UBS

Global Research

31 August 2017

UBS Global I/O

Autos/Industrial Semiconductors

Q2 strength surprised - steady outlook into H2

Equities

Global

Semiconductors

David Mulholland, CFA
Analyst
david.mulholland@ubs.com
+44-20-7568 4069

Francois-Xavier Bouvignies
Analyst
francois.bouvignies@ubs.com
+44-20-7568 7105

Stephen Chin
Analyst
stephen.chin@ubs.com
+1-212-713 4111

Steven Chin
Analyst
steven.chin@ubs.com
+1-415-352 5675

Nicolas Gaudois
Analyst
nicolas.gaudois@ubs.com
+852-2971 5681

Bill Lu
Analyst
bill.lu@ubs.com
+852-2971 8360

Kenji Yasui
Analyst
kenji.yasui@ubs.com
+81-3-5208 6211

Patrick Hummel, CFA
Analyst
patrick.hummel@ubs.com
+41-44-239 79 23

David Lesne
Analyst
david.lesne@ubs.com
+44-20-7567 5815

Q2 strength surprised, some risks remain but steady outlook into H2

Heading into Q2 we had some concerns on what we might see from the sector given end demand trends. In the event, content growth continued to provide a buffer for semis and we saw growth accelerate in Q2 rather than slow and expectations are now for y-o-y growth to remain high-single digit in H2. It was telling however that despite strong results, stocks haven't moved much showing what is already priced in. In summary, we maintain our Neutral view on the sector and would look to the structural winners. We believe the industry will see some softening in growth rates in Q3 but at this point no sharp correction. We believe risks remain: 1) Autos OEM inventories appear 2 days above levels normally seen in Q2; 2) Q2 results commentary from some autos OEMs pointed to some production cut-backs (GM) and 3) Auto sales growth continues to slow though the strength in luxury vehicles is providing a buffer.

What are the key indicators to look at from here?

Following recent trends, we will closely look at the development of car sales in China, US and Europe. We believe semis revenue growth will continue to outperform car production due to content growth but the level seen in H1 (c10%) could slow in our view (we expect c4% content growth through 2020). Although if the momentum in EVs keeps accelerating we could see the inflection in content that we expect this will drive occurring earlier than the 2020 we assume (see our recent Q-Series report on electric vehicles). From a qualitative perspective, industrial strength was driven by a resilient order outlook while end demand is steady in autos (mainly Europe).

Inventory levels elevated at OEMs but well managed at semis

Inventory at semis looks healthy at 107 days in line with historic average while Auto OEM inventory came in at 56 days (2 days above historic average) and are in-line with normal levels at Industrial OEMs when adjusted for acquisitions and disposals (would appear 3 days higher otherwise) although there are pockets of excess.

Reiterate Neutral / selective view on the sector

We have seen the sector grow into multiples recently trading on 19x 1-year forward P/E below recent peak of 21x but above the historic forward average of c17.5x. Within Europe we reiterate our preference for Infineon (Buy) over STMicroelectronics (Sell).

Autos / Industrial Semiconductors

UBS Research THESIS MAP | MOST FAVORED | LEAST FAVORED

Most favored: Infineon, Texas Instruments

Least favored: Melexis, STMicro

PIVOTAL QUESTIONS

Q: Where are we in the autos / industrial semis cycle?
At this point, lead indicators are mixed - slightly elevated inventory days at autos OEMs but normal levels at semi companies and also industrial OEMs on a normalized basis. Growth rates at expected to remain high-single digit into H2 and surprised on the upside in Q2. The main question mark from here is the car production and industrial demand after a strong H1 17.

Q: Is demand improving or worsening in autos / industrial end markets?
Recent trends have suggested some slowing in automotive demand. While part of this is due to the tough comps faced, we would also note that within this a number of the European OEMs are performing better relatively. Overall trends in end demand appear resilient at this point.

WHAT'S PRICED IN?

Sector still trading on 5-year high multiples and 4-6% growth. We estimate that most of the autos / industrial exposed semis names are currently pricing in 4-6% long-term growth in earnings into perpetuity. Within the last 12-months having seen a significant increase in the multiples the sector trades on although more recently this has fallen slightly (19x P/E vs recent peak of 21x).

UBS VIEW

Remain selective, long-term trends in tact but valuation rich: We would recommend investors remain highly selective in the autos / industrial exposed semis names as while the long-term trends are very much in tact, the valuations do appear to be largely pricing this in at these levels. We also see leading indicators are largely depending on the end demand with downside risks in case of slowdown.

EVIDENCE

Inventories slightly high at OEMs and well managed at Semis: We summarise our work on the lead indicators for the sector in the table below but in general we see the outlook as mixed. We expect y-o-y growth to sustain into H2 for semis but the inventory situation appears slightly high at OEMs to reflect strong outlook.

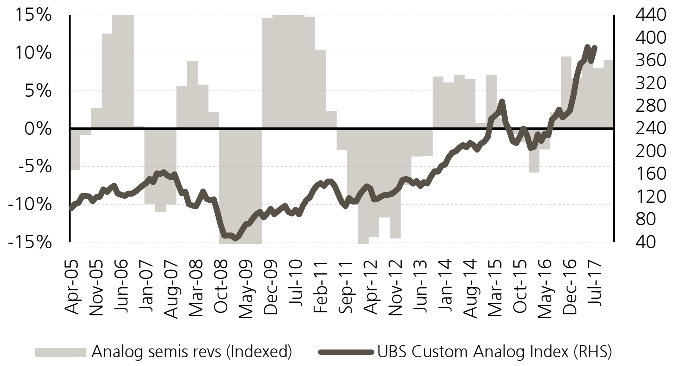
Figure 1: UBS leading indicators for autos / industrial semis

Indicator	Q2'16	Q1'17	Trend Q2'17	Q3'17E	Q4'17E	Commentary
1) Semis y-o-y revenue growth	-3%	7%	10%	8%	9%	Neutral -We expect y-o-y growth rates to remain resilient into H2
2) Semis vs OEM revenue gap	-7%	2%	11%	1%		Positive - OEM growth accelerating in H2 (with currency tailwind) such that we see semis growth in-line with OEMs - supporting semis growth estimates.
3) Inventory days - Semis	111	108	108			Neutral - well managed
4) Inventory days - OEMs	72	73	71			Negative – Overall ok but slightly elevated inventories within autos
5) Autos production y-o-y	3%	5%	0%			Neutral - Growth estimates recently reduce but y-o-y growth in production could accelerate in H2

Source: UBS estimates

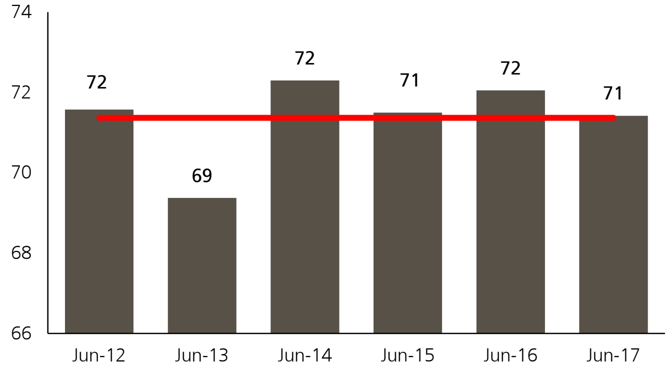
OUR THESIS IN PICTURES

return



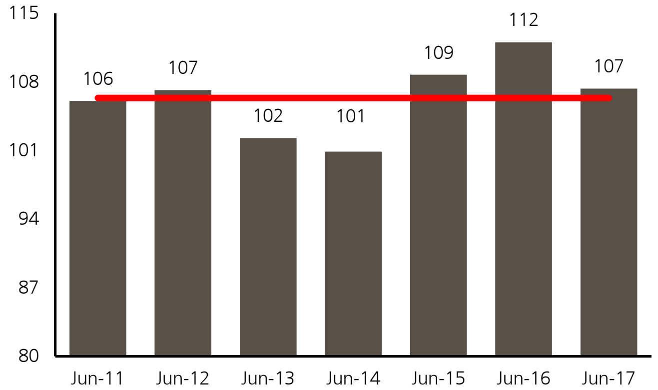
Revenue growth rates are likely to sustain at high single-digit levels in H2…

Autos / Industrial OEMs inventory days



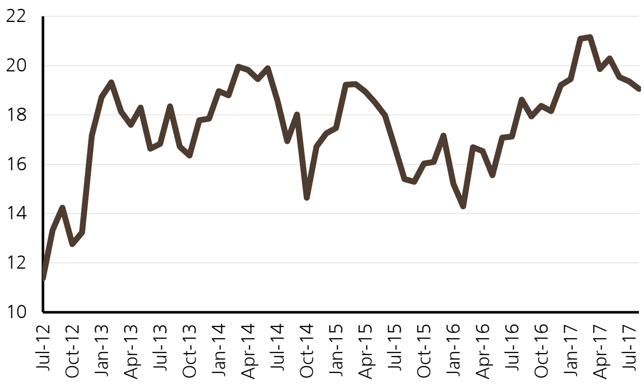
… OEM inventory days appear in-line overall but within the detail is slightly elevated at Autos OEMs…

Autos / Industrial Semis inventory days



… but well managed on semi company balance sheets

12-month forward P/E multiple



Sector still trading on high multiples but has fallen below recent highs

Source for all Figures: UBS, Company data, Datastream

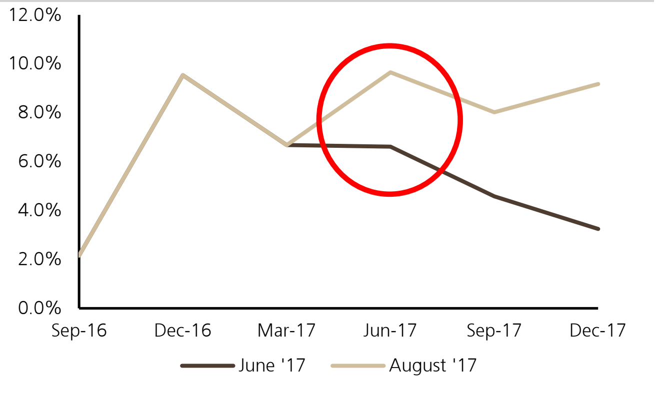
KEY TRENDS IN Q2

return

Overall growth accelerated in Q2 and likely to sustain in H2

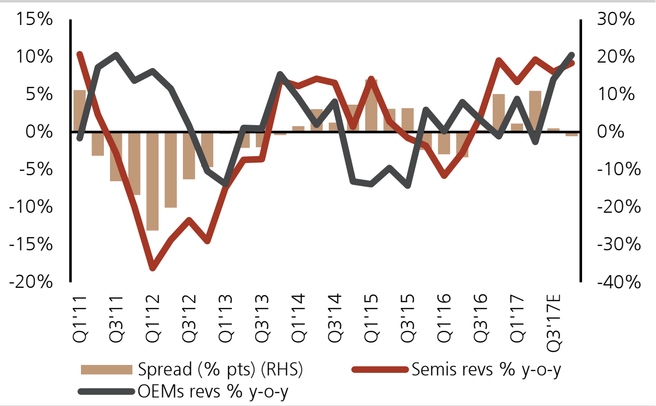
One of the key surprises in Q2 was the level of growth that sustained, higher than we had expected and is now expected to sustain at this level into H2. Previously we had assumed that growth would likely slow through H2. This removes one of the reasons we had some caution on the sector earlier this year and is supported by the expected OEM acceleration in H2 (although some of this is the currency tailwind of converting EUR sales into US$). The growth rates we expect in H2 are now consistent between semis and OEMs having seen a period of outperformance by semis, this is encouraging as otherwise we would expect to be seeing inventory building up on OEM balance sheets.

