Tflops/s to 432.2 Tflops/s, with the number one supercomputer (China's Sunway TaihuLight) at 93 petaflops.

Figure 58: CS Cloud CapEx Model

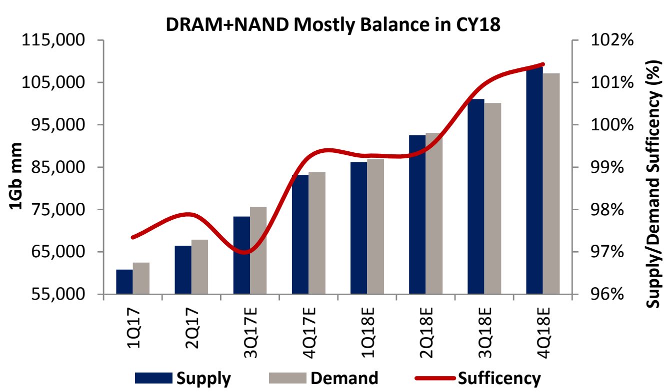
CapEx ($m)	Mar-16 C1Q	Jun-16 C2Q	Sep-16 C3Q	Dec-16 C4Q	Mar-17 C1Q	Jun-17 C2Q	Sep-17 C3QE	Dec-17 C4QE	Mar-18 C1QE	Jun-18 C2QE	Sep-18 C3QE	Dec-18 C4QE	2016	2017E	2018E
Super 7	$7,916	$8,279	$8,879	$9,398	$8,225	$10,293	$10,606	$11,506	$10,367	$12,236	$12,586	$13,225	$34,473	$40,630	$48,414
Others	$4,289	$5,042	$6,760	$5,514	$5,089	$4,400	$7,017	$6,393	$5,574	$5,783	$8,003	$7,389	$21,606	$22,899	$26,748
Total	$12,206	$13,321	$15,639	$14,912	$13,314	$14,693	$17,623	$17,898	$15,940	$18,019	$20,589	$20,614	$56,078	$63,528	$75,162
Total Ex-AAPL	*$9,870*	*$10,512*	*$11,662*	*$11,578*	*$10,339*	*$12,333*	*$13,107*	*$14,177*	*$12,506*	*$14,607*	*$15,158*	*$16,056*	*$43,622*	*$49,957*	*$58,327*
% of Total	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**	**2016**	**2017E**	**2018E**
Super 7	64.9%	62.2%	56.8%	63.0%	61.8%	70.1%	60.2%	64.3%	65.0%	67.9%	61.1%	64.2%	61.5%	64.0%	64.4%
Others	35.1%	37.8%	43.2%	37.0%	38.2%	29.9%	39.8%	35.7%	35.0%	32.1%	38.9%	35.8%	38.5%	36.0%	35.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Ex-AAPL	*80.9%*	*78.9%*	*74.6%*	*77.6%*	*77.7%*	*83.9%*	*74.4%*	*79.2%*	*78.5%*	*81.1%*	*73.6%*	*77.9%*	*77.8%*	*78.6%*	*77.6%*
Q/Q	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**			
Super 7	13.1%	4.6%	7.2%	5.8%	-12.5%	25.2%	3.0%	8.5%	-9.9%	18.0%	2.9%	5.1%			
Others	-26.7%	17.5%	34.1%	-18.4%	-7.7%	-13.6%	59.5%	-8.9%	-12.8%	3.8%	38.4%	-7.7%			
Total	-5.0%	9.1%	17.4%	-4.7%	-10.7%	10.4%	19.9%	1.6%	-10.9%	13.0%	14.3%	0.1%			
Total Ex-AAPL	*6.9%*	*6.5%*	*10.9%*	*-0.7%*	*-10.7%*	*19.3%*	*6.3%*	*8.2%*	*-11.8%*	*16.8%*	*3.8%*	*5.9%*			
Y/Y	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**	**2016**	**2017E**	**2018E**
Super 7	28.0%	20.9%	37.2%	34.3%	3.9%	24.3%	19.4%	22.4%	26.0%	18.9%	18.7%	14.9%	30.1%	17.9%	19.2%
Others	-6.5%	20.7%	19.9%	-5.7%	18.7%	-12.7%	3.8%	15.9%	9.5%	31.4%	14.0%	15.6%	6.7%	6.0%	16.8%
Total	13.3%	20.8%	29.1%	16.1%	9.1%	10.3%	12.7%	20.0%	19.7%	22.6%	16.8%	15.2%	19.9%	13.3%	18.3%
Total Ex-AAPL	*17.4%*	*17.0%*	*37.3%*	*25.4%*	*4.8%*	*17.3%*	*12.4%*	*22.4%*	*21.0%*	*18.4%*	*15.6%*	*13.3%*	*24.2%*	*14.5%*	*16.8%*

Source: Company data, Credit Suisse estimates, Thomson Reuters

DRAM Sustainable Thru CY18, Potential for Modest NAND Oversupply

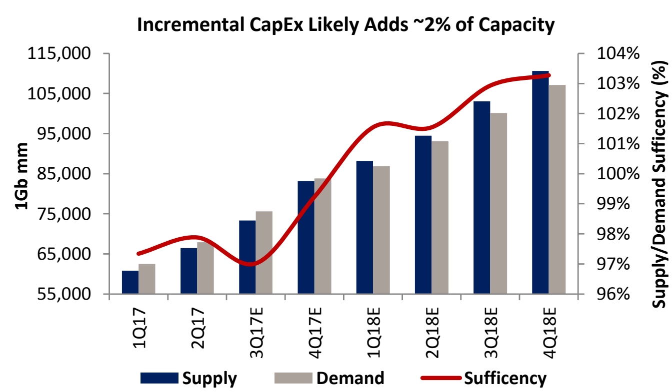
Despite upward revisions to CY17 and CY18 DRAM+NAND CapEx, we see a negligible impact to CY17 DRAM/NAND bit production given that (1) bit growth comes roughly 2-3 Qs after CapEx spend and (2) higher CY17 CapEx is being been offset by both higher capital intensity and significantly lower yield rates. However, we do see the potential for increased CapEx to result in NAND being ~5% oversupplied in C2H18, versus equilibrium in C4Q17, as 3D increases to ~65-70% of mix and 3D yields improve significantly, both of which will modestly offset higher capital intensity and drive incremental bit growth per wafer. Importantly, despite increased DRAM CapEx, we expect DRAM to continue to be 1-2% undersupplied in C2H18, vs. 3% undersupplied in C4Q17, as the increasing number of process steps results in high-teens y/y incremental bit growth per wafer going forward, well below historic levels of ~35%, more than offsetting the incremental CapEx spend.

Figure 59: Supply/Demand Mostly Balanced in CY18



Source: Company data, Credit Suisse estimates

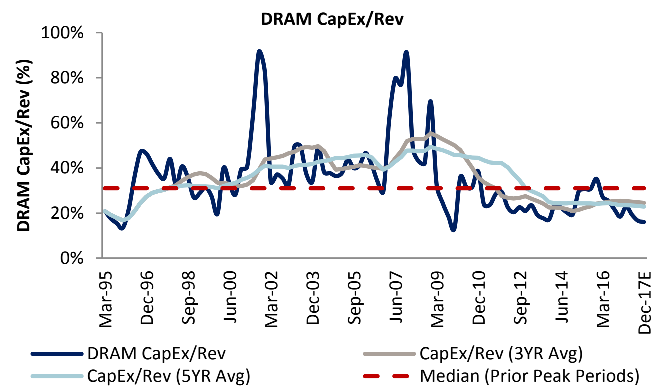
Figure 60: Incr. CapEx Adds ~2% of CY18 Capacity



Source: Company data, Credit Suisse estimates

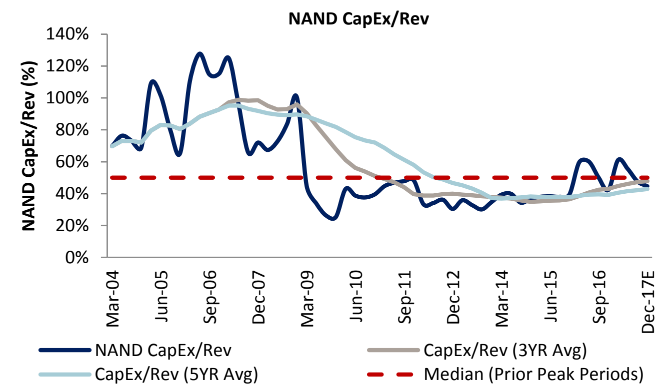
DRAM CapEx Metrics Remain Healthy, NAND at Peak Levels: Even if one is unwilling to subscribe to the structurally improving narrative for memory, cyclical analysis and recent supply chain commentary would support a better C2H17/CY18 outlook than expected coming into 2017. Trough-to-date C2Q17 DRAM CapEx is up only ~43% and CapEx/Rev is ~20% versus prior peaks of 118%/31% suggesting not enough time has passed for a cycle-ending supply response in DRAM. However, NAND CapEx is up 33% and CapEx/Rev is 55%, in-line/modestly above prior peak of ~34%/50%. Importantly, C2Q is only the 4th quarter post trough for NAND and 5th quarter post trough for DRAM, versus the cyclical median of 9 quarters trough-to-peak. Further, trough-to-date DRAM Rev/bit growth of 81%/11% is also below prior peaks of 107%/54%, and trough-to-date NAND Rev/bit growth of 56%/27% is below prior peaks of 110%/120%.

Figure 61: DRAM CapEx/Rev Below Prior Peaks



Source: Company data, Credit Suisse estimates, SIA

Figure 62: NAND CapEx/Rev In-Line w/ Prior Peaks



Source: Company data, Credit Suisse estimates, SIA

Commentary from PC, Server, Smartphone and HDD/SSD OEMs suggests a tight supply environment for both DRAM and NAND into CY18. Importantly, supply chain commentary suggests that customers are not de-specing into C2H and we would also note additional tailwinds on the come from better than expected China handset builds in C3Q along with iPhone 8 builds beginning in C3Q (DRAM/NAND content up ~20%/15% gen-on-gen).

Figure 63: DRAM/NAND Rev & CapEx Growth Below Prior Trough-to-Peaks

DRAM: Cyclical Trough to Peak Analysis					
SIA DRAM Rev ($bn)					
Trough Q	**3Q01**	**2Q05**	**1Q09**	**3Q12**	**1Q16**
Peak Q	**4Q04**	**4Q06**	**3Q10**	**4Q14**	**2Q17**
Duration (Qtrs)	**13**	**6**	**7**	**9**	**5**
Trough	$1.7	$5.8	$3.7	$6.2	$8.7
Peak	$7.2	$10.8	$10.8	$12.6	$16.5
Delta	**326.4%**	**85.3%**	**195.9%**	**102.3%**	**90.4%**
Average	***160.1%***	***160.1%***	***160.1%***	***160.1%***	***160.1%***
Median	***102.3%***	***102.3%***	***102.3%***	***102.3%***	***102.3%***
DRAM CapEx ($bn)					
Trough Q	**3Q01**	**2Q05**	**1Q09**	**3Q12**	**1Q16**
Peak Q	**4Q04**	**4Q06**	**3Q10**	**4Q14**	**2Q17**
Trough	$1.8	$2.6	$1.1	$1.4	$2.3
Peak	$2.7	$5.7	$3.4	$3.5	$3.3
Delta	**50.7%**	**118.3%**	**204.5%**	**151.8%**	**43.3%**
Average	***113.7%***	***113.7%***	***113.7%***	***113.7%***	***113.7%***
Median	***118.3%***	***118.3%***	***118.3%***	***118.3%***	***118.3%***
DRAM CapEx/Rev					
Trough Q	**3Q01**	**2Q05**	**1Q09**	**3Q12**	**1Q16**
Peak Q	**4Q04**	**4Q06**	**3Q10**	**4Q14**	**2Q17**
Trough	104.4%	44.5%	30.1%	22.5%	26.8%
Peak	36.9%	52.3%	31.0%	28.0%	20.2%
Peak Average	***33.7%***	***33.7%***	***33.7%***	***33.7%***	***33.7%***
Peak Median	***31.0%***	***31.0%***	***31.0%***	***31.0%***	***31.0%***

NAND: Cyclical Trough to Peak Analysis				
SIA NAND Rev ($bn)				
Trough Q	**2Q05**	**4Q08**	**2Q12**	**2Q16**
Peak Q	**3Q07**	**1Q11**	**3Q14**	**2Q17**
Duration (Qtrs)	**9**	**9**	**9**	**4**
Trough	$1.5	$2.4	$5.3	$6.9
Peak	$4.6	$6.4	$7.7	$10.9
Delta	**204.7%**	**163.8%**	**44.9%**	**55.5%**
Average	***117.2%***	***117.2%***	***117.2%***	***117.2%***
Median	***109.6%***	***109.6%***	***109.6%***	***109.6%***
NAND CapEx ($bn)				
Trough Q	**2Q05**	**4Q08**	**2Q12**	**2Q16**
Peak Q	**3Q07**	**1Q11**	**3Q14**	**2Q17**
Trough	$2.3	$1.2	$2.1	$4.2
Peak	$3.1	$2.9	$2.7	$6.0
Delta	**35.6%**	**137.5%**	**24.7%**	**32.5%**
Average	***57.6%***	***57.6%***	***57.6%***	***57.6%***
Median	***34.0%***	***34.0%***	***34.0%***	***34.0%***
NAND CapEx/Rev				
Trough Q	**2Q05**	**4Q08**	**2Q12**	**2Q16**
Peak Q	**3Q07**	**1Q11**	**3Q14**	**2Q17**
Trough	147.7%	49.4%	40.0%	60.0%
Peak	65.7%	44.5%	34.4%	55.4%
Peak Average	***50.0%***	***50.0%***	***50.0%***	***50.0%***
Peak Median	***50.0%***	***50.0%***	***50.0%***	***50.0%***

Source: Company data, Credit Suisse estimates, SIA

Advanced Micro Devices, Inc.

(AMD, $14.22, NEUTRAL, TP $10.50)

Valuation Well Ahead of Better Fundamentals

Reporting Date: Tuesday, October 24th, 2017, After Market Close

Conference Call: Tuesday, October 24th, 2017, 5:00pm EST

Figure 64: AMD Summary of Expectations

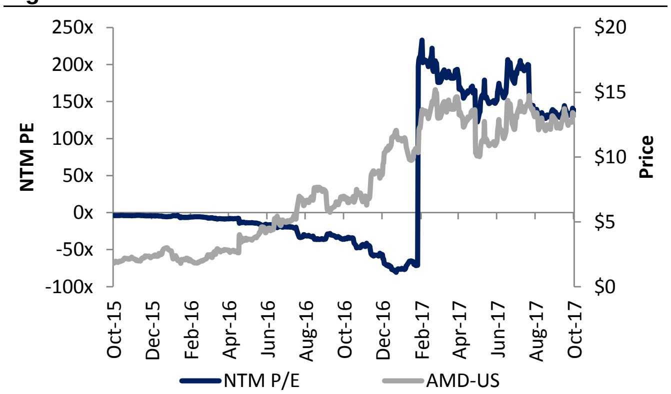
US$ in millions, unless otherwise stated

AMD	Jun-17	Sep-17			Dec-17E		CY2017E		CY2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$1,222	$1,503	$1,503	*$1,466m to $1,540m*	$1,350	$1,332	$5,059	$5,041	$5,451	$5,666
% Q/Q chng	*24.2%*	*23.0%*	*23.0%*	*+20% to +26%*	*-10.2%*	*-11.4%*				
% Y/Y chng	*19.0%*	*15.0%*			*22.1%*		*18.4%*	*18.0%*	*7.7%*	*12.0%*
Seasonality (q/q)	*3.1%*	*12.6%*			*-9.7%*					
Gross Margin	33.1%	34.0%	34.0%	*~34%*	35.0%	35.0%	34.0%	34.0%	36.6%	36.3%
Operating Expenses	$380	$400		*~$400m*	$381		$1,525		$1,621	
Operating Margin	4.0%	7.4%			6.8%	5.0%	4.8%	4.0%	7.5%	8.3%
Net Income	$19	$83			$61		$125		$309	
Net Margin	-0.4%	3.9%			2.8%		0.6%		3.9%	
EPS (GAAP)	($0.02)	$0.04			$0.02		($0.02)		$0.15	
EPS PF (ex options)	$0.02	$0.07	$0.07	*Implies $0.07*	$0.05	$0.03	$0.12	$0.10	$0.27	$0.30
Fully diulted shares	1,036.0	1,140.0			1,140.0		1,063.8		1,140.0	

Source: Thomson Reuters, Company data, Credit Suisse estimates

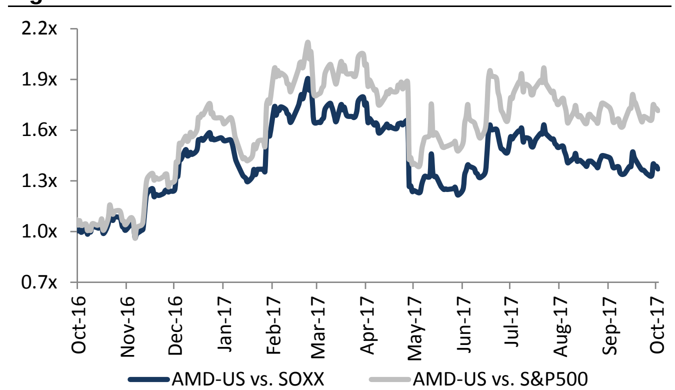
AMD: Recap of Recent Stock Performance

Figure 65: AMD Price vs. NTM PE



Source: Thomson Reuters, Company data

Figure 66: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data

Key Message: We expect AMD to report C3Q and guide C4Q at least INLINE with Street, both with a positive bias. Share gains and market demand continue to support revenue. Specifically, we would highlight: (1) a broadening of Ryzen offerings in the core PC business, (2) the initial launch of Epyc server chips in C3Q, (3) improving PC trends, and (4) graphics demand driven by cryptocurrency. However, margin leverage is less certain than revenue upside. While new products have >50% GM, AMD likely needs a few more quarters before the increased unit mix becomes readily transparent. We also see an upward bias to OpEx as AMD needs to spend more on R&D – and would remind investors that starting in C1Q the company began capitalizing mask costs (an unusual practice) in order to mitigate rising R&D in the P&L. Importantly, AMD's target model requires both execution and a benign competitive environment. New products need to grow from ~10% of mix today to ~55% in CY20 to hit target GM of 42%. LT OpM target of ~14% has only been achieved in four of the last twenty-five years. Further, market share and margin targets do not account for likely competitive responses from INTC and NVDA who have scale and well-established ecosystems. While AMD IP is valuable, shares trade at ~56x NTM P/E (ex-SBC), and even at target model for CY20 EPS of $0.75 discounted back to today AMD trades at ~26x P/E (ex-SBC). While management is establishing a better track record of execution, is intent on investing for the LT health of the Company, and has set reasonable near-term targets – the stocks seems to embed loftier expectations. Specifically, the last time AMD EV/Sales was ~3x was in 2005/06 when Discrete GPU share was ~50% (versus ~30% today), PC MPU share was ~20% (versus ~8% today), and Server share was ~20% (versus <1% today) – i.e. shares already embed aggressive share gains, which underpins our Neutral rating. Our Neutral rating reflects what we see as a balanced risk/reward – core IP is valuable, new products show some promise, but current valuation embeds share/margin expectations that seem aggressive.

Expect C3Q Results At Least In-line with CS/Street

We expect AMD to report C3Q Rev/EPS at least IN-LINE with CS/Street estimates of $1,503m/$0.07 and the mid-point of guidance for $1,503m/$0.07 – with bias to the upside for Rev on Ryzen proliferation and GPUs on continued cryptocurrency demand.

- **C&G Driven by Ryzen and Continued GPU Strength:** We expect C&G Rev up at least 10% q/q in a seasonally down quarter. Computing Rev (58% of C&G Rev) is driven by increased Ryzen traction as Company benefits from greater availability of Ryzen DT driving Ryzen DT mix of 40% versus 25% in C2Q. In addition, the "Raven Ridge" Ryzen NB launch should provide channel fill cushion. GPU Rev (42% of C&G Rev) is driven by continued cryptocurrency mining demand.
- **EESC Driven by EPYC Launch and Scorpio Builds:** We expect EESC Rev up ~38% q/q, mostly in-line with seasonal trends that peak in C3Q around new gaming product launches. Relative to Server MPUs, we expect Rev up ~170% q/q – albeit off a C2Q Rev base of <$10m – as AMD begins to benefit from early EPYC qualifications (~30k units at a $400 ASP versus ~2 weeks in C2Q with ~5k units). Relative to Semi-Custom, we expect Rev up ~50% q/q driven by builds of the Xbox One Scorpio – which ships November 7th – which we expect to drive ~$100m of Rev, assuming 1m units and $100 of content across the "Radeon" GPU and "Jaguar" CPU.
- **New Products Expected to Drive GM Leverage:** While we have seen several positive proof points that support upside to Rev estimates, we see less upside to GM guidance for ~34% in a quarter where EESC mix is increasing ~600 bps q/q, and expect GM to be reported mostly in-line. While GM of ~34% is expected up 350 bps y/y, target GM of 42% is more likely in C2H18 at the earliest.
- **EPS At Least In-Line with CS/Street:** We expect interest, taxes and other expenses of $28m – we estimate a quarterly interest expense of $23m and tax expense of $5m. We expect no licensing Rev as AMD realized the entirety of the CY17 licensing benefit in the 1H17. We expect shares to increase to 1,140 up from 1,036m in C2Q – we would remind investors that Non-GAAP EPS will use the diluted share count in C3Q, versus the basic share-count in C2Q, as AMD returns to GAAP profitability. We expect Rev at least in-line with guidance, and profitability in-line with guidance to drive EPS at least in-line with CS, Street, and Guidance for $0.07.

Expect C4Q Rev/EPS Guide At Least In-Line with Street

We expect AMD to guide C4Q Rev/EPS at least in-line with Street of $1,332m/$0.03 driven by C&G Rev down low-single digits q/q and EESC Rev down high-teens q/q. Importantly, we would highlight that mgmt's guidance for CY17 Rev up mid to high-teens y/y only implies seasonal C4Q Rev – which may prove conservative if crypto GPU demand sustains and/or AMD sees meaningful traction from new product launches.

- **Client Rev Mostly Seasonal:** We expect AMD units seasonally up low-single digits with a bias to the upside as AMD's sees continued DT traction, with Ryzen DT unit mix up 10 ppts q/q, and a more meaningful launch of their "Raven Ridge" Ryzen NBs (C4Q units of ~530k up from ~125k in C3Q) – driving Ryzen to 15% of NB mix vs 4% in C3Q. While AMD will see average Ryzen DT ASPs decline q/q as lower-ASPs SKUs (Ryzen 3 and 5) increase as a % of mix versus Ryzen 7, Ryzen will reach ~50% of DT mix in C4Q, up 13 ppts q/q, driving DT ASPs up ~8% q/q.
- **Conservative Crypto Outlook Suggests Likely Upside:** While AMD acknowledged that visibility into cryptocurrency remains limited, and it is hard to distinguish relative to general gaming usage, mgmt. has taken a very conservative outlook on crypto GPU demand, especially in C4Q17. AMD GPUs continue to be in high demand (with the Vega 56 selling out on most online marketplaces within minutes on August 28th) – providing comfort around their conservative guidance. Further, we would note that China's recent ban on cryptocurrency may actually fuel GPU demand in China, as GPU mining is now the best way to obtain crypto currencies.
- **EESC to Moderate Post Seasonal Peak:** We expect EESC Rev down ~17% q/q, modestly below seasonal as sub-seasonal Semi-custom Rev offsets above seasonal Server Rev. Specifically, we expect Semi-custom Rev down ~40% q/q following ~55% q/q growth in C3Q and Server Rev up ~24% q/q as growth moderates following ~170% q/q growth in C3Q.
- **Gross Margins Achievable & OpEx Biased to Upside on Higher Spending:** We expect GM of 35.0%, in-line with Street, albeit we would note this may prove cautious as (1) Ryzen mix in DT increases 10 ppts q/q, (2) Ryzen mix in NBs increases 11 ppts q/q, and (3) C&G mix increases ~4 ppts q/q**.** We expect OpEx above CS of $381m (down ~5% q/q and 28.2% of Rev) and more in-line with Street of $400m (flat q/q and 30.0% of Rev) as AMD continues to see outsized OpEx spend as they ramp new products.
- **EPS At Least In-Line with Street:** We expect $25m of interest expense, $5m of taxes, and no licensing gain. We expect Rev and profitability at least IN-LINE with Street to drive EPS guidance of at least $0.03 IN-LINE with Street, but modestly BELOW CS due to higher than expected OpEx.

Figure 67: AMD Revenue Model

AMD Segments Revenue ($m)	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17E 3Q	Dec-17E 4Q	Mar-18E 1Q	Jun-18E 2Q	Sep-18E 3Q	Dec-18E 4Q	2016	2017E	2018E
C&G	$460	$435	$472	$600	$593	$659	$725	$705	$705	$691	$757	$738	$1,967	$2,682	$2,891
EESC	$372	$592	$835	$506	$391	$563	$778	$645	$468	$662	$810	$620	$2,305	$2,377	$2,560
Core EESC	*$372*	*$592*	*$760*	*$406*	*$335*	*$483*	*$623*	*$490*	*$368*	*$562*	*$635*	*$445*	$2,130	$1,931	$2,010
New Design Win	*$0*	*$0*	*$75*	*$100*	*$80*	*$80*	*$155*	*$155*	*$100*	*$100*	*$175*	*$175*	$175	$470	$550
Total	**$832**	**$1,027**	**$1,307**	**$1,106**	**$984**	**$1,222**	**$1,503**	**$1,350**	**$1,173**	**$1,353**	**$1,567**	**$1,358**	**$4,272**	**$5,059**	**$5,451**
% of Revenue	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**	**2016**	**2017E**	**2018E**
C&G	55.3%	42.4%	36.1%	54.2%	60.3%	53.9%	48.2%	52.2%	60.1%	51.1%	48.3%	54.4%	46.0%	53.0%	53.0%
EESC	44.7%	57.6%	63.9%	45.8%	39.7%	46.1%	51.8%	47.8%	39.9%	48.9%	51.7%	45.6%	54.0%	47.0%	47.0%
Core EESC	44.7%	57.6%	58.1%	36.7%	34.0%	39.5%	41.5%	36.3%	31.3%	41.5%	40.5%	32.8%	49.9%	38.2%	36.9%
New Design Win	0.0%	0.0%	5.7%	9.0%	8.1%	6.5%	10.3%	11.5%	8.5%	7.4%	11.2%	12.9%	4.1%	9.3%	10.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Q/Q	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**			
C&G	-2.1%	-5.4%	8.5%	27.1%	-1.2%	11.1%	10.0%	-2.7%	0.0%	-2.0%	9.5%	-2.5%			
EESC	-23.8%	59.1%	41.0%	-39.4%	-22.7%	44.0%	38.2%	-17.1%	-27.5%	41.7%	22.4%	-23.5%			
Core EESC	-23.8%	59.1%	28.4%	-46.6%	-17.5%	44.2%	29.0%	-21.3%	-25.0%	53.0%	13.0%	-30.0%			
New Design Win	NA	NA	NA	33.3%	-20.0%	0.0%	93.8%	0.0%	-35.5%	0.0%	75.0%	0.0%			
Total	**-13.2%**	**23.4%**	**27.3%**	**-15.4%**	**-11.0%**	**24.2%**	**23.0%**	**-10.2%**	**-13.1%**	**15.4%**	**15.8%**	**-13.4%**			
Y/Y	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**	**2016**	**2017E**	**2018E**
C&G	-13.5%	14.8%	11.3%	27.7%	28.9%	51.5%	53.6%	17.6%	18.9%	4.9%	4.4%	4.6%	9.0%	36.4%	7.8%
EESC	-25.3%	5.2%	31.1%	3.7%	5.1%	-4.9%	-6.8%	27.5%	19.6%	17.6%	4.2%	-3.9%	5.4%	3.1%	7.7%
Core EESC	-25.3%	5.2%	19.3%	-16.8%	-9.9%	-18.4%	-18.0%	20.7%	9.7%	16.4%	2.0%	-9.2%	-2.6%	-9.3%	4.1%
New Design Win	NA	NA	NA	NA	NA	NA	106.7%	55.0%	25.0%	25.0%	12.9%	12.9%	NA	168.6%	17.0%
Total	**-19.2%**	**9.0%**	**23.2%**	**15.4%**	**18.3%**	**19.0%**	**15.0%**	**22.1%**	**19.2%**	**10.8%**	**4.3%**	**0.5%**	**7.0%**	**18.4%**	**7.7%**

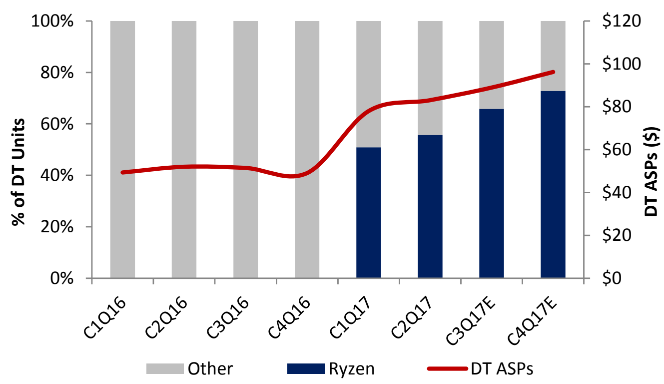
Source: Company data, Credit Suisse estimates

Key Issues

Share Gains and Market Demand Continue to Support Revenue: AMD's revenue continues to be supported by share gains and strong market demand. Specifically, we would highlight: (1) a broadening of Ryzen offerings in the core PC business, (2) the initial launch of Epyc server chips in C3Q, (3) improving PC trends, and (4) graphics demand driven by cryptocurrency.

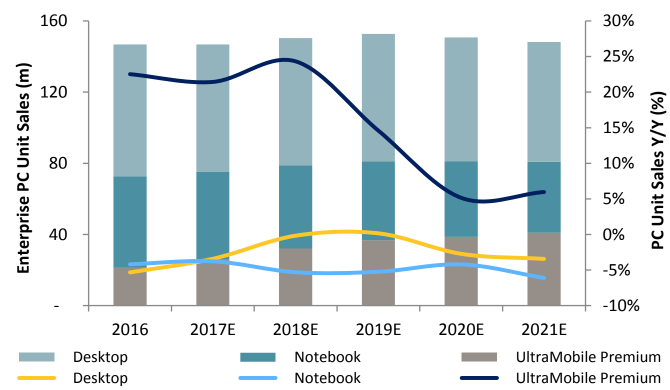
- **Ryzen Proliferation:** Relative to DT, we expect Ryzen DT unit mix to increase to ~50% in C4Q17 after launching in C1Q17. Ryzen mix will result in DT ASPs of $96 in C4Q17 versus ~$49 in C4Q16. Relative to NB, we expect Ryzen NB unit mix to increase to 15% of NB mix in C4Q17 vs 4% in C3Q17 as AMD sees a more meaningful contribution from "Raven Ridge" that launches in C3Q – with C4Q units of ~530k up from ~125k in C3Q.
- **EPYC Server Launch:** Relative to Server MPUs, we expect C3Q Rev up ~170% q/q – albeit off a C2Q Rev base of <$10m – as AMD realizes a full quarter of EPYC sales with ~30k units and a $400 ASP (versus ~2 weeks in C2Q with ~5k units). We expect Epyc server mix of ~50% in C4Q17 to drive Server ASPs of ~$300 in C4Q17 versus $210 in C1Q prior to EPYC's launch.
- **Improving PC Trends:** CY18 unit sales are expected up 1% y/y, marking the first year of y/y growth since 2011. Enterprise up 2.4% y/y is driven by an OS refresh cycle as an additional ~48% of enterprises adopt Windows 10 over the next 24 months (ending July 2019) versus ~27% of enterprises that had as of July 17th. Moderating consumer unit declines will be driven by improved features for lower priced PCs, which should entice some to upgrade.
- **Graphics Demand Driven by Cryptocurrency:** Mgmt. has taken a very cautious outlook remand to crypto GPU demand, especially with regards to C4Q17. Importantly, AMD GPUs continue to be undersupplied (with the Vega 56 selling out on most online marketplaces within minutes on August 28th) – providing comfort around their cautious guidance.

Figure 68: Ryzen Unit Mix Driving DT ASPs Higher



Source: Company data, Credit Suisse estimates

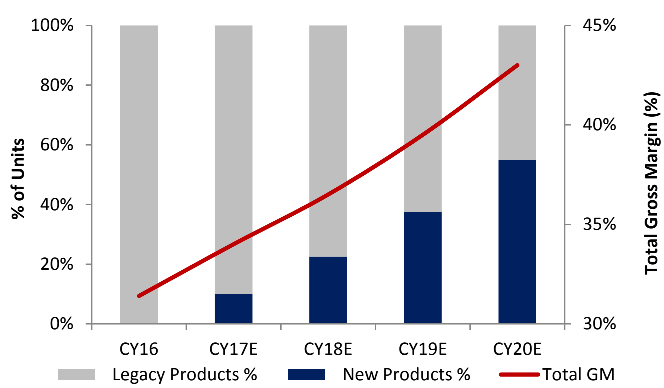
Figure 69: Enterprise PC Trends



Source: Gartner

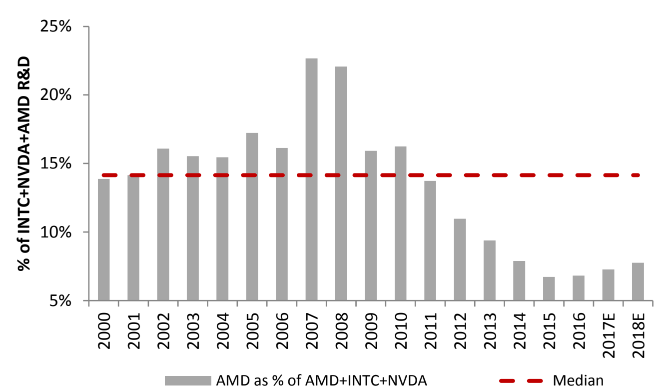
Margin Leverage Less Certain than Revenue Upside: We feel comfortable that share gains and market demand will support continued revenue demand. However, we are less certain on margin leverage since it is unclear what competitive responses AMD's targets embed and target margins imply profitability levels to which the Company has rarely executed. While new products have >50% GM, AMD likely needs a few more quarters before the increased unit mix becomes readily transparent. We also see an upward bias to OpEx, as AMD needs to spend more on R&D – and would remind investors that starting in C1Q17 the company began capitalizing mask costs, an unusual practice, in order to mitigate rising R&D in the P&L.

Figure 70: New Products as % of Mix



Source: Company data, Credit Suisse estimates

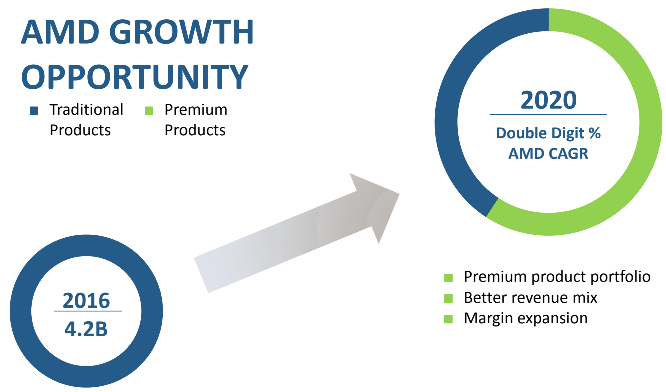
Figure 71: R&D Scale Requirements Increasing



Source: Company data, Credit Suisse estimates

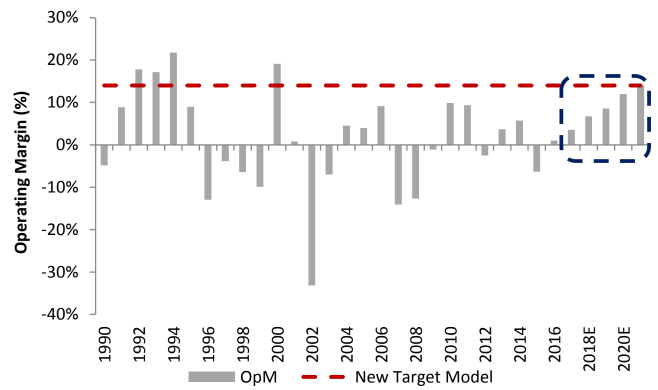
Target Model Requires Execution and A Benign Competitive Environment: New products need to grow from ~10% of mix today to ~55% in CY20 to hit target GM of 42%. AMD expects growth to be driven by a mix shift towards premium products such as: Ryzen desktop to the channel and OEMs, Radeon Vega to AIB channel and OEMs, Epyc to OEMs and cloud customers, and Radeon Instinct to OEMs and Cloud customers. LT OpM target of ~14% has only been achieved in four of the last twenty-five years. Further, market share and margin targets do not account for likely competitive responses from INTC and NVDA who have scale and well-established ecosystems.

Figure 72: New Products Growing to >50% of Mix



Source: AMD

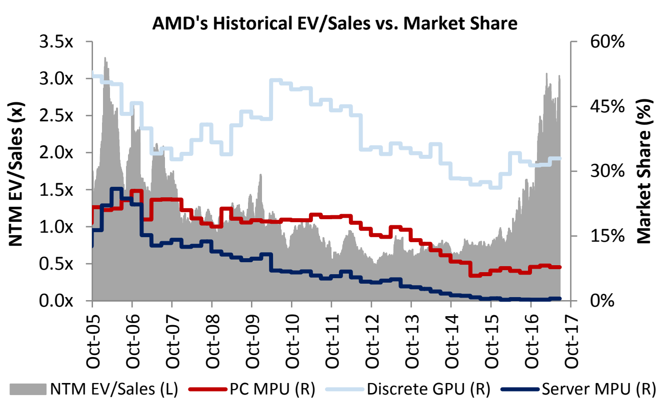
Figure 73: AMD OpM Over Time



Source: Company data, Credit Suisse estimates

Valuation Not Overly Compelling Even at Target Model: Shares trade at ~56x NTM P/E (ex-SBC) versus the Semi average of ~17x. Even at target model for CY20 EPS of $0.75 discounted back to today AMD trades at ~26x P/E (ex-SBC). The last time AMD EV/Sales was ~3x was in 2005/06 when Discrete GPU share was ~50% (versus ~30% today), PC MPU share was ~20% (versus ~8% today), and Server share was ~20% (versus <1% today) – i.e. even though management has set conservative NT targets, shares already embed aggressive share gains, which underpins our Neutral rating. Balancing our concerns around ambitious targets and lack of scale continues to be core IP that we believe has significant scarcity value.

Figure 74: AMD EV/Sales at Peak Levels



Source: Company data, Credit Suisse estimates

Figure 75: Metrics at Prior EV >$5.5bn

($m)	C1Q11	C2Q11	C1Q12	C1Q16	C2Q16	C2Q17
Operating:						
Rev	$1,613	$1,574	$1,585	$832	$1,027	**$1,222**
GM	44.6%	45.7%	46.1%	32.5%	31.1%	**33.1%**
OpM	7.4%	8.5%	9.7%	12.7%	29.7%	**23.1%**
FCF/Sh	-$0.28	$0.14	$0.09	-$0.09	-$0.13	**-$0.09**
Debt/Sh	$2.97	$2.96	$2.70	$2.82	$2.73	**$1.37**
CPU Share:						
Server	6.8%	5.9%	6.8%	0.3%	0.4%	**0.5%**
DT	25.4%	26.6%	22.7%	10.3%	8.8%	**9.4%**
NB	13.2%	14.7%	17.1%	5.8%	5.8%	**6.8%**
GPU Share:						
Discrete	49.2%	45.4%	45.0%	29.4%	34.2%	**33.0%**
Integrated	14.0%	15.3%	17.1%	7.1%	7.7%	**6.3%**

Source: Company data, Credit Suisse estimates

Analog Devices Inc.

(ADI, $89.06, OUTPERFORM, TP $100)

Early Read: F4Q At Least In-Line, F1Q ABOVE

Reporting Date: TBD

Conference Call: TBD

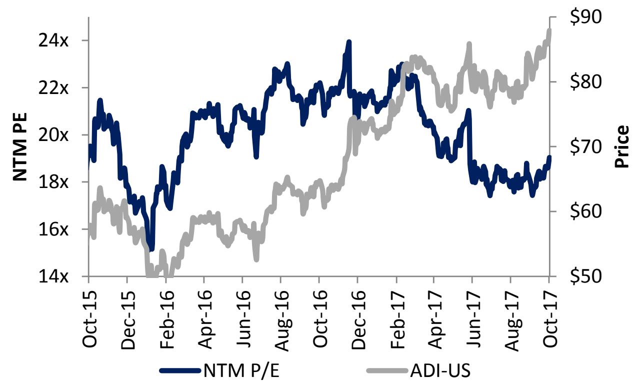
Figure 76: ADI Summary of Expectations

ADI-US	F3Q17 (JulQ)	F4QE17 (OctQ)			F1QE18 (JanQ)		FY2017E		FY2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$1,458	$1,500	$1,502	*$1,450m to $1,550m*	$1,505	$1,450	$5,152	$5,134	$5,896	$5,814
% Q/Q chng	*20.7%*	*2.8%*	*3.0%*	*-0.6% q/q to +6.3% q/q*	*0.3%*	*-3.5%*				
Seasonal (5-year)	*3.1%*	*8.1%*	*8.1%*		*-5.5%*	*-5.5%*				
% Y/Y chng	*67.7%*	*49.5%*	*49.7%*		*52.8%*	*47.2%*	*50.6%*	*50.0%*	*14.4%*	*13.3%*
Gross Margin	70.5%	70.5%	*70.6%*	*70.5%*	70.2%	*70.4%*	69.4%	*69.5%*	70.9%	*70.9%*
Operating Expenses	$437.1	$430.5		*Down 3% to flat q/q*	$450.2		$1,554		$1,718	
Operating Margin	40.5%	41.8%		*41%-42%*	40.3%		39.2%		41.8%	
Net Income	$466	$506			$460		$1,619		$1,892	
Net Margin	31.9%	33.7%			30.6%		31.4%		32.1%	
EPS (Cont. Ops., ex-SBC)	$1.34	$1.45			$1.33		$4.92		$5.46	
EPS (Cont. Ops., w\ SBC)	$1.26	$1.36	$1.36	*$1.29-$1.43*	$1.24	$1.18	$4.58	$4.58	$5.10	$4.93
EPS (GAAP)	$0.18	$0.91			$0.81		$2.04		$3.50	
FCF/sh (annualized)	$3.47	$5.68	$5.60		$5.14	$5.10	$4.60	$4.58	$5.15	$5.00
Fully diluted shares	371.2	371.2			371.2		350.3		371.2	

Source: Thomson Reuters, Company data, Credit Suisse Estimates

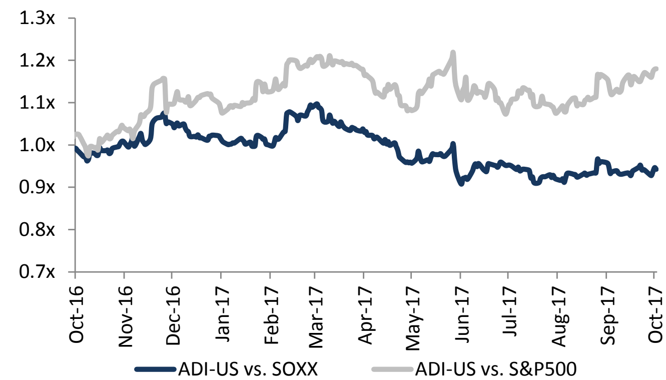
ADI: Recap of Recent Stock Performance

Figure 77: ADI NTM PE vs. Price



Source: Thomson Reuters, Company data

Figure 78: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data

Key Message: While early, we expect ADI to report F4Q (Oct) at least IN-LINE and guide F1Q (Jan) ABOVE CS/Street on B2B strength, initial iPhone builds, an acceleration in LLTC cost synergies and an extra week in F1Q. Most importantly, F4Q/F1Q should mark the 6th and 7th consecutive quarters that ADI's core franchise of B2B (86% of Rev well above the Semi avg. of 60%) is out-growing peers. Despite several Qs of outsized Rev growth, ADI's stock has lagged peers based on the following concerns: (1) Cyclical overheating –Industrial growing 20%+ y/y for 2 consecutive Qs, (2) LLTC integration, (3) AAPL content loss, and (4) New-not-well-known CFO. We see earnings as a positive catalyst; results will begin to drive confidence in future execution. Against the backdrop of more modest Semi growth in CY18, we see multiple ADI-specific tailwinds: (1) A reacceleration in China EV where ADI has 50%+ BMS share, (2) MIMO share and content gains, (3) 5G trials, (4) Upside/pull-in to LLTC synergies, (5) Already de-risked Consumer modeled down 20-30% y/y, and (6) HITT. Continued outperformance in B2B with tailwinds in Factory Automation, EV, ADAS, mmW, Medical and Mil/Aero along with upside to LLTC synergies underpin out OP rating – We see base-case FCFPS potential of $7+ by FY22 vs. $5.10 in FY18, more than supporting our PT of $100. Longer-term, customers will prefer to deal with fewer suppliers who can do more – driving faster than historic share gains for ADI – upside to LLTC Rev synergies could drive $1 in EPS, and every point of Analog share gain at 45% OpM drives ~$0.45 of EPS upside. ADI trades IN-LINE with peers and a 15% discount to the SPX despite faster growth, faster returns, and a FCF margin within the top 5% of the SPX.

Expect OctQ Rev/EPS At Least In-Line with CS/Street

While still early, we expect ADI to report F4Q17 (OctQ) Rev/EPS of at least $1.50bn/$1.36, IN-LINE with CS/Street both at $1.50bn/$1.36. Our F4Q expectations embed 2.8% q/q growth, below the 5YR median of up 8.1% q/q – reflecting lower iPhone X content partially offset by better than seasonal growth in Industrial.

- **B2B Outgrowing Peers:** F4Q marks the 6th consecutive quarter that ADI is outgrowing peers – up 14% y/y vs. peers up 11% y/y. We believe the magnitude of outperformance should continue. We expect Industrial (48% of Rev) flat q/q above seasonal of modestly down q/q. While F3Q/F4Q Industrial is growing 27%/23% y/y and is outgrowing peers by 1000/1100 bps respectively, inventories remain lean and seasonal q/q growth from F4Q drives a soft-landing to sustainable 4% y/y growth by F3Q18. We expect Autos up 3% q/q and Comms flattish q/q, in-line with seasonal.
- **Consumer Risk Already Modeled In:** We are modeling Consumer Rev up ~10% q/q, below seasonal of up ~25% q/q, reflecting the delayed ramp and lack of Force Touch in the iPhone X. Specifically we are modeling for 70m iPhone builds (35m 8 builds at $3.15 content and 35m X builds at $0.75 content) – note AAPL is only 6% of Rev, significantly reducing q/q volatility.
- **GM/OpM At Target:** We expect F3Q GM of 70.5% in-line with which is in-line with Street at 70.6% and ADI's LT target of 70%+ as cost synergies offset negative mix shift towards Consumer, and OpEx of $431m (down 3% q/q) – driving OpM of 41.8% which is in-line with the midpoint of ADI's LT 39-45% OpM target. Note we expect $85m in LLTC cost synergies by the end of F4Q (2/3 in OpEx, 1/3 in COGS). We are modeling interest expense of $65m, TR of 10% and share count of 371m, altogether driving EPS of $1.36 at the midpoint, IN-LINE with CS/Street both at $1.36.

Expect JanQ Rev/EPS Guidance ABOVE CS/Street

While still early, we expect ADI to report F1Q18 (JanQ) Rev/EPS of $1.51bn/$1.28, IN-LINE with/ABOVE CS at $1.51bn/$1.24 but ABOVE Street at $1.45bn/$1.18. While q/q Rev flattish is well above seasonal of down ~5% q/q – we would highlight that F1Q18 has an additional week that Street estimates seem to miss. While the extra week should have an equal impact to Rev and OpEx, we see EPS upside from acceleration in LLTC synergies, which could drive OpEx flat q/q, BELOW CS/Street currently modeling up 4%/5% q/q – driving $0.04 of EPS upside to CS.

- **Continued B2B Outperformance, At Least Seasonal Consumer:** Our estimates embed seasonal B2B growth and a better than seasonal decline in iPhone builds. Specifically adjusting for the extra week, we are modeling for B2B Rev to grow 8% y/y, better than peers and embedding Industrial down 5% q/q, Autos down 3% q/q, and Comms down 2% q/q all in-line with seasonal. We expect Consumer down approx. 10% q/q, above seasonal of down ~25% q/q due to iPhone X timing (peak builds in Jan) and the extra week. We are modeling 65m iPhone builds (38m X, 27m 8).

- **Better Synergies Drive OpM Leverage:** We expect F1Q GM of 70.4%, in-line with Street at 70.4% vs. CS at 70.2%. Despite an extra week of expenses, we believe OpEx could be flat q/q at ~$431m, BELOW CS/Street at $450m/$455m – with an acceleration and extra week of LLTC synergies ($>100m annualized) more than offsetting variable comp increases. We are modeling interest expense of $65m, TR of 15% and share count of 371m, altogether driving EPS of $1.28 at the midpoint, ABOVE CS at $1.24 and Street at $1.18.

Figure 79: ADI Revenue Model

(3-months ending)	Jan-17 1Q	Apr-17 2Q	Jul-17 3Q	Oct-17 4QE	Jan-18 1QE	Apr-18 2QE	Jul-18 3QE	Oct-18 4QE	Jan-19 1QE	FY2016	FY2017E	FY2018E	CY2016	CY2017E	CY2018E
Industrial	$402.6	$575.7	$712.5	$715.4	$733.9	$738.0	$743.1	$738.4	$712.4	$1,503.8	$2,406.1	$2,953.5	$1,557.9	$2,737.5	$2,932.0
Autos	$138.7	$193.6	$233.0	$238.7	$250.1	$247.8	$244.9	$251.7	$248.0	$540.5	$804.0	$994.5	$552.8	$915.4	$992.4
Communications	$173.0	$218.5	$259.0	$261.4	$279.0	$262.3	$272.6	$276.7	$275.0	$689.6	$911.9	$1,090.6	$694.8	$1,018.0	$1,086.6
Consumer	$270.1	$221.0	$254.0	$284.5	$241.5	$174.7	$195.8	$244.8	$194.9	$687.5	$1,029.7	$856.9	$830.8	$1,001.1	$810.3
TOTAL	$984.4	$1,208.8	$1,458.5	$1,500.0	$1,504.6	$1,422.9	$1,456.4	$1,511.7	$1,430.2	$3,421.4	$5,151.6	$5,895.6	$3,636.3	$5,671.9	$5,821.2

% of Total Rev	Jan-17	Apr-17	Jul-17	Oct-17	Jan-18	Apr-18	Jul-18	Oct-18	Jan-19	FY2016	FY2017E	FY2018E	CY2016	CY2017E	CY2018E
Industrial	40.9%	47.6%	48.9%	47.7%	48.8%	51.9%	51.0%	48.8%	49.8%	44.0%	46.7%	50.1%	42.8%	48.3%	50.4%
Autos	14.1%	12.4%	16.0%	15.9%	16.6%	17.4%	16.8%	16.7%	17.3%	15.8%	15.6%	16.9%	15.2%	16.1%	17.0%
Communications	17.6%	15.0%	17.8%	17.4%	18.5%	18.4%	18.7%	18.3%	19.2%	20.2%	17.7%	18.5%	19.1%	17.9%	18.7%
Consumer	27.4%	17.0%	17.4%	19.0%	16.1%	12.3%	13.4%	16.2%	13.6%	20.1%	20.0%	14.5%	22.8%	17.6%	13.9%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Q/Q Change	Jan-17	Apr-17	Jul-17	Oct-17	Jan-18	Apr-18	Jul-18	Oct-18	Jan-19
Industrial	1.6%	43.0%	23.8%	0.4%	2.6%	0.6%	0.7%	-0.6%	-3.5%
Autos	-2.0%	39.6%	20.4%	2.5%	4.8%	-0.9%	-1.2%	2.8%	-1.5%
Communications	0.7%	26.3%	18.5%	0.9%	6.7%	-6.0%	3.9%	1.5%	-0.6%
Consumer	-8.1%	-18.2%	14.9%	12.0%	-15.1%	-27.7%	12.1%	25.0%	-20.4%
TOTAL	-1.9%	22.8%	20.7%	2.8%	0.3%	-5.4%	2.4%	3.8%	-5.4%

Y/Y Change	Jan-17	Apr-17	Jul-17	Oct-17	Jan-18	Apr-18	Jul-18	Oct-18	Jan-19	FY2016	FY2017E	FY2018E	CY2016	CY2017E	CY2018E
Industrial	15.6%	49.4%	90.7%	80.5%	82.3%	28.2%	4.3%	3.2%	-2.9%	0.8%	60.0%	22.8%	4.5%	75.7%	7.1%
Autos	9.7%	40.2%	73.1%	68.7%	80.3%	28.0%	5.1%	5.5%	-0.8%	2.8%	48.7%	23.7%	4.6%	65.6%	8.4%
Communications	3.1%	24.6%	48.3%	52.3%	61.3%	20.1%	5.2%	5.8%	-1.5%	0.1%	32.2%	19.6%	6.4%	46.5%	6.7%
Consumer	113.0%	176.2%	36.1%	-3.3%	-10.6%	-21.0%	-22.9%	-13.9%	-19.3%	-5.6%	49.8%	-16.8%	9.3%	20.5%	-19.1%
TOTAL	27.9%	55.2%	67.7%	49.5%	52.9%	17.7%	-0.1%	0.8%	-4.9%	-0.4%	50.6%	14.4%	5.9%	56.0%	2.6%

Source: Company data, Credit Suisse estimates

Key Issues

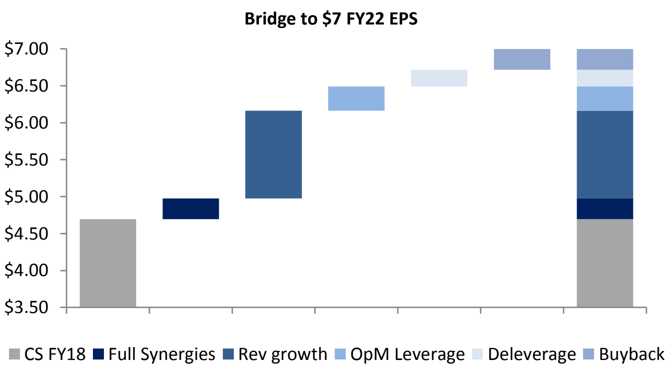
Base-Case $7+ in LT EPS/FCFPS: Continued outperformance in B2B, better than historic share gains from scale, upside to LLTC synergies and optionality from deleveraging and buybacks support $8+ of EPS/FCFPS by FY22 vs. the Street which is modeling ~$5 for FY18. Note ADI's LT target model calls for mid-single digit Rev growth, 70%+ GM, 39-45% OpM, and 34-42% FCF Margin, driving 8-12% EPS/FCF growth and FY22 EPS/FCFPS approaching ~$7 or $7.25 at the high end. Note ADI is already operating at target GM/OpM of 70%+/42%, and F4Q is ADI's first quarter with a new CFO – we expect an incremental update on LT targets and cash return shortly thereafter.

- **At Least Mid-Single Digit Rev Growth Achievable:** ADI's Rev growth target includes Industrial growing >2x GDP (assuming a similar GDP environment as today), Autos growing up to 3x SAAR, Comms growing up to mid-single digit, and Consumer growing up to mid-single digit which we view as easily achievable. Note ADI's Rev target does not include any impact from a stronger GDP environment or high-volume Consumer wins – which could add >$0.50 to EPS.

- **Rev Synergies and Share Gains Could Add $1+ to EPS/FCFPS:** As silicon becomes a greater % of BOM, customers will prefer to deal with fewer suppliers who can do more – driving faster than historic share gains. Every point of Analog share gain at 45% OpM drives ~$0.45 of EPS upside. Importantly ADI's target model does not include any impact from LLTC Rev synergies (up to $1bn LT starting in 2019) – which at 45% OpM would drive an incremental $1 in EPS.

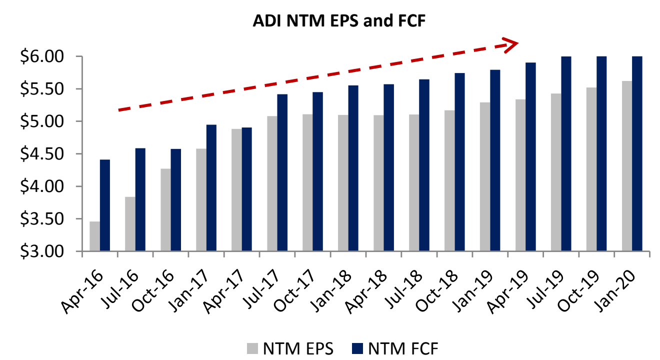
- **Upside from Deleverage and Buybacks:** Deleveraging and buybacks could add another $0.15-$0.20 in EPS. To put in perspective – assuming ADI raises its dividend 5-10% in FY18 in-line with target and uses the remainder of FCF generated towards debt reduction would yield an incremental $0.05 in EPS. Importantly ADI expects to achieve 2x net leverage by FY19 at which the Company should reinstate its buyback (note ADI targets to return 80-100% of FCF to shareholders post debt-service).

Figure 80: $7+ of FCFPS Before LLTC Rev Synergies



Source: Company data, Credit Suisse estimates

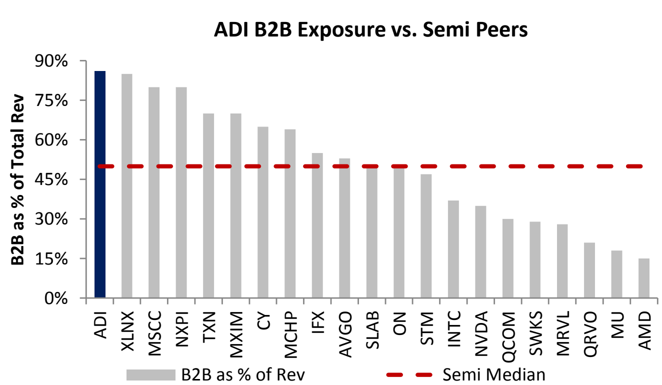
Figure 81: ADI NTM FCFPS/EPS Growing 8-12%



Source: Company data, Credit Suisse estimates, SIA

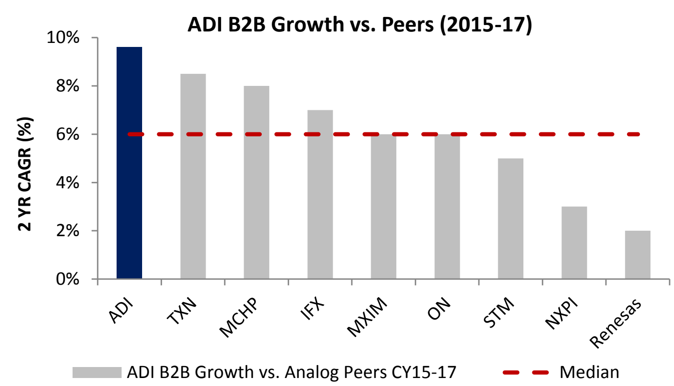
B2B Outgrowing, Future Drivers Underappreciated. ADI has ~85% of Rev in more stable, higher multiple B2B buckets. MEMS Passive Safety, which represented ~150 bps of headwind to growth from 2012-2016, has stabilized at less than 2% of overall Rev, and F4Q/F1Q should mark the 5th/6th consecutive quarters that ADI is out-growing peers in B2B. While F3Q/F4Q Industrial (49% of Rev) are growing 27%/23% y/y, 1000 bps above peers and raising questions of sustainability – we would note inventories remain lean and ADI-specific drivers (HITT, A&D, Automated Test) support at least sustained seasonal q/q growth and a "soft-landing" to 4-5% y/y growth by C1H18. Longer-term, the addition of LLTC should improve B2B growth and mix, and we see multiple drivers to sustain B2B growth ABOVE peers including: (1) Accelerating penetration of ADAS, A^{2}B and BMS, (2) MIMO share and content gains ahead of 5G trials, (3) HITT Rev synergies especially in Mil/Aero, and (4) Factory Automation.

Figure 82: Superior End-Market Exposure



Source: Company data, Credit Suisse estimates, SIA, Thomson Reuters Datastream

Figure 83: ADI's B2B Outgrowing Peers



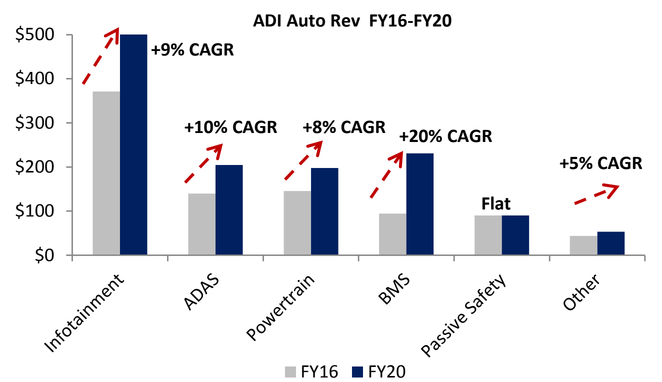
Source: Company data, Credit Suisse estimates

We would note that ADI spends 75% of R&D on defending and extending its leads in core markets, 20% on building new business momentum, and 5% on options for future business growth. We would highlight: (1) Relative to Industrial, ADI currently derives $500m in annualized factory automation Rev or ~25% of total Industrial Rev – characterized diversity of product functions/customers and long (15-20 year) lifecycles. We expect ADI will continue to strengthen its market position as customers re-allocate R&D to software/services and ADI becomes a fuller-solution supplier. (2) Relative to Autos: ADI's

LT target model embeds Autos growing up to 3x SAAR with incremental opportunities in electrification, AD and cabin electronics driving a $600 content opportunity per vehicle by 2025 vs. $250 today. While ADI has built upon its strong position in Autos (A^2B, LED, and accelerating opportunities in ADAS among others), ADI should continue to benefit from working directly with Tier 1s and OEMs resulting in reduced time to market.

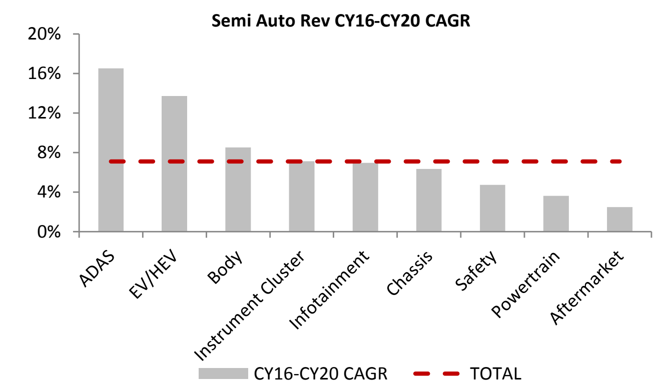
EV Acceleration Drives Autos In CY18. ADI is poised to out-grow Analog Auto Rev in CY18 driven by a reacceleration in China EV where ADI has 50%+ share (~10% of ADI Autos Rev). Note the vast majority of ADI's EV exposure is through core LLTC battery management systems (BMS) – we would note that LLTC's Auto business actually DECLINED Y/Y in AprQ and JulQ on a prolonged China EV inventory correction. On the back of an increasing government push towards electrification (China targeting to end fossil-fuel vehicle sales within the next 20 years and relaxing foreign JV EV rules), ADI's BMS Rev could grow 50%+ y/y in CY18 with an acceleration into CY19 vs. our current model of 30% y/y. Specifically we would note that in 09/17 China's Ministry of Industry and Information (MIIT) introduced legislation setting quotas for EV production by OEM – beginning at 10% of CY19 builds vs. <5% today. We would note that ADI has a first-mover advantage – its 4th-gen BMS solution is wireless, delivers 3x better accuracy, 25+ mile increase in driving range, $500+ cost savings to OEMs, and 10+ years of battery life.

Figure 84: Strong Growth from ADI's BMS Segment



Source: Company data, Credit Suisse estimates, SIA, Thomson Reuters Datastream

Figure 85: EV/HEV Growing at a 10%+ CAGR

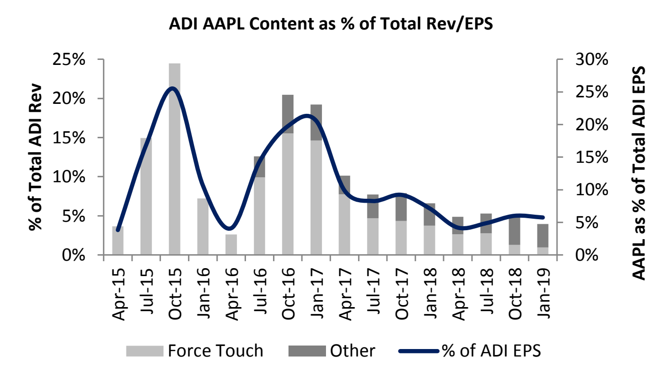


Source: Company data, Credit Suisse estimates

Longer-term, we expect a 10x increase in EV by 2022 driven by both opportunities in China (BYD plans to produce only electric vehicles by 2030) and internationally (TSLA, F who already has an A^2B partnership with ADI, and GM which on 10/02 announced plans for 18 new EVs by 2023). We expect ADI's SAM for EV to increase from $1.5bn to $3bn+ by 2022 – with the Company's EV/BMS Rev to increase at a 20%+ CAGR as ADI gets 2x content from HEV to EV. Specifically against Analog Semi Auto Rev which we expect to grow at a 9% CAGR through CY20 (above overall Semi Auto Rev of 7%), we expect superior growth from EV/HEV (13%), ADAS (12%), Infotainment (11%) and Powertrain (10%) – together, these sub-verticals comprise approx. 75% of ADI's Auto Rev.

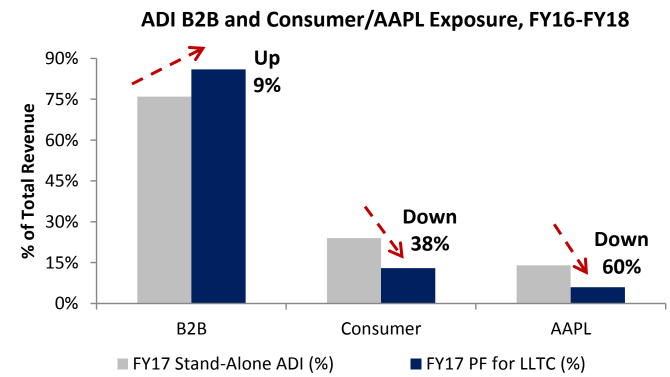
AAPL Headwind Priced In: Despite better-than-seasonal Consumer growth in the short-term due to iPhone X ramp timing, ADI has successfully de-risked Consumer Rev growth ahead of CY18 – specifically guiding Consumer down 20-30% y/y for FY18 against total Rev up 4% y/y. We are modeling FY18 Consumer down 25% y/y reflecting loss of ForceTouch in the OLED iPhone X. Despite content loss which reduced NTM EPS by ~5%, ADI's overall NTM EPS has increased 25% since closing LLTC – reflecting the diversity of B2B drivers. Importantly ongoing AAPL exposure will be only ~5% of Rev, well BELOW 12% in FY16 and significantly reducing volatility. We would also note that ADI's Force Touch opportunity at AAPL is likely to decline to $0 over the next 1-2 years as all models move to an OLED form-factor, albeit ADI can offset content loss in other applications – Street is modeling FY19 Consumer down an additional ~10% y/y. Importantly without any AAPL Rev, ADI is only trading at a 5% premium to peers despite the industry's highest FCF margin – an in-line multiple would imply a trough at $79. Finally, we would note that conservatism around LLTC synergies could offset potential disruption at AAPL – specifically an incremental $50m in annualized cost synergies would drive 100 bps of OpM expansion / ~$0.15 in EPS.

Figure 86: AAPL Declining as % of Rev/EPS



Source: Company data, Credit Suisse estimates, SIA, Thomson Reuters Datastream

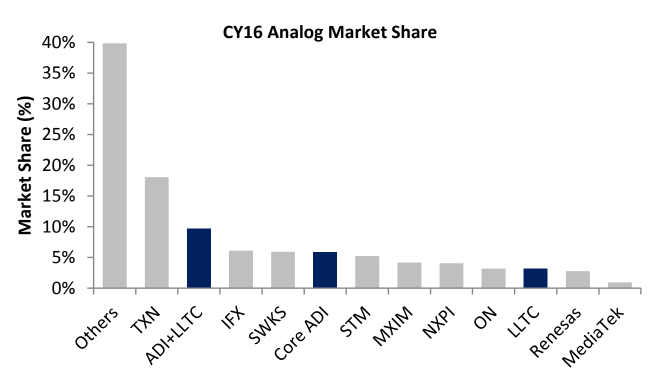
Figure 87: LLTC Improves Rev Diversity and Quality



Source: Company data, Credit Suisse estimates

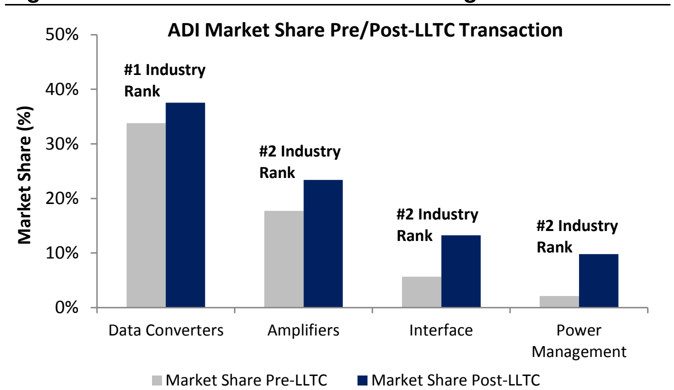
LLTC Integration Ahead of Schedule: ADI is tracking ahead of original cost synergy targets and we expect its new CFO to drive leverage towards the high end of target OpM of 45%. The merger with LLTC provides core IP in Power Management and increases ADI's TAM by $6bn or 75%. The addition of LLTC also propels ADI from the 4th to the 2nd largest Analog Company behind TXN with ~10% share and dominant market positions in Data Conversion (#1 Share), Power Management (#2), Amplifiers (#2), Interface (#2) and RF/Microwave (#1). Despite concerns regarding LLTC integration ADI raised LT cost synergy targets to $250m by FY22 and reiterated its F4Q18 timeline for achieving the first $150m. Given that ADI has already identified and taken action on approx. $100m in cost synergies (including ARW distribution agreement and core ADI voluntary retirement which together should drive ~$80m in annualized cost savings), we feel confident that the $150m is achievable in the ST – we are modeling for $85m in LLTC cost synergies by the end of F4Q (2/3 in OpEx, 1/3 in COGS) with an additional $65m on the come between F1Q18-F4Q18. Further, a clear focus on growth AND GM/OpM discipline, altogether driving outsized FCF growth should provide the foundation for stronger LLTC Rev growth moving forward and greater flexibility in pursuing power management Rev opportunities.

Figure 88: LLTC Propels ADI to #2 Analog Share



Source: Company data, Credit Suisse estimates, SIA, IC Insights

Figure 89: ADI #1 or #2 Across All Analog Products

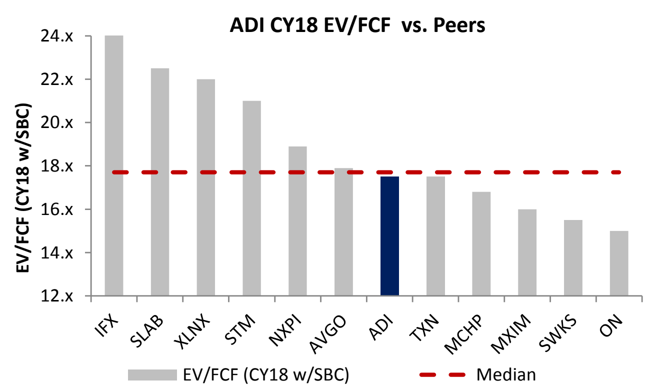


Source: Company data, Credit Suisse estimates, SIA

We would highlight ADI's track record integrating HITT (2x Rev pipeline since purchase, first co-designed products coming to market this year) as a proof-point of ADI's successful M&A integration strategy – focused on customer needs and sustainable B2B growth rather than cost rationalization. Longer-term, complementary portfolios and manufacturing scale should provide the basis for faster than historic share gains at better profitability – specifically ADI should benefit from up to $1bn in Rev synergies with LLTC starting in 2019 in part due to complementary customer bases (60% of core ADI sales to larger customers vs. 30% for core LLTC – directly giving core ADI direct engagement with 2-3k incremental customers) and a shared profitable growth focus.

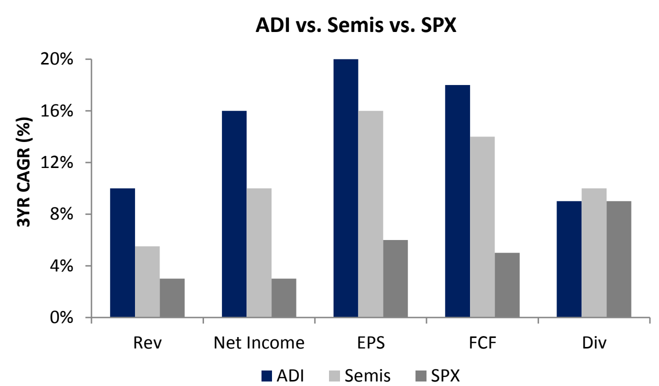
Superior Returns Merit Premium Valuation: ADI trades at 17.8x CY18 EV/FCF and 17.0x with full merger synergies, essentially in line with peers despite faster growth, incremental self-help on M&A synergies and meaningful margin expansion. We see upside to FCFPS of ~$7+ by FY22 driven by market share gains, OpM expansion, deleveraging and buybacks. We continue to argue higher quality Rev, better growth and superior returns merit a premium multiple. Over the past 3 years relative to the SPX and Semis, ADI has exhibited faster Rev, Net Income and FCF growth at higher margins. Our $100 PT is based on 20x CY18 EV/FCF.

Figure 90: ADI Trading In-Line on CY18 EV/FCF



Source: Company data, Credit Suisse estimates, Bloomberg

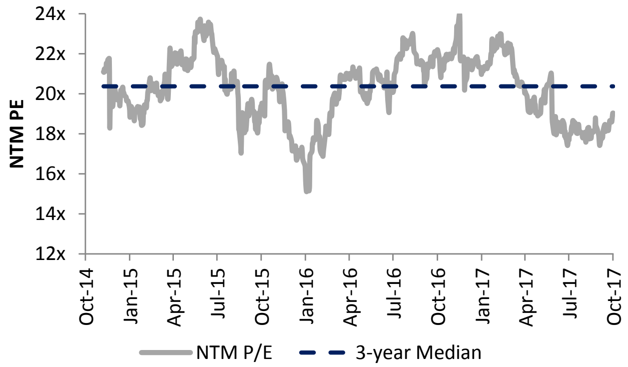
Figure 91: Superior Returns to Semis and SPX



Source: Company data, Credit Suisse estimates, Thomson Reuters

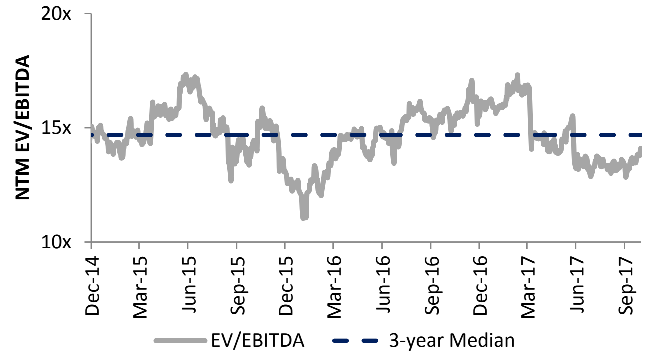
ADI is well positioned with >80% of Rev in more favorable I/A/I buckets and well levered to (1) Accelerating penetration of ADAS, A^2B and BMS, (2) More integrated transceivers in Infrastructure, (3) HITT Rev synergies especially in Mil/Aero, (4) Factory Automation and (5) Emerging opportunities in Healthcare. The Company is well levered to our Data Growth Paradigm and benefits as the "digital" and "real" worlds merge, interact and co-exist at increasing rates. ADI's core IP especially in A/D Conversion (40% share) makes it a unique asset in Semis, and the addition of LLTC provides a significantly larger and leverageable position in Power Management which positions ADI to benefit from the proliferation of silicon in non-traditional applications. While scale has not historically been a strategic imperative in analog, we see increasing silicon content in non-traditional areas driving customers to seek fewer suppliers with greater capabilities over-time; providing the basis for faster than historic share gains – accretive to our upside scenario.

Figure 92: NTM PE Over Time



Source: Company data, Thomson Reuters

Figure 93: NTM EV/EBITDA Over Time



Source: Company data, Thomson Reuters

Applied Materials, Inc.

(AMAT, $53.94, OUTPERFORM, TP $62.00)

INLINE/INLINE; Secular Growth at Cyclical Valuations

Reporting Date: TBD

Conference Call: TBD

Figure 94: AMAT Summary of Expectations

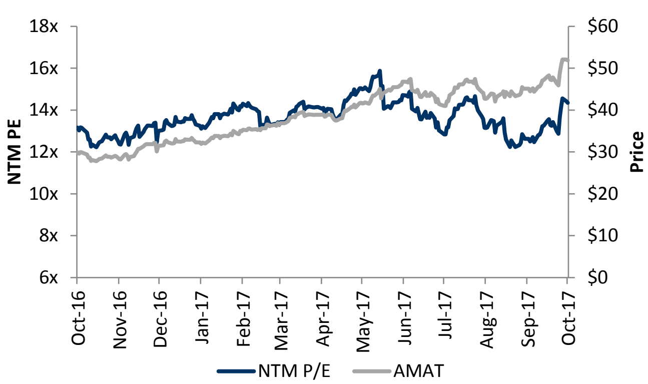
USD in millions, unless otherwise stated

AMAT	Jul-17	Oct-17			Jan-18		CY17E		CY18E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Total Revenue	$3,744.0	$3,925.0	$3,939.0	$3.85-$4.00bn	$4,048.2	$3,942.7	$15,263.2	$15,171.6	$16,632.2	$16,178.3
% Q/Q chng	*5.6%*	*4.8%*	*5.2%*		*3.1%*	*0.1%*				
% Y/Y chng	*32.7%*	*19.0%*	*19.5%*		*23.5%*	*20.3%*	*28.8%*	*28.1%*	*9.0%*	*6.6%*
Total GM*	46.6%	46.0%		*46.5%*	46.0%		46.2%		46.5%	
R&D Expense*	$454.0	$464.0			$468.0		$1,823.0		$1,896.0	
Operating Mgin*	28.7%	28.5%	28.7%		28.9%	28.1%	28.5%		29.7%	
Net Income*	$927.0	$970.8			$1,005.2		$3,764.1		$4,243.3	
Net Margin*	24.8%	24.7%			24.8%		24.7%		25.5%	
EPS	$0.86	$0.90	$0.90	*$0.86-$0.94*	$0.94	$0.89	$3.48	$3.44	$4.00	$3.69
Fully diluted shares	1,083.0	1,078.5			1,074.0		1,080.6		1,062.3	

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

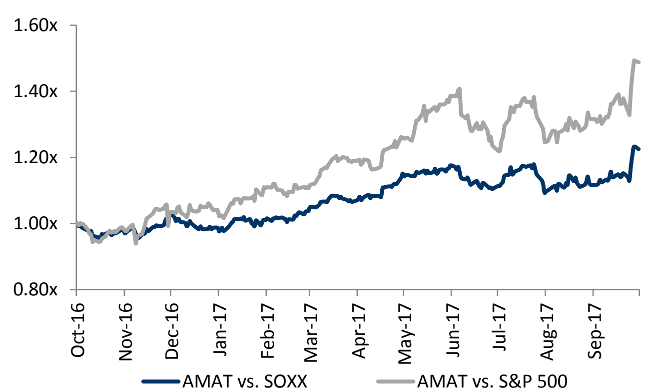
AMAT: Recap of Recent Stock Performance

Figure 95: AMAT NTM PE vs. Price



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 96: LTM Performance vs. SOXX vs. SPX



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Key Message: While still early in the quarter we expect AMAT to report F4Q17 at least in-line with CS estimates, and guide F1Q17 above Street estimates. DRAM/NAND pricing has continued to remain strong, and commentary from KLAC suggests that there has been meaningful upside in new orders since last earnings. Our checks also suggest that INTC orders are also tracking higher, driven by incremental spending on XPoint, and 10nm investments. We expect CY18 EPS at $4 vs. Street at $3.69 due to stronger WFE spend. While the stock is up 79% over the past year, forward NTM PE is at a 25% discount to S&P versus 30% historically. We expect the stock to react positively as estimates continue to be revised upwards. We continue to believe that WFE is structurally likely to grow faster than Semis, and believe that valuations are very attractive for AMAT given the discount to the market.

