



Automotive Semiconductor market tracker - post summer update

Auto semi growth continues to positively surprise, visibility appears to improve

Automotive semiconductor demand remains strong and continues to somewhat positively surprise with +12% y/y in Q2 (in \$) despite slowing Auto production. For Q3 we expect another good quarter with +11% followed by 11% again in Q4. We also take a first look at 2018 where we expect a continuation of the strong content increase trends while Auto units should only grow 1%. We expect 8% global \$ Auto semi growth with continued outperformance by companies with strong exposure to electrification and ADAS. Our industry conversations point to record amounts of order intake in these areas with recent contract awards for powertrain electrification having accelerated, providing improved visibility on growth also in 2019 and beyond. On this note, Infineon recently commented to see >2x the amount of electrified powertrain order intake compared to one year ago. Our top picks remain strongly exposed EV beneficiaries such as Infineon (also strong in ADAS), ON and Maxim (all Buy) while we remain cautious on STM's (Sell) so far underperforming Auto business despite good exposure to the electrification theme.

Impressive +12% y/y growth in Q2 and see Q3 at a strong +11% y/y

Q2 Auto Semi revenues of listed companies were in line with our expectations and grew +4% q/q, +12% y/y in Q2 (in USD vs DBE of +12% y/y). We saw low- to mid-single digit growth q/q at the large suppliers with TI growing +7%, STMicro +7%, Renesas (incl Intersil) +6%, NXP +4%, Infineon +1%, ON Semi (incl. FCS) flat, while ADI declined -6%. Among smaller suppliers, ROHM grew +13%, Melexis +7%, Elmos +1%, and NVIDIA +1%, while Xilinx and Maxim declined -3% and -1% respectively. For Q3, we expect +1% q/q and 11% y/y revenue growth for the overall industry.

Expect 12% 2017 Auto semi growth and see 8% in 2018

Strong demand momentum for ADAS features (radar, video) and EV/hybrid powertrain components continues to fuel Auto semiconductor growth with companies heavily exposed to these trends outgrowing the industry. We see 12% growth in Auto semis in 2017 (13% in 2016) and take a first look at 2018 where we model 8% followed by continued healthy (content-driven) growth beyond. While the broader Auto market continues to slow (+2% y/y global production global production growth in 2017e, +1% in 2018e), global premium car unit growth remains solid at +5% ytd (and +5% in August) which contributes positively to Auto semis growth (better mix). Normalizing production conditions in Japan following the early-2016 earthquake are also supportive.

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Companies featured

NVIDIA Corporation (NVDA.OQ),USD179.00	Hold
Xilinx Inc (XLNX.OQ),USD69.33	Hold
Texas Instruments (TXN.OQ),USD88.27	Hold
Infineon Technologies (IFXGn.DE),EUR20.89	Buy
Elmos (ELGG.DE),EUR22.59	Hold
Renesas Electronics (6723.T),¥1,265	Hold
STMicroelectronics (STM.PA),EUR16.37	Sell
NXP Semiconductors (NXPI.OQ),USD112.64	Hold
ON Semiconductor Corp (ON.OQ),USD17.64	Buy
Maxim Integrated (MXIM.OQ),USD46.93	Buy
Analog Devices (ADI.OQ),USD84.92	Hold

Source: Deutsche Securities Inc.

We value stocks in the sector on a P/E and/or EV/Sales basis, benchmarking the multiple vs. either peers and/or expected growth rates. Key sector risks are: A macro/ auto production slowdown and design and/ or market share losses.



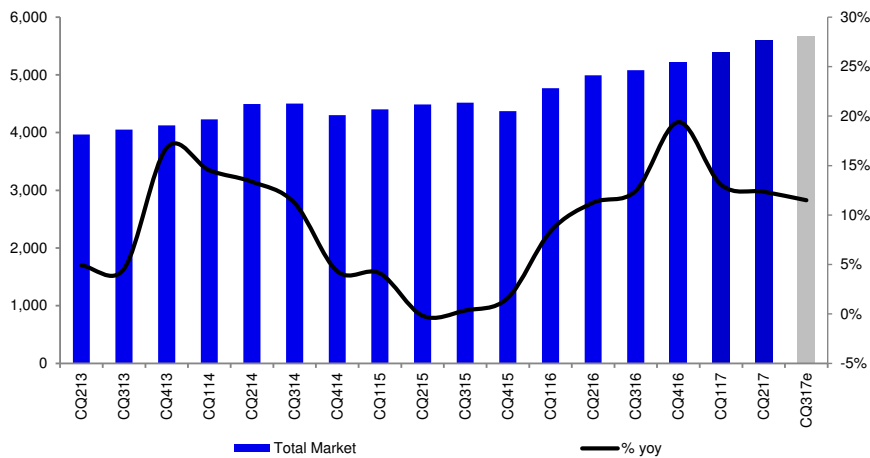
[Auto market slowdown remains 'under control', inventories remain healthy](#)

DB's Auto supply chain inventory tracker shows that at 8.6% of revenues, relative inventory levels at the major global automotive suppliers closed Q2 at levels slightly higher than Q1 (8.4%). Yet, this is relatively in line with the historical average of 8.5% and we continue to view the situation as healthy. We expect global auto demand to increase by +2% in 2017 with production also in-balance at 2% y/y. We retain our view that the Auto market slowdown remains fairly well controlled as Europe and China compensate for the weaker US.



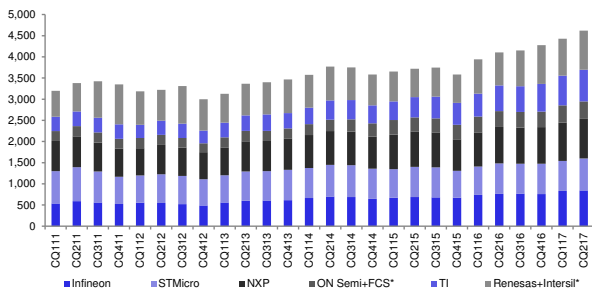
Revenues +12% y/y in Q2 and +11% y/y in Q3e

Figure 1: Q2 +4% q/q; +1%q/q implied from Q3 guides



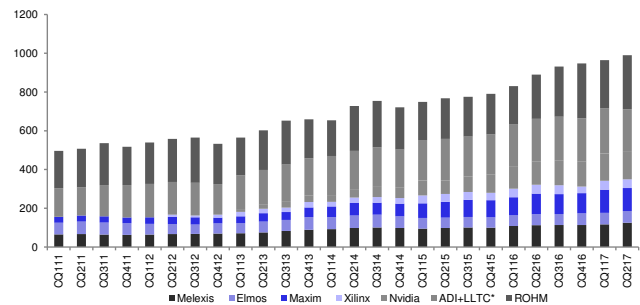
Source: Company data, Deutsche Bank estimates, Company guidance