Figure 2: Revenue growth surprised in Q2 stable in H2



Source: UBS, Datastream consensus, Company data

Figure 3: Inventory situation slightly elevated in autos

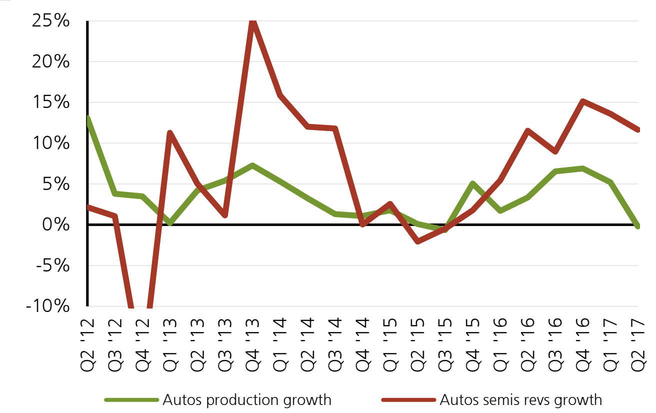


Source: UBS, Company data

Content growth tailwind continued in Q2 17

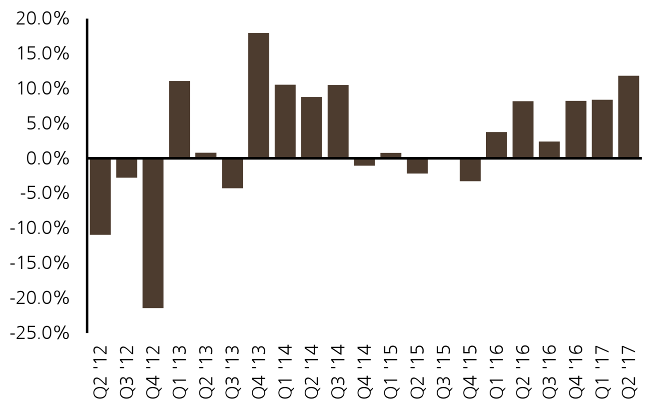
As seen in the past quarters, content growth continued in Q2 17 at c+12% after +8% in Q1 17. Comments from the industry remained positive with strong bookings driven mainly by China and dragged down by sluggish performance in US. That said, some players are talking about normalization of auto revenues in the second half of the year (i.e Infineon).

Figure 4: Quarterly production growth vs. auto semis revenue growth (y-o-y) – Content growth continues



Source: UBS estimates, Company data, IHS Global Insight

Figure 5: Delta car production yoy growth and semis revs growth shows +11.8% content growth in Q2 17



Source: UBS estimates, Company data, IHS Global Insight

Comments from OEMs consistent with our analysis

We also looked at comments from some select OEMs regarding inventories in the table below. As a summary, we believe the situation is still under control but downside risk remains as car sales growth is slowing down.

Figure 6: Comments on inventory from Automotive OEMs

Companies	Comments
Ford Motors	Company is comfortable with current inventory position and believes that it is optimally managed. They still have some inventory holds in other parts of business for various reasons, which have subsequently unwound.
General Motors	GM built inventory in the first half in preparation for previously announced downtime in trucks and crossovers in the second half of the year. Are on track with inventory days at 105 and committed to bring inventory in-line with end 2016 levels of about 70 days by end of 2017. This will primarily come from lower production levels at 800-825 '000 units from 980,000 units last year.
Nissan	Company is taking action to reduce inventory by following month-in, month-out to maintain a healthy level. So, as an example, reduction in the sale of mid-size sedan has led to adjustment in production to prevent too much inventory. Currently, Inventory is around 85-day supply, which is healthy and within the target range and significantly lower than the typical range in the market. On the contrary, that some of Nissan's competitors have increased inventory significantly. Company will continue to adjust as needed on an ongoing basis.
Peugeot	There are different challenges, the one is to move from a push mode to a pull mode, this is a significant change in terms of sales policies and the way companies interact with their dealers. They are supportive of this change because it puts a lower burden on their finances in terms of carrying the inventory but it needs sometime because company is trying to reduce the inventories in China.
Renault	The increase in inventory of 3 days reflects the need of available cars to show the business. The inventory days at 63 remains within the targeted range. In absolute terms also the inventories increased in order to respond to the market growth. Independent dealer inventory were at 410,000 units compared to 371,000 units a year ago. This is expected to boost the supply chain.

Source: Company conference call transcript, UBS

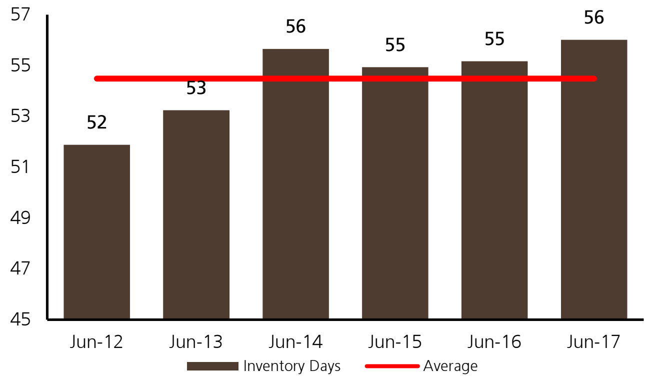
Figure 7: Comments on inventory from industrial OEMs

Companies	Comments
Arrow	Customers are largely getting what they want, although, they would like to have a little more inventory. Company is comfortable with three months' inventories sitting on the shelf. Inventory is expected to be lower but doesn't want to put a number out there right now because company is still looking for internal efficiencies where it can help offset some of those investments to be made in inventory. Its a a six-month cycle from the build-up of inventory at the frontend to support the sales growth all the way through the growth ramping and then the collections on the other end, before a normal run rate
Avnet	Inventory declined during the quarter. While lead times are expanding, the inventory philosophy is also improving. The company is balancing inventory levels with customer needs as performance improves and also take advantage of near-term opportunities by broadening their base.
Johnson Controls	Power Solutions inventory build was driven by customer requests to meet their stocking demands in coming six months. Some buffer capacities will help the company to offset some of the need for inventory in the future. In Q1 17, the company incurred incremental service and support costs and likely lost business opportunities due to inventory shortages during the peak season. Hence the increase in inventory to minimize the loss in preparation for the H2 CY. Inventory is much higher than it was a year ago (that's twofold). One is it's a response to the fact that Company had having service problems over the last year-and-a-half and also during the peak season, because its peak capacity is probably 120% of our total capacity.
Philips	The company is decreasing its inventory in order to increase working capital efficiencies. Currently, inventory as a percentage of sales decreased to 14.4% y/y and improved a 120 basis points

Source: Company transcript, UBS

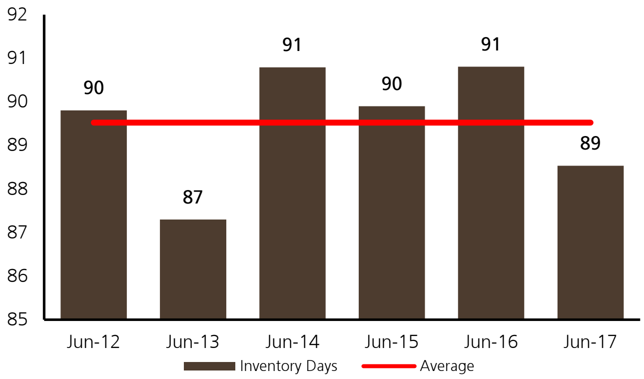
Looking at the inventory level by sub sector, we see autos OEMS still are slightly high levels but also for industrial to reflect strong outlook. The Industrial OEM inventory days we show below has been adjusted to exclude companies where we have seen a step change in inventories related to either acquisitions of disposals which disrupt the time series element of our data. Although we would note that one of the companies we remove - Johnston Controls - called out on its investor call that inventories were elevated on an underlying basis.

Figure 8: Auto OEMs inventory days vs historic still relatively high vs the average of the last 5 years



Source: UBS, Company data

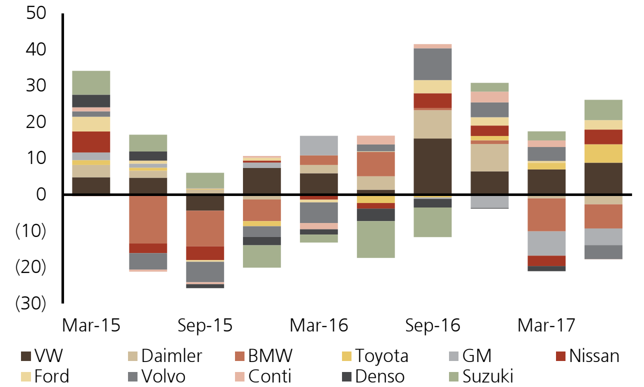
Figure 9: Industrial OEMs inventory days look slightly better than normal seasonality



Source: UBS, Company data, excluding Avnet, Johnson Controls and Emerson that we would normally include for comparability reasons

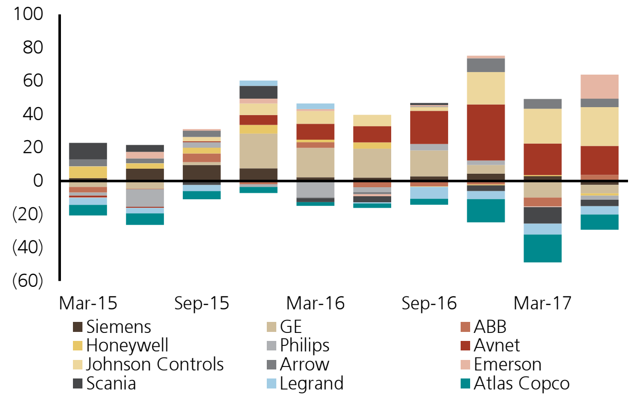
We analyse below the principal drivers. From a quantitative perspective, VW and Toyota are driving the increase in autos at OEMs but we note that this is mainly driven by recalls from VW. The slight decrease from GM however is caused mainly by the divestment of Opel. As shown above, GM is expected to cut production in the second half to lower its inventory level target of c70 days. On the industrial side, on a headline basis inventory days increased by c3 days but if we adjust for the impact of acquisitions/disposals (Avnet, Emerson and Johnson Controls), on an underlying basis the inventory level is broadly in line with historical average.

Figure 10: Auto invendory days change y-o-y: VW and Toyota driving the increase



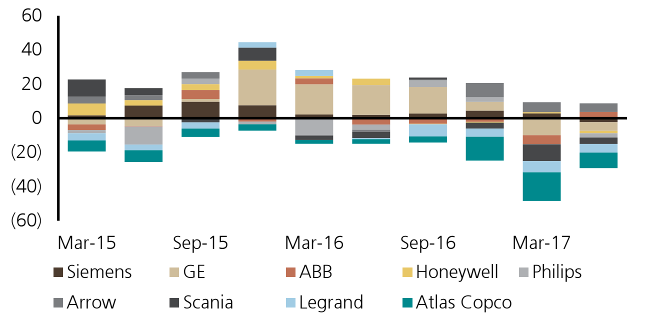
Source: UBS estimates, Company data

Figure 11: Industrial invendory days change y-o-y: increase due primarily to accounting at three companies



Source: UBS estimates, Company data

Figure 12: Excluding these industrial well managed



Source: UBS estimates, Company data

PIVOTAL QUESTIONS

return ↑

Q: Where are we in the analog semis cycle?

UBS VIEW

At this point, lead indicators are mixed - slightly elevated inventory days at autos OEMs but normal levels at semi companies and also industrial OEMs on a normalized basis. Growth rates at expected to remain high-single digit into H2 and surprised on the upside in Q2. The main question mark from here is the car production and industrial demand after a strong H1 17.

EVIDENCE

Our analysis shows that y-o-y revenue growth is likely to sustain at high-single digit levels through H2. Inventory are slightly high at autos OEMs while semis inventories seem to be under control.

WHAT'S PRICED IN?

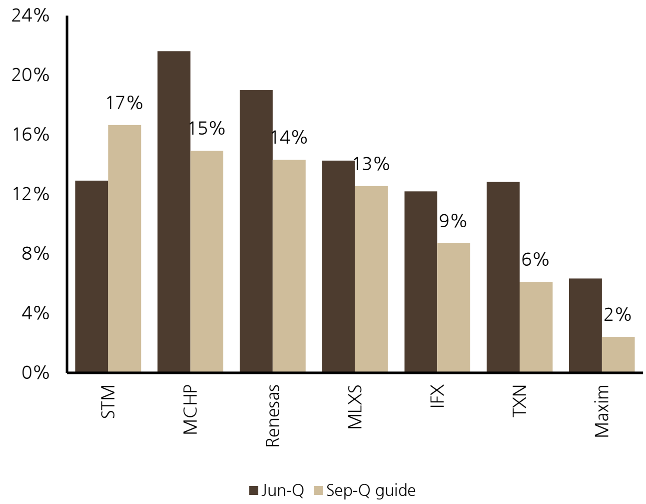
With the sector on 5-year high multiples and pricing in solid long-term growth, we believe the market is assuming the recent strength will sustain and is not pricing in a significant correction (we don't envisage one at present).