Expect F4Q17 (OctQ) Results In-line with CS

While still early in the quarter, we expect AMAT report C3Q Rev/EPS IN-LINE with CS estimate of $3.93bn/0.90, Street estimate of $3.94bn/0.90, and guidance of $3.85-$4.00bn (+2.8% to +6.8% q/q)/$0.86-$0.94. We are modeling bookings of $3.99bn (+4.0% q/q). By segment, we are modeling Rev/Bookings as follows (1) SSG $2.42bn (-4.2% q/q)/$2.55bn (+2.7% q/q). (2) AGS $811m (+3.2% q/q)/$801m (+0.3% q/q) (3) Display $669m (+63.2% q/q)/$610m (+13.0% q/q). (4) EES $20m (+25.0% q/q)/$30m (+66.7% q/q). We are modeling GM of 46.0% (-60 bps q/q) BELOW guidance of 46.5%, and OpEx of $686m (vs $671m in JulQ). We expect Inline Rev, OpEx and GM to drive EPS in-line with CS and Street estimates of $0.90.

Expect F1Q18 (JanQ) Guidance In-line with CS/Street

We expect AMAT to guide C4Q Rev/EPS to $4.05bn (+3.1% q/q)/$0.94 IN-LINE with CS at $4.05bn (+3.1% q/q)/$0.94 and above Street at $3.94bn (+0.1% q/q)/0.89. We expect stronger DRAM, to drive potential upside of $200mn/$0.06 to our estimate, and potentially lead to EPS of $1. We are currently modeling C4Q17 AGS+SSG rev at +6.9% q/q and orders at $4.0bn (+1.0% q/q). We are modeling GM at 46.0% (flat q/q) and OpEx at $692m (vs. $686m in OctQ). In-line revenues, GM and OpEx will drive EPS to $0.94, INLINE with CS at $0.94 versus Street at $0.89.

2018 Outlook

We are modeling CY18 Rev/EPS of $16.6bn/$4.0 versus Street at $16.2bn/$3.69. We believe that Street is underestimating the growth in Silicon and SSG. By segment in CY2018 we are modelling Rev as follows (1) SSG $10.4bn (+3.7% y/y). We see upward bias to our estimate driven by potential upside in DRAM and Intel (2) AGS $3.6bn (+15.0% y/y). Note that AMAT's installed base is growing at ~9% in CY17, which should support ~15% y/y growth in services. Note the AMAT has also guided AGS growth at 15% per annum for next three years (3) Display 2.5bn (+26.2% y/y). AMAT has indicated that FY18 display revenues should grow 30% y/y, driven by continued strength in OLED and buildout of Gen 10 capacity in China. We expect GM of 46.5% - up 30bps from CY17. Note that AMAT's target model implies ~50bps per year growth in GM. We are currently modelling OpEx of $2.8bn (+3.7% y/y), but AMAT's commentary at Analyst Day implies that OpEx could potentially upside to $3bn – while this could be a ~18c risk to EPS, we expect revenue upside to offset the impact from higher OpEx.

Figure 97: AMAT Revenue Model

(3-months ending)	Jan-16 1QA	Apr-16 2QA	Jul-16 3QA	Oct-16 4QA	Jan-17 1QA	Apr-17 2QE	Jul-17 3QA	Oct-17 4QE	Jan-18 1QE	Apr-18 2QE	Jul-18 3QE	Oct-18 4QE	CY16	CY17E	CY18E
Silicon	$1,373.0	$1,587.0	$1,786.0	$2,127.0	$2,150.0	$2,404.0	$2,532.0	$2,425	$2,667	$2,500	$2,633	$2,510	$7,650.0	$10,028.0	$10,403.7
Fab Solutions	$626.0	$648.0	$657.0	$693.0	$676.0	$724.0	$786.0	$810.8	$790.92	$832.6	$903.9	$932.4	$2,674.0	$3,111.7	$3,578.5
Display	$213.0	$167.0	$313.0	$452.0	$422.0	$391.0	$410.0	$669.0	$550.0	$650.0	$650.0	$650.0	$1,354.0	$2,020.0	$2,550.0
Adjacent Groups	$45.0	$48.0	$65.0	$25.0	$30.0	$27.0	$16.0	$20.0	$40.0	$25.0	$25.0	$25.0	$168.0	$103.0	$100.0
Total Revenue	**$2,257.0**	**$2,450.0**	**$2,821.0**	**$3,297.0**	**$3,278.0**	**$3,546.0**	**$3,744.0**	**$3,925.0**	**$4,048.2**	**$4,007.8**	**$4,212.2**	**$4,117.1**	**$11,846.0**	**$15,263.2**	**$16,632.2**

Revenue % of total	Jan-16	Apr-16	Jul-16	Oct-16	Jan-17	Apr-17	Jul-17	Oct-17	Jan-18	Apr-18	Jul-18	Oct-18	CY16	CY17E	CY18E
Silicon	60.8%	64.8%	63.3%	64.5%	65.6%	67.8%	67.6%	61.8%	65.9%	62.4%	62.5%	61.0%	64.6%	65.7%	62.6%
Fab Solutions	27.7%	26.4%	23.3%	21.0%	20.6%	20.4%	21.0%	20.7%	19.5%	20.8%	21.5%	22.6%	22.6%	20.4%	21.5%
Display	9.4%	6.8%	11.1%	13.7%	12.9%	11.0%	11.0%	17.0%	13.6%	16.2%	15.4%	15.8%	11.4%	13.2%	15.3%
Adjacent Groups	2.0%	2.0%	2.3%	0.8%	0.9%	0.8%	0.4%	0.5%	1.0%	0.6%	0.6%	0.6%	1.4%	0.7%	0.6%

Revenue % chg q/q	Jan-16	Apr-16	Jul-16	Oct-16	Jan-17	Apr-17	Jul-17	Oct-17	Jan-18	Apr-18	Jul-18	Oct-18
Silicon	-8.1%	15.6%	12.5%	19.1%	1.1%	11.8%	5.3%	-4.2%	10.0%	-6.3%	5.3%	-4.7%
Fab Solutions	-1.7%	3.5%	1.4%	5.5%	-2.5%	7.1%	8.6%	3.2%	-2.5%	5.3%	8.6%	3.2%
Display	11.5%	-21.6%	87.4%	44.4%	-6.6%	-7.3%	4.9%	63.2%	-17.8%	18.2%	0.0%	0.0%
Adjacent Groups	-2.2%	6.7%	35.4%	-61.5%	20.0%	-10.0%	-40.7%	25.0%	100.0%	-37.5%	0.0%	0.0%
Total	**-4.7%**	**8.6%**	**15.1%**	**16.9%**	**-0.6%**	**8.2%**	**5.6%**	**4.8%**	**3.1%**	**-1.0%**	**5.1%**	**-2.3%**

Revenue % chg y/y	Jan-16	Apr-16	Jul-16	Oct-16	Jan-17	Apr-17	Jul-17	Oct-17	Jan-18	Apr-18	Jul-18	Oct-18	CY16	CY17E	CY18E
Silicon	-5.3%	1.7%	9.2%	42.4%	56.6%	51.5%	41.8%	14.0%	24.1%	4.0%	4.0%	3.5%	26.2%	31.1%	3.7%
Fab Solutions	7.4%	0.3%	-1.2%	8.8%	8.0%	11.7%	19.6%	17.0%	17.0%	15.0%	15.0%	15.0%	3.9%	16.4%	15.0%
Display	-22.5%	2.5%	107.3%	136.6%	98.1%	134.1%	31.0%	48.0%	30.3%	66.2%	58.5%	-2.8%	88.6%	49.2%	26.2%
Adjacent Groups	-18.2%	-34.2%	66.7%	-45.7%	-33.3%	-43.8%	-75.4%	-20.0%	33.3%	-7.4%	56.3%	25.0%	-17.2%	-38.7%	-2.9%
Total	**-4.5%**	**0.3%**	**13.3%**	**39.2%**	**45.2%**	**44.7%**	**32.7%**	**19.0%**	**23.5%**	**13.0%**	**12.5%**	**4.9%**	**24.0%**	**28.8%**	**9.0%**

Source: Company data, Credit Suisse estimates

Key Issues

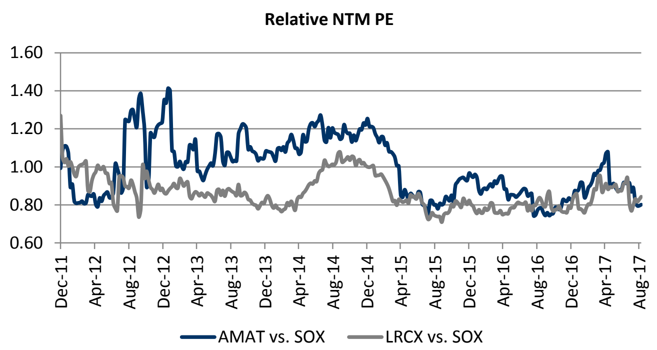
- **Revised Long Term Model is More Credible than Others.** AMAT's LT 2020 model has Rev growing at 11% CAGR to $19.6bn, GM of 47%, OpM of 29.6% and EPS of $5.08. AMAT assumes display business to grow at 23% CAGR and Services to grow at +15% CAGR while Semi likely to grow at +7% CAGR. While we regard AMAT's market share goals as ambitious, we believe the target model is achievable as the Company is expecting WFE to be flattish versus our expectation of growing at 7%+ year. We also think that target model is more credible than single product companies, as AMAT's diverse product portfolio, and a growth strategy that is based on multiple technology inflections, reduces long term technology risk for the Company.

- **AMAT benefits as Litho scaling moves to Materials Scaling:** Note that AMAT has the broadest product portfolio which positions them well them to capitalize on new technology inflexions. Historically, since the start of Semiconductor industry, the node scaling has been primarily driven by lithographic scaling. However looking ahead, there are significant changes in Litho, transistor, and interconnect formation. While Lithography challenges are well advertised and investors are aware of the challenges faced in Multipatterning/EUV development, very few investors are aware of the significant challenges that are faced in transistors and interconnects where there is a huge inflection in challenges at sub-10nm nodes (especially sub 7nm nodes). AMAT has a strong position in transistor and interconnect formation, and will benefit from the dramatic increase in Complexity increase. We also expect the Company to leverage their product portfolio to gain higher share in the patterning market.

- **Display - Strong growth in 2018 Driven by China Gen 10 Fab investments, and OLED.** We expect that Display spending will remain strong in 2018 driven by continued growth of OLED, and Gen 10/11 Display fabs investments in China. AMAT Display business has about equal exposure to OLED, and Large Size LCD panels. We expect OLED investments to continue to remain strong in 2018 driven by continued buildout of capacity for iPhone. In addition there are new Gen 10 fabs in China that will likely see increased investment. While we are less sure on 2019 spending, given that there could be risk to China FPD investments, increased market share (target to grow SAM to 40% by 2020 from 15% currently) could be a positive. AMAT expects its

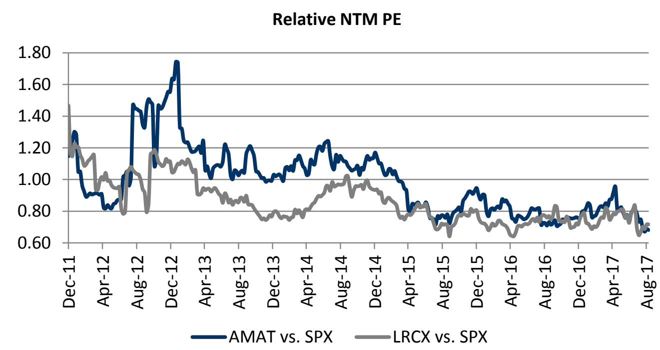
Display business to grow fastest among all its other segments at a CAGR of 23% and expected to result in >$3.5bn Revenue in FY20.

Figure 98: NTM PE Relative to the SOX



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 99: NTM PE Relative to the S&P

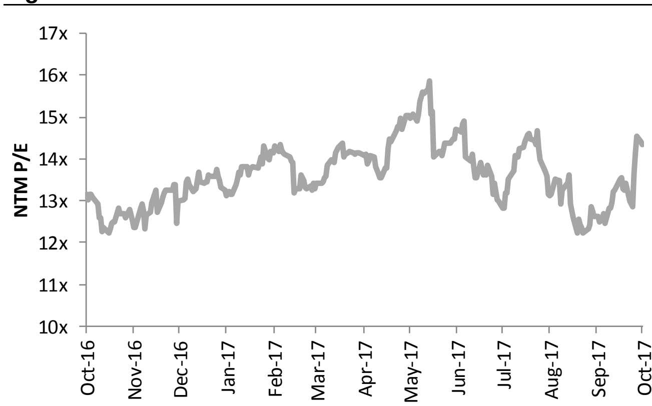


Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Investment View and Valuation

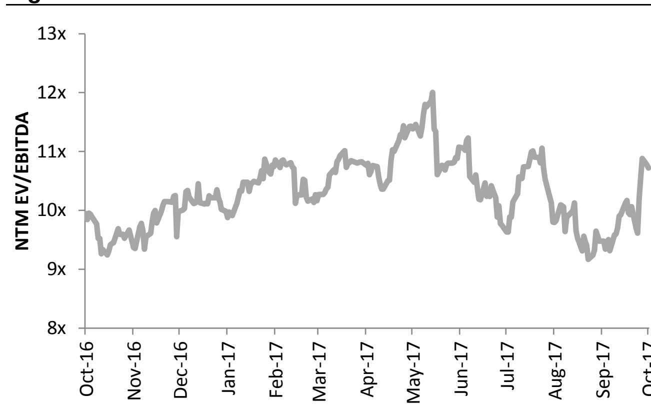
We maintain our OP rating and continue to view AMAT as beneficiary of self-help and improving industry fundamentals. Specifically (i) Solid track record of Buybacks. Company has lowered share count by 19%/34% over last 6 years/ last 12 years. AMAT recently increased the buyback authorization to $4bn; (ii) New Products in OLED can increase the SAM from 15% to 40%, providing the Company a growth Driver for Display revenues. We expect >40% y/y growth in CY17, driven by strong backlog. (iii) AMAT is well poised to benefit from the growth in China CapEx, given its higher exposure to new Capacity additions (versus lower exposure to conversion capex which tends to be Litho/Etch intensive). (iv) HDD to SSD transition could drive multiyear investment cycle for NAND, and (v) Valuations are attractive– AMAT is currently trading at 15.5x of CY17 EPS, ~18% discount to SPX at 18.3x, versus historical 3% discount over SPX over last 5 years. Our TP of $62 represents ~15.5x our CY18 EPS.

Figure 100: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 101: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

ASML Holding N.V.

(ASML.AS, €148.30, NEUTRAL, TP €140.00)

INLINE/INLINE; Potential EUV Orders + DRAM Upside

Reporting Date: Wednesday, October 18th, 1:00 AM EST

Conference Call: Wednesday, October 18th, 9:00 AM EST, Phone: 1-866-349-6092, Passcode: 912190

Figure 102: ASML Summary of Expectations

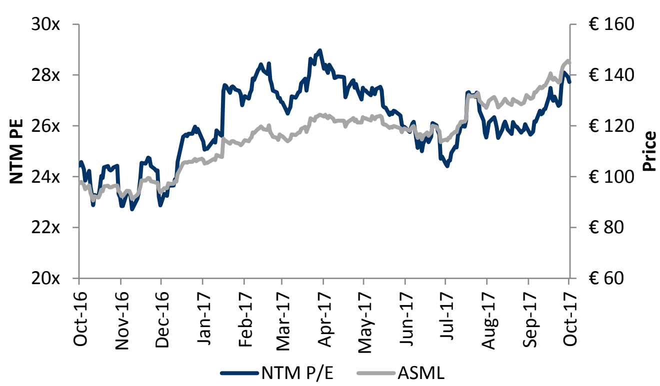
US$ in millions, unless otherwise stated

ASML	Jun-17	Sep-17			Dec-17		2017E		2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Bookings	**€ 2,374.8**	**€ 1,870.9**			**€ 1,707.7**		**€ 7,717.2**		**€ 7,606.8**	
% Q/Q chng	34.6%	-21.2%			-8.7%		43.0%		-1.4%	
Total Revenue	**€ 2,101.4**	**€ 2,200.0**	**€ 2,184.1**	**E2.2bn**	**€ 2,277.0**	**€ 2,260.9**	**€ 8,522.0**	**€ 8,435.0**	**€ 10,170.7**	**€ 9,619.4**
% Q/Q chng	8.1%	4.7%	3.9%		3.5%	3.5%				
% Y/Y chng	20.8%	21.2%	20.4%		19.4%	18.5%	25.4%	24.1%	19.3%	14.0%
Total GM*	**45.0%**	**43.0%**	*43.3%*	**43.0%**	**41.0%**	*42.2%*	**44.0%**	*44.6%*	**44.6%**	
Operating Exp.*	**-€ 414.7**	**-€ 420.0**		**-€ 420.0**	**-€ 420.0**		**-€ 1,668.4**		**-€ 1,752.1**	
Operating Mgin*	**26.4%**	**25.0%**	*25.6%*		**23.6%**	*24.8%*	**25.5%**		**27.4%**	
Net Income*	**€ 466.3**	**€ 463.7**			**€ 460.9**		**€ 1,843.0**		**€ 2,409.4**	
Net Margin*	**22.2%**	**21.1%**			**20.2%**		**21.6%**		**23.7%**	
EPS*	**€ 1.08**	**€ 1.07**	**€ 1.07**	**Implied E1.07-E1.09**	**€ 1.07**	**€ 1.11**	**€ 4.26**	**€ 4.33**	**€ 5.61**	**€ 5.39**
Fully diluted shares	432.4	432.4			432.4		432.4		429.2	

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

ASML: Recap of Recent Stock Performance

Figure 103: ASML NTM PE vs. Price



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 104: LTM Performance vs. SOXX vs. SPX

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Key Message: We expect the stock to react positively driven by upside to F3Q/F4Q, and continued momentum on EUV. We expect ASML to report F3Q EPS at E1.14, above CS/Street expectations of E1.07, and guide F4Q EPS to E1.20, above CS/Street expectation of E1.07/E1.11. We expect the upside to F3Q/F4Q to be driven by Memory and Services. We also expect the Company to receive orders for 4 new EUV systems, and expect the Company to maintain a positive outlook on 2018, driven by growth in EUV. While we view ASML favorably, we maintain our Neutral rating due to relative valuations.

Expect C3Q17 (SepQ) Revenues/EPS In-line/ABOVE with CS

We expect ASML to report SepQ Rev/EPS of E2.25bn/E1.15, above CS and Street at E2.2bn/E1.07, and Company guidance of E2.2bn /E1.07 (implied). The relative upside to our model is driven by higher services revenues - note the Company has revised their outlook for CY17 services revenue growth from +20% y/y to +25% y/y. We are currently modelling orders of E1.9bn, but see potential upside to E2.1bn, driven by higher DRAM orders. Our rev/unit estimates by product are (1) Immersion E1029m/21 units, (2) Non Immersion E222m/25 units, (3) EUV E300m/2 units, (4) Service E570m, (5) metrology & Inspection E79m. We expect revenue recognition of 2 EUV 3400 system. Rev breakdown by device is as follows (1) Foundry 48%, (2) IDM 27%, (3) Memory 25%. For SepQ, we are modeling orders of E1.9bn (-21.2% q/q) with orders mix of 40% Foundry, 40% Memory and 20% IDM. We are modeling GM in-line with guidance of 43% (-200bps q/q), but see potential upside to 43.5%, due to higher services revenues. We expect OpEx in-line with guidance of E420m (up E5.3m q/q). We estimate that higher revenues and modestly higher GM can drive EPS to E1.12, above CS and Street at E1.07.

Expect C4Q17 (DecQ) Guidance In-Line with CS/Street

We expect ASML to guide Rev/EPS to E2.43bn/E1.20, above CS at E2.28bn/E1.07, and Street at E2.26bn/E1.11. Note that since ASML's results, LRCX and other SCE companies have guided C4Q shipments to sequentially increase from C3Q - versus our current model embedding a 5% decline in revenues. Assuming non EUV revenues to be flattish, and factoring in the increase in FY17 services shipment from 20% y/y to 25% y/y, we estimate that revenues can upside to E2.43bn. By segment, we expect shipment mix of 46% Foundry, 32% Memory and 23% IDM with sequential growth of -1%/+33%/-13% q/q, respectively. Our rev/unit estimates by product are (1) Immersion E943m/19 units, (2) Non Immersion E255m/22 units, (3) EUV E420m/3 units, (4) Service E579m, (5) metrology & Inspection E81m. We expect revenue recognition of 3 EUV 3400 system. We are modeling GM of 41.0% (-200bps q/q) but expect that higher non-EUV revenues can drive GM to 41.7%. We expect OpEx of E461m including E315m for R&D and E105m for SG&A. While ASML does not guide orders, we are modeling total orders of E1.70bn (-8.7% q/q), including Non EUV orders of E1.27bn (-11.4% q/q) and EUV orders of E440m (4 system). We expect higher Rev, higher GM and Inline OpEx to drive EPS to E1.20, above CS at E1.07 and Street at E1.11.

2018 Outlook

We expect ASML CY18 Rev ABOVE Street, driven by stronger industry spending. We are modelling CY18 Rev/EPS at E10.3bn/E5.74, ABOVE Street at E9.6bn/E5.40. We expect orders of E7.6bn. Our rev/unit estimates by product are (1) Immersion E3.8bn (down 3% y/y)/75 units. Note we are estimating WFE to be up 4% y/y in CY18 (2) Non Immersion E854m (down 9% y/y) /75 units, (3) EUV E2.3bn (up 144% y/y) /20 units, (4) Service E3.0bn (up 12% y/y), (5) metrology & Inspection E374m. We are modeling GM of 44.8% (+70bps y/y) and expect OpEx of E1.75bn (up E84m y/y). We estimate that inline revenue, GM and OpEx can drive EPS to E5.74, In-line with CS at E5.74 and Above Street.

Figure 105: ASML Revenue Model

Revenue (Eu mn) *by product*	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Immersion	676	953	953	915	900	886	1,029	1,042	997	932	911	911	3,498	3,856	3,751
Non-Immersion	180	201	198	166	255	208	222	255	217	217	217	204	745	940	854
EUV	0	100	87	142	0	221	300	420	575	575	575	575	329	941	2,300
Service	477	486	576	618	728	717	621	629	811	799	693	701	2,158	2,694	3,005
Metrology & Inspection				66	61	69	79	81	78	90	102	105	66	290	374
Total	**1,333**	**1,740**	**1,815**	**1,907**	**1,944**	**2,101**	**2,251**	**2,426**	**2,678**	**2,613**	**2,497**	**2,496**	**6,795**	**8,722**	**10,283**

% in Total	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Immersion	51%	55%	53%	48%	46%	42%	46%	43%	37%	36%	36%	37%	51%	44%	36%
Non-Immersion	13%	12%	11%	9%	13%	10%	10%	11%	8%	8%	9%	8%	11%	11%	8%
EUV	0%	6%	5%	7%	0%	11%	13%	17%	21%	22%	23%	23%	5%	11%	22%
Service	36%	28%	32%	32%	37%	34%	28%	26%	30%	31%	28%	28%	32%	31%	29%
Metrology & Inspection				3%	3%	3%	4%	3%	3%	3%	4%	4%		3%	4%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Q/Q Growth	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE
Immersion	7%	41%	0%	-4%	-2%	-2%	16%	1%	-4%	-7%	-2%	0%
Non-Immersion	-27%	12%	-1%	-16%	54%	-19%	7%	15%	-15%	0%	0%	-6%
EUV	nm	nm	-14%	64%	-100%	nm	35%	40%	37%	0%	0%	0%
Service	-14%	2%	19%	7%	18%	-1%	-13%	1%	29%	-1%	-13%	1%
Metrology & Inspection					-8%	14%	14%	3%	-4%	16%	13%	3%
Total	**-7%**	**30%**	**4%**	**5%**	**2%**	**8%**	**7%**	**8%**	**10%**	**-2%**	**-4%**	**0%**

Y/Y Growth	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Immersion	-35%	6%	44%	44%	33%	-7%	8%	14%	11%	5%	-11%	-13%	8%	10%	-3%
Non-Immersion	-15%	19%	-37%	-33%	42%	3%	12%	53%	-15%	4%	-3%	-20%	-21%	26%	-9%
EUV	nm	43%	nm	nm	nm	121%	246%	196%	nm	160%	92%	37%	370%	186%	144%
Service	18%	-7%	0%	12%	52%	48%	8%	2%	11%	11%	12%	12%	5%	25%	12%
Metrology & Inspection								23%	27%	30%	29%	29%			29%
Total	**-19%**	**5%**	**17%**	**33%**	**46%**	**21%**	**24%**	**27%**	**38%**	**24%**	**11%**	**3%**	**8%**	**28%**	**18%**

Source: Company data, Credit Suisse estimates

Figure 106: ASML Bookings Model

Orders (Eu mn) *by product*	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Immersion	575	1,101	730	615	1,102	1,153	1,063	971	920	920	929	938	3,021	4,289	3,707
Non-Immersion	260	25	355	305	180	275	293	217	217	217	217	191	945	965	841
EUV	0	440	330	660	330	880	440	440	600	600	600	840	1,430	2,090	2,640
Metrology & Inspection					151	67	75	80	100	103	106	110		373	419
Total	**835**	**1,566**	**1,415**	**1,580**	**1,764**	**2,375**	**1,871**	**1,708**	**1,837**	**1,840**	**1,852**	**2,079**	**5,396**	**7,717**	**7,607**

% in Total	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Immersion	69%	70%	52%	39%	63%	49%	57%	57%	50%	50%	50%	45%	56%	56%	49%
Non-Immersion	31%	2%	25%	19%	10%	12%	16%	13%	12%	12%	12%	9%	18%	13%	11%
EUV	0%	28%	23%	42%	19%	37%	24%	26%	33%	33%	32%	40%	27%	27%	35%
Metrology & Inspection					9%	3%	4%	5%	5%	6%	6%	5%	0%	5%	6%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Q/Q Growth	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE
Immersion	-34%	92%	-34%	-16%	79%	5%	-8%	-9%	-5%	0%	1%	1%
Non-Immersion	-15%	-90%	1321%	-14%	-41%	53%	6%	-26%	0%	0%	0%	-12%
EUV	nm	nm	-25%	100%	-50%	167%	-50%	0%	36%	0%	0%	40%
Metrology & Inspection						-56%	12%	7%	25%	3%	3%	4%
Total	**-29%**	**88%**	**-10%**	**12%**	**12%**	**35%**	**-21%**	**-9%**	**8%**	**0%**	**1%**	**12%**

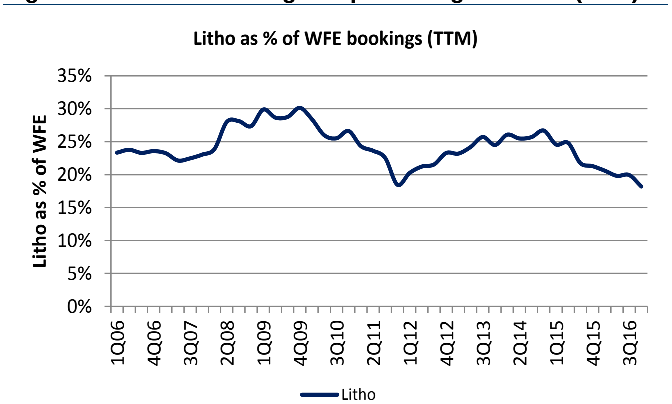
Y/Y Growth	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Immersion	-28%	53%	19%	-30%	92%	5%	46%	58%	-17%	-20%	-13%	-3%	0%	42%	-14%
Non-Immersion	12%	-87%	22%	-1%	-31%	1002%	-17%	-29%	20%	-21%	-26%	-12%	-7%	2%	-13%
EUV	nm	-28%	nm	nm	nm	100%	33%	-33%	82%	-32%	36%	91%	133%	46%	26%
Metrology & Inspection									-34%	54%	41%	38%			12%
Total	**-19%**	**3%**	**57%**	**33%**	**111%**	**52%**	**32%**	**8%**	**4%**	**-23%**	**-1%**	**22%**	**16%**	**43%**	**-1%**

Source: Company data, Credit Suisse estimates

Key Issues

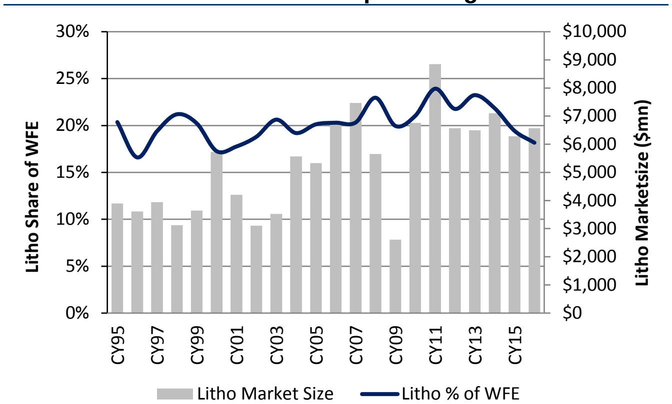
- **EUV grows share in logic/Foundry but does not address declining share in Memory:** Over last 5 years, ASML's systems revenues have grown at 10% versus 14% /25% for AMAT/LRCX. Our analysis suggests that ASML's relatively slower growth has been driven by (i) Decline in Foundry spending due to slowing smartphone growth - since 2012 the Foundry WFE has declined by 23% to $14.6bn in 2017. The decline in overall spending has masked overall growth in Logic/Foundry market share for ASML (ii) Decline in overall market share in memory - we think primarily due to 3D NAND and higher adoption of Self aligned multipatterning in DRAM. Note that even with the adoption of EUV, we expect the trend to continue. EUV is unlikely to be adopted in NAND and only adopted for 1 or 2 layers in DRAM - which is not enough to increase share for ASML in memory, which is the fastest growing part of the WFE. We expect that EUV will continue to drive higher share for ASML in logic foundry, however it may not be enough to drive meaningful share gains for ASML.
- **There are still Supply Chain Challenges to EUV adoption:** While the EUV is mostly meeting the milestones for HVM production, there are challenges which are likely to limit adoption at 7nm, despite the potential benefit to cost and Cycle time. In particular (i) Stochastic challenges could limit EUV adoption to only cut masks (5 layers) at 7nm. (ii) EUV introduces new challenges for OPC and Design rules need to be mature before they are robust enough for manufacturing. (iii) The industry needs to develop processes to manage the mask defects in manufacturing - while there are no showstoppers, the implementation may take longer than expected. We expect EUV adoption at 5 layers on 7nm, 10 layers at 5nm, and 15 layers at 3nm, and believe that adoption maybe below investor expectations.
- **ASML - Market Share Gains Have Limited Headroom.** The primary growth driver for ASML has been the market share gain in the Litho market – market share has increased from 32% in 2000 to ~75% in 2016 while Litho share in WFE has declined modestly. The company has established a leading position in the Immersion market where ASML had ~76% unit market share and ~75% revenue share in 2016. Given already high market share, revenue growth due to market share gains is hard going forward. We expect that ASML will be able to increase gross margins in immersion as the company increases lead over competitors - we are modeling immersion GM to increase from 49.2% in 2015 to 50.2% in 2017 and 51.8% in 2018. While ASML has clear product leadership in immersion, a consolidated customer base could make it difficult to raise margins while protecting market share.

Figure 107: Litho bookings as percentage of WFE (TTM)



Source: Company data, Credit Suisse estimates

Exhibit 108: Litho Revenues as percentage of WFE



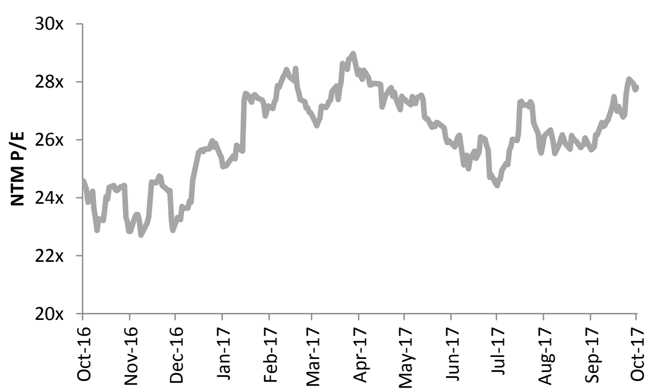
Source: Company data, Credit Suisse estimates

- **Service Revenue Growth is Clear Positive.** ASML service revenues have grown at a 24% CAGR over last 5 year, and now represent ~31% of the overall revenues for ASML - versus peers at ~25%. The growth has been driven by rising installed base of immersion systems, new product offerings like holistic lithography, Cymer acquisition, and system upgrades. While the growth rate could potentially decelerate, given the slowing pace of growth of installed base - a result of larger installed base. We expect that company will continue to grow service at 10-15% CAGR and could potentially exceed the E3bn target for 2020. The higher service revenues inherently reduce the cyclicality in revenues, and provide a steady cash stream that could be returned to investors.

Investment View and Valuation

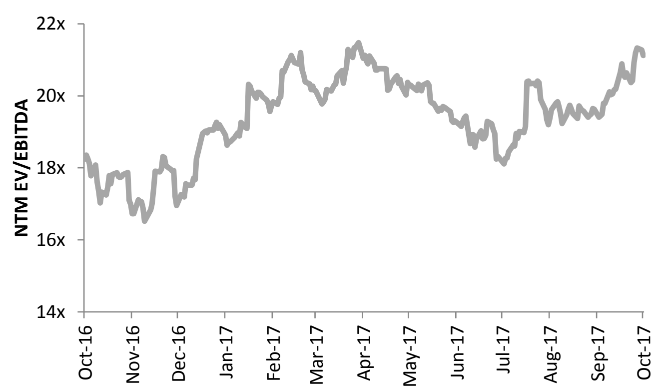
ASML is a near monopoly in €6bn per year Litho market, and is making steady progress towards commercialization of EUV technology, which could potentially more than double ASML's earnings power by 2020. Fundamentals are clearly better than a year ago; specifically (i) Wafer Fab Expenditures (WFE) for 2017 is now tracking to $45bn+ versus our expectation of $35bn a year ago (ii) Foundry market is now growing again (iii) The headwinds of planar to 3D NAND transition for Litho are now behind us (iv) ASML has made steady progress on EUV source power, and delivered on milestones committed three year ago – a significant departure from past trend of pushing out EUV milestones. It is now a question of what will be the extent of EUV adoption, rather than when or if EUV is going to be adopted. While much has progressed well, more progress is needed for adoption and there are still technology risks. Specifically (i) EUV source power of 250 W needs to be demonstrated with stable uptime at customers (ii) Pellicle needs to be proven at high power (iii) Resist and Mask defects needs to meet requirements of High volume production. We believe that story is largely unchanged – the Company is continuing to invest in EUV but meaningful ramp in earnings is still at least couple of years away, and we continue to believe that adoption of EUV could be lower than expected. ASML is currently trading at 25x of Our CY18 EPS of E5.74 versus KLAC/LRCX/AMAT at 15x/13x/13x of CY18 EPS. Our TP of €140 is based on ~25x of CY18 EPS.

Figure 109: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 110: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Broadcom Ltd.

(AVGO, $247.96, RESTRICTED)

Street Expects F4Q In-Line, F1Q Above Seasonal

Reporting Date: TBD
Conference Call: TBD

Figure 111: AVGO Summary of Street Expectations

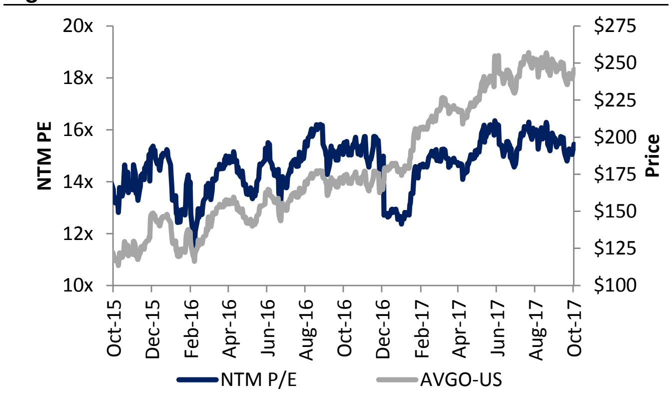
US$ in millions, unless otherwise stated

AVGO	F3Q (Jul-17)	F4Q (Oct-17E)			F1Q (Jan-18E)		FY2017		FY2018	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$4,467.0	N/A	$4,800.0	*$4,800m +/- 75m*	N/A	$4,714.0	N/A	$17,614.0	N/A	$19,158.0
% Q/Q chng	*6.3%*	*N/A*	*7.5%*	*+5.8% to +9.1%*	*N/A*	*-1.8%*				
% Y/Y chng	*17.5%*	*N/A*	*15.8%*		*N/A*	*13.6%*	*N/A*	*32.5%*	*N/A*	*8.8%*
Seasonal	*6.8%*		*5.2%*			*-3.7%*				
Gross Margin (ex. SBC)	63.3%	N/A	*63.0%*	*63.0% +/- 1%*	N/A	*62.3%*	N/A	*62.8%*	N/A	*62.2%*
Operating Expenses (ex. SBC)	$768		$780	*$780m*		$763		*$3,206*		*$3,123*
Operating Margin	46.1%	N/A	*46.8%*		N/A	*46.1%*	N/A	*44.6%*	N/A	*45.9%*
Net Income (ex. SBC)	$1,871									
Net Margin	41.9%		*42.7%*							
EPS (ex. SBC)	$4.10	N/A	$4.48	*Implied $4.48*	N/A	$4.34	N/A	$15.91	N/A	$17.61
EPS (cont. ops, w SBC)	$3.55		$3.93							
EPS (GAAP)	$1.14		$0.08							
Fully diluted shares	456.0		*457.0*	*457m*						

Source: Thomson Reuters, Company data

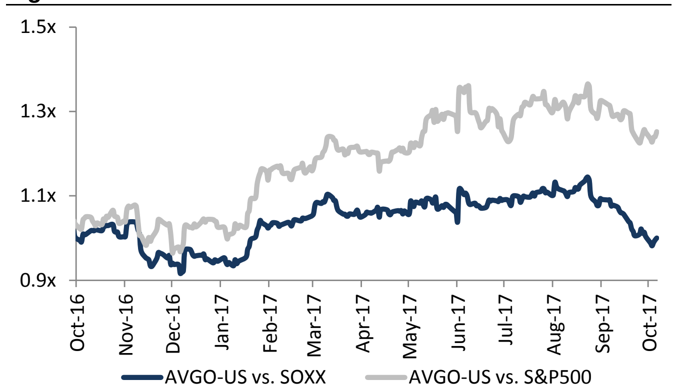
AVGO: Recap of Recent Stock Performance

Figure 112: AVGO NTM PE vs. Price



Source: Thomson Reuters, Company data

Figure 113: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data

Key Message: We remain restricted on AVGO pending the acquisition of BRCD. While still early, the Street expects F4Q IN-LINE with guidance and F1Q Rev guided above seasonal. Importantly, the Street expects Wireless Rev to hold up in F1Q, versus seasonal of down high-single digits, as timing of iPhone X provides for a "Stronger-For-Longer" AAPL build. While the magnitude of the F3Q beat and raise was the lowest in 7/6 quarters, respectively, as Rev upside was somewhat offset by pockets of weakness (optical, HDDs, Service Providers) and margins are above target – F4Q guidance for Rev up 16% y/y is well ABOVE Semis ex-memory tracking up 8% y/y. Further, while mgmt. targets a LT growth rate of 5%, Street F1Q Rev expectations imply four consecutive quarters of ~15% y/y Rev growth, demonstrating the broad-based strength of AVGO's IP portfolio. In addition, there are 2 NT events to watch: (1) closing of BRCD, which management expects by Nov 30th, and (2) Dividend increase in Nov – which at 50% of TTM FCF would increase ~55% y/y.

Street Expects F4Q Rev/EPS IN-LINE with Guidance

While still early, the Street expects AVGO to report F4Q Rev/EPS of $4,800m/$4.48 IN-LINE with the midpoint of guidance for $4,800 +/- $75m and implied EPS of $4.48. The Street expects AVGO to report F4Q Rev up 7.5% q/q above seasonal of up 5.2% primarily driven by Wireless strength due to a full quarter of the iPhone 8 ramp.

- **Wireless Benefits from iPhone 8 Builds:** The Street expects AVGO Wireless Rev up 30-40% q/q, above seasonal driven by a full quarter of AAPL ramp with ~40% y/y increase in content on average for the iPhone 8 vs. the iPhone 7.
- **Enterprise Storage to See Sharp Correction:** The Street expects Storage Rev down HSD q/q as F3Q HDD trends are not sustainable and AVGO guided for a sharp decline in demand driven by the start of an anticipated correction in the HDD market – partially offset by server and storage connectivity which should drive double digit growth y/y. We would note that despite that share q/q correction, Storage is expected up high-teens y/y.
- **Wired Declines Seasonally, Industrial Remains Strong:** The Street expects Wired Rev down low single digits q/q driven by seasonal weakness in broadband access, an industry trend that was seen last quarter around soft demand from Chinese operators for optical and broadband access products. Note – Wired Rev is expected up mid-single digit y/y in-line with AVGO's LT target. AVGO also guided Industrial resales to continue to increase in F4Q as demand continues to trend upwards.
- **Better-than-Expected Profitability Driving OpM Above Target:** The Street expects F4Q GM down ~30 bps q/q to 63.0% driven by mix shift towards Wireless. The Street expects OpM up ~70 bps q/q to 46.8% -- above their target of ~45%. Rev and profitability in-line with guidance drive EPS of $4.48 IN-LINE with Street and guidance of $4.48.

Street Expects F1Q Rev Above Seasonal

While still early, the Street expects AVGO to guide F1Q Rev/EPS of $4,714m/$4.34. Specifically, the Street expects F4Q Rev guided down 1.8% q/q above seasonal of down ~4% q/q. We would note that while the BRCD acquisition is expected to close Nov 31st, it is not currently embedded in Street estimates as the timing of the transaction close has changed several times.

- **Wireless Benefits from iPhone Pushout and Increased Content:** Street expects Wireless Rev down low-single digits q/q, well above seasonal of down high-single digits q/q. We would highlight that AVGO soft-guided F1Q (JanQ) Wireless Rev to "hold up sequentially" due to ramp timing.
- **Wired Declines Seasonally, Storage Returns to Growth:** The Street expects Wired Rev seasonally down low-single digits q/q and Storage up mid-single digits q/q modestly above seasonal following the sharp F4Q contraction. In addition to easy sequential Storage compares, AVGO's Server and storage connectivity business should continue to benefit from platform launches.
- **Dividend Increase:** AVGO is expected to issue a new dividend for FY18. With a target of 50% of TTM FCF, and expectations for FY17 FCF of ~$5.2bn – Street expects the dividend to increase ~55% y/y.
- **Gross Margins & OpEx:** While Street expects GM to decline ~30% bps q/q to 62.8% and OpM down ~70 bps to 46.1% – we would highlight that BRCD will be immediately accretive to margins, with GM of ~77% and OpM of ~58% -- which assuming the deal

closes on Nov 31st would imply upside to Street margins. Street expects above seasonal Rev growth and profitability down q/q to drive EPS guidance of $4.34 down from $4.48 in F4Q.

Key Issues

Financial Implications of BRCD. AVGO expect a fully integrated FC SAN business to have 77% GM, 58% OpM, and generate $900m of EBITDA – supporting at least $1.11 of accretion with upside to $1.23 if AVGO achieves target BRCD margins for the entirety of FY18. AVGO expects to drive ~1,000 bps of GM improvement from the ~67% at BRCD to ~77% and to drive ~800 bps of OPM improvement from current levels of ~50% to target levels of ~58%. Importantly, the majority of these synergies are simply coming from the transition to the AVGO platform – and are more secure. Lastly, we would highlight that AVGO acquired BRCD in an all cash deal for $12.75/share or $5.5bn plus $400 mm in debt – or 8.8 times EV/EBITDA pre-deal synergies and just 4.9x EV/EBITDA with synergies and proposed divestitures, well below the average Semis acquisition of ~20x.

Figure 114: AVGO + BRCD Accretion Analysis to Street FY18 EPS

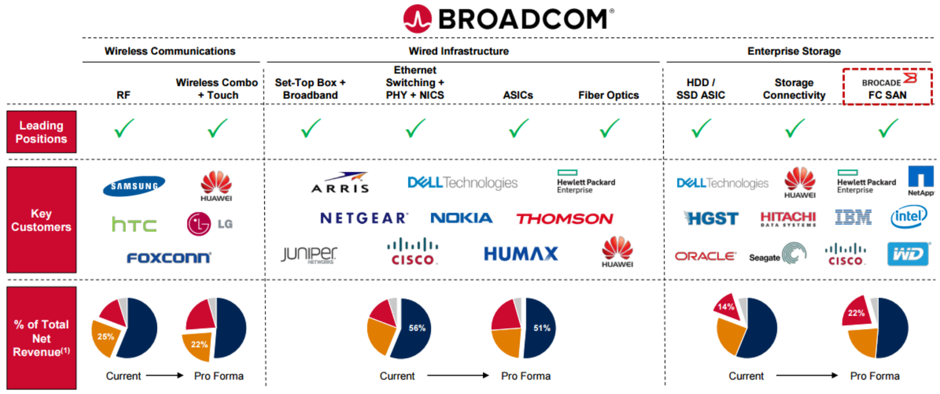
Inputs	
Synergy Assumptions	
COGS in '18	
R&D Synergy '18	
SG&A Synergy '18	
Total Cost Savings '18	$0
Prem./(Disc.)	46.6%
PF BRCD	$12.75
AVGO Mkt Cap	$70,283
BRCD Mkt Cap	$3,588
PF BRCD Ent. Value	$5,900
Financing Assumptions	
Stock	$0
% of total	0.0%
Cash	$590
% of total	10.0%
Debt	$4,455
% of total	90.0%
Int. Rate	4.0%

AVGO + BRCD Pro Forma ($m)	AVGO FY2018	BRCD FY2018	ex-costs/synergies FY2018	Assumptions FY2018	Deal Terms FY2018
Revenue	$18,972.0	$1,364.0	$20,336.0		$20,336.0
COGS	$7,019.6	$321.4	$7,341.0	$0.0	$7,341.0
Gross Profit	$11,952.4	$1,042.6	$12,995.0		$12,995.0
GM (%)	63.0%	76.4%	63.9%		63.9%
OpEx	$3,249.0	$246.8	$3,495.8		$3,495.8
Op Inc	$8,703.4	$795.8	$9,499.1		$9,499.1
OpM (%)	45.9%	58.3%	46.7%		46.7%
Net Int/Other	-$385.0	-$36.0	-$421.0	-$190.0	-$611.0
Pre-tax Income	$8,318.4	$759.8	$9,078.1		$8,888.1
Taxes	$369.34	$174.74	$399.44	-$8.4	$391.1
TR (%)	4.4%	23.0%	4.4%	4.4%	4.4%
Net Inc	$7,949.0	$585.0	$8,678.7		$8,497.0
Shares	446.0	412.0	446.0	0.0	446.0
EPS (ex-SBC)	$17.82	$1.42	$19.46		$19.05
Accretion/Dilution ($)			+$1.64		+$1.23
Accretion/Dilution (%)					6.5%

Source: Company data, Thomson Reuters

Brocade Business Summary. Brocade is a networking equipment provider that specializes in data and storage networking products with products that include routers and switches optimized for data center, campus and carrier environments, and IP and Fibre Channel storage network fabrics. Note – AVGO plans to divest ~$1.0bn of BRCD Networking Rev that competes with its Networking customers such as CSCO, ANET, and JNPR. We would highlight that AVGO does not intend to enter the systems business as the Switch Box market is very competitive and would put AVGO in direct competition with Ethernet switching, routing and WLAN customers. AVGO will focus on BRCD's Service Area Network (SAN) Fiber Channel Rev that fills a key area in AVGO's Enterprise Storage product line and addresses the large but stable Enterprise customers (Govt, Telco's, Banks) that require high performance and secure infrastructure. While the ~$10bn FC SAN market has been flattish over the past 5 years, AVGO expects secular headwinds to be offset by expanding capacity bandwidth that gradually increase ASPs. Further, AVGO noted that these large customers are typically risk-adverse and slow moving so AVGO would expect any industry changes to occur very slowly. BRCD has a dominant position in the SAN market with ~55% market share well ahead of the next largest competitor CSCO who has ~20% market and CAVM who has ~14% market share. Note – BRCD and CSCO combine for >2/3 of the SAN market.

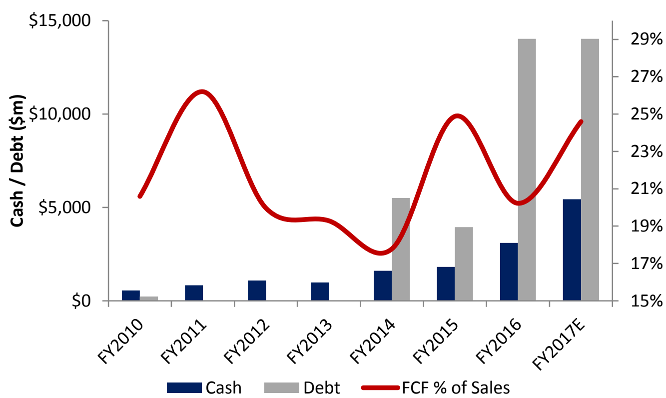
Figure 115: BRCD Adds Another Key Element to AVGO Portfolio



Source: Broadcom

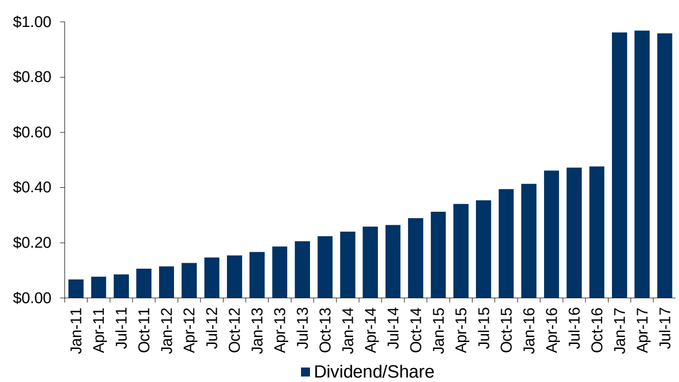
A Total Return Story. AVGO's current leverage ratio is 1.0x and Street expects it to drop to <1.0x exiting FY17. AVGO has pursued an aggressive M&A strategy – acquiring 6 companies in the last 4 years or approximately $3.9bn in Rev (~20% of CY18 Rev) and ~$3.00 of EPS (~20% of CY18 EPS). Since the inception of AVGO's dividend program in F2Q11, the Company has increased its dividend every quarter and during its F4Q16 Earnings CC AVGO doubled the divided to $1.02/sh (2.3% implied yield) and committed to a 35% FCF margin and to return 50% of TTM FCF to shareholders.

Figure 116: AVGO Cash and Debt Balances



Source: Company data, Thomson Retuers

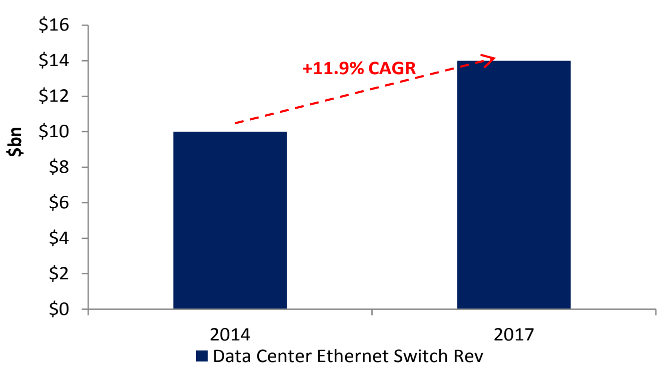
Figure 117: AVGO Dividend Payout Summary



Source: Company data

Steady ASIC to Merchant Conversion. Core BRCM ING's 3 and 5 year Rev CAGRs have been ~10%, mostly driven by organic growth, vs. CSCO's 3 and 5 year CAGRs of 1.6%/3.2%, respectively – we believe a key dynamic behind the outperformance is merchant silicon, specifically Trident and Tomahawk, taking share from custom ASICs. The Datacenter Infrastructure innovation cycle is seeing some disruption as the demand of the large operators cannot be served by the traditional model, which entails OEMs' collaboration with silicon vendors. In response to the challenge, OEMs such as HP, Dell, and JNPR are incorporating merchant silicon and actively supporting open standards. The ASIC to merchant trend plays a role in all the markets that AVGO plays in, specifically, the Enterprise (~1/3 of core BRCM Rev), Data Center (~1/3 of core BRCM Rev), and Carrier/Service Provider markets (~1/3 of core BRCM Rev) – within the split of end markets Data Center/Cloud have been the fastest growing, while Enterprise has been the slowest. AVGO expects the Data Center Ethernet Switch SAM to grow at a ~12% CAGR from ~$9bn in 2014 to ~$13bn in 2017, driven mainly by Cloud/Data Center expansion. The Enterprise market is evenly divided by CSCO, which is still using internal ASIC, and the other players (HP, Dell, JNPR, etc.) that have moved to merchant, taking merchants to 20-50% market share. AVGO is seeing growing momentum for Tomahawk, a top-of-the-rack Ethernet switch solution based on 25Gbps for Data Centers. While we believe the market for merchant will grow faster than internal ASICs, the process is taking longer than hoped especially in the Enterprise market – for instance, while most had expected CSCO to adopt Tomahawk for its new Nexus 9000, the socket went internal as internal ASICs drive higher margins for CSCO.

Figure 118: Data Center Ethernet Switch SAM



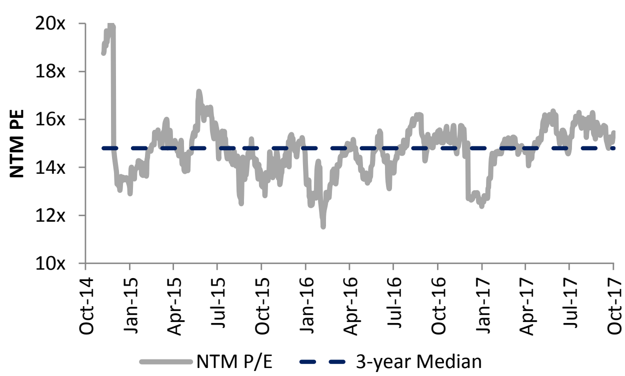
Source: Gartner

Figure 119: Tomahawk – Ethernet Switch for Data Center

Source: Broadcom

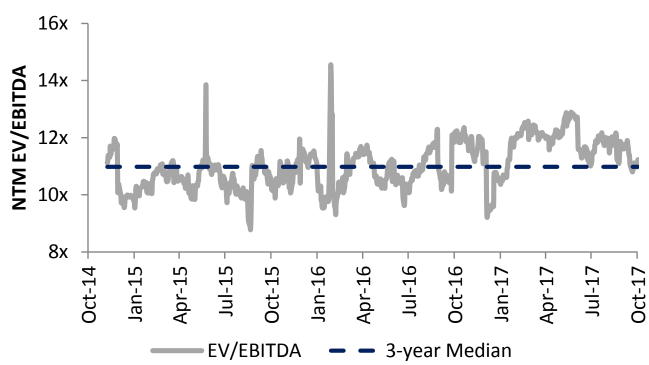
Diversified Revenue Stream Calls for Multiple Expansion. AVGO has pursued an aggressive M&A strategy – acquiring 6 companies in the last 4 years or approximately $3.9bn in Rev (~20% of CY18 Rev) and ~$3.00 of EPS (~20% of CY18 EPS). While the M&A strategy has been financially driven, an arbitrage between historically low interest rates and under-managed assets, it has also diversified AVGO's Rev stream. AVGO is not overly dependent on any one customer or end market and can weather isolated storms while maintaining the integrity of EPS upside, which should lead to multiple expansion – especially as Handsets have declined from 50% to 25% of Rev while Wired has grown from 25% to 50% of Rev. Notably, since its IPO on 08/09 AVGO has exceeded the midpoint of EPS guidance 100% of the time by ~10% on average.

Figure 120: NTM PE Over Time



Source: Company data, Thomson Reuters

Figure 121: NTM EV/EBITDA Over Time



Source: Company data, Thomson Reuters

Brooks Automation Inc.

(BRKS, $31.68, NEUTRAL, TP $26.00)

INLINE/ABOVE; Lifesciences Optionality Priced In

Reporting Date: TBD

Conference Call: TBD

Figure 122: Summary of Expectations

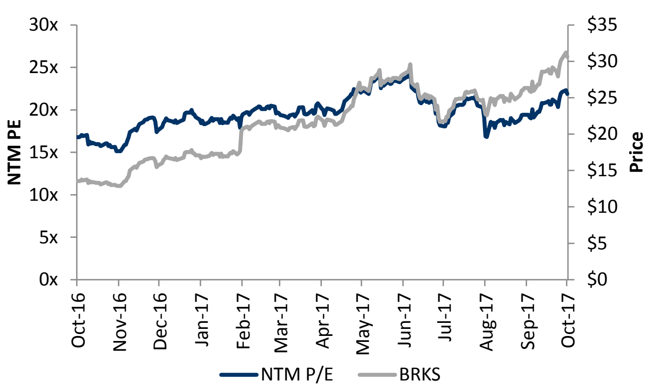
US$ in millions, unless otherwise stated

BRKS-US	Jun-17	Sep-17			Dec-17		CY17E		CY18E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Total Revenue	**$181.7**	**$175.0**	**$174.7**	**$172-178mn**	**$187.8**	**$177.4**	**$713.8**	**$696.6**	**$770.3**	**$761.1**
% Q/Q chng	*7.3%*	*-3.7%*	*-3.9%*		*7.3%*	*1.6%*				
% Y/Y chng	*23.2%*	*11.1%*	*10.9%*		*17.4%*	*10.8%*	*18.9%*	*16.0%*	*7.9%*	*9.3%*
Total GM*	**40.0%**	**39.2%**			**38.1%**		**39.1%**		**39.4%**	
Operating Exp.*	**$45.0**	**$46.2**			**$47.0**		**$182.9**		**$190.7**	
Operating Mgin*	**15.2%**	**12.8%**	*14.0%*		**13.1%**	*13.8%*	**13.4%**		**14.6%**	
Net Income*	**$25.4**	**$20.7**			**$22.4**		**$88.3**		**$101.4**	
Net Margin*	**14.0%**	**11.8%**			**11.9%**		**12.4%**		**13.2%**	
EPS*	**$0.36**	**$0.29**	**$0.29**	***$0.27-$0.31***	**$0.32**	**$0.30**	**$1.25**	**$1.13**	**$1.44**	**$1.47**
Fully diluted shares	70.4	70.4			70.4		70.3		70.4	

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

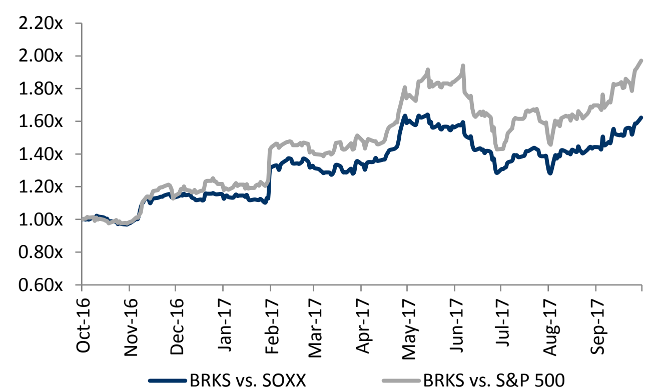
BRKS: Recap of Recent Stock Performance

Figure 123: BRKS NTM PE vs. Price



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 124: LTM Performance vs. SOXX vs. SPX



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Key Message: We are positive heading into the quarter as we expect the Company to guide above Street. Based on commentary from LRCX and KLAC, DecQ should see growth in Semis versus current Street estimates modelling flat sequential revenues. As a supplier to Dep and Etch systems, BRKS is benefitting from growth seen by LRCX/AMAT. However, it is worth noting that Company's Semi revenues are growing only ~20% y/y versus AMAT/LRCX Semis system revenues growing ~30% y/y / 55% y/y. We are also concerned about sustainability of Margins as BPS operating margins are currently ~17% versus last 5 years average of only 6% - we are concerned that over time cost cutting initiatives at AMAT/LRCX drive margins lower for BRKS. We see potential for divesture of Semi and Lifesciences assets down the line, however at current valuations - stock is pricing in lifesciences at 5x of Sales for a business that has so far shown low single digit profitability.

Expect C3Q17 Results In-Line with CS/Street

We expect BRKS to report C3Q17 Rev/EPS INLINE with CS and Street at $175m (-3.7% q/q)/$0. By segment, we are modeling BPS rev of $111m (-9.6% q/q) and Service rev of $23m (+1.8% q/q). Total BPS and Service should fall by 7.8% q/q in-line with the company guidance of downside by 7-8% q/q. We expect Life Sciences rev of $42m (+12.4% q/q). Higher lifescience revenue is in-line with the company's guidance of double digit growth to be more than $40mn. We are modeling GM of 39.2% (-80bps q/q) and OpEx of $46.2m (+2.5% q/q). We expect In-line rev, in-line GM and in-line OpM to drive EPS to $0.29, INLINE with guidance of $0.27-$0.31, CS and street at $0.29.

Expect C4Q17 Rev/EPS At least In-line with CS/ Above Street

We expect BRKS to guide Rev/EPS AT LEAST INLINE with CS at $188m/$0.32, and ABOVE Street at $177m/$0.30. Specifically we expect that BPS rev is likely to increase by 9% q/q. We are modeling Products rev of $121m (+9.3% q/q), Service rev of $23.2m (+1.8% q/q) and Lifescience rev of $43.7m (+5.0% q/q). We are modeling GM of 38.1% (-110 bps q/q) and OpEx of $47.0m (+1.9% q/q). We estimate that in-line rev and in-line GM will keep EPS to $0.32, versus CS at $0.32 and above street at $0.30.

CY18 Outlook

We are modeling BRKS CY18 Rev/EPS of $770m (+7.9% y/y)/$1.44 vs. Street estimate of $766m (+9.8% y/y)/$1.45. Specifically, we expect BPS revenue to increase 2% y/y and Life Sciences revenue to grow at +29.1% y/y in CY18. We expect GM to be 39.4% (+30bp y/y) and OpM of 14.6% (+120bps y/y), but see risk to our margin expectations as LRCX/AMAT implement cost cutting initiatives. We estimate that in-line Rev, and in-line GM and OpM will result in EPS of $1.44.

Figure 125: BRKS Revenue Model

Revenue ($ '000)	Dec-15 1QA	Mar-16 2QA	Jun-16 3QA	Sep-16 4QA	Dec-16 1QA	Mar-17 2QA	Jun-17 3QA	Sep-17 4QE	Dec-17 1QE	Mar-18 2QE	Jun-18 3QE	Sep-18 4QE	CY16	CY17E	CY18E
Product Revenues	$76,600	$86,800	$96,000	$102,853	$105,655	$112,700	$122,317	$110,604	$120,877	$116,488	$126,506	$114,340	$391,308	$466,498	$470,928
Global Customer Operation	$22,455	$22,000	$22,000	$23,000	$21,000	$22,000	$22,400	$22,800	$23,200	$23,600	$24,000	$24,400	$88,000	$90,400	$96,800
Total Product + Service:	**$99,055**	**$108,800**	**$118,000**	**$125,853**	**$126,655**	**$134,700**	**$144,717**	**$133,404**	**$144,077**	**$140,088**	**$150,506**	**$138,740**	**$479,308**	**$556,898**	**$567,728**
Lifescience	**$20,900**	**$26,500**	**$29,000**	**$31,700**	**$33,300**	**$34,700**	**$37,000**	**$41,596**	**$43,676**	**$45,860**	**$48,153**	**$52,968**	**$120,500**	**$156,972**	**$202,596**
Total Revenues	**$119,955**	**$135,300**	**$147,000**	**$157,553**	**$159,955**	**$169,400**	**$181,717**	**$175,000**	**$187,752**	**$185,948**	**$198,658**	**$191,708**	**$599,808**	**$713,869**	**$770,324**
Income Statement Revenue	$119,955	$135,281	$147,534	$157,553	$159,955	$169,333	$181,717	$175,000	$187,752	$185,948	$198,658	$191,708	$600,323	$713,802	$770,324

% of Total	Dec-15 1QA	Mar-16 2QA	Jun-16 3QA	Sep-16 4QA	Dec-16 1QA	Mar-17 2QA	Jun-17 3QA	Sep-17 4QE	Dec-17 1QE	Mar-18 2QE	Jun-18 3QE	Sep-18 4QE	CY16	CY17E	CY18E
Product Revenues	63.9%	64.2%	65.3%	65.3%	66.1%	66.5%	67.3%	63.2%	64.4%	62.6%	63.7%	59.6%	65.2%	65.3%	61.1%
Global Customer Operation	18.7%	16.3%	15.0%	14.6%	13.1%	13.0%	12.3%	13.0%	12.4%	12.7%	12.1%	12.7%	14.7%	12.7%	12.6%
Total Product + Service:	**82.6%**	**80.4%**	**80.3%**	**79.9%**	**79.2%**	**79.5%**	**79.6%**	**76.2%**	**76.7%**	**75.3%**	**75.8%**	**72.4%**	**79.9%**	**78.0%**	**73.7%**
Lifescience	**17.4%**	**19.6%**	**19.7%**	**20.1%**	**20.8%**	**20.5%**	**20.4%**	**23.8%**	**23.3%**	**24.7%**	**24.2%**	**27.6%**	**20.1%**	**22.0%**	**26.3%**
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Q/Q Growth	Dec-15 1QA	Mar-16 2QA	Jun-16 3QA	Sep-16 4QA	Dec-16 1QA	Mar-17 2QA	Jun-17 3QA	Sep-17 4QE	Dec-17 1QE	Mar-18 2QE	Jun-18 3QE	Sep-18 4QE
Product Revenues	-26.2%	13.3%	10.6%	7.1%	2.7%	6.7%	8.5%	-9.6%	9.3%	-3.6%	8.6%	-9.6%
Global Customer Operation	-9.8%	-2.0%	0.0%	4.5%	-8.7%	4.8%	1.8%	1.8%	1.8%	1.7%	1.7%	1.7%
Total Product + Service:	**-23.0%**	**9.8%**	**8.5%**	**6.7%**	**0.6%**	**6.4%**	**7.4%**	**-7.8%**	**8.0%**	**-2.8%**	**7.4%**	**-7.8%**
Lifescience	**22.2%**	**26.8%**	**9.4%**	**9.3%**	**5.0%**	**4.2%**	**6.6%**	**12.4%**	**5.0%**	**5.0%**	**5.0%**	**10.0%**
Total Revenue	**-17.7%**	**12.8%**	**8.6%**	**7.2%**	**1.5%**	**5.9%**	**7.3%**	**-3.7%**	**7.3%**	**-1.0%**	**6.8%**	**-3.5%**

Y/Y Growth	Dec-15 1QA	Mar-16 2QA	Jun-16 3QA	Sep-16 4QA	Dec-16 1QA	Mar-17 2QA	Jun-17 3QA	Sep-17 4QE	Dec-17 1QE	Mar-18 2QE	Jun-18 3QE	Sep-18 4QE	CY16	CY17E	CY18E
Product Revenues	-7.7%	-12.3%	-8.4%	-0.9%	37.9%	29.8%	27.4%	7.5%	14.4%	3.4%	3.4%	3.4%	1.9%	19.2%	0.9%
Global Customer Operation	-2.4%	-4.3%	-6.8%	-7.6%	-6.5%	0.0%	1.8%	-0.9%	10.5%	7.3%	7.1%	7.0%	-6.3%	2.7%	7.1%
Total Product + Service:	**-6.6%**	**-10.8%**	**-8.1%**	**-2.2%**	**27.9%**	**23.8%**	**22.6%**	**6.0%**	**13.8%**	**4.0%**	**4.0%**	**4.0%**	**0.2%**	**16.2%**	**1.9%**
Lifescience	**22.9%**	**48.5%**	**75.8%**	**85.4%**	**59.3%**	**30.9%**	**27.6%**	**31.2%**	**31.2%**	**32.2%**	**30.1%**	**27.3%**	**66.6%**	**30.3%**	**29.1%**
Total Revenue	**-2.5%**	**-3.3%**	**1.5%**	**8.1%**	**33.3%**	**25.2%**	**23.6%**	**11.1%**	**17.4%**	**9.8%**	**9.3%**	**9.5%**	**9.0%**	**19.0%**	**7.9%**

Source: Company data, Credit Suisse estimates

Key Issues

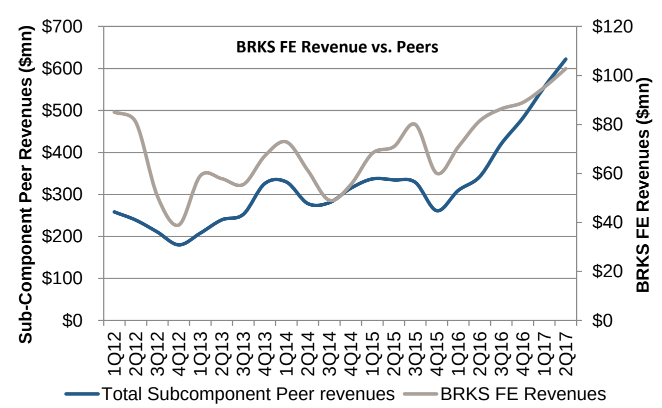
- **Growth has lagged Peers.** Our analysis of historical revenue growth for the subcomponent supplier industry suggests that BRKS revenues have historically lagged peers. In particular the Company lost market share at LRCX in atmospheric robot business following the NVLS/LRCX merger. The Company's growth recently has over also lagged AMAT/LRCX and peers AEIS/MKSI – BPS revenues are up 19% in CY17 versus AMAT/LRCX up 31%/57% (compare to SSG for AMAT and Systems shipments for LRCX), and MKSI/AEIS up 42%/34% based on Street estimates. We worry if there are similar market share losses this year.

- **Margins are above historical level.** Currently for CY17 we are modelling OpM% of 13.4%(up 430 bps y/y).In CY 2014 BRKS had OpM% of 2.1%. In particular BPS margins (has increased by 450 bps y/y in CY17 to 16.1%) are well above. AMAT/LRCX has indicated margin improvement and could put pressure on margins. The R&D as percentage of sales is also low at 6.7% (-150 bps y/y) in C2017.

- **Current Valuations leave little room for upside.** BRKS is currently trading at 25x of our CY17 EPS versus 15.5x for AMAT/LRCX. Assuming 16x of CY17 EPS as value of BPS core business, we estimate that street is currently valuing the Lifesciences business at ~$800mn, which implies ~5x of CY17 revenues. While BRKS claims to have had 20% organic growth in lifesciences, margins are still low at low single digit, which would imply that street is valuing lifesciences at ~80x to 100x on PE. We would also note that growth has at times also disappointed.

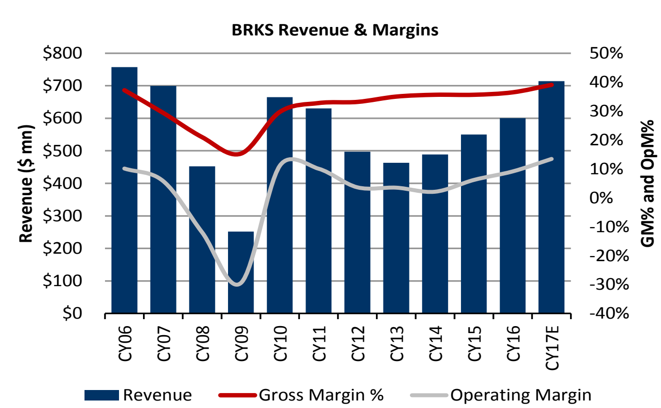
- **4titude acquisition increases the Lifesciences exposure.** BRKS acquired 4titude on October 5, 2017 for 65mn – implying 4.6x times of LTM sales of $14mn. The Company also announced a secured seven year loan agreement with group of Institutional Investors. The loan immediately funded $200mn. Other terms of the loan are Interest rate of LIBOR plus 250 bps, 1% amortization per year, flexibility to pay the loan. We expect that acquisition will likely increase the exposure to the Lifesciences market – assuming $17mn from 4titude for CY18, we expect BRKS can pull in the time line for Lifesciences revenues reaching $200mn from FY19 to Fy18.

Figure 126: BRKS FE Revenues vs. Peers



Source: Company data, Credit Suisse estimates

Figure 127: BRKS Revenue and OpM%

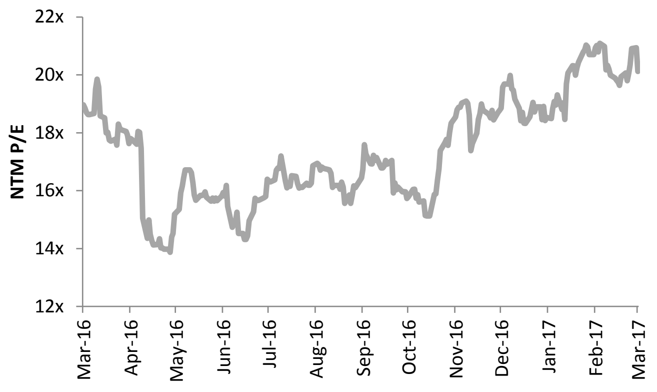


Source: Company data, Credit Suisse estimates

Investment View and Valuation

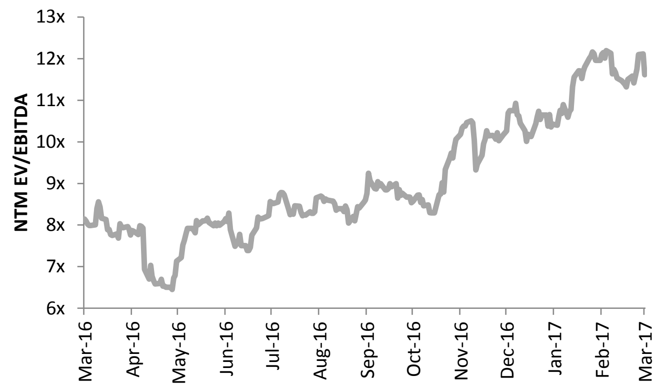
BRKS is a sub-system supplier to Semiconductor Capital Equipment companies like AMAT and LRCX. The Company is focusing on building on their core capabilities to diversify into Lifesciences, and has made several acquisitions in that area. The strategy will require several years of investment cycle and there is a risk that it may not be successful given Company's lack of experience in the area. We continue to prefer AMAT and LRCX over BRKS but acknowledge that there could be upside to near term estimates. Specifically (i) Cost cutting initiatives at AMAT/LRCX makes margin improvement challenging for BRKS, (ii) Valuations are less attractive than Equipment companies AMAT/LRCX. On P/E BRKS is trading at 25.0x of our CY17 EPS versus LRCX/AMAT at 15.5x/15.5x. Our TP of $26 represents 21x of CY17 EPS.

Figure 128: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 129: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Cadence Design Systems Inc.

(CDNS, $42.00, NEUTRAL, TP $34.00)

In-Line/In-Line; Gaining Share in Digital but Emulation Headwinds

Reporting Date: Thursday**,** October 26, AMC

Conference Call: Thursday, October 26, 2:00PM EST

Figure 130: CDNS Summary of Expectations

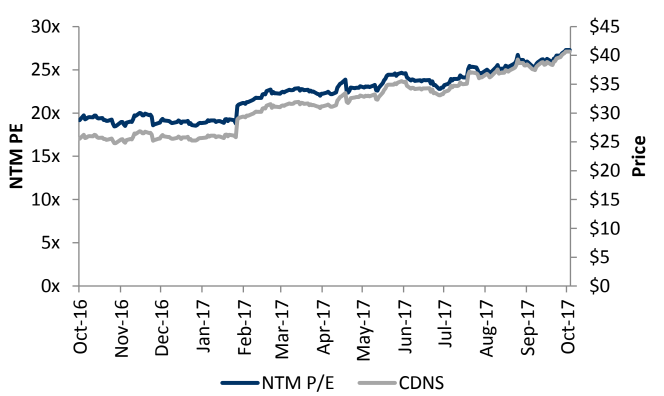
US$ in millions, unless otherwise stated

CDNS	Jun-17	Sep-17			Dec-17		2017E		2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Total Revenue	$479.0	$480.0	$480.9	$475-$485	$494.1	$497.5	$1,930.0	$1,933.9	$2,058.1	$2,042.6
% Q/Q chng	*0.4%*	*0.2%*	*0.4%*		*2.9%*	*3.5%*				
% Y/Y chng	*5.7%*	*7.6%*	*7.8%*		*5.4%*	*6.1%*	*6.3%*	*6.5%*	*6.6%*	*5.6%*
Gross Margin*	89.8%	89.5%			88.8%		89.6%		89.8%	
Operating Exp.*	$301.9	$302.1			$290.1		$1,207.2		$1,258.8	
Operating Margin*	26.8%	26.5%			30.1%		27.0%		28.6%	
Net Income*	$94.1	$93.7			$110.0		$384.8		$436.1	
Net Margin*	19.6%	19.5%			22.3%		19.9%		21.2%	
EPS* (Non-GAAP)	$0.34	$0.34	*$0.34*	*$0.33-$0.35*	$0.39	$0.39	$1.37	$1.39	$1.56	$1.51
Fully diluted shares	279.5	279.5			279.5		279.9		279.5	

Source: Thomson Reuters, Company data, Credit Suisse estimates. *Pro- forma excluding one-time items

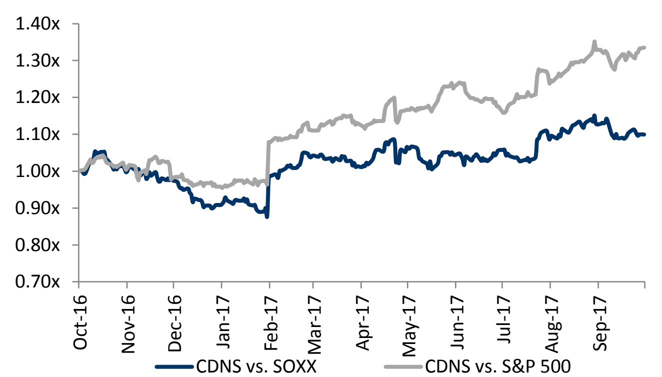
CDNS: Recap of Recent Stock Performance

Figure 131: CDNS NTM PE vs. Price



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 132: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data, Credit Suisse estimates

Key Message: We expect largely in-line results and guidance, and expect a neutral stock reaction. While the company has a strong set of products, and has made recent gains within the core EDA market, valuations are less compelling than SNPS (on EV to EBITDA). In addition, overall revenues have continued to decelerate every year for the last five years, and company growth is tracking below SNPS. In addition, Emulation growth could also be negatively impacted in C2H18 due to the introduction of Veloce Strato M. We continue to prefer SNPS over CDNS within EDA as it offers higher growth at cheaper valuation.