Figure 2: Tier-1 auto semi players



Source: Company data, Deutsche Bank, (in US\$ m); *- ADI+LLTC PF numbers, Intersil acquired by Renesas on 24 February 2017 (Renesas+ISIL PF numbers)

Figure 3: Tier-2 auto semi players



Source: Company data, Deutsche Bank, (in US\$ m); * ADI+LLTC PF numbers



+1% q/q implied from Q3/17 auto semi guidance

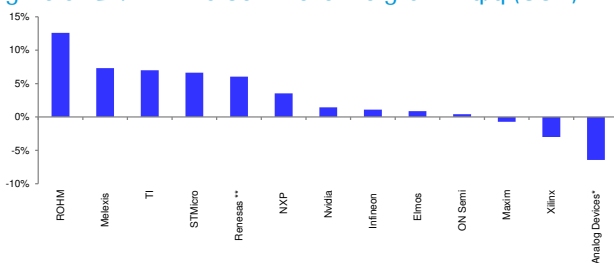
Figure 4: Auto semi vendors Q3/17 guide

Company	Group revenue guidance	Auto revenue guidance
Infineon	flat q/q	DBe -1%q/q
ST Micro	+9.0% q/q +/- 3.5pts	DBe +4%q/q
ON Semi	flat to +4% q/q	Automotive flat q/q
Maxim	-1% to -8% q/q implied	Automotive down q/q
Analog Devices	+1% to +8% q/q implied	Auto up q/q
Auto Semi market (DBe)		1% q/q

Source: Deutsche Bank, Company data

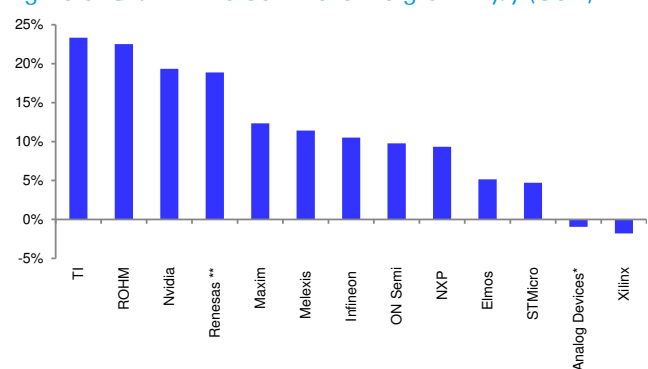
Q2/17 Auto Semi revenue performance

Figure 5: Q2/17 Auto Semi revenue growth q/q (USD)



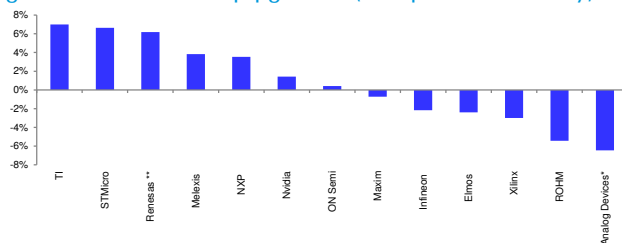
Source: Company data; ADI calendarized; Growth when revenues converted to US\$ *- ADI+LLTC PF numbers; **Intersil acquired by Renesas on 24 February 2017

Figure 6: Q2/17 Auto Semi revenue growth y/y (USD)



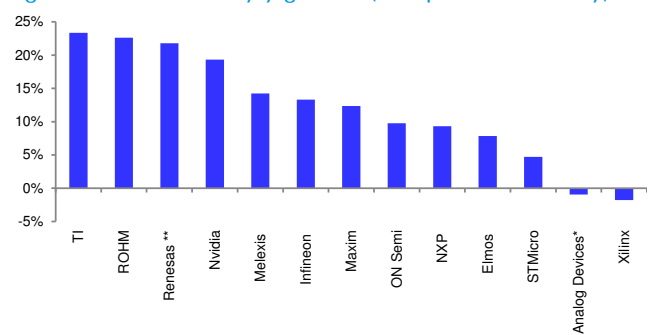
Source: Company data; ADI calendarized; Growth when revenues converted to US\$ *- ADI+LLTC PF numbers; **Intersil acquired by Renesas on 24 February 2017

Figure 7: Q2/17 Auto q/q growth (in reported currency)



Source: Company data; Note ADI calendarized *- ADI+LLTC PF numbers; **Intersil acquired by Renesas on 24 February 2017

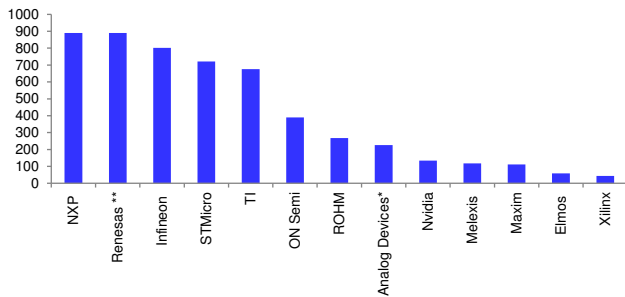
Figure 8: Q2/17 Auto y/y growth (in reported currency)



Source: Company data; Note ADI calendarized *- ADI+LLTC PF numbers; **Intersil acquired by Renesas on 24 February 2017

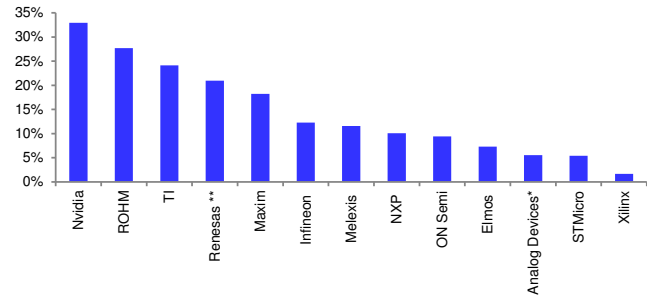


Figure 9: Auto Semi LTM sales quarterly average (USDm)