Lead indicators

#1 y-o-y semis growth – past the peak

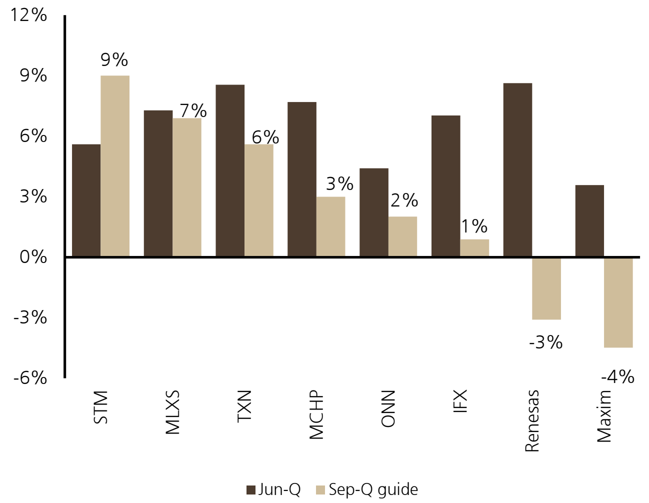
The first leading indicator we focus on, and often the most important one, is the trend in y-o-y growth for the sector. If we look across the autos and industrial semis companies, the trend into CQ3 is quite mixed, with some guiding to an improvement (STM) but others are mentioning slower trend in the rest of the year (IFX/Sensata). This could be explained by either some normalisation in the content growth trend mentioned above along with more challenging comps.

Figure 13: y-o-y revenue trend comparison (in US$)



Source: Company reports; NOTE: Sep-Q guide has been converted into US$ using assumed exchange rates by company or spot rate where none specified

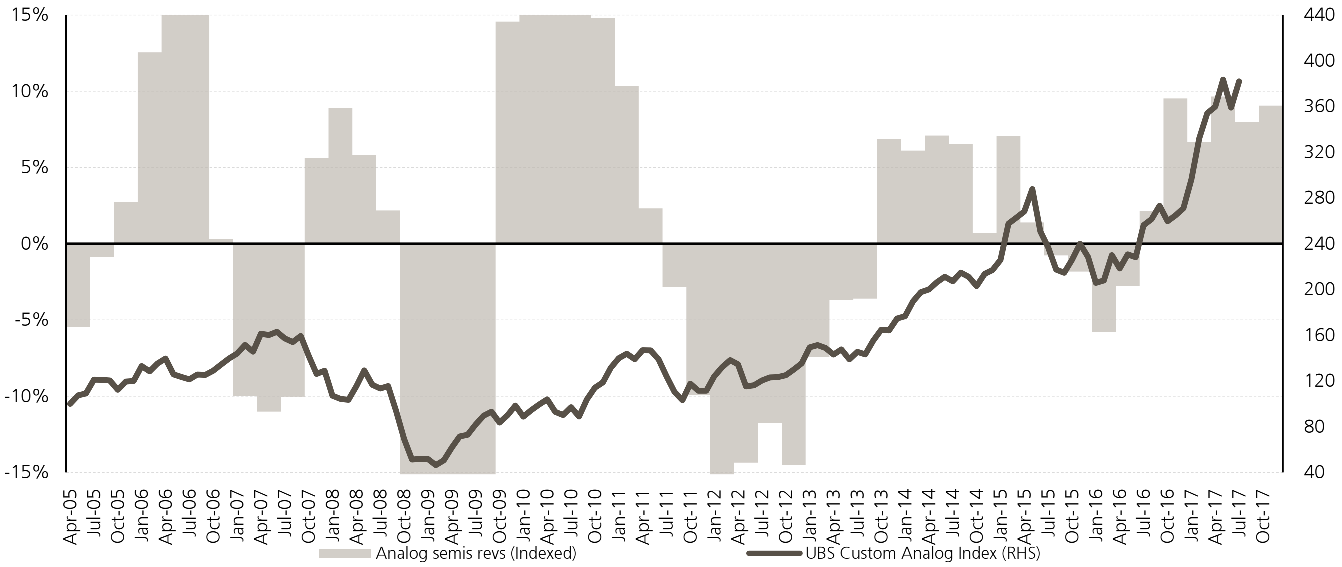
Figure 14: q-o-q revenue trend comparison (in US$)



Source: Company reports; NOTE: Jun-Q guide has been converted into US$ using assumed exchange rates by company or spot rate where none specified

Historically it has proven right to turn more cautious on the sector few months ahead of the peak as the y-o-y growth trends slow. However, in more recent cycles the stocks – driven by fiscal easing in particular – have continued to see multiple expansion even after the lead indicators have turned. At this point - revenue growth appears to be sustaining at high-single digit levels through H2.

Figure 15: Revenue growth likely to peak in Q4 and slow in Q1/Q2

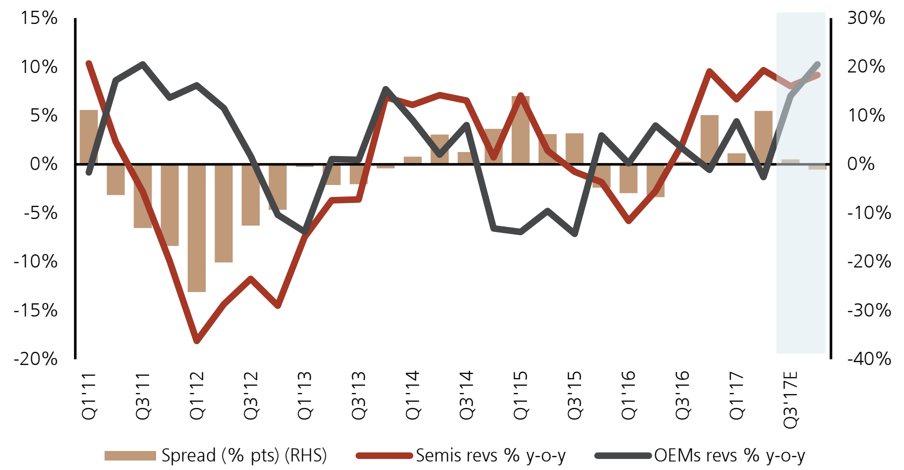


Source: UBS estimates, Company data, IBES consensus NOTE: Analog semis index calculated as a simple average of the performance of the share prices of Analog Devices, ams, Texas Instruments, STMicro, Infineon, ON Semi, Microchip, Maxim, Melexis and NXP

#2 – Semis vs. OEMs revenue gap

Through 2016 we saw a tale of two halves - with the OEMs experiencing a strong first half while semis saw a challenging correction but with both seeing a reversal of fortunes in H2 that sustained into H1'17. As we enter H2, we expect that semis will largely grow at similar rates to OEMs which we would see as a positive signal for the sector. We would note that so far monthly sales for autos slowed down towards the end of Q2 and comps are tough especially in China for the second half of the year (H2 16 production in China was up +21% y-o-y) but at this point industrial demand is providing a buffer.

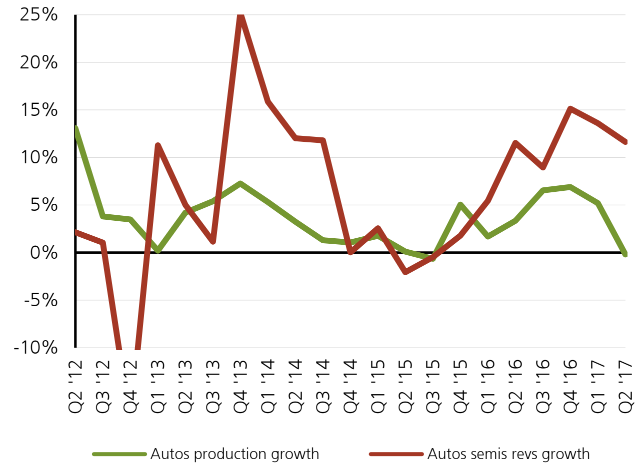
Figure 16: Autos/industrial semis vs. OEM revs (y-o-y)



Source: Company data, IBES consensus data, UBS estimates, (13 semis, 23 OEMs)

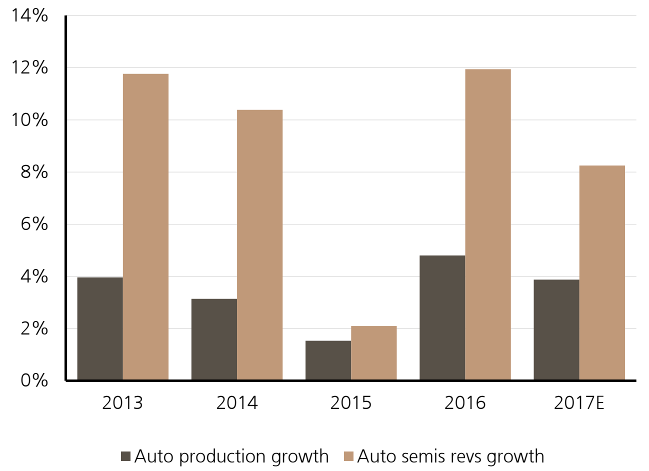
Looking specifically at the automotive semi market, we show that following a year of significant outperformance vs. production growth in 2014, we saw a soft landing in 2015 with only marginal outperformance (although currency didn't help with this). In 2016 outperformance returned and we expect that in 2017E this will remain strong again, driven by content growth resuming strongly (particularly drivers likely to be electric drive trains and RADAR sensors as called out by Infineon).

Figure 17: Autos semis revenues vs. autos production



Source: UBS estimates, Company data, IHS Global Insight

Figure 18: Autos semis revenues vs. autos production

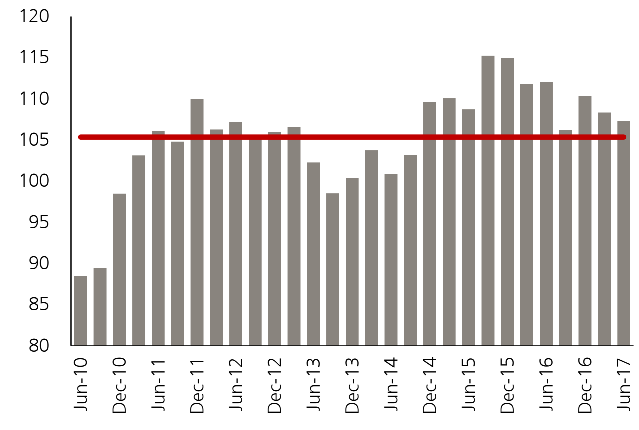


Source: UBS estimates, Company data, IHS Global Insight

#3 – Inventories in normal ranges for semis but relatively high for OEMs

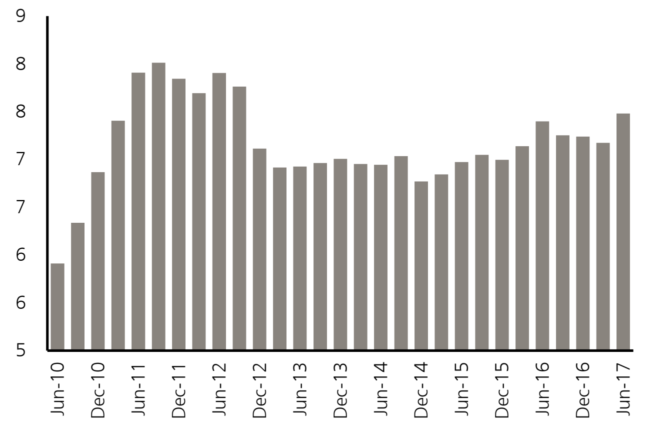
Q2 semis inventory in days remained flat at 107 days, but remains largely in-line with the long-term average inventory days in the sector.