Expect F3Q17 (SepQ) Rev/EPS AT LEAST IN-LINE with CS/Street

We expect CDNS to report SepQ Rev/EPS at $480.0m (+0.2% q/q)/$0.34 AT LEAST IN-LINE with CS at $480.0m (+0.2% q/q)/$0.34 and street at $480.9m (+0.4% q/q)/$0.34. We expect sequential q/q growth across Functional Verification at 2.1%, System Interconnect and Analysis at 5.3%, and IP at 3.2%. We are modeling GM of 89.5% (-40bps q/q) and OpEx of $302.1m (+0.1% q/q). We expect in-line revenue, GM and OpEx to drive EPS of $0.34 in-line with CS/street at $0.34.

Expect F4Q17 (DecQ) Rev IN-LINE with CS/Below Street, EPS IN-LINE with CS/Street

We expect CDNS to guide DecQ Rev/EPS to $494.1m (+2.9% q/q)/$0.39, IN-LINE with CS rev at $494.1m (+2.9% q/q) and BELOW Street rev at $497.5m (+3.5% q/q), while expect EPS to be IN-LINE with CS/Street EPS at $0.39. We are modeling GM of 88.8% (-80bps q/q) and OpEx of $290.1m (versus $279.7m in F4Q16). We expect that in-line Revenues, GM and Opex will drive EPS to $0.39, in-line with CS/street at $0.39.

Expect CY18 Rev/EPS ABOVE Street

We are modeling CY18 Rev/EPS of $2.06bn (+6.6% y/y)/$1.56 which is ABOVE the Street at $2.04bn (+5.6% y/y)/$1.51. We are modeling GM of 89.8% (+20bps y/y) and OpEx of $1.18bn (+4.3% q/q). We expect that in-line Revenues, GM and Opex will drive EPS to $1.56 which is above the street at $1.51.

Figure 133: CDNS Revenue Model by Type

US$ in millions, unless otherwise stated

(3-months ending)	Mar-15 1QA	Jun-15 2QA	Sep-15 3QA	Dec-15 4QA	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	2015	2016	2017E	2018E
Revenue (in $ mm)																
Product	$279.7	$281.7	$288.6	$304.4	$302.6	$311.5	$301.7	$322.1	$336.8	$330.0	$324.8	$337.2	$1,154.3	$1,237.9	$1,328.8	$1,451.1
Maintenance	$103.9	$103.3	$108.3	$109.1	$109.1	$108.4	$113.7	$114.6	$114.6	$113.9	$119.41	$120.3	$424.6	$445.9	$468.2	$491.6
Product and Maintenance	$383.6	$385.0	$396.9	$413.5	$411.7	$420.0	$415.4	$436.7	$451.4	$443.8	$444.2	$457.5	$1,578.9	$1,683.8	$1,796.9	$1,942.7
Services	$27.7	$30.9	$36.9	$27.6	$36.1	$33.1	$30.9	$32.3	$25.5	$35.2	$35.9	$36.6	$123.1	$132.3	$133.1	$115.4
Total Revenue	**$411.4**	**$415.9**	**$433.8**	**$441.1**	**$447.9**	**$453.0**	**$446.2**	**$469.0**	**$476.9**	**$479.0**	**$480.0**	**$494.1**	**$1,702**	**$1,816.1**	**$1,930.0**	**$2,058.1**
Revenue (in %)																
Product	68%	68%	67%	69%	68%	69%	68%	69%	71%	69%	68%	68%	68%	68%	69%	71%
Maintenance	25%	25%	25%	25%	24%	24%	25%	24%	24%	24%	25%	24%	25%	25%	24%	24%
Product and Maintenance	93%	93%	91%	94%	92%	93%	93%	93%	95%	93%	93%	93%	93%	93%	93%	94%
Services	7%	7%	9%	6%	8%	7%	7%	7%	5%	7%	7%	7%	7%	7%	7%	6%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
% q/q																
Product	**-3.3%**	**0.7%**	**2.4%**	**5.5%**	**-0.6%**	**2.9%**	**-3.2%**	**6.8%**	**4.6%**	**-2.0%**	**-1.6%**	**3.8%**				
Maintenance	**0.0%**	**-0.6%**	**4.9%**	**0.8%**	**0.0%**	**-0.6%**	**4.9%**	**0.8%**	**0.0%**	**-0.6%**	**4.9%**	**0.8%**				
Product and Maintenance	**-2.4%**	**0.3%**	**3.1%**	**4.2%**	**-0.4%**	**2.0%**	**-1.1%**	**5.1%**	**3.4%**	**-1.7%**	**0.1%**	**3.0%**				
Services	**-7.2%**	**11.6%**	**19.3%**	**-25.2%**	**30.9%**	**-8.5%**	**-6.7%**	**4.7%**	**-21.0%**	**37.8%**	**2.0%**	**2.0%**				
Total Revenue	**-2.8%**	**1.1%**	**4.3%**	**1.7%**	**1.5%**	**1.2%**	**-1.5%**	**5.1%**	**1.7%**	**0.4%**	**0.2%**	**2.9%**				
% y/y																
Product	**8.3%**	**10.0%**	**6.5%**	**5.2%**	**8.2%**	**10.6%**	**4.5%**	**5.8%**	**11.3%**	**5.9%**	**7.7%**	**4.7%**	**7.4%**	**7.2%**	**7.3%**	**9.2%**
Maintenance	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**
Product and Maintenance	**7.4%**	**8.6%**	**6.1%**	**5.2%**	**7.3%**	**9.1%**	**4.7%**	**5.6%**	**9.6%**	**5.7%**	**6.9%**	**4.8%**	**6.7%**	**6.6%**	**6.7%**	**8.1%**
Services	**30.8%**	**27.2%**	**39.8%**	**-7.6%**	**30.3%**	**6.9%**	**-16.4%**	**17.0%**	**-29.4%**	**6.3%**	**16.2%**	**13.3%**	**21.0%**	**7.4%**	**0.6%**	**-13.3%**
Total Revenue	**8.7%**	**9.8%**	**8.3%**	**4.2%**	**8.9%**	**8.9%**	**2.9%**	**6.3%**	**6.5%**	**5.7%**	**7.6%**	**5.4%**	**7.7%**	**6.7%**	**6.3%**	**6.6%**

Source: Company data, Credit Suisse estimates

Figure 134: CDNS Revenue Model by Product

US$ in millions, unless otherwise stated

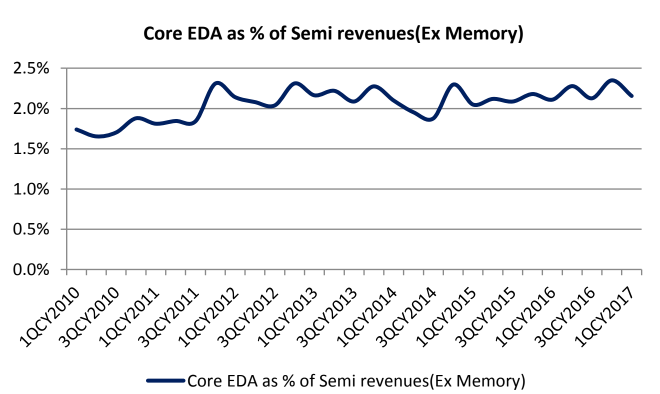
(3-months ending)	Mar-15 1QA	Jun-15 2QA	Sep-15 3QA	Dec-15 4QA	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	2015	2016	2017E	2018E
Rev by Product Group (in %)																
Functional Verification, incl Emulation	23%	21%	23%	25%	26%	27%	24%	25%	23%	23%	23%	24%	23%	25%	23%	24%
Digital IC Design and Signoff (incl. DFM)	28%	29%	28%	28%	30%	27%	28%	29%	29%	30%	29%	30%	28%	29%	29%	29%
Custom IC Design	27%	27%	26%	25%	25%	26%	27%	25%	26%	26%	26%	24%	26%	26%	26%	25%
System Interconnect and Analysis	11%	11%	10%	10%	9%	10%	10%	10%	10%	10%	11%	10%	10%	10%	10%	10%
IP	11%	12%	13%	12%	10%	10%	11%	11%	12%	11%	11%	12%	12%	11%	12%	12%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Rev by Product Group (in $mn)																
Functional Verification, incl Emulation	$94.6	$87.3	$99.8	$110.3	$116.4	$122.3	$107.1	$117.2	$109.7	$110.2	$112.4	$118.9	$392.0	$463.1	$451.2	$491.4
Digital IC Design and Signoff (incl. DFM)	$115.2	$120.6	$121.5	$123.5	$134.4	$122.3	$124.9	$136.0	$138.3	$143.70	$138.7	$146.9	$480.7	$517.6	$567.6	$596.0
Custom IC Design	$111.1	$112.3	$112.8	$110.3	$112.0	$117.8	$120.5	$117.2	$124.0	$124.5	$124.1	$120.8	$446.4	$467.5	$493.4	$513.1
System Interconnect and Analysis	$45.3	$45.7	$43.4	$44.1	$40.3	$45.3	$44.6	$46.9	$47.7	$47.9	$50.4	$49.7	$178.5	$177.1	$195.7	$213.3
IP	$45.3	$49.9	$56.4	$52.9	$44.8	$45.3	$49.1	$51.6	$57.2	$52.7	$54.4	$57.80	$204.5	$190.8	$222.1	$244.3
Total Revenue	**$411.4**	**$415.9**	**$433.8**	**$441.1**	**$447.9**	**$453.0**	**$446.2**	**$469.0**	**$476.9**	**$479.0**	**$480.0**	**$494.1**	**$1,702.1**	**$1,816.1**	**$1,930.0**	**$2,058.1**
% q/q																
Functional Verification, incl Emulation	6.5%	-7.7%	14.2%	10.5%	5.6%	5.0%	-12.4%	9.5%	-6.4%	0.4%	2.1%	5.8%				
Digital IC Design and Signoff (incl. DFM)	-2.8%	4.7%	0.7%	1.7%	8.8%	-9.0%	2.1%	8.9%	1.7%	3.9%	-3.5%	5.9%				
Custom IC Design	-6.2%	1.1%	0.4%	-2.2%	1.5%	5.2%	2.3%	-2.7%	5.8%	0.4%	-0.4%	-2.7%				
System Interconnect and Analysis	-2.8%	1.1%	-5.2%	1.7%	-8.6%	12.4%	-1.5%	5.1%	1.7%	0.4%	5.3%	-1.4%				
IP	-10.9%	10.3%	13.0%	-6.1%	-15.4%	1.2%	8.3%	5.1%	10.9%	-7.9%	3.2%	6.3%				
Total Revenue	**-2.8%**	**1.1%**	**4.3%**	**1.7%**	**1.5%**	**1.2%**	**-1.5%**	**5.1%**	**1.7%**	**0.4%**	**0.2%**	**2.9%**				
% y/y																
Functional Verification, incl Emulation	8.7%	9.8%	8.3%	24.1%	23.1%	40.1%	7.3%	6.3%	-5.8%	-9.9%	5.0%	1.4%	12.8%	18.1%	-2.6%	8.9%
Digital IC Design and Signoff (incl. DFM)	1.4%	6.1%	4.6%	4.2%	16.6%	1.4%	2.9%	10.1%	2.9%	17.5%	11.0%	8.0%	4.1%	7.7%	9.7%	5.0%
Custom IC Design	8.7%	5.9%	4.3%	-6.9%	0.8%	4.9%	6.8%	6.3%	10.7%	5.7%	3.0%	3.0%	2.7%	4.7%	5.5%	4.0%
System Interconnect and Analysis	19.5%	9.8%	8.3%	-5.2%	-10.9%	-1.0%	2.9%	6.3%	18.3%	5.7%	13.0%	6.0%	7.4%	-0.8%	10.5%	9.0%
IP	19.5%	31.8%	28.0%	4.2%	-1.0%	-9.2%	-13.0%	-2.5%	27.8%	16.3%	10.8%	12.0%	19.9%	-6.7%	16.4%	10.0%
Total Revenue	**8.7%**	**9.8%**	**8.3%**	**4.2%**	**8.9%**	**8.9%**	**2.9%**	**6.3%**	**6.5%**	**5.7%**	**7.6%**	**5.4%**	**7.7%**	**6.7%**	**6.3%**	**6.6%**

Source: Company data, Credit Suisse estimates

Key Issues

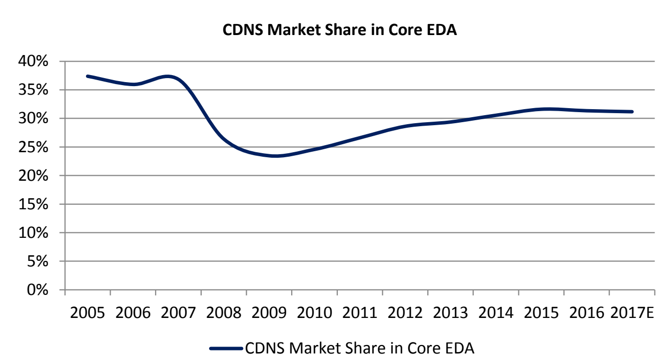
- **EDA Industry is Starting to Grow Faster than Semis.** EDA industry data shows that EDA is starting to grow faster than Semis. EDA is benefitting from the market expansion of non-Semi companies, and greater pricing power. In addition, we note the following as positive for the industry: i) slowing Moore's law implies more chip design, ii) wider adoption of ASICs as workloads become more mature, iii) potential opportunity of large complex ASICs for AI, iv) neuromorphic computing – which significantly reduces power consumption for AI computation, and v) China's Fabless companies are growing at 25-35% and can become ~10% of EDA revs over next five years from 5-6% today.

Figure 135: Core EDA Industry Rev as % of Semi



Source: Company data, Credit Suisse estimates

Figure 136: CDNS Market Share in Core EDA

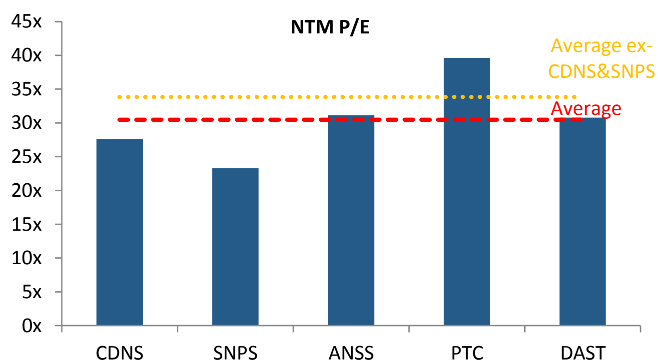


Source: Company data, Credit Suisse estimates

- **Market share gains appear to have slowed.** EDA CDNS market share gains appear to have slowed recently. While the company is gaining share in digital (digital revenues are growing 9.7% this year which is well above EDA market growth) the company's overall revenue growth in core EDA (excluding the system and IP segments) is growing slower than the overall market. We believe this is driven by market share losses in emulation, and lower exposure to verification growth

- **Non GAAP margins are expanding – rerating to ANSS and Dassault multiple.** CDNS OpM, 28% in SepQ, is on path to reach 30%. As a result, bulls argue CDNS should get a multiple in-line with ANSS and Dassault. ANSS and Dassault are currently trading at 12.7%/11.4% premium to CDNS respectively.

Figure 137: NTM P/E for Comparable Companies

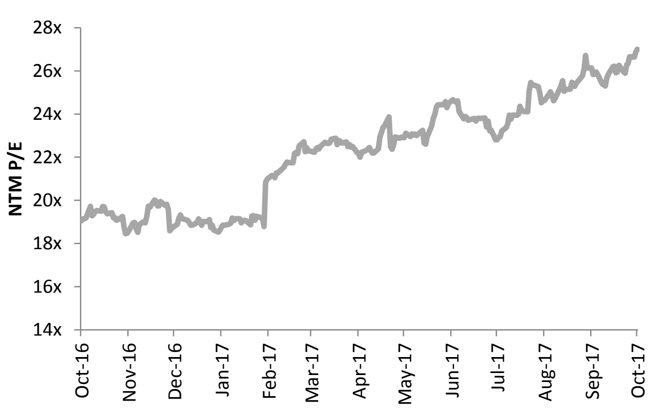


Source: Company data, Credit Suisse estimates, Thomson Reuters

Investment View and Valuation

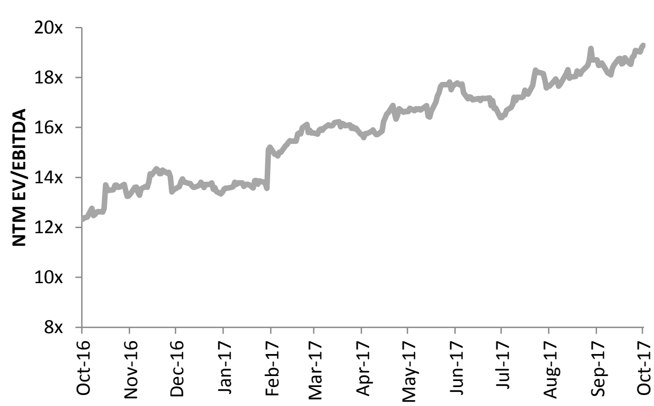
CDNS has the broadest product portfolio that is required for designing products all the way from chip design to complete systems. The company is a near monopoly in custom design (80%+ share) and has strong presence in most EDA markets. CDNS has shown the fastest Rev/EPS growth over the past five years among the EDA companies. The company is also aggressively returning cash to shareholders - the Company announced a new share buyback program of $525mn, following completion of $1.2bn of accelerated buyback. While the Company has strong set of products, and has made recent gains within the core EDA market, valuations are less compelling than SNPS. In addition, the overall revenues have continued to decelerate, and overall growth is less than SNPS. Our $34 target price is based on DCF, using an 8.6% discount, ~7% growth rate through CY21, and terminal growth rate of 3.5%. CDNS is trading at ~29.2x/26.9x of CY17/CY18 EPS, versus SNPS at ~25.1x/23.2x.

Figure 138: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters

Figure 139: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters

Cypress Semiconductor Corp.

(CY, $15.86, NEUTRAL, TP $14.00)

Rev/EPS Upside Reflected in Valuation

Reporting Date: Thursday, October 26th, 2017, After Market Close

Conference Call: Thursday, October 26th, 2017, 4:30PM EST

Figure 140: Summary of Expectations

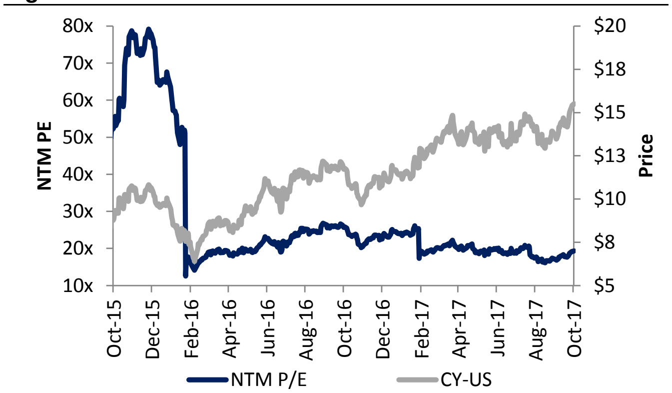
US$ in millions, unless otherwise stated

CY	Jun-17	Sep-17E			Dec-17E		2017E		2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenues	$593.8	$600.0	$602.4	$585m to $615m	$594.0	$593.0	$2,320	$2,319	$2,480	$2,461.0
% Q/Q chng	11.6%	1.0%	1.4%	-1-5% to +3.6% q/q	-1.0%	-1.2%				
% Y/Y chng	30.1%	13.2%			12.0%		19.5%	19.4%	6.9%	6.1%
Seasonality	7.5%	3.5%			-3.5%					
Gross Margin	40.9%	41.5%	41.5%	41.0% to 42.0%	43.0%	42.8%	41.2%	41.2%	45.1%	45.1%
Operating Expenses	$151.5	$146.0		$145-$147m	$142.6		$583.9		$616.7	
Operating Margin	15.4%	17.2%	17.2%		19.0%	18.3%	16.0%	15.7%	20.2%	20.4%
Net Income	$74.7	$83.9			$92.1		$296.6		$421.5	
Net Margin	12.6%	14.0%			15.5%		12.8%		17.0%	
EPS (ex-SBC)	$0.21	$0.23	$0.23	$0.21 to $0.25	$0.25	$0.24	$0.82	$0.81	$1.16	$1.16
EPS (w/SBC)	$0.12	$0.15			$0.17		$0.49		$0.83	
EPS (GAAP)	$(0.07)	$0.01			$0.03		$(0.17)		$0.26	
Fully diluted shares	363.9	366.0			366.0		363.8		363.0	

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

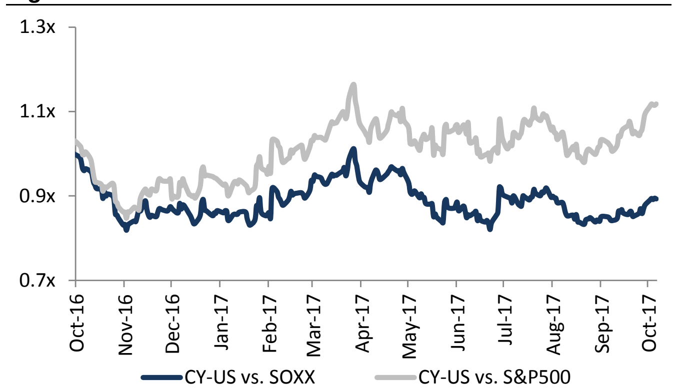
CY: Recap of Recent Stock Performance

Figure 141: CY NTM PE vs. Price



Source: Company data, Thomson Reuters Datastream

Figure 142: LTM Performance vs. SOXX vs. SPX



Source: Company data, Thomson Reuters Datastream

Key Message: We expect CY to report C3Q and guide C4Q Rev/EPS ABOVE CS/Street. Our positive bias is driven by (1) USB Type-C Rev from AAPL, (2) CY content (~$4) in the Nintendo Switch that continues to see upward sales revisions, and (3) strong NOR pricing as industry supply remains constrained. While fundamentals continue to be positive, with C2Q IoT Rev up 110% y/y, new content at AAPL and Nintendo, and strong NOR pricing – it appears to be fully reflected in valuation, especially if you include SBC which takes up CY18 EV/FCF by ~8 turns versus ~3 turns for Semis on average. Investor preference will continue to be margin leverage over Rev upside. Specifically, while C2Q saw the best incremental GM in 3 Qs, C2Q GM only beat by 40 bps despite Rev that beat by 9% as upside from IoT at 50% GM is being offset by upside from NOR at ~30-35% GM. At target GM and OpM of 50% and >20%, CY18 EPS (w/SBC) and FCF would be $1.20 and $550m versus CS estimates of $0.83 and $415m – implying a CY18 P/E (w/SBC) of 13.3x and

EV/FCF of 12.6x versus current CY18 valuation on Street consensus of 19.3x and 17.2x. We remain neutral as upside potential seems reflected in valuation as CY trades at ~17x CY18 EV/FCF (ex-SBC) and ~25x w/SBC vs Semis of ~17x and ~20x, respectively. Downside is limited by M&A potential.

Expect C3Q Rev/EPS Above CS/Street Estimates

We expect CY to report C3Q Rev/EPS of $635m/$0.25 ABOVE CS of $600m/$0.23, ABOVE Street of $602.4m/$0.23 and ABOVE the midpoint of guidance for Rev of $600m +/- $15m and EPS of $0.23 +/- $0.02. We expect Rev upside as CY benefits from (1) under-modelled Type-C Rev from AAPL where CY likely has $0.75 for controller and $0.50 for accessory content, (2) under-appreciated content in the Nintendo Switch where CY likely has $4 of content and units sales continue to see upward revisions, and (3) strong NOR pricing as industry supply remains constrained thru 2018. Relative to our expectations, we would highlight:

1) **Consumer Product Ramps.** iPhone Rev is being under-modelled. Specifically, we expect $0.75 for the controller and $0.25-0.50 of accessory content in the power adapter to drive $30m of C3Q AAPL Rev. Relative to the Nintendo Switch, CY has ~$4 of content and we expect ~6m units in C3Q, versus ~5m units in C2Q. Taken together, we expect $35m of incremental q/q Rev to drive MCD up ~11% q/q versus our initial forecasts and implied guidance of up ~1.5% q/q

2) **Narrow NOR Supply Cushions MPD.** While CY is primarily levered to Auto and Industrial markets within NOR, we would note CY has ~25% market share of the ~88k wspm NOR market. Despite commentary around avoiding low-end, commoditized NOR markets – we would highlight this market is forecasted to be under-supplied by ~30% thru CY17 and pricing increased ~50% in 1H17 – providing increased comfort in our expectations for MPD Rev flat q/q.

3) **Expect EPS Above Guidance.** We expect GM of 42.0%, ABOVE CS/Street of 41.5% as incremental $35m of BRCM IoT and Type-C Rev is ~50% GM and provides a ~50 bps tailwind. We expect OpM of 17.6%, modestly above CS/Street of 17.2%. We expect higher Rev and modestly better margins to drive EPS of $0.25 ABOVE CS/Street of $0.23, and at the high end of Guidance for $0.21 to $0.25.

Expect C4Q Rev/EPS Above CS/Street

We expect CY to guide C4Q Rev/EPS of $630m/$0.27 ABOVE CS of $594m/$0.25 and Street of $593m/$0.24 – with conservative Rev guidance of down 1% q/q. However, we the see the potential for Rev to ultimately be up sequentially in C4Q versus seasonal of down 1% q/q. We would highlight:

1) **MCD Drives C4Q Upside:** We expect CY to realize ~$80m of AAPL Rev in C4Q, assuming 80m iPhone 8 units and a $1 ASP – driving AAP Type-C Rev up ~170% q/q from $30m in C3Q. We also expect Nintendo switch units to growth to 7m q/q, from 6m in C3Q, driving $5m of incremental q/q Rev.

2) **BRCM IoT Sustainability:** While mgmt. guided CY17 BRCM IoT Rev up 23-27% y/y relative to annualized C4Q16 at their Analyst Day on 03/29, the Company increased that to 35-40% during the C2Q earnings CC and we expect further upside to >50% y/y. Focus is likely to be on sustainability of IoT Rev upside.

3) **FCF Improves in 2H:** While C1H FCF of $29m was down ~80% H/H, we would highlight changes in working capital represented a ~$65m headwind due to inventory builds in anticipation of market demand and CY was negatively impacted by merger-related charges and legal settlement charges, which go away in the 2H. We expect C2H FCF of $220m (~15% of Rev) versus $29m in C1H (~2-3% of Rev) .

4) **Expect EPS Guidance Above CS/Street.** We expect GM guidance of 43.5%, ABOVE CS of 43.0% and Street of 42.8% reflecting higher Rev and better GM mix from Type-C contribution. Note – we expect incremental GM of ~80% versus the historical median of ~55%. We expect OpM of 19.3% ABOVE CS of 19.0% and Street of 18.3%. We see Rev and profitability ABOVE CS/Street driving EPS guidance of $0.28 ABOVE CS of $0.25 and Street of $0.24.

Figure 143: CY Revenue Model

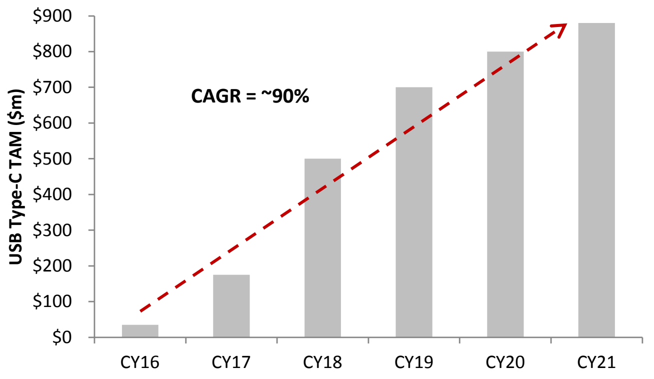
Period Revenue	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17E 3Q	Dec-17E 4Q	Mar-18E 1Q	Jun-18E 2Q	Sep-18E 3Q	Dec-18E 4Q	2016	2017E	2018E
MCU & Connectivity (MCD)	$207.5	$210.0	$290.5	$294.9	$317.9	$360.5	$366.7	$366.2	$367.0	$397.3	$424.7	$417.4	$1,002.9	$1,411.3	$1,606.3
Memory Products (MPD)	$217.7	$246.4	$239.6	$235.3	$214.0	$233.2	$233.3	$227.8	$209.2	$222.1	$222.6	$220.2	$938.9	$908.3	$874.1
Total Revenue	$425.2	$456.4	$530.1	$530.2	$531.9	$593.7	$600.0	$594.0	$576.2	$619.4	$647.3	$637.6	$1,941.9	$2,319.6	$2,480.4
Cypress	$425.2	$456.4	$467.6	$457.9	$437.9	$483.8	$487.1	$490.1	$461.9	$496.0	$520.1	$513.0	$1,807.1	$1,898.9	$1,991.0
BRCM IoT			$62.5	$72.3	$94.0	$110.0	$112.9	$103.9	$114.3	$123.4	$127.1	$124.6	$134.8	$420.8	$489.4
Total Cypress	$425.2	$456.4	$530.1	$530.2	$531.9	$593.8	$600.0	$594.0	$576.2	$619.4	$647.3	$637.6	$1,941.9	$2,319.6	$2,480.4
% of Total	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**	**2016**	**2017E**	**2018E**
MCU & Connectivity (MCD)	48.8%	46.0%	54.8%	55.6%	59.8%	60.7%	61.1%	61.6%	63.7%	64.1%	65.6%	65.5%	51.6%	60.8%	64.8%
Memory Products (MPD)	51.2%	54.0%	45.2%	44.4%	40.2%	39.3%	38.9%	38.4%	36.3%	35.9%	34.4%	34.5%	48.4%	39.2%	35.2%
Total Revenue	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cypress	100.0%	100.0%	88.2%	86.4%	82.3%	81.5%	81.2%	82.5%	80.2%	80.1%	80.4%	80.5%	93.1%	81.9%	80.3%
BRCM IoT			11.8%	13.6%	17.7%	18.5%	18.8%	17.5%	19.8%	19.9%	19.6%	19.5%	6.9%	18.1%	19.7%
Total Cypress	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Q/Q Change	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**			
MCU & Connectivity (MCD)	6.5%	1.2%	38.3%	1.5%	7.8%	13.4%	1.7%	-0.2%	0.2%	8.3%	6.9%	-1.7%			
Memory Products (MPD)	-16.8%	13.2%	-2.7%	-1.8%	-9.1%	9.0%	0.0%	-2.3%	-8.2%	6.2%	0.2%	-1.1%			
Total Revenue	-6.8%	7.3%	16.1%	0.0%	0.3%	11.6%	1.1%	-1.0%	-3.0%	7.5%	4.5%	-1.5%			
Cypress	-6.8%	7.3%	2.5%	-2.1%	-4.4%	10.5%	0.7%	0.6%	-5.8%	7.4%	4.9%	-1.4%			
BRCM IoT				15.7%	30.0%	17.0%	2.7%	-8.0%	10.0%	8.0%	3.0%	-2.0%			
Total Cypress	-6.8%	7.3%	16.1%	0.0%	0.3%	11.6%	1.0%	-1.0%	-3.0%	7.5%	4.5%	-1.5%			
Y/Y Change	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**	**2016**	**2017E**	**2018E**
MCU & Connectivity (MCD)	108.0%	-8.2%	39.8%	51.4%	53.2%	71.7%	26.2%	24.2%	15.4%	10.2%	15.8%	14.0%	37.1%	40.7%	13.8%
Memory Products (MPD)	99.0%	-6.0%	-8.6%	-10.1%	-1.7%	-5.3%	-2.6%	-3.2%	-2.2%	-4.8%	-4.6%	-3.4%	4.9%	-3.3%	-3.8%
Total Revenue	103.3%	-7.1%	12.8%	16.2%	25.1%	30.1%	13.2%	12.0%	8.3%	4.3%	7.9%	7.3%	19.4%	19.5%	6.9%
Cypress	103.3%	-7.1%	-0.5%	0.3%	3.0%	6.0%	4.2%	7.0%	5.5%	2.5%	6.8%	4.7%	11.1%	5.1%	4.9%
BRCM IoT							80.7%	43.7%	21.6%	12.2%	12.6%	19.9%		212.1%	16.3%
Total Cypress	103.3%	-7.1%	12.8%	16.2%	25.1%	30.1%	13.2%	12.0%	8.3%	4.3%	7.9%	7.3%	19.4%	19.5%	6.9%

Source: Company data, Credit Suisse estimates

Key Issues

The Emergence of USB Type-C. 2015 was more about design wins than actual revenue for USB Type-C (Rev contribution was <$1m per quarter) and 2016 only saw modest Rev contributions (we estimate ~$10-15m in CY16). As such, CY highlighted accelerating Rev growth during their Analyst Day. While Type-C has been predominately a PC feature to date, handset penetration emerged in 2017. Given the exponentially larger market opportunity (~1.5bn annual smartphone shipments vs. 250m PC shipments), CY focused on sizing the Rev opportunities within the ~$900m CY21 TAM. Relative to applications, USB Type-C was first used in PCs – recall that AAPL was the first to ship a product with Type-C (in their MacBook), but adoption spread to most new PC systems starting in the beginning of 2016. According to Gartner, USB Type-C will account for ~75% of Enterprise NB PCs by 2018. Further, by 2018, this technology will likely become the standard power connector in other devices as well, such as Smartphones, Tablets, Monitors and External Peripherals.

Figure 144: Type-C TAM Growing at 96% CAGR



Source: Gartner, Company data

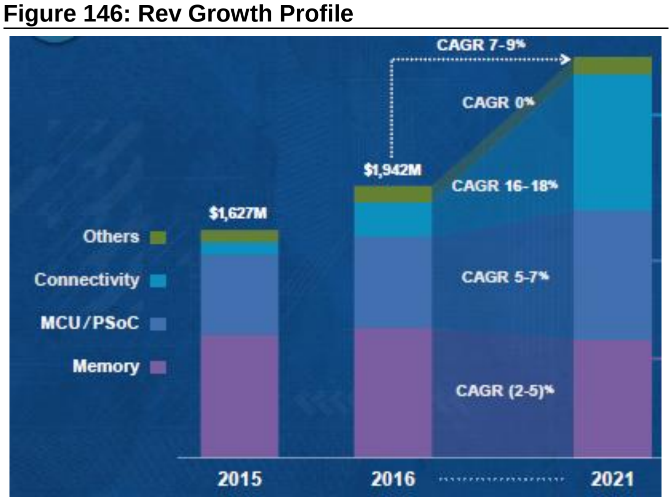
Figure 145: Type-C Sensitivity Analysis

Rev ($mm)	Attach Rate in 2021						
ASPs	44%	46%	48%	50%	52%	54%	56%
$1.00	$1,100	$1,150	$1,200	$1,250	$1,300	$1,350	$1,400
$0.90	$990	$1,035	$1,080	$1,125	$1,170	$1,215	$1,260
$0.80	$880	$920	$960	$1,000	$1,040	$1,080	$1,120
$0.70	$770	$805	$840	$875	$910	$945	$980
$0.60	$660	$690	$720	$750	$780	$810	$840
$0.50	$550	$575	$600	$625	$650	$675	$700
$0.40	$440	$460	$480	$500	$520	$540	$560
$0.30	$330	$345	$360	$375	$390	$405	$420

Source: Credit Suisse estimates

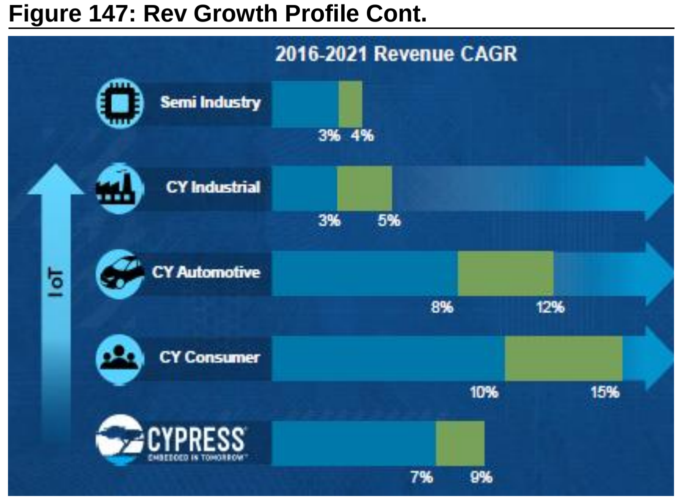
Above Industry Growth Despite Structurally Declining Memory. Given that CY's business model now includes the BRCM IoT asset and that the Company reclassified their segments, CY provide an updated Rev growth target of 7-9% from CY16-CY21 up from the 3.5% CAGR thru CY19 that the Company provided and well above the historic 5-year CAGR of flattish. CY's incrementally positive Rev expectations are driven by: (1) Industrial Rev growth of 3-5% with growth from MCUs, Wireless Connectivity, and SRAM, (2) Auto Rev growth of 8-12% with growth from MCUs, TrueTouch, PMIC, Wireless Connectivity, and NOR Flash, and (3) Consumer Rev growth of 10-15% with growth from MCUs, Wireless Connectivity, and USB Type-C. We view CY's Rev target as appropriately set as they embedded realistic expectations around emerging growth trends in Auto and Industrial, Consumer trends have seen strong upside in CY17 as CY is seeing success with companies such as AAPL and Nintendo, and Memory expectations were conservatively set for Rev to continue to decline low-single digits going forward reflecting a declining market that will be offset by exposure to Auto/ADAS NOR Memory growth as well as share gains.

Figure 146: Rev Growth Profile



Source: Cypress Semiconductor

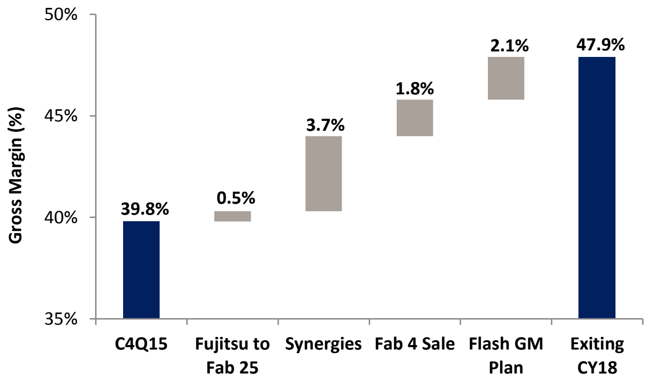
Figure 147: Rev Growth Profile Cont.



Source: Cypress Semiconductor

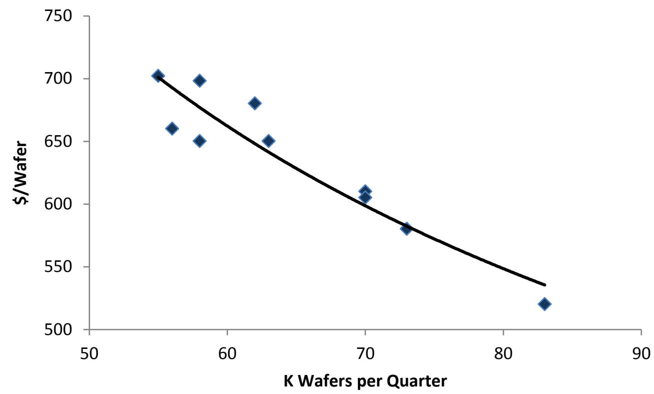
GM Timeline. While CY re-iterated expectations for GMs of ~43% exiting CY17 and ~48% exiting CY18 – we would note that CY's GM timeline has seen significant downside over the past two years. Specifically, following C2Q15 earnings CY expected ~45-46% GM exiting CY16 and ~50% GM in late 2017 – however, following C4Q15 earnings CY guided C1Q16 GM to 36.0% (a ~500 bps reduction from C2Q GM of 41.0%) as weak end-demand is causing slower than expected inventory burn. Then at their Analyst Day in Mar16, CY guided GM of ~40% exiting CY16 and ~48% exiting CY17 – both down-ticked from prior expectations. Further, despite the BRCM IoT acquisition in C3Q16 that was immediately accretive to margins – with IoT now ~20% of Total Rev at 50% GMs – CY still did not hit their down-ticked CY16 GM target, and CY17 is trending to ~41% -- WELL BELOW the down-ticked target of ~48% issued in early 2016 and the ~50% target issued in early 2015. As such, we expect investor focus to remain on margins over Rev – and would expect margin leverage to be received positively by investors.

Figure 148: CY Gross Margin Bridge



Source: Company data, Credit Suisse estimates

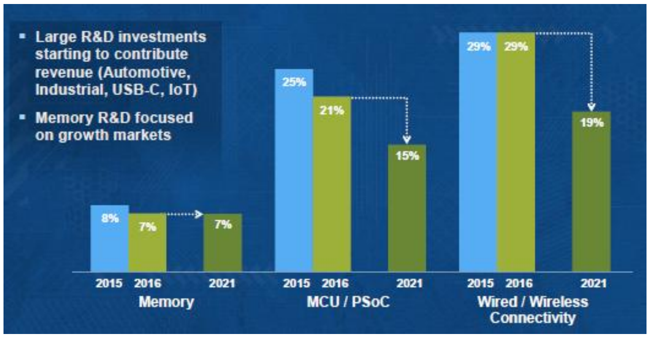
Figure 149: Fab 25 Wafer Cost vs. Volume



Source: Company data, Credit Suisse estimates

Broad Customer Base, Operating Leverage, and Cash Flow Generation. CY has continued to diversify their Rev stream over time and has gone from Top 10 Customers representing ~46% of Rev in 2011 with 1 >10% customer to the Top 10 Customers representing only ~26% of Rev in 2016 with no >10% customers. Further, we would highlight that CY has gone from historically having only 1/3 of the quarter booked to having 90% of the quarter booked the past two quarters. Relative to operating leverage, CY highlighted that (1) Memory R&D went from 8% of Rev in CY15 to 7% of Rev in CY16, and the Company expects to achieve levels of ~7% in CY21. (2) MCU/PSoC R&D went from 25% of Rev in CY15 to 21% of Rev in CY16, and the Company expects to achieve levels of ~15% in CY21. (3) Wired/Wireless Connectivity R&D was flat at 29% of Rev in CY15 and CY16, however the Company expects to achieve levels of ~19% in CY21. In aggregate, CY expects R&D to represent ~14-15% of Total Rev in 2021 – albeit with continued investments in R&D with a focus on high growth products and end markets, a focused investment on MCU and Connectivity products, and new products targeted at GM >50%. Given their Rev growth expectations of 7-9% and OpEx target at 27-28%, CY expects to grow OpM ~2.5x Rev from CY16 to CY21 and grow FCF ~3x Rev from CY16 to CY21.

Figure 150: R&D Investments Start to Contribute Rev



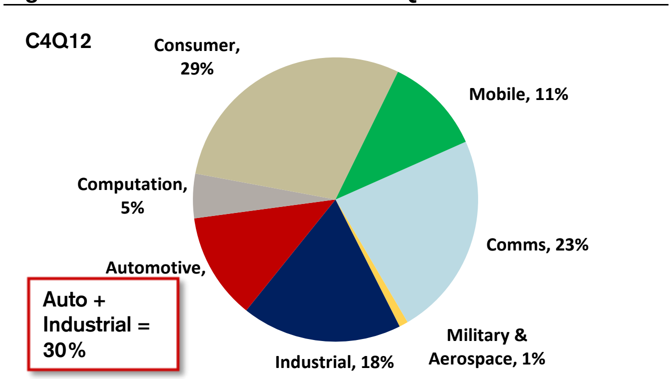
Source: Cypress Semiconductor

Figure 151: FCF Growth Expectations

Source: Cypress Semiconductor

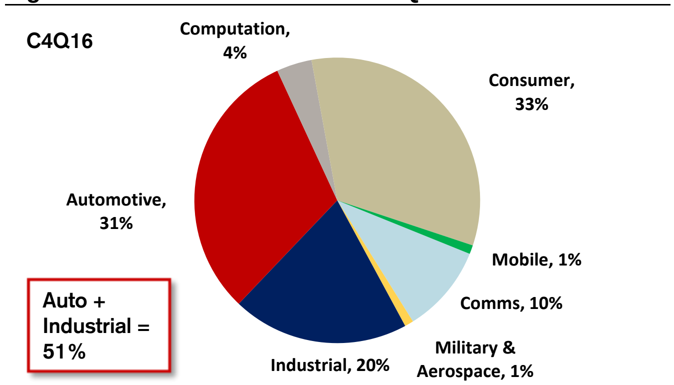
Structurally Improved End Market Exposure. Over the past 4 years CY has transformed from an SRAM/Mobile company to an MCU/Memory company via the CODE merger in 02/15 to an Industrial/Auto company focused on connectivity via the TT Mobile divestiture and the BRCM IoT Acquisition. Importantly, we believe the CY transformation is misunderstood and likely under-appreciated by investors. Specifically, CY has reduced their Mobile exposure from 11% in C4Q12 to 1% in C4Q16 while increasing their Industrial/Auto exposure from 30% to 51% – with Auto increasing ~3x. As a result, CY has increased their book-to-bill ratio entering the quarter from ~50% to ~90% and diversified their customer base with no customers greater than 5% (and the largest Denso an Auto supplier), thus providing a more stable and predictable revenue stream. Relative to Rev growth going forward, we believe CY is better positioned to capture growth in emerging Auto markets such as ADAS (5-yr CAGR of ~16%), Connectivity (5-yr CAGR of ~14%) Infotainment (5-yr CAGR of ~7%), Instrument Cluster (5-yr CAGR of ~7%), and Body Electronics (5-yr CAGR of ~9%) – which collectively should allow CY to grow their Auto Rev (~33% of Rev) at a 8-12% Rev CAGR through CY21. CY is well positioned to benefit from emerging Auto markets – CY is currently the #3 supplier of Auto Memory and MCUs and is designed in with each of the Top 25 Global Auto OEMs.

Figure 152: CY End-Market Mix: C4Q12



Source: Company data, Credit Suisse estimates

Figure 153: CY End-Market Mix: C4Q16



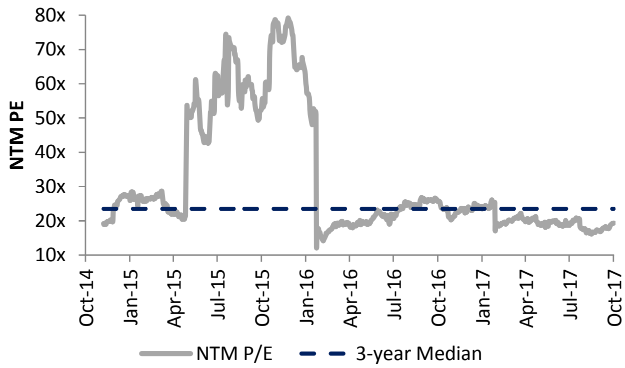
Source: Company data, Credit Suisse estimates

Investment View and Valuation

While we remain encouraged by improved mix towards higher-growth Industrial/Auto, the benefit of USB Type-C ramps, BRCM IoT Rev tracking above expectations, and strong mgmt. execution, the stock looks at least fairly valued especially when including SBC. We remain neutral as upside potential seems reflected in valuation as CY trades at 17x CY18 EV/FCF ex-SBC and 25x w/SBC vs Semis of 17x and 20x, respectively – in addition >70% buy ratings is among highest on Street. Downside is limited by M&A potential. At target

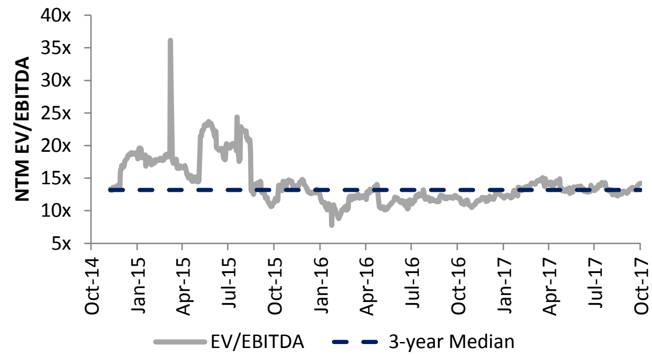
GM and OpM of 50% and >20%, CY18 EPS (w/SBC) and FCF would be $1.20 and $550m versus CS estimates of $0.83 and $415m – implying a CY18 P/E (w/SBC) of ~13x and EV/FCF of ~16x versus current CY18 valuation on Street consensus of ~19x and ~17x.

Figure 154: NTM PE Over Time



Source: Company data, Thomson Reuters Datastream

Figure 155: NTM EV/EBITDA Over Time



Source: Company data, Thomson Reuters Datastream

Intel Corp.

(INTC, $39.67, NEUTRAL, TP $35.00)

Low Expectations Vrs Lofty Valuation

Reporting Date: Thursday October 26th, After Market Close

Conference Call: Thursday October 26th, 5:00PM EST

Figure 156: INTC Summary of Expectations

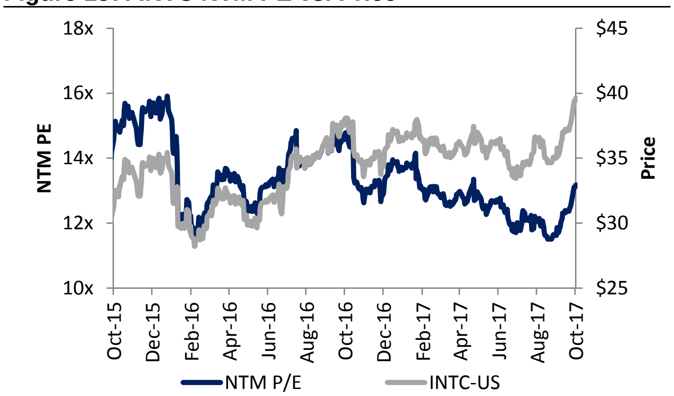
US $ in millions, unless otherwise stated

INTC	Jun-17	Sep-17			Dec-17E		CY2017E			CY2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	Updated Guidance	New CS	Cons
Revenue	$14,763	$15,700	$15,717	$15.7bn +/- $500m	$16,041	$16,092	$61,300	$61,367	$61.3bn	$63,429	$63,056
% q/q	*-0.2%*	*6.3%*	*6.5%*	*+3.0% to +9.7%*	*2.2%*	*2.4%*					
Seasonal q/q %	*3.2%*	*5.2%*			*2.6%*						
% y/y	*9.1%*	*-0.5%*			*-2.0%*		*3.0%*	*4.3%*	*+3.0% y/y*	*3.5%*	*2.8%*
Gross Margin	63.0%	63.0%	*63.1%*	63% +/- a few pct pts	62.9%	*62.5%*	63.0%	*62.6%*	63% +/- a few % pts	63.7%	*62.7%*
OpEx (R&D plus MG&A)	$5,129	$5,100		~$5.1bn	$5,050		$20,709		~$20.7bn +/- $400m	$20,900	
Operating Margin	28.2%	30.5%			31.4%		29.2%			30.7%	
Net Income	$3,506	$3,869			$3,966		$14,560			$15,240	
Net Margin	23.7%	24.6%			24.7%		23.8%			24.0%	
EPS (w/ options)	$0.72	$0.80	$0.80	$0.80 +/- $0.05	$0.82	$0.83	$3.00	$3.01	$3.00	$3.15	$3.10
EPS pf (w/o options)	$0.81	$0.88			$0.90		$3.33			$3.47	
EPS (GAAP)	$0.58	$0.72			$0.76		$2.66			$2.84	
Fully diluted shares	4,845	4,845			4,845		4,854			4,845	

Source: Company data, Credit Suisse estimates, Thomson Reuters

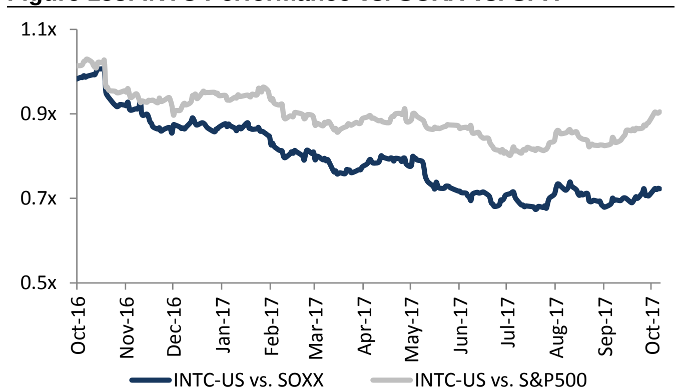
INTC: Recap of Recent Stock Performance

Figure 157: INTC NTM PE vs. Price



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 158: INTC Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data, Credit Suisse estimates

Key Message: We expect INTC to report C3Q and guide C4Q at least INLINE with a POSITIVE bias. Against credible-to-low-expectations, PCs, Server, and Memory trends and the addition of MBLY support topline while continued cost cutting supports the bottom line – numbers will have an upward bias in the near-term. Our quandary is reconciling (1) poor investor sentiment (10 year relative low to the SOX, short interest near 3 year high), (2) somewhat lofty valuation (EV/FCF of 16.5x on CY18 versus the 3, 5 and 10 year averages of 15.4x, 15.1x and 14.2x), and (3) open-ended structural concerns around x86 architecture, which are unlikely to be answered in the near-term. While INTC's LT position is better than most realize, in the near-term we continue to see risk/reward balanced and hence our Neutral rating. We would highlight: (1) 2H DCG expectations of at least 7% y/y growth seem reasonable, but upside to 10% plus likely capped until 2018 when we expect greater availability of Xeon Scalable, (2) 2H PLD demand likely to reaccelerate as MSFT

Azure builds out acceleration-as-a-service using INTC/ALTR, providing tangible evidence that INTC is “part-of-the-conversation” on next generation workloads, (3) PC trends continue to be benign in 2H17, but we would note that after 7 quarters of “easy compares” comps become more difficult starting in C4Q17, and (4) Memory is a source of EPS upside as we see a ~$500 mm swing in operating profit from CY17 to CY18 or approximately ~10 cents or 100% of Street Consensus EPS growth in CY18. While we continue to have a favorable LT fundamental view of INTC and believe the “rumors of x86 death" have been greatly exaggerated – we would prefer to wait for a better valuation entry point. Relative to valuation – CapEx post CY18 is a significant swing factor – if this is the new norm then upside to $40 is difficult, if CapEx is elevated then $42 is possible.

Expect C3Q At least In-Line with Guidance

We expect INTC to report C3Q Rev/EPS at least IN-LINE with CS and the Street at $15.70bn/$0.80 representing the mid-point of Company guidance of $15.7bn +/- $500m and $0.80 +/- $0.05. We would note that C3Q guidance for Rev up 6.3% is modestly above seasonal of up 5.2% q/q – albeit C3Q includes the impact of MBLY (that closed on Aug 8th) that we expect to result in $65m of incremental Rev – implying C3Q core sequential guidance for Rev up ~5.9% q/q. We see cushion to Rev guidance from better PC demand, better BB share at AAPL, and sustained NSG growth as memory demand remains strong.

- **Expect PCs To Provide Cushion to CCG.** We are modeling CCG Rev (~55% of Rev) up 4.2% q/q in-line with seasonal trends. NB build were up ~7% q/q, below seasonal of up ~10% q/q, and we expect INTC’s PC unit to be up ~6% q/q in-line with seasonal trends – we would highlight that (1) TW NB ODM builds and INTC’s PC units have a 0.81 r-squared and (2) INTC PC units in C3Q have over-shipped TW NB ODM builds on a q/q basis by ~150 on average over the last 5-years versus our current estimate for under-shipping by ~100 bps. Potential risk to this analysis includes C1Q/C2Q results with INTC PC Units ~490/380 bps above TW NB ODM builds (r^2 of 0.39/0.66 with INTC PC Units in C1Q/C2Q). We would also note that while NB is strong DT is mixed to weak. Lastly, build trends improved directionally thru C3Q, with C3Q q/q NB builds ~350 bps above forecasts coming in to the quarter.
- **DCG Estimates.** While visibility is limited, our DCG Rev estimate for C3Q is up 12.0% q/q versus seasonal of up ~8% q/q. Relative to y/y Rev, we expect C3Q up ~7.8% y/y, above Street consensus for up ~6.5% y/y. Importantly, while both CS and Street expect y/y DCG growth to decelerate from up 8.6% y/y in C2Q, we would highlight that y/y compares increase from up 4.5% y/y in C2Q16 to up 9.7% y/y in C3Q16. While we expect Enterprise Server Rev to continue to decline high-single digits y/y, we expect Cloud growth in the mid-20s and Networking and Comms to grow high-teens. We don't see the potential for double-digits growth until C4Q17/CY18 with better availability of Xeon Scalable and easier compares. We are modeling DCG OpM of ~43%, an improvement from 38% in C2Q – recall that C1Q OpM was down 520 bps q/q and 900 bps y/y albeit 700 bps of the y/y decline came from cost re-allocation – 35% OpM should mark the trough.
- **Expect Upside from Remaining Businesses.** We expect upside to our seasonal NSG Rev assumptions of up ~5.3% q/q as NAND pricing continued to improve – note MU NAND ASPs in AugQ were reported ~500 bps above expectations and NAND Rev was reported ~300 bps above expectations. We also believe our seasonal PSG assumptions may prove cautious as MSFT plans for deployments of Stratix FPGAs in Azure data centers. Specifically, assuming 1m MSFT servers, a 10-15% FPGA attach rate, 4 FPGAs/CPU and a $300 ASP implies a $120-180m Rev opportunity or ~7-10% of annual PSG Rev. We expect MBLY Rev of ~$135 in C4Q, versus $60m in C3Q, as

INTC realizes a full quarter of contribution. Note we currently expect MBLY to contribute ~$200m of Rev, $100m in EBIT, and $0.02 of EPS in C2H17.

We expect GM of 63.0% mostly in-line with CS/Street estimates of 63.0%/63.1% as ASP increases are partially offset by growth in lower-GM businesses (NSG and modem baseband). Note our C4Q GM estimates imply CY17 GM of 63% in-line with mgmt. guidance. We expect OpEx (Non-GAAP) of $5.10bn (-0.6% q/q), in-line with CS/Street estimates of $5.10bn. Lastly, we expect a net gain of $300m from equity investments, interest, and other income and TR of 24%, in-line with CS estimates. We expect at least in-line Rev and profitability to drive EPS of at least $0.80 versus CS, Street, and guidance of $0.80.

Expect C4Q Guidance Mostly In-Line with CS/Street

We expect INTC to guide C4Q Rev to a range of $16.04bn +/- $500m and EPS of $0.77-$0.87, mostly IN-LINE with CS at $16.04bn/$0.82 and Street at $16.09bn/$0.83. While Rev of $16.04bn would represent growth of 2.2% q/q vs. seasonal of up 2.6% q/q, we would note our Core expectations (ex-MBLY) are only for Rev up 1.7% q/q – which appears achievable and is supported by the C2H Xeon Scalable ramp, continued memory strength, and potential optionality in PSG if MSFT deploys ALTR Stratix FPGAs.

- **Expect PCs To Be Sub-Seasonal, AAPL to Provide CCG Cushion.** We currently model (1) PC Rev down ~2% q/q with units down 3.5% q/q and ASPs up 1.5% q/q and (2) Mobile Rev up 18% q/q. We expect INTC's baseband in the iPhone 8 to cushion CCG Rev – 25m C4Q builds (~30% market share) at a $10 ASP implies $250m of C4Q Rev versus 15m C3Q builds for $150m of Rev.
- **DCG Estimate Achievable.** While the server supply chain is more difficult to track, our DCG Rev estimate for C4Q of up 7% q/q versus seasonal of up 4% q/q appears achievable as it requires only 300k of incremental Xeon Scalable, at a $500 ASP, or ~4% of C4Q MPU Server units. Note we are modelling for C4Q DCG Rev up 12.5% y/y, accelerating from up 7.8% y/y in C3Q as y/y compares moderate and Xeon Scalable sees a more meaningful contribution versus C3Q. We are modeling DCG C4Q OpM of 44.0%, up modestly from 43.5% in C3Q.
- **Expect Seasonal with Upside Bias from Remaining Businesses.** We expect (1) IoT to grow ~4.5% q/q in-line with seasonal, (2) PSG down ~3% q/q in-line with seasonal of down ~3% q/q, and (3) NSG up 2% q/q. Importantly, we see upside in NSG from better memory trends and would highlight that our PSG estimates could prove cautious if MSFT deploys ALTR Stratix FPGAs.
- **Better Pricing and Xeon Scalable Support GM Upside.** We expect INTC to guide C4Q GM to AT LEAST 62.9% (down ~10 bps q/q) above Street at 62.5% (down ~50 bps q/q) due to better CCG ASPs and a step-up in high-end server demand from the launch of Xeon Scalable. In addition, we expect INTC to guide OpEx of $5.05bn (down 1.0% q/q), mostly in-line with Street. At least in-line Rev, GM, and OpEx drive an EPS of ~$0.82 +/- $0.05, mostly IN-LINE with CS and Street estimates of $0.82 and $0.83.

Figure 159: INTC Revenue Model

Segment Revenue *$ in millions*	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17E 3Q	Dec-17E 4Q	Mar-18E 1Q	Jun-18E 2Q	Sep-18E 3Q	Dec-18E 4Q	2016	2017E	2018E
CCG	$7,549	$7,338	$8,892	$9,129	$7,976	$8,213	$8,556	$8,415	$7,540	$7,909	$8,602	$8,485	$32,908	$33,160	$32,536
DCG	$3,999	$4,027	$4,542	$4,668	$4,232	$4,372	$4,896	$5,254	$4,860	$5,113	$5,352	$5,558	$17,236	$18,753	$20,884
IoT	$651	$572	$689	$726	$721	$720	$765	$800	$795	$820	$860	$925	$2,638	$3,006	$3,400
NSG	$557	$554	$649	$816	$866	$874	$920	$940	$915	$940	$970	$980	$2,576	$3,600	$3,805
ISG	$537	$537	$537	$550	$534	--	--	--	--	--	--	--	$2,161	$534	$0
PSG	$458	$465	$425	$420	$425	$440	$450	$435	$450	$463	$470	$480	$1,768	$1,750	$1,863
MBLY	--	--	--	--	--	--	$63	$137	$165	$175	$190	$210	$0	$200	$740
All Other	$50	$40	$44	$65	$42	$144	$50	$60	$60	$60	$60	$60	$199	$296	$240
Total	**$13,801**	**$13,533**	**$15,778**	**$16,374**	**$14,796**	**$14,763**	**$15,700**	**$16,041**	**$14,786**	**$15,479**	**$16,504**	**$16,698**	**$59,486**	**$61,299**	**$63,467**

% of Total	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	2016	2017E	2018E
CCG	54.7%	54.2%	56.4%	55.8%	53.9%	55.6%	54.5%	52.5%	51.0%	51.1%	52.1%	50.8%	55.3%	54.1%	51.3%
DCG	29.0%	29.8%	28.8%	28.5%	28.6%	29.6%	31.2%	32.8%	32.9%	33.0%	32.4%	33.3%	29.0%	30.6%	32.9%
IoT	4.7%	4.2%	4.4%	4.4%	4.9%	4.9%	4.9%	5.0%	5.4%	5.3%	5.2%	5.5%	4.4%	4.9%	5.4%
NSG	4.0%	4.1%	4.1%	5.0%	5.9%	5.9%	5.9%	5.9%	6.2%	6.1%	5.9%	5.9%	4.3%	5.9%	6.0%
ISG	3.9%	4.0%	3.4%	3.4%	3.6%	--	--	--	--	--	--	--	3.6%	0.9%	0.0%
PSG	3.3%	3.4%	2.7%	2.6%	2.9%	3.0%	2.9%	2.7%	3.0%	3.0%	2.8%	2.9%	3.0%	2.9%	2.9%
MBLY	--	--	--	--	--	--	0.4%	0.9%	1.1%	1.1%	1.2%	1.3%	0.0%	0.3%	1.2%
All Other	0.4%	0.3%	0.3%	0.4%	0.3%	1.0%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%	0.5%	0.4%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Q/Q	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18
CCG	-13.8%	-2.8%	21.2%	2.7%	-12.6%	3.0%	4.2%	-1.6%	-10.4%	4.9%	8.8%	-1.4%
DCG	-7.2%	0.7%	12.8%	2.8%	-9.3%	3.3%	12.0%	7.3%	-7.5%	5.2%	4.7%	3.8%
IoT	4.2%	-12.1%	20.5%	5.4%	-0.7%	-0.1%	6.3%	4.6%	-0.6%	3.1%	4.9%	7.6%
NSG	-14.8%	-0.5%	17.1%	25.7%	6.1%	0.9%	5.3%	2.2%	-2.7%	2.7%	3.2%	1.0%
ISG	4.9%	0.0%	0.0%	2.4%	-2.9%	--	--	--	--	--	--	--
PSG	18.8%	1.5%	-8.6%	-1.2%	1.2%	3.5%	2.3%	-3.3%	3.4%	2.8%	1.6%	2.1%
MBLY	--	--	--	--	--	--	--	117.5%	20.4%	6.1%	8.6%	10.5%
All Other	-15.3%	-20.0%	10.0%	47.7%	-35.4%	242.9%	-65.3%	20.0%	0.0%	0.0%	0.0%	0.0%
Total	**-7.5%**	**-1.9%**	**16.6%**	**3.8%**	**-9.6%**	**-0.2%**	**6.3%**	**2.2%**	**-7.8%**	**4.7%**	**6.6%**	**1.2%**

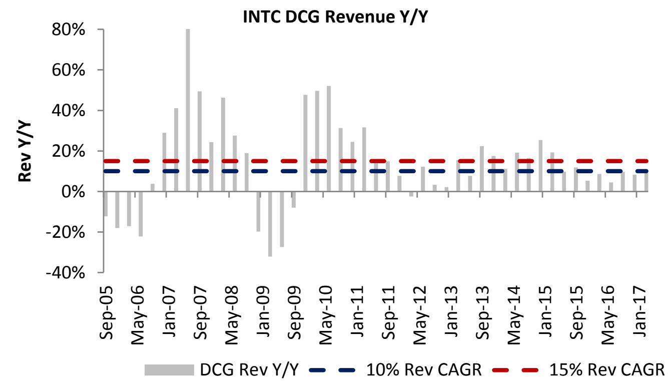
Y/Y	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	2016	2017E	2018E
CCG	1.7%	-2.6%	4.5%	4.3%	5.7%	11.9%	-3.8%	-7.8%	-5.5%	-3.7%	0.5%	0.8%	2.1%	0.8%	-1.9%
DCG	8.6%	4.5%	9.7%	8.4%	5.8%	8.6%	7.8%	12.5%	14.8%	16.9%	9.3%	5.8%	7.9%	8.8%	11.4%
IoT	22.1%	2.3%	18.6%	16.2%	10.8%	25.9%	11.0%	10.2%	10.3%	13.9%	12.4%	15.6%	14.8%	13.9%	13.1%
NSG	-5.9%	-20.4%	-0.9%	24.8%	55.5%	57.8%	41.8%	15.2%	5.7%	7.6%	5.4%	4.3%	-0.8%	39.8%	5.7%
ISG	12.1%	10.0%	6.1%	7.4%	-0.6%	--	--	--	--	--	--	--	8.9%	-75.3%	-100.0%
PSG	5.1%	12.0%	6.1%	8.9%	-7.2%	-5.4%	5.9%	3.6%	5.9%	5.1%	4.4%	10.3%	8.0%	-1.0%	6.4%
MBLY	--	--	--	--	--	--	--	--	--	--	201.6%	53.3%	--	--	270.0%
All Other	-34.2%	-36.5%	-42.9%	10.2%	-16.0%	260.0%	13.6%	-7.7%	42.9%	-58.3%	20.0%	0.0%	-27.6%	48.7%	-18.9%
Total	**8.0%**	**2.6%**	**9.1%**	**9.8%**	**7.2%**	**9.1%**	**-0.5%**	**-2.0%**	**-0.1%**	**4.8%**	**5.1%**	**4.1%**	**7.5%**	**3.0%**	**3.5%**

Source: Company data, Credit Suisse estimates

Key Issues

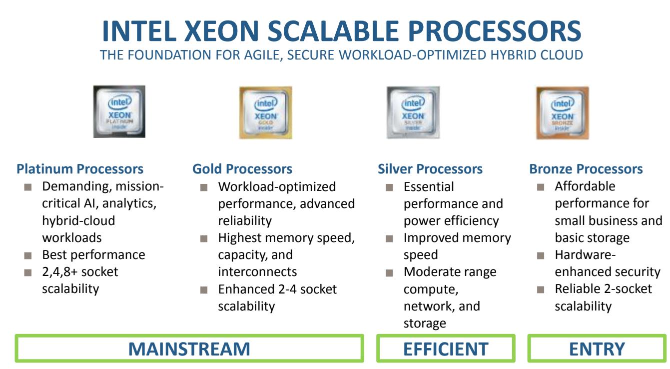
DCG LT Growth Rate Likely Closer to 10%. DCG Rev grew 8% y/y in 2016 driven by growth in Cloud Service Providers (up 24% y/y) and Comm Service Providers (up 19% y/y), offset partially by a decline in Enterprise & Government (down 3% y/y). We expect CY17 DCG Rev growth of ~10%. INTC's double-digit growth target assumes a continued decline in Enterprise Server Rev (base case -5% Rev CAGR). Importantly, INTC can sustain a double-digit DCG Rev growth CAGR from 2017-2021 even with -7% growth in Enterprise. Note – in C2H16, INTC's Enterprise business dropped below 50% of DCG Rev for the 1st time (~49% of Rev). We expect C2H17 server demand to pick up modestly driven by the launch of Xeon Scalable – better ASPs could return DCG to 10% y/y growth by C4Q. While early indications are positive for Xeon Scalable and likely to drive customers to buy higher in the stack, lack of wide spread availability could cause some NT pause with upside more likely in C1H18.

Figure 160: DCG Y/Y Rev Growth vs Double-Digit CAGR



Source: Mercury Research, IDC, Company data, Credit Suisse estimates

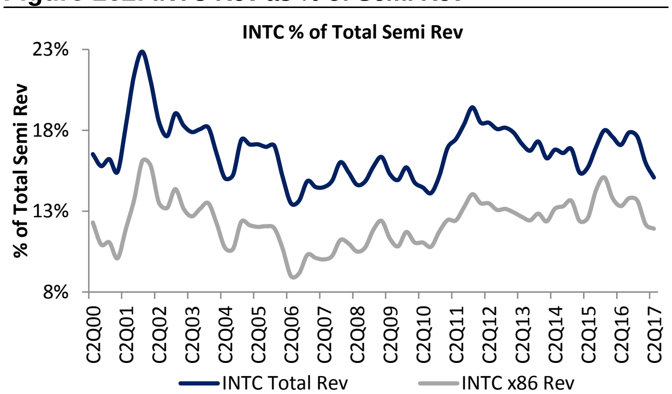
Figure 161: Xeon Scalable Processors



Source: Intel

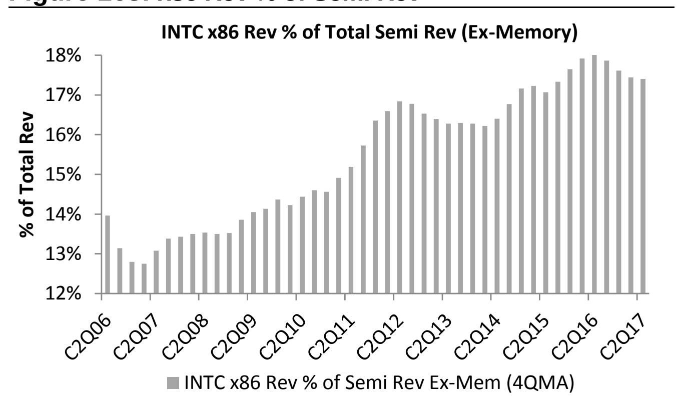
In Defense of x86: The key LT concern is whether INTC and x86 is losing relevancy. We reject the view that INTC is losing relevancy. The recent spending spree is not a sign of management "running scared" – the utility/stability of PCs along with the lion-share of workloads where x86 is and will be the optimal architecture provides durable cash flows to make larger riskier investments with longer paybacks. INTC is well levered to our Data Growth Paradigm and high levels of R&D/CapEx create motes. Despite NT challenges from AMD with Zen, NVDA/GPU in Machine Learning, and under-performance relative to XLNX in FPGAs, we continue to see multiple drivers being under-appreciated: (1) Networking, (2) Non-CPU growth – XPoint, Omni-Path, and Silicon Photonics (accretive to LT CAGR by 300 bps), (3) Rack Scale Design, and (4) potential for private cloud to moderate deflationary enterprise IT trends – all of which support INTC's double digit growth CAGR moving forward.

Figure 162: INTC Rev as % of Semi Rev



Source: Company data, Credit Suisse estimates

Figure 163: x86 Rev % of Semi Rev



Source: Company data, Credit Suisse estimates

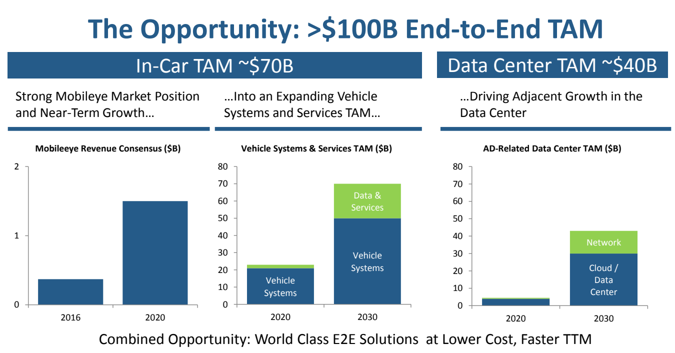
Non-traditional Investments: INTC has recently pursued non-traditional investments – in Memory thru Xpoint, in FPGAs thru ALTR, and in Autos thru MBLY. Relative to Memory, XPoint is MU and INTC's storage class memory that is expected to deliver improvements in cost/bit, performance, and density. While MU expects XPoint to be used across numerous applications, customer feedback and the Company's expectations suggest that it will be (at least initially) most pervasive in Servers – MU recently outlined expectations for penetration in 2/4-way x86 Server to increase from 0% in 2017 to 27% in 2022. Relative to FPGAs, while the timing of MSFT's deployment of ALTR FPGAs is still uncertain – our analysis around MSFT suggest a $120-180m Rev opportunity or ~7-10% of PSG Rev – assuming 1m MSFT servers, a 10-15% FPGA attach rate, 4 FPGAs/CPU and a $300 ASP. Relative to Autos, while $15.3 bb or ~21 times CY18 Rev is clearly not cheap, we like the MBLY transaction because it better positions INTC to capture a significantly larger future TAM at high levels of margins and returns. Over the 9 months it is estimated to close the deal INTC should generate enough FCF to cover >60% of the purchase price and while it is still too early to pick the winners in HAV and FAV (Highly Autonomous and Fully Autonomous Vehicles) the depth and breadth of resources and IP an INTC/MBLY combination represents surely places them in the pole position.

Figure 164: MSFT FPGA Rev Sensitivity Analysis

Rev ($m)	Server/FPGA Attach Rate 9%	10%	11%	12%	13%	14%	15%
MSFT Servers 700,000	$76	$84	$92	$101	$109	$118	$126
800,000	$86	$96	$106	$115	$125	$134	$144
900,000	$97	$108	$119	$130	$140	$151	$162
1,000,000	$108	$120	$132	$144	$156	$168	$180
1,100,000	$119	$132	$145	$158	$172	$185	$198
1,200,000	$130	$144	$158	$173	$187	$202	$216
1,300,000	$140	$156	$172	$187	$203	$218	$234

Source: Company data, Credit Suisse estimates

Figure 165: INTC's $100bn Autonomous Driving TAM

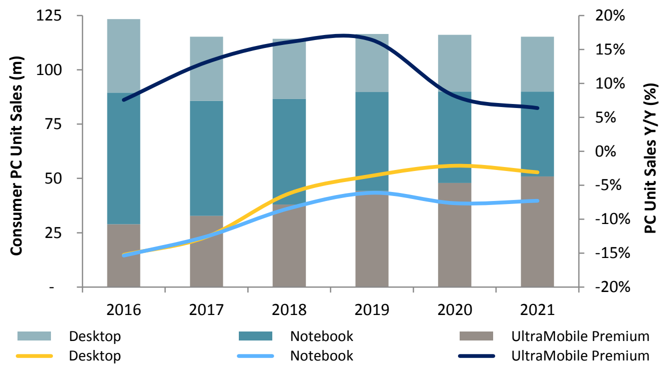


Source: Intel

Despite More Difficult Compares, Expect CY18 PC Units to Grow Y/Y: We expect CY17 unit sales down ~3% y/y, versus down ~6% y/y in CY16, as Consumer moderates from down ~11% to down ~7% y/y and Enterprise goes from down ~2% y/y to flat y/y. Importantly, we expect CY18 to grow 1% y/y with Consumer down ~1% y/y and Enterprise up ~2% y/y.

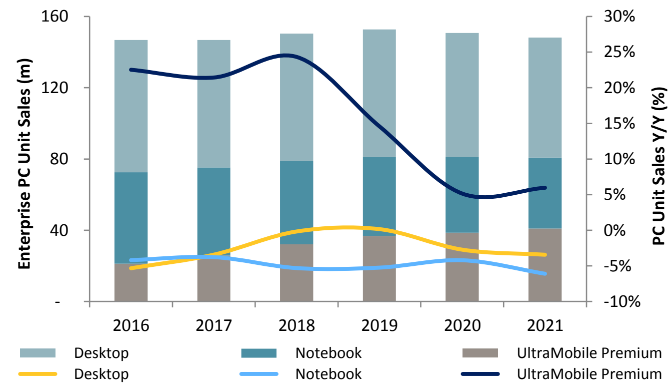
- **CY18 Expected to Be Up for First Time Since 2011:** Industry expectations are for CY18 to see 1% y/y unit sales growth, marking the first year of y/y growth since 2011. Specifically, Enterprise up 2.4% y/y will offset consumer down 0.9% y/y. While replacement rates for PCs have gone from ~4 years in the past to ~5-6 years today, the PC market should benefit from a replacement cycle in CY18/CY19 that will drive positive y/y unit growth for the first time since 2011.
- **Enterprise and Consumer Trends:** Enterprise unit growth will be driven by an OS refresh cycle – with Windows 10 enterprise penetration only at ~27% as of July 17th, per a CS Software Survey, with expectations for ~48% more to adopt Windows 10 over the next 24 months (ending July 2019). Moderating consumer unit declines will be driven by higher sales of lower priced PCs, with increased competition from AMD, which should entice some to upgrade.
- **More Difficult Compares Next Year:** Assuming Y/Y declines moderate mostly in C3Q and C4Q implies 2017 will be down 2% y/y (on average) versus down 8% y/y in 2016 (on average) – i.e. comps will be more difficult next year. As such, while there are several drivers of demand in CY18 that we expect to result in PC units returning to y/y growth, we would acknowledge more difficult compares.