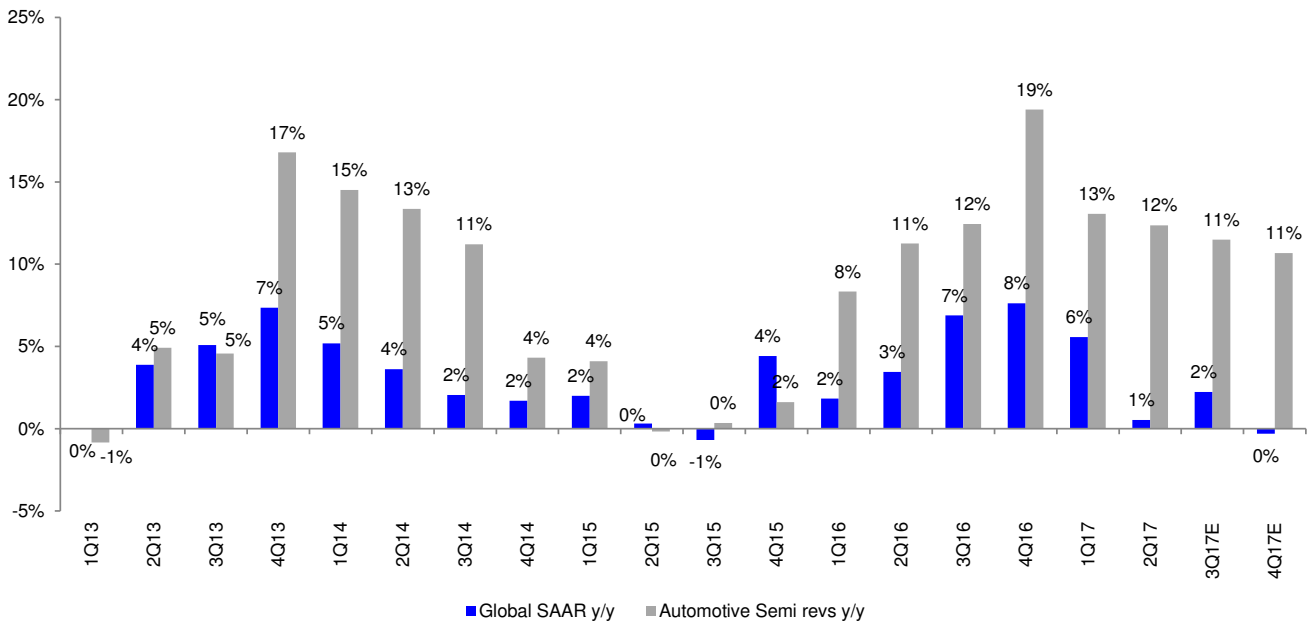
Source: Company data, Deutsche Bank, Note ADI calendarized *- ADI+LLTC PF numbers; **Intersil acquired by Renesas on 24 February 2017

Figure 10: LTM revenue y/y growth (USD)



Source: Company data, Deutsche Bank, Note ADI calendarized *- ADI+LLTC PF numbers; **Intersil acquired by Renesas on 24 February 2017

Figure 11: Global Auto semi revenues vs Global SAAR – outperformance to continue

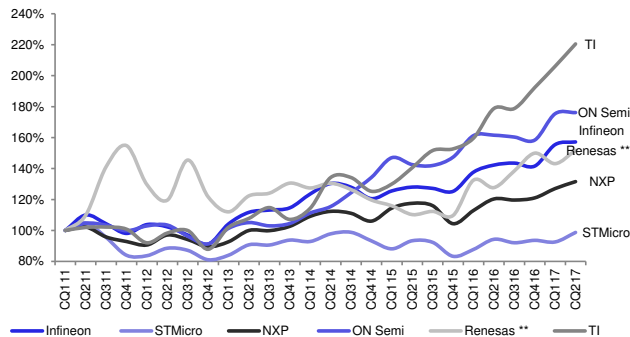


Source: Company data, IHS, Deutsche Bank estimates; Content gain = Automotive semi revs (y/y) – Global SAAR (y/y); average Q1/13 – Q4/17E= 5.5%



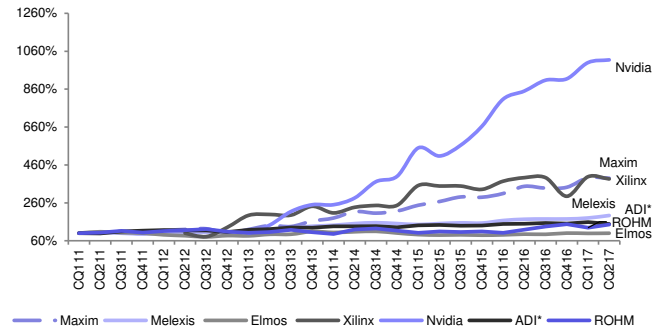
So who's gained share over time?

Figure 12: TI, ON Semi and Infineon gained share while STMicro underperforms



Source: Company data, Deutsche Bank, ** Intersil acquired by Renesas on 24 February 2017 (Renesas +ISIL PF numbers)

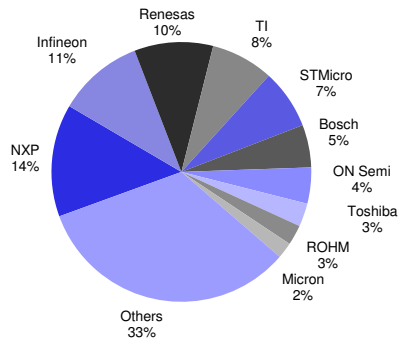
Figure 13: NVIDIA remains strong, Elmos underperforming



Source: Company data, Deutsche Bank, Note ADI figure calendarized *- ADI+LLTC PF numbers;

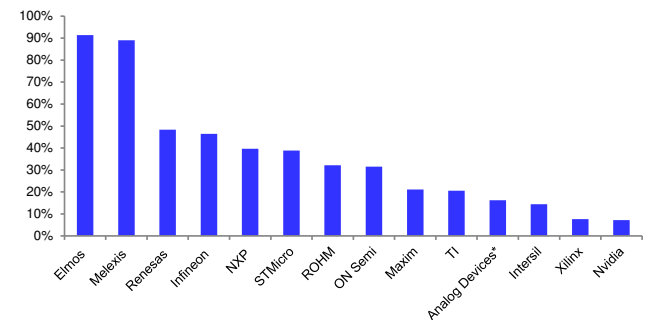
Autos Semis sales exposure and market share by product

Figure 14: Automotive semiconductor supplier share



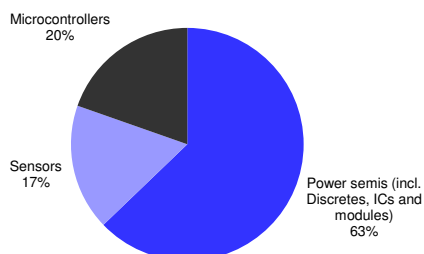
Source: Infineon, company data, Strategy Analytics