Figure 19: Autos / industrial semis inventory days



Source: UBS, Company data

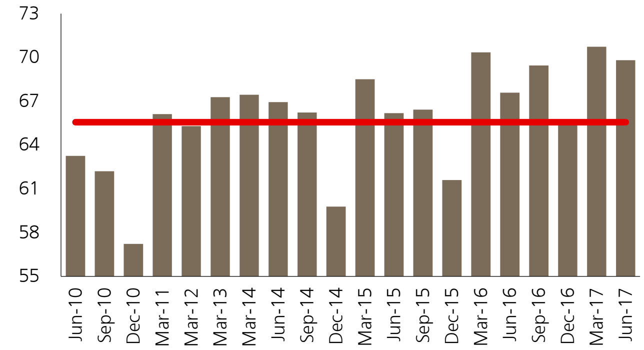
Figure 20: Autos / industrial semis inventory (US$bn)



Source: UBS, Company data

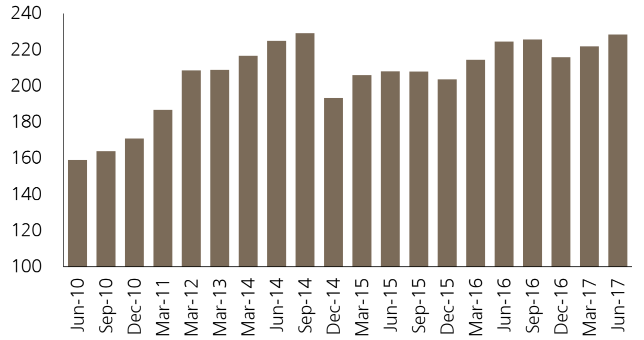
When we look at the OEMs, the inventory appears high vs historic mainly driven by Industrial companies. Inventory days have decreased sequentially in Q2 but not as much as expected and are up 2 day vs. Q1'17 and up 2% y-o-y in absolute terms. While this may not pose an issue if end demand remains as resilient as it has been recently, it could become a significant problem if the trends start to slow.

Figure 21: Auto / industrial OEM inventory days



Source: UBS, Company data

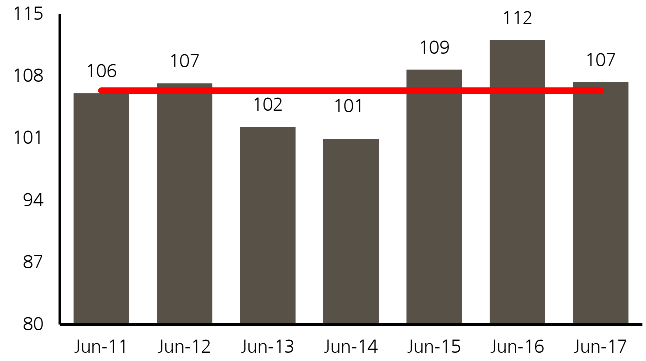
Figure 22: Autos / industrial OEM inventory (US$m)



Source: UBS, Company data

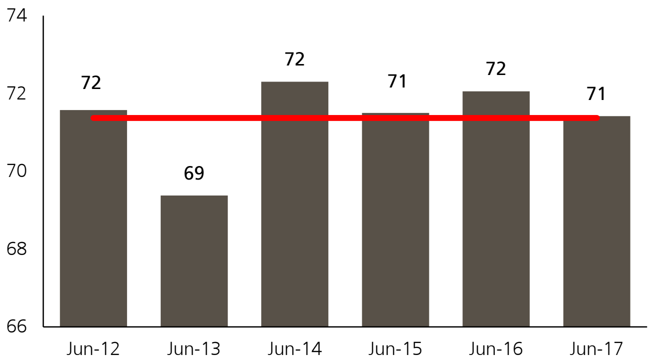
If we adjust for seasonality and focus on the y-o-y trends in inventory it reinforces the trend that inventory levels is well managed across the OEM base as well.

Figure 23: Inventory levels more consistent with normal seasonality at semi companies (average based)



Source: UBS, Company data

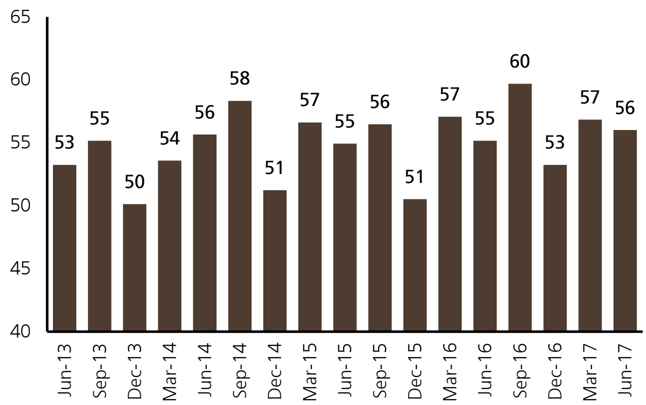
Figure 24: OEM inventory days are in-line with normal seasonality (average based)



Source: UBS, Company data, excluding Avnet, Johnson Controls and Emerson for comparability

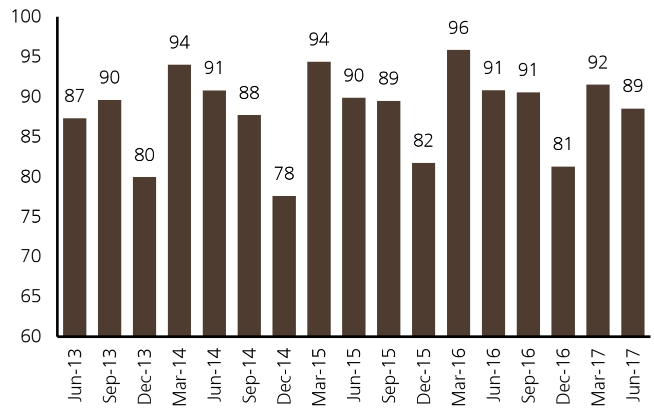
Segmenting this into the sub-industries, we have seen a decrease in the sector industrial and auto but when adjusted for seasonality, we find autos inventory has increased relatively which industrial appears ok. The data is somewhat impacted by acquisitions being done by many of the industrial OEMs but we have attempted where possible to adjust for this (or excluded the data).

Figure 25: Autos OEMs inventory days



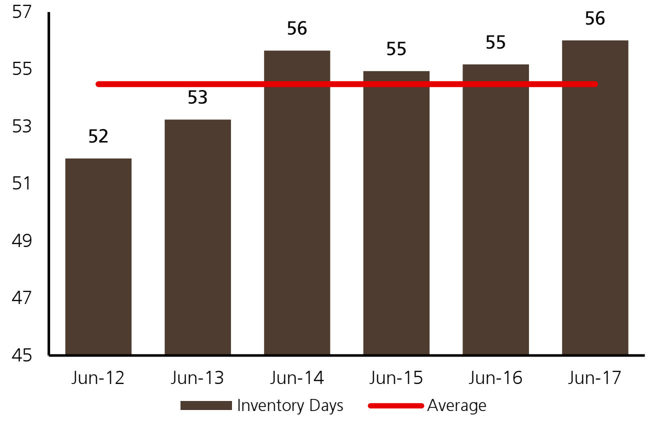
Source: UBS, Company data

Figure 26: Industrial OEMs inventory days



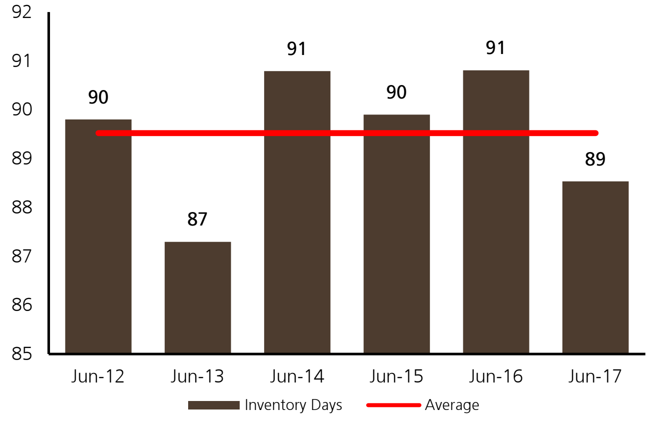
Source: UBS, Company data

Figure 27: Auto OEMs inventory days vs historic still relatively high vs the average of the last 4 years



Source: UBS, Company data

Figure 28: Industrial OEMs inventory day vs historic is healthy



Source: UBS, Company data, excluding Avnet, Johnson Controls and Emerson for comparability which we would normally include

PIVOTAL QUESTIONS

return ↑

Q: Is demand improving or worsening in autos / industrial end markets?

UBS VIEW

Recent trends have suggested some slowing in automotive demand. While part of this is due to the tough comps faced, we would also note that within this a number of the European OEMs are performing better relatively. Overall trends in end demand appear resilient at this point.

EVIDENCE

Data from Q2 show that Automotive production is slowing to flat in Q2 vs +5% in Q1.

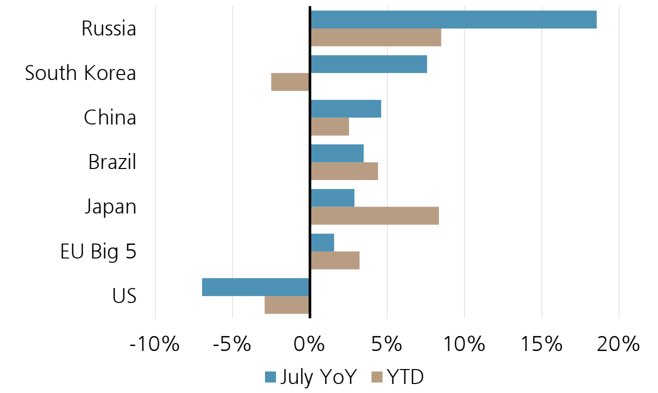
WHAT'S PRICED IN?

With the sector on 5-year high multiples and pricing in solid long-term growth, we believe the market is assuming the recent strength will sustain and is not pricing in a significant correction (we don't envisage one at present).

Automotive – China and US showed weakness in H1. Europe strong

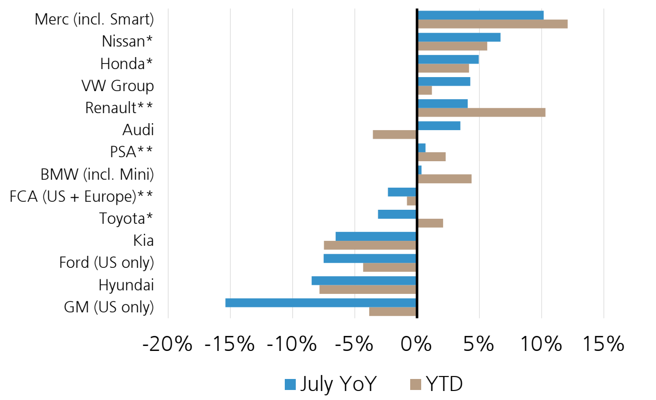
Our global auto sales forecast was recently trimmed to reflect the latest market trends. We reduced our China growth to +3% to reflect a softer than expected ytd growth (from +7%), but increased our forecast for Western Europe. We believe the latest purchase incentive campaign by German OEMs to trade in old diesel cars can boost new car sales, in particular in Germany. We now forecast +3% growth for Western Europe this year (from +1%). Our US forecast remained unchanged at -2% y/y. All in all markets were resilient in July. Western Europe grew in the mid-single digit range excluding UK. UK declined 9.3% continuing its lumpy path, after a recovery in sales numbers in June. China was up +4.6%. Russia enjoyed its fastest growth in 4.5 years and Brazil continued on its recently established recovery trend. For the second half of the year, we expect a return to better growth in China (the pre-buying effect ahead of the sales tax incentive expiry at year-end should kick in); moderate growth in Europe on a tougher base and a stable US market on a sequential basis.