Figure 166: Consumer PC Trends



Source: Gartner

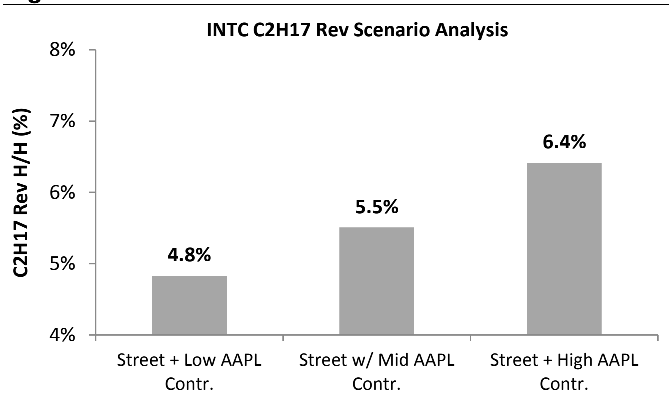
Figure 167: Enterprise PC Trends



Source: Gartner

INTC to Benefit From Increased Baseband Share: Following the dual-sourcing of modems last year from both QCOM and INTC, we suspect INTC's new CDMA-compatible modem is closing the gap with QCOM and could potentially displace QCOM further at AAPL LT. Recall INTC's modem in the iPhone 7 was only GSM-compatible. Note – while INTC likely had ~20% market share in the iPhone 7 – implying ~$190m of C2H16 Rev assuming 95m units at a $10 ASP – we suspect share increased ~10 ppts y/y. 30% share of C2H17 iPhone units would imply ~35m C2H17 builds or ~$400m of Rev – up 60% vs C2H16.

Figure 168: AAPL Provides Cushion to C2H Growth



Source: Company data, Credit Suisse estimates

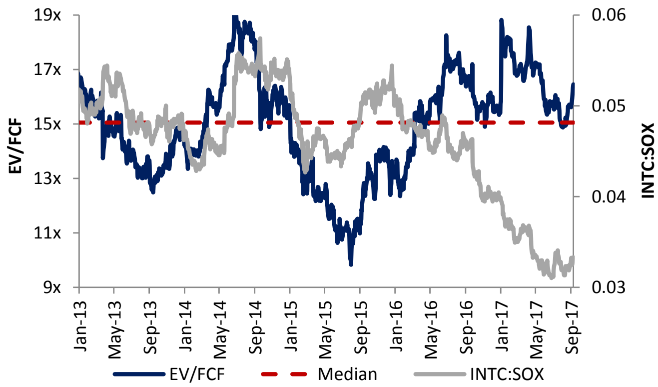
Figure 169: AAPL Rev Improves 2H H/H Growth

AAPL C2H17 Modem Contribtion Sensitivity Analysis			
Units (m)		**Mkt Share (%)**	
High	110.0	***High***	50.0%
Mid-point	105.0	***Mid-point***	35.0%
Low	100.0	***Low***	20.0%
Implied Units (m)		**ASP ($)**	
High	55.0	***High***	$11.5
Mid-point	36.8	***Mid-point***	$10.0
Low	20.0	***Low***	$8.5
Implied Rev ($m)		**Incremental Growth (H/H)**	
High	$632.5	***High***	**6.4%**
Mid-point	$367.5	***Mid-point***	**5.5%**
Low	$170.0	***Low***	**4.8%**

Source: Company data, Credit Suisse estimates

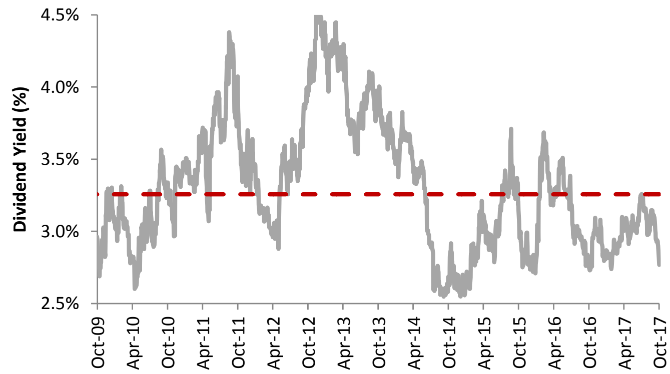
Valuation Remains at Premium Levels: While MBLY is embedded in Street FCF since INTC guided with MBLY prior to closing the deal, the entirety of the financing is not included in EV when using C2Q balance sheet numbers as the deal had not closed yet. As such, even including the $4bn of cash generated in C3Q, we expect INTC's EV to increase by ~$4bn or ~2% as INTC finances the remaining $8bn of the MBLY acquisition – implying that INTC trades at 16.8 NTM EV/FCF -- an ~11% premium to their historic median. An in-line EV/FCF multiple with their historic median would imply a TP of $35 – INLINE with our target price. Relative to their dividend, we would note that $39/sh implies a 2.8% yield – and over the last 8 years INTC's yield has peaked at 2.6% and the median has been 3.3% -- implying share upside to $42/sh at 2.6% yield and $33/sh at 3.3% yield. CapEx post CY18 is a significant swing factor – if this is the new norm then upside to $40 is difficult, if CapEx is elevated then $42 is possible.

Figure 170: ~11% Premium to Historic EV/FCF



Source: Company data, Credit Suisse estimates

Figure 171: Downside at 3.3% Yield & Peak at 2.6% Yield



Source: Company data, Credit Suisse estimates

CREDIT SUISSE

Keysight Technologies

(KEYS, $42.72, OUTPERFORM, TP $49.00)

In-Line/In-Line; Poised to Benefit from 5G

Reporting Date: Wednesday, November 15, After Market Close

Conference Call: TBD

Figure 172: KEYS Summary of Expectations

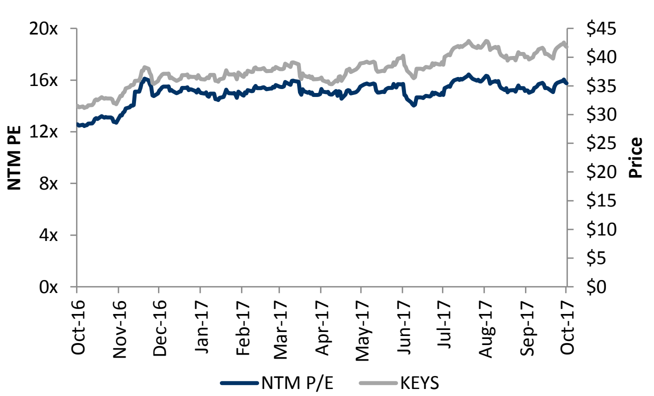
US$ in millions, unless otherwise stated

KEYS	Jul-17	Oct-17			Jan-18		C2017E		C2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Total Revenue	**$758.0**	**$890.0**	**$885.4**	**$875-905mn**	**$880.0**	**$864.0**	**$3,391.0**	**$3,298.0**	**$3,740.9**	**$3,619.0**
% Q/Q chng	*4.4%*	*3.1%*	*16.8%*		*-1.1%*	*-2.4%*				
% Y/Y chng	*3.1%*	*18.5%*	*17.9%*		*21.2%*		*15.7%*	*10.6%*	*10.3%*	*10.7%*
Gross Margin*	**59.0%**	**60.3%**			**60.5%**		**60.2%**	*58.3%*	**60.9%**	*61.1%*
Operating Exp.*	**$300.0**	**$371.6**			**$373.1**		**$1,406.8**		**$1,532.1**	
Operating Margin*	**19.4%**	**18.5%**	*19.3%*		**18.1%**	*18.8%*	**18.7%**	*19.9%*	**19.9%**	*19.4%*
Net Income*	**$114.0**	**$120.7**			**$114.3**		**$464.1**		**$545.5**	
Net Margin*	**15.0%**	**13.6%**			**13.0%**		**13.7%**		**14.6%**	
EPS*	**$0.64**	**$0.64**	**$0.64**	***$0.59-$0.69***	**$0.60**	**$0.61**	**$2.50**	**$2.47**	**$2.83**	**$2.65**
Fully diluted shares	179.0	189.0			190.0		185.9		192.5	

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

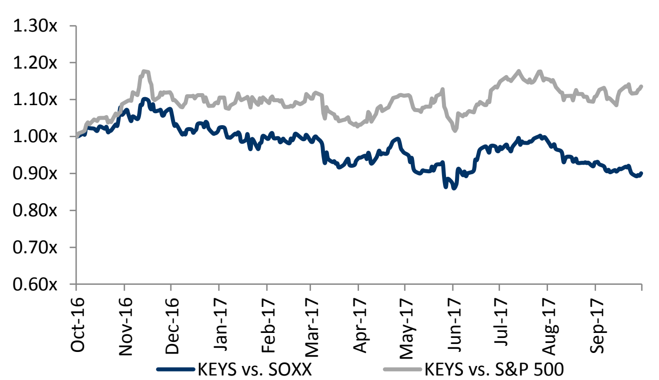
KEYS: Recap of Recent Stock Performance

Figure 173: KEYS NTM PE vs. Price



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 174: LTM Performance vs. SOXX vs. SPX



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Key Message: While still early in the quarter, we believe that the Company is a turnaround story and is well positioned to benefit from the growth of 5G, an increase in Defense spending, IoT, and secular electronics growth in cars. The market is currently discounting the stock relative to other test and measurement peers, as the Company had historically shown little or no growth; however, we think this was driven by lower R&D investments, as Agilent was running the Keysight business as a cash cow. Management has raised FY18 EPS guidance signaling that investments in 5G are coming to fruition and we see potential for investors to view the business as a play on 5G. In addition, management noted that 5G orders exceeded the decline in 4G for the first time last quarter giving further evidence that Keysight is poised for growth.

Expect F4Q17 (OctQ) Rev IN-LINE with CS/ABOVE Street, EPS IN-LINE with CS/Street

While still early in the quarter, we expect KEYS to report OctQ Rev/EPS of $890.0 (+3.1% q/q)/$0.64 IN-LINE with CS rev at $890.0 (+3.1% q/q) and ABOVE street rev at $885.4m, while expect EPS to be IN-LINE with CS/street at $0.64. By segment, we are modeling revenues as follows: (i) Communication Solutions Group as $440.6 (+5.4% q/q) out of which Aerospace, Defense & Government constitutes $167.3m (+18.8% q/q) and Commercial Communications at $273.3 (+30.7% q/q), (ii) Electronic Industrial Solutions Group as $211.5m (-3.0% q/q), (iii) IXIA Solution Group as $126.6m (+14.2% q/q), and (iv) Services Solutions Group as $111.28m (+12.5%). We are modeling GM (ex-SBC) of 60.3% (-110bps q/q), and OpEx of $371.6m (+270 bps q/q). We expect in-line revenue, GM, and OpEx to drive EPS to $0.64 in-line with CS/street estimate at $0.64. \

Expect F1Q18 (JanQ) Rev ABOVE Street, EPS BELOW Street

KEYS has not released any guidance for F1Q18, but we expect Rev/EPS of $880.0m (-1.1% q/q) ABOVE street at $864.0m (-2.4% q/q) and expect EPS of $0.60 BELOW street at $0.61. We are projecting an 18.1% OpM BELOW street at 18.8%. By segment, we are modeling revenues as follows: (i) Communications Solutions Group as $443.3m (-4.6% q/q) out of which Aerospace, Defense, and Government comprises $166.7m (-0.4% q/q) and Commercial Communications comprises $276.6m (+1.2% q/q), (ii) Electronic Industrial Solutions Group at $199.7m (-5.5% q/q), (iii) IXIA Solutions Group at $130.0m (+2.7% q/q), and (iv) Services Solutions Group at $107.0m (-3.8% q/q). We are modeling GM (ex-SBC) of 60.5% (+30bps q/q) and OpEx of $373.1m (+0.4% q/q). We expect in-line revenue, GM, and OpEx to drive EPS to $0.60 below street estimates of $0.61.

Expect CY18 Rev/EPS ABOVE Street

While KEYS has not released any guidance on 2018, we expect REV/EPS at $3,740.9m (+10.3% y/y)/$2.83 which is ABOVE street at $3,619.0m (+10.7% y/y)/$2.65. By segment, we are modeling revenues as follows: (i) Communication Solutions Group as $1,724.9m (-1.0% y/y) out of which Aerospace, Defense, and Government constitutes $665.9m (-8.6% y/y) and Commercial Communications constitutes $1,059.0m (+4.4% y/y), (ii) Electronic Industrial Solutions Group at $849.2m (9.3% y/y), (iii) IXIA Solutions Group at $388.6m, and (iv) Services Solutions Group at $427.3m (+5.0% y/y). We are modeling GM (ex-SBC) of 60.9% (+1.09% y/y), and OpEx of $1,532.1 (+8.91% y/y). We expect in-line revenue, GM, and OpEx to drive EPS to $2.83 above street estimates of $2.65.

Figure 175: KEYS Revenue Model by Segment

Revenue ($mn)	Jan-16 1QA	Apr-16 2QA	Jul-16 3QA	Oct-16 4QA	Jan-17 1QA	Apr-17 2QA	Jul-17 3QA	Oct-17 4QE	Jan-18 1QE	Apr-18 2QE	Jul-18 3QE	Oct-18 4QE	Jan-17 C2016	Jan-18 C2017E	Jan-19 C2018E
Aerospace, Defence & Government	*$191.0*	*$189.0*	*$172.0*	*$188.0*	*$180.0*	*$168.0*	*$164.00*	*$167.3*	*$166.7*	*$167.2*	*$168.2*	*$176.6*	*$729.0*	*$665.9*	*$695.3*
Commercial Communications	*$249.0*	*$257.0*	*$249.0*	*$254.0*	*$254.0*	*$255.0*	*$254.0*	*$273.3*	*$276.6*	*$297.2*	*$285.5*	*$308.7*	*$1,014.0*	*$1,059.0*	*$1,202.2*
Communications Solutions Group	$440.0	$446.0	$421.0	$442.0	$434.0	$423.0	$418.0	$440.6	$443.3	$464.4	$453.7	$485.3	$1,743.0	$1,724.9	$1,897.5
Electronic Industrial Solutions Group	$191.0	$193.0	$191.0	$201.0	$192.0	$220.0	$218.0	$211.5	$199.7	$217.9	$201.2	$212.2	$777.0	$849.2	$833.2
IXIA Solutions Group	na	na	na	na	na	$12.0	$120.0	$126.6	$130.0	$133.9	$137.4	$139.7	na	$388.6	$553.0
Services Solutions Group	$95.0	$96.0	$103.0	$108.0	$100.0	$102.0	$107.0	$111.28	$107.0	$109.1	$114.5	$119.1	$407.0	$427.3	$457.2
Total Revenue	**$726.0**	**$735.0**	**$715.0**	**$751.0**	**$726.0**	**$757.0**	**$863.0**	**$890.0**	**$880.0**	**$925.3**	**$906.7**	**$956.3**	**$2,927.0**	**$3,390.0**	**$3,740.9**

% of Total	Jan-16 1QA	Apr-16 2QA	Jul-16 3QA	Oct-16 4QA	Jan-17 1QA	Apr-17 2QA	Jul-17 3QA	Oct-17 4QE	Jan-18 1QE	Apr-18 2QE	Jul-18 3QE	Oct-18 4QE	Jan-17 C2016	Jan-18 C2017E	Jan-19 C2018E
Aerospace, Defence & Government	*26.3%*	*25.7%*	*24.1%*	*25.0%*	*24.8%*	*22.2%*	*19.0%*	*18.8%*	*18.9%*	*18.1%*	*18.5%*	*18.5%*	*24.9%*	*19.6%*	*18.6%*
Commercial Communications	*34.3%*	*35.0%*	*34.8%*	*33.8%*	*35.0%*	*33.7%*	*29.4%*	*30.7%*	*31.4%*	*32.1%*	*31.5%*	*32.3%*	*34.6%*	*31.2%*	*32.1%*
Communications Solutions Group	60.6%	60.7%	58.9%	58.9%	59.8%	55.9%	48.4%	49.5%	50.4%	50.2%	50.0%	50.7%	59.5%	50.9%	50.7%
Electronic Industrial Solutions Group	26.3%	26.3%	26.7%	26.8%	26.4%	29.1%	25.3%	23.8%	22.7%	23.5%	22.2%	22.2%	26.5%	25.1%	22.3%
IXIA Solutions Group	na	na	na	na	na	1.6%	13.9%	14.2%	14.8%	14.5%	15.2%	14.6%	na	11.5%	14.8%
Services Solutions Group	13.1%	13.1%	14.4%	14.4%	13.8%	13.5%	12.4%	12.5%	12.2%	11.8%	12.6%	12.5%	13.9%	12.6%	12.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Q/Q change	Jan-16 1QA	Apr-16 2QA	Jul-16 3QA	Oct-16 4QA	Jan-17 1QA	Apr-17 2QA	Jul-17 3QA	Oct-17 4QE	Jan-18 1QE	Apr-18 2QE	Jul-18 3QE	Oct-18 4QE
Aerospace, Defence & Government	*-7.3%*	*-1.0%*	*-9.0%*	*9.3%*	*-4.3%*	*-6.7%*	*0.4%*	*2.0%*	*-0.4%*	*0.3%*	*0.6%*	*5.0%*
Commercial Communications	*0.8%*	*3.2%*	*-3.1%*	*2.0%*	*0.0%*	*0.4%*	*-2.7%*	*8%*	1.20%	7.4%	-3.9%	8.1%
Communications Solutions Group	-2.9%	1.4%	-5.6%	5.0%	-1.8%	-2.5%	-1.2%	5.4%	-4.6%	0.5%	-5.9%	9.0%
Electronic Industrial Solutions Group	-4.5%	1.0%	-1.0%	5.2%	-4.5%	14.6%	-8.6%	-3.0%	-5.5%	9.1%	-7.7%	5.5%
IXIA Solutions Group	na	na	na	na	na	na	900.0%	5.5%	2.7%	3.0%	2.6%	1.7%
Services Solutions Group	-7.8%	1.1%	7.3%	4.9%	-7.4%	2.0%	4.9%	4.0%	-3.8%	2.0%	4.9%	4.0%
Total	**-4.0%**	**1.2%**	**-2.7%**	**5.0%**	**-3.3%**	**4.3%**	**14.0%**	**3.1%**	**-1.1%**	**5.1%**	**-2.0%**	**5.5%**

Y/Y change	Jan-16 1QA	Apr-16 2QA	Jul-16 3QA	Oct-16 4QA	Jan-17 1QA	Apr-17 2QA	Jul-17 3QA	Oct-17 4QE	Jan-18 1QE	Apr-18 2QE	Jul-18 3QE	Oct-18 4QE	Jan-17 C2016	Jan-18 C2017E	Jan-19 C2018E
Aerospace, Defence & Government	*1.6%*	*7.4%*	*2.4%*	*-8.7%*	*-5.8%*	*-11.1%*	*-4.7%*	*-11.0%*	*-7.4%*	*-0.5%*	*2.6%*	*5.6%*	*-1.6%*	*-8.6%*	*4.4%*
Commercial Communications	*5.1%*	*-1.2%*	*12.7%*	*2.8%*	*2.0%*	*-0.8%*	*2.0%*	*7.6%*	*8.9%*	*16.5%*	*12.4%*	*12.9%*	*3.8%*	*4.4%*	*13.5%*
Communications Solutions Group	3.5%	2.3%	8.2%	-2.4%	-1.4%	-5.2%	-1.2%	-0.3%	2.1%	9.8%	8.5%	10.1%	1.5%	-1.0%	10.0%
Electronic Industrial Solutions Group	5.5%	-4.5%	9.1%	0.5%	0.5%	14.0%	14.1%	5.2%	4.0%	-1.0%	-7.7%	0.4%	1.2%	9.3%	-1.9%
IXIA Solutions Group	na	na	na	na	na	na	na	na	na	1015.8%	14.5%	10.3%			
Services Solutions Group	0.0%	-5.9%	2.0%	4.9%	5.3%	6.3%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	1.5%	5.0%	7.0%
Total	**3.6%**	**-0.7%**	**7.5%**	**-0.7%**	**0.0%**	**3.0%**	**20.7%**	**18.5%**	**21.2%**	**22.2%**	**5.1%**	**7.5%**	**1.4%**	**15.8%**	**10.4%**

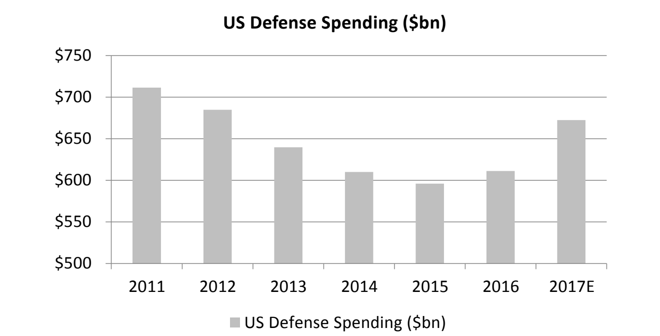
Source: Company data, Credit Suisse estimates

Key Issues

- **5G Transition Likely to Drive Commercial Communications.** We think that KEYS is one of the best plays on 5G growth and is expected to be one of the most important tech themes over the next five years. 5G promises to make a fully interconnected world a reality, such as IoT and machine-to-machine communication in factories, virtual and augmented reality, autonomous driving, and cars communicating to other cars and the cloud. Given the wide range of applications, we expect that 5G will be a significant driver of the communication test market. Based on Credit Suisse checks at MWC, the timeline for commercial rollout of 5G services seems to have been pulled for deployment in C2H 2019. We expect that 5G will continue to drive growth until 2021, when the technology could be in a stage of full scale commercial deployment.
    - In F3Q17, Management also reiterated the opportunity to build businesses with new and existing customers: orders for 5G solutions grew by 2x y/y. They also commented on how 5G for the first time is outpacing the decline in legacy communications (where customers generally came from research and technology oriented efforts) thanks to the industry accelerating towards 3GPP NR specifications.
- **Aerospace and Defense Has Upside.** Almost 20% of revenues for KEYS are from Aerospace and Defense, which has been very weak recently. KEYS provides Test and Measurement equipment for testing of the wireless, RF, and Radar for Defense and Aerospace. We expect Aero and Defense revenues to grow at 2-3% over the long term, but there could be a bigger upside in 2018, due to potential increases in Defense

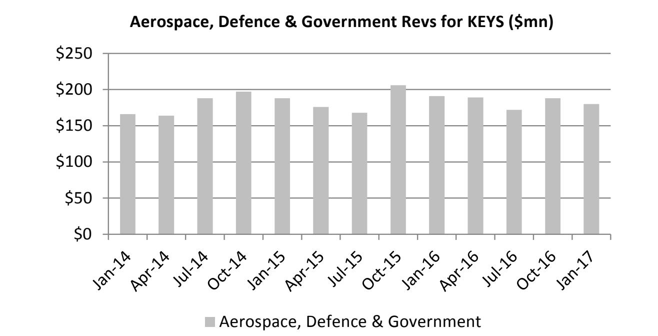
spending in the US. Management in the F3Q17 earnings call also mentioned that they believe ADG orders have stabilized now and will strengthen heading forward.

Figure 176: US Defense Spending Has Declined in the Last Few Years but Can Grow from Here



Source: Company data, Credit Suisse estimates

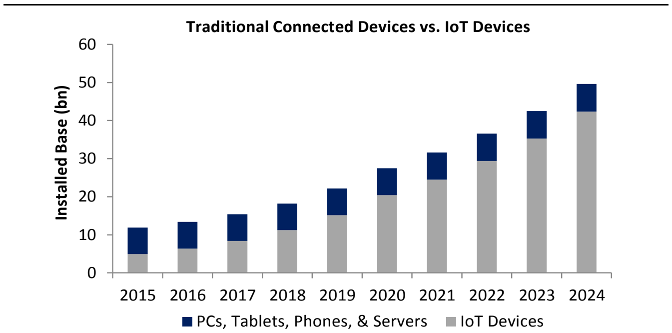
Figure 177: Aerospace, Defense, and Government Revs for KEYS



Source: Company data, Credit Suisse estimates

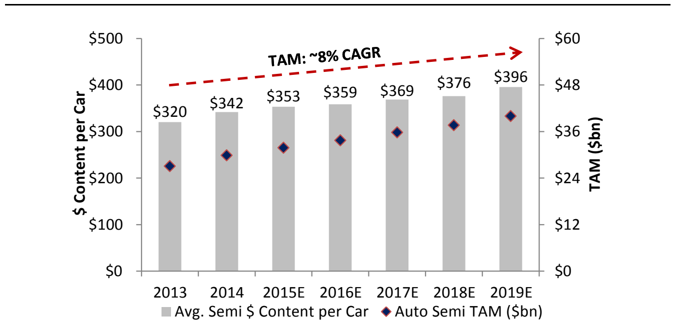
- **Industrial Solutions Group Benefits from Growth in Autos and IoT.** Of the revenues for KEYS, ~20% are from Industrial Solutions Group. We expect this group to benefit from (1) Increased adoption of 5G in IoT and (2) increased growth of electronics content in Car, driven by Hybrid/Electric cars. We see both as secular growth drivers that can continue to support growth of Industrial Solutions group revenues at 2-3%, in-line with the Company guidance of 2-3%.

Figure 178: IoT Growth Will Be a Growth Driver for the Next Several Years



Source: Company data, Credit Suisse estimates

Figure 179: Semi Content Continuing to Grow In Cars



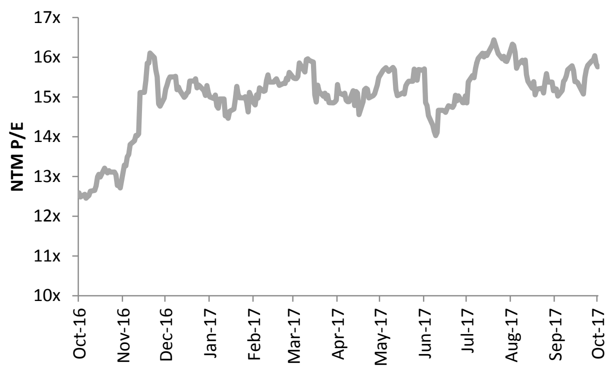
Source: Company data, Credit Suisse estimates

- **IXIA Drives Accretion in 2018.** KEYS closed the acquisition of IXIA on April 18. Our pro forma analysis based on consensus estimates for IXIA suggests that IXIA can drive 10% upside to CY18 EPS estimates for KEYS. IXIA is also ~300bps accretive to GM, and increases the growth rate for KEYS by ~1% per year. It is noteworthy that with IXIA, Anite, and EDA design tools, the company could have nearly $1bn of revenues that are comparable in quality to a software company. We note that MENT was recently sold for EV/Sales of 3.75x. One could argue that IXIA plus software products, which include the market dominant EDA tools for RF market, could be a similar company to MENT, Implying that software + IXIA could be worth as much as half of the market cap.

Investment View and Valuation

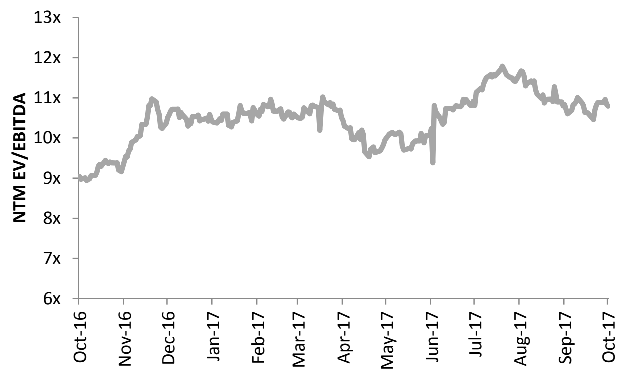
KEYS is the largest company globally for Electronics and Communication Test and Measurement. We believe that the Company is a turnaround story and is well positioned to benefit from growth of 5G, an increase in Defense spending, IoT, and secular electronics growth in cars. The market is currently discounting the stock relative to other test and measurement peers, as the Company had historically shown little or no growth; however, we think this was driven by lower R&D investments, as Agilent was running the Keysight business as a cash cow. Our analysis suggests that the Company is starting to gain market share after increasing R&D investments from sub-optimal levels. We expect that 5G related orders will pick up meaningfully starting in C2H17 and drive market share gains and growth for the Company in Commercial Communications. In Aero and Defense, the revenues are currently at depressed levels due to budget approval, and there are proposals to increase spending from next year. As KEYS starts to deliver on growth, we expect investors to start valuing the company more in-line with broader Test and measurement space and see potential for NTM P/E to expand from 15.6x currently vs 22x for peers. Our TP of $49 is based on 16x of FY19 EPS of $3.05.

Figure 180: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 181: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

KLA-Tencor Corp.

(KLAC, $105.30, OUTPERFORM, TP $115.00)

INLINE/INLINE; Finding Small Defects with Big Data

Reporting Date: Thursday, October 26th, After Market Close

Conference Call: Thursday, October 26th, 6:00PM EST

Figure 182: KLAC Summary of Expectations

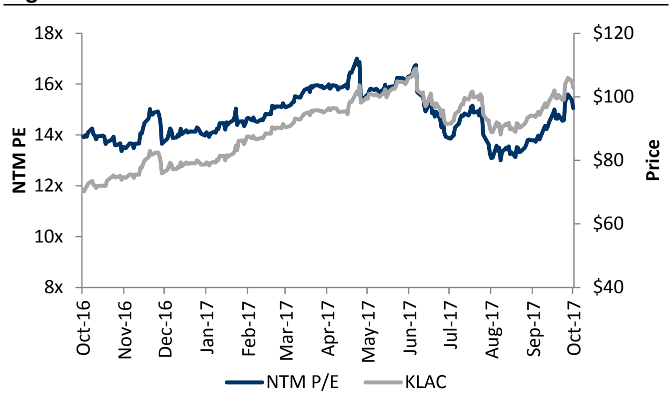
US$ in millions, unless otherwise stated

KLAC-US	Jun-17	Sep-17			Dec-17		CY17E		CY18E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Shipments	$971	$985		*$945-$1025m*	$990		$3,855		$3,955	
Bookings	$1,000	$900			$975		$3,865		$4,030	
Total Revenue	$939	$940	$947	$910-$970m	$988	$973	$3,780	$3,773	$3,944	$3,926
% Q/Q chng	*2.7%*	*0.1%*	*0.9%*		*5.1%*	*2.8%*				
% Y/Y chng	*2.1%*	*25.2%*	*26.1%*		*12.6%*	*11.0%*	*16.0%*	*15.8%*	*4.3%*	*4.1%*
Gross Margin*	63.0%	63.0%		*62.5%-63.5%*	63.0%		62.9%		62.8%	
Operating Exp.*	$238.3	$248.9			$248.9		$959.7		$995.5	
Operating Mgin*	37.6%	36.5%	*36.7%*		37.8%	*37.1%*	37.5%		37.6%	
Net Income*	$259.0	$256.3			$273.2		$876.0		$1,086.5	
Net Margin*	27.6%	27.3%			27.7%		27.6%		27.6%	
EPS*	$1.64	$1.62	$1.64	$1.50-$1.74	$1.72	$1.67	$6.60	$6.57	$6.78	$6.77
Fully diluted shares	157.9	158.4		*157*	158.9		158.3		160.2	

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

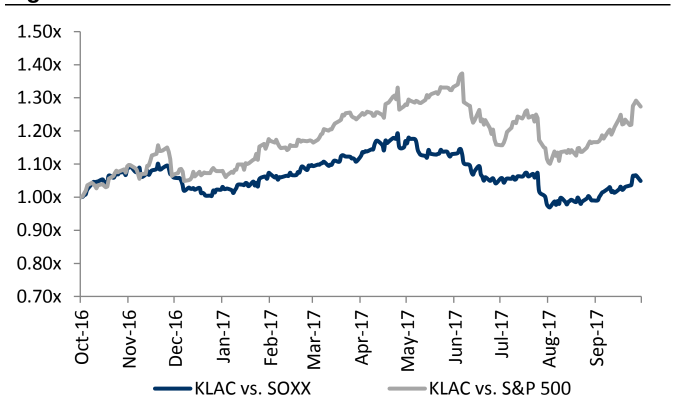
KLAC: Recap of Recent Stock Performance

Figure 183: KLAC NTM PE vs. Price



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 184: LTM Performance vs. SOXX vs. SPX



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Key Message: KLAC is a leading provider of Process Control tools used in Semiconductor manufacturing. We believe KLAC can grow revenues at >5% CAGR, and expand OpM. In addition the company is benefitting from the favorable Gen 5 product cycle, which can allow it to grow its revenues above industry in CY17 and CY18. We also believe that valuations are attractive and that investors are underestimating both growth and margins for the business. We expect results and guidance to be largely in-line with Street and expect the earnings to be neutral for the stock.

Expect SepQ Rev/EPS In-Line with CS/Street Estimates

We expect KLAC to report SepQ Rev/EPS INLINE with CS estimates of $940m/$1.62 and BELOW street estimates of $947m/$1.64, and INLINE with the guidance of $910-$970m/$1.50-$1.74. We are modeling bookings of $900m (-10.0% q/q). We have modeled Bookings mix of Memory-40%, Logic-10% and Foundry-50%, which would represent sequential growth of +3%/ -10%/ -18% q/q respectively. We are modeling shipments of $985m (+1.4% q/q), in-line with midpoint of company guidance for shipments of $945-$1,025m. We are modeling GM of 63.0% (flat q/q) and OpEx of $249m (+4.4% q/q). We expect Inline rev, GM and OpEx to drive EPS of $0.1.62, INLINE with CS and Street at $1.62/$1.64.

Expect DecQ Rev/EPS In-line CS/ Above Street

We expect KLAC to guide Dec Rev/EPS to $988m (+5.1% q/q)/$1.72 IN-LINE with CS at $988m (+5.1% q/q)/$1.72, and ABOVE Street at $973m (+2.8% q/q)/$1.67. We are modeling bookings at $975m (+8.3% q/q) and shipments at $990m (+0.5% q/q). We expect bookings mix of (1) Memory-45% (2) Logic-8% and (3) Foundry-48%, which would drive q/q growth of +21%/-13%/+3%. We expect KLAC to guide GM of 62.5-63.5%, with the mid-point in-line with CS at 63.0% (flat q/q). We are modeling OpEx of $249m (flat q/q). We expect that Inline rev, Inline GM and OpEx will drive EPS to $1.72, INLINE with CS at $1.72 and ABOVE Street at $1.67.

CY18 Outlook

We are modeling CY18 Rev/EPS of $3.9bn (+4.3% y/y)/$6.78 In line with the CS at $3.94bn(+4.3% y/y) and Street estimate of $3.93bn (+4.1% y/y)/$6.77. We have modelled bookings of $4.03bn (+4.26% y/y). We are modelling GM of 62.8% (-10 bps y/y) and OpEx of $996mn (vs $960mn in 2017). We expect that Inline rev, Inline GM and OpEx will drive EPS to $6.78, INLINE with CS at $6.78 and ABOVE Street at $6.77.

Figure 185: KLAC Order Model

Bookings by Device in US$m	Sep-15 1QA	Dec-15 2QA	Mar-16 3QA	Jun-16 4QA	Sep-16 1QA	Dec-16 2QA	Mar-17 3QA	Jun-17 4QA	Sep-17 1QE	Dec-17 2QE	Mar-18 1QE	Jun-18 2QE	CY15	CY16	CY17E
Memory	$268.3	$436.8	$140.0	$279.9	$105.0	$671.0	$415.8	$350.0	$360.0	$433.9	$490.0	$551.1	$1,239.3	$1,195.9	$1,559.7
Logic	$137.8	$145.6	$140.0	$106.2	$112.0	$22.0	$39.6	$100.0	$90.0	$78.0	$60.0	$41.2	$365.4	$380.2	$307.6
Foundry	$319.0	$327.6	$420.0	$579.0	$483.0	$407.0	$534.6	$550.0	$450.0	$463.1	$450.0	$437.8	$1,394.3	$1,889.0	$1,997.7
Total orders	**$725.0**	**$910.0**	**$700.0**	**$965.0**	**$700.0**	**$1,100.0**	**$990.0**	**$1,000.0**	**$900.0**	**$975.0**	**$1,000.0**	**$1,030.0**	**$2,999.0**	**$3,465.0**	**$3,865.0**

% of total	Sep-15 1QA	Dec-15 2QA	Mar-16 3QA	Jun-16 4QA	Sep-16 1QA	Dec-16 2QA	Mar-17 3QA	Jun-17 4QA	Sep-17 1QE	Dec-17 2QE	Mar-18 1QE	Jun-18 2QE	CY15	CY16	CY17E
Memory	37%	48%	20%	29%	15%	61%	42%	35%	40%	45%	49%	54%	41%	35%	40%
Logic	19%	16%	20%	11%	16%	2%	4%	10%	10%	8%	6%	4%	12%	11%	8%
Foundry	44%	36%	60%	60%	69%	37%	54%	55%	50%	48%	45%	43%	46%	55%	52%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Q/Q Growth	Sep-15 1QA	Dec-15 2QA	Mar-16 3QA	Jun-16 4QA	Sep-16 1QA	Dec-16 2QA	Mar-17 3QA	Jun-17 4QA	Sep-17 1QE	Dec-17 2QE	Mar-18 1QE	Jun-18 2QE
Memory	-36%	63%	-68%	100%	-62%	539%	-38%	-16%	3%	21%	13%	12%
Logic	310%	6%	-4%	-24%	6%	-80%	80%	153%	-10%	-13%	-23%	-31%
Foundry	44%	3%	28%	38%	-17%	-16%	31%	3%	-18%	3%	-3%	-3%
Total	**8%**	**26%**	**-23%**	**38%**	**-27%**	**57%**	**-10%**	**1%**	**-10%**	**8%**	**3%**	**3%**

Y/Y Growth	Sep-15 1QA	Dec-15 2QA	Mar-16 3QA	Jun-16 4QA	Sep-16 1QA	Dec-16 2QA	Mar-17 3QA	Jun-17 4QA	Sep-17 1QE	Dec-17 2QE	Mar-18 1QE	Jun-18 2QE	CY15	CY16	CY17E
Memory	3%	15%	19%	-33%	-61%	54%	197%	25%	243%	-35%	18%	57%	23%	-4%	30%
Logic	-13%	140%	189%	216%	-19%	-85%	-72%	-6%	-20%	255%	52%	-59%	-18%	4%	-19%
Foundry	116%	-23%	-20%	161%	51%	24%	27%	-5%	-7%	14%	-16%	-20%	-11%	35%	6%
Total	**28%**	**5%**	**1%**	**44%**	**-3%**	**21%**	**41%**	**4%**	**29%**	**-11%**	**1%**	**3%**	**-1%**	**16%**	**12%**

Source: Company data, Credit Suisse estimates

Key Issues

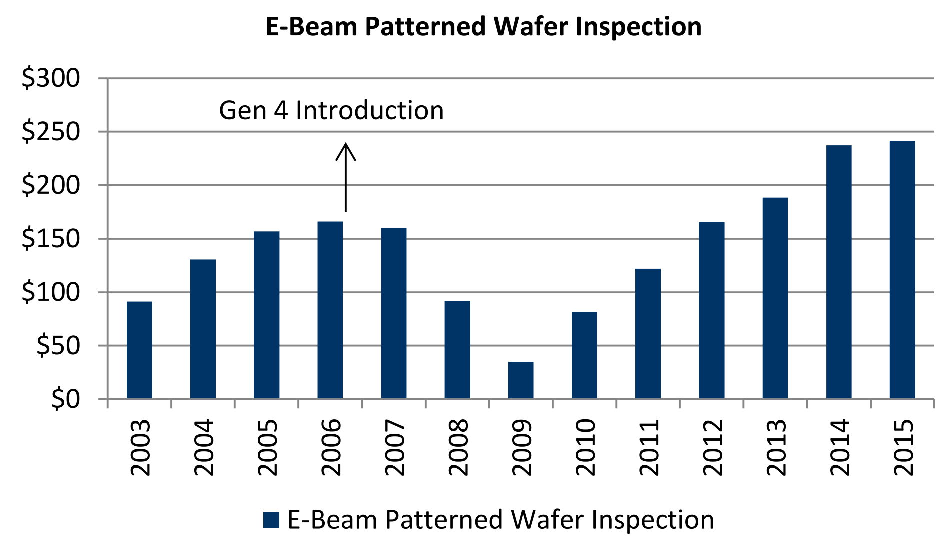
- **Industry Fundamentals have Improved.** At the last earnings call KLAC and other Semicap companies had indicated that the CY17 is likely to have stronger C1H17. However, recently LRCX indicated that visibility has improved in C2H, and Company now expects year to be more evenly balanced rather than the 20% decline it had initially expected. We believe that visibility has improved due to better Foundry and continued strength in NAND. On the Foundry side, the spending now appears to have strengthened due to stronger GF, China, and China Foundries, and we won't be surprised if C2H17 is stronger for Foundry spending in C1H17. We are also more positive on next year China memory spend as commentary from Semicap companies has become incrementally more positive on China Memory CapEx.

- **Headwinds are becoming tailwinds.** From 2012 to 2015, KLAC revenue and earnings growth stagnated due to several headwinds which we think are now starting to reverse. Specifically (i) Foundry Spending is now starting to increase: Due to deceleration of smartphone market, there was also a decline in revenue growth of Foundries - from >20%/ yr in 2010 - 2012, to only 6% in 2014. This led to a decrease in Foundry wafer Fab spending from ~$14-15bn to ~$10bn in 2015. As the Foundry growth has re-accelerated from 6% in 2014 to 8% in 2016, we are starting to see increase in Foundry WFE - 2016 Foundry WFE was ~$12bn in our estimate. We expect Foundry CapEx to grow at least in-line with Foundry growth of 7% CAGR - this should help KLAC as the Company has highest exposure to Foundry spending within our coverage. (ii) Design Starts went down from 28nm to 20nm/16nm, but are increasing at 10nm/7nm. (iii) Nodes are not extending anymore. (iv) CapEx is Diversifying to more customers

- **Tax Reform will Benefit KLAC.** We believe that KLAC will benefit from a tax reform as the company could benefit from lower taxes, and also significantly increase Cash return. KLAC has ~16% of market cap in offshore cash, the Company also generates ~75% of its revenues overseas, and has the highest tax rate among the larger US Semicap companies. In case of Tax reform the company could potentially lower their taxes, to 10% (assuming border adjustability), and could also repatriate their trapped offshore cash, which could allow them to de-lever the balance sheet.

- **Benefit of Product Cycles in 2018.** KLAC has two product cycles that are important in near term, and we believe could provide growth in CY18. (i) Gen 5 systems are continuing to gain traction in defect discovery. These systems are much more advanced than the prior generation of Gen 4 products, and command higher pricing (almost double ASP). The Company recognized revenues on 4 systems last year and expects to double it this year. We expect that Company will continue to grow Gen 5 revenues in CY18 as the Customers invest in EUV infrastructure. We expect incremental ~$100mn in sales next year from Gen 5, and expect that Gen 5 systems will continue to be a revenue driver as EUV is adopted in manufacturing (ii) 3D NAND Inspection tool. There are buried defects on 3D NAND which are causing yield issues. Traditionally there were no good techniques to measure these defects. However, KLAC has now figured out a technology which is effective in finding these defects. The company has indicated that these tools are likely to be introduced in late this year. We expect that there will be significant demand for these tools in CY18. Note that this application is not currently served by an existing tool, and could be all incremental demand. We expect $100-150mn of incremental revenues from this tool.

Figure 186: Gen 5 could potential take market share from E Beam

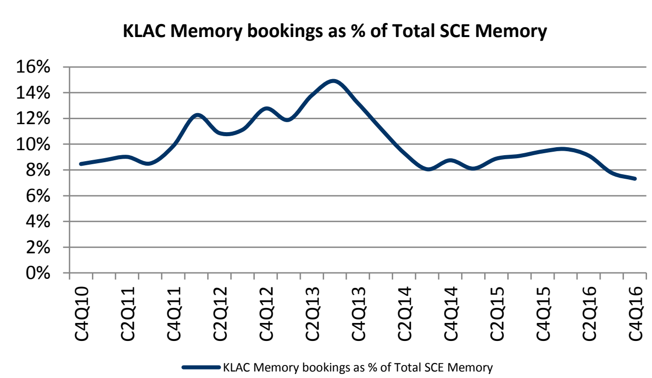


Source: Company data, Credit Suisse estimates

- **China 28nm Foundry CapEx will be Growth Driver in 2018.** China Fabless companies are growing at 30%-40%, and can support growth in Foundry CapEx. We estimate that about 25-30% of Foundry CapEx this year is from China Foundries, and expect it to grow at 20%+ CAGR till 2020. Even if ROW Foundry CapEx is flat from here, China CapEx growth can support high single digit growth in Foundry Capex. Note also that ~40% of KLAC's sales over LTM are from memory – the company will also benefit from growth in memory Capex (albeit less than LRCX/AMAT).

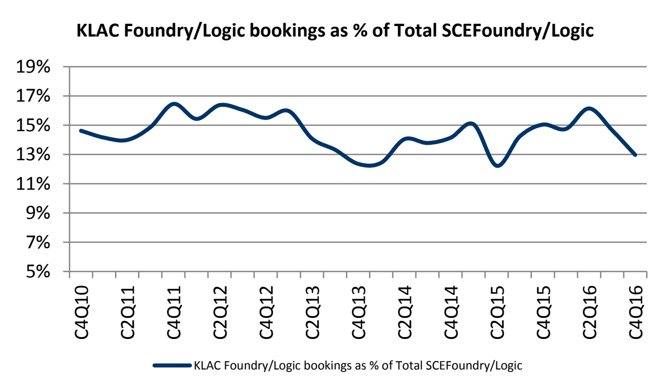
- **Process Control Intensity Impacted by Lower Foundry Spend.** KLAC at its last analyst day had indicated that process control intensity is likely to increase in both memory and Logic/Foundry, from node to node. KLAC has underperformed peers over last two years as the mix of spending has moved from Logic/Foundry to Memory. However even within Memory and Logic/Foundry, KLAC has not been able to show growth relative to peers. We don't see much merit to concerns that KLAC has been underinvesting in the core business and expect the company to outgrow the industry once Logic/Foundry growth outgrows WFE.

Figure 187: KLAC Memory Orders % of Total SCE Memory



Source: Company data, Credit Suisse estimates

Figure 188: KLAC Foundry/Logic Orders % of Total SCE

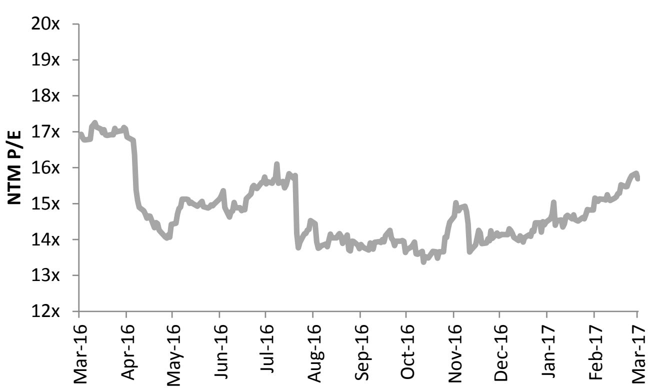


Source: Company data, Credit Suisse estimates

Investment View and Valuation

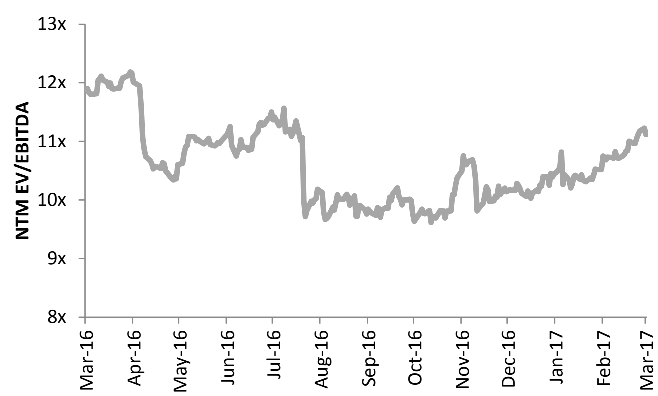
We continue to rate KLAC at Outperform. We expect that WFE can grow sustainably till 2020 at 5%-7% CAGR, driven by content increases on smartphones, and growth in IoT, and expect KLAC to grow at least inline with WFE. In addition, growth of China Fabs is an incremental positive for KLAC – more number of fabs implies that yield needs to be improved at more customers. Bears have always argued that KLAC is overearning (GM 15%-20% above peers) and will lose margins/market share, but historical data demonstrates that KLAC has maintained their share of WFE in both Memory and Logic, and has expanded margins. In addition this is an excellent management team with solid track record of returning cash - should there be progress on tax reform, one can count on significant cash return (~$3bn in offshore trapped cash). We expect a rerating higher as company starts to deliver growth. Despite 35% OpM and 3% Div yield, KLAC screens as one of the cheapest Semi/Semicap stocks. KLAC currently trades at 16.4x of our CY17 EPS, versus AMAT at 15.5x, LRCX at 15.5x and ASML at 34.4x. Our TP of $115 represents 18.3x of CY17 EPS.

Figure 189: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 190: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Lam Research Corp

(LRCX, $189.90, OUTPERFORM, TP $214.00)

Inline/Inline; Margin Protected Play on Big Data

Reporting Date: Wednesday, October 17th, After Market Close

Conference Call: Wednesday, October 17th, 5.00 PM ET

Figure 191: LRCX Summary of Expectations

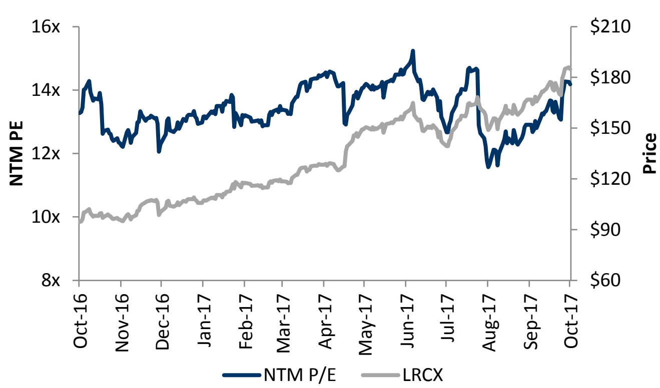
US$ in millions, unless otherwise stated

LRCX	Jun-17	Sep-17			Dec-17		CY17E		CY18E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Shipment	$2,542.7	$2,362.3		$2350m±100m	$2,636.2		$9,953.8		$10,329.2	
Total Revenue	$2,344.9	$2,450.0	$2,463	$2450m±100m	$2,539.2	$2,478	$9,488.1	$9,440	$10,325.9	$9,946
% Q/Q chng	8.9%	4.5%	5.0%		3.6%	0.6%				
% Y/Y chng	51.7%	50.1%	50.9%		34.9%	31.6%	48.8%	48.1%	8.8%	5.4%
Total GM*	46.5%	46.5%		46.5%±1%	46.5%		46.4%		46.5%	
Operating Exp.*	$440.1	$454.5			$460.0		$1,768.8		$1,850.2	
Operating Mgin*	27.7%	28.0%	28.1%	28%±1%	28.4%	28.4%	27.8%		28.6%	
Net Income*	$565.5	$595.4			$631.7		$2,300.4		$2,586.5	
Net Margin*	24.1%	24.3%			24.9%		24.2%		25.0%	
EPS*	$3.11	$3.25	$3.27	$3.00±0.12	$3.50	$3.29	$12.65	$12.48	$14.31	$12.99
Fully diluted shares	182.1	183.0		180	180.7		181.8		180.7	

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

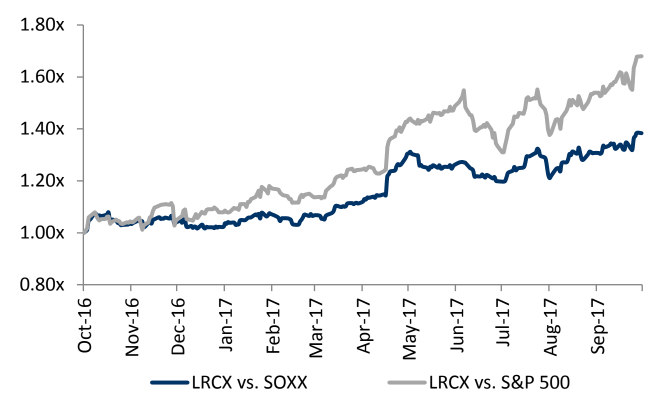
LRCX: Recap of Recent Stock Performance

Figure 192: LRCX NTM PE vs. Price



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 193: LTM Performance vs. SOXX vs. SPX



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Key Message: We expect LRCX to report/guide C3Q/C4Q EPS at least in-line with CS and In-line/Above Street. Among the Semicap companies LRCX has highest exposure to DRAM CapEx, and will benefit from CapEx upside in C2H, and 2018; we also expect a more confident tone around 2018, which should be positive for the stock. In addition we expect the upcoming analyst day to be positive for the stock, as we expect the Company to guide to a $19 EPS at $45bn WFE, above expectation of $16 to $18. We continue to believe that LRCX is benefitting from secular growth in memory, but continues to be priced as a cyclical. The company also has ~$20 of market cap in net cash, and we estimate that in case of tax reform there is potential to return >$50 per share by 2020.

Expect C3Q17 (SepQ) Results In-line with CS/Street and Guidance

We expect LRCX to report SepQ Rev/EPS IN-LINE with CS estimate of $2.45bn (+4.5% q/q)/$3.25 and below Street estimate of $2.46bn (5.0% q/q)/$3.27, versus guidance of $2.45bn±$100m/$3.00±0.12. We are modeling Shipments of $2.36bn (-7.1% q/q) in line with the guidance of $2.35bn±$100m. By segment, we expect Shipments as follows: DRAM $450m (+73% q/q), NAND $705m (-40% q/q), Foundry $520m (+13% q/q) and Logic $118m (+18% q/q) - we expect segment Shipments to track largely with our expectations. We expect GM of 46.5% (flat q/q) in-line with guidance of 46.5%±1%, and OpEx of $455m (+3.3% q/q). We expect that Inline rev, GM and OpEx will drive EPS to $3.25, INLINE with CS estimate of $3.25 and guidance of $3.00±0.12, but below Street estimate of $3.27.

Expect C4Q17 (DecQ) Rev/EPS Guidance In-line with CS Above Street

We expect LRCX to guide Rev/EPS to $2.54bn (+3.6% q/q)/$3.50, Inline with CS at $2.54bn (+3.6% q/q)/$3.50 and Above Street at $2.48bn (+0.6% q/q)/$3.29. We are modeling Shipments at $2.64bn (+11.6% q/q) in line with the company's expectation of shipments slightly less than $10bn in C2017. By segment, we are modeling memory shipments of $1,400m (+21.2% q/q), Foundry shipments of $512m (-2.0% q/q) and Logic shipments at $126m (+7.0% q/q). We are modeling GM of 46.5% (flat q/q) and OpEx of $460m (+1.2% q/q). We expect that in-line Rev, GM and OpM will drive EPS to $3.50, INLINE with CS at $3.50 and above Street at $3.29.

2018 Outlook

We expect LRCX 2018 Rev/EPS ABOVE Street. We expect LRCX to have Rev/EPS to $10.3bn (+8.8% y/y)/$14.31, in-line with CS at $10.3bn (+8.8% y/y)/$14.31 and Above Street at $9.98bn (+5.7% y/y)/$13.08. For the 2018, we are modelling shipments of $10.33bn (+3.7% y/y). By segment, we are modeling memory shipments of $5.20bn(-3.4% y/y), Foundry shipments of $1.94bn (flat y/y) and Logic shipments at $405m (+1% y/y). We are modeling GM of 46.5% (+10bps y/y) and OpEx of $1.85bn (+4.6% y/y). We expect that in-line Rev, GM and OpM will drive EPS to $14.31, in-line with CS at $14.31 and above Street at $13.08.

Figure 194: LRCX Shipment Model

Shipments ($mn) By Segment	Mar-16 3QA	Jun-16 4QA	Sep-16 1QA	Dec-16 2QA	Mar-17 3QA	Jun-17 4QA	Sep-17 1QE	Dec-17 2QE	Mar-18 3QE	Jun-18 4QE	Sep-18 1QE	Dec-18 2QE	CY16	CY17E	CY18E
Service Shipment	**$388**	**$413**	**$450**	**$477**	**$509**	**$544**	**$569**	**$598**	**$636**	**$676**	**$712**	**$753**	**$1,727**	**$2,220**	**$2,777**
DRAM	$286	$176	$164	$347	$438	$260	$450	$500	$504	$299	$500	$500	$972	$1,648	$1,802
NAND	$455	$599	$541	$535	$952	$1,179	$705	$900	$900	$900	$800	$800	$2,130	$3,736	$3,400
Foundry	$243	$317	$453	$448	$457	$460	$520	$512	$471	$473	$500	$500	$1,462	$1,949	$1,944
Logic	$74	$82	$101	$116	$57	$100	$118	$126	$90	$135	$90	$90	$373	$401	$405
System Shipment	**$1,058**	**$1,174**	**$1,259**	**$1,445**	**$1,904**	**$1,999**	**$1,793**	**$2,038**	**$1,964**	**$1,808**	**$1,890**	**$1,890**	**$4,937**	**$7,733**	**$7,552**
Total	**$1,446**	**$1,587**	**$1,708**	**$1,923**	**$2,413**	**$2,543**	**$2,362**	**$2,636**	**$2,600**	**$2,484**	**$2,602**	**$2,643**	**$6,664**	**$9,954**	**$10,329**

% of Total	Mar-16 3QA	Jun-16 4QA	Sep-16 1QA	Dec-16 2QA	Mar-17 3QA	Jun-17 4QA	Sep-17 1QE	Dec-17 2QE	Mar-18 3QE	Jun-18 4QE	Sep-18 1QE	Dec-18 2QE	CY16	CY17E	CY18E
DRAM	27%	15%	13%	24%	23%	13%	25%	25%	26%	17%	26%	26%	19.7%	21.3%	23.9%
NAND	43%	51%	43%	37%	50%	59%	39%	44%	46%	50%	42%	42%	43.1%	48.3%	45.0%
Foundry	23%	27%	36%	31%	24%	23%	29%	25%	24%	26%	26%	26%	29.6%	25.2%	25.7%
Logic	7%	7%	8%	8%	3%	5%	7%	6%	5%	7%	5%	5%	7.5%	5.2%	5.4%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Q/Q growth	Mar-16 3QA	Jun-16 4QA	Sep-16 1QA	Dec-16 2QA	Mar-17 3QA	Jun-17 4QA	Sep-17 1QE	Dec-17 2QE	Mar-18 3QE	Jun-18 4QE	Sep-18 1QE	Dec-18 2QE
DRAM	*-26%*	*-38%*	*-7%*	*112%*	*26%*	*-41%*	*73%*	*11%*	*1%*	*-41%*	*67%*	*0%*
NAND	*116%*	*32%*	*-10%*	*-1%*	*78%*	*24%*	*-40%*	*28%*	*0%*	*0%*	*-11%*	*0%*
Foundry	*6%*	*30%*	*43%*	*-1%*	*2%*	*1%*	*13%*	*-2%*	*-8%*	*1%*	*6%*	*0%*
Logic	*-19%*	*11%*	*23%*	*15%*	*-51%*	*75%*	*18%*	*7%*	*-29%*	*50%*	*-34%*	*0%*
Total	**15.6%**	**11.0%**	**7.2%**	**14.8%**	**31.7%**	**5.0%**	**-10.3%**	**13.7%**	**-3.6%**	**-8.0%**	**4.6%**	**0.0%**

Y/Y growth	Mar-16 3QA	Jun-16 4QA	Sep-16 1QA	Dec-16 2QA	Mar-17 3QA	Jun-17 4QA	Sep-17 1QE	Dec-17 2QE	Mar-18 3QE	Jun-18 4QE	Sep-18 1QE	Dec-18 2QE	CY16	CY17E	CY18E
Service													**23%**	**29%**	**25%**
DRAM	*-46%*	*-63%*	*-58%*	*-10%*	*53%*	*47%*	*175%*	*44%*	*15%*	*15%*	*11%*	*0%*	*-45%*	*69%*	*9%*
NAND	*86%*	*105%*	*11%*	*154%*	*109%*	*97%*	*30%*	*68%*	*-5%*	*-24%*	*13%*	*-11%*	*72%*	*75%*	*-9%*
Foundry	*-13%*	*-4%*	*106%*	*96%*	*88%*	*45%*	*15%*	*14%*	*3%*	*3%*	*-4%*	*-2%*	*38%*	*33%*	*0%*
Logic	*-36%*	*-54%*	*-18%*	*26%*	*-23%*	*22%*	*17%*	*9%*	*58%*	*35%*	*-24%*	*-29%*	*-27%*	*8%*	*1%*
Total system	**-9.2%**	**-7.6%**	**3.1%**	**57.9%**	**79.9%**	**70.2%**	**42.4%**	**41.0%**	**3.2%**	**-9.6%**	**5.4%**	**-7.3%**	**8.0%**	**56.6%**	**-2.3%**
Memory	**$741**	**$775**	**$705**	**$882**	**$1,390**	**$1,439**	**$1,155**	**$1,400**	**$1,404**	**$1,199**	**$1,300**	**$1,300**	**$3,103**	**$5,384**	**$5,202**

Source: Company data, Credit Suisse estimates

Key Issues

- **Potential to return >$50 net cash per share over next 3 years.** LRCX has net Cash of ~$18 per share, and we estimate that there could be additional $5 per share of net cash generated by end of 2017 - implying total net cash of $23 per share. While most of this tax is trapped offshore, note that there is potential for tax reform which could allow LRCX to access foreign cash. At the time of proposed merger with KLAC, LRCX had indicated plans to raise net debt equaling ~2.5x of EBITDA. Should the Company decide to raise similar level of net debt there is potential to raise $5.1bn of net debt (or $29 per share). In addition the Company could continue to generate >$10 per year in FCF, which could allow cumulative cash generation of >$30 per share. Adding the excess net cash ($23 per share) at end of 2017, potential to de-lever ($29 per share), and ongoing cash generation ($30 per share), there is total cash of $82. However the company may need ~$5 per share of cash for running the Company, which should theoretically still allow the Company to return $77 per share in Cash. In case we are wrong and LRCX earnings decline by 30% (extremely conservative scenario) - LRCX could still raise $20 per share in recap, and generate ~$20 per share over next three year, which should allow the company to still return ~$55 per share by 2020. Needless to say - capital return will be depend on tax reform - there could be cash return absent tax reform.

- **New Target Model, Buybacks and Dividend Raise.** LRCX will hold their annual analyst day on November 8. We expect the Company to share a new target model with EPS of $17/$19 at WFE of $42bn/$45bn. Note that LRCX has ~25% of revenues from services business, which is growing at ~20% CAGR. We also expect the Company to announce new buyback authorization of $1.5bn, and a 50% dividend increase.

Figure 195: CS expectation of new target model

	2017	2020/2021	
WFE	$42bn	$42bn	$45 bn
Service	$2.2 bb	$3.5 bn	$3.8 bn
Systems	$7.3bn	$8.4 bn	$9 bn
Revenue	$9.5 bb	$11.9 bn	$12.8bn
Non-GAAP Operating Inc.	28%	29%	30%
EPS	$12.65	$17.00	$19.00

Source: Company data, Credit Suisse estimates

- **Services Growth Under Appreciated:** Services growth is tied to the installed base growth of equipment. Due to the strong growth this year in WFE, we expect that services growth will be stronger next year (>10% y/y). In particular, we expect that LRCX service revenues to grow 20-25% y/y in CY18 as the Company has seen an uptick in service attach rates due to higher consumable needed. Note that over last 4 years ~$16bn of systems sales have resulted in ~$1.2bn in incremental service revenues for LRCX, implying 7.5% service attach rate (ie. Rate of recurring revenues). Even if system sales were flattish at CY17 level (versus our expectation of growth rates of 7% +), the service revenues could grow to $4.5bn by 2021 - assuming 32% OpM (above corporate OpM), it could imply potential $6.94 for service EPS by 2021. Using a 20x multiple for discounted EPS (discounted at 10% for four years) would imply that services business is worth $95 today. Adding excess cash of $20 to value of services business implies that market is only valuing the systems business at ~7x of CY18 EPS (versus 28x for ASML, assuming a similar multiple for their Services business).

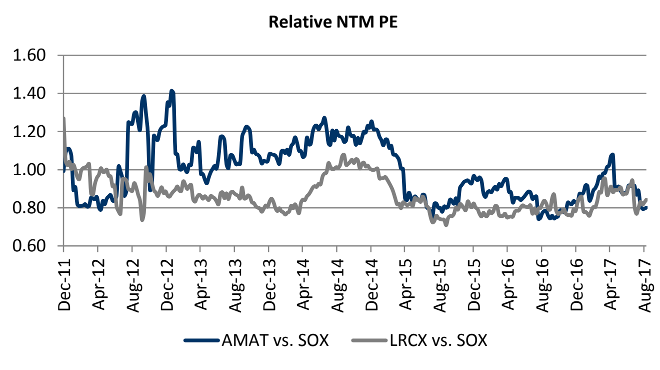
Figure 196: LRCX Services Revenues and EPS

	2017	2018	2019	2020	2021
Service Revenues	$2,200	$2,785	$3,370	$3,955	$4,540
	32%	32%	32%	32%	32%
Implied Service EPS	$3.36	$4.26	$5.15	$6.05	$6.94
			Value in 2021 (20x)		$139
Discount rate 10%			Value in 2017		$95

Source: Company data, Credit Suisse estimates

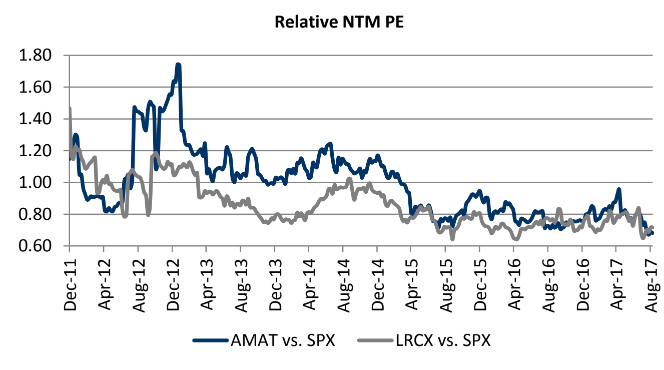
- **Valuations are Attractive on Relative Basis.** While SemiCap stocks have outperformed SOX over last year, both AMAT and LRCX screens attractive on valuations, both in comparison to peers and to their own historic multiples. Relative to the SOX, LRCX is trading at ~19% discount on a NTM PE basis while AMAT is trading at ~25% discount, also on a NTM PE estimates. On NTM PE basis LRCX is trading at 12.8x, a 3% discount to last 5 year average of 13.3x, and at a 19% discount to the SOX (vs. historic discount of 18% over last 5 years). On NTM PE basis AMAT is trading at 15.1x of NTM EPS estimates, at 3.2% discount to last 5 year average of 15.6x, and at a~25% discount to the SOX (vs. historic discount of 1.9% over last 5 years). Relative discount to historic multiples leads us to believe valuations are still reasonable at this point

Figure 197: NTM PE Relative to the SOX



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 198: NTM PE Relative to the S&P

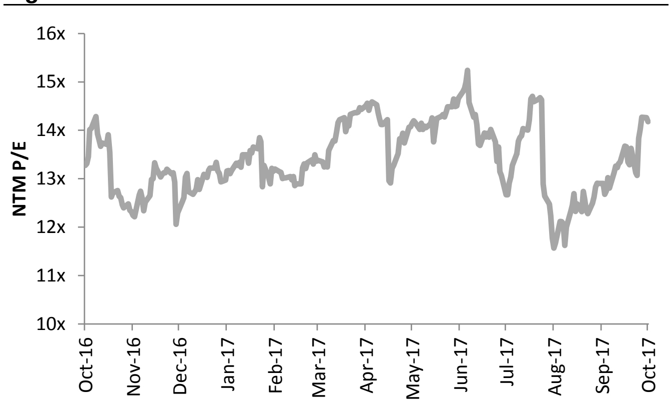


Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Investment View and Valuation

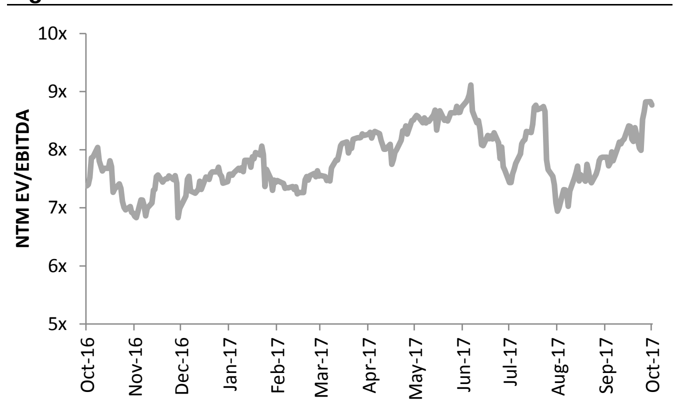
While the company has been one of the fastest EPS growers, the stock screens as cheapest within our Semi/Semicap coverage on EV/EBITA. Multiples are discounted as market is overly concerned regarding (i) Peak NAND spending in 2017 (ii) Negative impact from EUV adoption starting in 2019 – we believe both will be better than feared and there are offsets that can allow the company to grow revenues at >5% CAGR through 2020. Specifically (i) While NAND CapEx to rev is ~54% in CY16 (vs average/peak of 39%/67%), note that Memory CapEx to revs is only at 37% (vs. historical average/peak of 36%/62%). As memory pricing recovers, overall memory revenues and CapEx should grow next year. (ii) Longer term, Memory revenues growth should accelerate due to demand growth from Cloud, Big Data, and Artificial intelligence. LRCX has high exposure to all types of memories (iii) China Fabs should structurally increase CapEx to Revs for Semi industry – note Wuhan NAND fab orders start in C2H17 (iv) Services is becoming bigger portion of revenues (v) Even with EUV, more patterning etch steps may be needed. In addition 65% of LRCX's revenues are from Services/China/Sensor & MEMS/ 3D NAND – this is unlikely to be affected by EUV (vi) The company is continuing to build cash and there could be potential to increase returns if there is tax reform. LRCX also screens attractive on valuations, both in comparison to peers and to their own historic multiples. LRCX is trading at 15.5x of our CY17 EPS, versus AMAT at 15.5x, KLAC at 16.4x and ASML at 34.4x. Our TP of $214 represents 17.9x of CY17 EPS.

Figure 199: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 200: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Marvell Technology Ltd.

(MRVL, $18.28, OUTPERFORM, TP $22.00)

Neutral Bias to F3Q/F4Q

Reporting Date: TBD

Conference Call: TBD

Figure 201: MRVL Summary of Expectations

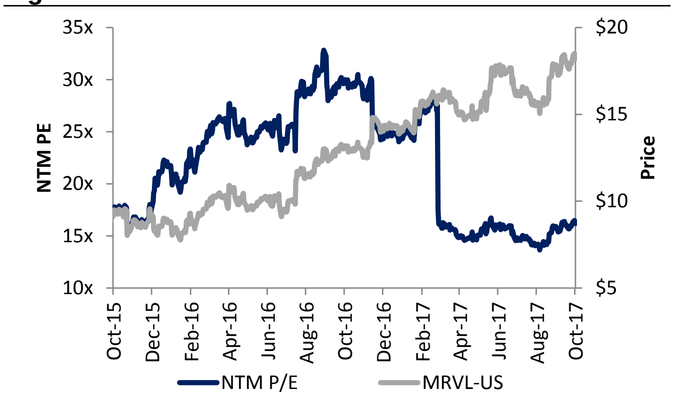
US$ in millions, unless otherwise stated

MRVL	Jul-17	Oct-17E			Jan-18E		FY2018E		FY2019E	
	Actual	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	**$604.8**	**$610.0**	**$610.0**	***$595m-$625m***	**$585.1**	**$590.7**	**$2,379.0**	**$2,384.6**	**$2,438.8**	**$2,449.0**
q/q % change	*4.4%*	*0.9%*	*0.9%*	***-3% to +3% q/q***	*-4.1%*	*-3.2%*				
Seasonal	*5.3%*	*1.5%*			*-6.0%*					
y/y % change	*-3.5%*	*-6.8%*	*-6.8%*		*2.4%*	*3.4%*	*-0.6%*	*-0.4%*	*2.5%*	*2.7%*
Non-GAAP Gross Margin	**61.2%**	**61.5%**	**61.5%**	***61.0% to 62.0%***	**62.0%**	**61.5%**	**61.3%**	**61.1%**	**62.3%**	**61.8%**
Operating Expenses (pf)	**$214.2**	**$207.5**	**$207.5**	***$205-$210***	**$219.0**	**$220.7**	**$864.6**	**$873.8**	**$880.1**	**$865.5**
Operating Margin (pf)	25.8%	27.5%	*27.5%*		24.6%	*24.1%*	24.9%	*24.5%*	26.2%	*26.5%*
Net Margin (pf)	25.4%	27.0%			24.3%		24.6%		25.9%	
GAAP EPS	**$0.33**	**$0.28**		***$0.25 to $0.31***	**$0.24**		**$1.06**		**$1.09**	
EPS inc Options	**$0.25**	**$0.28**			**$0.23**		**$0.96**		**$1.05**	
Pro forma EPS	**$0.30**	**$0.32**	**$0.32**	***$0.30 to $0.34***	**$0.27**	**$0.27**	**$1.12**	**$1.12**	**$1.22**	**$1.24**
Diluted Shares Out	519.4	519.4			519.4		520.4		519.4	

Source: Bloomberg, Company data, Credit Suisse estimates

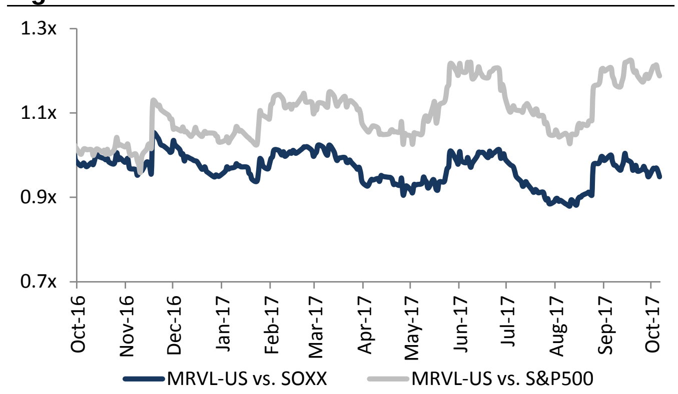
MRVL: Recap of Recent Stock Performance

Figure 202: MRVL NTM EPS vs. Price



Source: Thomson Reuters, Company data

Figure 203: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data

Key Message: While early, we expect MRVL to report F3Q and guide F4Q INLINE with a neutral bias on Rev, but still positive bias on EPS. Our outperform rating reflects what we believe are multiple paths to a higher share price including: (1) a new management team that is better than investors perception of the "old-MRVL", (2) further upside from "self-help" with a GM/OpM potential of 65%/35% versus management target of 60%/30% and OctQ of 61.5%/27.5%, (3) better growth prospects in storage as HDD most likely has a longer-tail and SSD a more vibrant merchant controller market than investors believe, (4) better growth prospects in networking first as legacy tailwinds subside in 2H17 and second as new product ramps in 25/50/100 accelerate in CY18 and (5) further capital structure optimization including Buybacks, at some point a dividend, and opportunistic M&A – we would note MRVL currently has $3/share of NET cash versus the average Semi company with 1.5 turns of leverage; at semi average leverage MRVL could theoretically buyback ~25% of the current outstanding shares. LT we see organic growth of at least 5% driving the stock to our $22 PT or ~16x target model of $1.55 discounted back to FY18 at a 10% WACC, plus $3 of net cash. MRVL trades at 12.9x CY18 EV/FCF, a ~25% discount to Semis of 17.5x – our $22 target price implies 16.0x EV/FCF.

Expect F3Q Rev/EPS In-Line CS/Street

While still early, we expect MRVL to report F3Q (OctQ) Rev/EPS IN-LINE with CS/Street at $610m/$0.32 and the midpoint of company guidance for $595-625m/$0.30-0.34. We expect Storage Rev flat q/q reflecting a cautious view of HDD demand in the near term, Networking Rev up low single digits q/q as new product ramps offset the legacy decline in 2H18, Connectivity Rev down slightly q/q as gaming seasonally declines, and Other Rev approximately flat q/q.

1) **SSD Mix Tracking Towards High-End of Guidance.** While MRVL previously issued a target for SSDs to be 25-30% of F2H Storage Rev – SSDs were already >25% of Storage in F2Q. We expect increased 2H NAND supply to drive incremental SSD demand and result in SSDs at the high-end of guidance for ~30% of Storage Rev in F2H – implying FY18 SSD Rev up >50% y/y.
2) **Networking Headwinds Subside, Connectivity Down Modestly:** EOL products were ~15-20% of F1Q Networking Rev, and a ~400 bps q/q headwind in F1Q and F2Q, which we expect to moderate to a ~200/150 bps q/q headwind in F3Q/F4Q, respectively. While Connectivity was up ~30% q/q in F2Q, we expect Rev down ~1% q/q in F3Q.
3) **Sustainable Gross Margin Above Target.** Target GMs >60% appears conservative: (1) F3Q GM guidance of 61.5% is up ~30 bps versus F2Q despite lower GM Connectivity that has increased 300 bps, (2) increased SSD mix and new product ramps with above avg. GMs should allow targets to drift to ~65% over time.
4) **Rev/EPS In-Line CS/Street.** We expect MRVL to report GM of 61.5% (up 30 bps q/q), in-line with CS/Street. We expect MRVL to report OpEx of $207.5m (down 3.1% q/q), in-line with CS and the midpoint of guidance. We expect Rev and profitability in-line with CS/Street to drive EPS of $0.32 IN-LINE with CS, Street, and Guidance of $0.32.

Expect F4Q Rev/EPS In-Line with CS

While still early, we expect MRVL to guide F4Q (JanQ) Rev/EPS of $585m/$0.27, IN-LINE with CS estimates of $585m/$0.27 and mostly in-line with Street of $591m/$0.27. We would note that F4Q is a 14-week quarter, and mgmt. expects only modest Rev upside with a more noticeable uptick in OpEx.

1) **Achievable Rev Expectations.** While we expect F4Q Rev guidance of down 4% q/q, above seasonal of down 6% q/q, we would highlight that (1) we expect F3Q Rev ~60 bps below seasonal provides moderately easier q/q compares, (2) we expect legacy Networking headwinds to moderate to only a ~150 bps q/q headwind in F4Q, and (3) our Wireless estimates are already conservatively set at down 25% q/q.
2) **Segment Expectations.** By segment, we expect (1) Storage (~56% of Rev) up 4.0% q/q, above seasonal of up 2.9% q/q as SSD Rev experiences double-digit q/q growth and increases to ~30% of Storage Rev with strength in both Client and enterprise and HDD Rev remains steady as MRVL gains share in Enterprise/Data Center and experiences some secular growth trends in surveillance and connected home. (2) Networking (~27% of Rev) up ~5% q/q which is 210 bps above seasonal, as EOL rolls off and 10G Rev continues to ramp, specifically with

regards to emerging markets as well as pre-production ramps at 25G. (3) Wireless (~13% of Rev) down ~25% q/q, mostly in-line with seasonal trends.