Figure 15: Automotive as percentage of total sales



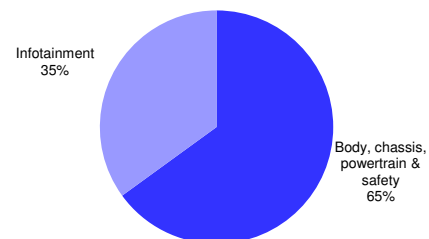
Source: Deutsche Bank, company data *- ADI+LLTC PF numbers; Note Intersil acquired by Renesas on 24 February 2017

Figure 16: Infineon ATV revenue split by product group



Source: Company data (2016)

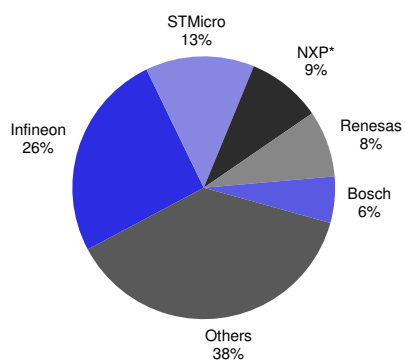
Figure 17: STMicro Auto revenue split by product vertical



Source: Company data (2014)

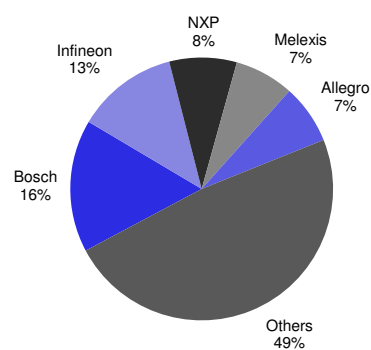


Figure 18: Market share in Auto power semis



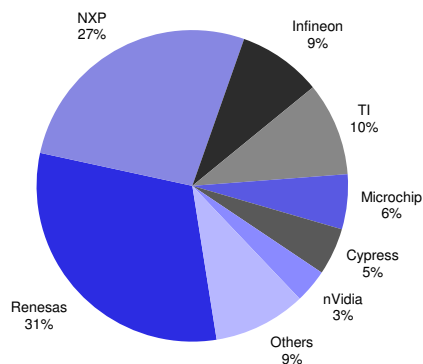
Source: Infineon, company data, Strategy Analytics (2016); * NXP's Standard Product business closed on 16th Feb 2017, hence included in 2016 rankings

Figure 19: Market share in Auto sensors



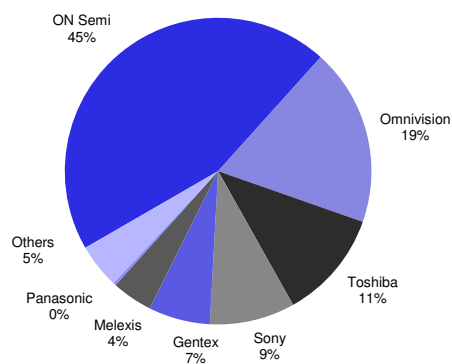
Source: Infineon, company data, Strategy Analytics (2016)

Figure 20: Market share in Auto Microcontrollers



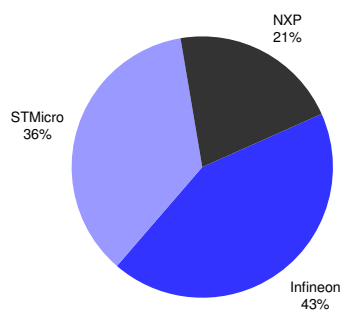
Source: Infineon, company data (2016)

Figure 21: Market share in Auto CMOS sensors



Source: Company data (2015)

Figure 22: Radar sensor market share



Source: Infineon, STMicro, company data, Deutsche Bank (2015)



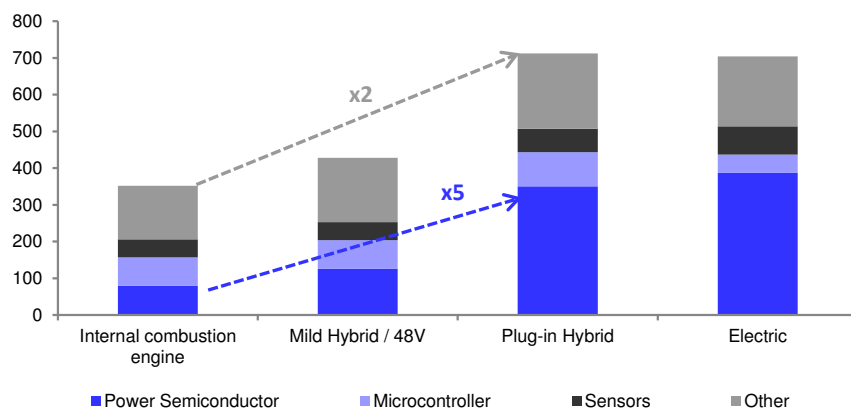
Figure 23: End market exposure of the automotive semiconductor suppliers

Company	Major automotive semiconductor products/End market area
Infineon	Number 1 in Power semis, also strong in Microcontrollers and Sensors (e.g. radar, hall)
STMicroelectronics	Infotainment & Connectivity, Power semis, Body, Chassis & Safety
NXP	Auto infotainment, In-vehicle networking, Auto access/security, Sensors (radar, magnetic) and Microcontrollers
Analog Devices	ADAS, Infotainment, Powertrain, Body and Chassis & Safety
Elmos	Sensors, Motor control, Embedded systems
Melexis	Actuators, Analog and digital semiconductors, Sensors, Smart motor drivers
Renesas*	Number 1 in Microcontrollers, also present in powertrain, safety, chassis & safety, Camera Video signal processing, Power systems
Maxim	Serial Link, LED Lighting, Smart Key, Infotainment, Sensors, High-Integration Power, EV battery
Xilinx	Auto-grade programmable SoCs, FPGAs
NVIDIA	Infotainment and navigation, ADAS, Rear seat entertainment, Digital instrument clusters
ON Semi	Powertrain, Infotainment, ADAS, Park Assist, Image sensors, LED Lighting
Texas Instruments	Passive safety, Infotainment, ADAS, Powertrain, Lighting and body electronics
ROHM	High exposure to audio/infotainment, also HVAC control, body, electronic power steering, battery management/charging

Source: Company data, Deutsche Bank; *Intersil acquired by Renesas on 24 February 2017