Figure 29: Sales growth in key markets in July



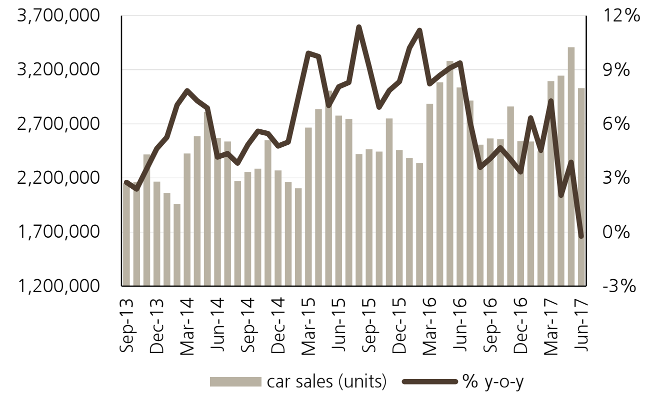
Source: Bloomberg, respective car associations, UBS.

Figure 30: Unit sales growth by OEM in July



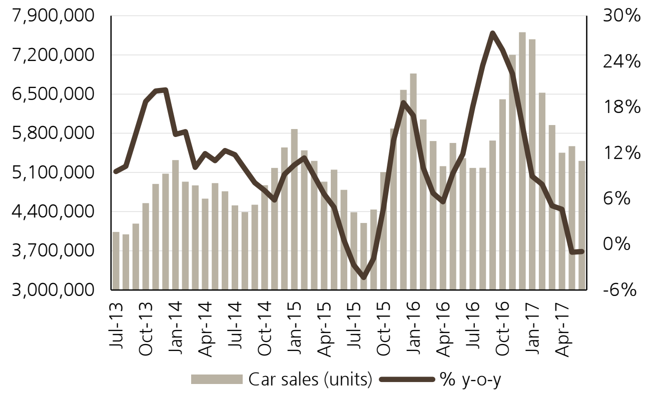
Source: Company data, UBS. Note: * June production data for Toyota & Honda and June sales for Nissan. Note: **June sales data for PSA, Renault and FCA

Figure 31: EU big 5 - Car sales growth (rolling quarters)



Source: UBS, ACEA

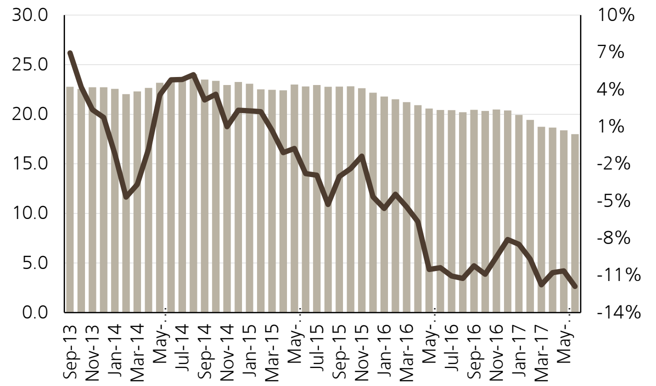
Figure 32: China - Car sales growth (rolling quarters)



Source: UBS, CAAM

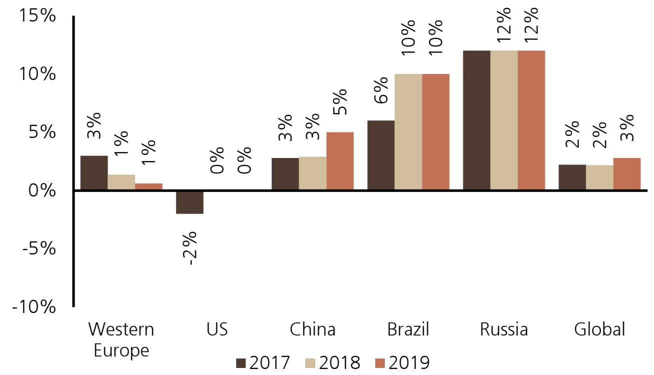
As shown below, we continue to expect 3% sales growth for the full year 2017 globally and +4% y-o-y for the production.

Figure 33: US - Car sales growth (rolling quarters)



Source: UBS, Bloomberg

Figure 34: UBS sales forecast across regions

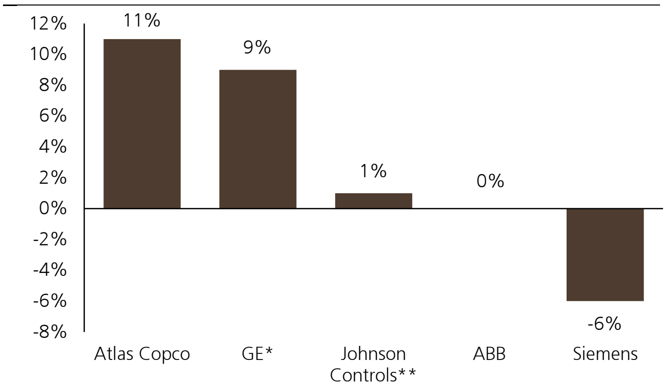


Source: UBS

Industrial bookings still favourable

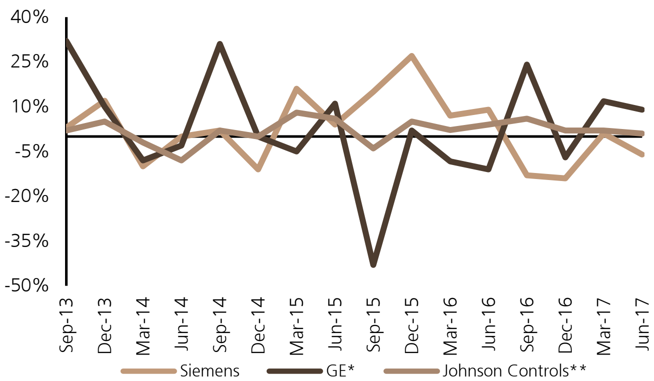
In Q2'17, order bookings were positively skewed for the major industrial OEMs (except Siemens) posting increase in orders. Both Atlas Copco and GE reported order strong growth of 11% and 9% y/y, respectively.

Figure 35: Orders growth (y-o-y) – Q2'17



Source: UBS, company data (* GE Equipment **Building Efficiency)

Figure 36: Orders growth (y-o-y)



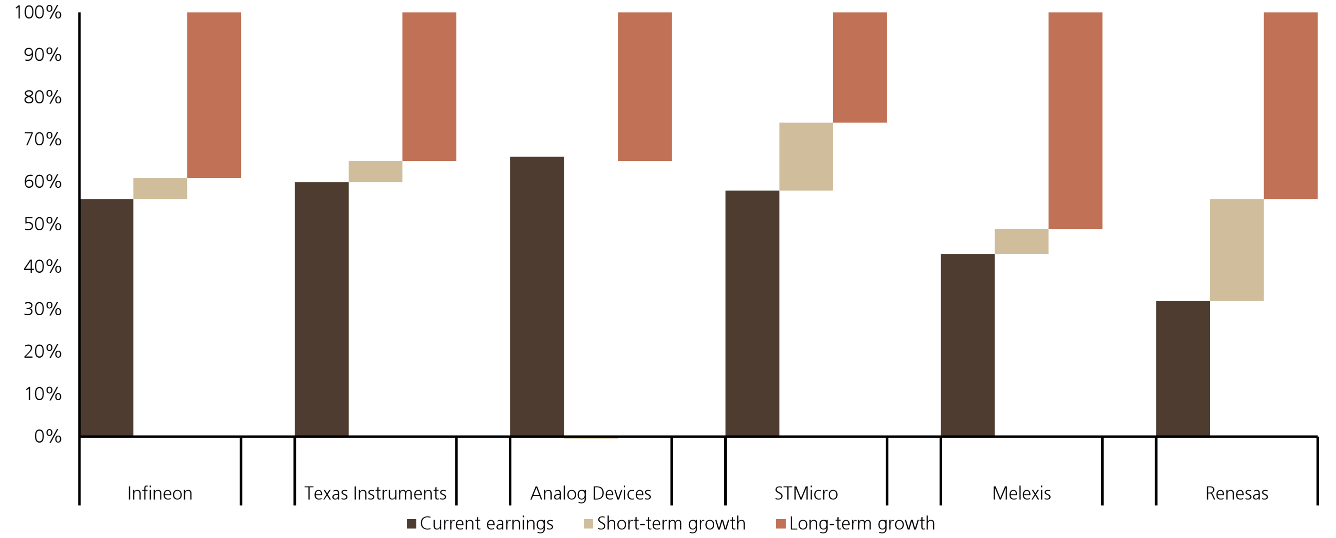
Source: UBS, company data (* GE Equipment **Building Efficiency)

WHAT'S PRICED IN?

return ↑

To calculate what is priced in at current levels, we use a residual income model based on current book value and two years forward consensus forecasts. This shows (using a consistent discount rate of 9%), the implied value (between short-term and long-term growth) for each of the key stocks in the sector.

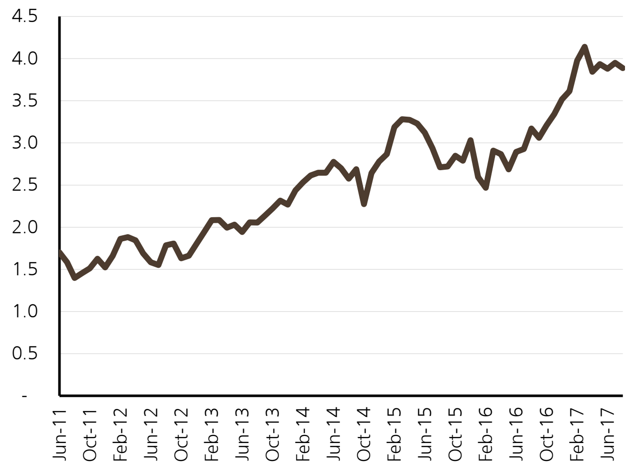
Figure 37: Creation of value horizon across the Autos / Industrial Semis space (priced as of 30 August 2017)



Source: UBS estimates

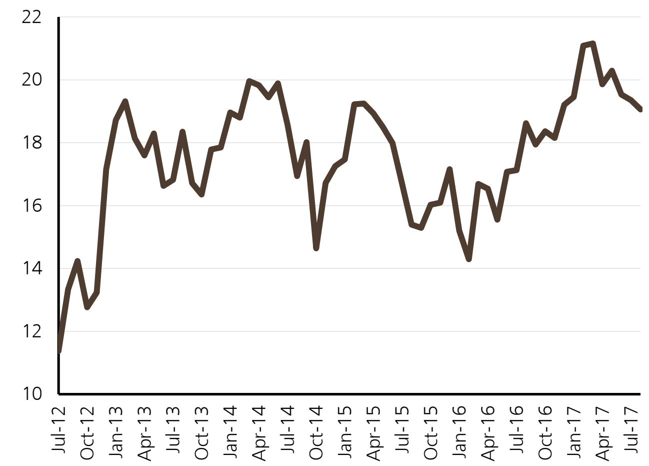
There has been a significant increase in the growth outlook being priced into the sector through this year. While there are still growth opportunities in the sector we are concerned at the current valuation levels across the sector. The analog and industrial semis sector is currently trading on one-year fwd P/E of 19x down from the recent peak of 21x and compared to its historical average of c17.5x but EV/EBITDA multiple at c11.5x is still above its average c8x. We remain Neutral in our ratings for the autos and industrial names as valuation multiples remains high.