3) **Networking Product Ramps Accelerate into FY19.** MRVL is seeing a number of new product ramps during the Q related to switching, PHYs, and embedded SoC products. We expect these products ramps to more than offset legacy declines in FY19, and result in double-digit y/y Networking Rev growth.

4) **Gross Margins Achievable.** We expect F4Q GM of 62.0%, up 50 bps q/q, above Street of 61.5% and would highlight that Street has F4Q GM down q/q on a 400 bps q/q decline in Connectivity – note F4Q17 saw Connectivity mix only decline by 200 bps on Rev down 13% q/q and MRVL saw GM's increase ~90 bps q/q.

5) **Rev/EPS Guidance In-Line with CS.** We expect MRVL to provide GM guidance of 62.0% IN-LINE with CS but ABOVE Street. We expect OpEx guidance of ~$219m (up 5.5% q/q) in-line with CS but below Street of ~$221m (up 6.6% q/q) implying OpM of 24.6% in-line with CS but above Street of 24.0%. While mgmt. expects annualized OpEx of $820-830m, F4Q will have 14 weeks causing an uptick in OpEx. We expect Rev and profitability in-line with CS to drive EPS guidance of $0.27 IN-LINE with CS/Street of $0.27.

Figure 204: MRVL Revenue Model

Revenue ($m)	Apr-16 1Q	Jul-16 2Q	Oct-16 3Q	Jan-17 4Q	Apr-17 1Q	Jul-17 2Q	Oct-17E 3Q	Jan-18E 4Q	Apr-18E 1Q	Jul-18E 2Q	Oct-18E 3Q	Jan-19E 4Q	FY2017	FY2018E	FY2019E
Storage	$243	$276	$332	$311	$304	$312	$315	$327	$321	$333	$330	$334	$1,162	$1,257	$1,318.4
Networking	$138	$156	$144	$148	$145	$147	$149	$157	$160	$163	$175	$181	$587	$598	$679
Wireless Connectivity	$74	$90	$88	$66	$76	$99	$98	$73	$70	$90	$93	$79	$317	$345	$330
Other	$65	$78	$63	$47	$54	$47	$48	$28	$28	$28	$28	$28	$252	$178	$111
Discontinued Ops	$22	$25	$28	$0	$0	$0	$0	$0	$0	$0	$0	$0	$76	$0	$0
Total	$541	$626	$654	$571	$579	$605	$610	$585	$578	$614	$625	$621	$2,393	$2,379	$2,438.8
% of Total	**Apr-16**	**Jul-16**	**Oct-16**	**Jan-17**	**Apr-17**	**Jul-17**	**Oct-17E**	**Jan-18E**	**Apr-18E**	**Jul-18E**	**Oct-18E**	**Jan-19E**	**FY2017**	**FY2018E**	**FY2019E**
Storage	44.8%	44.1%	50.7%	54.4%	52.5%	51.5%	51.6%	55.9%	55.5%	54.3%	52.8%	53.8%	48.5%	52.9%	54.1%
Networking	25.6%	24.9%	22.0%	25.9%	25.0%	24.3%	24.5%	26.8%	27.7%	26.6%	27.9%	29.1%	24.5%	25.2%	27.8%
Wireless Connectivity	13.6%	14.4%	13.4%	11.5%	13.1%	16.3%	16.0%	12.5%	12.0%	14.6%	14.8%	12.7%	13.2%	14.5%	13.5%
Other	12.0%	12.5%	9.6%	8.2%	9.4%	7.8%	7.9%	4.7%	4.8%	4.5%	4.4%	4.5%	10.5%	7.5%	4.6%
Discontinued Ops	4.0%	4.1%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.2%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Q/Q	**Apr-16**	**Jul-16**	**Oct-16**	**Jan-17**	**Apr-17**	**Jul-17**	**Oct-17E**	**Jan-18E**	**Apr-18E**	**Jul-18E**	**Oct-18E**	**Jan-19E**			
Storage	-16.2%	13.9%	20.0%	-6.3%	-2.2%	2.5%	1.0%	4.0%	-2.0%	4.0%	-1.0%	1.2%			
Networking	4.3%	13.0%	-7.9%	2.9%	-2.2%	1.7%	1.5%	5.0%	2.0%	2.0%	7.0%	3.5%			
Wireless Connectivity	-6.2%	22.6%	-2.8%	-25.1%	15.9%	29.5%	-1.0%	-25.0%	-5.0%	29.0%	3.2%	-15.0%			
Other	-36.7%	20.5%	-19.9%	-25.1%	16.1%	-12.9%	1.0%	-42.0%	0.0%	0.0%	0.0%	0.0%			
Discontinued Ops	65.8%	16.4%	11.9%	-100.0%	NA	NA	NA	NA	NA	NA	NA	NA			
Total	-12.2%	15.7%	4.5%	-12.7%	1.4%	4.4%	0.8%	-4.0%	-1.2%	6.3%	1.8%	-0.6%			
Y/Y	**Apr-16**	**Jul-16**	**Oct-16**	**Jan-17**	**Apr-17**	**Jul-17**	**Oct-17E**	**Jan-18E**	**Apr-18E**	**Jul-18E**	**Oct-18E**	**Jan-19E**	**FY2017**	**FY2018E**	**FY2019E**
Storage	-30.3%	-10.7%	27.8%	7.4%	25.2%	12.7%	-5.2%	5.3%	5.5%	7.1%	4.9%	2.1%	-3.7%	8.2%	4.9%
Networking	-2.6%	19.5%	16.8%	11.6%	4.7%	-5.8%	3.8%	6.0%	10.5%	10.9%	16.9%	15.2%	11.0%	2.0%	13.4%
Wireless Connectivity	-30.9%	-31.0%	-28.9%	-16.3%	3.5%	9.3%	11.3%	11.5%	-8.6%	-9.0%	-5.2%	7.4%	-27.8%	9.0%	-4.4%
Other	-42.9%	-33.2%	-56.2%	-54.2%	-16.0%	-39.3%	-23.5%	-40.8%	-49.0%	-41.4%	-42.0%	0.0%	-46.9%	-29.7%	-37.4%
Discontinued Ops	52.7%	12.9%	9.8%	-100.0%	-100.0%	-100.0%	-100.0%	NA	NA	NA	NA	NA	-0.2%	-100.0%	NA
Total	-25.3%	-11.8%	-3.0%	-7.3%	7.0%	-3.5%	-6.9%	2.4%	-0.2%	1.6%	2.6%	6.2%	-12.2%	-0.6%	2.5%

Source: Company data, Credit Suisse estimates

Key Issues

Multimedia Solutions Sale. On 6/12, MRVL announced the sale of their Multimedia Solutions business for $95m to SYNA, which consists of set-top box IP, processors used in connected home applications, and AR/VR platforms. Recall this business was already included in discontinued operations, so there is no impact to our FY18 Rev/EPS estimates. Importantly, the sale increases MRVL cash balance by ~6% from $1.65bn to $1.75bn – implying MRVL has $3.10 of net cash/sh. SYNA paid $95m for the Multimedia Solution business, or ~1x TTM P/S of $94m. We would note that this business had ~40% GM, below MRVL's corporate average of ~60%, and ~$60m of OpEx implying ($22m) of EBIT in FY17. The sale increases MRVL cash balance by ~$95m and should continue to underpin the debate on capital allocation, in particular on timing of returns and the choice between M&A vs. buybacks.

LT Growth Target of 5%. One of the primary investor concerns on MRVL is their ability to grow their Revenue base, specifically in lieu of structural headwinds from HDDs (~40% of Rev). MRVL laid out Rev growth expectations of ~5%, at the high-end of our expectation for 3-5%, consisting of a "conservative" core Rev growth target of 6% that does not factor in optionality from HDD preamps and Auto Ethernet, above Semi industry growth of ~3%, and expectations for Other Rev to declines ~10% annually post FY18. From a bottoms-up build perspective, if HDD Rev declines ~4% per year and SSD Rev grows ~18% per year, Storage Rev should grow at a ~1% CAGR through CY20 – implying that SSDs would increase to ~32% of Storage Rev from ~20% in CY16. Assuming MRVL Networking Rev grows at ~15% per year based on share gains in 10 GbE and modest traction in 25/50/100 GbE and Wireless grows ~5% per year, we see a bottoms up blended CAGR of 5%. We would also note that MRVL's assumptions for end market growth are mostly consistent with third party estimates – specifically: (1) Gartner forecasts the HDD unit TAM to decline at a ~10% CAGR, (2) IDC forecasts the SSD unit TAM to grow at a ~20% CAGR, (3) Crehan Research forecasts the Ethernet Switch market to grow at a ~15% CAGR, and (4) IDC forecasts the WLAN to grow at a ~5% CAGR.

Figure 205: MRVL Bottom-Up LT Rev Breakdown

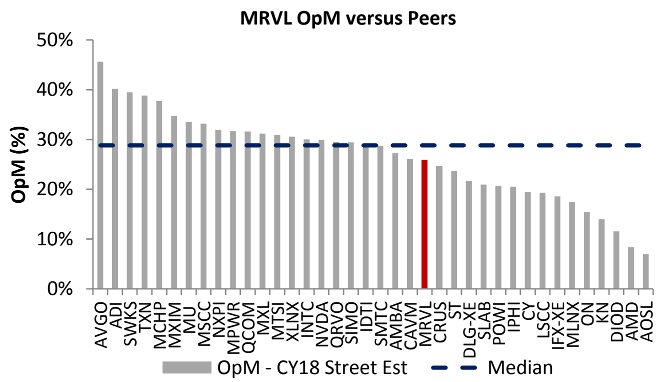
Rev ($m)	2017	2018	2019	2020	CAGR
HDDs	$998	$918	$900	$882	-4.0%
SSDs	$250	$294	$348	$410	18.0%
Networking	$613	$705	$811	$933	15.0%
Wireless	$329	$345	$363	$381	5.0%
Other	$164	$148	$133	$120	-10.0%
Total	**$2,354**	**$2,412**	**$2,554**	**$2,726**	**5.0%**
Y/Y	***NA***	***2.4%***	***5.9%***	***6.7%***	

% of Total	2017	2018	2019	2020
HDDs	42.4%	38.1%	35.2%	32.4%
SSDs	10.6%	12.2%	13.6%	15.0%
Networking	26.1%	29.3%	31.8%	34.2%
Wireless	14.0%	14.3%	14.2%	14.0%
Other	7.0%	6.1%	5.2%	4.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Company data, Credit Suisse estimates

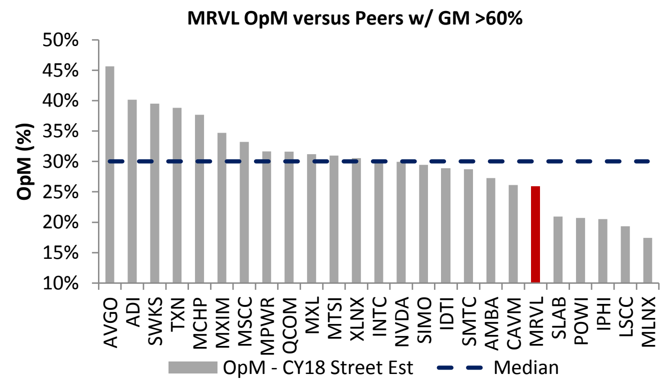
LT OpM Target of ~30%. MRVL introduced an OpM target of ~30% exiting FY20, at the high-end of our expectation for 25-30%, with R&D as 22-24% of sales and SG&A as 8% of sales. Today, MRVL has completed the restructuring and divesture laid out last November. During the last 9 months, MRVL has reduced $250m run rate cost. Remember, Q4 has 14 weeks, so OpEx will uptick in F4Q and will cause 1Q18 payroll tax and reiterated a comfort level with current OpEx. In the mid-term MRVL will be focused on R&D efficiency to increase productivity, the centralization of procurement functions, and the simplification of their organization structure. Longer term, mgmt. plans to drive leverage through process standardization/automation, a shared-service center, and site optimization. Note – MRVL stated that the restructuring plan was one quarter ahead of schedule, and updated their expectations at the Analyst Day for GMs from 58-60% in F2H18 to 59-60% in F1H18 and for OpEx of $820-840m annual run-rate exiting F4Q18 to $820-830m exiting F3Q18. In addition, we would remind investors that MRVL's current GM target is >60% which is currently embedded in estimates for FY19 (i.e. CY18) – importantly, MRVL's peers with 60% GM and above, have a median OpM of ~32%.

Figure 206: MRVL CY18 OpM (Street Est) vs Peers



Source: Thomson Reuters, Company data

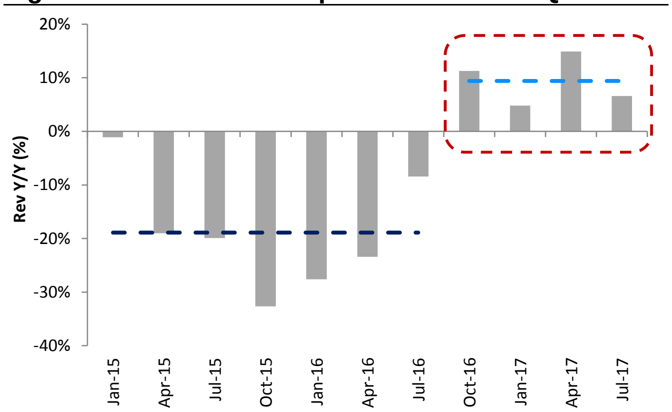
Figure 207: MRVL OpM vs Peers w/ GM >60%



Source: Thomson Reuters, Company data

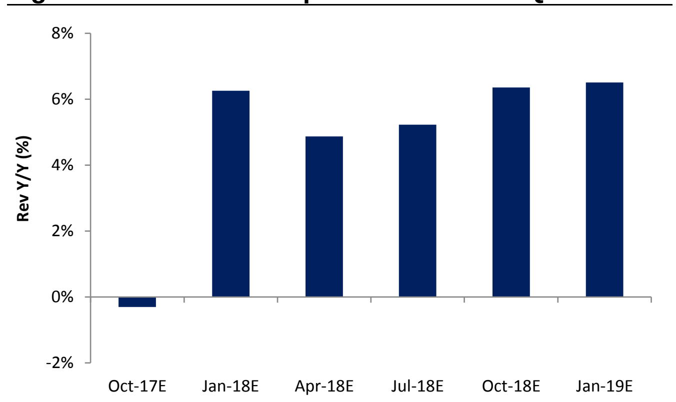
Harder Y/Y Compares Coming. While we are encouraged by LT Rev growth expectations, we would highlight that starting in F3Q18 (OctQ) y/y Rev compares for MRVL's core business become more difficult. Specifically, compares turn positive in F3Q18 at up ~6.4% y/y following seven quarters of y/y declines on average down ~19%. Note – MRVL's Storage business compares will increase from trough levels in OctQ '15 at down 43% y/y to OctQ '16 at up 28% y/y, while Networking will increase from trough levels in JulQ '15 at down 27% y/y to up 17% y/y in OctQ '16. However, we would highlight that Core Rev compares moderate starting in F3Q19 (OctQ) after four quarters of strong y/y growth (on average up ~10% y/y) – note we only expect F3Q18 up 2.6% y/y.

Figure 208: Difficult Compares Start in OctQ '17



Source: Company data, Credit Suisse estimates

Figure 209: Easier Compares Start in OctQ '18

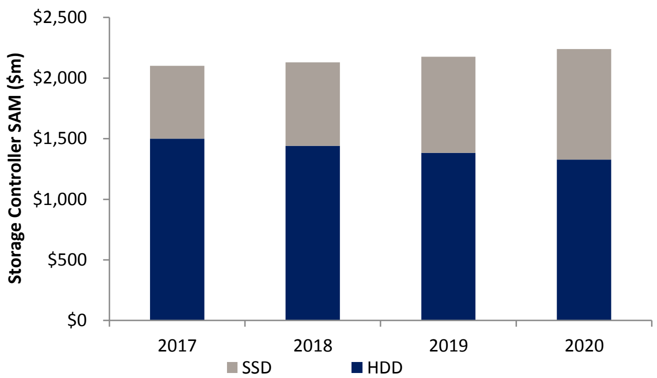


Source: Company data, Credit Suisse estimates

Extending Storage Leadership. MRVL is currently the leading provider of HDD controllers and Merchant SSD controllers during a time where exponential data growth is driving the need for more storage. Specifically, HDD is growing in the cloud, SSDs are growing double-digits in all segments, and there are new emerging growth opportunities such as HDD preamps. While the HDD market is in structural decline, MRVL is focused on (1) increasing share, (2) maintaining Client while growing in the Cloud, and (3) expanding their SAM. Importantly, MRVL is focused on extending their Tech leadership as they move from 28nm today to 16nm in the future, yielding a 40% reduction in size, 40% reduction in power consumption, and 30% increase in performance. Further, we would note that while the broader HDD TAM is contracting, certain segments such as the Cloud are actually growing at a ~3% CAGR thru CY20. MRVL has an opportunity in Preamps, a key enabler for Areal Density gains, which increase in necessity over time as more platters require more channel and more preamps – increasing MRVL's HDD SAM by >$350m. Relative to SSD, MRVL expects the market to grow at a >15% CAGR, with Data Center and

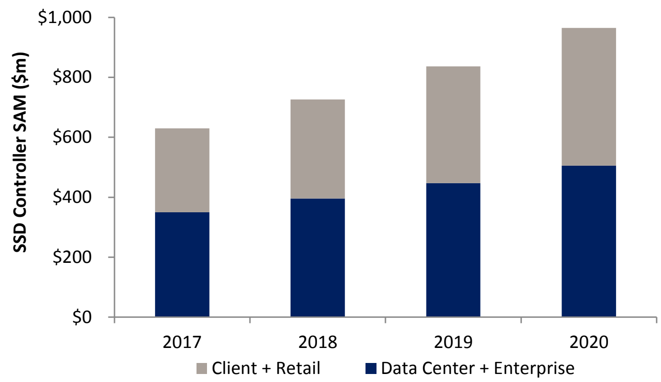
Enterprise both growing ~13% and Client and Retail both growing ~18%. MRVL is well positioned to benefit from SSD growth given their comprehensive product portfolio, the ability to leverage HDD competencies in to SSD, and strong customer relationships. Lastly, we would highlight that MRVL is positioned for success in Networked Storage as hyperscale Data Centers move to Networked Storage and experience limitations with current implementation, and NVMe Over Fabric is emerging as the future solution.

Figure 210: Storage SAM Growing at ~3% CAGR



Source: Trendforce, Gartner

Figure 211: SSD Controller SAM Growing at >15%



Source: Gartner

SSD TAM Underappreciated. We believe MRVL's Rev TAM in SSDs is underappreciated. While SSDs only represents ~9% of 2016 petabytes sold, SSDs are already ~25% of MRVL's Storage Rev – due to higher content and lower average density per SSD. While we continue to see a long tail for HDDs, investors worried about SSD cannibalization should note that MRVLs Storage SAM would be 2-2.5x larger in an all SSD world. While SSDs represented less than 3% of storage capacity in 2012, they have increased to 9% in 2016 and industry forecasts expect SSDs to increase to 20% of capacity in 2020 – as SSD capacity increases at a ~50% CAGR through 2020 while HDD capacity increases at a ~20% CAGR through 2020.

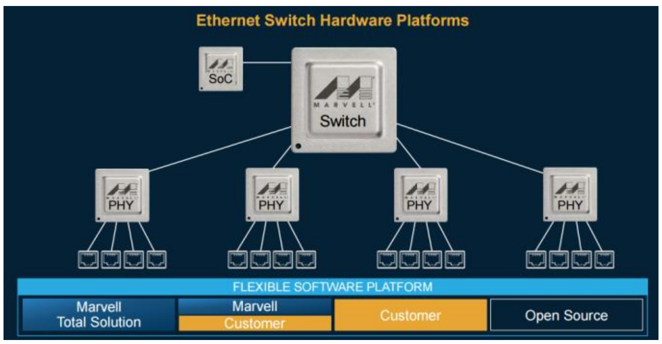
Figure 212: SSDs Currently Represent ~9% of Storage Capacity

Petabytes (k)	2013	2014	2015	2016	2017	2018	2019	2020
Total SSD	**12**	**22**	**34**	**59**	**91**	**144**	**212**	**307**
PC/Consumer Grade	9	15	22	36	53	76	106	148
Enterprise	3	7	13	23	39	68	107	159
Total HDD	**454**	**527**	**528**	**593**	**723**	**860**	**1,024**	**1,232**
PC/Consumer Grade	364	411	371	351	385	392	423	470
Enterprise	91	117	157	242	338	468	601	762
Total PB	**467**	**549**	**562**	**652**	**815**	**1,005**	**1,236**	**1,539**
% of Total	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Total SSD	**2.7%**	**4.0%**	**6.1%**	**9.0%**	**11.2%**	**14.4%**	**17.2%**	**20.0%**
PC/Consumer Grade	2.0%	2.7%	3.8%	5.5%	6.5%	7.6%	8.6%	9.6%
Enterprise	0.7%	1.3%	2.2%	3.6%	4.7%	6.8%	8.6%	10.3%
Total HDD	**97.3%**	**96.0%**	**93.9%**	**91.0%**	**88.8%**	**85.6%**	**82.8%**	**80.0%**
PC/Consumer Grade	77.9%	74.8%	66.0%	53.8%	47.3%	39.0%	34.2%	30.5%
Enterprise	19.4%	21.2%	27.9%	37.2%	41.5%	46.6%	48.6%	49.5%
Total PB	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Y/Y	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Total SSD	**NA**	**75.4%**	**56.4%**	**72.4%**	**55.1%**	**58.1%**	**47.0%**	**44.7%**
PC/Consumer Grade	NA	62.6%	44.2%	65.1%	48.1%	44.5%	39.1%	40.2%
Enterprise	NA	111.3%	82.7%	84.9%	65.8%	76.7%	55.8%	49.1%
Total HDD	**NA**	**16.1%**	**0.0%**	**12.4%**	**21.9%**	**19.0%**	**19.0%**	**20.3%**
PC/Consumer Grade	NA	12.9%	-9.8%	-5.4%	9.8%	1.8%	7.8%	11.1%
Enterprise	NA	28.7%	34.6%	54.5%	39.4%	38.4%	28.4%	26.8%
Total PB	**NA**	**17.6%**	**2.3%**	**16.1%**	**24.9%**	**23.3%**	**23.0%**	**24.5%**

Source: Gartner

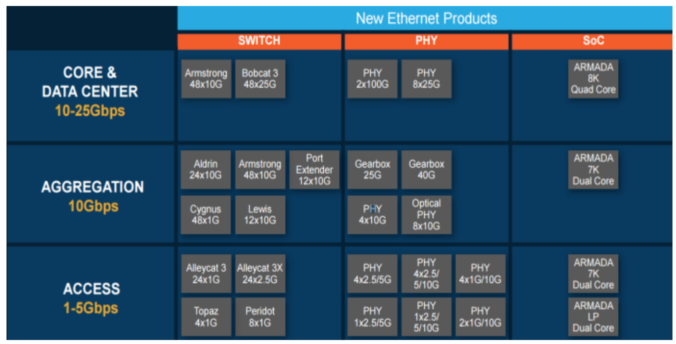
Networking & Connectivity Positioned for Growth. MRVL's growth strategy is focused on (1) a refreshed Enterprise portfolio, (2) capitalizing on market transitions, and (3) entry into the Data Center. The Enterprise Infrastructure market represents a $2bn opportunity as part of the $3.6bn Networking SAM – with the remaining split between Carrier and Data Center. The refreshed Enterprise Networking portfolio consists of switches, PHYs, and SoCs and MRVL has introduced 25 new products all in the last 18 months. We would highlight that while competition is focused primarily on the high-end, MRVL is mostly focused on the most used aggregation and core layers. Relative to the market transitions, MRVL is focused on the multi-gigabit campus and the rise of China OEMs. Today, there are 90 billion meters of cable and 90% of those cables in enterprises don't support 10 Gbps – which at a cost of $300 per cable to upgrade creates a multi-billion problem. MRVL is addressing this problem through their optimized solutions as part of the NBASE-T Alliance that allows the movement between 1 and 10 Gbps without the need to upgrade enterprise access link cables.

Figure 213: Silicon & SW Powering Ethernet



Source: MRVL 2017 Analyst Day

Figure 214: Refreshed Networking Portfolio



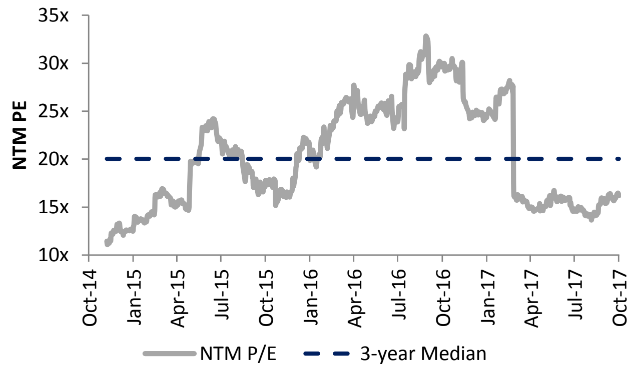
Source: MRVL 2017 Analyst Day

New and Improved Management Team. CEO Matt Murphy joined MRVL over a year ago after 22 years at MXIM most recently as COO and has already recruited an impressive list of senior executives from BRCM, MXIM, and ISIL and Board Members from NVLS and ARMH. MRVL has always had a rich history of IP, historically lacking operational prowess – this new management team has a proven track record. Matt Murphy most recently led product development, sales and field application, marketing and central engineering. Willem Meintjes was appointed as senior VP of finance and will lead MRVL's Financial Planning and Analysis team with responsibility for building and managing financial plans along with strategic analysis and reporting – Willem came from Newport Corporation where he was VP and Corporate Controller. Andrew Micalef was appointed as Chief Operating Office – he joins Marvell from ISIL where he was Senior Vice President of Operations since January 2015. Chris Koopmans was appointed executive VP of marketing and sales – he will be responsible for defining market opportunities where Marvell's core competencies in System on Chip Design can be most effectively applied, and joined MRVL from Citrix Systems, Inc., where he was Vice President and General Manager of Service Provider Platforms since 2012. Ernst & Young's retired partner Michael Strachan was named as an independent board director, making Marvell's an eleven member board. Lastly, Hedge fund Starboard Value acquired a 6.7% stake in Marvell and appointed one of its directors, Richard Hill, as the company's chair.

Investment Thesis & Valuation

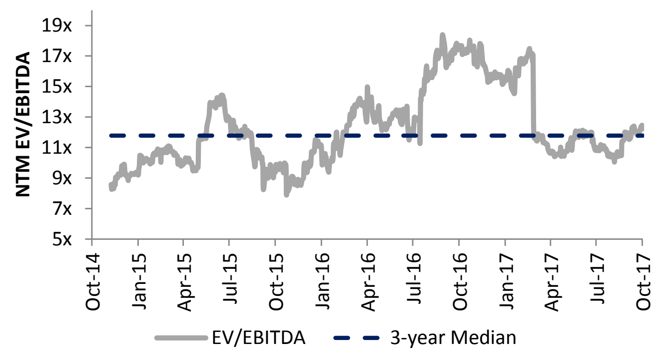
Our Outperform rating on MRVL reflects our view that new management at MRVL can reduce operating expenses and still have the resources to invest in new growth initiatives. Upside to our TP will become more dependent on whether MRVL can find new avenues of growth especially in Networking, to offset what is likely to be a more stagnant longer term growth in Storage owing to SSD displacement of HDDs. We reiterate our OP rating and PT of $22 which represents ~16x target model of $1.55 discounted back to FY18 at a 10% WACC, plus $3 of net cash.

Figure 215: PE Over Time



Source: Thomson Reuters, Company data

Figure 216: EV/EBITDA Over Time



Source: Thomson Reuters, Company data

Maxim Integrated Products

(MXIM, $49.35, NEUTRAL, TP $46.00)

F1Q/F2Q Mostly In-Line

Reporting Date: Thursday, October 19th, After Market Close
Conference Call: Thursday, October 19th, 5:00PM EST

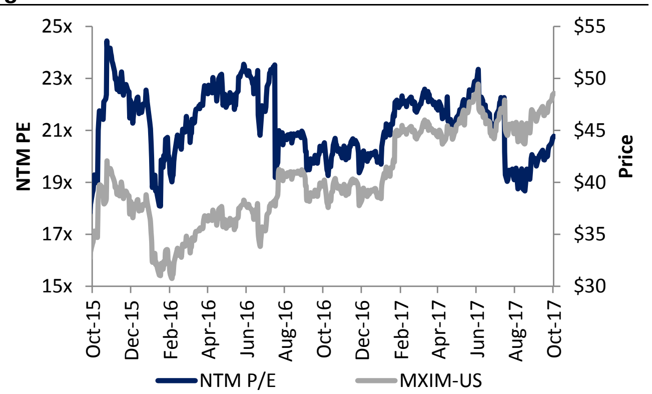
Figure 217: MXIM Summary of Expectations

MXIM-US	F4Q17 (Jun)	F1QE18 (Sep)			F2QE18 (Dec)		FY2018E		FY2019E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$602.0	$575.0	$576.8	$555m to $595m	$582.5	$582.2	$2,349	$2,365	$2,423	$2,459
% Q/Q chng	*3.6%*	*-4.5%*	*-4.2%*	*-7.8% to -1.2%*	*1.3%*	*0.9%*				
% Y/Y chng	*6.3%*	*2.4%*	*2.8%*		*5.7%*	*5.7%*	*2.3%*	*2.7%*	*3.2%*	*4.0%*
Seasonal (5Y Median)	*2.0%*	*-3.4%*			*-2.3%*					
Gross Margin	67.2%	66.5%	*66.4%*	*65% to 68%*	66.9%	*66.6%*	66.8%	*66.2%*	66.8%	*66.6%*
Operating Expenses	$189	$189			$186		$760		$769	
Operating Margin	35.8%	33.6%			34.9%		34.4%		35.0%	
Net Income	$180	$160			$168		$668		$702	
Net Margin	29.9%	27.7%			28.9%		28.5%		29.0%	
EPS (Cont. Ops, ex-opts)*	$0.69	$0.62			$0.65		$2.57		$2.69	
EPS (Cont. Ops, w-opts)*	$0.63	$0.55	$0.56	$0.52-$0.58	$0.59	$0.57	$2.33	$2.34	$2.45	$2.49
Fully diluted shares	287.5	287.5			287.4		287.4		287.3	

Source: Thomson Reuters, Company data, Credit Suisse estimates

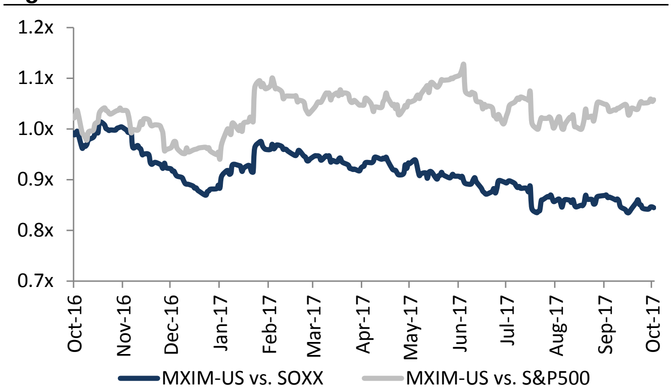
MXIM: Recap of Recent Stock Performance

Figure 218: MXIM NTM PE vs. Price



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 219: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data, Credit Suisse estimates

Key Message: We expect MXIM to report F1Q and guide F2Q IN-LINE with CS/Street with a neutral to positive bias from strong I/A/I fundamentals and better than expected Consumer – note F2Q is a 14-week quarter. Despite a company-specific relative pause in Autos growth (F4Q up 10% y/y which was the lowest in 15 quarters), MXIM's Autos segment has grown 2x peers over the past 2 years and content growth in BMS, ADAS and Infotainment should sustain a 10%+ CAGR moving forward – furthermore, post-hurricane Auto rebuilds could provide another tailwind to Auto Rev into CY18 although our checks suggest the Auto Semi supply chain has seen no hurricane-related impact yet. Despite B2B y/y growth lagging peers, MXIM is experiencing tailwinds from Consumer Diversification, specifically better than expected Samsung Galaxy Note 8 builds. The Company continues to execute on margin expansion – clear path to high 60%s/high 30%s GM/OpM with only low single digit Rev growth – and continues to generate high economic returns – FCF yield of 6% above Analog peers at 5%. Lack of outsized growth continues to underpin our Neutral rating – on CY18 EV/FCF MXIM is trading at 16x vs analog peers of 17x – despite peers exhibiting better 3YR Rev growth CAGRs. Conversely, strong profitability, FCF, $1bn (7% of market cap) buyback authorization, and 3% div yield provide downside support especially as MXIM faces easier y/y compares than peers into CY18.

Expect F1Q18 (SepQ) Results At Least In-Line with CS/Street

We expect MXIM to report F1Q Rev/EPS at least IN-LINE with Street at $577m/$0.56 vs. CS and the midpoint of guidance at $575m/$0.55 with a neutral to positive bias from strong I/A/I fundamentals and better than expected Samsung Galaxy Note 8 builds. CS/Street estimates embed Rev down 4.5%/4.2% q/q – ex-$19m of JunQ sell-in accounting, CS/Street is modeling Rev down 1.4%/1.1% q/q, ABOVE seasonal of down ~3.5% q/q driven by strong growth in non-Samsung Consumer.

- **At Least In-Line B2B and Consumer:** Note MXIM's guidance implies B2B up 10% y/y, below peers modeled up ~12% y/y and in-line with historic underperformance. Adjusted for sell-in accounting, we expect: Auto Rev down ~2% q/q vs. the 5-year median of down 1% q/q, albeit Auto Rev is growing 13% y/y ABOVE F4Q up ~11% y/y. Note MXIM provided Auto end-demand commentary was more conservative than peers for the 2nd consecutive quarter. We are modeling Industrial down 3% q/q in-line with seasonal vs. peers 100 bps above seasonal, Comms & Data Center down 3% q/q; and Consumer up 3% q/q embedding flat smartphone Rev q/q and strong q/q growth in tablets (AAPL), gaming (Switch) and wearables – we are modeling GS8/GN8 units flat q/q at 17m but see modest upside from better GN8 demand – note Samsung should only comprise 8% of F1Q Rev.
- **Continued Margin Execution:** We expect GM of 66.5% vs. Street at 66.4% – as MXIM continues to execute on margins (incr. GM of 83%) – note while GM is down 70 bps q/q, 50 bps of the decline is from sell-in accounting. We are modeling OpEx of $189m, flat q/q and a TR of 15%, driving EPS of $0.56, at least IN-LINE with Street at $0.56 vs. CS and the midpoint of guidance for $0.55.

Expect F2Q18 (DecQ) Guidance Mostly In-Line with CS/Street

We expect MXIM to guide F2Q Rev/EPS of $583m/$0.58, mostly in-line with CS at $583m/$0.59 and Street at $582m/$0.57. Note DecQ Rev includes a ~$19m benefit from the transition to sell-in at AVT (50% in Industrial, 30% Comms, 10% Consumer, 5% Auto, 5% Computing) as well as an extra week of OpEx due to a 14-week quarter (but no extra Rev) – adj. for sell-in accounting Rev of $564m is down 2% q/q, in-line with seasonal.

- **Seasonal B2B and Consumer:** Adjusted for sell-in accounting, we are modeling B2B Rev up 9% y/y vs. peers up 10% y/y – embedding seasonal growth in Industrial (down 5% q/q) and Comms (down 3% q/q). We are modeling for seasonal growth in Autos (up 3% q/q) which could have upside from hurricane replacements. We are modeling Consumer down 2% q/q – which embeds Samsung down 15% q/q on lower GS8/GN8 builds, and non-Samsung up 5% q/q driven by AAPL, a rebound in China handsets, and holiday Nintendo Switch builds.
- **AVT Sell-In Benefits Margins:** We expect GM to grow 40 bps q/q to 66.9%, ABOVE Street at 66.6% -- the transition to sell-in accounting for $19m of AVT Rev is likely to have a 50 bps positive impact to GM. We are modeling OpEx down ~1% q/q to $186m, Interest/other expense of $5.5m, and a TR of 15%. At least in-line Rev, GM and OpEx drive a guided EPS range of $0.53-$0.63 or $0.58 at the midpoint vs. Street at $0.57.

Figure 220: MXIM Revenue Model

US$ in millions, unless otherwise stated

(3-months ending) End markets	Mar-16 3Q	Jun-16 4Q	Sep-16 1Q	Dec-16 2Q	Mar-17 3Q	Jun-17 4Q	Sep-17 1QE	Dec-17 2QE	Mar-18 3QE	Jun-18 4QE	Sep-18 1QE	Dec-18 2QE	CY2016	CY2017E	CY2018E
Consumer	$163.7	$164.5	$174.0	$168.6	$149.1	$147.2	$151.1	$149.9	$139.9	$152.5	$154.3	$145.6	$670.8	$597.3	$592.3
Industrial	$153.8	$151.2	$146.0	$140.0	$166.2	$177.2	$163.5	$165.7	$165.5	$168.9	$167.2	$165.5	$590.9	$672.7	$667.1
Comm & Data Center	$120.0	$120.6	$115.6	$113.0	$120.3	$128.8	$119.4	$121.6	$122.2	$123.2	$120.7	$118.6	$469.2	$490.1	$484.7
Automotive	$94.9	$107.6	$103.3	$105.2	$119.7	$120.4	$117.1	$121.2	$133.7	$139.1	$137.6	$135.6	$411.0	$478.4	$546.1
Computing	$22.7	$22.3	$22.5	$24.2	$25.8	$28.4	$23.9	$24.1	$23.2	$23.2	$22.5	$21.9	$91.7	$102.2	$90.8
Total	**$555.2**	**$566.1**	**$561.4**	**$551.0**	**$581.2**	**$602.0**	**$575.0**	**$582.5**	**$584.6**	**$606.8**	**$602.3**	**$587.2**	**$2,233.7**	**$2,340.7**	**$2,381.0**

% of Revenue by End-Market	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	CY2016	CY2017E	CY2018E
Consumer	29.5%	29.1%	31.0%	30.6%	25.7%	24.4%	26.3%	25.7%	23.9%	25.1%	25.6%	24.8%	30.0%	25.5%	24.9%
Industrial	27.7%	26.7%	26.0%	25.4%	28.6%	29.4%	28.4%	28.4%	28.3%	27.8%	27.8%	28.2%	26.5%	28.7%	28.0%
Comm & Data Center	21.6%	21.3%	20.6%	20.5%	20.7%	21.4%	20.8%	20.9%	20.9%	20.3%	20.0%	20.2%	21.0%	20.9%	20.4%
Automotive	17.1%	19.0%	18.4%	19.1%	20.6%	20.0%	20.4%	20.8%	22.9%	22.9%	22.8%	23.1%	18.4%	20.4%	22.9%
Computing	4.1%	3.9%	4.0%	4.4%	4.4%	4.7%	4.2%	4.1%	4.0%	3.8%	3.7%	3.7%	4.1%	4.4%	3.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Q/Q Change	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18
Consumer	12.8%	0.5%	5.8%	-3.1%	-11.6%	-1.3%	2.7%	-0.7%	-6.7%	9.0%	1.2%	-5.7%
Industrial	5.6%	-1.7%	-3.4%	-4.1%	18.8%	6.6%	-7.7%	1.3%	-0.1%	2.0%	-1.0%	-1.0%
Comm & Data Center	11.9%	0.4%	-4.1%	-2.3%	6.5%	7.1%	-7.3%	1.8%	0.6%	0.8%	-2.0%	-1.8%
Automotive	6.6%	13.3%	-4.0%	1.9%	13.8%	0.6%	-2.8%	3.5%	10.4%	4.0%	-1.1%	-1.4%
Computing	-4.3%	-2.0%	0.8%	8.0%	6.4%	10.1%	-15.9%	1.0%	-3.9%	0.0%	-3.0%	-2.5%
Total	**8.7%**	**2.0%**	**-0.8%**	**-1.9%**	**5.5%**	**3.6%**	**-4.5%**	**1.3%**	**0.4%**	**3.8%**	**-0.7%**	**-2.5%**

Y/Y Change	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	CY2016	CY2017E	CY2018E
Consumer	-8.5%	-11.7%	-3.3%	16.2%	-8.9%	-10.5%	-13.2%	-11.1%	-6.2%	3.6%	2.2%	-2.9%	-2.8%	-11.0%	-0.8%
Industrial	-1.3%	-3.9%	-3.9%	-3.9%	8.1%	17.3%	12.0%	18.4%	-0.4%	-4.7%	2.2%	-0.1%	-3.2%	13.8%	-0.8%
Comm & Data Center	-9.6%	-5.9%	1.0%	5.3%	0.2%	6.8%	3.3%	7.6%	1.6%	-4.4%	1.1%	-2.5%	-2.8%	4.5%	-1.1%
Automotive	26.5%	31.9%	15.5%	18.1%	26.1%	11.9%	13.3%	15.1%	11.7%	15.5%	17.5%	11.9%	22.7%	16.4%	14.1%
Computing	-34.4%	-23.5%	-16.0%	2.1%	13.5%	27.5%	6.4%	-0.5%	-10.2%	-18.4%	-5.9%	-9.1%	-19.7%	11.5%	-11.2%
Total	**-3.8%**	**-2.8%**	**-0.2%**	**7.9%**	**4.7%**	**6.3%**	**2.4%**	**5.7%**	**0.6%**	**0.8%**	**4.7%**	**0.8%**	**0.0%**	**4.8%**	**1.7%**

Source: Company data, Credit Suisse estimates

Key Issues

Targets More Margin, Less Rev: On 09/05 MXIM updated its target model from its CY16 Analyst Day as follows: (1) LT Rev CAGR at least in-line with Industry of 3-5% growth from 1.5x Industry, (2) GM 67-70% from ~65%, (3) OpEx growing ½ Rev from ~30% of Rev, (4) OpM 37-40% from ~35%, (5) FCF Margin 35%+ from 30-35%, (6) Tax Rate of 14% down from 15%, and reiterated CapEx at 1-3% of Rev and shareholder returns of 80% of FCF – all driving a FCFPS target of $3.00 within 1-2 years and $3.50 within 3-5 years vs. prior LT target of $3.

- **Continued Margin and FCF Leverage:** While closing the D&A to CapEx gap is the largest single driver from the old to new midpoint of MXIM's target OpM (~200 bps), continued operational and mix improvements are driving additional accretion and leverage to the high end of target range (70% GM, 40% OpM, high-30%s FCF) – including improved utilization of MXIM's Oregon fab, flexible foundry capacity, growing SMB customer base with lower purchase volumes and higher margins, and a structurally improving pricing environment. Importantly MXIM's updated FCF margin target of 35%+ is among the highest in the industry**,** altogether driving FCFPS of $3 within 1-2 years and $3.50 within 3-5 years vs. $2.73 LTM – at target FCFPS MXIM would be trading at 13 times EV/FCF vs. peers at 17 times.
- **Rev Growth Target Realistic:** MXIM's relative growth target of at least market growth (~3-5%) appears achievable and is supported by growth drivers in Autos (20% of Rev), Data Center (~7% of Rev) and Industrial 4.0 (~10% of Rev) as well as structurally better pricing. Specifically MXIM's LT Rev CAGR is based upon: (1) low teens growth in Autos, (2) high-single digit growth in Industrial (29% of Rev) led by factory automation, (3) mid-single digit growth in Comms & Data Center (20%+ growth in Data Center which is ~7% of Rev, flattish growth in Comms which is ~14% of Rev), and (4) stabilization to LT growth in Consumer (25% of Rev). Specific to Autos MXIM continues to expect above-market growth – led by ADAS and BMS with continued double-digit growth in Infotainment (2/3 of current Autos Rev). In addition MXIM reiterated its focus on distribution – now 42% of Rev (up from 29% in FY12) with headroom to grow as

MXIM is expanding with several new distribution partners with increased exposure to new SMB customers and applications.

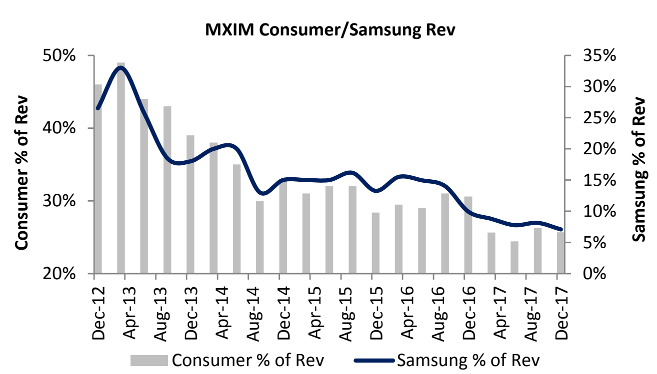
Figure 221: MXIM Target Model

Financial Target Model Summary	New Target Model	Previous Target Model (2016 Analyst Day)	F4Q17 (JunQ)
Rev	At Market	50% Above Market	+3% y/y adj.
GM	67-70%	~65%	67.2%
OpEx	Grow at 1/2 Rev Growth	~30% of Rev	31.4%
OpM	37-40%	~35%	35.8%
Tax Rate	14%	15%	15.1%
CapEx (% of Rev)	1-3%	1-3%	2.2%
FCF Margin (% of Rev)	35%+	30-35%	34% LTM
Cash Return (% of FCF)	80%	80%	80% LTM
FCF/sh	$3.50	$3.00	$2.73 LTM

Source: Company data, Credit Suisse estimates

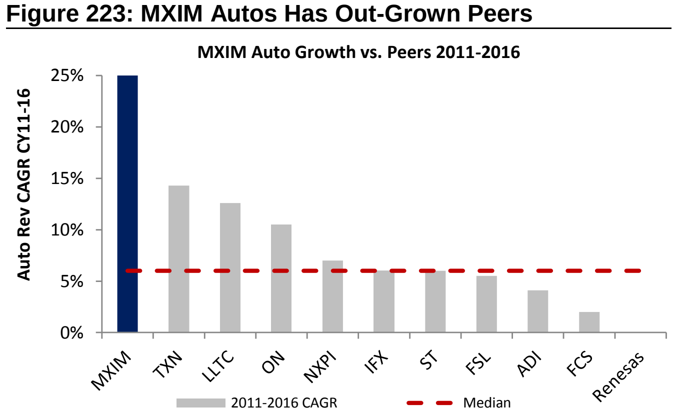
Continuing Consumer Diversification. We continue to remain cautious on Handsets due to slowing unit growth, adverse ASP trends, continued OEM consolidation and an already crowded chip landscape. Relative to MXIM's Consumer end-market, its short-term goal is stabilization with a LT goal of Consumer growth. Over the last 3 years handset/Samsung exposure had proven to be a headwind to MXIM's Rev growth – Samsung/Consumer Rev declined 50% / 35%, driving total Rev down 8%. CY17 marks an important milestone for MXIM as Samsung will be permanently below 10% of Rev moving forward vs. 30%+ at peak in CY13 – driven by GS8 content moving from single to dual source. Further Diversification within Consumer continues to gain traction – AAPL, Huawei, Gaming and Wearables – we are modeling non-Samsung Consumer up ~15% y/y in CY17. In particular we would note MXIM's emphasis on (1) Wearables (5% of Rev and growing) and IoT relative to sensors, and (2) audio opportunity with OEM handsets in DSM (dynamic speaker management). Consumer should comprise ~26% of CY17 Rev vs. 30% in CY16.

Figure 222: Improving Diversification within Consumer



Source: Company data, Credit Suisse estimates

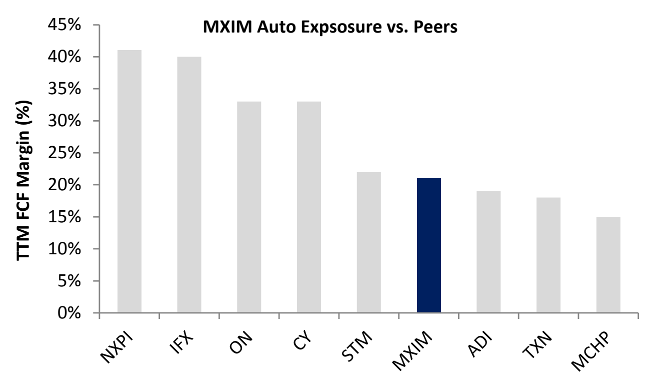
Figure 223: MXIM Autos Has Out-Grown Peers



Source: Company data, Credit Suisse estimates

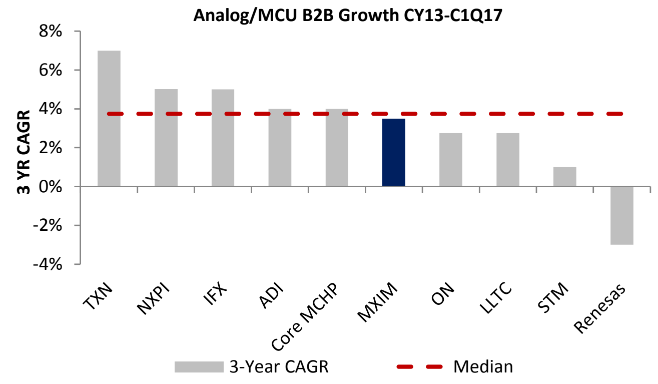
Focus on Power Management and I/A/I Growth Drivers. Amongst its core growth drivers of Autos (20% of Rev), Data Center (7%), Industrial 4.0 (10%), MXIM has emphasized its focus in power management (~40% of Total Analog, and the fastest growing segment of the market) and Rev growth in I/A/I power from $300m to $570m CY12-CY16, implying an ~18% CAGR – however, over ~65% of the growth was driven by Auto. Despite MXIM significantly outgrowing peers in Autos, the Company's total B2B growth has lagged peers for the past 5 years (in particular Industrial) – bottom-up drivers in Autos (low-teens CAGR), Industrial (high-single digit CAGR), and Comms & Data Center (mid-single digit CAGR) support better growth longer-term. Relative to Autos we would note that MXIM has lower penetration in the Americas and China –and we continue to expect above-market growth – led by ADAS and BMS with continued double-digit growth in Infotainment (2/3 of current Autos Rev).

Figure 224: MXIM Autos as % of total Rev vs. Peers



Source: Company data, Credit Suisse estimates

Figure 225: MXIM's B2B Undergrowing Peers

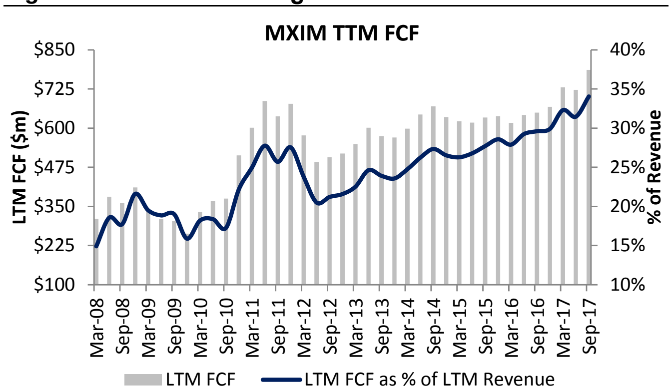


Source: Company data, Credit Suisse estimates

We would also note that the Analog TAM for Autos has surpassed that for Smartphones – note MXIM's Consumer Rev in CY16 was $670m, which we which we are modeling flattish LT vs. Autos at $410m in CY16 Rev, which we are modeling up 15%+ through CY18. Within Industrial (29% of Rev), MXIM highlighted Factory Automation (25% of Industrial TAM and 40% of MXIM Industrial Rev) as an area of focused investment since 2012 which is driving Industrial growth closer to in-line with peers following 9 consecutive quarters of underperformance. Within Comms and Data Center (21% of Rev), we continue to see LT growth potential in Data Center (~7% of Rev) as growth in the Cloud overtakes enterprise server market share with MXIM well-positioned in optical given IP for low power applications and diverse customer base.

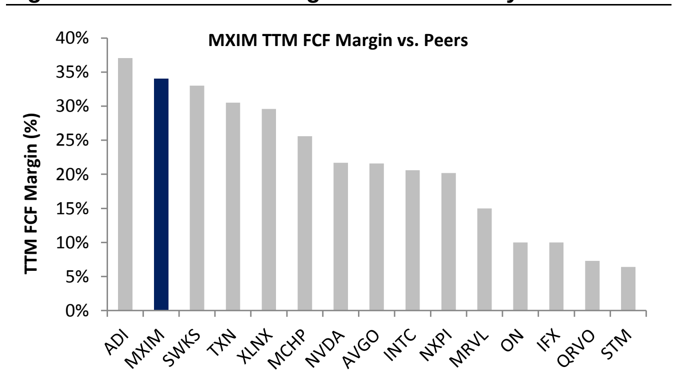
Compelling Total Returns Strategy Supported by Consistent Cash Flow. We believe MXIM's capital-light business model (CapEx only 1-3% of Rev) should allow the Company to generate consistent FCF. On a LTM basis MXIM we are modeling MXIM's SepQ FCF margin at 34% vs. 2016 Analyst Day target of 30-35% and recently updated target of 35%+. We are also modeling for MXIM to return 78% of LTM FCF to shareholders through buybacks and dividends vs. target of 80% and above the peer median of ~70% – despite lower levels of share repurchases in (Jun17 buybacks down 16% y/y. Note MXIM's FCF yield / Div yield of 6%/3% are both above the peer group median of 5%/2%.

Figure 226: MXIM's Strong Generation of FCF



Source: Company data, Credit Suisse estimates

Figure 227: MXIM FCF Margin Leads Industry

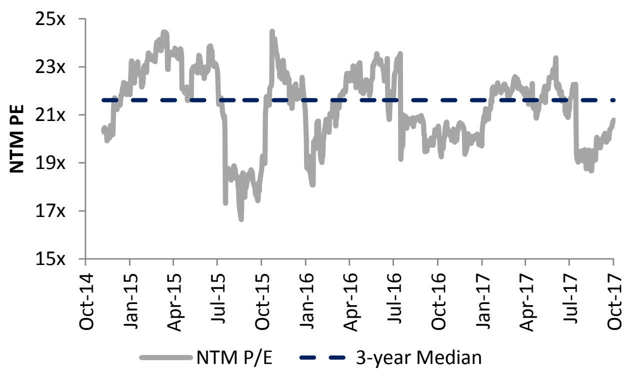


Source: Company data, Credit Suisse estimates

Investment Thesis and Valuation

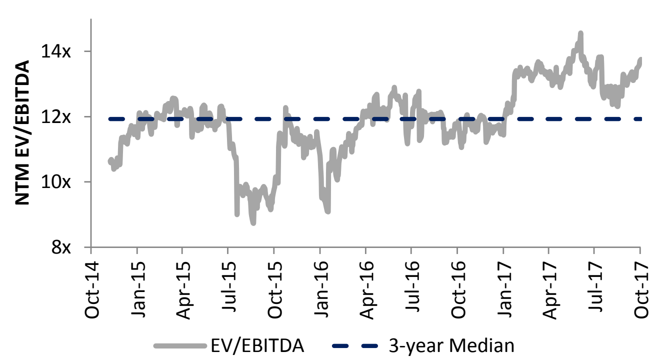
Despite diversification in Consumer and secular growth drivers in Autos (20% of Rev), Data Center (7% of Rev) and Factory Automation (10% of Rev) MXIM has undergrown peers in B2B – although we would highlight the Company continues to generate high economic returns – implied FCF yield of 6% and TTM FCF margin of 34% are among the highest in the industry and strong profitability, 3% dividend yield and a $1bn (7% of market cap) buyback authorization provide downside support. Our Neutral rating reflects strong fundamentals, good management and a stock which appears to be fairly priced. On CY18 EV/FCF MXIM is trading at 16x vs peers of 17x, despite peers exhibiting better 3YR Rev growth CAGRs. Our PT of $46 is based on 17x CY18 FCF per sh, in-line with peers, albeit on EV/FCF a 1 turn discount.

Figure 228: NTM PE Over Time



Source: Company data, Credit Suisse estimates, Thomson Reuters

Figure 229: NTM EV/EBITDA Over Time



Source: Company data, Credit Suisse estimates, Thomson Reuters

Mellanox Technologies, Ltd.

(MLNX, $44.65, NEUTRAL, TP $45.00)

In-Line; Rate of Change Improving Slowly

Reporting Date: Wednesday, October 25th, After Market Close

Conference Call: Wednesday, October 25th, 5:00PM EST

Figure 230: MLNX Summary of Expectations

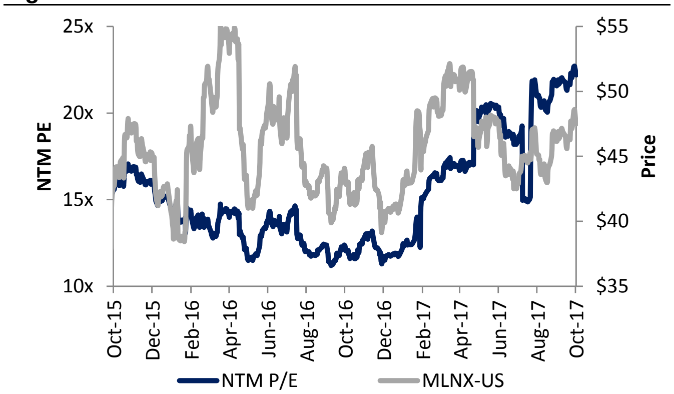
US $ in millions, unless otherwise stated

MLNX-US	Jun-17	Sep-17E			Dec-17E		CY2017E		CY2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$212.0	$227.0	$226.8	*$222-232m*	$238.5	$241.2	$866.1	$868.6	$995.0	$978.9
% Q/Q chng	*12.4%*	*7.1%*	*7.0%*	*+4.7% to +9.5% q/q*	*5.1%*	*6.3%*				
% Y/Y chng	*-1.3%*	*1.2%*	*1.2%*		*7.6%*	*8.8%*	*1.0%*	*1.3%*	*14.9%*	*12.7%*
Seasonality	*11.2%*	*6.0%*	*6.0%*		*1.4%*	*1.4%*				
Gross Margin (Non-GAAP)	70.6%	71.0%	*70.5%*	*70.5-71.5%*	70.8%	*70.6%*	71.0%	*70.6%*	70.5%	*69.8%*
Operating Expenses (Non-GAAP)	$123.3	$125.0		*$124-126m*	$127.5		$495.3		$545.2	
Operating Margin (Non-GAAP)	12.5%	15.9%			17.4%		13.8%		15.7%	
Net Income (ex-options)	$22.4	$34.0			$39.0		$110.1		$147.1	
Net Margin	10.6%	15.0%			16.4%		12.7%		14.8%	
EPS (cont. ops, ex-options)	$0.44	$0.66	$0.64	***Implied ~$0.66***	$0.75	$0.77	$2.15	$2.14	$2.80	$2.77
EPS (GAAP)	-$0.16	$0.03			$0.14		-$0.23		$0.51	
Non-GAAP Fully diluted shares	51.1	51.7		*51.4-51.9m*	51.9		51.3		52.6	

Source: Company data, Credit Suisse estimates, Thomson Reuters

MLNX: Recap of Recent Stock Performance

Figure 231: MLNX NTM PE vs. Price



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 232: LTM Performance vs. SOXX vs. SPX

Source: Thomson Reuters, Company data, Credit Suisse estimates

Key Message. We expect MLNX to report an IN-LINE C3Q and guide C4Q IN-LINE with CS but MODESTLY BELOW Street. We are modeling C4Q Rev to grow 5.1% q/q versus the Street of 6.3% q/q and seasonal of 1.4%. Significantly better than seasonal growth is underpinned by improved availability of Xeon Scalable, tailwinds from 25/50/100 Gb/s, diminished headwinds from 40 Gb/s and ramping Spectrum Rev, albeit recent data points (JNPR, AAOI) of slowing AWS spending are an incremental concern. C3Q will mark the first time y/y Rev growth is positive since C4Q16, albeit OpP is still declining ~25% y/y as increased investments continue to drive negative leverage. Importantly, we expect C4Q OpP to decline only 7% y/y before showing strong growth in C1Q18 – returning to operating leverage and y/y OpP growth is essential to justify current valuation let alone upside. While we see some positives for the Company in C1H18 around leverage, we continue to worry that MLNX will need to invest at much higher rates in order to compete with much larger competitors like INTC and AVGO which calls into question terminal share and/or profitability – ultimately limiting upside for a stock that already trades at 30x CY18 EPS w/SBC, in-line with high growth Semi Peers despite not growing and well above the Semi median of 18x. Conversely with $1.90 cash/share and the strategic value of the asset, we see M&A potential as providing downside support – hence our Neutral rating.

Expect C3Q Results In-line with CS/Street

We expect MLNX to report C3Q Rev/EPS IN-LINE with CS at $227m/$0.66 and the mid-point of implied guidance for $227m/$0.66 vs. Street at $227m/$0.64. Importantly C3Q marks a return to both q/q (up 7.1% q/q) and y/y (up 1.2% y/y) growth for the first time in 4 quarters.

- **Return to Y/Y Growth in IB and Ethernet:** Our expectations for a return to Y/Y growth are supported by the following: (1) Multiple large HPC deals for C3Q that are already in backlog, (2) Improved availability of Xeon Scalable in C3Q, and (3) Accelerating customer adoption of 25/50/100 Gb/s Ethernet. We are modeling for InfiniBand (51% of Rev) to increase ~10% q/q on continued EDR strength with multiple large HPC deals (including from the U.S. Department of Energy) – driving IB to increase modestly y/y for the first time in 5 quarters. We also expect Ethernet (41% of Rev) up ~5% q/q, driven by strength in 25/50/100Gb/s including an acceleration in Spectrum Rev (5% of Rev and growing) – with Xeon Scalable availability likely to accelerate MLNX Rev growth through CY18.

- **GM In-Line, OpEx Still Outpacing Rev Growth:** We expect GM of 71.0% (up 40 bps q/q), in-line with mid-point of guidance for 70.5-71.5% vs. Street at 70.5% as IB growth reaccelerates (higher GM than Spectrum). We expect OpEx of $125m, up 1.4% q/q vs. Rev up 7.1% q/q. However, on a y/y basis OpEx is growing 11.9%, ABOVE Rev up 1.2% y/y, albeit we would note that the gap between OpEx/Rev growth should narrow from 2470 bps in C2Q to 1550 bps. We expect in-line Rev, GM, and OpEx to drive EPS of $0.66, IN-LINE with CS and the midpoint of implied guidance and modestly ABOVE Street at $0.64.

Expect C4Q Guidance In-Line with CS

We expect MLNX to guide C4Q Rev/EPS IN-LINE with CS at $239m/$0.75 and modestly BELOW Street at $241m/$0.76. We are modeling C4Q Rev up 5.1% q/q versus the Street of 6.3% q/q and seasonal of 1.4%. Significantly better than seasonal growth is underpinned by improved availability of Xeon Scalable (albeit more of a CY18 driver), tailwinds from 25/50/100 Gb/s, diminished headwinds from 40 Gb/s and ramping Spectrum Rev. While Street Rev is attainable, we would note that MLNX out-quarter guidance has missed Street for 6 consecutive quarters, but the Company has only missed guidance 2 times in the past 10 years. Note MLNX still expects total Rev to grow y/y (implying C4Q Rev >$230m).

- **Accelerating IB and Ethernet Growth:** We expect InfiniBand Rev up ~11% q/q with EDR up ~19% q/q and Other IB flat q/q – note InfiniBand Rev is historically weighted towards C2H. We would note that INTC's OPA continues to gain modest share (June's TOP500 Supercomputer list showed INTC growing IB share to 17.6% from 13.0% 6 months ago vs. MLNX share down to 82.4% from 87.0%). We expect Ethernet Rev up ~2% q/q– as 25/50/100Gb/s adoption continues to accelerate. We are modeling Spectrum Rev up 15% q/q and expect continued momentum into CY18 – note on 09/25 HPE announced adoption of Spectrum to power its StoreFabric M-series storage networking switches.

We currently model GM of 70.8% (down 20 bps q/q), mostly in-line with Street at 70.6%, and OpEx of $127.5m (+2.0% q/q), in-line with Company guidance for OpEx to grow low single digit q/q following C2Q. While OpEx is growing 10.8% y/y, ABOVE Rev up 6.8% y/y – the gap between OpEx and Rev growth is smaller than in C3Q, and we expect Rev growth will outpace OpEx growth in C1Q18. In-line Rev, GM and OpEx drive EPS guidance of $0.75 IN-LINE with CS vs. Street at $0.76.

Figure 233: MLNX Revenue Model

US$ in millions, unless otherwise stated

Revenue By Technology	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17E 3Q	Dec-17E 4Q	Mar-18E 1Q	Jun-18E 2Q	Sep-18E 3Q	Dec-18E 4Q	Dec-16 2016	Dec-17E 2017E	Dec-18E 2018E
InfiniBand	$114.1	$111.7	$121.1	$132.3	$97.0	$108.1	$122.5	$137.3	$119.2	$129.4	$138.9	$142.4	$479.2	$464.9	$530.0
EDR: Enhanced Data Rate - 100gb/s InfiniBand	$21.7	$24.6	$30.3	$48.7	$39.7	$59.5	$71.4	$85.7	$75.4	$84.4	$92.9	$97.5	$125.2	$256.2	$350.2
Other InfiniBand	$92.5	$87.1	$90.8	$83.6	$57.3	$48.7	$51.1	$51.6	$43.9	$45.0	$46.1	$44.9	$354.0	$208.7	$179.8
Ethernet	$68.9	$88.1	$89.7	$71.0	$80.5	$87.0	$89.9	$90.0	$87.5	$97.4	$100.7	$106.3	$317.6	$347.4	$392.0
Other	$13.8	$15.0	$13.5	$18.4	$11.2	$16.8	$14.7	$11.2	$13.2	$18.2	$20.3	$21.3	$60.6	$53.9	$73.0
Total	**$196.8**	**$214.8**	**$224.2**	**$221.7**	**$188.7**	**$212.0**	**$227.0**	**$238.5**	**$220.0**	**$245.0**	**$260.0**	**$270.0**	**$857.5**	**$866.1**	**$995.0**
% of Total	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**	**2016**	**2017E**	**2018E**
Infiniband	58.0%	52.0%	54.0%	59.7%	51.4%	51.0%	54.0%	57.5%	54.2%	52.8%	53.4%	52.8%	55.9%	53.7%	53.3%
EDR: Enhanced Data Rate - 100gb/s InfiniBand	11.0%	11.4%	13.5%	22.0%	21.0%	28.1%	31.4%	35.9%	34.3%	34.5%	35.7%	36.1%	14.6%	29.6%	35.2%
Other InfiniBand	47.0%	40.6%	40.5%	37.7%	30.4%	23.0%	22.5%	21.6%	19.9%	18.4%	17.7%	16.6%	41.3%	24.1%	18.1%
Ethernet	35.0%	41.0%	40.0%	32.0%	42.7%	41.0%	39.6%	37.7%	39.8%	39.8%	38.7%	39.4%	37.0%	40.1%	39.4%
Other	7.0%	7.0%	6.0%	8.3%	5.9%	7.9%	6.5%	4.7%	6.0%	7.4%	7.8%	7.9%	7.1%	6.2%	7.3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
% Change (Q/Q)	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**			
Infiniband	0.8%	-2.1%	8.4%	9.3%	-26.7%	11.5%	13.3%	12.1%	-13.1%	8.5%	7.4%	2.5%			
EDR: Enhanced Data Rate - 100gb/s InfiniBand	19.7%	13.3%	23.2%	60.8%	-18.5%	49.9%	20.0%	20.0%	-12.0%	12.0%	10.0%	5.0%			
Other InfiniBand	-2.8%	-5.8%	4.2%	-7.9%	-31.4%	-15.1%	5.0%	1.0%	-15.0%	2.5%	2.5%	-2.5%			
Ethernet	49.7%	27.9%	1.8%	-20.8%	13.4%	8.1%	3.3%	0.2%	-2.7%	11.3%	3.4%	5.5%			
Other	-22.1%	9.1%	-10.5%	36.6%	-39.3%	50.9%	-12.8%	-23.5%	17.8%	37.5%	11.8%	4.6%			
Total	**11.2%**	**9.1%**	**4.4%**	**-1.1%**	**-14.9%**	**12.4%**	**7.1%**	**5.1%**	**-7.8%**	**11.4%**	**6.1%**	**3.8%**			
% Change (Y/Y)	**Mar-16**	**Jun-16**	**Sep-16**	**Dec-16**	**Mar-17**	**Jun-17**	**Sep-17E**	**Dec-17E**	**Mar-18E**	**Jun-18E**	**Sep-18E**	**Dec-18E**	**2016**	**2017E**	**2018E**
Infiniband	12.9%	-2.1%	-0.5%	16.8%	-15.0%	-3.2%	1.2%	3.7%	22.9%	19.6%	13.5%	3.8%	6.5%	-3.0%	14.0%
EDR: Enhanced Data Rate - 100gb/s InfiniBand	984.4%	276.5%	107.3%	168.7%	82.9%	142.1%	135.8%	75.9%	90.0%	41.9%	30.1%	13.8%	203.6%	104.6%	36.7%
Other InfiniBand	-6.7%	-19.0%	-15.2%	-12.1%	-38.0%	-44.1%	-43.7%	-38.3%	-23.5%	-7.6%	-9.8%	-12.9%	-13.4%	-41.1%	-13.8%
Ethernet	99.0%	124.9%	149.2%	54.3%	16.9%	-1.2%	0.2%	26.8%	8.7%	12.0%	12.1%	18.1%	103.9%	9.4%	12.9%
Other	25.6%	52.8%	-1.9%	3.9%	-19.1%	11.9%	9.1%	-38.9%	18.6%	8.1%	38.5%	89.3%	16.1%	-11.1%	35.5%
Total	**34.2%**	**31.7%**	**30.8%**	**25.3%**	**-4.1%**	**-1.3%**	**1.2%**	**7.6%**	**16.6%**	**15.6%**	**14.5%**	**13.2%**	**30.3%**	**1.0%**	**14.9%**

Source: Company data, Credit Suisse estimates

Key Issues

Expect Return to Positive Leverage in C1Q18… While there continues to be significant IP at MLNX as evidenced by GM of >70%, the Company is investing on multiple fronts, well ahead of Rev potential, minimizing/negating operating leverage. Over the past 4 quarters Core/Total growth rates have decelerated from 16%/32% to -4%/-1%, MLNX has provided out-quarter guidance that has missed Street for 6 consecutive quarters, and FTM EPS estimates have declined ~30% over the last 6 months – leading to a 30% y/y EPS decline in C3Q. C3Q will mark the first time y/y Rev growth is positive since C4Q16 albeit OpP is still declining ~25% y/y as increased investments continue to drive negative leverage. Importantly, we expect C4Q OpP to decline only 7% y/y before showing strong growth in C1Q18 – returning to operating leverage and y/y OpP growth is essential to justify current valuation.

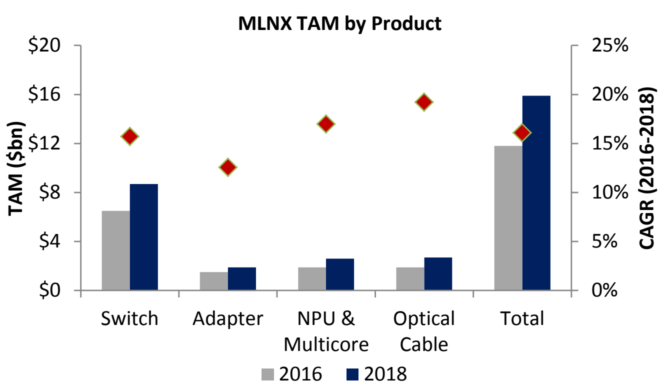
- **…But LT Competitive Questions Remain:** While we see some positives for the Company in C1H18 around leverage, we continue to worry that MLNX will need to invest at much higher rates in order to compete with larger competitors like INTC and AVGO which calls into question terminal share and/or profitability. We expect growth to reaccelerate into CY18 as the company anniversaries non-EDR IB headwinds with multiple growth drivers including 200GB/s+ IB and Spectrum (>5% of Rev and growing). However, while moving from niche to mainstream provides significantly larger TAMs, it also brings significantly strong competitors and significant growth in OpEx of 22% TTM might just be the new cost of doing business.

MLNX Losing Share to Omni-Path: While Purley should continue to drive growth, it does create an opportunity for another round of share gains at INTC. INTC's OPA continued to gain share in the latest Jun17 TOP500 Supercomputer list – of the TOP500 systems, high-speed IB-like fabric is used in 216 or 43.2% systems, up from 43% 6 months ago, and

MLNX saw its share of IB drop to 82.4% from 87.0% 6 months ago and 96.2% 12 months ago vs. INTC which grew share to 17.6% from 13.0% 6 months ago and 3% 12 months ago – despite the modest share shift we would highlight MLNX's still dominant-position in the market. While Omni-Path has proven to be competitive, we would highlight the following offsets – (1) checks suggest INTC's Omni-Path is a more proprietary/closed architecture which is somewhat troublesome to customers and targets HPC (~30% of MLNX Rev), (2) we believe overall market growth is accelerating and supportive of multiple players, and (3) INTC is as likely to accelerate overall market adoption as it is to take share. MLNX expects to maintain its tech gap – we believe that by the time Omni-Path is on par with EDR, MLNX will be at 200Gb/s.

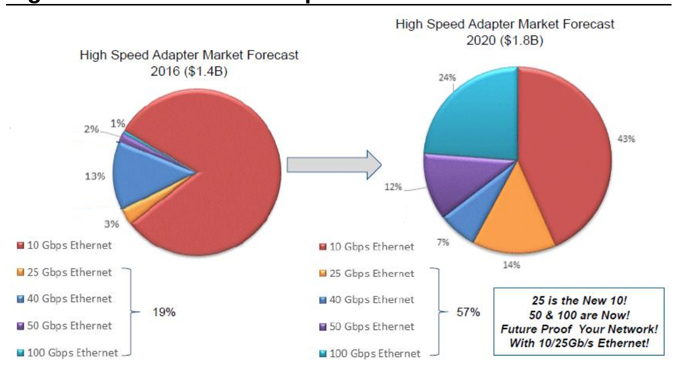
Strong Exposure to Data Growth Paradigm. MLNX core IP in interconnect (both InfiniBand and Ethernet) is well suited to our view of Data Growth supporting a sustainable LT Rev CAGR of 15%+ ahead of our overall Semi LT CAGR of 6-9%. MLNX is levered to a high-growth TAM – more specifically, MLNX now addresses a TAM of ~$12bn – including Switch ($6.5bn), Adapters ($1.5bn), NPU & Multicore ($1.9bn), and Optical Cables ($1.9bn). We expect this TAM to grow at a ~16% CAGR to ~$16bn by 2018 – including Switch ($8.7bn, 15% CAGR), Adapters ($1.9bn, 13% CAGR), NPU & Multicore ($2.6bn, 17% CAGR), and Optical Cables ($2.7bn, 20% CAGR). We believe that MLNX should at least grow in-line with its TAM, especially given its relatively low market share in certain markets (namely Ethernet Switches). We expect a 25%+ CAGR over the next several years in data traffic growth and that 3rd party estimates are under-estimating the potential growth (could be as high as 40+% CAGR) driven by the continued and increasing demand for mobile data, as well as the trend of compute offload to the Cloud – as Web 2.0 and Cloud providers handle exponentially growing data traffic, and Big Data analysis continues to evolve and expand in capability. In these applications not only does MLNX deliver solutions that reduce latency – the delay between two end-points caused by the interconnect – but also lowers application costs as higher efficiency and improved performance translates into lower costs per application. This is key for data centers which monetize total compute, less overhead cost, delivered over a period of time.

Figure 234: MLNX TAM by Product (2016-2018)



Source: Company data, Credit Suisse estimates

Figure 235: Ethernet 25Gbps+ – Growth Driver



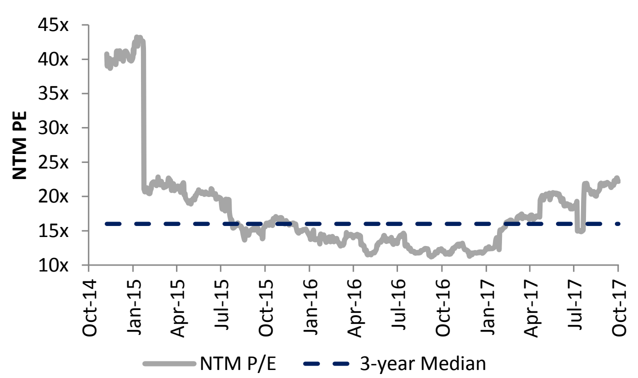
Source: Company data, Credit Suisse estimates

Spectrum Provides Incremental Organic Growth. MLNX is now shipping Spectrum (Ethernet Switch) to hyperscale and OEM customers albeit Rev contribution is still small. The overall Switch TAM is ~$6-7bn and MLNX is targeting 25Gb/s+ which represents approx. 20% of the Switch market (i.e. a ~$250m opportunity) and eventually expected to reach approx. 60% of the market by 2020 (i.e. a ~$1bn opportunity). Adoption should continue to accelerate in 2017/18 – note on 09/25 HPE announced adoption of Spectrum to power its StoreFabric M-series storage networking switches. While MLNX has benefitted from a first-mover advantage and believes that it has lower power/latency than AVGO's Tomahawk with better software capabilities, we believe it will become increasingly difficult for MLNX to compete as moving from niche to mainstream brings strong competitors with significant resources. While MLNX does not guide GM beyond 1 quarter, the Company has previously stated that it expects GM to remain above their LT target model (mid to high 60%) over the next several quarters – eventually GM should align with MLNX's LT target as a result of higher volume and a more split mix as Spectrum continues to ramp and general availability increases.

Investment View and Valuation

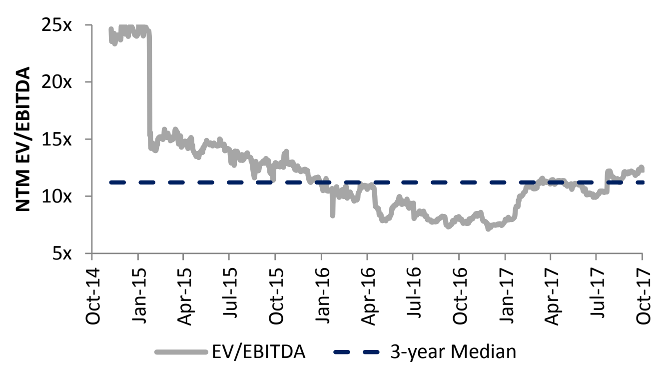
While MLNX is well levered to our Data Growth Paradigm, execution has been lackluster – over the past 4 quarters Core/Total growth rates have decelerated from 16%/32% to -4%/-1%, and while there continues to be significant IP at MLNX as evidenced by GM of >70%, the Company is investing on multiple fronts minimizing/negating operating leverage. We continue to see MLNX as a solid Neutral as INTC continues to gain share in OPA and MLNX is being forced to grow OpEx faster than Rev to compete with INTC/AVGO. Conversely $1.90 cash/sh and the strategic value of the asset provide downside support as M&A is a potential. The stock is trading at 30x EV/FCF w/SBC in-line with high-growth peers of 30x and above the Semi median of 18x, which appears more fair than cheap until growth reaccelerates and operating leverage returns.

Figure 236: NTM PE Over Time



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 237: NTM EV/EBITDA Over Time



Source: Thomson Reuters, Company data, Credit Suisse estimates

Microchip Technology Inc.