Automotive semi content increasing meaningfully

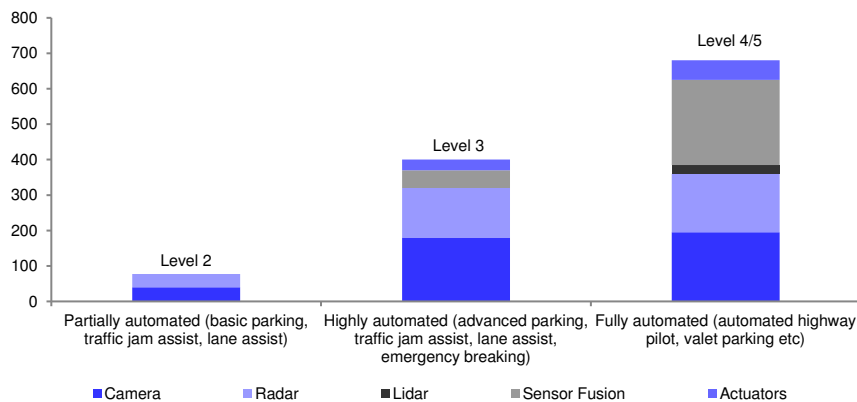
Figure 24: Semiconductor content per car (\$) – power semis x5 with plug-in/
EV



Source: Company data, Deutsche Bank



Figure 25: Incremental ADAS semiconductor content per level of automation (\$)



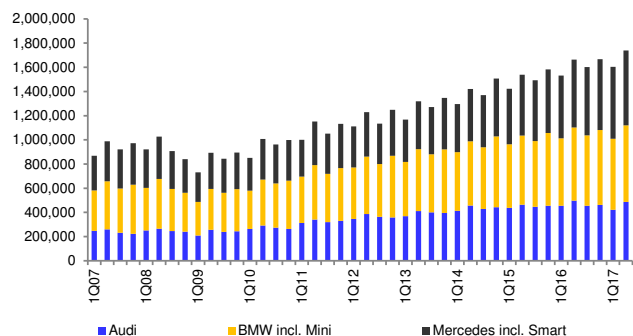
Source: Deutsche Bank, Company data ADAS – Advanced Driver Assistance Systems

Premium car segment – demand remains resilient

- Premium unit growth momentum maintained (ytd):** Growth in the premium segment (Audi, BMW, Mercedes) continues to stand at +5% ytd. In Q3/17 thus far, July and August growth stands at +5% and +5.5%, respectively. This supports our view of a relatively resilient global demand picture for premium cars which has a positive mix impact on overall average semi content per car.
- Infineon most exposed to premium OEMs:** Premium cars have a significantly above-average semiconductor content of >\$500 vs the average car at ~\$300-350. We hence deem it particularly important to monitor this market. Among our semiconductor automotive suppliers Infineon is most exposed to the premium manufacturers, i.e., BMW, Audi, Mercedes and VW. By contrast ST is somewhat more exposed to the volume manufacturers. We note the premium car segment has posted a unit CAGR of ~8% over the last three years. This compares with the overall car market where units have only grown at ~3%. We see a similar trend reflected in revenues posted by Infineon vs ST where the CY13-16 revenue CAGR for Infineon is 18% (partially due to IRF) vs ST at 4%. However, a good part of this outperformance is also owed to Infineon's structurally better product positioning.

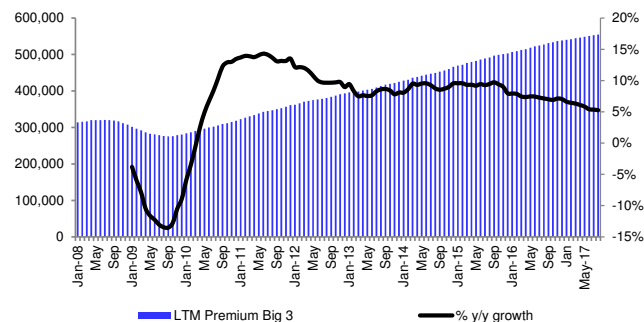


Figure 26: Premium 3 (BMW, Audi, Mercedes) shipments



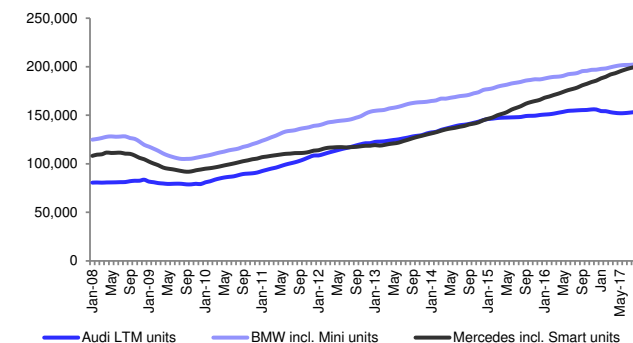
Source: Company data

Figure 27: Shipments up +5% y/y in Q1'17, +5% y/y YTD (Jan to May'17)