Figure 38: Autos/Industrial semis Forward EV/Sales



Source: UBS, DataStream

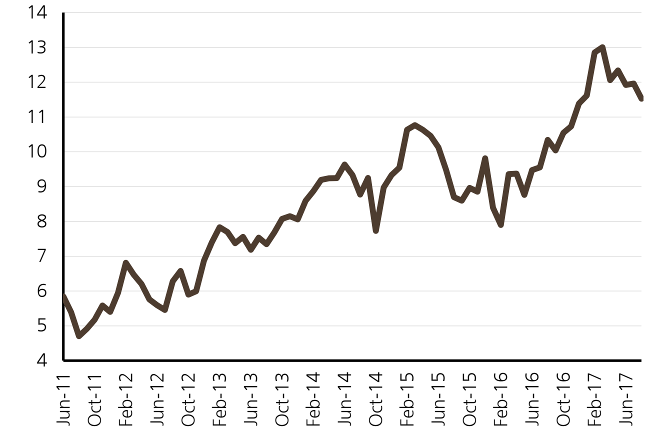
Figure 39: Autos/Industrial semis Forward P/E



Source: UBS, DataStream

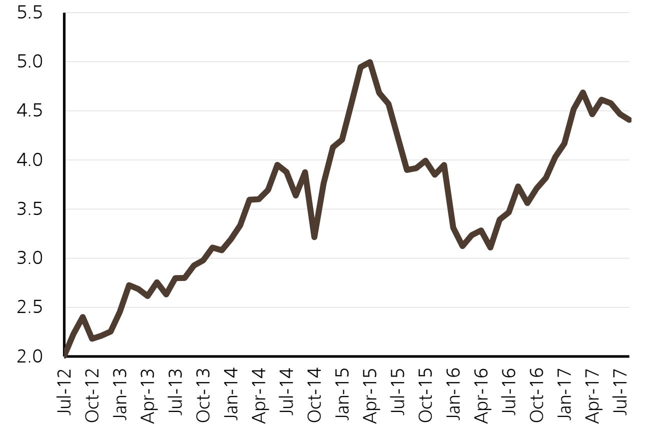
We show the multiples for each company in the sector; the historic multiples the sector has traded on and a chart showing EV/Sales against EBITDA margin which we believe provides a good visual indicator to valuation discrepancies.

Figure 40: Autos/Industrial semis Forward EV/EBITDA



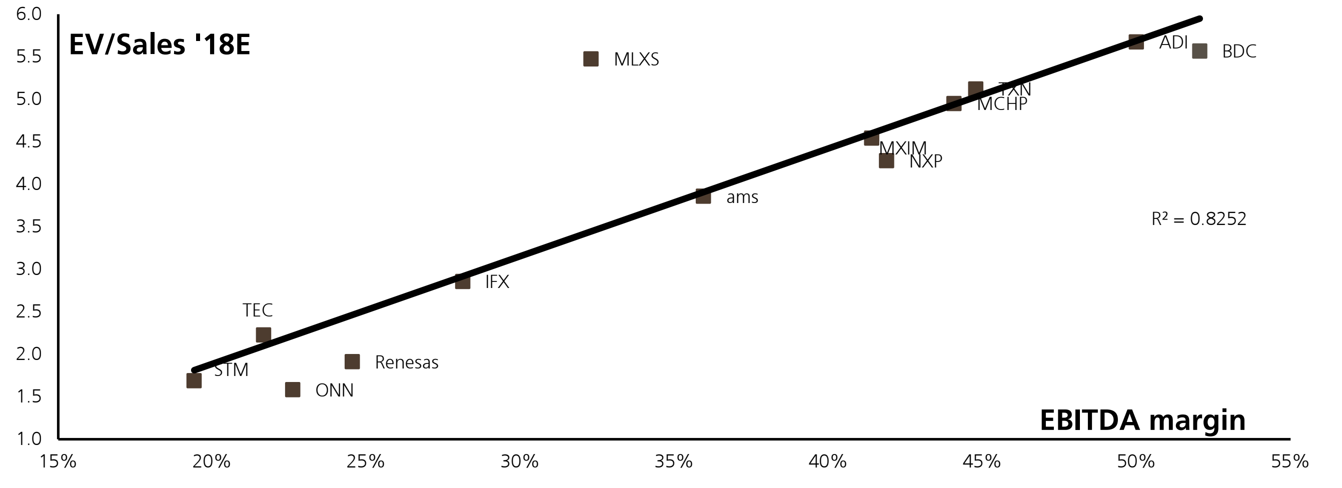
Source: UBS, DataStream

Figure 41: Autos/Industrial semis Forward P/BV



Source: UBS, DataStream

Figure 42: 2018E EV/Sales vs. EBITDA margin for analog semis



Source: UBS estimates; Datastream consensus used for non-covered companies

Figure 43: Analog Semis Global Valuation Multiples (Priced on 30 August 2017)

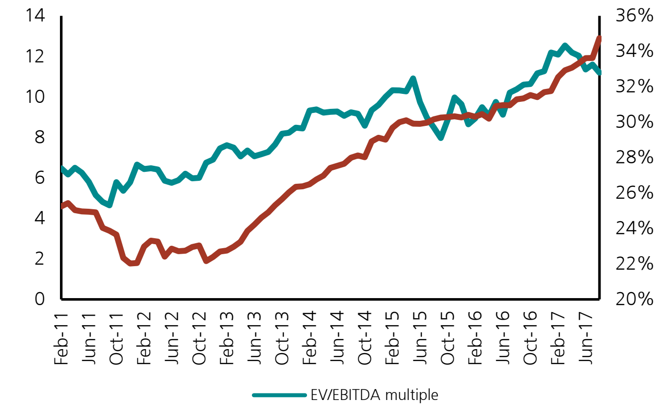
Company	Rating	Price (lc)	Price Target (lc)	Market Cap ($m)	EV/Sales 2017E	EV/Sales 2018E	EV/EBITDA 2017E	EV/EBITDA 2018E	Price/Earnings 2017E	Price/Earnings 2018E	Price/Book 2017E	Price/Book 2018E	Dividend Yield 2017E	Dividend Yield 2018E
Analog Devices	Neutral (UR)	79.55	94.00	27,152	5.6	5.7	11.9	11.4	18.0	17.3	2.4	nm	2.2%	2.3%
ams AG	Neutral	65.20	70.00	5,762	5.1	3.8	22.4	10.6	47.8	17.3	4.5	3.9	0.3%	1.2%
Infineon	Buy	18.95	21.00	25,516	3.0	2.8	11.0	10.0	20.4	18.7	3.6	3.3	1.7%	1.9%
Maxim Integrated	Neutral	44.75	48.00	12,653	4.7	4.5	11.7	10.9	19.7	18.2	5.3	4.6	3.1%	3.2%
Microchip Technology	Not Covered	83.83	-	19,510	5.4	5.0	12.4	11.2	17.0	15.1	5.7	4.5	1.7%	1.7%
Melexis	Sell	76.27	53.00	3,706	5.9	5.5	18.8	17.0	27.6	25.7	10.7	9.9	2.8%	2.9%
NXP	Not Covered	112.31	-	38,860	4.9	4.3	13.9	10.2	17.8	15.8	2.8	2.5	nm	nm
ON Semi	Not Covered	16.18	-	6,821	1.7	1.6	7.9	7.0	11.7	10.2	3.0	2.3	nm	nm
Renesas Electronics	Neutral	1075.00	1,150	16,521	2.1	1.9	10.3	7.9	28.7	19.6	3.8	3.3	0.9%	0.9%
STMicroelectronics	Sell	14.10	13.00	15,005	1.9	1.7	10.0	8.5	19.7	17.7	2.9	2.6	1.5%	1.4%
TE Connectivity	Not Covered	78.53	-	27,751	2.4	2.2	10.9	10.4	16.3	15.4	3.0	2.7	2.0%	2.1%
Texas Instruments	Buy	81.03	93.00	80,544	5.4	5.1	12.3	11.5	20.0	19.1	7.4	7.1	2.6%	2.9%
Analog Semis				*Mean*	**4.0**	**3.7**	**12.8**	**10.5**	**22.1**	**17.5**	**4.6**	**4.2**	**1.9%**	**2.1%**
				Median	**4.8**	**4.0**	**11.8**	**10.5**	**19.7**	**17.5**	**3.7**	**3.3**	**1.8%**	**2.0%**

Source: UBS estimates, IBES consensus used for non-covered stocks

But we do recognise that returns in the industry have improved

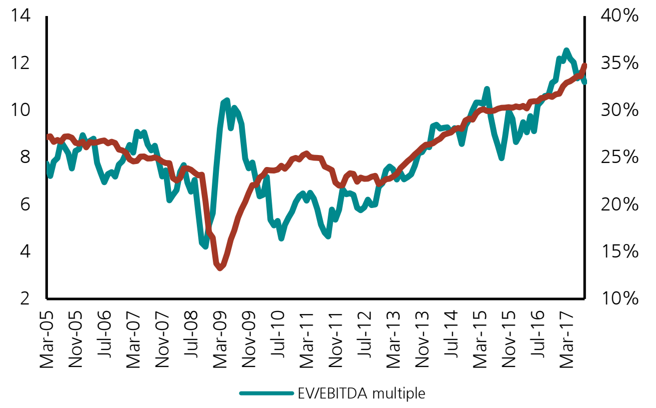
One factor that does in part justify the increase in multiples for the sector is the increase in profitability that we have seen which is arguably a structural change towards higher earnings quality in the sector that it has had historically.

Figure 44: Forward EV/EBITDA multiple vs. EBITDA margin



Source: UBS, Datastream

Figure 45: Forward EV/EBITDA multiple vs. EBITDA margin



Source: UBS, Datastream

Figure 46: Recent commentary from major analog semis companies

Company	Date	Current Q	Next Q guide	Comments				
				Inventories	Autos trend Q2	Industrials trend Q2	Orders and book-to-bill	General comments
Maxim	20-Jul	Up 3.6% q/q, Up 6.3% y/y	Down 4.5% q/q	Distributor channel down 2 days q/q driven by strong resales	Expect it to grow in low teens y/y		-	Softness seen broadly across auto market for the second consecutive quarter. LT auto demand intact led by fully autonomous cars and electric vehicles
Texas Instruments	25-Jul	Up 8.6% q/q, Up 12.8% y/y	Up 5.6% q/q	Inventory days were down q/q to 133. Dist. Inventory at 4wks, down q/q	Continued to remain strong - increased semis content	also strengthened with broad-based growth	B2B overall was 1.06	Lead times remains stable, confident to gain market shaer in the range of 30-40bps
STMicro	26-Jul	Up 5.6% q/q, Up 12.9% y/y	Up 9.0% q/q	Inventory days down q/q (distributors inventory are at very low level)	To be up y/y	-	is positive (trends of bookings has increased in the month of june and month of july)	Continue to see healthy demand from our point-of-sales data
Xilinx	26-Jul	Up 1.0% q/q, Up 7.0% y/y	Up 0.8% q/q	increased slightly primarily from advanced products	Q3 expected to be up q/q	Q3 to be down driven by wireless	-	Each of the end markets in the Industrial and A&D space is growing and company see strength across the board
Infineon	1-Aug	Up 3.6% q/q, Up 12.2% q/q	flat q/q	Healthy inventory both in-house and in the channel. Overall no inventory buildup	Remains very solid	strong (more growth coming from industrial IoT with the embedded SIM)	Overall 1.1 (vs 1.2 in CQ2), 1.2 in autos (vs. 1.0), 1.3 in IPC (vs. 1.3), 1.1 in PMM (vs. 1.4)	Automotive demand continues to be strong, while they see some normalization in terms of car unit growth
Renesas	28-Jul	Up 11.5% q/q	down 1.2% q/q	increased slightly up q/q	Expect it to be down q/q	Expect a seasonal down, around the white goods	-	Auto is expected to be down led by softening in the end market primarily in the US and to a lesser extent China
Microchip	3-Aug	Up 7.7% q/q	Up 3% q/q	Inventory days are at a 7-year low, and don't expect inventory to grow in Q3	Consistent growth and expect Q3 to perform well	Broad based growth	Bookings are strong	Aggressively adding capacity to support the growth; current capacity increases is not able to keep pace with irise in demand
On Semi	7-Aug	Up 4.4% q/q, Up 9.0% y/y	Up 2% q/q	Inventory days down 3 days q/q to 108 Distis inventory flat	Q3 to be flat q/q as opposed to normal seasonality of decline	Q3 to be down q/q	Backlog levels represent ~80% - 85% of anticipated Q3 revenue	Didn't see any evidence of inventory build in distribution channel or of anomalous booking patterns

Source: Company results, call transcripts

Valuation Method and Risk Statement

The upside risks to the semiconductor sector include stronger end demand from OEMs and tightness of supply due to the financial distress of competitors. Downside risks include macro-economic factors, over-capacity in times of peaking demand and poor yields. The semiconductor sector is high cyclical and vulnerable to sudden shifts in customer sentiment while many companies also have high cost bases meaning they can go loss-making in the downturn.