(MCHP, $91.76, OUTPERFORM, TP $95.00)

At Least In-Line Rev w/ Upside EPS Bias

Reporting Date: Monday, November 6th After Market Close

Conference Call: Monday, November 6th, 5:00PM EST

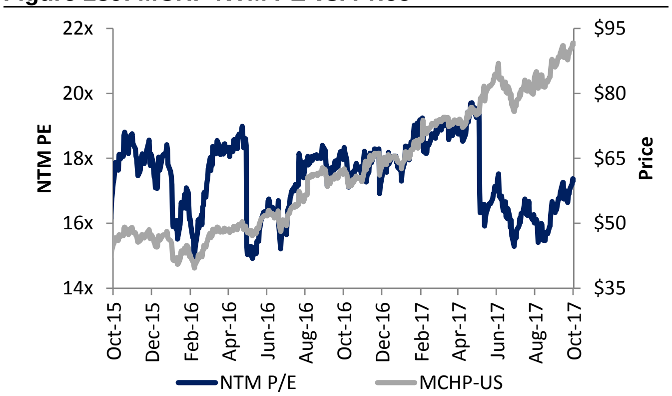
Figure 238: MCHP Summary of Expectations

MCHP-US	Jun-17	Sep-17				Dec-17E		FY2018E		FY2019E	
	Reported	CS	Cons	Guidance	Updated Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$972.1	$1,001.3	$1,001.8	*$1,001.3m*	*$1,001.3m*	$973.9	$982.8	$3,930.5	$3,948.8	$4,035.3	$4,118.4
% Q/Q chng	*7.7%*	*3.0%*	*3.1%*	*+3.0% q/q*	*+3.0% q/q*	*-2.7%*	*-1.9%*				
% Y/Y chng	*15.2%*	*14.6%*	*14.6%*			*10.5%*	*11.5%*	*12.2%*	*13.5%*	*2.7%*	*4.3%*
5YR Median	*3.2%*	*4.8%*				*-1.9%*					
Gross Margin	60.4%	60.6%	*60.6%*	*60.5% to 60.75%*		60.3%	*60.4%*	60.5%	*60.5%*	61.1%	*61.1%*
Operating Expenses	$222.9	$227.7		*22.5% to 23.0%*		$222.6		$895.2		$913.2	
Operating Margin	37.5%	37.9%		*37.5% to 38.25%*		37.5%		37.7%		38.5%	
Net Income	$319.1	$330.7				$317.5		$1,294.2		$1,356.5	
Net Margin	32.8%	33.0%				32.6%		32.9%		33.6%	
EPS (pf, ex-options)	$1.31	$1.35	$1.35	*$1.33-$1.37*	*$1.33-$1.37*	$1.30	$1.30	$5.30	$5.28	$5.55	$5.66
EPS (pf, incl. options)	$1.25	$1.29				$1.24		$5.06		$5.31	
EPS (GAAP)	$0.70	$0.76				$0.89		$3.29		$3.93	
Fully diluted shares	242.9	244.4				244.4		244.0		244.4	

Source: Thomson Reuters, Company data, Credit Suisse estimates

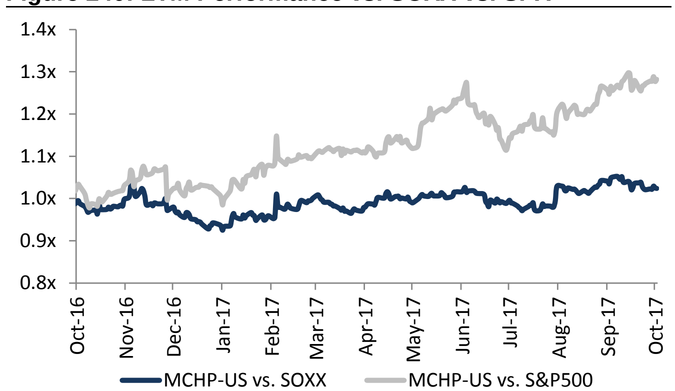
MCHP: Recap of Recent Stock Performance

Figure 239: MCHP NTM PE vs. Price



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 240: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data, Credit Suisse estimates

Key Message: We expect MCHP to report F2Q AT LEAST IN-LINE with Street and its 09/05 positive pre of $1,001m/$1.35, and guide F3Q ABOVE Street as demand continues to outstrip supply. MCHP reiterated F2Q guidance on 09/05 and while they did not raise the midpoint, upside is likely – note MCHP only reiterated F4Q17/F2Q17 guidance but then beat the high end by 5%/6% respectively. While some of the growth is undoubtedly cyclical in nature, the current environment continues to be well-managed – disciplined capacity additions and lead time management suggest a cycle soft-landing, while improving prices especially in 8-bit suggest structurally better Rev growth. Simply, we see multiple drivers of upside to EPS which over time could add over $2.50 to our base case CY18 EPS of $5.50 BEFORE factoring in additional M&A. Specifically: **(1) Structurally Improving Growth from Better Pricing.** MCHP expects Rev to grow high-single digit LT on stable pricing vs. the 5-year MCU/Analog ASP CAGR of -2%. Street is only modeling

3.5% y/y growth in CY19 – better pricing could drive $0.50 in FCFPS/EPS. **(2) Margin expansion above what is currently embedded in Street estimates.** Operating leverage and upside to ATML accretion should drive GM/OpM from 60%/38% today to targets of 62.5%/40% within 1-2 years, driving $0.50 of upside to CY18. **(3) MCU and Analog should begin to benefit from scale.** As silicon becomes a greater % of BOM, customers will deal with fewer suppliers who do more – driving faster than historic share growth. Every 1% increase in MCU market share would drive $0.50 of upside to EPS. We see terminal market share in MCU at 20%+ versus high teens today and a potential $1.50 to EPS. **(4) Opportunity for More Accretive Acquisitions.** With 1x net leverage MCHP has the financial and management bandwidth to engage in M&A. MCHP is currently trading at EV/FCF of 17x versus peers of 17.5x, despite FTM EPS estimates that have increased 50% over the last 9 months versus a Semi average of 25%.

Expect F2Q18 (SepQ) Results At Least In-Line with Revised Guidance

We expect MCHP to report F2Q Rev/EPS at least in-line with the midpoint of reiterated guidance for $1,001m/$1.35 vs. CS/Street both at $1,001m/$1.35 – guidance embeds Rev up 3.0% q/q well ABOVE seasonal of up 0.5% q/q, driven by broad-based strength across MCUs and Analog. Note on 09/05 MCHP reiterated F2Q Rev guidance – importantly, MCHP noted that the business environment remains strong and lead times have begun to stabilize albeit it will take until mid-CY18 for MCHP inventories and lead times to return to optimal levels. Despite cyclical leverage, company-specific initiatives around ATML products are more supportive of continued growth than double-ordering. Further, while MCU pricing is tracking down 8% y/y for C3Q, 8-bit MCU pricing (where MCHP leads with 25% share) is tracking up 6% y/y for the 2nd consecutive quarter – supportive of upside as well as MCHP's LT target for stable to rising ASPs.

- **Better than Seasonal MCUs and Analog with ATML Upside:** We expect better than seasonal growth in both MCUs (up 3% q/q) and Analog (up 3% q/q) as the Company continues to gain share in 8, 16, and 32 bit MCUs and execute on cross-selling opportunities. We are modeling GM of 60.6% (+20 bps q/q) and OpEx of $228m, in-line with Street and midpoint of guidance albeit we see upside to guided OpM of 37.9% from continued execution on ATML cost savings and pricing leverage. We expect interest and other expense of $16.9m, TR of 8.8% and sharecount of 244.4m, in-line with guidance, altogether driving a non-GAAP EPS ex-SBC of $1.35, at least IN-LINE with CS/Street at $1.35 and guidance for $1.33-$1.37.

Expect F3Q18 (DecQ) Guidance At Least In-Line with Street

We expect MCHP to guide F3Q18 Rev/EPS to $990m/$1.33 at the midpoint +/- $20m/$0.04, ABOVE CS at $974m/$1.30 and Street at $983m/$1.30 – embedding a 1.3% q/q decline vs. CS/Street which embed Rev down 2.7%/1.9% q/q respectively. Note on 08/03 MCHP provided "implied" guidance for F3Q to be ABOVE seasonal as demand continues to outstrip supply – we expect upside to seasonal from Analog strength and continued better pricing in 8-bit.

- **Continued Rev and OpM Upside:** Relative to product segments, we see upside to our estimates for MCUs to be down 4% q/q and Analog to be flat q/q, both in-line with seasonal – albeit Analog remains capacity constrained. Outside of MCHP's 2 largest product areas of MCU and Analog (together 92% of Rev), we are modeling Flash Memory down 8% q/q, Licensing up 1% q/q, and Multi-Market/Other flat q/q, all in-line with seasonal. We expect GM of at least 60.4% as MCHP realizes benefits from ATML, OpEx of $223m (down 2% q/q), interest expense of $16.9m (flat q/q), TR of 8.8%, and sharecount of 244.4m (flat q/q), driving an EPS guided range of $1.28-$1.38 or $1.33 at the midpoint, ABOVE CS/Street at $1.30/$1.30.

Figure 241: MCHP Revenue Model

US$ in millions, unless otherwise stated

Segment Revenue	Mar-17 F4Q17	Jun-17 F1Q18	Sep-17 F2Q18	Dec-17 F3Q18	Mar-18 F4Q18	Jun-18 F1Q18	Sep-18 F2Q18	Dec-18 F3Q18	Mar-19 F4Q18	FY2017	FY2018E	FY2019E	CY2016	CY2017E	CY2018E
MCUs	$580.5	$635.5	$656.2	$631.7	$642.3	$665.0	$671.5	$642.6	$656.1	$2,228.7	$2,565.8	$2,635.2	$1,988.6	$2,503.9	$2,621.5
Flash Memory/EEPROM	$45.5	$49.5	$48.8	$45.2	$46.0	$46.7	$46.3	$42.8	$43.5	$186.3	$189.5	$179.2	$168.0	$189.0	$181.7
Analog	$230.5	$239.1	$244.9	$245.5	$246.4	$255.6	$258.4	$258.3	$257.3	$898.4	$975.8	$1,029.6	$839.6	$959.9	$1,018.6
Technology Licensing	$23.1	$25.0	$27.0	$27.3	$26.8	$25.2	$26.2	$26.6	$25.4	$91.2	$106.1	$103.2	$88.1	$102.4	$104.6
Multi-Market & Other	$23.2	$23.1	$24.2	$24.2	$21.7	$22.5	$22.0	$23.2	$20.4	$97.1	$93.2	$88.0	$83.1	$94.6	$89.3
Total Revenues	**$902.7**	**$972.1**	**$1,001.3**	**$973.9**	**$983.1**	**$1,014.9**	**$1,024.3**	**$993.5**	**$1,002.7**	**$3,501.7**	**$3,930.4**	**$4,035.3**	**$3,167.5**	**$3,850.0**	**$4,015.8**
% of Sales	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**	**Mar-19**	**FY2017**	**FY2018E**	**FY2019E**	**CY2016**	**CY2017E**	**CY2018E**
MCUs	64.3%	65.4%	65.5%	64.9%	65.3%	65.5%	65.6%	64.7%	65.4%	63.6%	65.3%	65.3%	62.8%	65.0%	65.3%
Flash Memory/EEPROM	5.0%	5.5%	5.4%	5.0%	5.1%	5.2%	5.1%	4.7%	4.8%	5.3%	4.8%	4.4%	5.3%	4.9%	4.5%
Analog	25.5%	26.5%	27.1%	27.2%	27.3%	28.3%	28.6%	28.6%	28.5%	25.7%	24.8%	25.5%	26.5%	24.9%	25.4%
Technology Licensing	2.6%	2.8%	3.0%	3.0%	3.0%	2.8%	2.9%	2.9%	2.8%	2.6%	2.7%	2.6%	2.8%	2.7%	2.6%
Multi-Market & Other	2.6%	2.6%	2.7%	2.7%	2.4%	2.5%	2.4%	2.6%	2.3%	2.8%	2.4%	2.2%	2.6%	2.5%	2.2%
Total Revenues	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Segment q/q change	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**	**Mar-19**						
MCUs	4.4%	9.5%	3.3%	-3.7%	1.7%	3.5%	1.0%	-4.3%	2.1%						
Flash Memory/EEPROM	-2.3%	8.8%	-1.3%	-7.5%	1.7%	1.6%	-0.9%	-7.6%	1.7%						
Analog	1.1%	3.7%	2.5%	0.2%	0.4%	3.7%	1.1%	0.0%	-0.4%						
Technology Licensing	-3.2%	8.5%	8.0%	1.0%	-2.0%	-6.0%	4.0%	1.5%	-4.5%						
Multi-Market & Other	-13.4%	-0.5%	5.0%	0.0%	-10.4%	3.6%	-2.0%	5.4%	-12.1%						
Total Revenues	**2.4%**	**7.7%**	**3.0%**	**-2.7%**	**1.0%**	**3.2%**	**0.9%**	**-3.0%**	**0.9%**						
Segment y/y change	**Mar-17**	**Jun-17**	**Sep-17**	**Dec-17**	**Mar-18**	**Jun-18**	**Sep-18**	**Dec-18**	**Mar-19**	**FY2017**	**FY2018E**	**FY2019E**	**CY2016**	**CY2017E**	**CY2018E**
MCUs	70.5%	18.1%	18.4%	13.6%	10.7%	4.6%	2.3%	1.7%	2.1%	65.6%	15.1%	2.7%	46.4%	25.9%	4.7%
Flash Memory/EEPROM	67.2%	4.0%	4.8%	-3.0%	1.1%	-5.6%	-5.3%	-5.4%	-5.4%	59.3%	1.7%	-5.4%	37.7%	12.5%	-3.9%
Analog	34.2%	11.2%	8.9%	7.6%	6.9%	6.9%	5.5%	5.2%	4.5%	41.3%	8.6%	5.5%	41.8%	14.3%	6.1%
Technology Licensing	15.5%	21.6%	14.2%	14.6%	16.0%	0.5%	-3.2%	-2.8%	-5.2%	2.2%	16.4%	-2.7%	-7.8%	16.3%	2.1%
Multi-Market & Other	153.1%	0.5%	-0.3%	-9.5%	-6.4%	-2.6%	-9.1%	-4.2%	-6.0%	269.8%	-4.1%	-5.5%	215.9%	13.9%	-5.6%
Total Revenues	**58.8%**	**15.2%**	**14.6%**	**10.5%**	**8.9%**	**4.4%**	**2.3%**	**2.0%**	**2.0%**	**58.2%**	**12.2%**	**2.7%**	**44.3%**	**21.5%**	**4.3%**

Source: Company data, Credit Suisse estimates

Key Issues

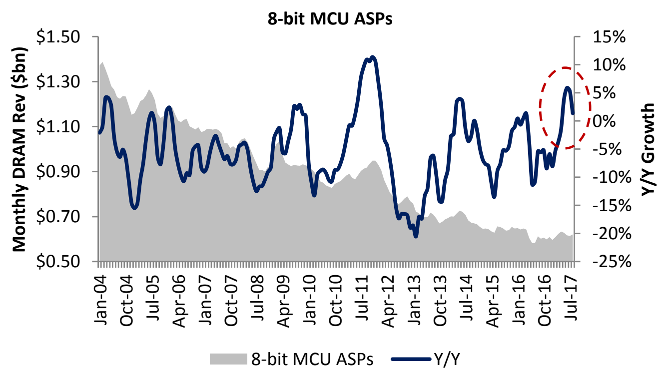
Better LT Pricing, Scale and End-Market Exposure Drive Organic Upside: MCHP was early to M&A as the Company believed organic Industry growth might only be 1-3%, which was the case in 2015/16. However, the Company's recent commentary around structurally better pricing and expectations for LT growth of high-single digits supports our view for a base-case LT Semi Rev CAGR (ex-Memory) of 5-7%+. We see multiple drivers of upside which could add $2+ to our CY18 EPS of $5.50 before additional M&A. Specifically we would highlight the following:

(1) Structurally Improving Growth from Better Pricing. MCHP issued a high-single digit LT CAGR based upon more rational pricing from consolidation (flat to up vs. the 5-year CAGR of -2%), upside from analog attach, and distribution leverage. Importantly, while MCU pricing is tracking down 8% y/y for C3Q, 8-bit MCU pricing (where MCHP leads with 25% share) is tracking up 6% y/y – supportive of NT upside as well as MCHP's LT target for a stable to rising pricing environment longer-term.

(2) Leverage to Higher-Growth End-Markets: MCHP's end-market exposure is among the most diverse in Semis – 35% Industrial, 25% Auto, 24% White Goods Consumer, 9% Computing, 5% Comms, 2% Mil/Aero. 60% exposure to Industrial and Auto, more stable end markets with significant content growth is one of the highest in our coverage.

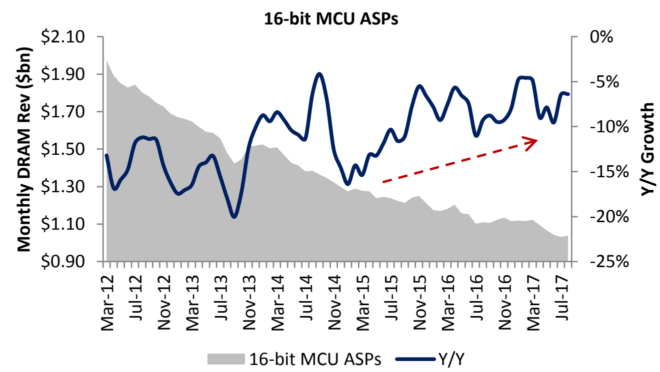
(3) MCU and Analog segments should begin to benefit from scale. As silicon becomes a greater % of BOM, customers will deal with fewer suppliers who do more – driving faster than historic share growth. We see terminal market share in MCU at 20%+ vs. high teens today.

Figure 242: Stable to Rising Pricing in 8-Bit MCUs



Source: Company data, Credit Suisse estimates

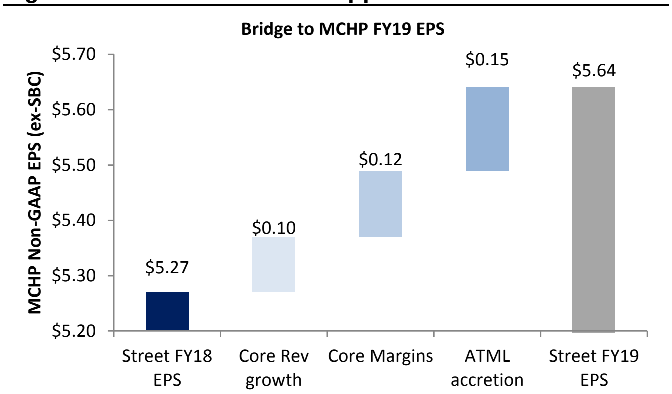
Figure 243: Better than Historic Pricing in 16-Bit MCUs



Source: Company data, Credit Suisse estimates

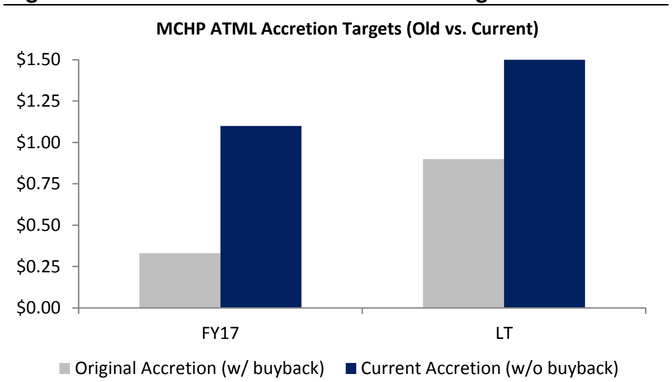
ATML Accretion Still Under-Modeled. MCHP has successfully executed on ATML pricing discipline, cost-cutting and Rev stabilization with additional benefits from operational improvements and cross-selling still on the come. While MCHP will not buy back the 13m shares used to fund the ATML transaction, JunQ annualized accretion of ~$1.12 was above MCHP's original LT accretion target of $0.90 which included a share buyback – we see terminal accretion closer to $1.50. Importantly, we would argue that Street FY19 EPS appears conservative – specifically Street is currently modeling FY19 EPS of $5.64, embedding ~$0.15 in incremental ATML accretion (or ~$1.30 in total ATML accretion vs. our LT target of $1.50), and an incremental ~$0.22 from Rev growth and core margin expansion – well below ~$0.60 in FY17 and ~$0.70 in FY18. Assuming an incremental $0.35 in ATML accretion (yielding total accretion of $1.50) and an incremental $0.60 in core Rev growth in margin expansion would imply FY19 EPS closer to $6.25, well ABOVE Street of $5.64.

Figure 244: FY19 Street EPS Appears Conservative



Source: Company data, Credit Suisse estimates

Figure 245: Current Accretion ABOVE Original Forecast

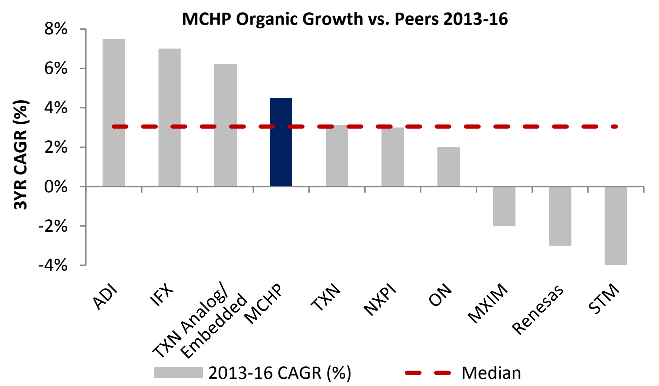


Source: Company data, Credit Suisse estimates

Note ATML outsourced 90% of testing vs. core MCHP 90% in-house – as MCHP continues to insource testing (55% in-house today, goal of 80%) we expect to see further benefit to GM towards 62.5%. With total Rev now >$4bn, we see additional OpM leverage towards LT target of ~40% as achievable in the ST. Specifically MCHP has managed to stabilize ATML Rev but would continue to highlight ongoing opportunities in 8-bit (ATML had neglected this business, continues to be capacity rather than demand constrained which MCHP will be able to correct) and Analog attach (a $300m opportunity over the next 5 years, on top of MCHP's ~$1bn existing Analog business).

At Least In-Line Organic Growth with Inorganic Upside. Relative to MCHP a key concern continues to be the organic growth profile of the Company. Determining organic vs. inorganic growth becomes increasingly more difficult as the Company continues to execute on M&A due to the co-mingling and cross-selling that occur 2-3 quarters after any acquisition. Our analysis suggests that the MCHP core business is growing at least in-line with industry – specifically, we estimate that over the past 5 years core MCHP Rev grew at a 4% CAGR vs. peers at ~3% and Semis ex-Memory at 3%. We continue to highlight MCHP's impressive track record of buying sub-par assets and driving significant accretion: 17 deals over the past 10 years, adding $2+ to annual EPS. Importantly the Company will soon have the financial and management bandwidth to engage in additional M&A – MCHP maintained that there are still suitable targets available despite high Semi valuations in general. We would also note that in 03/17 MCHP amended its credit agreement – allowing for 5.5x times total leverage in certain conditions vs. prior max of 5.0x – note the prior 2 times MCHP amended its covenant in a similar manner was 3/1 month(s) before it announced the MCRL and ATML transactions, respectively.

Figure 246: Organic Growth In-Line with Peers



Source: Company data, Credit Suisse estimates

Figure 247: Organic Growth with Inorganic Upside

Company	Acquisition Date	Purchase Price ($m)	Annual Rev ($m)	% of total MCHP Rev	Annual Accretion
SSTI	2010	$177	$100	3%	$0.40-$0.45
SMSC	2012	$711	$460	12%	$0.40-$0.45
SUPX	2014	$224	$65	2%	$0.10-$0.15
ISSC	2014	$304	$65	2%	$0.05
MCRL	2015	$830	$260	7%	$0.25
ATML	2016	$3,500	$1,150	29%	$1.00

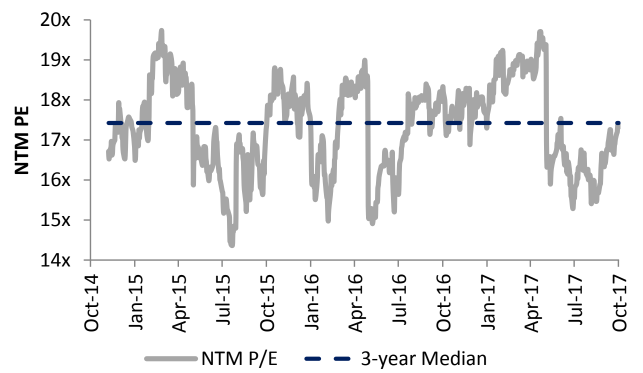
Source: Company data, Credit Suisse estimates

Margins Still Have Upside to Achieve LT Target. Operating leverage and upside to ATML accretion should drive GM/OpM from 60%/38% today to targets of 62.5%/40% within 1-2 years, driving ~$0.30 of upside to CY18. With core-ATML GM >54% and OpM >33% vs. 45%/4% respectively upon close of the acquisition – we see MCHP entering uncharted levels of operational efficiencies and leverage. Recall MCHP's LT target model calls for high-single digit Rev growth, 62.5% GM, and 40% OpM vs. our expectations for 4% Rev growth, 61.0% GM and 38.3% OpM in CY18 – while MCHP's current LT targets do not have a specific timeline we believe MCHP could achieve its LT model in under 3 years. We would highlight that MCHP has historically been successful on driving improved margins relative to acquisitions despite the near-term negative effect of absorbing lower-margin companies. Specifically, MCHP has achieved 60% GM for SUPX (high 60%s/30%s GM/OpM vs. 47%/9% upon acquisition), SMSC (~52%/7% GM/OpM upon acquisition), and MCRL (60%/30% GM/OpM once higher-cost inventory is sold through vs. 51%/8% upon acquisition). We see upside towards MCHP's target model from: (1) improving Analog attach at higher margins, (2) flat to rising ASPs LT on both core MCHP and core ATML portfolios, (3) even better ATML execution.

Investment View and Valuation

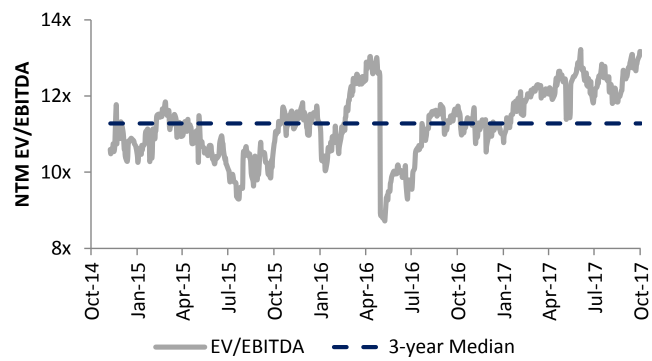
We continue to see MCHP as a core holding – strong management team, diversified product and end market exposure, operating leverage, M&A potential, and cheap valuation. The stock is currently trading at EV/FCF on CY18 of 17x, a 5% discount to peers and its 5YR median despite FTM EPS/FCF estimates that have increased 50% over the last 9 months versus a Semi average of 25%. FCF growth (~$1bn annualized rate in F1Q) provides ample resources for additional accretive acquisitions with a stellar track record – 17 over the last 10 years driving $2+ of accretion. We rate MCHP OP with a PT of $90 based upon 18x CY18 EV/FCF. The consistency of its business, the longer duration of its product portfolio, the diversity of its customer base and the potential for further accretion, debt reduction and buybacks are all supportive of a premium multiple.

Figure 248: NTM PE Over Time



Source: Company data, Credit Suisse estimates, Thomson Reuters

Figure 249: NTM EV/EBITDA Over Time



Source: Company data, Credit Suisse estimates, Thomson Reuters

Micron Technology

(MU, $40.40, OUTPERFORM, TP $50.00)

Upside Not as Important as Sustainability

Reporting Date: TBD

Conference Call: TBD

Figure 250: MU Summary of Results and Expectations

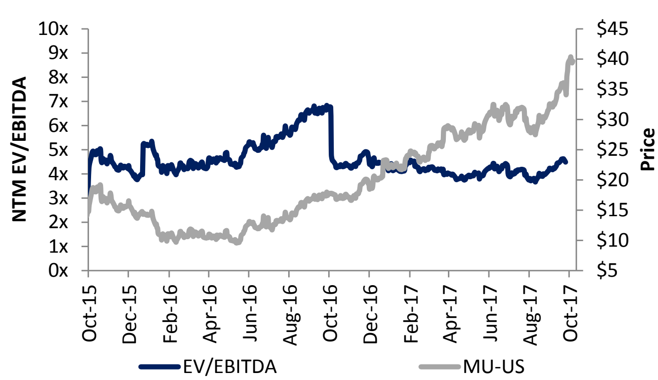
US $ in millions, unless otherwise stated

MU	Aug-17	Nov-17E			Feb-18E		CY2018E		CY2019E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$6,138	$6,299	$6,372	$6.10-6.50bn	$6,053	$6,055	$24,807	$24,540	$26,161	$24,588
% Q/Q chng	*10.3%*	*2.6%*	*3.8%*		*-3.9%*	*-5.0%*				
% Y/Y chng	*90.8%*	*58.7%*			*30.2%*		*9.5%*	*8.3%*	*5.5%*	*0.2%*
Gross Margin	51.3%	53.2%	*52.5%*	*50.0%-54.0%*	52.6%	*51.1%*	51.9%	*48.5%*	52.5%	*45.7%*
Total Operating Expenses	$601	$600		$575-$625	$590		$2,409		$2,448	
Operating Income	$2,546	$2,753		$2.65-$2.85bn	$2,593		$10,462		$11,293	
Operating Margin	41.5%	43.7%			42.8%		42.2%		43.2%	
Net Income (w/ options)	$2,330	$2,516			$2,331		$9,284		$9,911	
Net Margin	38.0%	39.9%			38.5%		37.4%		37.9%	
EPS (Pro Forma w/ options)	$1.97	$2.11			$1.95		$7.73		$8.16	
EPS (Pro Forma ex options)	$2.02	$2.16	$2.16	$2.09-$2.23	$2.00	$1.91	$7.92	$7.36	$8.35	$6.21
EPS (GAAP)	$1.90	$2.09			$1.93		$7.64		$8.06	
Diluted Shares Outstanding	1,181.0	1,191.0			1,194.6		1,200.7		1,214.4	
Free Cash Flow	$1,703	$1,464			$1,710		$6,007		$8,788	
FCF per share	$1.44	$1.23			$1.43		$5.00		$7.24	

Source: Thomson Reuters, Company data, Credit Suisse estimates

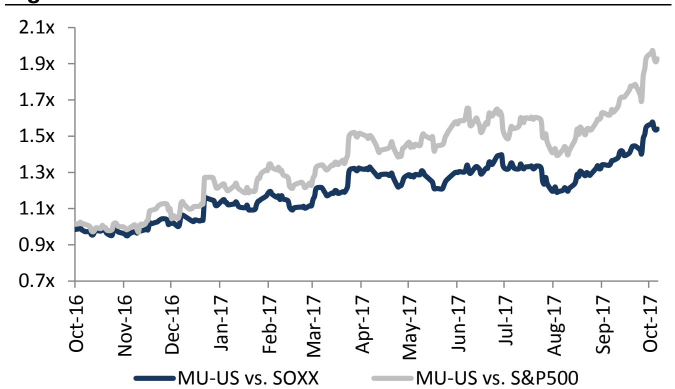
MU: Recap of Recent Stock Performance

Figure 251: MU NTM EV/EBITDA vs. Price



Source: Company data, Thomson Reuters

Figure 252: LTM Performance vs. SOXX vs. SPX



Source: Company data, Thomson Reuters

Key Message. While still early, we expect MU to report F1Q and guide F2Q at least IN-LINE with a POSITIVE bias. F1Q bias-to-the-upside is being driven by continued strong price trends as guidance embeds ASPs of flat to down, versus more recent channel checks that suggest up mid-single digits q/q. Should current trends hold we see ~15 cents of upside to F1Q EPS to $2.30 versus CS of $2.16. Upside is not as important as perceived sustainability – YTD MU FTM EPS has increased ~220% versus a stock up ~85% – implying a ~40% contraction in the multiple, reflecting investor concerns that the memory industry and MU are currently over-earning. While memory is still cyclical, we see the current environment as "Stronger-For-Longer" for 3 reasons: (1) Not enough time has passed for a cycle-ending supply response, (2) The cost of capacity is structurally increasing, and (3) New applications around Data Analytics, AI and AD are driving sustainably higher demand. In addition, MU has company specific cost drivers in both DRAM and NAND to drive additional alpha especially with the new CEO and COO having extensive NAND industry experience. We view FY18 CapEx guidance as a positive, as it signifies a significant change from "fast follower" to "cost competitive." While the optics of the recent stock offering raised concerns around management's own confidence in the sustainability of the business, we would argue the offering (1) accelerates debt reduction, (2) increases flexibility of onshore cash, and (3) achieves #1 and #2 with minimal to no EPS dilution. While convincing investors of sustainability is a process not an event, still conservative EPS, a move to net cash positive in FY18, and continued progress on closing the cost gap should support a higher share price. Reiterate OP and $50 TP or ~9x FY18 EV/FCF, in-line with global peers.

Recap of F4Q17 (AugQ) Rev/EPS ABOVE CS/Street:

MU reported AugQ Rev of $6.14bn (+10.3% q/q) ABOVE CS preview of $6.09bn (+9.3% q/q, Street preview of $6.03bn (+8.3% q/q), CS of $5.90bn (+6.0% q/q), and guidance for $5.90bn (+6.0% q/q).We would highlight the following:

- **DRAM:** MU's DRAM Rev (65% of total Rev) of $4.0bn increased ~13% q/q, IN-LINE with CS preview of at least $4.0bn (up ~13% q/q) – driven by a 8% q/q increase in ASPs (above CS preview at +4.5% q/q and guidance for flat q/q) and a 5% q/q increase in bits shipments (below CS preview of 8.5% q/q). Relative to DRAM mix, Mobile DRAM decreased from 25% to 20%, PC mix increased from 21% to 25%, Server mix was flat at 30%, and Other mix increased from 24% to 25%. Importantly, Server was larger than PC and Mobile again – a continuation of the trend that emerged for the first time last quarter, driven by hyperscale demand.

- **NAND:** NAND Rev (30% of total Rev) of $1.85bn increased 8% q/q, above CS preview of at least $1.81bn – driven by a 5% increase in ASPs (above CS preview of +1% q/q and guidance for flat q/q) and a 3% q/q increase in bit shipments (below CS preview of 5% q/q). Relative to NAND mix, Consumer was flat at 40%, Mobile was 20% up from 16%, SSDs were 20% down from 26%, and Auto/Industrial/Other was 20% up from 18%.

- **GM, OpM, and EPS ABOVE CS/Street:** GM of 51.3% (+330 bps q/q) was ABOVE CS preview of 50.6% (+260 bps q/q), Street preview of 50.0%, CS of 49.0% (+100 bps q/q), and guidance for 49.0% (+100 bps q/q). While better ASPs drove GM higher q/q, we would note that better than expected NAND ASPs were offset by cost/bit that was up 6% versus CS expectations for down 3%, driving NAND GM down q/q – as MU identified and corrected a flash component issue on select TLC 3D NAND products. Note DRAM cost/bit was down 4%, better than CS expectations for down 1% q/q. OpEx of $600m (-2.0% q/q) was ABOVE CS estimate of $585m (-4.4% q/q) and ABOVE the mid-point of original guidance for $560-610m, and Interest expense of $113m was BELOW CS estimate of $122m. Higher Rev and better margins drove an EPS of $1.62, IN-LINE with CS of $1.63 but ABOVE Street estimates of $1.51 and guidance for $1.50.

F1Q18 (NovQ) Rev/EPS Guided ABOVE CS and Street:

MU guided F4Q Rev to a range of $6.10-6.50bn or $6.30bn at the mid-point modestly BELOW CS preview of $6.32bn (+3.9% q/q) but ABOVE Street preview of $6.21bn (+3.0% q/q) and CS of $6.16bn (+4.4% q/q).

- **DRAM:** We expect DRAM Rev of $4.14bn up ~3.6% q/q – driven by a ~3.5% increase in bit shipments q/q with ASPs flat. Lastly, we expect cost downs of ~6% q/q in F1Q. Relative to FY18, MU expects industry bit growth of ~20% y/y, and the timing of the 1x transition is expected to result in bit growth at or slightly below industry growth rates – albeit we expect bits to accelerate as MU reaches 1xnm crossover towards the end of CY18.
- **NAND:** We expect NAND Rev of $1.87bn up ~1.4% q/q – driven by ~4% increase in bit shipments q/q despite ASPs being down 2.5 q/q. Relative to FY18, MU expects industry bit growth of ~50% y/y and expects CY18 bits to modestly outgrow the industry. We would note that based on the timing of tech transitions, MU expects relatively muted bit growth in F1H18 followed by stronger growth in F2H18 as MU reaches crossover on 64-layer 3D NAND.
- **GM, OpM, and EPS ABOVE CS/Street:** MU guided GM to a range of 50% to 54%, with a midpoint of 52% ABOVE CS preview of 51.6% and ABOVE Street of preview of 50.6%. OpEx of $575-625m or $600m at the mid-point was modestly ABOVE CS of $595m (-0.8% q/q). MU guided EPS to a range of $2.09-$2.23 or $2.16 at the mid-point was ABOVE CS preview of $2.10, Street preview of $2.00 and CS of $1.96. Should current trends hold we see ~15 cents of upside to the midpoint of F1Q EPS of $2.16.

Figure 253: MU Revenue and Gross Margin Model

Revenue ($m)	Nov-16 F1Q	Feb-17 F2Q	May-17 F3Q	Aug-17 F4Q	Nov-17E F1Q	Feb-18E F2Q	May-18E F3Q	Aug-18E F4Q	Nov-18E F1Q	Feb-19E F1Q	May-19E F1Q	Aug-19E F1Q	Nov-19E F1Q	FY2017	FY2018	FY2019	CY2017	CY2018	CY2019
DRAM Products	$2,411	$2,946	$3,526	$3,999	$4,143	$3,921	$3,707	$3,620	$3,679	$3,635	$3,632	$3,632	$3,813	$12,882	$15,391	$14,578	$14,615	$14,927	$14,712
NAND Flash Products	$1,411	$1,551	$1,841	$1,980	$2,006	$1,982	$2,059	$2,371	$2,868	$2,699	$2,644	$2,715	$2,790	$6,784	$8,418	$10,926	$7,379	$9,279	$10,848
Trade NAND	$1,276	$1,416	$1,706	$1,845	$1,871	$1,847	$1,924	$2,236	$2,733	$2,564	$2,509	$2,580	$2,655	$6,244	$7,878	$10,386	$6,839	$8,739	$10,308
INTC (IMFT)	$135	$135	$135	$135	$135	$135	$135	$135	$135	$135	$135	$135	$135	$540	$540	$540	$540	$540	$540
Other	$148	$151	$198	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$647	$600	$600	$649	$600	$600
Total	$3,970	$4,648	$5,566	$6,129	$6,299	$6,053	$5,915	$6,141	$6,697	$6,485	$6,426	$6,497	$6,753	$20,313	$24,409	$26,105	$22,642	$24,807	$26,161
COGS ($m)	Nov-16	Feb-17	May-17	Aug-17	Nov-17E	Feb-18E	May-18E	Aug-18E	Nov-18E	Feb-19E	May-19E	Aug-19E	Nov-19E	FY2017	FY2018	FY2019	CY2017	CY2017	CY2017
DRAM Products	$1,734	$1,646	$1,625	$1,638	$1,593	$1,508	$1,427	$1,364	$1,386	$1,355	$1,312	$1,285	$1,309	$6,642	$5,892	$5,338	$6,501	$5,684	$5,261
NAND Flash Products	$1,118	$1,121	$1,150	$1,243	$1,253	$1,262	$1,302	$1,485	$1,802	$1,758	$1,700	$1,657	$1,643	$4,632	$5,302	$6,917	$4,767	$5,851	$6,758
Trade NAND	$983	$986	$1,015	$1,108	$1,118	$1,127	$1,167	$1,350	$1,667	$1,623	$1,565	$1,522	$1,508	$4,092	$4,762	$6,377	$4,227	$5,311	$6,218
INTC (IMFT)	$135	$135	$135	$135	$135	$135	$135	$135	$135	$135	$135	$135	$135	$540	$540	$540	$540	$540	$540
Other	$86	$142	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$428	$400	$400	$442	$400	$400
Total	$2,938	$2,909	$2,875	$2,981	$2,946	$2,870	$2,829	$2,948	$3,288	$3,213	$3,112	$3,042	$3,052	$11,702	$11,594	$12,655	$11,710	$11,936	$12,420
Gross Profit ($m)	Nov-16	Feb-17	May-17	Aug-17	Nov-17E	Feb-18E	May-18E	Aug-18E	Nov-18E	Feb-19E	May-19E	Aug-19E	Nov-19E	FY2017	FY2018	FY2019	CY2017	CY2017	CY2017
DRAM Products	$677	$1,300	$1,902	$2,361	$2,550	$2,413	$2,280	$2,256	$2,293	$2,280	$2,320	$2,346	$2,504	$6,240	$9,499	$9,240	$8,113	$9,243	$9,451
NAND Flash Products	$294	$430	$691	$737	$753	$720	$756	$886	$1,066	$941	$944	$1,058	$1,146	$2,152	$3,116	$4,009	$2,612	$3,428	$4,090
Trade NAND	$294	$430	$691	$737	$753	$720	$756	$886	$1,066	$941	$944	$1,058	$1,146	$2,152	$3,116	$4,009	$2,612	$3,428	$4,090
INTC (IMFT)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other	$62	$9	$98	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$219	$200	$200	$207	$200	$200
Total	$1,032	$1,739	$2,691	$3,149	$3,353	$3,183	$3,086	$3,193	$3,409	$3,272	$3,314	$3,455	$3,701	$8,611	$12,815	$13,449	$10,932	$12,871	$13,741
Gross Margin (%)	Nov-16	Feb-17	May-17	Aug-17	Nov-17E	Feb-18E	May-18E	Aug-18E	Nov-18E	Feb-19E	May-19E	Aug-19E	Nov-19E	FY2017	FY2018	FY2019	CY2017	CY2017	CY2017
DRAM Products	28.1%	44.1%	53.9%	59.1%	61.5%	61.5%	61.5%	62.3%	62.3%	62.7%	63.9%	64.6%	65.7%	48.4%	61.7%	63.4%	55.5%	61.9%	64.2%
NAND Flash Products	20.8%	27.7%	37.5%	37.2%	37.5%	36.3%	36.7%	37.4%	37.2%	34.9%	35.7%	39.0%	41.1%	31.7%	37.0%	36.7%	35.4%	36.9%	37.7%
Trade NAND	23.0%	30.4%	40.5%	39.9%	40.3%	39.0%	39.3%	39.6%	39.0%	36.7%	37.6%	41.0%	43.2%	34.5%	39.6%	38.6%	38.2%	39.2%	39.7%
INTC (IMFT)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other	41.6%	6.0%	49.5%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.8%	33.3%	33.3%	31.9%	33.3%	33.3%
Total	26.0%	37.4%	48.4%	51.4%	53.2%	52.6%	52.2%	52.0%	50.9%	50.5%	51.6%	53.2%	54.8%	42.4%	52.5%	51.5%	48.3%	51.9%	52.5%

Source: Company data, Credit Suisse estimates

Key Issues

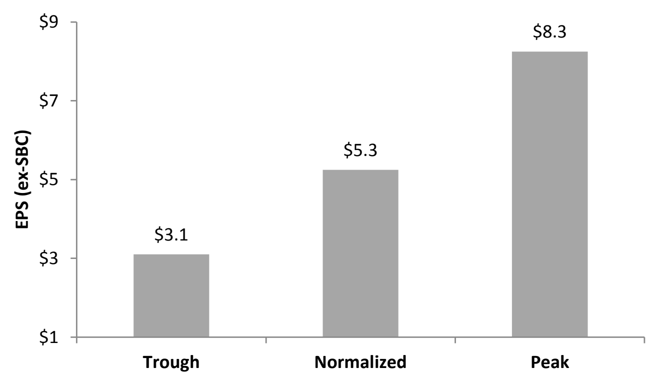
A "Stronger-for-Longer" Plateau, Not a Peak: FTM EPS estimates for MU have increased 220% YTD and while we see solid upside to results, significant beat/raises may be plateauing into 2H17, albeit NOT peaking. While memory is still cyclical, we are arguing "stronger-for-longer" for 3 reasons: (1) Not enough time has passed for a cycle-ending supply response, (2) The cost of capacity is increasing structurally, and (3) New applications (AI/DL, AD, SSDs) are supporting diversification and a demand-pull not seen since 1994-95. Our tops down view is supported by price checks that suggest stability/upside to DRAM through 2017 and more modest than originally expected NAND declines in 2H17. Lastly, idiosyncratic drivers should allow for MU to narrow the "cost-GAP" with peers and for margin expansion even with modest ASP declines.

- **Cycle Mostly Behaved:** Trough-to-date DRAM CapEx is up only 18% and CapEx/Rev is 19% vs. prior peaks of 110%/34%; NAND CapEx is up 33% and CapEx/Rev is 50%, in-line with prior peaks, a modest risk to NAND supply/demand. Importantly, C3Q is only the 5th quarter post-trough vs median of 9 quarters trough-to-peak.
- **Capacity Costs Increasing:** Over the last 3 years, incr. DRAM/NAND bit growth per wafer declined to 19%/27% from 35%/38% at the same time complexity has decreased ‘ceteris paribus’ wspm by ~20%/50% -- driving DRAM/NAND cost declines from 25-30% to 10-15% and 30-40% to 15-20%. The cost to grow DRAM/NAND bits by 1% has increased by 120%/100%.
- **New Demand Drivers:** AI servers are ~8-10x more DRAM intensive, at 10% of total servers AI could be as large as the server market today. SSDs are 9% of exabytes, at 20%, SSDs would be as large as the overall NAND market today. Auto is pure upside - AD could become 20-80% of today’s DRAM market, up from 0.5% today.

MU Earnings in the Last Cycle Have Not Been Representative of the Overall Memory Industry. MU earnings while being viewed as a peak, are however still lower than their full potential as the Company is lagging behind peers. Specifically, MU LTM OpM are ~30%, vs peers at ~40% and 45% respectively. If we assume that Company had ~40% OpM, we estimate that FY17 MU EPS/FCF would be ~$6.50/$4.50 versus current CS estimate of $4.64/$2.64. Assuming Samsung's OpM of ~45%, FY17 MU EPS/FCF would be ~$7.10/$5.15 versus CS of $4.64/$2.64. Current MU earnings are also impacted by less profitable sales of NAND to Intel that are on cost plus arrangement. MU is selling ~$550mn of NAND per year to Intel at low margins. Assuming the company is able to improve the margins to rest of the business, it would drive up to ~$300mm/$0.25 upside to annual Rev/EPS.

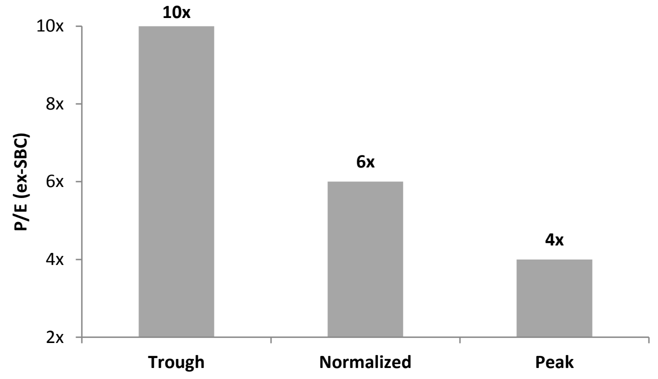
Higher Peak – Higher Troughs. Much of the conversation on MU has focused on "where we are in cycle" and when DRAM pricing declines. However, investors are continuing to miss the structural improvements in the memory industry, and that peak/trough earnings are now structurally higher at >$8/>$3. We see normalized earnings this cycle at >$5, and see the stock as extremely attractive, trading at ~4x/10x of peak/trough, and only at ~6x of normalized earnings. It is now clear that MU will likely have peak quarterly EPS of >$2 (or >$8 on annualized) versus <$1 last cycle ($1.30 adjusted for accounting changes/ Inotera). We also think that trough earnings in next cycle will be significantly higher than ($0.08) trough earnings – and we see trough earnings at ~$0.75. Specifically (i) Peers’ OpM declined by 8%/ 18% in last cycle versus ~25% for MU. Assuming a similar decline in OpM (~18%) from peak, we estimate MU's OpM at ~25% which should support an annualized EPS of $3. (ii) Cost declines for industry in NAND/DRAM have decelerated from a 40%/30% per year CAGR to ~15%-20% / 10%-15%. It is less disadvantageous to be a year behind technology than it used to be (iii) New CEO is more focused on closing the technology gap relative to peers. Peak and trough earnings are now growing – and higher than past cycles. MU stock is only at 4x/10x of trough earnings. We believe too much focus on cycle is leading to extremely attractive valuations.

Figure 254: MU's Normalized EPS of >$5



Source: Company data, Credit Suisse estimates

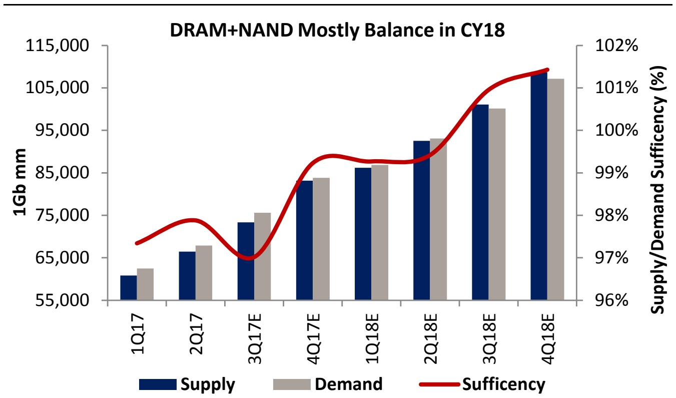
Figure 255: Valuation Only ~6x Normalized EPS



Source: Company data, Credit Suisse estimates

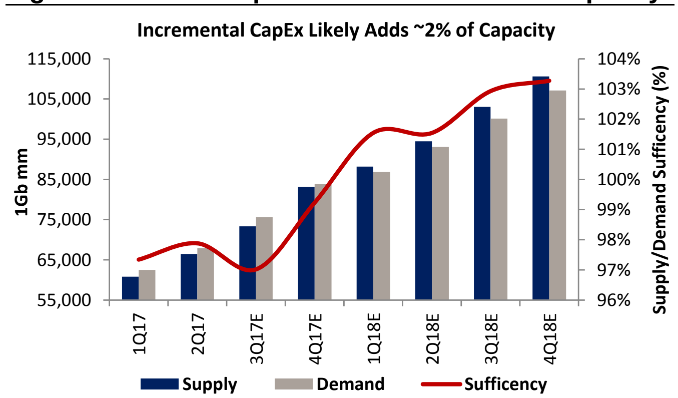
DRAM Sustainable Thru CY18, Potential for C2H18 NAND Modestly Oversupplied: Following C2Q earnings, we are updating our DRAM and NAND supply/demand models to reflect recent CapEx upward revisions as well as current end-market dynamics. While CY17 and CY18 DRAM+NAND CapEx were increased by 9% / 5%, we see a negligible impact to CY17 DRAM and NAND bit production given that (1) bit growth comes roughly 2-3 Qs after CapEx spend and (2) higher CY17 CapEx is being been offset by both higher capital intensity and significantly lower yield rates. However, we do see the potential for increased CapEx to result in NAND being ~5% oversupplied in C2H18, versus equilibrium in C4Q17, as 3D increases to ~65-70% of mix and 3D yields improve significantly, both of which will modestly offset higher capital intensity and drive incremental bit growth per wafer. Importantly, despite increased DRAM CapEx, we expect DRAM to continue to be ~1-2% undersupplied in C2H18, versus ~3% undersupplied in C4Q17, as the increasing number of process steps results in high-teens y/y incremental bit growth per wafer going forward, well below historic levels of ~35%, more than offsetting the incremental CapEx spend.

Figure 256: Supply/Demand Mostly Balanced in CY18



Source: Company data, Credit Suisse estimates

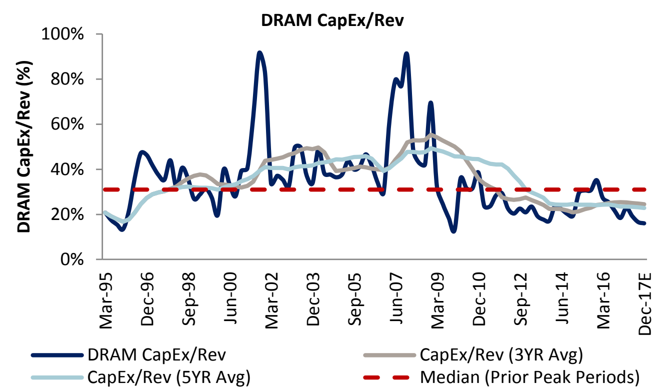
Figure 257: Incr. CapEx Adds ~2% of CY18 Capacity



Source: Company data, Credit Suisse estimates

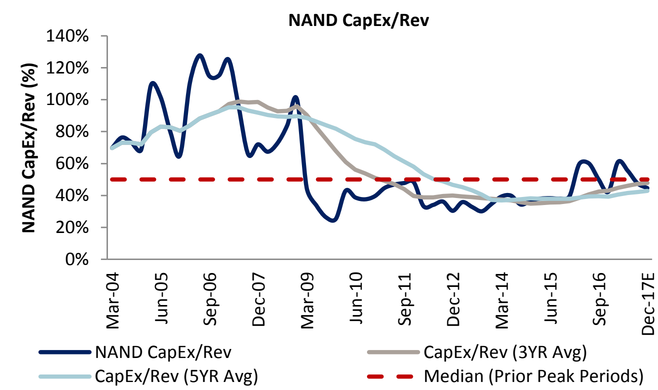
DRAM CapEx Metrics Remain Healthy, However NAND at Peak Levels: Even if one is unwilling to subscribe to the structurally improving narrative for memory, cyclical analysis and recent supply chain commentary would support a better 2H outlook than expected coming into 2017. However, over the course of C2Q earnings Memory suppliers increased their CY17 CapEx, which was mostly expected as 1H CapEx was already in-line with full-year targets. As such, CS SemiCap Analyst increased his CY17 CapEx estimates from $75.3bn (+16.7% y/y) to $82.4bn (+27.7% y/y), and increased CY18 CapEx estimates from $81.1bn (+7.7% y/y) to $85.2bn (+3.4% y/y). However, we would now highlight that Trough-to-date C2Q17 DRAM CapEx is up only ~43% and CapEx/Rev is ~20% versus prior peaks of 118%/31% suggesting not enough time has passed for a cycle-ending supply response in DRAM. However, NAND CapEx is up 33% and CapEx/Rev is 55%, in-line/modestly above prior peak of ~34%/50%. Importantly, C2Q is only the 4th quarter post trough for NAND and 5th quarter post trough for DRAM, versus the cyclical median of 9 quarters trough-to-peak.

Figure 258: DRAM CapEx/Rev Below Prior Peaks



Source: Company data, Credit Suisse estimates, SIA

Figure 259: NAND CapEx/Rev In-Line with Prior Peaks



Source: Company data, Credit Suisse estimates, SIA

We would also note commentary from PC, Server, Smartphone and HDD/SSD OEMs suggests a tight supply environment for both DRAM and NAND through C2H (incrementally better than expected coming into 2017). Importantly, supply chain commentary suggests that customers are not de-specing into C2H and we would also note additional tailwinds on the come from better than expected China handset builds in C3Q along with iPhone 8 builds beginning in C3Q (DRAM/NAND content up ~20%/15% gen-on-gen).

Figure 260: DRAM/NAND Rev & CapEx Growth Below Prior Trough-to-Peaks

DRAM: Cyclical Trough to Peak Analysis					
SIA DRAM Rev ($bn)					
Trough Q	3Q01	2Q05	1Q09	3Q12	1Q16
Peak Q	4Q04	4Q06	3Q10	4Q14	2Q17
Duration (Qtrs)	13	6	7	9	5
Trough	$1.7	$5.8	$3.7	$6.2	$8.7
Peak	$7.2	$10.8	$10.8	$12.6	$16.5
Delta	326.4%	85.3%	195.9%	102.3%	90.4%
Average	*160.1%*	*160.1%*	*160.1%*	*160.1%*	*160.1%*
Median	*102.3%*	*102.3%*	*102.3%*	*102.3%*	*102.3%*
DRAM CapEx ($bn)					
Trough Q	3Q01	2Q05	1Q09	3Q12	1Q16
Peak Q	4Q04	4Q06	3Q10	4Q14	2Q17
Trough	$1.8	$2.6	$1.1	$1.4	$2.3
Peak	$2.7	$5.7	$3.4	$3.5	$3.3
Delta	50.7%	118.3%	204.5%	151.8%	43.3%
Average	*113.7%*	*113.7%*	*113.7%*	*113.7%*	*113.7%*
Median	*118.3%*	*118.3%*	*118.3%*	*118.3%*	*118.3%*
DRAM CapEx/Rev					
Trough Q	3Q01	2Q05	1Q09	3Q12	1Q16
Peak Q	4Q04	4Q06	3Q10	4Q14	2Q17
Trough	104.4%	44.5%	30.1%	22.5%	26.8%
Peak	36.9%	52.3%	31.0%	28.0%	20.2%
Peak Average	*33.7%*	*33.7%*	*33.7%*	*33.7%*	*33.7%*
Peak Median	*31.0%*	*31.0%*	*31.0%*	*31.0%*	*31.0%*

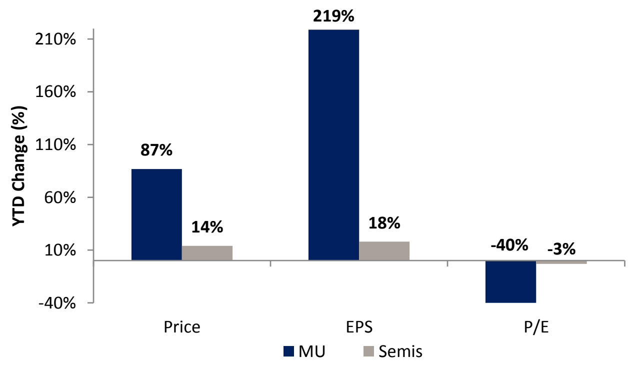
NAND: Cyclical Trough to Peak Analysis				
SIA NAND Rev ($bn)				
Trough Q	2Q05	4Q08	2Q12	2Q16
Peak Q	3Q07	1Q11	3Q14	2Q17
Duration (Qtrs)	9	9	9	4
Trough	$1.5	$2.4	$5.3	$6.9
Peak	$4.6	$6.4	$7.7	$10.9
Delta	204.7%	163.8%	44.9%	55.5%
Average	*117.2%*	*117.2%*	*117.2%*	*117.2%*
Median	*109.6%*	*109.6%*	*109.6%*	*109.6%*
NAND CapEx ($bn)				
Trough Q	2Q05	4Q08	2Q12	2Q16
Peak Q	3Q07	1Q11	3Q14	2Q17
Trough	$2.3	$1.2	$2.1	$4.2
Peak	$3.1	$2.9	$2.7	$6.0
Delta	35.6%	137.5%	24.7%	32.5%
Average	*57.6%*	*57.6%*	*57.6%*	*57.6%*
Median	*34.0%*	*34.0%*	*34.0%*	*34.0%*
NAND CapEx/Rev				
Trough Q	2Q05	4Q08	2Q12	2Q16
Peak Q	3Q07	1Q11	3Q14	2Q17
Trough	147.7%	49.4%	40.0%	60.0%
Peak	65.7%	44.5%	34.4%	55.4%
Peak Average	*50.0%*	*50.0%*	*50.0%*	*50.0%*
Peak Median	*50.0%*	*50.0%*	*50.0%*	*50.0%*

Source: Company data, Credit Suisse estimates, SIA

Investment View and Valuation

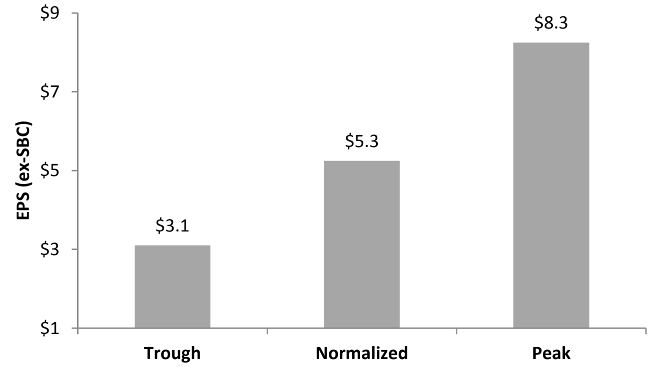
YTD MU FTM EPS has increased ~ 220% versus a stock up ~85% -- implying a ~40% contraction in the multiple, reflecting investor concerns that the memory industry and MU is currently over-earnings. We would note that while Semis as whole have seen modest multiple contraction around concerns of cyclical peaks, not to the same magnitude as MU. Despite investor concerns, we are arguing "stronger-for-longer" for 3 reasons: (1) Not enough time has passed for a cycle-ending supply response, (2) The cost of capacity is increasing structurally, and (3) New applications (AI/DL, AD, SSDs) are supporting diversification and a demand-pull not seen since 1994-95. Our top's down view is supported by price checks that suggest stability/upside to DRAM through C1H18 and more modest than originally expected NAND declines in CY18. Lastly, idiosyncratic drivers should allow for MU to narrow the “cost-GAP” with peers and for margin expansion even with modest ASP declines. Reiterate OP and $50 TP or ~9x FY18 EV/FCF, in-line with global peers.

Figure 261: 40% Multiple Contraction YTD



Source: Company data, Credit Suisse estimates

Figure 262: MU Normalized EPS of >$5



Source: Company data, Credit Suisse estimates

ON Semiconductor Corp.

(ON, $19.57, UNDERPERFORM, TP $14.50)

C3Q/C4Q Expect Upside – Especially on FCF

Reporting Date: TBD

Conference Call: TBD

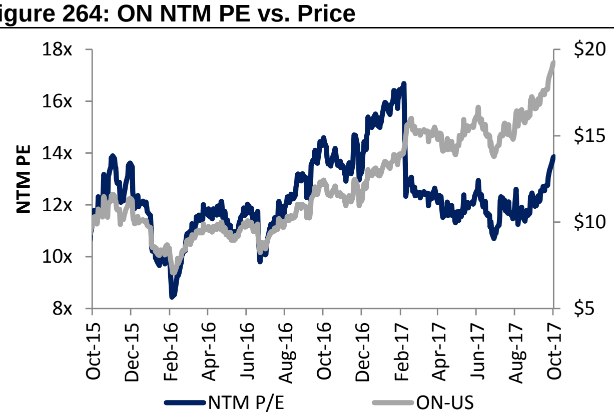
Figure 263: ON Summary of Expectations

ON-US	C2Q17	C3Q17			C4QE17		CY2017E		CY2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$1,338	$1,365	$1,367	$1,340m to $1,390m	$1,326	$1,327	$5,311	$5,313	$5,428	$5,453
% Q/Q chng	4.4%	2.0%	2.2%	+0.1% to +3.9% q/q	-2.9%	-2.9%				
% Y/Y chng	52.4%	43.5%	52.2%		5.2%	39.6%	35.9%	36.0%	2.2%	2.6%
Seasonal	4.3%	2.7%			-6.2%					
Gross Margin	36.9%	37.2%	37.4%	36.2% to 38.2%	36.8%	36.7%	36.6%	36.6%	37.4%	37.5%
Operating Expenses	$297	$292.0		$285m to $299m	$289.0		$1,163		$1,149	
Operating Margin	14.7%	15.8%			15.0%		14.7%		16.2%	
Net Income	$153.5	$172.3		Tax $13-17m	$155.7		$596		$683	
Net Margin	11.5%	12.6%			11.7%		11.2%		12.6%	
EPS (cont. ops, ex-options)	$0.41	$0.44			$0.40		$1.56		$1.76	
EPS (cont. ops, w-options)	$0.36	$0.40	$0.40	Implied $0.40	$0.36	$0.36	$1.40	$1.39	$1.60	$1.59
EPS (GAAP)	$0.22	$0.27			$0.24		$0.91		$1.18	
Fully diluted shares	425.9	427.0		427m	427.0		426.4		427.0	

Source: Thomson Reuters, Company data, Credit Suisse estimates

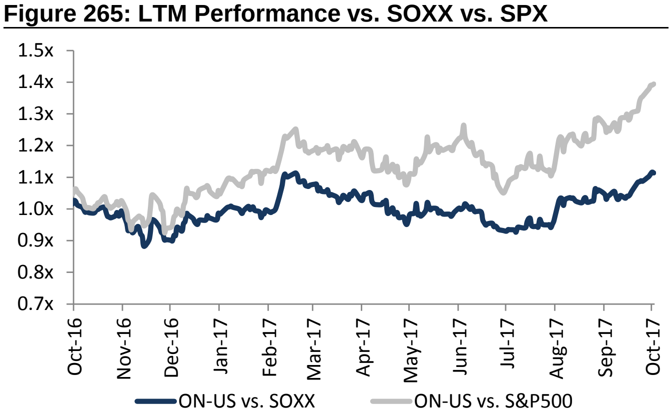
ON: Recap of Recent Stock Performance

Figure 264: ON NTM PE vs. Price



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 265: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data, Credit Suisse estimates

Key Message: We expect ON to report C3Q and guide C4Q at least IN-LINE with an UPWARD bias. The Company guided C3Q Rev essentially in-line with seasonal and our checks suggest UPSIDE to seasonal supported by strong trends in Auto/Industrial, new flagship phones in China and initial ramps for AAPL on iPhone8/X. Importantly we believe management has set conservative NT targets on margins and FCF – specifically on the latter CY17 FCF target of ~$625 implies 2H down ~50% h/h on Rev up ~3% h/h – we see CY17 FCF closer to $675-700m. While we remain structural bulls on all of Semis, we continue to argue for some cyclical defense and given ON's historic "early-cycle" leverage and our relative rating structure – we continue to find better risk/rewards in the group. With ON up 30% in C3Q versus SOX of 13%, that view has not been correct to-date and bulls would point to: (1) better management execution, (2) stronger than historic FCF with optionality of cash return in 1H18, and (3) a target model that drives $2.00 of EPS by 2020 versus CY18 $1.60. While valid, ON is currently trading at EV/FCF w/SBC of 16x on our CY18 FCF of $760m vs. Street of only $700m – about in-line with MCHP and MXIM despite ON OpM of ~15% versus ~35% for MCHP and MXIM. Against ON's CY20 FCFPS target of ~$2.15, the stock is trading at 12x EV/FCF vs. TXN at 13x based on our LT FCFPS of $7 and ADI at 12x based on our LT FCFPS of $7. Risk/Reward profile especially against ON's recent outperformance seem better elsewhere.

Expect SepQ Results At Least IN-LINE with CS/Street

We expect ON to report C3Q Rev/EPS of AT LEAST ~$1,375m/$0.42 vs. CS at $1,365m/$0.40, the Street at $1,367m/$0.40 and guidance of $1,340-$1,390m/$0.40 at the midpoint. Guidance is underpinned by C2Q ending backlog which represents 80-85% of C3Q Rev guide, in-line with the 8-quarter avg. The Company guided C3Q Rev up 2.0% q/q or up ~3% q/q adjusting for ON's exit from the mobile image sensor business, essentially IN-LINE with seasonal – our checks suggest UPSIDE to seasonal supported by strong trends in Auto/Industrial, new flagship phones in China and initial ramps for AAPL on iPhone8/X.

- **Continued Strong End-Demand:** Relative to end-markets we expect Autos flat q/q, above normal seasonal of down low-single digit q/q – Note Kingpak (80% share in Auto CMOS image sensor packaging for ON) reported C3Q Rev flat q/q supporting ON's guidance for Autos flat q/q. We expect Industrial down 2% q/q, Consumer up 5% q/q and Computing up 3% q/q all in-line with seasonal, and Comms up 8% q/q driven by AAPL and China smartphone ramps (together ~13% of Rev).
- **Better-than-Historical GM/OpM Leverage:** We expect GM of 37.5%, in-line with Street at 37.4% and ABOVE CS and the midpoint of guidance for 37.2% driven by better mix, cyclical pricing leverage and FCS synergies – embedding 53% incremental GM which is in-line with ON's LT target of 50% but above the historical norm of 40%. We expect OpEx of $292m, in-line with guidance and Street and embedding $160m in annualized FCS cost synergies – altogether driving an OpM of 16.5%, ABOVE CS at 15.8%. We expect interest/other expense of $28m and cash taxes of $15m, both in-line with guidance. We expect better Rev and GM to drive non-GAAP EPS of $0.42, AT LEAST in-line with CS/Street and implied guidance for $0.40.

Expect DecQ Rev/EPS Guidance At Least In-Line with CS/Street

We expect ON to guide C4Q Rev/EPS to $1,335m/$0.39m, at least IN-LINE with CS/Street at $1,326/$0.36m with an UPWARD bias **–** CS/Street estimates reflect a 2.9% q/q / 2.8% q/q sequential decline vs. seasonal of down ~2% q/q.

- **Mostly Seasonal Autos/Industrial with Comms Upside:** We expect mostly seasonal growth in Autos (up 2% q/q) and Industrial (down 2% q/q) – post-hurricane Auto rebuilds could provide a tailwind to Autos Rev although our checks suggest the Auto Semi supply chain has seen no hurricane-related impact yet. ON should guide Comms up q/q above seasonal of down 3% q/q, driven by continued AAPL and China handset builds. We expect Computing down 7% q/q (modestly better than seasonal driven by Server-related ramps) and Consumer down 16% q/q, in-line with seasonal.
- **Cyclical OpM Leverage and FCF Upside:** We expect ON to guide GM of 36.8% at the midpoint, modestly above Street at 36.7% driven by tailwinds from cyclical pricing leverage and FCS synergies. We expect ON to guide OpEx of $289m, embedding $180m in annualized FCS synergies in-line with ON's target as it completes ON/FCS ERP integration – altogether driving ~15% OpM. We expect interest/other expense of

$28m and cash taxes of $15m. At-least in-line Rev, GM and OpEx drive an implied EPS of $0.39, ABOVE CS/Street at $0.36. ON also raised its CY17 FCF target from $550-600m to $600-650m implying C2H FCF of ~$205m at the midpoint vs. C1H of $420m (down 51% h/h) – despite higher C2H CapEx (up 85% h/h) we expect CY17 FCF closer to $675-700m.

Figure 266: ON Revenue Model

US$ in millions, unless otherwise stated

End Markets	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	CY2016	CY2017E	CY2018E
Automotive	$315.5	$314.9	$309.6	$370.5	$407.9	$409.6	$409.6	$415.7	$440.7	$451.7	$445.5	$449.6	$1,310.5	$1,642.8	$1,787.5
Consumer	$92.7	$99.1	$123.3	$181.2	$181.8	$194.3	$204.0	$171.4	$165.4	$174.9	$187.1	$159.1	$496.3	$751.5	$686.4
Industrial	$196.1	$220.6	$236.4	$303.9	$326.7	$351.3	$344.3	$337.4	$344.1	$359.6	$351.5	$346.3	$957.0	$1,359.7	$1,401.5
Communications	$137.3	$155.9	$184.2	$276.3	$237.9	$252.1	$272.3	$276.3	$239.0	$253.3	$281.2	$278.4	$753.7	$1,038.6	$1,051.8
Computing	$75.6	$87.2	$97.3	$129.2	$127.2	$130.6	$134.8	$125.4	$123.7	$126.8	$130.6	$120.1	$389.3	$518.0	$501.1
Total Rev	**$817.2**	**$877.7**	**$950.9**	**$1,261.0**	**$1,281.6**	**$1,338.0**	**$1,365.0**	**$1,326.1**	**$1,312.8**	**$1,366.3**	**$1,395.9**	**$1,353.4**	**$3,906.8**	**$5,310.6**	**$5,428.4**

% of Total Rev	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	CY2016	CY2017E	CY2018E
Automotive	38.6%	35.9%	32.6%	29.4%	31.8%	30.6%	30.0%	31.4%	33.6%	33.1%	31.9%	33.2%	33.5%	30.9%	32.9%
Consumer	11.3%	11.3%	13.0%	14.4%	14.2%	14.5%	14.9%	12.9%	12.6%	12.8%	13.4%	11.8%	12.7%	14.2%	12.6%
Industrial	24.0%	25.1%	24.9%	24.1%	25.5%	26.3%	25.2%	25.4%	26.2%	26.3%	25.2%	25.6%	24.5%	25.6%	25.8%
Communications	16.8%	17.8%	19.4%	21.9%	18.6%	18.8%	19.9%	20.8%	18.2%	18.5%	20.1%	20.6%	19.3%	19.6%	19.4%
Computing	9.3%	9.9%	10.2%	10.2%	9.9%	9.8%	9.9%	9.5%	9.4%	9.3%	9.4%	8.9%	10.0%	9.8%	9.2%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

% Growth Q/Q	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18
Automotive	6.8%	-0.2%	-1.7%	19.7%	10.1%	0.4%	0.0%	1.5%	6.0%	2.5%	-1.4%	0.9%
Consumer	-5.3%	6.9%	24.4%	47.0%	0.3%	6.9%	5.0%	-16.0%	-3.5%	5.8%	7.0%	-15.0%
Industrial	-5.7%	12.5%	7.2%	28.5%	7.5%	7.5%	-2.0%	-2.0%	2.0%	4.5%	-2.3%	-1.5%
Communications	-11.1%	13.5%	18.2%	50.0%	-13.9%	6.0%	8.0%	1.5%	-13.5%	6.0%	11.0%	-1.0%
Computing	-10.4%	15.3%	11.6%	32.7%	-1.5%	2.6%	3.2%	-7.0%	-1.4%	2.5%	3.0%	-8.0%
Total	**-2.7%**	**7.4%**	**8.3%**	**32.6%**	**1.6%**	**4.4%**	**2.0%**	**-2.8%**	**-1.0%**	**4.1%**	**2.2%**	**-3.0%**

% Growth Y/Y	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	CY2016	CY2017E	CY2018E
Automotive	7.1%	13.8%	10.5%	25.4%	29.3%	30.1%	32.3%	12.2%	8.0%	10.3%	8.8%	8.1%	14.2%	25.4%	8.8%
Consumer	-22.2%	-19.8%	-6.7%	85.1%	96.1%	96.1%	65.5%	-5.4%	-9.0%	-10.0%	-8.3%	-7.2%	5.0%	51.4%	-8.7%
Industrial	-10.6%	-1.4%	3.5%	46.1%	66.6%	59.2%	45.6%	11.0%	5.3%	2.4%	2.1%	2.6%	8.8%	42.1%	3.1%
Communications	-4.3%	-6.8%	11.0%	78.8%	73.3%	61.7%	47.8%	0.0%	0.4%	0.5%	3.3%	0.8%	19.4%	37.8%	1.3%
Computing	-19.7%	-2.4%	0.0%	53.0%	68.3%	49.8%	38.5%	-2.9%	-2.8%	-3.0%	-3.1%	-4.2%	6.6%	33.1%	-3.3%
Total	**-6.2%**	**-0.3%**	**5.2%**	**50.1%**	**56.8%**	**52.4%**	**43.6%**	**5.2%**	**2.4%**	**2.1%**	**2.3%**	**2.1%**	**11.8%**	**35.9%**	**2.2%**

Source: Company data, Credit Suisse estimates

Key Issues

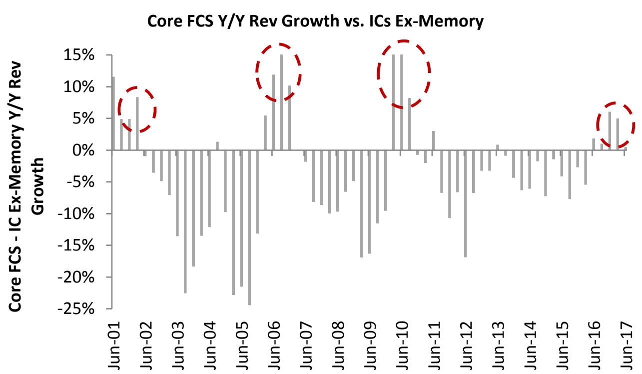
ON and FCS Historically Underperformed Post Y/Y Rev Peaks: While we continue to argue that the cycle has become more muted (y/y Rev growth at the current peak in May will be less than ½ of the historical median), our analysis suggests that ON shares tend to under-perform the group post-industry y/y Rev growth peaks – specifically, in the last 7 cycles ON shares have underperformed by a median of 2050/870 bps 6/12 months post y/y Rev peaks. Further, FCS shares underperformed on average 1300/900 bps 6/12 months post y/y Rev peak. We remain structural Semi bulls, but at a cyclical peak prefer high quality assets like TXN, ADI, and MCHP. FCS outgrew peers by ~400 bps in C4Q, by 300-400 bps in C1Q and by 100-200 bps in C2QE – the 3Qs of ~1000 bps of accumulative outperformance compares to a median of 3Qs and ~2000 bps. Following periods of y/y out-growth FCS under-grew the Industry by 1200 bps on average in the 12 months post-peak. Similarly, ON tends to lag the Industry in y/y Rev growth following peaks in Semi Rev growth – under-growing the broader market by 900 bps on average 12 months post peaks in y/y IC ex-Memory Rev growth (adjusted for M&A).