Source: Company data

Figure 28: Mercedes is gaining momentum in premium, BMW still leads

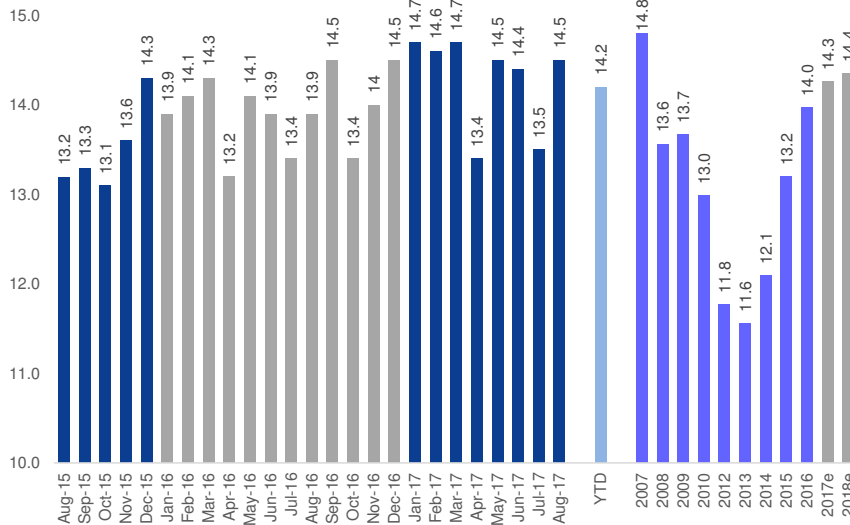


Source: Company data



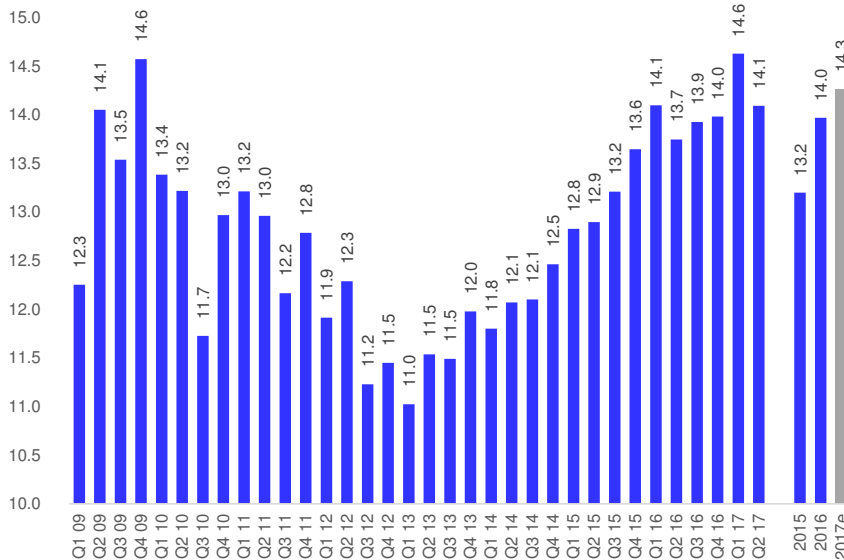
Global car sales and production trends

Figure 29: Europe SAAR on a monthly basis (Jan '15 –May'17) and full year estimates



Source: Deutsche Bank, LMC Automotive

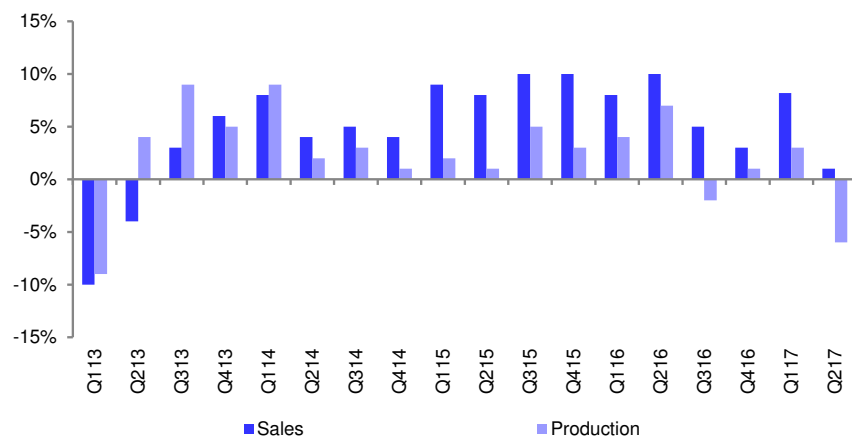
Figure 30: Europe SAAR on a quarterly basis (Q1 09 – Q2 17) – in m units



Source: Deutsche Bank, LMC Automotive

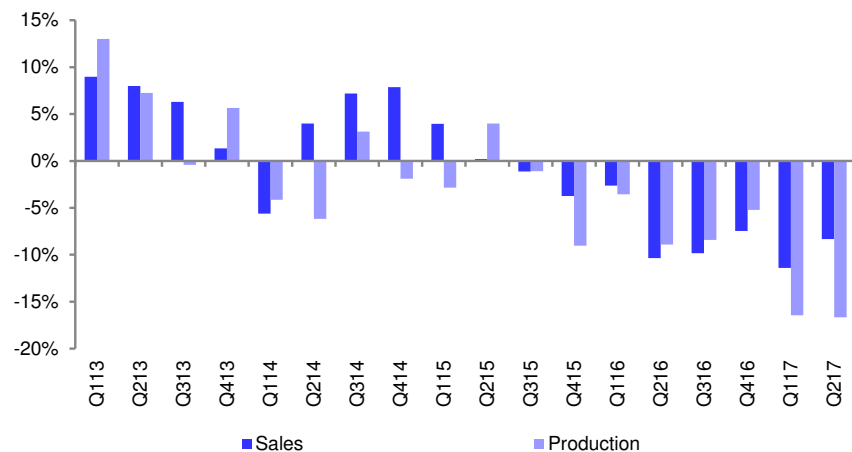


Figure 31: European car sales are outgrowing a declining production



Source: Company data, Deutsche Bank, ACEA; "European Registrations – A better month partially impacted by extra days, dated 06 June 2017"

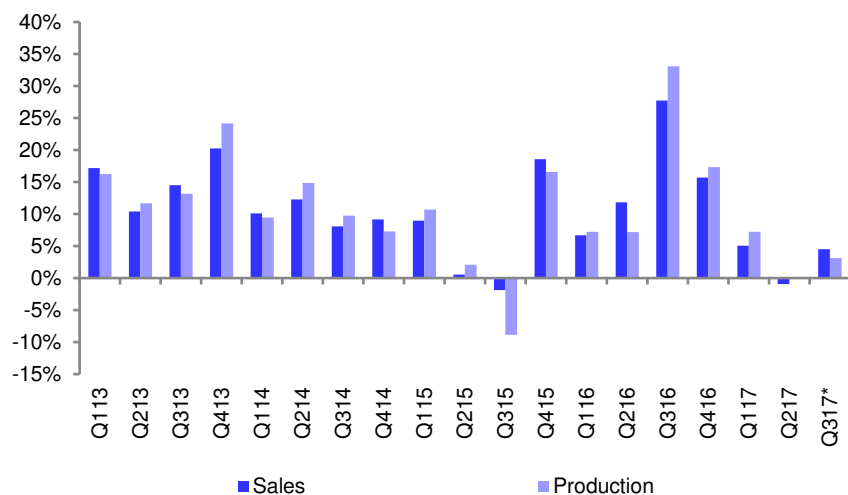
Figure 32: US car production has reduced more than sales in Q2