Required Disclosures

This report has been prepared by UBS Limited, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

For information on the ways in which UBS manages conflicts and maintains independence of its research product; historical performance information; and certain additional disclosures concerning UBS research recommendations, please visit www.ubs.com/disclosures. The figures contained in performance charts refer to the past; past performance is not a reliable indicator of future results. Additional information will be made available upon request. UBS Securities Co. Limited is licensed to conduct securities investment consultancy businesses by the China Securities Regulatory Commission. UBS acts or may act as principal in the debt securities (or in related derivatives) that may be the subject of this report. This recommendation was finalized on: 31 August 2017 03:30 AM GMT.

Analyst Certification: Each research analyst primarily responsible for the content of this research report, in whole or in part, certifies that with respect to each security or issuer that the analyst covered in this report: (1) all of the views expressed accurately reflect his or her personal views about those securities or issuers and were prepared in an independent manner, including with respect to UBS, 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 by that research analyst in the research report.

UBS Investment Research: Global Equity Rating Definitions

12-Month Rating	**Definition**	**Coverage**[1]	**IB Services**[2]
Buy	FSR is > 6% above the MRA.	45%	28%
Neutral	FSR is between -6% and 6% of the MRA.	38%	27%
Sell	FSR is > 6% below the MRA.	17%	11%
Short-Term Rating	**Definition**	**Coverage**[3]	**IB Services**[4]
Buy	Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%
Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

Source: UBS. Rating allocations are as of 30 June 2017.
1:Percentage of companies under coverage globally within the 12-month rating category.
2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
3:Percentage of companies under coverage globally within the Short-Term rating category.
4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

KEY DEFINITIONS:Forecast Stock Return (FSR) is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months. **Market Return Assumption (MRA)** is defined as the one-year local market interest rate plus 5% (a proxy for, and not a forecast of, the equity risk premium). **Under Review (UR)** Stocks may be flagged as UR by the analyst, indicating that the stock's price target and/or rating are subject to possible change in the near term, usually in response to an event that may affect the investment case or valuation. **Short-Term Ratings** reflect the expected near-term (up to three months) performance of the stock and do not reflect any change in the fundamental view or investment case. **Equity Price Targets** have an investment horizon of 12 months.

EXCEPTIONS AND SPECIAL CASES:UK and European Investment Fund ratings and definitions are: Buy: Positive on factors such as structure, management, performance record, discount; **Neutral:** Neutral on factors such as structure, management, performance record, discount; **Sell:** Negative on factors such as structure, management, performance record, discount. **Core Banding Exceptions (CBE):** Exceptions to the standard +/-6% bands may be granted by the Investment Review Committee (IRC). Factors considered by the IRC include the stock's volatility and the credit spread of the respective company's debt. As a result, stocks deemed to be very high or low risk may be subject to higher or lower bands as they relate to the rating. When such exceptions apply, they will be identified in the Company Disclosures table in the relevant research piece.

Research analysts contributing to this report who are employed by any non-US affiliate of UBS Securities LLC are not registered/qualified as research analysts with FINRA. Such analysts may not be associated persons of UBS Securities LLC and therefore are not subject to the FINRA restrictions on communications with a subject company, public appearances, and trading securities held by a research analyst account. The name of each affiliate and analyst employed by that affiliate contributing to this report, if any, follows.

UBS Limited: David Mulholland, CFA; Francois-Xavier Bouvignies; David Lesne. **UBS Securities LLC:** Stephen Chin; Steven Chin. **UBS AG Hong Kong Branch:** Nicolas Gaudois; Bill Lu. **UBS Securities Japan Co., Ltd.:** Kenji Yasui. **UBS AG:** Patrick Hummel, CFA.

Company Disclosures

Company Name	Reuters	12-month rating	Short-term rating	Price	Price date
ams AG[13]	AMS.S	Neutral	N/A	CHF65.70	30 Aug 2017
Analog Devices Inc.[16]	ADI.O	Neutral (UR)	N/A	US$83.72	30 Aug 2017
Infineon Technologies AG[7]	IFXGn.DE	Buy	N/A	€19.04	30 Aug 2017
Melexis NV	MLXS.BR	Sell	N/A	€76.47	30 Aug 2017
Renesas Electronics	6723.T	Neutral	N/A	¥1,070	30 Aug 2017
STMicroelectronics[5, 7, 16]	STM.PA	Sell	N/A	€14.20	30 Aug 2017
Texas Instruments Inc.[16]	TXN.O	Buy	N/A	US$82.31	30 Aug 2017

Source: UBS. All prices as of local market close.
Ratings in this table are the most current published ratings prior to this report. They may be more recent than the stock pricing date

5. UBS AG, its affiliates or subsidiaries expect to receive or intend to seek compensation for investment banking services from this company/entity within the next three months.
7. Within the past 12 months, UBS Securities LLC and/or its affiliates have received compensation for products and services other than investment banking services from this company/entity.
13. UBS AG, its affiliates or subsidiaries beneficially owned 1% or more of a class of this company`s common equity securities as of last month`s end (or the prior month`s end if this report is dated less than 10 days after the most recent month`s end).
16. UBS Securities LLC makes a market in the securities and/or ADRs of this company.

Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report. For a complete set of disclosure statements associated with the companies discussed in this report, including information on valuation and risk, please contact UBS Securities LLC, 1285 Avenue of Americas, New York, NY 10019, USA, Attention: Investment Research.

Global Disclaimer

This document has been prepared by UBS Limited, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

Global Research is provided to our clients through UBS Neo, in certain instances, UBS.com and any other system, or distribution method specifically identified in one or more communications distributed through UBS Neo or UBS.com as an approved means for distributing Global Research (each a "System"). It may also be made available through third party vendors and distributed by UBS and/or third parties via e-mail or alternative electronic means. The level and types of services provided by Global Research to a client may vary depending upon various factors such as a client's individual preferences as to the frequency and manner of receiving communications, a client's risk profile and investment focus and perspective (e.g., market wide, sector specific, long-term, short-term, etc.), the size and scope of the overall client relationship with UBS and legal and regulatory constraints.

All Global Research is available on UBS Neo. Please contact your UBS sales representative if you wish to discuss your access to UBS Neo.

When you receive Global Research through a System, your access and/or use of such Global Research is subject to this Global Research Disclaimer and to the terms of use governing the applicable System.

When you receive Global Research via a third party vendor, e-mail or other electronic means, your use shall be subject to this Global Research Disclaimer and to UBS's Terms of Use/Disclaimer (http://www.ubs.com/global/en/legalinfo2/disclaimer.html). By accessing and/or using Global Research in this manner, you are indicating that you have read and agree to be bound by our Terms of Use/Disclaimer. In addition, you consent to UBS processing your personal data and using cookies in accordance with our Privacy Statement (http://www.ubs.com/global/en/legalinfo2/privacy.html) and cookie notice (http://www.ubs.com/global/en/homepage/cookies/cookie-management.html).

If you receive Global Research, whether through a System or by any other means, you agree that you shall not copy, revise, amend, create a derivative work, transfer to any third party, or in any way commercially exploit any UBS research provided via Global Research or otherwise, and that you shall not extract data from any research or estimates provided to you via Global Research or otherwise, without the prior written consent of UBS.

This document is for distribution only as may be permitted by law. It is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or would subject UBS to any registration or licensing requirement within such jurisdiction. It is published solely for information purposes; it is not an advertisement nor is it a solicitation or an offer to buy or sell any financial instruments or to participate in any particular trading strategy. No representation or warranty, either expressed or implied, is provided in relation to the accuracy, completeness or reliability of the information contained in any materials to which this document relates (the "Information"), except with respect to Information concerning UBS. The Information is not intended to be a complete statement or summary of the securities, markets or developments referred to in the document. UBS does not undertake to update or keep current the Information. Any opinions expressed in this document may change without notice and may differ or be contrary to opinions expressed by other business areas or groups, personnel or other representative of UBS. Any statements contained in this report attributed to a third party represent UBS's interpretation of the data, information and/or opinions provided by that third party either publicly or through a subscription service, and such use and interpretation have not been reviewed by the third party.

This document is a general communication and is educational in nature. Nothing in this document constitutes a representation that any investment strategy or recommendation is suitable or appropriate to an investor’s individual circumstances or otherwise constitutes a personal recommendation. By providing this document, none of UBS or its representatives has any responsibility or authority to provide or have provided investment advice in a fiduciary capacity or otherwise. Investments involve risks, and investors should exercise prudence and their own judgement in making their investment decisions. None of UBS or its representatives is suggesting that the recipient or any other person take a specific course of action or any action at all. By receiving this document, the recipient acknowledges and agrees with the intended purpose described above and further disclaims any expectation or belief that the information constitutes investment advice to the recipient or otherwise purports to meet the investment objectives of the recipient. The financial instruments described in the document may not be eligible for sale in all jurisdictions or to certain categories of investors. Options, derivative products and futures are not suitable for all investors, and trading in these instruments is considered risky. Mortgage and asset-backed securities may involve a high degree of risk and may be highly volatile in response to fluctuations in interest rates or other market conditions. Foreign currency rates of exchange may adversely affect the value, price or income of any security or related instrument referred to in the document. For investment advice, trade execution or other enquiries, clients should contact their local sales representative.

The value of any investment or income may go down as well as up, and investors may not get back the full (or any) amount invested. Past performance is not necessarily a guide to future performance. Neither UBS nor any of its directors, employees or agents accepts any liability for any loss (including investment loss) or damage arising out of the use of all or any of the Information.

Any prices stated in this document are for information purposes only and do not represent valuations for individual securities or other financial instruments. There is no representation that any transaction can or could have been effected at those prices, and any prices do not necessarily reflect UBS's internal books and records or theoretical model-based valuations and may be based on certain assumptions. Different assumptions by UBS or any other source may yield substantially different results.

This document and the Information are produced by UBS as part of its research function and are provided to you solely for general background information. UBS has no regard to the specific investment objectives, financial situation or particular needs of any specific recipient. In no circumstances may this document or any of the Information be used for any of the following purposes:

(i) valuation or accounting purposes;

(ii) to determine the amounts due or payable, the price or the value of any financial instrument or financial contract; or

(iii) to measure the performance of any financial instrument.

By receiving this document and the Information you will be deemed to represent and warrant to UBS that you will not use this document or any of the Information for any of the above purposes or otherwise rely upon this document or any of the Information. Prior to making any investment or financial decisions, any recipient of this document or the information should seek individualized advice from his or her personal financial, legal, tax and other professional advisors that takes into account all the particular facts and circumstances of his or her investment objectives.

UBS has policies and procedures, which include, without limitation, independence policies and permanent information barriers, that are intended, and upon which UBS relies, to manage potential conflicts of interest and control the flow of information within divisions of UBS and among its subsidiaries, branches and affiliates. For further information on the ways in which UBS manages conflicts and maintains independence of its research products, historical performance information and certain additional disclosures concerning UBS research recommendations, please visit www.ubs.com/disclosures.

Research will initiate, update and cease coverage solely at the discretion of UBS Research Management, which will also have sole discretion on the timing and frequency of any published research product. The analysis contained in this document is based on numerous assumptions. All material information in relation to published research reports, such as valuation methodology, risk statements, underlying assumptions (including sensitivity analysis of those assumptions), ratings history etc. as required by the Market Abuse Regulation, can be found on NEO. Different assumptions could result in materially different results.

The analyst(s) responsible for the preparation of this document may interact with trading desk personnel, sales personnel and other parties for the purpose of gathering, applying and interpreting market information. UBS relies on information barriers to control the flow of information contained in one or more areas within UBS into other areas, units, groups or affiliates of UBS. The compensation of the analyst who prepared this document is determined exclusively by research management and senior management (not including investment banking). Analyst compensation is not based on investment banking revenues; however, compensation may relate to the revenues of UBS and/or its divisions as a whole, of which investment banking, sales and trading are a part, and UBS's subsidiaries, branches and affiliates as a whole.