Figure 267: ON Historical Stock Underperformance Following Cyclical Peaks

Semi Rev Y/Y Peak	Jun-00	Nov-02	Apr-04	Feb-06	Jun-08	Jan-10	Feb-14	Median
ON (Peak + 3 Months)	-13.0%	-41.6%	-40.3%	-8.5%	3.3%	-8.6%	0.4%	
ON (Peak + 6 Months)	-65.8%	-33.3%	-57.3%	-47.1%	-70.8%	-27.4%	-5.9%	
ON (Peak + 12 Months)	-65.5%	96.3%	-47.7%	-8.7%	-23.8%	12.0%	7.2%	
SOX (Peak + 3 Months)	7.1%	-27.3%	-5.7%	-6.0%	-4.2%	2.0%	1.8%	
SOX (Peak + 6 Months)	-49.6%	-10.8%	-18.9%	-23.5%	-50.2%	-7.4%	8.1%	
SOX (Peak + 12 Months)	-42.1%	32.9%	-17.0%	0.2%	-22.4%	14.4%	15.8%	
ON vs. SOX (P+3)	-20.1%	-14.3%	-34.6%	-2.5%	7.4%	-10.6%	-1.4%	-10.6%
ON vs. SOX (P+6)	-16.3%	-22.5%	-38.4%	-23.5%	-20.5%	-20.0%	-14.0%	-20.5%
ON vs. SOX (P+12)	-23.4%	63.4%	-30.7%	-8.9%	-1.4%	-2.4%	-8.7%	-8.7%

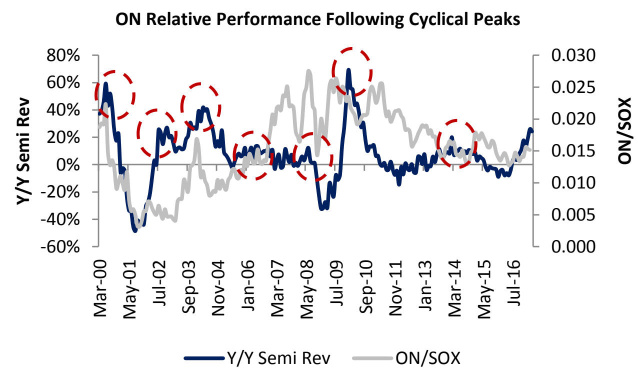
Source: Company data, Credit Suisse estimates

Figure 268: FCS Out-Growth Historically Not Sustainable



Source: Company data, Credit Suisse estimates

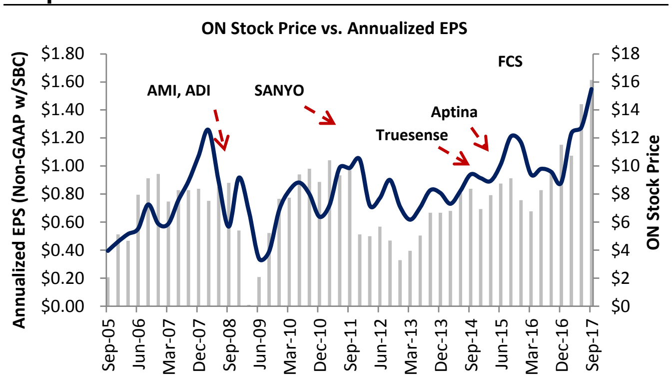
Figure 269: ON Shares Under-Perform Post-Cyclical Peaks



Source: Company data, Credit Suisse estimates

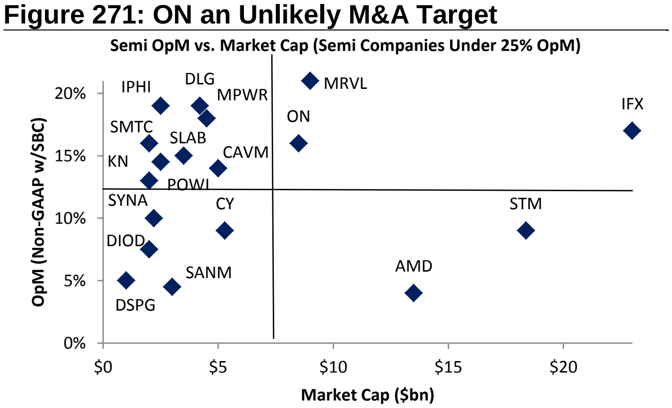
Consolidator More than Consolidated: ON has historically been a consolidator making 13+ acquisitions in the last 9 years – with GM/OpM of 37%/15% and target of 40%/19%, we see very few potential buyers of the asset. In addition the recent sale to China of Nexperia does muddy the LT competitive waters.

Figure 270: ON Hit $1 EPS Target Post 4+ Acquisitions



Source: Company data, Credit Suisse estimates

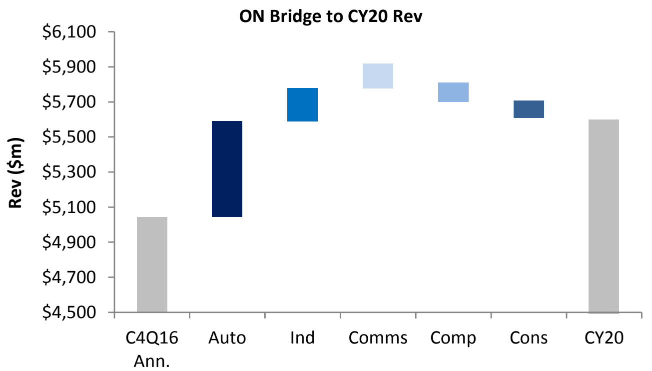
Figure 271: ON an Unlikely M&A Target



Source: Company data, Credit Suisse estimates

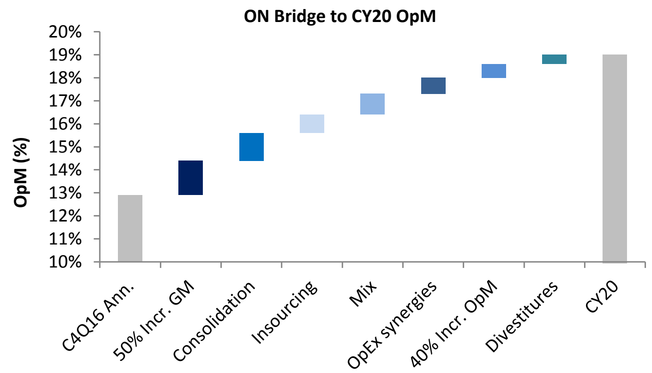
Operating Leverage Key to Target Model: While LT EPS of $2 is achievable, ON just eclipsed their 2010 LT EPS target of $1 inclusive of 4+ acquisitions. ON's CY20 target model assumes 3% Rev growth against Industry of 1.5-2%, both of which appear conservative against our view of 5% Industry growth. On top of Rev growth and FCS synergies, ON's target model assumes better than historical operating leverage (40% above historical median of 30%) and execution is key to achieving $2 in EPS. Specifically, upside to ON's 19% target is based on: Manufacturing consolidation/efficiencies (200 bps), 50% Incr. GM off 3% Rev growth (150 bps – includes 6% annual ASP declines), Improved mix (90 bps), OpEx synergies (70 bps), OpEx growing ½ Rev (60 bps), and divestitures (40 bps), and assumes better than historical core incremental GM/OpM (50%/40% vs. historical of 40%/30%, respectively). Assuming 3% Rev growth, historical incr. GM of 40%, full FCS synergies, and core OpEx growing ½ Rev yields CY20 EPS of ~$1.90 vs. target of $2, and FCF generation of ~$850m vs. target of $900m.

Figure 272: Rev Target Embeds 3% Annual Growth



Source: Company data, Credit Suisse estimates

Figure 273: Bridge to CY20 OpM of 19%

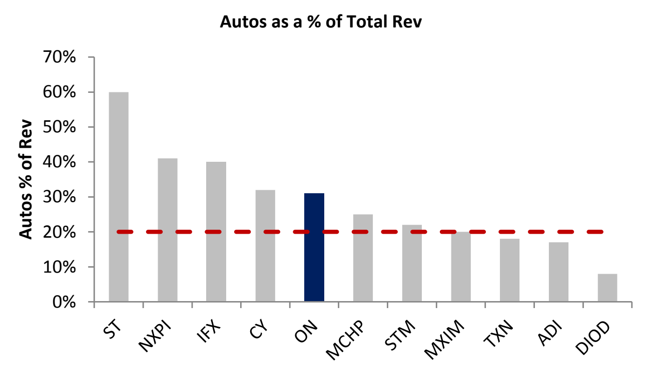


Source: Company data, Credit Suisse estimates

Strong Leverage to Autos: ON has experienced strong growth in Autos (3YR CAGR of 10%) and the company maintains it can grow its Auto Rev high single digit y/y in a flat SAAR environment. ON has relatively higher exposure to Autos (31% of Rev above the Analog/Diversified Median of ~20%), and has benefitted from continued content gains – we are modeling for ON's Auto Rev to grow 11% in CY17 vs. Total Semi Auto Rev of ~10%. ON's 2020 target model includes Autos growing 7-9% from 30% to 37% of Rev – stronger than expected content growth for ON in Autos could offset slowing unit growth and provide further tailwinds to Rev growth and GM.

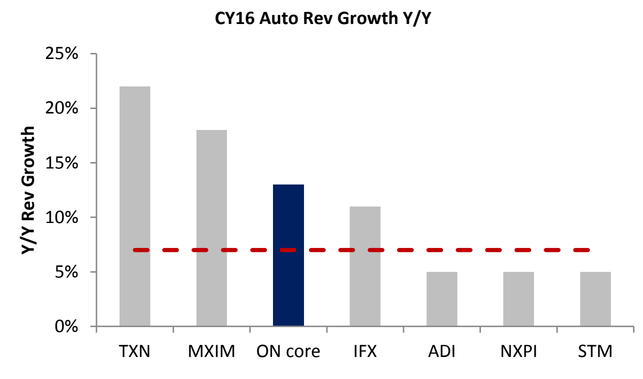
- **Fast-Growing Autos TAM:** Over the last 10 years ~60% of Semi Auto growth has been SAAR driven, ~40% content driven – we believe content growth is likely to represent 2/3 of Semi Auto Rev growth moving forward based upon: (1) Modestly shorter design cycles, (2) Faster than historic "water-falling" and (3) emphasis on new safety applications. ON's Auto TAM should grow high-single digit from 2017-2020 driven by ADAS, HEV, LED lighting, Infotainment and powertrain. Within ASG PMIC content could increase to $35-40 once the industry progresses to AD, and within ISG, ON is currently the market share leader in ADAS at ~70% share and should benefit from an increasing TAM (ADAS in less than 20% of auto builds today). We would note that Kingpak, which has 80% share in packaging ON's Auto CMOS image sensors (45% of ISG or 6% of total Rev) expects strong growth (30%+) in CY18.

Figure 274: Autos % of Rev vs. Peers



Source: Company data, Credit Suisse estimates

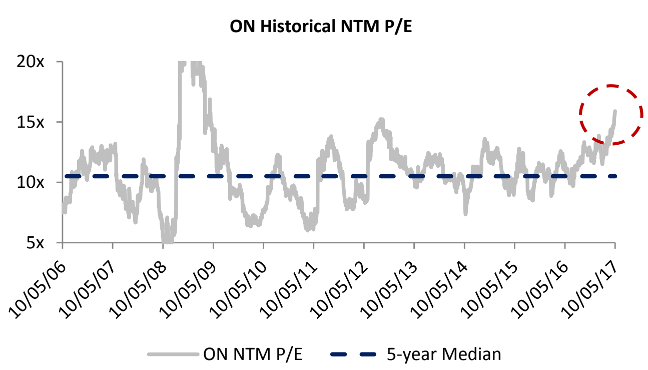
Figure 275: ON Outgrew Semi Auto Rev in CY16



Source: Company data, Credit Suisse estimates

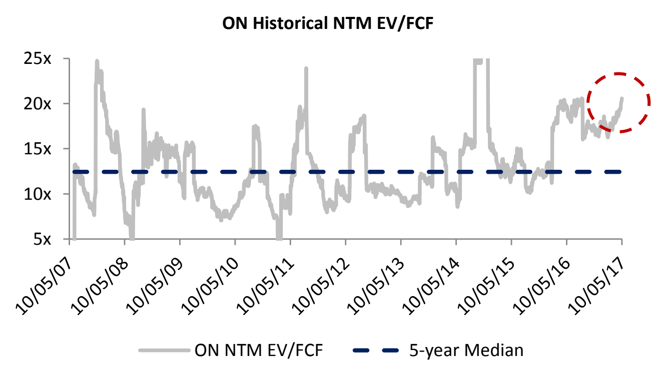
EV Valuation Less Compelling: While ON looks attractive on P/E and extremely attractive on P/E based on LT EPS of $2.00, the stock is currently trading at EV/FCF of 16x on our CY18 FCF of $760m vs. Street of only $700m – about in-line with MCHP and MXIM despite ON OpM of ~15% versus ~35% for MCHP and MXIM, and above its 3/5/10-year median of 14.4x/12.4x/12.1x. Against ON's CY20 FCFPS target of ~$2.15, the stock is trading at 12x EV/FCF vs. TXN at 13x our LT FCFPS of $7 and ADI at 12x LT FCFPS of $7. The historically cyclical nature of core-FCS Rev especially on sell-in Rev recognition likely warrants a discounted valuation multiple while structurally improved margins would likely drive multiple expansion.

Figure 276: ON NTM P/E Above 5-Year Median



Source: Company data, Credit Suisse estimates

Figure 277: ON NTM EV/FCF Above 5-Year Median

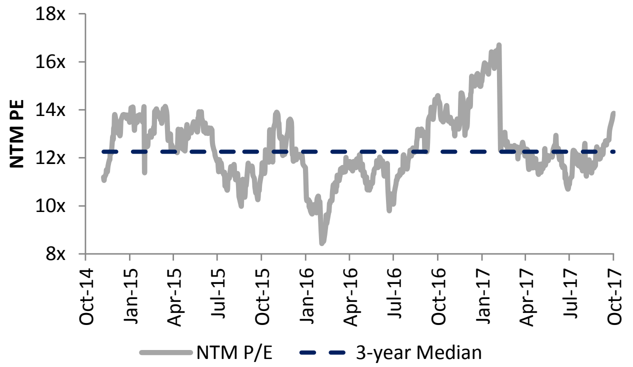


Source: Company data, Credit Suisse estimates

Investment View and Valuation

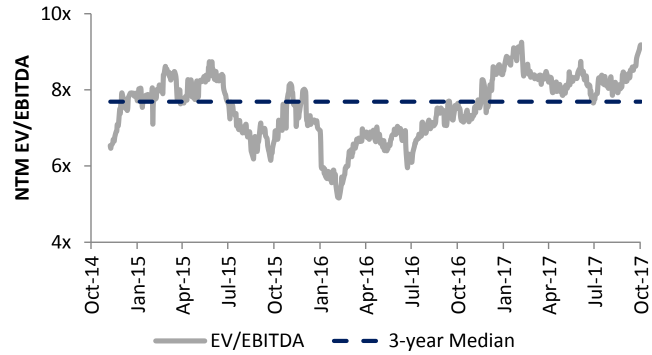
While we remain structural bulls on all of Semis, we continue to argue for some cyclical defense and given ON's historic "early-cycle" leverage and our relative rating structure – we continue to find better risk/rewards in the group. With ON up 30% in C3Q versus SOX of 13%, ON is currently trading at EV/FCF w/SBC of 16x on CY18 FCF of $760m vs. Street of only $700m – about in-line with MCHP and MXIM despite ON OpM of ~15% versus ~35% for MCHP and MXIM. While we see upside to NT estimates given Handset content gains, Autos growth driven by hurricane rebuilds, and conservative FCF guidance, Risk/Reward profile especially against ON's recent outperformance seem better elsewhere.

Figure 278: NTM PE Over Time



Source: Company data, Credit Suisse estimates, Thomson Reuters

Figure 279: NTM EV/EBITDA Over Time



Source: Company data, Credit Suisse estimates, Thomson Reuters

Qualcomm Inc.

(QCOM, $52.82, RESTRICTED)

Street Expects F4Q In-Line, F1Q Below Seasonal

Reporting Date: Wednesday, November 1st, After Market Close

Conference Call: Wednesday, November 1st, 4:45PM EST

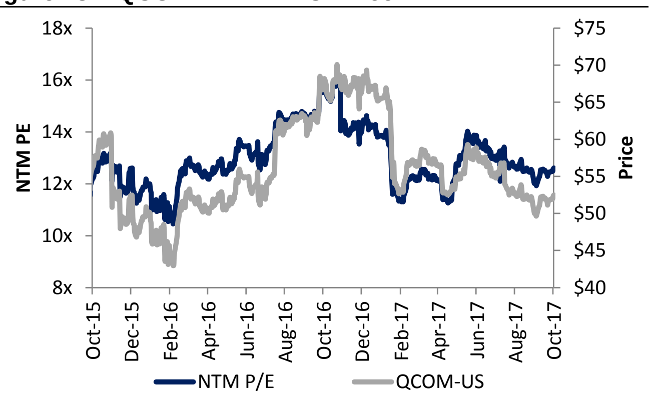
Figure 280: QCOM Summary of Expectations

QCOM	F3Q17	F4Q17E			F1Q18E		FY17E		FY18E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue ($m)	$5,303	NA	$5,802	$5,400-$6,200m	NA	$5,901	NA	$23,068	NA	$22,833
% q/q	-11.5%		9.4%	+1.8% to +16.9% q/q		1.7%				
5-year median q/q %	1.9%		2.3%			5.8%				
% y/y	-12.1%		-6.0%			-1.4%		-1.9%		-1.0%
Gross Margin	57.0%	NA	55.7%		NA	56.4%	NA	58.7%	NA	57.6%
OpEx (ex-SBC)	$1,799	NA	$1,838		NA	$1,804	NA	$6,903	NA	$7,260
Operating Income (ex-SBC)	$1,225		$1,396			$1,515		$6,865		$5,920
Operating Margin (ex-SBC)	23.1%	NA	24.1%		NA	25.7%	NA	29.8%	NA	25.9%
Net Income	$1,237		$1,211			$1,367		$6,201		$5,254
Net Margin	23.3%		20.9%			23.2%		26.9%		23.0%
EPS (Non-GAAP w/SBC)	$0.52									
EPS (Non-GAAP ex-SBC)	$0.83	NA	$0.80	$0.75-$0.85	NA	$0.89	NA	$4.16	NA	$3.47
EPS (GAAP)	$0.58			$0.55-$0.65						

Source: Thomson Reuters, Company data

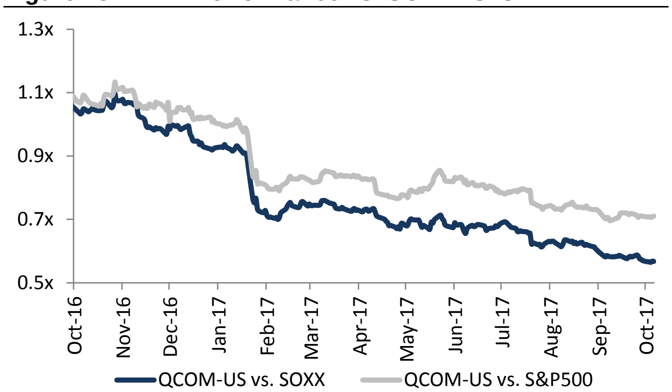
QCOM: Recap of Recent Stock Performance

Figure 281: QCOM NTM PE vs. Price



Source: Thomson Reuters, Company data

Figure 282: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data

Key Message: We remain restricted on QCOM pending the NXPI acquisition. The Street expects QCOM to report F4Q (SepQ) Rev/EPS essentially in-line with guidance for $5.80bn/$0.80, and to guide F1Q (DecQ) Rev/EPS of $5.90bn/$0.89. Street estimates and guidance embed Rev growth of 1.7% q/q which is BELOW the 5-year median of up 5.8% q/q. F4Q QCT Rev is modeled at $4.51bn, up 11.4% q/q versus seasonal of up 5.6%. Strong QCT Rev growth is driven by OEM product launches and continued traction with Chinese OEMs. While the timing of the China handset recovery could be uneven depending on timing of new models, we see the recovery in China as underway and expect new model launches from Xiaomi, Huawei, and Gionee in Sep/Oct to provide a tailwind to QCOM's QCT Rev. F4Q QTL Rev is modeled flattish q/q but down ~35-40% y/y, reflecting the exclusion of the disputed AAPL licensing Rev and for the other licensee in dispute. While focus remains largely on pending litigation regarding licensing payments, QCOM has already removed that Rev from their guidance – and mgmt. is unlikely to provide any meaningful updates around earnings. Longer term, focus will remain on QCOM's potential diversification away from handsets and in to adjacencies such as Autos, IoT and Security, and Networking.

Street Expects F4Q Rev/EPS In-Line with Guidance

The Street expects Rev/EPS of $5.80bn/$0.80, IN-LINE with the midpoint of guidance for Rev of $5.40bn-$6.20bn and EPS of $0.75-$0.85. The Street expects Rev up 9.4% q/q, above seasonal of up 2.3% q/q, and down 6.0% y/y. Note – Rev and EPS guidance the exclusion of the disputed AAPL licensing Rev and for the other licensee in dispute.

- **QCT Expectations:** The Street expects QCT Rev of $4.51bn, up ~11% q/q, with Mobile Station Modem (MSM) shipments of 213m (up 14% q/q), mostly in-line with the midpoint of guidance for 205-225m (up 10-20%) or 215m (up 15% q/q). MSM shipments up ~14% q/q are driven by OEM product launches and continued traction with OEMs in China. MSM ASPs are expected to be $21.2, down 2% q/q from $21.7 in F3Q. The Street expects QCT EBT of approx. 17-19%, or 18.0% at the midpoint, up ~400 bps q/q from 14% in F3Q and up ~130 bps y/y from 16.7% in the F4Q16, with y/y growth driven by favorable mobile product mix and growth in adjacent opportunities.
- **QTL Expectations: The** Street expects QTL Rev of $1.18bn (up 60 bps q/q), mostly in-line with the midpoint of mgmt. guidance for $1.0bn to $1.3bn (down 15% q/q to up 11% q/q). Note – QTL Rev guidance does not include revenue related to the sale of AAPL products by contract manufactures as well as the other licensee in dispute. The Street expects QTL's EBT to decrease q/q and be between 64-68%, with a midpoint of 66% down ~700 bps q/q and down 1,900 bps y/y. Lower QTL profitability reflects lower Rev and increased litigation-related expenses as QCOM continues to defend their business model in various forms.
- **Street Expects Rev/EPS IN-LINE with Guidance:** The Street expects GM of 55.7%, down 130 bps q/q and OpM of 24.1% up 100 bps q/q as OpEx as a % of Rev declines from 33.9% in F3Q to 31.4%. The Street expects IN-LINE Rev and profitability to drive EPS of $0.80, IN-LINE with the midpoint of guidance for $0.75 to $0.85.

Street Expects F1Q Rev/EPS Below Seasonal

The Street expects Rev/EPS of $5.90bn/$0.89, embedding Rev up 1.7% q/q which is below seasonal of up 5.8% q/q, and down 1.7% y/y versus down 6.0% y/y in F4Q. Note – Rev and EPS expectations exclude QTL revenues for AAPL-related products and for the other license in dispute

- **QCT Expectations:** The Street expects F1Q QCT Rev of $4.60bn, up ~2% q/q from $4.51bn in F4Q, and up ~13% y/y. MSM shipments of 219.3m are expected to be up 3.0% q/q from 213m in F4Q, with ASPs of $21 flat q/q. The Street expects QCT EBT of 17.8%, down 20 bps q/q. 3G/4G units are expected to be 377m, up 7% q/q from 352m in F4Q, with ASPs of $181 up 4% q/q.
- **QTL Expectations:** The Street expects F1Q QTL Rev of $1.20bn, up ~1% q/q from $1.18bn in F4Q, and down ~33% y/y, with y/y declines reflecting the exclusion of certain licensing payments. The Street expects QTL EBT of 65.1%, down ~100 bps q/q from 66% in F4Q.
- **Street Expects Improved Profitability to Drive EPS Up Sequentially:** The Street expects GM of 56.4%, up 70 bps q/q. Street expects OpM of 25.7%, up 160 bps q/q as OpEx declines from 31.4% of Rev to 30.5% of Rev. The Street expects sequential Rev growth and improved profitability to drive EPS of $0.89, up from $0.80 in F4Q.

Key Issues

QCOM and AAPL: A Tense Relationship Exacerbated By Several Factors. Between 2007 and late 2016, Apple and Qualcomm had navigated their licensing relationship well. The current dispute has been exacerbated by a series of developments, but any resolution is likely to come from common interest. We would note the following:

- **AAPL Increasing Use of INTC Chips.** Since the release of the iPhone 7, INTC has been supplying AAPL modems, resulting in QCOM losing its single source status. AAPL continues to seek alternatives to lower its BOM cost through vertical integration (i.e. IMG) and pricing concessions – note that the iPhone 8 BOM has increased from ~$220/$280 in the base iPhone 7/7 Plus to ~$250/$290 in the base iPhone 8/8 Plus. Note INTC's modem in the iPhone 7/8/X is only GSM-compatible and QCOM has maintained a technological lead. While INTC likely had ~20% market share in the iPhone 7, INTC’s share is likely to increase to ~30% in the 8/X.
- **AAPL and QCOM Reliant Upon Each Other.** AAPL controls ~35% of global smartphone revenue and ~80% of global smartphone profits, making it a key innovator and customer longer-term. Note AAPL continues to use QCOM modems in the iPhone 8/X – AAPL will be likely comprise 15-20% of F4Q QCT Rev. QCOM also has a vast Standard Essential Patents (SEP) portfolio for wireless standards, including battery, graphics, video and networking IP.
- **Potential Licensing Model Risk.** A prolonged period of AAPL not compensating QCOM may encourage other handset vendors to use similar tactics against QCOM, such as the other unpaying licensee (likely Huawei). Further, recent fines and court proceedings including a $773m fine from the Taiwan Fair Trade Commission on 10/11/2017 and ongoing proceedings in the U.S., EU, Korea and China related to antitrust accusations highlight the mounting challenges QCOM faces.
- **Multiple Existing Agreements Have Expired.** Agreements formed in the nascence of QCOM and AAPL’s relationship expired at the end of 2016. Both the Business Cooperation and Patent Agreement (BCPA) and the Transition Agreement (TA) restricted AAPL’s ability to sue QCOM and outlined royalty rebates/marketing payments paid to AAPL.
- **Apple Would Prefer a Direct Licensing Relationship.** The opaque nature of QCOM’s agreement with AAPL’s Contract Manufacturers has caused three tension points: 1) Contract Manufacturers have little incentive to negotiate fees lower since they pass the licensing costs along to AAPL and pay no portion, 2) AAPL suspects its Contract Manufacturers have agreed to license Qualcomm’s Standard Essential Patents (SEPs) on non-FRAND terms, violating ETSI requirement, and. 3) Because these agreements are confidential, AAPL is unable to review them, making it unclear what patents exactly are being paid for.
- **QCOM Withholding Marketing Payments or Royalty Rebates.** Due to "legal issues" regarding AAPL's interactions with the KFTC and other competition agencies, QCOM confirmed that it would not make any further BCP Payments to AAPL after 1Q16 – amounting to ~$1bn. QCOM later stated that the dispute could be resolved if AAPL retracted and corrected statements it made to government agencies, which QCOM claims to be both false and inaccurate.

Diversifying Outside Smartphones. QCOM has been focused on expanding its business beyond mobile into a number of growing adjacencies. A strong automotive presence would boost QCOM's presence in an adjacent market that management has frequently said they want to target. As such, acquisitions will provide increased exposure to growing adjacent areas and allow QCOM to achieve leadership positions in mobile, auto, IoT and Security, and Networking. According to management, the combined company's mobile revenue could make up less than 50% of QCT revenues going forward.

China Handsets Reaccelerating in C4Q. ~55% of QCOM Rev is from China. We expect ~180m China smartphone builds in C3Q, up 8% q/q which is modestly above the 5-year median of up 5% q/q – marking the second quarter of recovery off the C1Q17 trough. However, we would note that on a y/y basis C3Q China handset builds are still down 5%. We are modeling for a return to y/y growth in C4Q for the first time in 4 quarters driven by new model launches from Xiaomi, Huawei, and Gionee in Sep/Oct – specifically, we expect ~212m builds in C4Q, up 18% q/q, which is above seasonal of up 5% q/q and marks a return to y/y growth of up 7%. While the magnitude of the C2H recovery could vary for different companies depending on inventories, we are modeling for total CY17 units of 708m, down 4% y/y and a steep deceleration from up 20%/21% in CY15/16. By OEM: we expect better than seasonal growth at Xiaomi, Huawei and Oppo and seasonal growth at Vivo. Lastly, we would highlight that y/y compares become significantly easier into C1Q18.

Figure 283: China Smartphone Growth Recovering in C2H17

China Smartphone Production Units (m)	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17 3QE	Dec-17 4QE	CY16	CY17
Huawei	25	35	35	45	32	35	38	50	140	155
Oppo	18	26	26	30	23	25	28	34	100	110
Vivo	16	21	22	28	20	22	25	29	87	96
Xiaomi, TCL, Coolpad, ZTE, Lenovo	61	57	55	45	42	48	53	58	218	201
Others	45	45	50	50	35	35	35	40	190	145
Total	165	183	188	198	152	165	179	211	734	707

% of Total	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	CY16	CY17
Huawei	15%	19%	19%	23%	21%	21%	21%	24%	19%	22%
Oppo	11%	14%	14%	15%	15%	15%	16%	16%	14%	16%
Vivo	10%	11%	12%	14%	13%	13%	14%	14%	12%	14%
Xiaomi, TCL, Coolpad, ZTE, Lenovo	37%	31%	29%	23%	28%	29%	30%	27%	30%	28%
Others	27%	25%	27%	25%	23%	21%	20%	19%	26%	21%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Q/Q	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	CY16	CY17
Huawei	-28.6%	38.0%	1.4%	28.6%	-28.9%	9.4%	8.6%	31.6%	26.8%	11.1%
Oppo	20.7%	43.6%	0.0%	15.4%	-23.3%	8.7%	12.0%	21.4%	122.4%	9.9%
Vivo	26.4%	31.6%	5.8%	27.3%	-28.6%	10.0%	13.6%	16.0%	116.5%	10.9%
Xiaomi, TCL, Coolpad, ZTE, Lenovo	6.3%	-6.7%	-3.5%	-18.2%	-6.7%	14.3%	10.4%	9.4%	-19.2%	-7.8%
Others	12.5%	0.0%	11.1%	0.0%	-30.0%	0.0%	0.0%	14.3%	35.7%	-23.7%
Total	3.1%	11.1%	2.6%	5.3%	-23.2%	8.6%	8.5%	17.9%	21.4%	-3.7%

Source: Company data, MIIT

Rudolph Technologies

(RTEC, $26.80, UNDERPERFORM, TP $23.00)

INLINE/INLINE; Weakness in both Front End and Back End

Reporting Date: Monday, October 30th, 4:00PM EDT

Conference Call: Monday, October 30th, 4:00PM EDT, Phone: (888) 401-4690

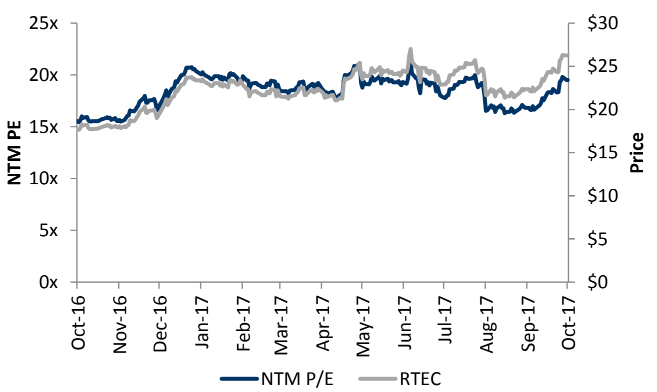
Figure 284: RTEC Summary of Expectations

RTEC	Jun-17	Sep-17			Dec-17		2017E		2018E	
	Reported	CS	Cons	Guidance	CS New	Cons	CS New	Cons	CS New	Cons
Total Revenue	**$67.4**	**$66.0**	**$66.0**	**$64-$68m**	**$59.8**	**$62.7**	**$253.9**	**$256.6**	**$274.8**	**$279.2**
% Q/Q chng	*11.1%*	*-2.1%*	*-2.1%*		*-9.4%*	*-5.1%*				
% Y/Y chng	*7.5%*	*7.1%*	*7.1%*		*10.6%*	*15.7%*	*9.1%*	*10.2%*	*8.2%*	*8.8%*
Total GM (w SBC)	**52.6%**	**52.0%**			**53.2%**		**52.6%**		**52.6%**	
Operating Exp (w SBC)	**$21.6**	**$21.5**			**$21.3**		**$85.2**		**$91.7**	
Operating Margin*	**-2.3%**	**-1.4%**			**-1.6%**		**-1.9%**		**-1.3%**	
Net Income*	**$10.6**	**$10.0**			**$8.4**		**$37.2**		**$41.5**	
Net Margin*	**15.7%**	**15.1%**			**14.1%**		**14.7%**		**15.1%**	
EPS (ex SBC)*	**$0.33**	**$0.31**	*$0.31*	**$0.28-$0.33**	**$0.26**	*$0.27*	**$1.16**	*$1.17*	**$1.29**	*$1.38*
Fully diluted shares	32.1	32.1			32.1		32.1		32.1	

Source: Company data, Credit Suisse estimates. * Pro forma excluding one-time items.

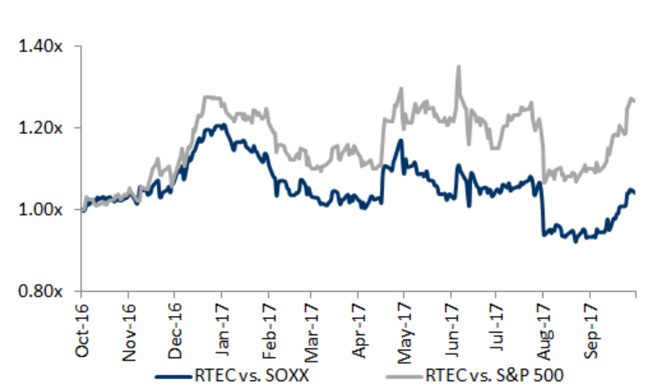
RTEC: Recap of Recent Stock Performance

Figure 285: RTEC NTM PE vs. Price



Source: Company data, Credit Suisse estimates

Figure 286: LTM Performance vs. SOXX vs. SPX



Source: Company data, Credit Suisse estimates

Key Message: RTEC revenues are growing lower than other equipment companies due to low Memory (capex strong) exposure, and because of decline in RF/InFo revenues this year. While progress in OLED has been promising, it has not materialized fully and we believe further capital investment will be needed to compete against Canon and Nikon. In addition, we see RF rev weakness persisting due to reuse of capital equipment and the transition to a larger wafer size.

Expect F3Q17 (SepQ) At Least In-Line with CS/Street

We expect RTEC to report Rev/EPS for SepQ AT LEAST IN-LINE with CS/Street estimates of $66m (-2.1% q/q)/$0.31. We are modeling Front End rev of $27.0m (-20.0% q/q), Back End rev of $29.9m (+3.3% q/q) and Litho rev of $9.1m. We are modeling GM of 52.2% (-106bps q/q) in-line with company guidance of 52-53% as company expects GM to decline due to higher mix of Litho shipments. We are modeling an OpEx of $22.0 (-26bps q/q) above company guidance of $20-$20.5m due to higher R&D expenses associated with OLED. In-line rev and GM with slightly higher OpEx will lead to EPS coming at $0.31, in-line with Street/Guidance of $0.31.

Expect F4Q16 (DecQ) At Least In-line with CS/Below Street

We expect RTEC to guide F4Q16 Rev/EPS At LEAST IN-LINE with CS at $59.8 (+10.6% q/q)/$0.26 and BELOW Street at $62.7 (+15.7% q/q)/$0.27. We are expecting revenue to grow lower compared to other equipment companies because of lower exposure to Memory (capex strong) and because we expect continued decline in RF/InFo. We also anticipate further competition in the Litho business as market entrants KLIC ramp up. Our model consists of Front-end rev of $32.4m (+20.0% q/q), back-end rev of $22.5 (-25.0% q/q), and litho revenue of $5.0 (-45.0% q/q). We expect GM of 53.3% (+220bps q/q) and OpEx of $21.79 (-1.1% q/q). In-line rev and GM with slightly higher OpEx will lead to EPS coming at least in-line with CS estimate of $0.26 and below street estimate of $0.27.

Expect CY18 Rev/EPS BELOW Street

We are modeling CY18 Rev/EPS of $274.8m (+8.2% y/y)/$1.29 which is BELOW the Street at $279.2m (+8.8% y/y)/$1.38. We are modeling GM of 52.6% (+0bps y/y) and OpEx of $91.7 (+7.6% q/q). We expect that in-line Revenues, GM and OpEx will drive EPS to $1.29 which is below the Street at $1.38.

Figure 287: RTEC Revenue Model

in $ millions Revenue	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Front End	$22.3	$13.3	$27.7	$31.4	$36.41	$33.71	$26.97	$32.4	$36.41	$34.7	$27.8	$33.3	$94.7	$129.4	$132.2
Back End	$32.1	$37.5	$29.6	$13.5	$24.27	$28.99	$29.9	$22.5	$26.09	$31.2	$32.2	$24.1	$112.6	$105.7	$113.6
Litho	$0.0	$11.9	$4.3	$3.8	$0.0	$4.72	$9.1	$5.0	$5.0	$5.0	$9.2	$9.8	$20.0	$18.8	$29.0
Total	**$54.4**	**$62.7**	**$61.6**	**$54.1**	**$60.7**	**$67.4**	**$66.0**	**$59.8**	**$67.5**	**$70.9**	**$69.2**	**$67.3**	**$232.8**	**$253.9**	**$274.8**

Percent of Total	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Front End	41.0%	21.3%	45.0%	58.0%	60.0%	50.0%	40.9%	54.1%	53.9%	49.0%	40.2%	49.5%	40.7%	51.0%	48.1%
Back End	59.0%	59.8%	48.0%	25.0%	40.0%	43.0%	45.4%	37.5%	38.7%	44.0%	46.5%	35.9%	48.4%	41.6%	41.3%
Litho	0.0%	19.0%	7.0%	7.0%	0.0%	7.0%	13.8%	8.4%	7.4%	7.1%	13.3%	14.6%	8.6%	7.4%	10.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Q/Q Growth	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE
Front End q/q	-17.6%	-40.2%	108.2%	13.1%	16.1%	-7.4%	-20.0%	20.0%	12.5%	-4.6%	-20.0%	20.0%
Back End q/q	102.6%	16.8%	-21.0%	-54.4%	79.9%	19.4%	3.3%	-25.0%	16.2%	19.4%	3.3%	-25.0%
Litho q/q	-100.0%	na	-63.8%	-12.3%	-100.0%	na	92.7%	-45.0%	0.0%	0.0%	84.0%	6.5%
Total q/q	**6.5%**	**15.3%**	**-1.7%**	**-12.3%**	**12.2%**	**11.1%**	**-2.1%**	**-9.4%**	**12.8%**	**5.0%**	**-2.4%**	**-2.7%**

Y/Y Growth	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Front End	-9.8%	-55.2%	-7.2%	15.9%	63.3%	153.0%	-2.8%	3.2%	0.0%	3.0%	3.0%	3.0%	-15.0%	36.7%	2.2%
Back End	15.1%	46.5%	17.4%	-14.7%	-24.3%	-22.6%	1.2%	66.4%	7.5%	7.5%	7.5%	7.5%	19.2%	-6.2%	7.5%
Litho	na	186.2%	22.7%	-53.7%	na	-60.4%	110.7%	32.1%	na	5.9%	1.2%	96.0%	26.3%	-6.0%	54.2%
Total y/y	**3.4%**	**5.4%**	**5.2%**	**5.9%**	**11.6%**	**7.5%**	**7.1%**	**10.6%**	**11.2%**	**5.1%**	**4.8%**	**12.5%**	**5.0%**	**9.1%**	**8.2%**

Source: Company data, Credit Suisse estimates

Key Issues

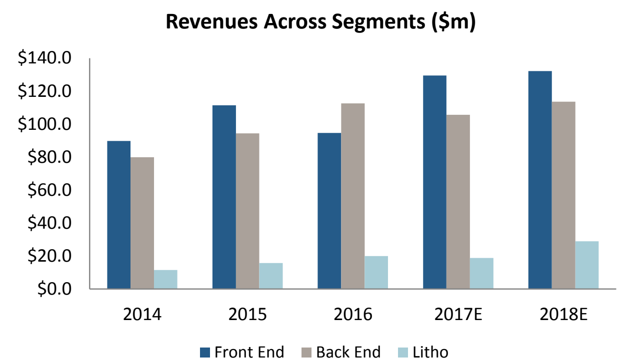
- **Target Model Updates – EPS Growth through Cost Management.** At the recent analyst day, RTEC disclosed a new operating financial model targeting an incremental EPS of $1.35 based on CS estimates and company guidance of revenues of $250-400m versus CS estimates of CY17 EPS of $1.16 at a similar revenue run rate. We believe the target model is promising and provides a path to earnings growth. Relative to CY17, the EPS growth of $1.35 at the low end of the target model was driven by 53% GM, 21% OpM, 27% Tax rate, and 32.1m shares. At the high end, RTEC guides a $400m revenue, 55% GM, and OpM of 30% for a $2.92 EPS. The company notes these targets are without the impact of OLED, and can be driven by mainly by +30% increases in shipment volumes and +40% improvements in inventory turnover.

- **Growing Less than Peers – RTEC is Growing Less than Peers this Year.** RTEC's overall revenue growth of 9% is below front end peers and back end peers. In aggregate RTEC CY17 revs are growing 9% y/y – below the aggregate revenues for large front end companies which are growing 28% y/y (in constant currency) and back end peers TER/KLIC/ASM Pacific which are growing 18.9% in aggregate. We believe that lower growth for RTEC is driven by an adverse mix and a higher exposure to RF market which is declining this year.

- **RF Market could Continue to Decline –** 16% of LTM revenues for RTEC were from the RF market with a projected FY17-22 Unit CAGR growth of 39% and 25% for Filters and Mems, the highest among any business segment. We remain cautious as lower spending from productivity gains of transition to 8" as well as higher reuse could hurt the company's growth in RF. QRVO on its recent FY1Q18 earnings call guided a reduction of CapEx to $300 from $400m. QRVO's projected CapEx will also be less than 10% of sales and an 8% drop compared to FY17.

- **OLED – Higher investments in the short-term may be needed before return.** While OLED opportunity could be meaningful in the long run, it could require significant investments before it becomes a sustainable business. Note that when RTEC had entered the Litho market towards the end of 2012 the Company had to increase CapEx from ~0.4m to 1.1m and 2.5m over the subsequent two quarters; while R&D was flat overall, the company's F4Q12 and F1Q13 earning calls also noted increases in R&D from the acquired Litho segment. Consequently, we worry that a similar trend may happen as RTEC enters the OLED space. There are sizeable competitors – Canon and Nikon – producing quarterly display sales of $1.5b and $2.5b related to Litho. For RTEC to meaningfully compete, they will need to invest more aggressively in OpEx. However, we would note positively that RTEC is focused on steppers which have a lower TCO compared to scanners used by Canon and Nikon.

Figure 288: RTEC Revenues Across Segments

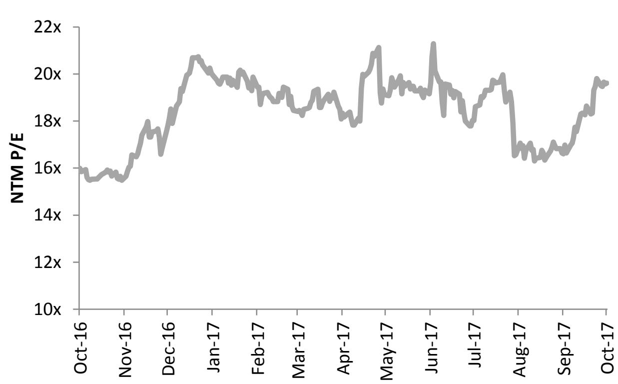


Source: Company data, Credit Suisse estimates

Investment View and Valuation

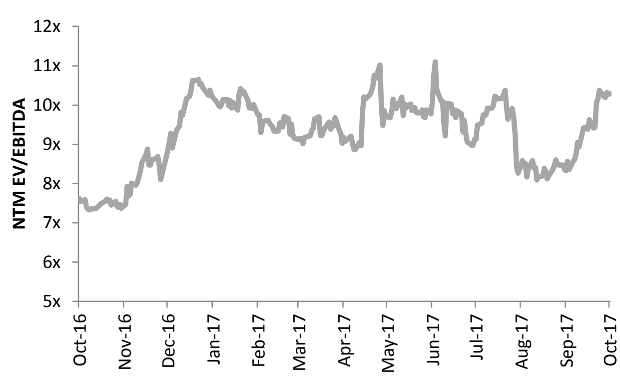
We continue to view RTEC as Underperform. RTEC's overall revenue growth of 9% is below front end peers and back end peers. In aggregate RTEC CY17 revs are growing 9% y/y – below the aggregate revenues for large front end companies which are growing 28% y/y (in constant currency) and back end peers TER/KLIC/ASM Pacific which are growing 18.9% in aggregate. We believe that lower growth for RTEC is driven by an adverse mix and a higher exposure to the RF/InFo market. In addition, RTEC is no longer appearing to be the faster growing company while Litho revenues could also decline due to increasing competition from the likes of KLIC entering. At current price, RTEC is trading at ~20.3x of CY17 EPS, on a net cash basis – fairly expensive given underperformance in both its front end and back end segments with headwinds in Litho. Our TP of $23 also reflects ~22x of our CY17 EPS (w/ SBC) of $1.03 vs. KLAC at only 13.6x.

Figure 289: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 290: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Synopsys Inc.

(SNPS, $84.61, OUTPERFORM, TP $90.00)

In-Line/In-Line:

Reporting Date: Wednesday, November 29, 2017, After Market Close

Conference Call: Wednesday, November 29, 2017

Figure 291: SNPS Summary of Expectations

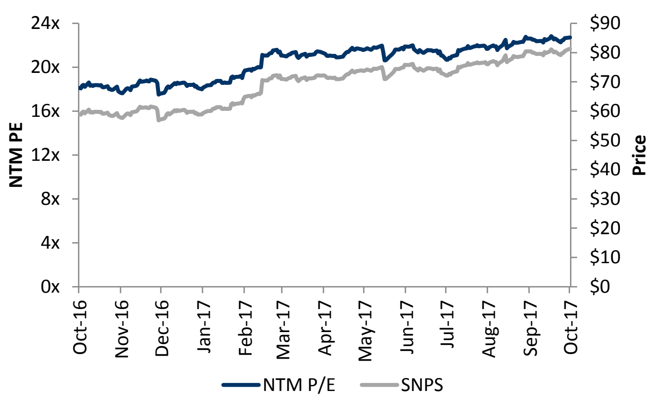
US$ in millions, unless otherwise stated

SNPS	Jul-17	Oct-17E			Jan-18E		F2017E		F2018E	
	Reported	CS	Cons	Guidance	CS New	Cons	CS	Cons	CS	Cons
Total Revenue	$695.4	$649.5	$650.7	$642-$657mn	$698.5	$672.6	$2,677.7	$2,678.9	$2,865.2	$2,810.4
% Q/Q chng	2.3%	-6.6%	-6.4%		7.5%	3.4%				
% Y/Y chng	13.0%	2.5%	2.7%		7.0%		10.5%	10.8%	7.0%	4.9%
Gross Margin*	79.0%	82.0%			81.5%		80.2%		81.5%	
Operating Exp.*	$375.4	$423.3			$400.3		$1,521.9		$1,648.1	
Operating Mgin*	25.1%	16.8%			24.2%		23.4%		24.0%	
Net Income*	$141.6	$88.6			$136.8		$511.1		$556.2	
Net Margin*	20.4%	13.6%			19.6%		19.1%		19.4%	
EPS* (Non-GAAP)	$0.92	$0.57	$0.57	$0.55-$0.58	$0.89	$0.84	$3.31	$3.31	$3.60	$3.58
Fully diluted shares	154.7	154.5		153-156m	154.5		154.6		154.5	

Source: Thomson Reuters, Company data, Credit Suisse estimates. * Pro forma excluding one-time items.

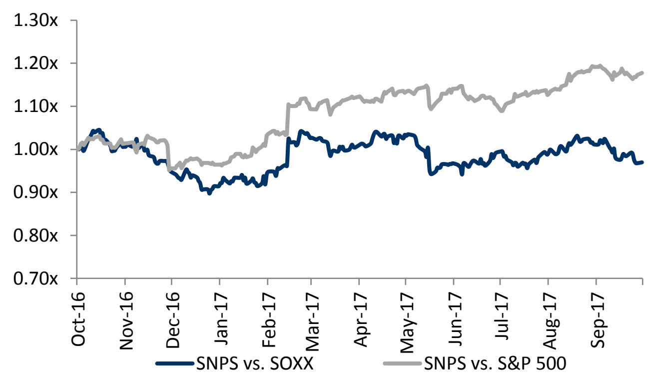
SNPS: Recap of Recent Stock Performance

Figure 292: SNPS NTM PE vs. Price



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 293: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data, Credit Suisse estimates

Key Message: While still early in the quarter, we expect SNPS to report F2Q and guide F3Q, at least in-line with CS/Street estimates. The Company has set a conservative bar for C2H, which could potentially drive upward revision for CY17. We expect that SNPS will be able to grow Core EDA (including Manufacturing) revenues, in-line with our expectation of industry growth rate of ~5% CAGR over the coming three to five years. SNPS also has exposure to Systems IP and Software testing businesses, which together represent 21% of total revenues and are growing at a >10%/>20% CAGR, respectively. We estimate these businesses will add about two points to growth CAGR on top of the Core EDA, implying total revenue CAGR of 7% over the coming five years. The Company is still trading at discount to CDNS on EV/Sales, and at significant discount to slower growth Engineering application software companies. We remain positive and expect multiple expansion to continue until PE reaches ~25x-30x (in-line with Engineering Software companies).

Expect F4Q17 (OctQ) Rev/EPS AT LEAST IN-LINE with CS/Street

While still early in the quarter, we expect SNPS to report OctQ Rev/EPS of $649.5 (-6.6% q/q)/$0.57 AT LEAST IN-LINE with CS at $649.5 (-6.6% q/q)/$0.57 and street at $650.7 (-6.4% q/q)/$0.57. In addition forecast estimates imply only a 2.5% y/y revenue growth. While SNPS had implied that OctQ growth could be sub-seasonal due to timing of IP and emulation, we think stronger Semi revenue trends should lead to moderate decline. Segments q/q rev growths are modeled as following: Core EDA -6.7%, IP & Systems -7.0%, Manufacturing -5.0%, and Services & Other -4.5%. Overall, we are modeling GM of 82.0% (+374bps q/q), OpEx of $423.3m (+12.7% q/q), and Rev $649.5 (-6.6% q/q) to drive $0.57 EPS at least in-line with company guidance at $0.57 EPS and above street at $0.55 EPS.

Expect F1Q18 (JanQ) Rev/EPS to be BELOW CS and IN-LINE with Street

We expect SNPS to report JanQ Rev/EPS of $672.6 (+3.6% q/q)/$0.84 BELOW CS at $698.5m (+7.5% q/q)/$0.89 and IN-LINE with street at $672.6 (+3.6% q/q)/$0.84. We are modeling y/y revenue growth of 7.0% for JanQ. In addition, we are modeling GM of 81.5% (-0.6% q/q) and OpEx of $400.3m (-5.4% q/q). We expect that above Revenues, GM, and OpEx will drive EPS to $0.84 below CS at $0.89 and in-line with street at $0.84.

Figure 294: SNPS Revenue Model by Type

US$ in millions, unless otherwise stated

(3-months ending)	Jan-16 1QA	Apr-16 2QA	Jul-16 3QA	Oct-16 4QA	Jan-17 1QA	Apr-17 2QA	Jul-17 3QA	Oct-17 4QE	Jan-18 1QE	Apr-18 2QE	Jul-18 3QE	Oct-18 4QE	Jan-17 C2016A	Jan-18 C2017E	Jan-19 C2018E
Revenue (in $mn)															
Time based license	$464.3	$484.2	$479.3	$483.2	$489.4	$501.1	$503.5	$505.5	$543.6	$566.3	$579.1	$540.9	$1,936.0	$2,053.7	$2,267.9
Upfront license	$43.4	$58.2	$66.9	$79.7	$79.6	$83.5	$100.3	$58.5	$87.6	$91.8	$110.3	$64.3	$284.3	$329.7	$335.5
Maintenance and Service	$60.9	$62.7	$69.0	$70.9	$83.8	$95.5	$91.6	$85.6	$92.0	$95.9	$98.0	$91.5	$286.4	$364.7	$383.9
Total Revenue	**$568.6**	**$605.0**	**$615.2**	**$633.7**	**$652.8**	**$680.1**	**$695.4**	**$649.5**	**$698.5**	**$727.7**	**$744.1**	**$695.0**	**$2,506.7**	**$2,723.4**	**$2,914.1**
Revenue (in %)															
Time based license	82%	80%	78%	76%	75%	74%	72%	78%	78%	78%	78%	78%	77%	75%	78%
Upfront license	8%	10%	11%	13%	12%	12%	14%	9%	13%	13%	15%	9%	11%	12%	12%
Maintenance and Service	11%	10%	11%	11%	13%	14%	13%	13%	13%	13%	13%	13%	11%	13%	13%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**104%**	**104%**	**106%**	**100%**	**100%**	**101%**	**103%**
Q/Q Growth %															
Time based license	-0.7%	4.3%	-1.0%	0.8%	1.3%	2.4%	0.5%	0.4%	7.5%	4.2%	2.3%	-6.6%			
Upfront license	-24.7%	33.9%	15.0%	19.1%	-0.1%	4.8%	20.1%	-41.7%	49.8%	4.8%	20.1%	-41.7%			
Maintenance and Service	-1.7%	2.9%	10.2%	2.7%	18.2%	14.0%	-4.1%	-6.6%	7.5%	4.2%	2.3%	-6.6%			
Total	**-3.2%**	**6.4%**	**1.7%**	**3.0%**	**3.0%**	**4.2%**	**2.3%**	**-6.6%**	**7.5%**	**4.2%**	**2.3%**	**-6.6%**			
Y/Y Growth %															
Time based license	7.7%	8.1%	7.5%	3.3%	5.4%	3.5%	5.1%	4.6%	11.1%	13.0%	15.0%	7.0%	6.1%	6.1%	10.4%
Upfront license	-6.5%	31.3%	36.8%	38.2%	83.3%	43.5%	49.9%	-26.6%	10.0%	10.0%	10.0%	10.0%	46.3%	16.0%	1.8%
Maintenance and Service	-5.7%	-3.7%	12.9%	14.4%	37.7%	52.4%	32.7%	20.7%	9.8%	0.3%	7.0%	7.0%	15.0%	27.3%	5.3%
Total	**4.9%**	**8.6%**	**10.7%**	**7.9%**	**14.8%**	**12.4%**	**13.0%**	**2.5%**	**7.0%**	**7.0%**	**7.0%**	**7.0%**	**10.5%**	**8.6%**	**7.0%**

Source: Company data, Credit Suisse estimates

Figure 295: SNPS Revenue Model by Product

US$ in millions, unless otherwise stated

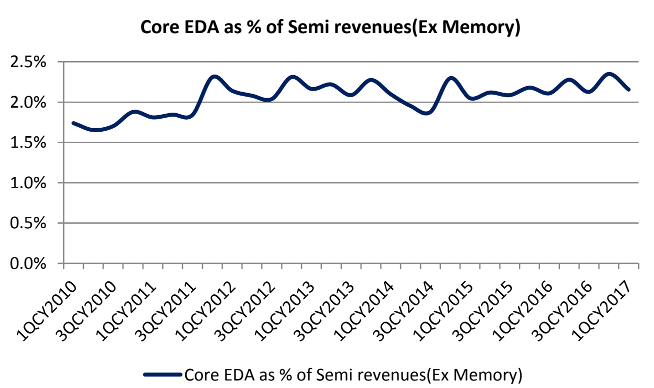
(3-months ending)	Jan-16 1QA	Apr-16 2QA	Jul-16 3QA	Oct-16 4QA	Jan-17 1QA	Apr-17 2QA	Jul-17 3QA	Oct-17 4QE	Jan-18 1QE	Apr-18 2QE	Jul-18 3QE	Oct-18 4QE	Jan-17 C2016A	Jan-18 C2017E	Jan-19 C2018E
Rev by Product Group (in %)															
Core EDA	60%	59%	62%	59%	56%	57%	59%	59%	59%	58%	57%	57%	59%	58%	58%
IP & Systems	29%	30%	27%	31%	33%	33%	31%	31%	32%	32%	33%	33%	30%	32%	32%
Manufacturing	9%	9%	9%	9%	9%	8%	8%	9%	7%	8%	8%	8%	9%	8%	8%
Services & Other	2%	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Rev by Product Group (in $mn)															
Core EDA	$339.7	$355.9	$384.4	$371.3	$368.5	$390.6	$407.2	$380.0	$412.1	$422.1	$424.1	$396.1	$1,480.1	$1,589.9	$1,675.8
IP & Systems	$167.0	$182.6	$167.6	$199.6	$214.2	$221.9	$216.5	$201.3	$223.5	$230.2	$243.4	$227.6	$764.0	$863.3	$939.0
Manufacturing	$48.6	$54.5	$52.9	$54.1	$58.4	$54.5	$58.1	$55.2	$48.9	$60.9	$61.7	$57.3	$219.9	$216.7	$241.3
Services & Other	$13.3	$11.9	$10.3	$8.8	$11.8	$13.1	$13.6	$13.0	$14.0	$14.6	$14.9	$13.9	$42.8	$53.7	$58.0
Total Revenue	**$568.6**	**$604.9**	**$615.2**	**$633.8**	**$652.9**	**$680.1**	**$695.4**	**$649.5**	**$698.5**	**$727.7**	**$744.1**	**$695.0**	**$2,506.8**	**$2,723.5**	**$2,914.1**
q/q															
Core EDA	-8.2%	4.8%	8.0%	-3.4%	-0.8%	6.0%	4.2%	-6.7%	8.5%	2.4%	0.5%	-6.6%			
IP & Systems	9.8%	9.3%	-8.2%	19.1%	7.3%	3.6%	-2.4%	-7.0%	11.0%	3.0%	5.7%	-6.5%			
Manufacturing	3.4%	12.1%	-2.9%	2.3%	7.9%	-6.7%	6.6%	-5.0%	-11.4%	24.6%	1.3%	-7.0%			
Services & Other	-25.3%	-10.5%	-13.4%	-14.6%	34.1%	11.0%	3.8%	-4.5%	7.5%	4.2%	2.3%	-6.6%			
Total Revenue	**-3.2%**	**6.4%**	**1.7%**	**3.0%**	**3.0%**	**4.2%**	**2.2%**	**-6.6%**	**7.5%**	**4.2%**	**2.3%**	**-6.6%**			
y/y															
Core EDA	7.0%	5.3%	10.4%	0.3%	8.5%	9.7%	5.9%	2.3%	11.8%	8.1%	4.2%	4.3%	6.0%	7.4%	5.4%
IP & Systems	2.3%	16.8%	18.9%	31.2%	28.3%	21.5%	29.2%	0.9%	4.3%	3.7%	12.4%	13.0%	23.9%	13.0%	8.8%
Manufacturing	8.0%	21.4%	12.6%	15.1%	20.2%	0.0%	9.8%	2.1%	-16.3%	11.8%	6.2%	3.9%	17.3%	-1.5%	11.4%
Services & Other	-18.4%	-34.3%	-48.0%	-50.6%	-11.3%	10.1%	32.0%	47.6%	18.4%	11.1%	9.4%	7.0%	-38.0%	25.4%	8.1%
Total Revenue	**4.9%**	**8.5%**	**10.7%**	**8.0%**	**14.8%**	**12.4%**	**13.0%**	**2.5%**	**7.0%**	**7.0%**	**7.0%**	**7.0%**	**10.5%**	**8.6%**	**7.0%**

Source: Company data, Credit Suisse estimates

Key Issues

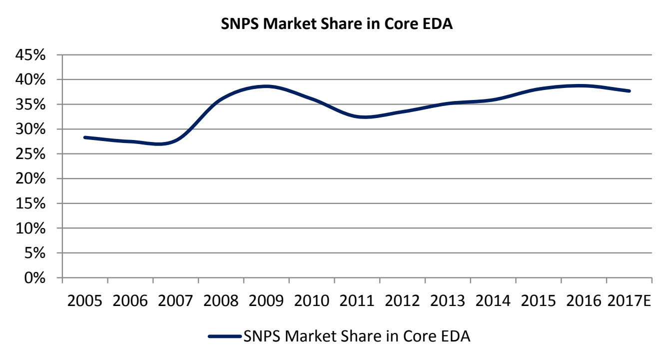
- **EDA Industry is Starting to Grow Faster than Semis.** EDA industry data shows that EDA is starting to grow faster than Semis. EDA is benefitting from the market expansion of non-Semi companies, and greater pricing power. In addition, we note the following as positive for the industry: i) slowing Moore's law implies more chip design, ii) wider adoption of ASICs as workloads become more mature, iii) potential opportunity of large complex ASICs for AI, iv) neuromorphic computing – which significantly reduces power consumption for AI computation, and v) while semi industry is maturing in developed countries, China's Fabless companies are growing at 25-35% and can become ~10% of EDA revs over next five years from 5-6% today.

Figure 296: Core EDA Industry Rev as % of Semi



Source: Company data, Credit Suisse estimates

Figure 297: EDA (w IP) revenues as % of Semis



Source: Company data, Credit Suisse estimates

- **SNPS is gaining share.** The company is steadily winning market share in the core EDA market, and market share has increased ~10 pts over last 10 years. Note that during 2009-2010 there was significant increase in market share as CDNS revenues declined significantly due to change in revenue recognition. Note that we are modeling

Core EDA (including Manufacturing) to grow at +6.7% y/y for SNPS in CY17 vs. CDNS at 4.8% y/y. If our expectation for upside to SNPS's F4Q17 is correct - the growth maybe even higher.

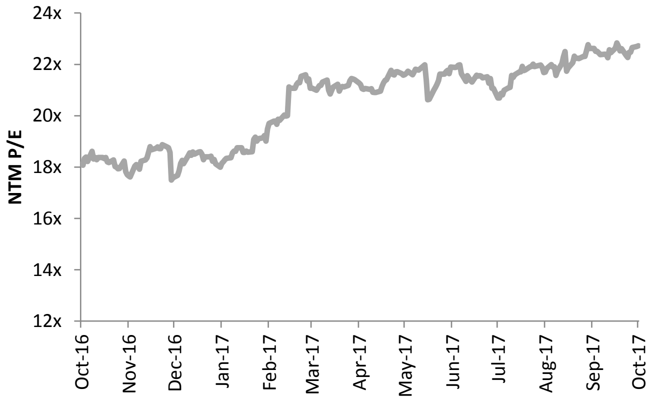
- **IP also adds a Growth Kicker.** EDA industry is also benefitting from the growth of Semi intellectual property which is growing at >10% revenue rate. SNPS has ~31% of revenues that are coming from IP. We think the Company can continue to grow IP revenues as >10% CAGR going forward. SNPS has three main drivers for their IP business: (i) Standard interface IP. The Company is the largest IP provider for Interface Ip; (ii) Processor IP. SNPS is the second largest provider for Processor IP. The ARC processor is well suited for IoT applications. The Company has recently also started to sell processor for Vision Processor using Deep neural networks.
- **Hidden Software Security: could add ~25% to the Company's SAM.** The Software Security and Verification total available market is expected to be ~$2.5bn versus ~$9.4bn for EDA. We believe that given that SNPS is investing in the space, the Company will over time gain market share in the business, and the large TAM should allow them to grow at high rates over next few years. However, note that SNPS will still continue to have losses this year in their Software security business, and we estimate that the business is ~160bps to Non GAAP OpM.
- **Growth not priced in – Growing faster than CDNS but cheaper.** We estimate that EDA spending represents ~3% of Semi revenues versus 0.75% of consumer Semi revenues from IAI/IoT; as Semi growth shifts toward IoT/IAI, it would enable Core EDA to grow faster than Semis. In addition, ~31% of revenues from SNPS are from IP/Software testing that are growing at a +10%/+20% CAGR. We estimate a revenue growth CAGR for SNPS at 2-3 pts above Semis and ~1-2 pts above EDA peers. Note that SNPS also has ~31% of revenues from high growth areas such as IP and Software testing, versus only 12% for CDNS - as a result we believe that SNPS could potentially continue to grow at a faster rate. Despite the more attractive growth - SNPS is trading at ~29% discount on EV/Sales and ~11% to 16% discount on other metrics.

Investment View and Valuation

We believe that SNPS can sustainably grow Revs at ~7% per year versus current share price only embedding a 4% growth per year. SNPS is the leader in EDA software and has some of the most differentiated products, which have enabled the company to steadily grow revenues, maintain margins, and deliver near 15% ROI. The stock has outperformed the SPX over the past year, five years, and ten years, driven mostly by earnings growth. We believe slowing Moore's law will place greater burden of overall system performance improvement on chip design, which will increase the relevance of SNPS within the tech ecosystem. We expect that SNPS will be able to grow Core EDA (including Manufacturing) revenues, in-line with our expectation of industry growth, at a ~5% CAGR over the coming three to five years. SNPS also has exposure to Systems IP and Software testing businesses, which together represent 31% of total revenues and are growing at a >10%/>20% CAGR, respectively. We estimate these businesses will add about two points to growth CAGR on top of the Core EDA growth of 5%, leading to 7% growth CAGR for next several years.

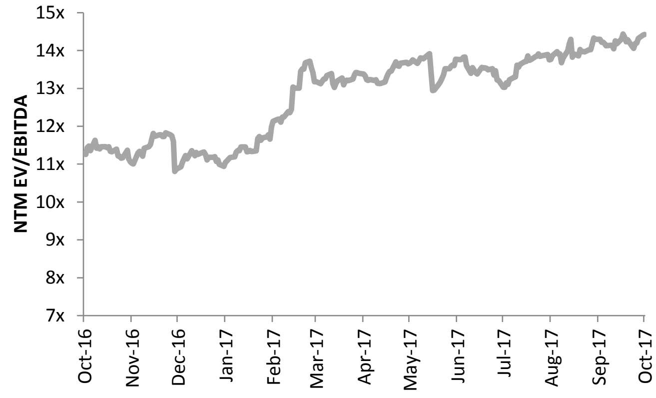
SNPS is trading at 22.7x FY18 EPS (ex SBC) of $3.60. Based on HOLT analysis, SNPS shares are only pricing in 4% CAGR vs. our expectation of >7%. In addition, despite superior growth and comparable OpM (w SBC), SNPS is trading at ~29% discount to CDNS on EV/Sales. Our $90 TP is based on 25.0x of CY18 Non GAAP EPS of $3.60. In addition, based on HOLT, we estimate that our target price implies ~6% growth with no margin expansion, or only 5%. Using a 10 year DCF, assuming 7% growth and Operating margin expansion to 25.5%, we also arrive at our Target price of $90

Figure 298: NTM P/E



Source: Company data, Credit Suisse estimates, Thomson Reuters

Figure 299: NTM EV/EBITDA



Source: Company data, Credit Suisse estimates, Thomson Reuters

Teradyne Inc.

(TER, $38.61, NEUTRAL, TP $36.00)

Inline/Inline: Semi Deceleration = SoC Test Decline

Reporting Date: TBD

Conference Call: TBD

Figure 300: TER Summary of Expectations

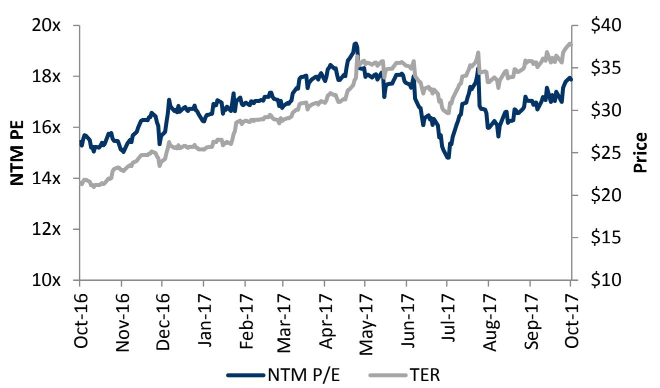
US$ in millions, unless otherwise stated

TER-US	Jun-17	Sep-17			Dec-17		2017E		2018E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Bookings	$461.0	$349.8			$465.0		$1,869.8		$2,050.4	
Total Revenue	$696.9	$465.0	$470.9	$455-$485m	$364.1	$366.2	$1,982.9	$1,990.9	$2,022.3	$2,103.2
% Q/Q chng	*52.5%*	*-33.3%*	*-32.4%*		*-21.7%*	*-22.2%*				
% Y/Y chng	*31.0%*	*13.3%*	*14.7%*		*-4.2%*	*-3.6%*	*13.1%*	*13.6%*	*2.0%*	*5.6%*
Total GM*	56.0%	57.0%			55.5%		56.6%		55.1%	
Operating Exp.*	$172.7	$163.2			$157.4		$654.4		$694.7	
Operating Mgin*	31.3%	21.9%	*21.2%*		12.3%	*11.5%*	23.6%		20.8%	
Net Income*	$181.6	$85.3			$37.5		$393.1		$353.4	
Net Margin*	26.1%	18.3%			10.3%		19.8%		17.5%	
EPS*	$0.90	$0.43	$0.43	*$0.39-$0.46*	$0.19	$0.20	$1.96	$1.97	$1.81	$2.18
Fully diluted shares	201.5	199.5			198.2		200.9		195.5	

Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

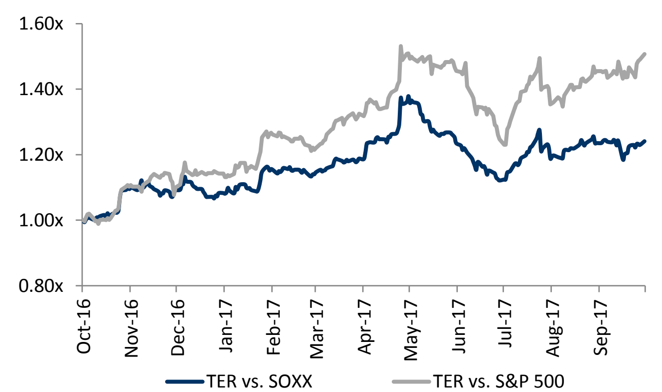
TER: Recap of Recent Stock Performance

Figure 301: TER NTM PE vs. Price



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Figure 302: LTM Performance vs. SOXX vs. SPX



Source: Company data, Credit Suisse estimates, Thomson Reuters Datastream

Key Message. We expect TER to report SepQ at least Inline with CS/Street, and guide DecQ in-line with CS but Above Street. While results are likely to be better than expected, we see 17% downside to current street estimates for CY18 EPS. We would note that for last 17 years, a deceleration in Semi revenues has resulted in decline in SoC test market. Currently we are expect Semi (ex memory, ex MPU) growth to decelerate from 9.9% in CY17 to 5.5% in CY18 which would suggest that SoC test market can decline next year versus current street estimate of growth in SoC. While we like the long term growth from Autos/ UR, we are concerned that reset in 2018 expectations could be negative for the stock.

Expect C3Q17 (SepQ) Results In-Line CS/Street

We expect TER to report Rev/EPS of $465m (-33.3% q/q)/$0.43, ATLEAST IN-LINE with CS at $465m (-33.3% q/q)/$0.43 and Street at $471m (-32.4% q/q)/$0.43, versus company guidance of $455-485m (-34.7% to -30.4% q/q)/$0.39-0.46. We would note that SIA data through August suggest that Semi growth has been extremely strong, which would suggest strong results for Soc test. In addition, Disco reported orders have been better than expected. By segment, we are modeling rev for Semi/Systems/Wireless /Universal Robots revenue at $348m/$55m/$23m/$35m and orders at $228m/$65m/$22m/$35m. We are modeling GM of 57.0% (+100bps q/q), and OpEx of $163m (vs. $173 in JunQ). We expect in-line rev and profitability to drive, EPS in-line with CS/Street estimate of $0.43.

Expect C4Q17 (DecQ) Rev/EPS Guidance In-line with CS Above Street

We expect TER to guide DecQ Rev/EPS to $364m/$0.19, INLINE with CS at $364m/$0.19 and BELOW Street at $366m/$0.20. By segment we are modeling rev as follows (i) Semi test $236m (-32% q/q) (ii) System test $58m (+5% q/q) (iii) Litepoint $20m (-11% q/q) (iv) Universal Robots $50m (+43% q/q). We are modeling GM of 55.5% (-150bps q/q), and OpEx of $157m (versus $163m in SepQ). In-line Rev, GM and OpEx will drive EPS to $0.19, in-line with CS at $0.19 and Below Street at $0.20.

2018 Outlook

We expect TER C2018 Revenue/EPS to be $2.02b(+2.0% y/y)/$1.81 in-line with the CS at $2.02bn(+2.0%)/$1.81 and below street at $2.1bn(+5.6% y/y)/$2.18. By segment we are modeling rev as follows (i) Semi test $1.47bn (-4% y/y) (ii) System test $200m (+6% q/q) (iii) Litepoint $99 (+3% y/y) (iv) Universal Robots $253m (+58% q/q). We expect GM of 55.1% in 2018 . We expect OpEx up 6.1% y/y to $695mn in 2018. We estimate 2018 Rev/EPS for TER at $2.02bn/$1.81 versus Street estimate of $2.1bn/$2.18.

Figure 303: TER Revenue Model

Revenues ($ mn)	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Semi Test	$340	$435	$322	$271	$356	$593	$348	$236	$352	$428	$369	$322	$1,367	$1,534	$1,471
System Test	$54	$49	$37	$50	$40	$37	$55	$58	$50	$50	$50	$50	$190	$189	$200
Wireless Litepoint	$20	$22	$28	$26	$25	$28	$23	$20	$26	$30	$23	$20	$96	$96	$99
Universal Robots	$17	$25	$24	$34	$36	$39	$35	$50	$70	$51	$54	$78	$100	$160	$253
Total	**$431**	**$532**	**$410**	**$380**	**$457**	**$697**	**$461**	**$364**	**$498**	**$558**	**$496**	**$470**	**$1,753**	**$1,979**	**$2,022**

% of Total	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Semi Test	79%	82%	78%	71%	78%	85%	76%	65%	71%	77%	74%	69%	78%	77%	73%
System Test	13%	9%	9%	13%	9%	5%	12%	16%	10%	9%	10%	11%	11%	10%	10%
Wireless Litepoint	5%	4%	7%	7%	5%	4%	5%	6%	5%	5%	5%	4%	5%	5%	5%
Universal Robots	4%	5%	6%	9%	8%	6%	8%	14%	14%	9%	11%	17%	6%	8%	12%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Q/Q Growth	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE
Semi Test	66%	28%	-26%	-16%	32%	67%	-41%	-32%	49%	21%	-14%	-13%
System Test	-8%	-9%	-25%	36%	-20%	-8%	48%	5%	-13%	0%	0%	0%
Wireless Litepoint	-38%	12%	25%	-7%	-4%	12%	-19%	-11%	30%	13%	-23%	-11%
Universal Robots	-23%	49%	-6%	40%	7%	8%	-10%	43%	40%	-27%	6%	43%
Total	**36%**	**23%**	**-23%**	**-7%**	**20%**	**53%**	**-34%**	**-21%**	**37%**	**12%**	**-11%**	**-5%**

Y/Y Growth	Mar-16 1QA	Jun-16 2QA	Sep-16 3QA	Dec-16 4QA	Mar-17 1QA	Jun-17 2QA	Sep-17 3QE	Dec-17 4QE	Mar-18 1QE	Jun-18 2QE	Sep-18 3QE	Dec-18 4QE	2016	2017E	2018E
Semi Test	25%	9%	-1%	32%	5%	36%	8%	-13%	-1%	-28%	6%	36%	14%	12%	-4%
System Test	54%	7%	-47%	-15%	-26%	-24%	49%	15%	25%	35%	-9%	-13%	-9%	0%	6%
Wireless Litepoint	-41%	-64%	-49%	-19%	25%	25%	-19%	-22%	5%	6%	0%	0%	-48%	0%	3%
Universal Robots			50%	52%	112%	54%	46%	49%	94%	31%	55%	55%	138%	60%	58%
Total	**27%**	**4%**	**-12%**	**19%**	**6%**	**31%**	**12%**	**-4%**	**9%**	**-20%**	**8%**	**29%**	**7%**	**13%**	**2%**

Source: Company data, Credit Suisse estimates

Key Issues

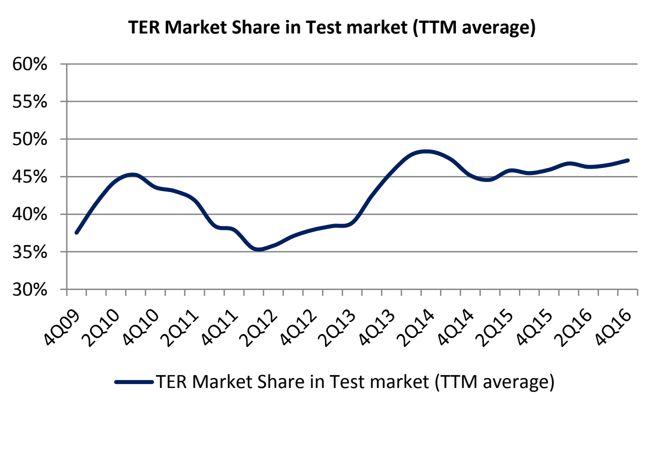
- **Semi Test Market could Decline in CY18:** We believe that SoC test market could decline by ~$200mn (-7% y/y) in CY18, while wireless test and systems test are likely to be flattish. Assuming 50% y/y growth in UR, 1% market share gain in SoC, and 10% y/y growth in Memory test, we estimate that CY18 Rev may be only $2.02bn, versus our prior estimate of $2.06bn. Note that for last 17 years (with exception of 2012), SoC test has declined/grown every year there has been a deceleration/acceleration in Semi growth. Note that even in 2012, it may have been different if the Semi revenues included the value of internally designed SoC (Apple/Samsung) that were responsible for most of SoC test market growth but were not counted in SIA reported revenues.

- **UR Ecosystem Broadening:** UR has the broadest ecosystem within the collaborative robots markets which could allow them to maintain market share. Flippy, which is VC backed startup added vision and AI to UR for flipping burgers. (note that there a 50K/ 500K fast food restaurant in US/globally). If UR is able to sustain 50% growth for next three years there could be potential for spinoff given high multiples in Automation space(UR could be >$500mn per year in rev and 15%-20% OpM)..

- **Auto test growing at 10%+ per year.** Note that implementation of self-driving features like Auto parking, require greater reliability due to ISO 26262 standards, leading to longer test times. We expect that Auto test market (~15% of SoC test) to grow at 10%+ per year - above the high single digit growth rate for Semis in Autos.

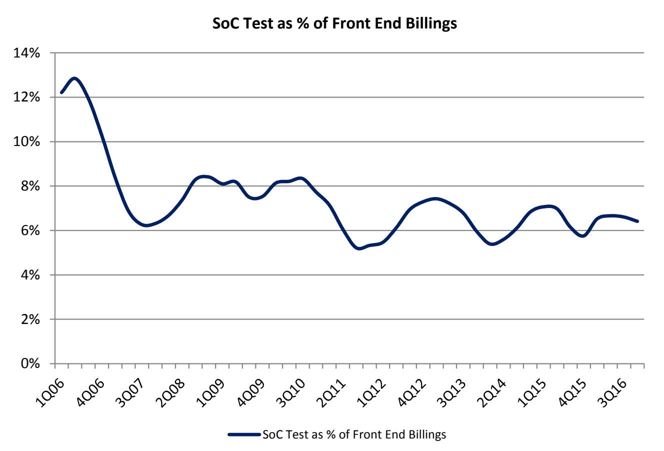
- **Semi Test Has Structurally Declined Relative to Semiconductor Market, but Appears to Be Stabilizing.** Equipment Test market (ex-service) has declined 62% from $4.7bn in 2004 to $1.8bn in 2013 while Semi revenues have increased 40% during the same period. As a result Test as a percentage of global semiconductor sales has declined from 2.6% in 2004 to 0.7% in 2013. We believe that a key reason for decline in Semi Test has been continued productivity gains in the Semi Test equipment which have outpaced Moore's law cadence of complexity increase. Productivity gains have not slowed down post Advantest Verigy merger as we have not yet seen a change in competitive dynamics between Advantest and Teradyne and both companies continue to introduce newer systems with higher productivity. However, Teradyne noted that the company is now reaching the limits on productivity gains on parallel test as test programs grow more complicated and savings are less as fixed costs are already spread over more units. The company now expects SoC test growth to recover to +3% y/y for the next few years. TER's 2014+2015 Semi test revenues of $2.5bn appear higher than 2012+2013 revenues of $2.16bn which is encouraging. Recent market data suggests that test capex is now growing in-line with front end.