Source: Deutsche Bank, BEA, DataStream



Figure 33: China passenger car sales and production trends are fairly balanced

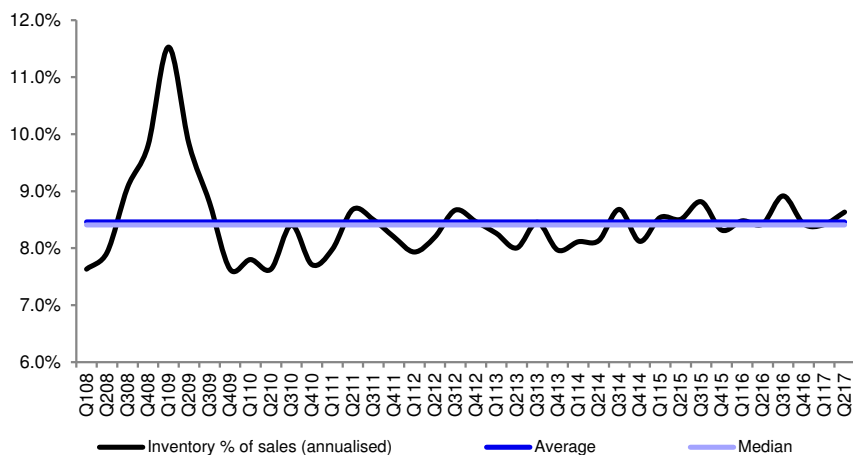


Source: Company data, Deutsche Bank, CAAM, DataStream, * based on July and August data



Auto supplier inventories have somewhat reduced recently

Figure 34: Auto supplier inventories appear fairly healthy compared to history



Source: Company data, FactSet

DB global car production forecast - slow growth continues

Figure 35: Global car production trends 2010-20e

	2010	2011	2012	2013	2014	2015	2016	2017E	2018E	2019E	2020E
North America	11,941	13,125	15,534	16,177	17,030	17,496	17,824	17,352	17,510	17,670	18,680
Europe	19,027	20,183	19,299	19,498	20,149	20,935	21,537	22,244	22,450	22,510	22,890
China	17,120	17,613	18,569	21,257	22,984	24,023	27,370	27,599	27,870	29,460	30,440
Japan/Korea	13,302	12,478	13,928	13,496	13,669	13,266	12,914	13,470	13,020	12,740	12,570
South Asia	6,626	6,856	8,257	8,199	7,776	7,979	8,415	8,657	9,165	9,700	10,580
South America	4,176	4,322	4,291	4,535	3,819	3,073	2,741	3,115	3,420	3,490	3,790
Other	2,183	2,287	1,661	1,560	1,952	1,965	2,308	2,486	2,710	2,890	3,080
Global	74,375	76,864	81,539	84,722	87,379	88,737	93,109	94,923	96,145	98,460	102,030
YoY %											
North America		10%	18%	4%	5%	3%	2%	-3%	1%	1%	6%
Europe		6%	-4%	1%	3%	4%	3%	3%	1%	0%	2%
China		3%	5%	14%	8%	5%	14%	1%	1%	6%	3%
Japan/Korea		-6%	12%	-3%	1%	-3%	-3%	4%	-3%	-2%	-1%
South Asia		3%	20%	-1%	-5%	3%	5%	3%	6%	6%	9%
South America		3%	-1%	6%	-16%	-20%	-11%	14%	10%	2%	9%
Other		5%	-27%	-6%	25%	1%	17%	8%	9%	7%	7%
Global		3%	6%	4%	3%	2%	5%	2%	1%	2%	4%

Source: Deutsche Bank, IHS Automotive



DB global car demand forecast

Figure 36: Global demand trends (2007-18e) - in-balance with production growth

(units '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017e	2018e
N. America	18,833	15,849	12,613	13,928	15,221	17,105	18,333	19,433	20,641	21,015	20,660	20,360
YoY %	-2%	-16%	-20%	10%	9%	12%	7%	6%	6%	2%	-2%	-1%
o/w USA	16,089	13,195	10,402	11,556	12,734	14,450	15,593	16,452	17,396	17,465	17,000	16,700
YoY %	-3%	-18%	-21%	11%	10%	13%	8%	6%	6%	0%	-3%	-2%
EU 28	18,235	16,771	15,914	15,305	15,245	13,968	13,777	14,602	15,982	17,120	17,620	17,770
YoY %	2%	-8%	-5%	-4%	0%	-8%	-1%	6%	9%	7%	3%	1%
Japan	5,353	5,082	4,609	4,956	4,210	5,370	5,375	5,562	5,046	4,970	5,270	5,250
YoY %	-7%	-5%	-9%	8%	-15%	28%	0%	3%	-9%	-2%	6%	0%
China	8,078	8,768	12,988	17,240	18,002	19,205	21,875	23,629	24,893	28,021	28,530	29,670
YoY %	20%	9%	48%	33%	4%	7%	14%	8%	5%	13%	2%	4%
India	1,710	1,747	2,065	2,714	2,933	3,193	2,929	2,931	3,124	3,349	3,680	4,200
YoY %	18%	2%	18%	31%	8%	9%	-8%	0%	7%	7%	10%	14%
Brazil + Argentina	2,921	3,309	3,554	3,959	4,246	4,449	4,494	3,979	3,085	2,667	2,830	2,940
YoY %	28%	13%	7%	11%	7%	5%	1%	-11%	-22%	-14%	6%	4%
Russia	2,594	2,916	1,469	1,879	2,646	2,938	2,777	2,492	1,603	1,426	1,540	1,630
YoY %	35%	12%	-50%	28%	41%	11%	-5%	-10%	-36%	-11%	8%	6%
ASEAN	1,607	1,816	1,639	2,231	2,346	3,208	3,255	2,890	2,700	2,730	2,920	3,160
YoY %	4%	13%	-10%	36%	5%	37%	1%	-11%	-7%	1%	7%	8%
S. Korea	1,272	1,215	1,447	1,556	1,580	1,542	1,539	1,622	1,798	1,784	1,780	1,800
YoY %	6%	-4%	19%	8%	2%	-2%	0%	5%	11%	-1%	0%	1%
Other	9,755	8,536	8,369	9,835	10,358	10,089	10,059	10,177	10,293	10,099	10,440	10,750
Global	70,359	66,009	64,668	73,603	76,787	81,067	84,413	87,317	89,165	93,181	95,270	97,530
YoY %	5%	-6%	-2%	14%	4%	6%	4%	3%	2%	5%	2%	2%
o/w												
BRICS	15,303	16,740	20,076	25,792	27,827	29,785	32,075	33,031	32,705	35,463	36,580	38,440
YoY %	24%	9%	20%	28%	8%	7%	8%	3%	-1%	8%	3%	5%
Mature markets (US, EU and Japan)	39,678	35,048	30,925	31,817	32,189	33,788	34,745	36,616	38,424	39,555	39,890	39,720
YoY %	-1%	-12%	-12%	3%	1%	5%	3%	5%	5%	3%	1%	0%
BRICS % global sales	22%	25%	31%	35%	36%	37%	38%	38%	37%	38%	38%	39%
Mature markets % global sales	56%	53%	48%	43%	42%	42%	41%	42%	43%	42%	42%	41%