For financial instruments admitted to trading on an EU regulated market: UBS AG, its affiliates or subsidiaries (excluding UBS Securities LLC) acts as a market maker or liquidity provider (in accordance with the interpretation of these terms in the UK) in the financial instruments of the issuer save that where the activity of liquidity provider is carried out in accordance with the definition given to it by the laws and regulations of any other EU jurisdictions, such information is separately disclosed in this document. For financial instruments admitted to trading on a non-EU regulated market: UBS may act as a market maker save that where this activity is carried out in the US in accordance with the definition given to it by the relevant laws and regulations, such activity will be specifically disclosed in this document. UBS may have issued a warrant the value of which is based on one or more of the financial instruments referred to in the document. UBS and its affiliates and employees may have long or short positions, trade as principal and buy and sell in instruments or derivatives identified herein; such transactions or positions may be inconsistent with the opinions expressed in this document.

United Kingdom and the rest of Europe: Except as otherwise specified herein, this material is distributed by UBS Limited to persons who are eligible counterparties or professional clients. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. **France:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities France S.A. UBS Securities France S.A. is regulated by the ACPR (Autorité de Contrôle Prudentiel et de Résolution) and the Autorité des Marchés Financiers (AMF). Where an analyst of UBS Securities France S.A. has contributed to this document, the document is also deemed to have been prepared by UBS Securities France S.A. **Germany:** Prepared by UBS Limited and distributed by UBS Limited and UBS Europe SE. UBS Europe SE is regulated by the Bundesanstalt fur Finanzdienstleistungsaufsicht (BaFin). **Spain:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities España SV, SA. UBS Securities España SV, SA is regulated by the Comisión Nacional del Mercado de Valores (CNMV). **Turkey:** Distributed by UBS Limited. No information in this document is provided for the purpose of offering, marketing and sale by any means of any capital market instruments and services in the Republic of Turkey. Therefore, this document may not be considered as an offer made or to be made to residents of the Republic of Turkey. UBS Limited is not licensed by the Turkish Capital Market Board under the provisions of the Capital Market Law (Law No. 6362). Accordingly, neither this document nor any other offering material related to the instruments/services may be utilized in connection with providing any capital market services to persons within the Republic of Turkey without the prior approval of the Capital Market Board. However, according to article 15 (d) (ii) of the Decree No. 32, there is no restriction on the purchase or sale of the securities abroad by residents of the Republic of Turkey. **Poland:** Distributed by UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce regulated by the Polish Financial Supervision Authority. Where an analyst of UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce has contributed to this document, the document is also deemed to have been prepared by UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce. **Russia:** Prepared and distributed by UBS Bank (OOO). **Switzerland:** Distributed by UBS AG to persons who are institutional investors only. UBS AG is regulated by the Swiss Financial Market Supervisory Authority (FINMA). **Italy:** Prepared by UBS Limited and distributed by UBS Limited and UBS Limited, Italy Branch. Where an analyst of UBS Limited, Italy Branch has contributed to this document, the document is also deemed to have been prepared by UBS Limited, Italy Branch. **South Africa:** Distributed by UBS South Africa (Pty) Limited (Registration No. 1995/011140/07), an authorised user of the JSE and an authorised Financial Services Provider (FSP 7328). **Israel:** This material is distributed by UBS Limited. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. UBS Securities Israel Ltd is a licensed Investment Marketer that is supervised by the Israel Securities Authority (ISA). UBS Limited and its affiliates incorporated outside Israel are not licensed under the Israeli Advisory Law. UBS Limited is not covered by insurance as required from a licensee under the Israeli Advisory Law. UBS may engage among others in issuance of Financial Assets or in distribution of Financial Assets of other issuers for fees or other benefits. UBS Limited and its affiliates may prefer various Financial Assets to which they have or may have Affiliation (as such term is defined under the Israeli Advisory Law). Nothing in this Material should be considered as investment advice under the Israeli Advisory Law. This Material is being issued only to and/or is directed only at persons who are Eligible Clients within the meaning of the Israeli Advisory Law, and this material must not be relied on or acted upon by any other persons. **Saudi Arabia:** This document has been issued by UBS AG (and/or any of its subsidiaries, branches or affiliates), a public company limited by shares, incorporated in Switzerland with its registered offices at Aeschenvorstadt 1, CH-4051 Basel and Bahnhofstrasse 45, CH-8001 Zurich. This publication has been approved by UBS Saudi Arabia (a subsidiary of UBS AG), a Saudi closed joint stock company incorporated in the Kingdom of Saudi Arabia under commercial register number 1010257812 having its registered office at Tatweer Towers, P.O. Box 75724, Riyadh 11588, Kingdom of Saudi Arabia. UBS Saudi Arabia is authorized and regulated by the Capital Market Authority to conduct securities business under license number 08113-37. **UAE / Dubai:** The information distributed by UBS AG Dubai Branch is only intended for Professional Clients and/or Market Counterparties, as classified under the DFSA rulebook. No other person should act upon this material/communication. The information is not for further distribution within the United Arab Emirates. UBS AG Dubai Branch is regulated by the DFSA in the DIFC. UBS is not licensed to provide banking services in the UAE by the Central Bank of the UAE, nor is it licensed by the UAE Securities and Commodities Authority. **United States:** Distributed to US persons by either UBS Securities LLC or by UBS Financial Services Inc., subsidiaries of UBS AG; or by a group, subsidiary or affiliate of UBS AG that is not registered as a US broker-dealer (a **'non-US affiliate'**) to major US institutional investors only. UBS Securities LLC or UBS Financial Services Inc. accepts responsibility for the content of a document prepared by another non-US affiliate when distributed to US persons by UBS Securities LLC or UBS Financial Services Inc. All transactions by a US person in the securities mentioned in this document must be effected through UBS Securities LLC or UBS Financial Services Inc., and not through a non-US affiliate. UBS Securities LLC is not acting as a municipal advisor to any municipal entity or obligated person within the meaning of Section 15B of the Securities Exchange Act (the "Municipal Advisor Rule"), and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of the Municipal Advisor Rule. **Canada:** Distributed by UBS Securities Canada Inc., a registered investment dealer in Canada and a Member-Canadian Investor Protection Fund, or by another affiliate of UBS AG that is registered to conduct business in Canada or is otherwise exempt from registration. **Mexico:** This report has been distributed and prepared by UBS Casa de Bolsa, S.A. de C.V., UBS Grupo Financiero, an entity that is part of UBS Grupo Financiero, S.A. de C.V. and is an affiliate of UBS AG. This document is intended for distribution to institutional or sophisticated investors only. Research reports only reflect the views of the analysts responsible for the reports. Analysts do not receive any compensation from persons or entities different from UBS Casa de Bolsa, S.A. de C.V., UBS Grupo Financiero, or different from entities belonging to the same financial group or business group of such. For Spanish translations of applicable disclosures, please see www.ubs.com/disclosures. **Brazil:** Except as otherwise specified herein, this material is prepared by UBS Brasil CCTVM S.A. to persons who are eligible investors residing in Brazil, which are considered to be: (i) financial institutions, (ii) insurance firms and investment capital companies, (iii) supplementary pension entities, (iv) entities that hold financial investments higher than R$300,000.00 and that confirm the status of qualified investors in written, (v) investment funds, (vi) securities portfolio managers and securities consultants duly authorized by Comissão de Valores Mobiliários (CVM), regarding their own investments, and (vii) social security systems created by the Federal Government, States, and Municipalities. **Hong Kong:** Distributed by UBS Securities Asia Limited and/or UBS AG, Hong Kong Branch. **Singapore:** Distributed by UBS Securities Pte. Ltd. [MCI (P) 007/09/2016 and Co. Reg. No.: 198500648C] or UBS AG, Singapore Branch. Please contact UBS Securities Pte. Ltd., an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110); or UBS AG, Singapore Branch, an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110) and a wholesale bank licensed under the Singapore Banking Act (Cap. 19) regulated by the Monetary Authority of Singapore, in respect of any matters arising from, or in connection with, the analysis or document. The recipients of this document represent and warrant that they are accredited and institutional investors as defined in the Securities and Futures Act (Cap. 289). **Japan:** Distributed by UBS Securities Japan Co., Ltd. to professional investors (except as otherwise permitted). Where this document has been prepared by UBS Securities Japan Co., Ltd., UBS Securities Japan Co., Ltd. is the author, publisher and distributor of the document. Distributed by UBS AG, Tokyo Branch to Professional Investors (except as otherwise permitted) in relation to foreign exchange and other banking businesses when relevant. **Australia:** Clients of UBS AG: Distributed by UBS AG (ABN 47 088 129 613 and holder of Australian Financial Services License No. 231087). Clients of UBS Securities Australia Ltd: Distributed by UBS Securities Australia Ltd (ABN 62 008 586 481 and holder of Australian Financial Services License No. 231098). This Document contains general information and/or general advice only and does not constitute personal financial product advice. As such, the Information in this document has been prepared without taking into account any investor's objectives, financial situation or needs, and investors should, before acting on the Information, consider the appropriateness of the Information, having regard to their objectives, financial situation and needs. If the Information contained in this document relates to the acquisition, or potential acquisition of a particular financial product by a 'Retail' client as defined by section 761G of the Corporations Act 2001 where a Product Disclosure Statement would be required, the retail client should obtain and consider the Product Disclosure Statement relating to the product before making any decision about whether to acquire the product. The UBS Securities Australia Limited Financial Services Guide is available at: www.ubs.com/ecs-research-fsg. **New Zealand:** Distributed by UBS New Zealand Ltd. UBS New Zealand Ltd is not a registered bank in New Zealand. You are being provided with this UBS publication or material because you have indicated to UBS that you are a "wholesale client" within the meaning of section 5C of the Financial Advisers Act 2008 of New Zealand (Permitted Client). This publication or material is not intended for clients who are not Permitted Clients (non-permitted Clients). If you are a non-permitted Client you must not rely on this publication or material. If despite this warning you nevertheless rely on this publication or material, you hereby (i) acknowledge that you may not rely on the content of this publication or material and that any recommendations or opinions in such this publication or material are not made or provided to you, and (ii) to the maximum extent permitted by law (a) indemnify UBS and its associates or related entities (and their respective Directors, officers, agents and Advisors) (each a 'Relevant Person') for any loss, damage, liability or claim any of them may incur or suffer as a result of, or in connection with, your unauthorised reliance on this publication or material and (b) waive any rights or remedies you may have against any Relevant Person for (or in respect of) any loss, damage, liability or claim you may incur or suffer as a result of, or in connection with, your unauthorised reliance on this publication or material. **Korea:** Distributed in Korea by UBS Securities Pte. Ltd., Seoul Branch. This document may have been edited or contributed to from time to time by affiliates of UBS Securities Pte. Ltd., Seoul Branch. This material is intended for professional/institutional clients only and not for distribution to any retail clients. **Malaysia:** This material is authorized to be distributed in Malaysia by UBS Securities Malaysia Sdn. Bhd (Capital Markets Services License No.: CMSL/A0063/2007). This material is intended for professional/institutional clients only and not for distribution to any retail clients. **India:** Distributed by UBS Securities India Private Ltd. (Corporate Identity Number U67120MH1996PTC097299) 2/F, 2 North Avenue, Maker Maxity, Bandra Kurla Complex, Bandra (East), Mumbai (India) 400051. Phone: +912261556000. It provides brokerage services bearing SEBI Registration Numbers: NSE (Capital Market Segment): INB230951431, NSE (F&O Segment) INF230951431, NSE (Currency Derivatives Segment) INE230951431, BSE (Capital Market Segment) INB010951437; merchant banking services bearing SEBI Registration Number: INM000010809 and Research Analyst services bearing SEBI Registration Number: INH000001204. UBS AG, its affiliates or subsidiaries may have debt holdings or positions in the subject Indian company/companies. Within the past 12 months, UBS AG, its affiliates or subsidiaries may have received compensation for non-investment banking securities-related services and/or non-securities services from the subject Indian company/companies. The subject company/companies may have been a client/clients of UBS AG, its affiliates or subsidiaries during the 12 months preceding the date of distribution of the research report with respect to investment banking and/or non-investment banking securities-related services and/or non-securities services. With regard to information on associates, please refer to the Annual Report at: http://www.ubs.com/global/en/about_ubs/investor_relations/annualreporting.html