Figure 304: TER market share in Test market



Source: Company data, Credit Suisse estimates

Figure 305: SoC Test as % of front End Billings



Source: Company data, Credit Suisse estimates

- **TER Is SemiCap Best Levered to IoT.** IoT devices are smaller in size which will lead to lower wafer area growth relative to unit growth. However TER revenues are tied more to the number of dies than to number to wafers - TER will benefit more than other SemiCaps from the build out of IoT. TER also has >70% market share in MCU's (versus ~40% overall market share in Test). In addition to the Semi Test business, the Litepoint business may also benefit as greater amount of devices could potentially need to be tested for connectivity. We believe that adoption of IoT will drive integration of RF capability into micro controllers which can potentially significantly increase test times. We believe that IoT growth has been a key driver for recent strength in J750.

Investment View and Valuation

TER has made significant improvements over last few years. Specifically (i) the company has shown increase in Semi Test Revenues, (ii) GMs are better and averaging at 55%, (iii) The Company is more committed to Capital returns, (iv) Business is more diversified and less cyclical. However we are concerned that there could be risk to street CY18 estimates, which could be negative for the stock. TER is currently trading at 19.4x of our CY17 EPS, versus average of 13.9x over the last five years. While there is promise in long term growth from UR, there is also a risk that this could be end up being another Litepoint, which has come short of expectations of >20%. We maintain Neutral rating and our TP of $36 represents 18.4x of CY17 EPS.

Texas Instruments

(TXN, $93.59, OUTPERFORM, TP $95.00)

Another Beat and Raise

Reporting Date: Tuesday, October 24th, 2017, 4:00PM EST

Conference Call: Tuesday, October 24th, 2017, 5:00 PM EST

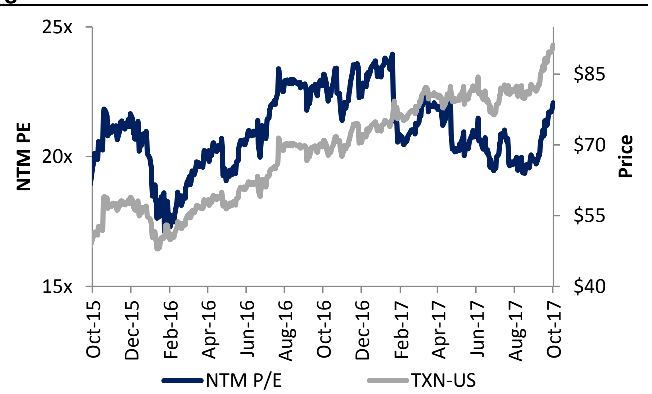
Figure 306: TXN Summary of Expectations

TXN	Jun-17	Sep-17E			Dec-17E		CY17E		CY18E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	$3,693	$3,900	$3,911	$3,740 to $4,060	$3,637	$3,657	$14,632	$14,661	$15,051	$15,195
% Q/Q chng	8.6%	5.6%	5.9%	+1.3% to +9.9%	-6.8%	-6.5%				
% Y/Y chng	12.8%	6.1%	6.4%		6.5%	7.1%	9.4%	9.7%	2.9%	3.9%
Seasonal	8.8%	6.3%			-7.0%					
Gross Margin	64.3%	64.5%	64.3%		64.4%	63.7%	64.1%	63.8%	64.6%	64.3%
Operating Expense	$812	$812			$769		$3,201		$3,240	
Operating Margin	42.3%	43.7%			43.2%		42.2%		43.1%	
Net Margin	29.8%	29.9%			29.6%		29.3%		29.4%	
Operating EPS (w\ options)	$1.08	$1.15			$1.06		$4.22		$4.37	
GAAP Reported EPS	$1.03	$1.11	$1.12	$1.04-$1.18	$1.01	$1.00	$4.12	$4.13	$4.22	$4.28
FCF/sh (ann.)	$3.02	$5.82	$5.46		$5.27	$5.26	$4.18	$4.08	$4.75	$4.65
Fully Diluted Sharecount	1,015	1,015			1,015		1,016		1,015	

Source: Thomson Reuters, Company data, Credit Suisse estimates

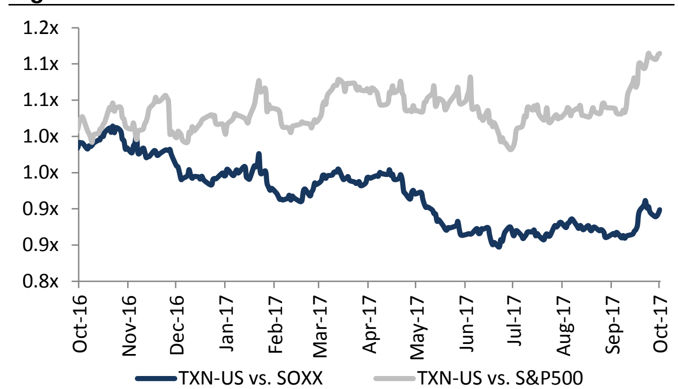
TXN: Recap of Recent Stock Performance

Figure 307: TXN NTM PE vs. Price



Source: Thomson Reuters, Company data, Credit Suisse estimates

Figure 308: LTM Performance vs. SOXX vs. SPX



Source: Thomson Reuters, Company data, Credit Suisse estimates

Key Message: We expect TXN to beat C3Q and guide C4Q at least INLINE and more likely ABOVE Street. Over the last 8Qs, TXN has exceeded the reported quarter Rev/EPS by ~5%/15% and has guided the out-quarter ~2%/5% ABOVE Street. Specifically, 2H Rev looks overly conservative especially as (1) C3Q Rev of +5.6% q/q is 70 bps below seasonal despite our checks, SIA and peer commentary of at least seasonal or better – note TXN has outgrown SIA by 1200 bps since the trough in C2Q16 and (2) AAPL (9% of Rev) which declined 25% H/H in 1H is likely to grow at least 50% H/H in 2H. More importantly, we see multiple drivers of upside to EPS which over time could add over $3.00 to our base case CY18 EPS of $4.22. Specifically we would highlight: **(1) Margin expansion above what is currently embedded in Street estimates.** While TXN is one of the few Semi Companies that have not provided a "target model" – 300 mm at only 30% utilization, incremental GM of 75%, and incremental OpM of 70% support a target GM/OpM of between 65-70%/45-50% – at the low end driving ~$0.40 of upside to CY18, at the high end ~$0.90. **(2) Analog/MCU segments should begin to benefit from scale.**

As IoT proliferates and silicon becomes a greater % of BOM (i.e. more critical to the end device), customers will deal with fewer suppliers who do more – driving faster than historic organic market share growth. While Digital Segments have already seen significant consolidation, Analog/MCU remain fragmented. At target margins every 1% increase in Analog/MCU market share would drive 15/5 cents of upside to EPS. We see terminal market share in Analog at 25-30% versus high teens today, for MCU of ~20-22% versus 15-17% today and a potential ~$1.30 and ~$0.30 respectively to EPS. **(3) TXN is a significant beneficiary of Tax Reform.** We estimate Tax Reform could add up to 40-50 cents to annual EPS. **(4) Pristine Balance Sheet Means M&A or Leverage.** Lastly, pristine balance sheet ($0 net debt) with most cash on-shore provides opportunity for additional cash return to investors ($21bn in the last 5 years) and accretive deals. TXN's current dividend yield of ~3% is significantly higher than a cost of debt of less than 2%; average leverage for the sector of 1.5x would allow the Company to buy $8bn in stock or 9% of current float adding 40 cents to EPS. Reiterate OP and $95 PT.

Expect SepQ Rev/EPS At Least IN-LINE with CS/Street

We expect TXN to report C3Q Rev/EPS of AT LEAST $3.91bn/$1.13 vs. CS and the midpoint of guidance at $3.90bn/$1.11 and Street at $3.91bn/$1.12. Note TXN guided C3Q Rev up 5.6% q/q, 70 bps BELOW seasonal despite benefitting from Industrial tailwinds and initial iPhone builds. Likewise, implied y/y growth of 6.3% y/y appears conservative against our end-market checks which suggest double digit B2B y/y growth.

- **C3Q Guide Conservative Against Peers and SIA:** TXN's guidance only embeds Analog/Embedded growing 10/100 bps above seasonal, well BELOW SIA Analog/Embedded which are tracking 360/400 bps above seasonal. On a y/y basis, C3Q guidance embeds TXN Analog/Embedded growing 11%, BELOW SIA Analog/Embedded and peers tracking up 12% y/y – which would mark only the 4th quarter in the last 20 that TXN Analog/Embedded has undergrown SIA. Note TXN has BEATEN Rev/EPS guidance by an average of 4%/10% over the last 8Qs, and our checks would suggest TXN is discounting disti orders by 10-15% and as much as 30% in some regions to maintain appropriate inventory levels.
- **Rev Upside from Strong B2B and Initial iPhone builds:** We expect continued double-digit growth in Auto and Industrial along with y/y growth in Personal Electronics off of easy compares. We are modeling Analog (65% of Rev) up 7% q/q – embedding core Analog up 3% q/q, 100 bps above seasonal which appears overly conservative given SIA Analog is tracking 360 bps above seasonal, and AAPL Rev of $390m. Our assumptions are based upon 65m iPhone builds/ASPs of $3.80, which are up 25% q/q but flat y/y given the pushout in iPhone X builds. We are modeling Embedded (24% of Rev) up 3% q/q, 100 bps above seasonal which appears conservative against SIA MCU/DSP tracking 400 bps above), and Other Rev up 6% q/q, in-line with seasonal.
- **Street Under-modeling Margin Leverage:** We are modeling GM of 64.5%, embedding 70% incr. GM and above Street at 64.3% – but see upside to 65% which embeds 75% incr. GM, in-line with TXN's LT historical median. We expect OpEx flat q/q at $812m, acquisition charges of $80m/qtr, and an effective GAAP tax rate of 29% (which includes a $20m discrete tax benefit, IN-LINE with guidance and already embedded in CS/Street estimates). Upside to Rev and GM should drive GAAP EPS of at least $1.13 vs. CS/Street at $1.11/$1.12.

Expect DecQ Guidance At Least IN-LINE CS/Street

We expect TXN to guide DecQ Rev/EPS of $3.67bn/$1.05, AT LEAST in-line with CS at $3.64bn/$1.01 and Street of $3.65bn/$1.00 with an UPSIDE bias even incorporating TXN's penchant to guide conservatively.

- **Upside Bias to Street Rev:** Street C4Q Rev down 6.5% q/q is only 50 bps above seasonal despite the tailwind from accelerating iPhone X builds alongside our expectation for at least seasonal B2B growth. We expect AAPL Rev up ~10% q/q to $435m based on ~70m iPhone builds/ASPs of $3.80 – and expect the delayed ramp to drive peak builds into C1Q, providing cushion to what are TXN's seasonally weakest C4Q/C1Q. From a segment perspective, we are modeling: (1) Analog down 4% q/q, (2) Embedded down 8% q/q and (3) Other down 23% q/q.

- **Street GM Too Low, OpEx too High:** We are currently modeling GM of 64.4% ABOVE Street at 63.7% which only embeds incr. GM of 65%. We expect non-GAAP OpEx down 5% q/q to $769m in-line with the 5YR median, BELOW Street which is modeling $778m, and an effective TR of 30% which includes $10m in tax benefits already included in CS/Street estimates, driving a guided EPS range of $1.00-$1.10, with the midpoint of at least $1.05 ABOVE CS at $1.01 and Street at $1.00.

Figure 309: TXN Revenue Model

US$ in millions, unless otherwise stated

Revenue ($m)	Mar-16 1Q	Jun-16 2Q	Sep-16 3Q	Dec-16 4Q	Mar-17 1Q	Jun-17 2Q	Sep-17E 3QE	Dec-17E 4QE	Mar-18E 1QE	Jun-18E 2QE	Sep-18E 3QE	Dec-18E 4QE	2016	2017E	2018E
Analog	$1,879.0	$2,044.0	$2,323.0	$2,290.0	$2,256.0	$2,411.0	$2,567.1	$2,472.4	$2,361.6	$2,506.3	$2,668.1	$2,559.6	$8,536.0	$9,706.5	$10,095.7
Embedded Processing	$729.0	$755.0	$795.0	$744.0	$803.0	$868.0	$894.0	$824.3	$853.2	$916.9	$938.9	$867.6	$3,023.0	$3,389.3	$3,576.6
Other	$400.0	$474.0	$557.0	$380.0	$343.0	$414.0	$438.8	$340.1	$312.9	$360.1	$403.4	$302.5	$1,811.0	$1,535.9	$1,378.9
Total	**$3,008.0**	**$3,273.0**	**$3,675.0**	**$3,414.0**	**$3,402.0**	**$3,693.0**	**$3,900.0**	**$3,636.8**	**$3,527.7**	**$3,783.4**	**$4,010.4**	**$3,729.7**	**$13,370.0**	**$14,631.8**	**$15,051.2**

Revenue (% of Total)	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17E	Dec-17E	Mar-18E	Jun-18E	Sep-18E	Dec-18E	2016	2017E	2018E
Analog	62.5%	62.5%	63.2%	67.1%	66.3%	65.3%	65.8%	68.0%	66.9%	66.2%	66.5%	68.6%	63.8%	66.3%	67.1%
Embedded Processing	24.2%	23.1%	21.6%	21.8%	23.6%	23.5%	22.9%	22.7%	24.2%	24.2%	23.4%	23.3%	22.6%	23.2%	23.8%
Other	13.3%	14.5%	15.2%	11.1%	10.1%	11.2%	11.3%	9.4%	8.9%	9.5%	10.1%	8.1%	13.5%	10.5%	9.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Revenue (q/q)	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17E	Dec-17E	Mar-18E	Jun-18E	Sep-18E	Dec-18E
Analog	-9.4%	8.8%	13.6%	-1.4%	-1.5%	6.9%	6.5%	-3.7%	-4.5%	6.1%	6.5%	-4.1%
Embedded Processing	4.1%	3.6%	5.3%	-6.4%	7.9%	8.1%	3.0%	-7.8%	3.5%	7.5%	2.4%	-7.6%
Other	-3.8%	18.5%	17.5%	-31.8%	-9.7%	20.7%	6.0%	-22.5%	-8.0%	15.1%	12.0%	-25.0%
Total	**-5.7%**	**8.8%**	**12.3%**	**-7.1%**	**-0.4%**	**8.6%**	**5.6%**	**-6.7%**	**-3.0%**	**7.2%**	**6.0%**	**-7.0%**

Revenue (y/y)	Mar-16	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17E	Dec-17E	Mar-18E	Jun-18E	Sep-18E	Dec-18E	2016	2017E	2018E
Analog	-7.7%	-0.2%	6.5%	10.5%	20.1%	18.0%	10.5%	8.0%	4.7%	4.0%	3.9%	3.5%	2.4%	13.7%	4.0%
Embedded Processing	8.5%	9.4%	9.7%	6.3%	10.2%	15.0%	12.5%	10.8%	6.2%	5.6%	5.0%	5.2%	8.5%	12.1%	5.5%
Other	-9.7%	-3.9%	6.7%	-8.7%	-14.3%	-12.7%	-21.2%	-10.5%	-8.8%	-13.0%	-8.1%	-11.1%	-3.4%	-15.2%	-10.2%
Total	**-4.5%**	**1.3%**	**7.2%**	**7.1%**	**13.1%**	**12.8%**	**6.1%**	**6.5%**	**3.7%**	**2.4%**	**2.8%**	**2.6%**	**2.8%**	**9.4%**	**2.9%**

Source: Company data, Credit Suisse estimates

Key Issues

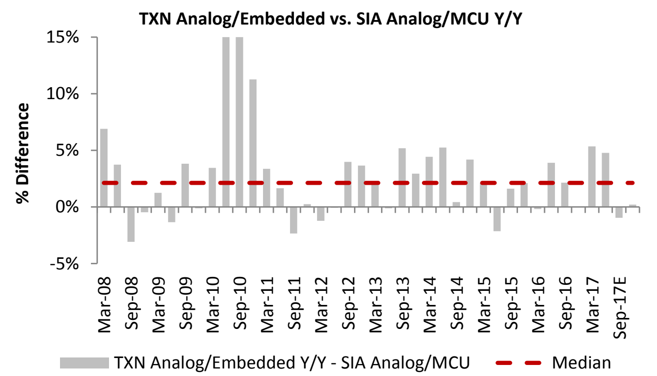
TXN Poised to Outgrow Industry. TXN is well-positioned to outgrow Semis as the company anniversaries growth headwinds caused by portfolio pruning in Wireless & Other. While TXN has grown topline at a 3% CAGR over the past 5 years below Semis ex-Memory at 4%, TXN's core franchises of Analog & Embedded have grown at 6%, out-growing SIA Analog & MCU at 5% and peers at 4%. Going forward industry growth ex-Memory is likely to accelerate from ~4% to ~6%+ – we also believe TXN's core LT growth rate is poised to accelerate from 6% to ~8%+.

- **Analog/MCU Segments Should Begin to Benefit from Scale:** While scale has not historically been a strategic imperative in analog, we see increasing silicon content in non-traditional areas driving customers to seek fewer suppliers with greater capabilities over time, providing the basis for share growth to accelerate to >100 bps/year vs. 30-40 bps today. At target margins every 1% increase in Analog/MCU market share would drive 15/5 cents of upside to EPS. We see terminal market share in Analog at 25-30% versus high teens today, for MCU of ~20-22% versus 15-17% today and a potential ~$1.30 and ~$0.30 respectively to EPS.

- **Web Presence, I/A/I Focus Driving Growth:** TXN's strong web presence gives it the industry's largest market channel with unique access to 100,000+ customers and 4x the web traffic of its nearest competitor, which should accelerate and diversify relative growth. Specific to CY17/18, Street is only modeling Rev growth of 9.7%/3.9%, BELOW peers and implied seasonal of ~11%/5% despite stronger core growth and AAPL providing 100 bps of tailwind. In-line Rev growth would drive ~$0.05 of EPS upside to current CY17/18. TXN continues to benefit from improving mix –we expect

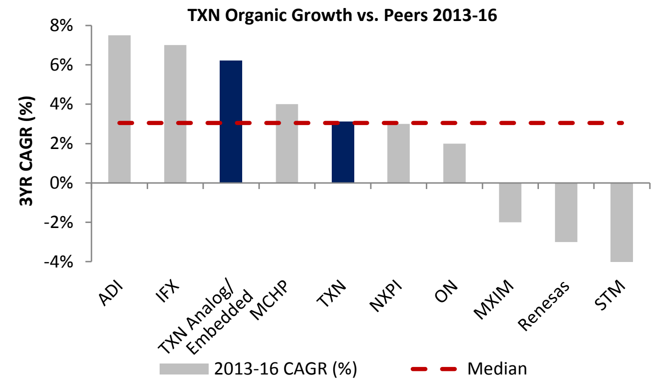
Auto/Industrial to increase to 35/19% of Rev in CY17 vs. 31%/15% in CY15 – Auto (by itself larger than most Peers' total Rev) grew 23% in CY16 and >20% in CY15.

Figure 310: TXN Consistently Outgrowing SIA



Source: Company data, Credit Suisse estimates

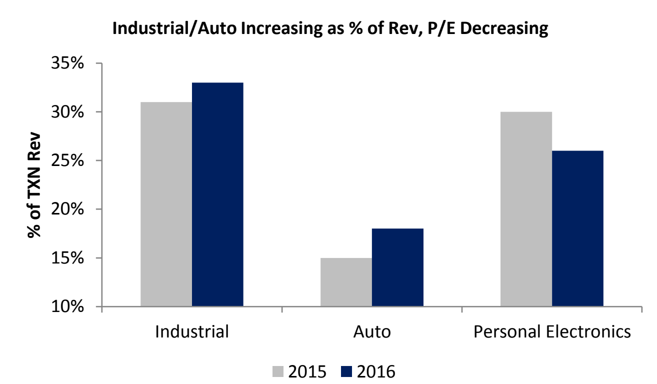
Figure 311: Analog/Embedded Outgrowing Peers



Source: Company data, Credit Suisse estimates

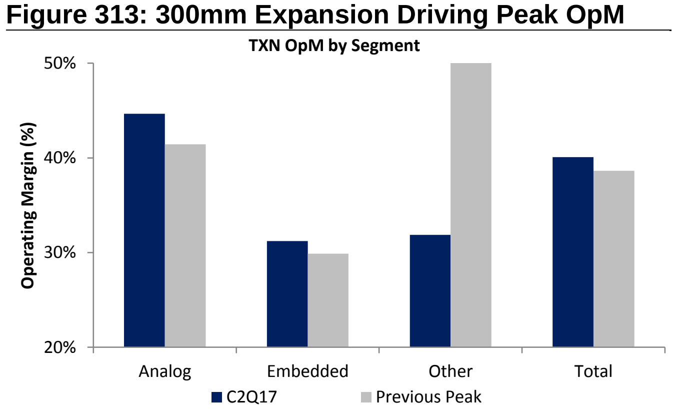
OpM Leverage Upside. While TXN does not have an official target model like many of its peers, we see significant upside to our own LT margin targets. Specifically, TXN is currently operating at Non-GAAP GM/OpM of 64%/42%, but we see upside to 65-70% and 45-50% within 1-2 years – the 300+ bps of upside to our target OpM compares to peers which have approx. 200 bps of upside to their respective targets. Our target model is underpinned by the following drivers of leverage: (1) incremental GM of ~75% versus C2Q GM of 64.3%, (2) 300 mm GM ~800 bps higher than 200 mm GM, (3) 300 mm capacity at 17% of Rev, 30% utilized, with $8bn of Rev at 100% utilization, and (4) Consistent share gains with an increasing emphasis on Auto and Industrial. Current GAAP OpM of 40.1% includes Analog OpM of 44.7% and Embedded OpM of 31.2%, both records – and with Embedded OpM up 620 bps y/y we continue to see a path to close the OpM gap over time especially as Rev growth accelerates. Specific to CY17/18 estimates, Street is only modeling OpM expansion of ~400/100 bps in respectively, ~880 bps trough-to-peak versus the normal cyclical TXN median of 1500 bps. Upside to our target would yield an incremental ~$0.40/$0.30 respectively.

Figure 312: Improved Mix as Auto/Industrial Increases and P/E Declines as % of Rev



Source: Company data, Credit Suisse estimates

Figure 313: 300mm Expansion Driving Peak OpM

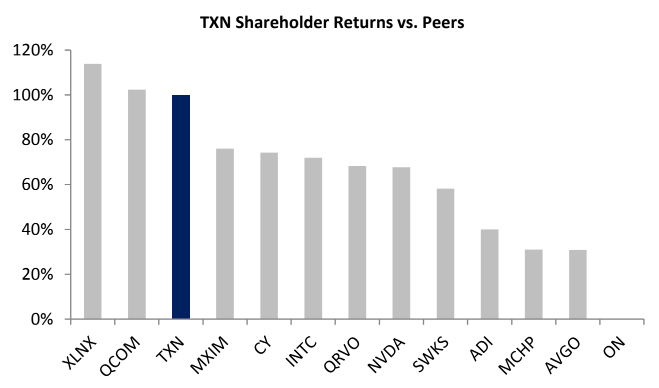


Source: Company data, Credit Suisse estimates

Consistent FCF Generation and Return. TXN's focus continues to be returning cash to shareholders, and the Company continues to lead peers both in FCF generation and shareholder returns. Specifically, TTM FCF generation was 28.5% of Rev (in-line with 20-30% target vs. peers of 27%) and TTM shareholder returns were 100% of FCF (in-line with target of 100% and above peers of ~80%). Most importantly we see FCFPS approaching $5+ at target OpM, driving ~35% FCF margin or an implied FCF yield of ~6.5%.

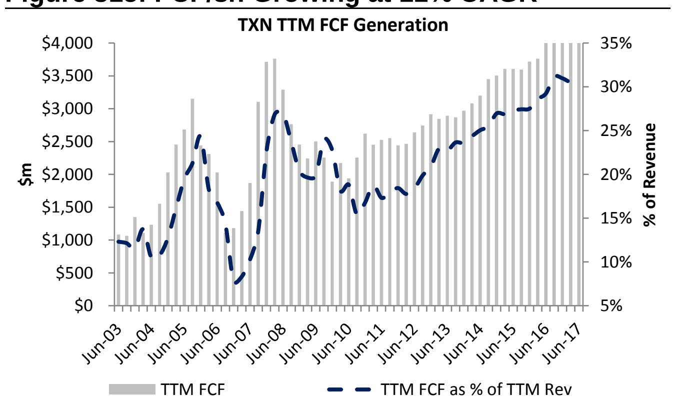
- **Recent Buyback/Dividend Increases Support Target:** TXN's dividend yield of 2.8% is above the peer group of 2.5% – its most recent increase on 09/21 from $0.50 to $0.62 is in-line with the 3/5YR dividend CAGRs of 21% and 24% respectively – recall TXN increased its dividend target from 50% of Trailing 4 Years Avg. FCF to 50-80% in Oct'16. In addition, the Company has $10.6bn (12% of market cap) buyback authorization outstanding including $6bn added on 09/21. Since Sep'04 TXN has repurchased 744m in shares, lowering share count by 42% from 1.76bn to 1.02bn.
- **Buybacks Are Self-Funding:** TXN's cost of capital today is <2%, the dividend yield is 2.8% – buybacks are somewhat self-funding. However, TXN's net leverage of 0.1x is WELL BELOW the Semi median of 1.5x – if TXN levered up to 1.5x and used the net proceeds to buy back shares, it would equate to ~90m shares at current prices (9% of float), and would add ~$0.40 to our CY18 EPS/FCFPS. The explicit use of cash for dividends and repurchases probably also indicates a lukewarm appetite for M&A, a sentiment the company has echoed in recent quarters given current valuations.

Figure 314: TXN Leads in Shareholder Returns



Source: Company data, Credit Suisse estimates

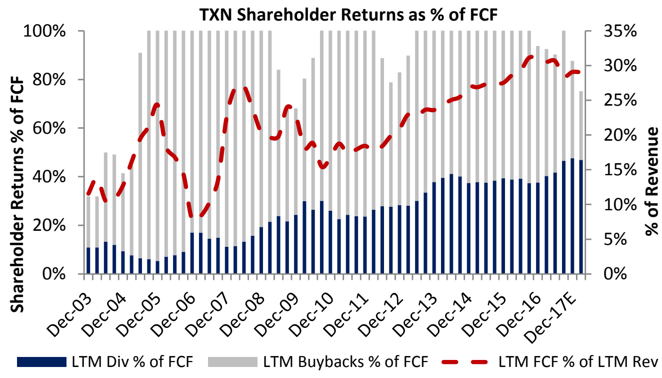
Figure 315: FCF/sh Growing at 11% CAGR



Source: Company data, Credit Suisse estimates

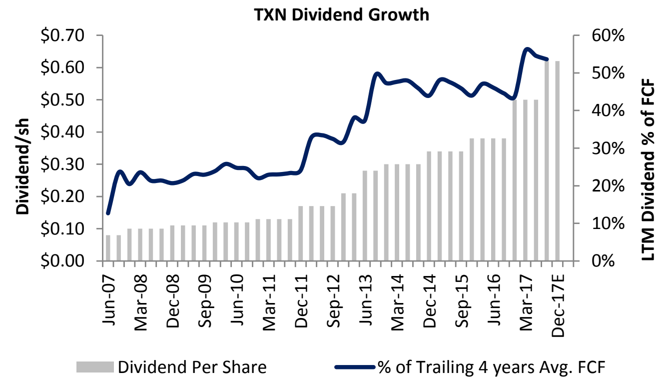
TXN has also deployed considerable organic investments to build sustainable barriers to entry and drive growth in its core markets of Analog and Embedded. Of $73bn in capital allocated over the past 10 years, $32bn went to R&D, Sales/Marketing, CapEx, and Inv (44% of total allocated capital), ABOVE share repurchases ($25bn or 34%), Dividends ($9bn or 12%) and M&A ($7bn or 10%). Despite essentially no top-line growth over the past 11 years as TXN exited Wireless and focused on its Analog and Embedded portfolio, the Company has managed to grow FCF at a 6% CAGR due to product mix improvement and 300mm production – the Company's share count has declined by 42% since CY04, driving a FCF/share CAGR of 11% during the same time period. We expect FCF/share to continue to outgrow the Industry due to (1) Analog + Embedded Rev growth, (2) FCF margin sustainable at ~30% and (3) continued share repurchases.

Figure 316: Increasing Dividend as % of Returns



Source: Company data, Credit Suisse estimates

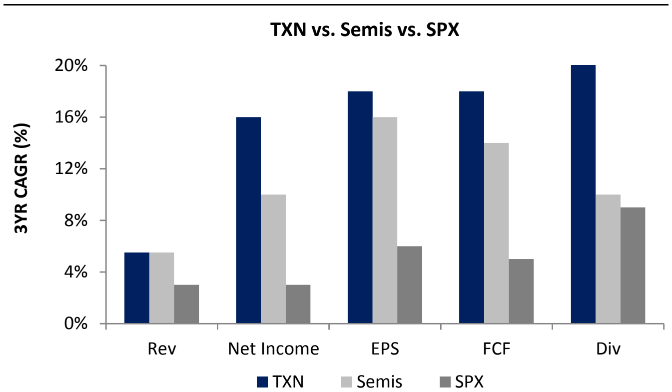
Figure 317: Div/sh Ann. Growth of 21% since CY11



Source: Company data, Credit Suisse estimates, Thomson Reuters

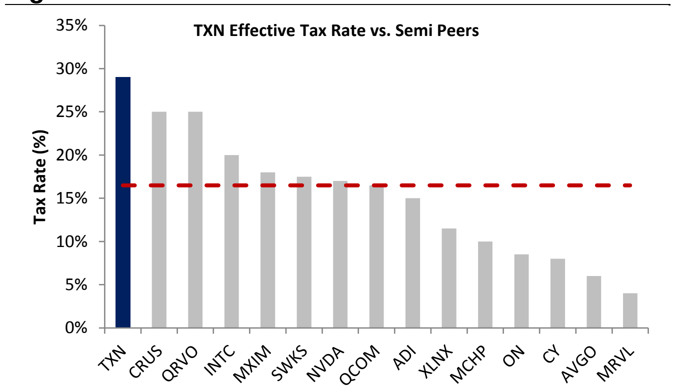
Valuation Attractive Despite Superior Returns, Tax Reform Optionality: While on an absolute basis TXN has seen ~15% multiple expansion in the last 3 years, its multiple has NOT appreciated relative to the SPX. In combination, topline growth, manufacturing efficiency, OpM leverage and buybacks should drive outsized EPS/FCF growth and support continued stock appreciation. On EV/FCF TXN is only trading at a 1 turn premium to the Semi median and a 3 turn discount to SPX – despite faster growth, higher profitability and superior cash returns. Specifically, over the past 3 years relative to the SPX, TXN has exhibited faster Rev, Net Income, EPS, FCF and Dividend growth with better yield. We continue to view TXN as the closest thing to a Compounder in Semis – we see FCFPS approaching $5+ at target OpM, driving ~35% FCF margin or an implied FCF yield of ~6.5%. Our $95 is based on 20x EV/FCF on CY18, a ~10% premium to peers but a 7% discount to SPX – an in-line with SPX multiple implies a price of $110. Finally, with a significant manufacturing footprint TXN has an effective TR of 27%, one of the highest in Semis. PF for Tax Reform our $95 PT only represents EV/FCF of 18.5x.

Figure 318: TXN Growth and Returns Superior to SPX



Source: Company data, Credit Suisse estimates

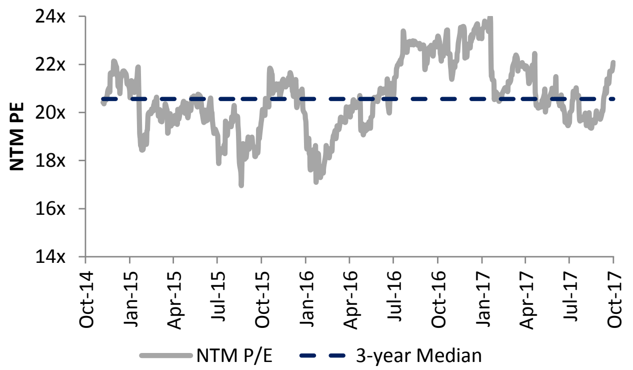
Figure 319: TXN Most Levered to Tax Reform



Source: Company data, Credit Suisse estimates

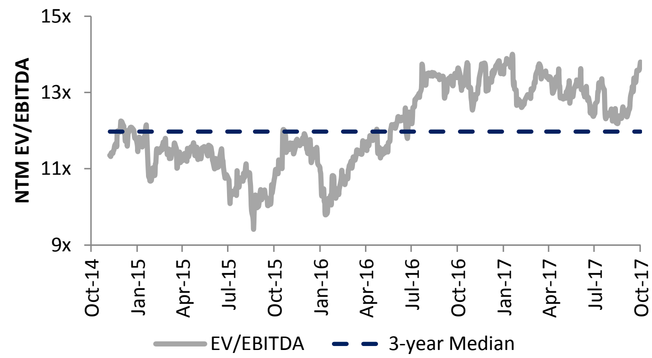
We see TXN's LT Rev growth rate poised to accelerate from 3% to 6-8% – TXN's continued dominant franchise position with broad-based product and end-market exposure skews risk to duration not fundamentals. Strong Analog + Embedded growth reflects a core business that has grown 2x industry over the past 2 years – and reinforces the financial strength of the TXN model, well-positioned to benefit from structural tailwinds still present – rising barriers to entry, slowing supply growth, consolidation, and more diversified demand. As scale advantages become more apparent, there is optionality for TXN's share growth to accelerate to >100 bps/year.

Figure 320: NTM PE Over Time



Source: Company data, Credit Suisse estimates, Thomson Reuters

Figure 321: NTM EV/EBITDA Over Time



Source: Company data, Credit Suisse estimates, Thomson Reuters

Xilinx

(XLNX, $72.81, OUTPERFORM, TP $75.00)

F2Q and F3Q In-Line with CS/Street

Reporting Date:

Conference Call:

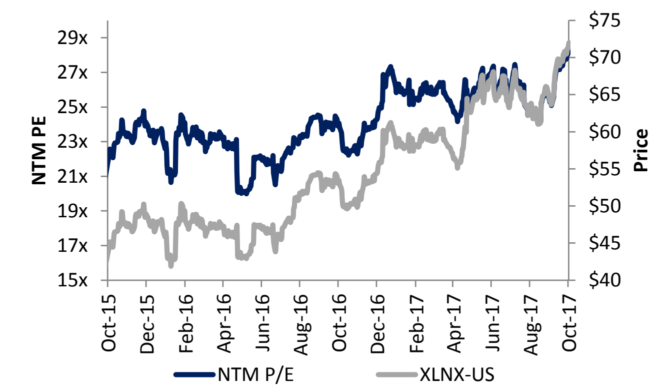
Figure 322: Summary of Expectations

XLNX	Jun-17	Sep-17E			Dec-17E		FY2018E		FY2019E	
	Reported	CS	Cons	Guidance	CS	Cons	CS	Cons	CS	Cons
Revenue	**$615.4**	**$620.0**	**$620.0**	***$605.0m-$635.0m***	**$624.6**	**$624.4**	**$2,509.6**	**$2,504.0**	**$2,674.3**	**$2,663.0**
% Q/Q chng	*1.0%*	*0.7%*	*0.7%*	*-1.7% to +3.2% q/q*	*0.7%*	*0.7%*				
% Y/Y chng	*7.0%*	*7.0%*	*7.0%*		*6.6%*	*6.6%*	*6.8%*	*6.6%*	*6.6%*	*6.3%*
Seasonality	*1.9%*	*-1.6%*			*-1.8%*					
Gross Margin	**68.8%**	**70.0%**	***70.0%***	*69.0% to 71.0%*	**69.5%**	***69.4%***	**69.6%**	***69.4%***	**69.8%**	***69.6%***
Operating Expenses	**$242.9**	**$253.0**		*$253.0m*	**$254.6**		**$1,008.2**		**$1,054**	
Operating Margin	**29.3%**	**29.2%**	***29.2%***		**28.7%**	***28.5%***	**29.4%**	***29.6%***	**30.3%**	***30.7%***
Net Income	**$167.2**	**$162.8**		*Tax Rate 12.0%*	**$162.6**		**$671**		**$733**	
Net Margin	**32.4%**	**31.4%**			**31.2%**		**31.8%**		**32.2%**	
EPS (pf, ex-SBC)	**$0.75**	**$0.76**			**$0.76**		**$3.10**		**$3.42**	
EPS (pf, w/SBC)	**$0.63**	**$0.63**	**$0.63**	*Implied $0.63*	**$0.64**	**$0.64**	**$2.60**	**$2.59**	**$2.91**	**$2.87**
EPS (GAAP)	**$0.63**	**$0.63**			**$0.64**		**$2.60**		**$2.91**	
Fully diluted shares	265.8	257.2			255.4		258.0		251.6	

Source: Company data, Credit Suisse estimates, Thomson Reuters

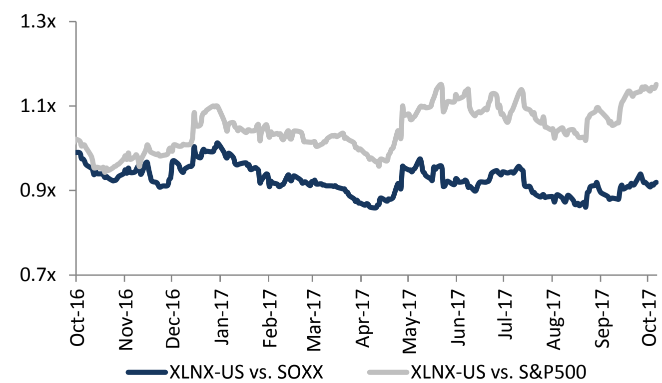
XLNX: Recap of Recent Stock Performance

Figure 323: XLNX NTM PE vs. Price



Source: Company data, Thomson Reuters

Figure 324: LTM Performance vs. SOXX vs. SPX



Source: Company data, Thomson Reuters

Key Message: We expect XLNX to report F2Q and guide F3Q INLINE with CS/Street. While we expect upside for the sector, we see XLNX bias as more neutral as Wired/Wireless end demand remains muted (JNPR, AAOI neg Pre) and the Company continues to invest in future growth opportunities. In addition, we see modest headline risk as INTC/ALTR likely benefits from MSFT Azure ramp in 2H, while XLNX's AWS opportunity is more CY18 event. While XLNX will have a more muted 2H than most semis, we maintain our OP rating (upgraded on 04/23) based on: (1) Solid core business especially in Industrial/Auto, (2) Growing position in 5G, which we believe becomes more "investible" in 2H18, (3) Significant optionality in the Data Center with Acceleration-As-A-Service with a potential TAM of at least ~$1 bb, (4) The strategic value of the asset, and (5) Cash Return. The key investment mile-stone will be a return to operating leverage –

specifically since CY10 XLNX Rev has grown 7%, but OpP has declined 8% as the Company has been accelerating investments to expand into new markets including Cloud Computing, Embedded Vision, Industrial IoT, and 5G Wireless. Importantly we see leverage returning to the model exiting FY18 and believe that will be a key catalyst to broaden stock ownership. Longer-term inclusive of new TAM we see Rev growth accelerating from 4-8% to 7-9% driving OpM from ~30% today to at least 35% (40% excluding SBC) and an EPS potential by FY21 of $4.15 (w/SBC). XLNX currently trades at ~18.5x EV/FCF on CY18, a 1-turn premium to peers, but justified given outsized future optionality.

Expect F2Q18 Rev/EPS In-Line with CS/Street

We expect XLNX to report F2Q Rev/EPS IN-LINE with CS/Street of $620.0m/$0.63 and the midpoint of guidance for Rev of $605m to $635m and implied EPS of $0.63. We expect F2Q Rev up 0.7% q/q, above seasonal of down ~1.5% q/q with strength stemming from multi-market opportunities in Industrial with ebbs and flows in Wireless and Wireline.

1) **Zynq Driving Advanced Product Growth.** We expect Advanced Products (28nm, 20nm, and 16nm) to increase ~5% q/q and to increase to ~54% of Rev in F2Q from 52% in F1Q. While XLNX only taped out Zynq on 28nm at the end of CY11, Zynq is now >10% of Rev – the lion share of Wireless products are already Zynq-based and Auto is gaining traction. XLNX expects Zynq to reach 20% of Rev in <5 years, and potentially dominate their entire portfolio over time.

2) **Data Center Growth Offsets Sub-seasonal Wired and Wireless:** We expect (1) continued growth in Data Center – note while JNPR and AAOI attributed negative pre's to cloud weakness, this was attributed to AMZN and FB, with continued strong demand from other top Datacenter customers, (2) Wired Rev ~400 bps below seasonal, which appears appropriately set relative to CSCO commentary around Service Provider, Campus switching, and enterprise access Routing, and (3) Sub-seasonal Wireless Rev, reflecting continued weakness in China optics.

3) **GM Benefits from Mix, OpEx Up on Tape-outs:** We expect GM of 70.0%, in-line with the midpoint of guidance, up ~120 bps q/q on mix sift towards Industrial and away from Wireless. We expect OpEx of $253m, in-line with guidance, up 4.1% q/q on Rev only up 0.7% q/q, as XLNX focuses on increased 16nm tape-outs in order to ensure competitive positioning.

4) **Rev/EPS IN-LINE.** We expect interest income of $3.5m, up from $1.8m in F1Q, and a tax rate of 12.0%. While XLNX did not guide sharecount again, as there are multiple moving parts (convert, buyback, and warrants), we expect F2Q diluted share of ~257m, down ~3% q/q. We expect Rev and profitability in-line with guidance to drive EPS of $0.63 IN-LINE with CS/Street of $0.63.

Expect F3Q18 Rev/EPS Guidance In-Line with CS/Street

We expect XLNX to guide F3Q Rev/EPS of $624.6m/$0.64 IN-LINE with CS of $624.6m/$0.64 and Street of $624.4m/$0.64. Specifically, we expect Rev up 0.7% q/q, above seasonal of down ~1.8% q/q.

1) **Comms & Data Center Above Seasonal:** We expect Comms & DataCenter up mid-single digits, above seasonal of up low-single digits q/q – mostly due to a sub-seasonal base. Specifically, we expect (1) Wireless to grow low-single digits q/q, following F2Q Rev down ~6% q/q – as China optics headwind subsides and (2) Wired to grow ~5% q/q following F2Q Rev down ~3% q/q as Service Provider, campus switching, and enterprise access routing headwinds moderate.

2) **Broadcast/Consumer/Auto Down Seasonally, I/A/I Sub-Seasonal:** We expect B/C/A down ~3% q/q, in-line with seasonality, as Auto up ~8% q/q offsets

Broadcast/Consumer down low double-digits q/q. We expect I/A/D down 2.5% q/q in a seasonally up quarter following 7% q/q growth in a seasonally down F2Q .

3) **Modest Leverage Exiting FY18 & Buyback Potential:** While we model F3Q OpM down q/q, we expect that incremental Rev growth in FY18 should drive OpM to at least 30% in F4Q. XLNX has repurchased ~$500m of shares over the last 4 quarter, and indicated that the Company intends to exhaust the remaining $615m of their current authorization over the next several quarters – representing EPS upside potential of ~12 cents.

4) **Rev/EPS IN-LINE with CS/Street.** We expect GM guidance of 69.5%, mostly in-line with Street of 69.4% and down q/q on mix shift towards Wireless. We expect OpM guidance of 28.7%, mostly in-line with Street of 28.5%. While XLNX guided FY18 OpEx growth essentially in-line with Rev growth, we would highlight the lion-share of OpEx is going towards R&D as XLNX accelerates 16nm tape-outs to capitalize on their current lead over ALTR. We expect shares of 255m down from 257m in F2Q. We see Rev guidance and profitability mostly IN-LINE with CS and Street to drive EPS guidance of $0.64 IN-LINE CS/Street of $0.64.

Figure 325: XLNX Revenue Model

(3-months ending)	Jun-16 F1Q	Sep-16 F2Q	Dec-16 F3Q	Mar-17 F4Q	Jun-17 F1Q	Sep-17E F2Q	Dec-17E F3Q	Mar-18E F4Q	Jun-18E F1Q	Sep-18E F2Q	Dec-18E F3Q	Mar-19E F4Q	CY2016E	CY2017E	CY2018E	FY2017E	FY2018E	FY2019E
Communications & Data Center	$255.1	$239.5	$256.1	$248.4	$250.9	$243.4	$258.0	$273.5	$279.9	$267.3	$268.6	$272.7	$996.7	$1,000.8	$1,089.3	$999.2	$1,025.8	$1,088.5
Wireless	$111.5	$99	$109.5	$101.8	$105.8	$99.8	$105.9	$110.2	$111.7	$102.0	$100.3	$103.0	$428.4	$413.3	$424.1	$422.0	$421.7	$416.9
Wired	$130.4	$124.5	$127.6	$123.8	$120.1	$116.46	$121.70	$125.35	$127.23	$120.23	$117.83	$116.65	$509.3	$482.0	$490.6	$506.2	$483.6	$481.9
Data Center	$13.2	$15.9	$19.0	$22.8	$25.1	$27.1	$30.4	$38.0	$41.0	$45.1	$50.5	$53.0	$59.1	$105.4	$174.6	$70.9	$120.6	$189.6
Broadcast/Consumer/Automotive	$95.9	$100.4	$87.8	$99.5	$102.4	$109.6	$106.3	$119.6	$127.5	$122.4	$113.8	$121.6	$380.2	$417.9	$483.4	$383.6	$438.0	$485.4
Auto	$46.00	$46.34	$39.4	$47.3	$48.2	$53.0	$57.3	$63.0	$66.1	$64.2	$63.5	$68.0	$174.6	$205.8	$256.8	$179.0	$221.5	$261.8
Broadcast/Consumer	$49.9	$54.1	$48.4	$52.2	$54.2	$56.6	$49.1	$56.6	$61.4	$58.3	$50.3	$53.6	$205.6	$212.1	$226.6	$204.6	$216.5	$223.6
Industrial/Aero/Defense	$224.0	$239.3	$241.8	$261.6	$262.0	$267.0	$260.3	$256.5	$258.4	$266.1	$276.8	$289.2	$934.1	$1,050.9	$1,057.8	$966.7	$1,045.8	$1,090.4
Total Rev	**$575.0**	**$579.2**	**$585.7**	**$609.5**	**$615.4**	**$620.0**	**$624.6**	**$649.6**	**$665.8**	**$655.8**	**$659.2**	**$683.5**	**$2,311**	**$2,470**	**$2,630**	**$2,349**	**$2,510**	**$2,664**

Percentage of Total Revs	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17E	Dec-17E	Mar-18E	Jun-18E	Sep-18E	Dec-18E	Mar-19E	CY2016E	CY2017E	CY2018E	FY2017E	FY2018E	FY2019E
Communications & Data Center	44.4%	41.3%	43.7%	40.8%	40.8%	39.3%	41.3%	42.1%	42.0%	40.8%	40.8%	39.9%	43.1%	40.5%	41.3%	42.5%	40.9%	40.7%
Wireless	19.4%	17.1%	18.7%	16.7%	17.2%	16.1%	17.0%	17.0%	16.8%	15.5%	15.2%	15.1%	18.5%	16.7%	16.1%	18.0%	16.8%	15.6%
Wired	22.7%	21.5%	21.8%	20.3%	19.5%	18.8%	19.5%	19.3%	19.1%	18.3%	17.9%	17.1%	22.0%	19.5%	18.6%	21.5%	19.3%	18.0%
Data Center	2.3%	2.7%	3.2%	3.7%	4.1%	4.4%	4.9%	5.8%	6.2%	6.9%	7.7%	7.8%	2.6%	4.3%	6.6%	3.0%	4.8%	7.1%
Broadcast/Consumer/Automotive	16.7%	17.3%	15.0%	16.3%	16.6%	17.7%	17.0%	18.4%	19.2%	18.7%	17.3%	17.8%	16.5%	16.9%	18.3%	16.3%	17.5%	18.1%
Auto	8.0%	8.0%	6.7%	7.8%	7.8%	8.6%	9.2%	9.7%	9.9%	9.8%	9.6%	9.9%	7.6%	8.3%	9.7%	7.6%	8.8%	9.8%
Broadcast/Consumer	8.7%	9.3%	8.3%	8.6%	8.8%	9.1%	7.9%	8.7%	9.2%	8.9%	7.6%	7.8%	8.9%	8.6%	8.6%	8.7%	8.6%	8.4%
Industrial/Aero/Defense	39.0%	41.3%	41.3%	42.9%	42.6%	43.1%	41.7%	39.5%	38.8%	40.6%	42.0%	42.3%	40.4%	42.6%	40.1%	41.1%	41.7%	40.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**99.6%**	**100.0%**	**100.0%**	**99.6%**

Percentage Growth Q/Q	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17E	Dec-17E	Mar-18E	Jun-18E	Sep-18E	Dec-18E	Mar-19E
Communications & Data Center	3.7%	-6.1%	7.0%	-3.0%	1.0%	-3.0%	6.0%	6.0%	2.4%	-4.5%	0.5%	1.5%
Wireless	3.1%	-11.1%	10.5%	-7.0%	3.8%	-5.6%	6.1%	4.0%	1.4%	-8.7%	-1.6%	2.7%
Wired	2.8%	-4.5%	2.5%	-3.0%	-3.0%	-3.0%	4.5%	3.0%	1.5%	-5.5%	-2.0%	-1.0%
Data Center	20.0%	20.0%	20.0%	20.0%	10.0%	8.0%	12.0%	25.0%	8.0%	10.0%	12.0%	5.0%
Broadcast/Consumer/Automotive	-0.1%	4.7%	-12.6%	13.3%	3.0%	7.0%	-3.0%	12.5%	6.6%	-4.0%	-7.0%	6.8%
Auto	7.4%	0.7%	-15.0%	20.0%	2.0%	10.0%	8.0%	10.0%	5.0%	-3.0%	-1.0%	7.0%
Broadcast/Consumer	-6.1%	8.4%	-10.5%	7.8%	3.9%	4.3%	-13.3%	15.4%	8.4%	-5.1%	-13.6%	6.5%
Industrial/Aero/Defense	-2.2%	6.8%	1.1%	8.2%	0.2%	1.9%	-2.5%	-1.5%	0.7%	3.0%	4.0%	4.5%
Total	**0.7%**	**0.7%**	**1.1%**	**4.1%**	**1.0%**	**0.8%**	**0.7%**	**4.0%**	**2.5%**	**-1.5%**	**0.5%**	**3.7%**

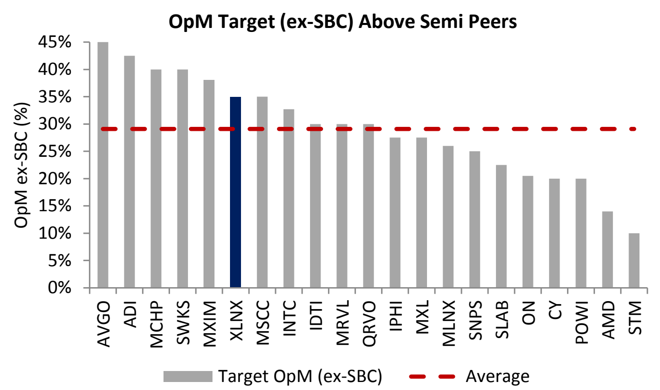
Percentage Growth Y/Y	Jun-16	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17E	Dec-17E	Mar-18E	Jun-18E	Sep-18E	Dec-18E	Mar-19E	CY2016E	CY2017E	CY2018E	FY2017E	FY2018E	FY2019E
Communications & Data Center	22.7%	9.7%	4.5%	1.0%	-1.6%	1.6%	0.7%	10.1%	11.6%	9.8%	4.1%	-0.3%	11.3%	0.4%	8.9%	8.9%	2.7%	6.1%
Wireless	28.4%	7.2%	1.9%	-5.9%	-5.2%	0.7%	-3.3%	8.2%	5.6%	2.2%	-5.3%	-6.5%	11.6%	-3.5%	2.6%	6.8%	-0.1%	-1.1%
Wired	13.5%	5.2%	-0.7%	-2.4%	-7.9%	-6.5%	-4.6%	1.3%	6.0%	3.2%	-3.2%	-6.9%	5.5%	-5.4%	1.8%	3.6%	-4.5%	-0.3%
Data Center	111.7%	107.4%	107.4%	107.4%	90.1%	71.1%	59.7%	66.3%	63.3%	66.3%	66.3%	39.7%	106.2%	78.4%	65.6%	108.2%	70.0%	57.3%
Broadcast/Consumer/Automotive	-1.1%	6.6%	-2.9%	3.6%	6.8%	9.1%	21.1%	20.3%	24.5%	11.7%	7.1%	1.6%	1.5%	9.9%	15.7%	1.6%	14.2%	10.8%
Auto	--	--	--	10.3%	4.8%	14.4%	45.4%	33.3%	37.2%	21.0%	10.9%	7.9%	--	17.9%	24.8%	--	23.8%	18.2%
Broadcast/Consumer	--	--	--	-1.9%	8.6%	4.6%	1.4%	8.5%	13.1%	2.9%	2.6%	-5.3%	--	3.1%	6.8%	--	5.8%	3.3%
Industrial/Aero/Defense	-8.2%	11.3%	4.8%	14.2%	17.0%	11.6%	7.7%	-1.9%	-1.4%	-0.3%	6.3%	12.7%	0.4%	12.5%	0.7%	5.2%	8.2%	4.3%
Total	**4.7%**	**9.8%**	**3.4%**	**6.7%**	**7.0%**	**7.0%**	**6.6%**	**6.6%**	**8.2%**	**5.8%**	**5.5%**	**5.2%**	**4.6%**	**6.9%**	**6.5%**	**6.1%**	**6.8%**	**6.2%**

Source: Company data, Credit Suisse estimates

Key Issues

Lack of NT OpM Leverage as XLNX Invests for LT Growth. At their Analyst Day on 5/22, XLNX issued FY18 OpEx guidance of ~$1.0bn that was ~5% above our expectations and mgmt. endorsed a LT OpM of ~30% below our expectations. However, we have a positive bias towards increased spending as XLNX is clearly focused on investing for LT growth, not NT leverage, as the Company seeks to position themselves as competitively as possible on advanced nodes to capture emerging Rev opportunities in Industrial, Infra, AD, and Acceleration. The company continues to execute on incremental R&D, which will benefit it longer-term – driving accelerated 16nm tape-out, new 28nm cost-optimized products and ramping 7nm with TSMC for a new class of devices. XLNX is clearly focused on investing at opportune times, and their share gains appear to support their strategy as XLNX increased their lead at 16nm from 12 months to 18 months. While the Company is placing a lot of faith in the role/success of PLD over the next 5 years, we would agree that emerging markets trends appear conducive towards an expanding PLD presence. Lastly, we would remind investors their OpM target is ~35% (ex-SBC), which is among the highest in Semis. As such, are willing to overlook the NT lack of OpM leverage given our view that new applications/workloads in AI/AD provide upside to LT CAGR of 7-9% and ultimate OpM leverage of ~35% (w/SBC).

Figure 326: OpM Target Above Semi Peers



Source: Company data, Credit Suisse estimates

Figure 327: Expanding Leadership Over ALTR

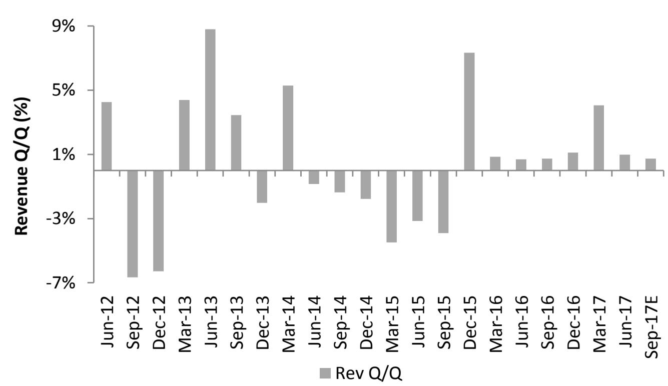
Source: Company data, Credit Suisse estimates

LT Growth Opportunities & Reduced Volatility: XLNX expects ~$750m in incremental Rev by FY20, which implies a ~6% Rev CAGR. Guidance continues to embed cautious Data Center Acceleration assumptions, which we believe will support further upside. Of the incremental $750m, $500 is driven by market expansion and $250m driven by share gains – XLNX expects to have 60-65% PLD market share by FY21 vs. 58% in FY17 and 52% in FY11. Note XLNX has ~65% share at 28nm, ~80% share at 20nm and 100% share at 16nm where it has an >18 month lead. XLNX noted that their multi-market exposure has helped them achieved significant share leadership in these advanced nodes as well as reduce volatility on a quarterly basis. We would note that F2Q Rev guidance implies 5 of the last 6 quarters will have Rev within +/- 1%.

Figure 328: $750m of Incremental Rev Growth

Source: Xilinx

Figure 329: Rev Growth More Stable



Source: Xilinx

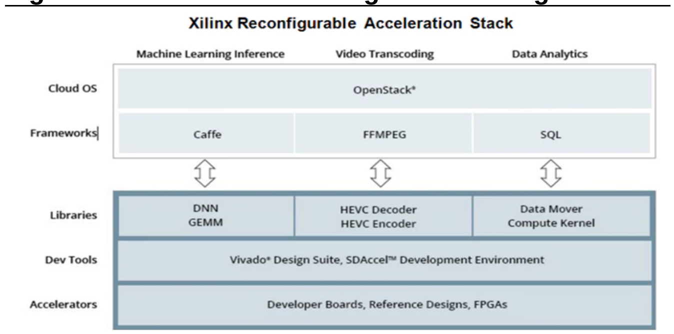
DataCenter and AWS Opportunity: XLNX expects Cloud Computing growth in areas such as the Data Center, Industrial, Wired Comms, Wireless, Broadcast, and A&D. We currently model a $6bn SAM within 5 years, with the majority of Storage focused on Interface/Control for SSDs and Flash Arrays, Networking focused on hyperscale and core, and Reconfigurable Compute focused on machine learning and big data. Relative to the value of acceleration in the Cloud, we would highlight that over the past five years XLNX has increased the average value of their design win by 3.5x and is engaged with all of the major hyperscale data centers (3 in production, 2 in trials, and 2 in discussion). While XLNX issued expectations for ~$250m of Data Center Rev by CY20 and "tens of millions" in CY17, AMZN announced in Dec16 that their new Elastic Compute Cloud (EC2) instance, known as the F1, would incorporate XLNX Virtex UltraScale FPGAs and on 9/13 launched SDAccel, XLNX's software defined development environment. While sizing the opportunity is proving difficult – acceleration is less than 0.5% of workloads today, and likely to grow to greater than 20% over time – representing what we believe to be an FPGA market opportunity of greater than $1 bb versus XLNX estimate of ~$250 mm by 2020. AWS alone could be as large as ~$350m assuming a 15% attach rate, ~2m AWS Servers, $300/chip, and 4 FPGA/CPU. Further, we would anticipate close to 60 cents of EPS from this opportunity assuming a ~60-65% GM, no incremental R&D, ~10-15% SG&A, and no interest burden.

Figure 330: AWS Revenue Sensitivity Analysis

Rev ($m)		Attach Rate						
		12%	13%	14%	15%	16%	17%	18%
AWS Servers	1,700,000	$245	$265	$286	$306	$326	$347	$367
	1,800,000	$259	$281	$302	$324	$346	$367	$389
	1,900,000	$274	$296	$319	$342	$365	$388	$410
	2,000,000	$288	$312	$336	$360	$384	$408	$432
	2,100,000	$302	$328	$353	$378	$403	$428	$454
	2,200,000	$317	$343	$370	$396	$422	$449	$475
	2,300,000	$331	$359	$386	$414	$442	$469	$497

Source: Company data, Credit Suisse estimates

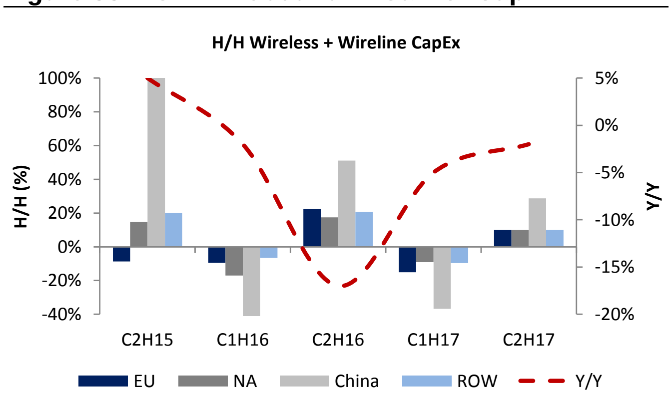
Figure 331: XLNX Addressing SW Challenges



Source: Xilinx

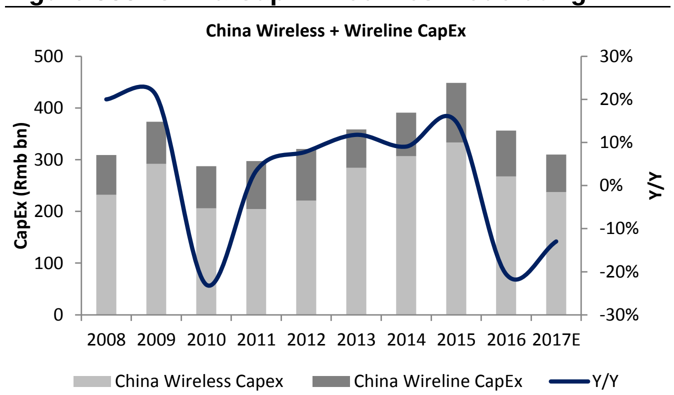
Wireless/Wireline CapEx Declines to Moderate Ahead of 5G: Our proprietary telecom operator CapEx model suggests that global Wireless/Wireline Capex is likely to be down ~4% in 2017, a moderation from down 11% in 2016 – with signs of stabilization in North America (up 4% y/y) and Korea/Japan (flat y/y). While it is still early to determine 2018 given telco companies have not yet announced CapEx budgets for next year, we estimate 2018 could end up flat to down ~2% y/y ahead of the 5G cycle, driven in part by Massive MIMO deployments. Heading into 2018, easy y/y compares and 5G trials could make this segment more "investable". While it still remains early to determine the timing and impact from mass 5G rollouts, commentary from most telco operators suggest that 5G trials could begin starting from 2018/19, with commercial rollouts from 2019/20.

Figure 332: CY17 Rebound in Carrier CapEx



Source: Company data, Credit Suisse estimates

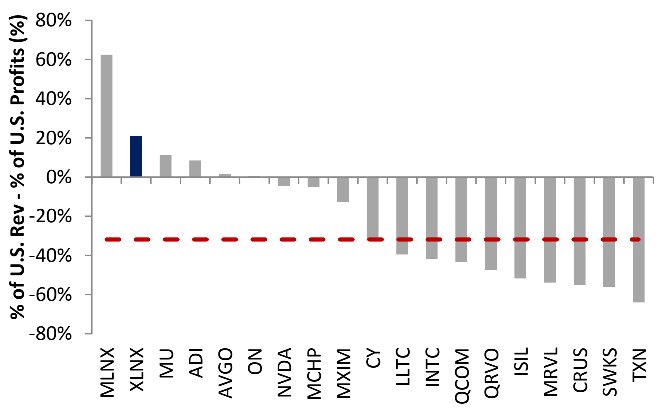
Figure 333: China CapEx Declines Moderating



Source: Company data, Credit Suisse estimates

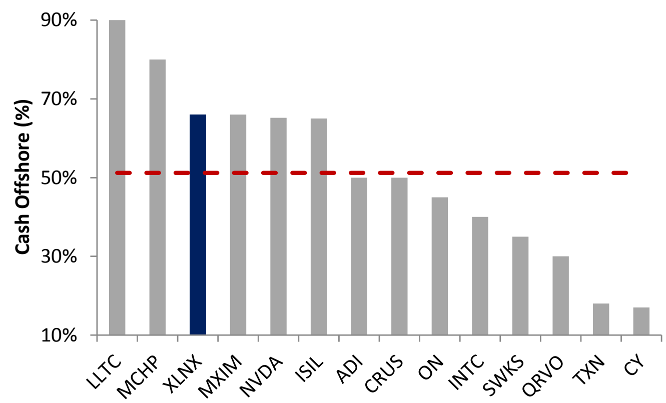
Presidential Reform: While analyzing tax policy and trade agreements is quite nuanced, at a high level we would highlight that while XLNX is likely negatively exposed to cross border adjustments they also stand to benefit from a potential repatriation holiday. Relative to cross border adjustments, we would note that this will negatively impact companies who currently benefit from the tax implications of manufacturing products abroad for sale in the U.S. (i.e. most fabless companies). Specifically, assuming that 90% of Rev onshore is associated with COGS manufactured abroad and imported back in to the U.S., and those associated COGS are taxed at 25% we have quantified the incremental hit on CY17 EPS and would highlight 7% downside for XLNX. On the other hand, we would highlight that XLNX has 2/3 off their cash offshore – vs. ~50% on average across our sample set – and would highlight the broad-based potential benefit of a one-time repatriation tax holiday where companies were allowed to bring offshore cash back onshore with only a 10% tax. This would provide XLNX with large quantities of additional cash with which they could invest in their businesses to drive growth or return to shareholders. While there are many factors to go in to valuation, we would note that Semis in aggregate trade at a 20-25% discount on EV/FCF, at least in part because Semis have more cash trapped overseas – repatriation could serve to help close that gap. Conversely, we would note that while companies with large amounts of cash offshore could benefit from repatriation, the same companies would likely be most exposed to the incremental tax hit from cross border adjustments.

Figure 334: XLNX Exposed to Border Adjustments



Source: Company data, Credit Suisse estimates

Figure 335: Albeit Benefits From Cash Offshore

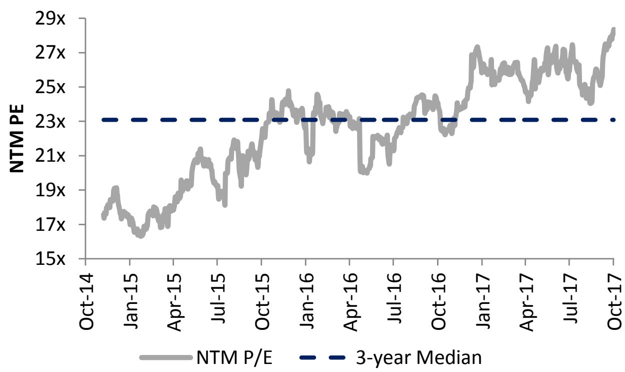


Source: Company data, Credit Suisse estimates

Investment View and Valuation

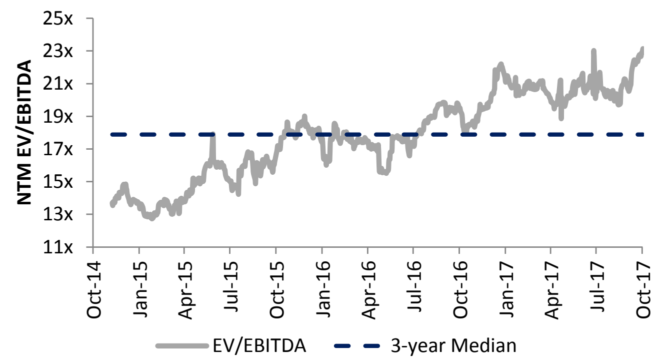
XLNX currently trades at ~18.5x CY18 EV/FCF, 1 turn above the Semi median of 17.5x – a premium we believe is justified as investors shift focus from 2H17 to CY18, where we see Infrastructure as a better end-market given easier compares and 5G ramps vs. Semis with difficult compares and no repeat of the iPhone 8. In addition, a solid core business in industrial and leverage to a 5G cycle in 2019 and beyond provide multiple vectors to drive a CAGR of 7-9% and upside to our FY18/19 EPS of $2.60 and $2.91, respectively. While investors will continue to focus on OpM leverage – we would remind investors XLNX's OpM target is ~35% when you exclude SBC, which is among the highest in Semis.

Figure 336: NTM PE Over Time



Source: Company data, Thomson Reuters

Figure 337: NTM EV/EBITDA Over Time



Source: Company data, Thomson Reuters

Companies Mentioned *(Price as of 13-Oct-2017)*

ANSYS (ANSS.OQ, $129.94)
ASML Holding N.V. (ASML.AS, €148.3)
Advanced Micro Devices, Inc. (AMD.OQ, $14.22)
Alibaba Group Holding Limited (BABA.N, $178.45)
Alpha and Omega (AOSL.OQ, $17.44)
Alphabet (GOOGL.OQ, $1007.87)
Amazon com Inc. (AMZN.OQ, $1002.94)
Ambarella (AMBA.OQ, $54.7)
Amphenol Corporation (APH.N, $87.2)
Analog Devices Inc. (ADI.OQ, $89.06)
Apple Inc (AAPL.OQ, $156.99)
Applied (AMAT.BA, $25.65)
Applied Materials Inc. (AMAT.OQ, $53.94)
Applied Optoelec (AAOI.OQ, $47.01)
Arista Networks (ANET.N, $191.14)
BIRD (600130.SS, Rmb7.0)
Baidu (BIDU.OQ, $262.68)
Broadcom Ltd (AVGO.OQ, $247.96)
Brocade Commns (BRCD.OQ, $12.04)
Brooks Automation Inc. (BRKS.OQ, $31.68)
Cadence Design System (CDNS.OQ, $42.0)
Cavium (CAVM.OQ, $68.34)
Cirrus Logic (CRUS.OQ, $54.48)
Cisco Systems Inc. (CSCO.OQ, $33.47)
Citrix Systems Inc. (CTXS.OQ, $81.47)
Coolpad Group Limited (2369.HK, HK$0.72)
Cree (CREE.OQ, $29.36)
Cypress Semiconductor Corp. (CY.OQ, $15.86)
DISCO (6146.T, ¥23,910)
DSP Group (DSPG.OQ, $13.925)
Dassault Systemes (DAST.PA, €89.0)
Dell Tech (DVMT.N, $80.68)
Dialog Semiconductor (DLGS.DE, €39.59)
Diodes (DIOD.OQ, $32.83)
Exar (EXAR.N)
Facebook Inc. (FB.OQ, $173.74)
Fingerprint Card (Unlisted)
Gionee Communication (Unlisted)
Hewlett Packard (HPQ.N, $21.71)
Hewlett Packard Enterprise (HPE.N, $14.89)
Himax Technologies, Inc. (HIMX.OQ, $9.33)
Hisense Kelon Electrical Holdings (0921.HK, HK$10.12)
Huawei Technologies (Unlisted)
Infineon Technologies AG (IFXGn.DE, €21.8)
Inphi (IPHI.N, $37.45)
Integrated Dvc (IDTI.OQ, $27.92)
Intel Corp. (INTC.OQ, $39.67)
Juniper Networks (JNPR.N, $25.82)
KLA-Tencor Corp. (KLAC.OQ, $105.3)
Keysight Technologies (KEYS.N, $42.72)
Knowles (KN.N, $15.35)
Kulicke & Soffa (KLIC.OQ, $22.03)
LG Electronics Inc (066570.KS, W88,500)
Lam Research Corp. (LRCX.OQ, $189.9)
Lattice Us (LSCC.OQ, $5.59)
MACOM (MTSI.OQ, $41.59)
MKS Instruments (MKSI.OQ, $98.4)
Marvell Technology Group Ltd. (MRVL.OQ, $18.28)
MaxLinear (MXL.N, $23.44)
Maxim Integrated Products (MXIM.OQ, $49.35)
Meizu (Unlisted)
Mellanox Technologies Ltd. (MLNX.OQ, $44.65)
Microchip Technology Inc. (MCHP.OQ, $91.76)
Micron Technology Inc. (MU.OQ, $40.4)
Microsemi (MSCC.OQ, $51.95)
Microsoft (MSFT.OQ, $77.49)
Monolithic Power (MPWR.OQ, $114.08)
NVIDIA Corporation (NVDA.OQ, $194.59)
NXP Semiconductors N.V. (NXPI.OQ, $115.17)
Nanometrics (NANO.OQ, $27.41)
Nintendo (7974.T, ¥44,150)
Nokia (NOK.N, $5.93)
Nokia (NOKIA.HE, €5.0)
Novellus Systems (NVLS.OQ^F12)
Novellus Systems (NVLS.OQ^F12)
ON Semiconductor Corp. (ON.OQ, $19.57)
Power Integrat (POWI.OQ, $73.4)
QUALCOMM Inc. (QCOM.OQ, $52.82)
Qorvo (QRVO.O, $72.39)
Rambus (RMBS.OQ, $13.67)
Rudolph Technologies (RTEC.N, $26.8)
STMicroelectronics NV (STM.PA, €16.92)
Samsung Electronics (005930.KS, W2,700,000)
Seagate Tech (STX.OQ, $34.4)
Semiconductor (NOD.OL, Nkr45.0)
Semtech (SMTC.OQ, $39.45)
Sensata Hldg (ST.N, $48.97)

Silicon Laboratories Inc. (SLAB.OQ, $87.9)
Silicon Mtn Tec (SIMO.OQ, $51.93)
Skyworks Solutns (SWKS.O, $106.66)
SoftBank (9984.T, ¥9,857)
Suess Microtec (SMHNn.DE, €16.595)
Synaptics (SYNA.OQ, $37.94)
Synopsys Inc. (SNPS.OQ, $84.61)
TE Connectivity (TEL.N, $87.74)
Taiwan Semiconductor Manufacturing (2330.TW, NT$237.5)
Teradyne Inc. (TER.N, $38.61)
Texas Instruments Inc. (TXN.OQ, $93.59)
Tianyun Intl (6836.HK, HK$1.23)
Veeco Instrument (VECO.OQ, $21.55)
Western Digital (WDC.OQ, $87.8)
Xiaomi (Unlisted)
Xilinx (XLNX.OQ, $72.81)
ZTE Corporation (0763.HK, HK$29.1)
ZTE Corporation (000063.SZ, Rmb29.5)

Disclosure Appendix

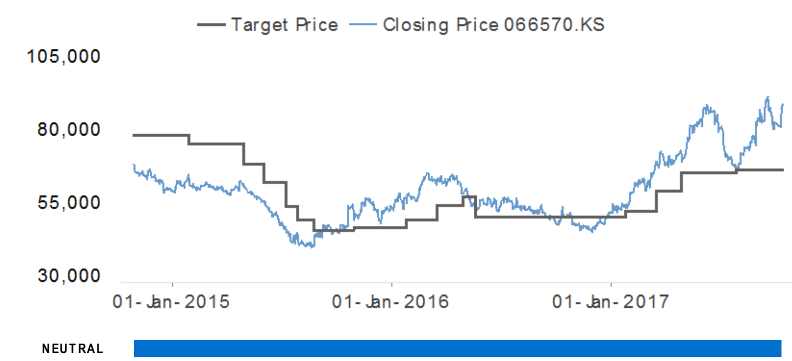
Analyst Certification

John W. Pitzer and Farhan Ahmad each certify, with respect to the companies or securities that the individual analyzes, that (1) the views expressed in this report accurately reflect his or her personal views about all of the subject companies and securities and (2) no part of his or her compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this report.

3-Year Price and Rating History for LG Electronics Inc (066570.KS)

066570.KS Date	Closing Price (W)	Target Price (W)	Rating
29-Oct-14	67,800	78,000	N
29-Jan-15	62,600	75,000	
29-Apr-15	61,200	68,000	
02-Jun-15	55,400	62,000	
09-Jul-15	45,750	53,500	
29-Jul-15	43,800	49,000	
25-Aug-15	40,850	45,500	
30-Oct-15	49,100	46,200	
26-Jan-16	54,800	49,000	
16-Mar-16	61,900	54,000	
28-Apr-16	58,200	57,000	
19-May-16	54,000	50,000	
25-Jan-17	54,200	52,000	
16-Mar-17	68,100	59,000	
27-Apr-17	72,300	65,000	
27-Jul-17	66,500	66,000	

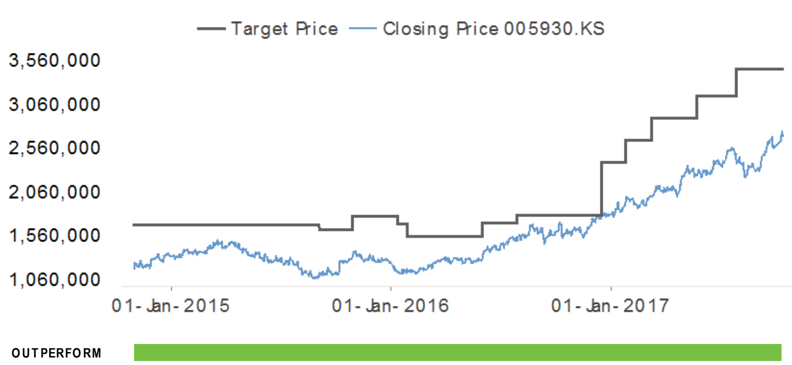
** Asterisk signifies initiation or assumption of coverage.*



3-Year Price and Rating History for Samsung Electronics (005930.KS)

005930.KS Date	Closing Price (W)	Target Price (W)	Rating
30-Oct-14	1,181,000	1,680,000	O
03-Sep-15	1,122,000	1,630,000	
29-Oct-15	1,325,000	1,785,000	
11-Jan-16	1,152,000	1,690,000	
28-Jan-16	1,145,000	1,550,000	
01-Jun-16	1,333,000	1,702,000	
28-Jul-16	1,507,000	1,790,000	
15-Dec-16	1,759,000	2,400,000	
24-Jan-17	1,908,000	2,650,000	
09-Mar-17	2,010,000	2,900,000	
23-May-17	2,246,000	3,150,000	
27-Jul-17	2,490,000	3,460,000	

** Asterisk signifies initiation or assumption of coverage.*



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Outperform (O) : The stock's total return is expected to outperform the relevant benchmark* over the next 12 months.
Neutral (N) : The stock's total return is expected to be in line with the relevant benchmark* over the next 12 months.
Underperform (U) : The stock's total return is expected to underperform the relevant benchmark* over the next 12 months.

**Relevant benchmark by region: As of 10th December 2012, Japanese ratings are based on a stock's total return relative to the analyst's coverage universe which consists of all companies covered by the analyst within the relevant sector, with Outperforms representing the most attractive, Neutrals the less attractive, and Underperforms the least attractive investment opportunities. As of 2nd October 2012, U.S. and Canadian as well as European ratings are based on a stock's total return relative to the analyst's coverage universe which consists of all companies covered by the analyst within the relevant sector, with Outperforms representing the most attractive, Neutrals the less attractive, and Underperforms the least attractive investment opportunities. For Latin American and non-Japan Asia stocks, ratings are based on a stock's total return relative to the average total return of the relevant country or regional benchmark; prior to 2nd October 2012 U.S. and Canadian ratings were based on (1) a stock's absolute total return potential to its current share price and (2) the relative attractiveness of a stock's total return potential within an analyst's coverage universe. For Australian and New Zealand stocks, the expected total return (ETR) calculation includes 12-month rolling dividend yield. An Outperform rating is assigned where an ETR is greater than or equal to 7.5%; Underperform where an ETR less than or equal to 5%. A Neutral may be assigned where the ETR is between -5% and 15%. The overlapping rating range allows analysts to assign a rating that puts ETR in the context of associated risks. Prior to 18 May 2015, ETR ranges for Outperform and Underperform ratings did not overlap with Neutral thresholds between 15% and 7.5%, which was in operation from 7 July 2011.*

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Neutral/Hold*	40%	(58% banking clients)
Underperform/Sell*	13%	(53% banking clients)
Restricted	2%	

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Credit Suisse Securities (USA) LLC ....John W. Pitzer ; Farhan Ahmad ; Steven Jozkowski ; Charles Kazarian

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