Source: Deutsche Bank, LMC

Figure 37: Automotive semiconductor revenues

All in USD m	CO114	CO214	CO314	CO414	CO115	CO215	CO315	CO415	CO116	CO216	CO316	CO416	CO117	CO217	CO317e	CO417e
Infineon	663	699	687	647	674	687	683	672	739	763	770	760	834	844	888	897
y/y %	19%	17%	13%	5%	2%	-2%	-1%	4%	10%	11%	13%	13%	13%	11%	15%	18%
q/q %	8%	5%	-2%	-6%	4%	2%	-1%	-1%	10%	3%	1%	-1%	10%	1%	5%	1%
STMicro	710	748	756	713	674	714	706	637	671	721	704	716	708	755	785	832
y/y %	11%	8%	9%	-1%	-5%	-5%	-7%	-11%	0%	1%	0%	12%	6%	5%	12%	16%
q/q %	-7%	5%	1%	-6%	-5%	6%	-1%	-10%	5%	7%	-2%	2%	-1%	7%	4%	6%
NXP	778	801	792	756	816	838	827	744	805	858	853	863	906	938	919	919
y/y %	18%	12%	11%	3%	5%	5%	4%	-2%	1%	2%	3%	16%	13%	9%	8%	7%
q/q %	6%	3%	-1%	-5%	8%	3%	-1%	-10%	8%	7%	-1%	1%	5%	4%	-2%	0%
ADI+LLTC*	202	201	204	194	209	213	207	208	221	222	227	224	235	220	245	255
y/y %	16%	12%	6%	2%	4%	6%	2%	7%	6%	4%	10%	8%	6%	-1%	8%	14%
q/q %	6%	0%	1%	-5%	7%	2%	-3%	1%	6%	0%	2%	-1%	5%	-6%	12%	4%
Elmos	62	65	66	61	56	54	55	54	55	57	57	60	60	60	66	72
y/y %	21%	14%	16%	-8%	-11%	-16%	-17%	-11%	-2%	6%	3%	12%	9%	5%	16%	20%
q/q %	-5%	3%	2%	-8%	-8%	-3%	2%	-2%	2%	4%	-1%	7%	-1%	1%	9%	10%
Melexis	92	98	101	98	95	98	101	100	109	113	114	114	117	126	135	143
y/y %	30%	30%	22%	10%	3%	0%	0%	2%	15%	15%	13%	14%	8%	11%	18%	26%
q/q %	4%	6%	3%	-3%	-3%	4%	3%	-1%	9%	4%	1%	0%	3%	7%	7%	6%
Renesas+Intersil*	777	796	771	730	707	673	685	669	808	779	845	915	873	926	946	951
y/y %	14%	7%	2%	-8%	-9%	-16%	-11%	-8%	14%	16%	23%	37%	8%	19%	12%	4%
q/q %	-2%	2%	-3%	-5%	-3%	-5%	2%	-2%	21%	-4%	8%	8%	-5%	6%	2%	1%
QI Semi+FCS*	269	268	289	312	342	331	330	343	375	378	373	368	408	410	410	410
y/y %	10%	21%	21%	28%	32%	23%	14%	10%	10%	13%	13%	7%	9%	9%	10%	11%
q/q %	6%	4%	8%	8%	9%	3%	0%	4%	9%	0%	-1%	-1%	11%	0%	0%	0%
Maxim	55	65	62	66	75	81	88	88	94	105	102	104	119	118	116	117
y/y %	50%	52%	52%	33%	38%	25%	42%	34%	25%	30%	16%	18%	27%	12%	13%	13%
q/q %	10%	19%	-4%	5%	14%	8%	9%	-1%	7%	12%	-3%	1%	15%	-1%	-2%	1%
Xilinx	24	28	29	29	41	41	41	39	44	46	46	46	34	46	48	53
y/y %	7%	19%	26%	2%	70%	47%	42%	34%	6%	13%	13%	-11%	6%	-2%	5%	54%
q/q %	-14%	14%	4%	0%	42%	-1%	0%	-5%	13%	5%	0%	-25%	35%	-3%	7%	10%
Nvidia	35	40	52	56	77	71	79	93	113	119	127	128	140	142	142	142
y/y %	150%	100%	73%	60%	120%	78%	52%	66%	47%	68%	61%	38%	24%	19%	12%	11%
q/q %	0%	14%	30%	8%	38%	-8%	11%	18%	22%	5%	7%	1%	9%	1%	0%	0%
TI	388	455	455	425	441	477	514	518	541	606	606	652	699	748	703	696
y/y %	12%	24%	17%	17%	14%	5%	13%	22%	23%	27%	18%	26%	29%	23%	16%	7%
q/q %	7%	17%	0%	-7%	4%	8%	8%	1%	5%	12%	0%	8%	7%	7%	-6%	-1%
ROHM	184	221	217	197	210	205	209	196	228	259	259	283	248	279	264	291
y/y %	4%	13%	6%	7%	7%	-9%	-15%	-4%	-1%	8%	27%	36%	27%	23%	2%	3%
q/q %	-9%	26%	4%	-10%	-9%	7%	-3%	2%	-6%	16%	14%	9%	-13%	13%	-5%	10%
Total Market	4,229	4,496	4,504	4,304	4,403	4,488	4,520	4,374	4,770	4,993	5,083	5,222	5,393	5,610	5,687	5,779
% qoq	3%	6%	0%	-4%	2%	2%	1%	-3%	5%	5%	2%	3%	3%	4%	1%	2%
% yoy	15%	13%	11%	4%	4%	0%	0%	2%	8%	11%	12%	19%	13%	12%	11%	11%

Source: : Company data, Deutsche Bank, ADI numbers calendarized. Note Intersil acquired by Renesas on 24 February 2017 *pre-deal numbers are PF DB/Company data



Appendix 1

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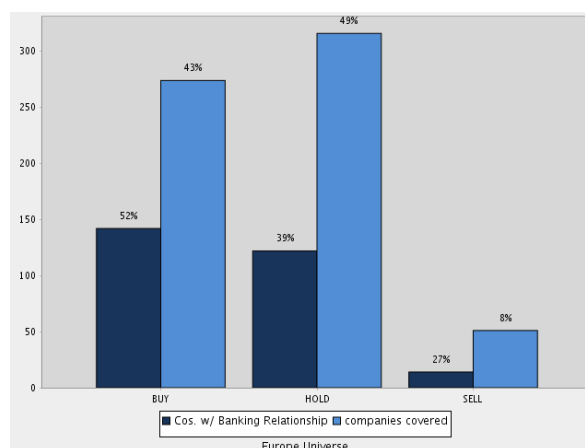
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