

UBS Global I/O

Global Semiconductors and Semi Equipment

Updating Capex/WFE Model; C2022 Now ~\$91B

Equities

Global
Semiconductors

Updating our WFE and WFE run-rate analysis post earnings season

With all SPE suppliers having reported + guided CQ2 w/some 2H commentary, we are raising our C2021E WFE from \$75B to \$83.2B (+39% Y/Y) and C2022E from ~\$82B to ~\$91B (still up ~9% Y/Y but off a higher base). We estimate CQ1:21 WFE was ~\$19.5B w/CQ2 up to ~\$20.5B and CQ3/CQ4 stepping up to ~\$21.5B/~\$21.7B each. For 2022, we see WFE stepping up again slightly H/H to \$46B for 1H22. We are rolling a new C2023 WFE estimate of \$84B, or -7% Y/Y as channel inventories are filled and WFE intensity comes off slightly but remains buttressed by the onset of subsidy-driven fab capacity adds and a strong OP pool (see below). Given a strong correlation between WFE run-rate and stocks, this should translate to a generally supportive backdrop w/a slight upward bias through the rest of '21. By segment, we feel that DRAM, NAND and foundry/logic will all be up about in-line w the market this year but DRAM & foundry/logic to out-grow in '22 w/NAND likely flat but remaining at a high level. For '23, we see the largest declines apt to be in the DRAM segment. Against our new semis revenue estimates of ~\$537B (+22% Y/Y) and ~\$622B (+16% Y/Y) for '21 and '22 respectively, this implies WFE intensity of ~15.5% for '21 falling to ~14.6% in '22 as semis grow faster than SPE on channel inventory fill. For '23, we model WFE intensity to compress to ~13.6% amid a semiconductor revenue outlook of about flat Y/Y. This is broadly consistent w/AMAT's 14% WFE intensity assumption for its '24 financial model. However, because the aggregate OpM of the semiconductor industry looks set to expand to ~36% in '22 (up from ~21% and ~24% in '19 and '20 respectively); WFE, even at ~\$90B+ looks set to fall to near 10yr lows relative to chip industry OP in '22 (see Figure 29). We are modeling WFE to come off slightly in '23, but this factor combined with the backdrop of subsidies should buttress WFE on the downside + add more stability for equipment company revenue - a factor that we have probably under-appreciated to date and been too cautious on AMAT in particular as a result.

Raising estimates & PTs for SPE suppliers on higher WFE; continue to favor LRCX on EPS upside

Rolling higher WFE through our models, C2022E EPS goes to \$7.93 for AMAT, \$18.13 for KLAC, and \$41.42 for LRCX. This assumes that both AMAT + LRCX gains a few 10's of bps WFE share in '21 and maintain share in '22 (20-20.5% range for AMAT, 13.5-14% range for LRCX) and KLAC share remains largely static in the ~6.0% range. Relative to Street estimates, we are now ~4% and ~6% above for AMAT and KLAC respectively, but ~15% above on LRCX. From a high level, this broadly backs our contention coming out of earnings season that expectations are already triangulating toward a \$90B WFE number next year but estimates still seem the most offside for LRCX - thus why we continue to favor the stock. NAND capex will inevitably come under pressure at some point, but we think it will stay "stronger for longer". Using 18x for both LRCX and AMAT and 19x for KLAC: PTs go from \$725 to \$745 for LRCX (Buy), \$130 to \$140 for AMAT (Neutral), and unchanged at \$345 for KLAC. These multiples are all consistent with the 2yr median that each have traded v the S&P500 with the exception of AMAT where we are providing an extra 1x accommodation due to display coming off a cyclical bottom.

Globally preferred stocks

In the US, we prefer LRCX but rate other major SPE suppliers Neutral as we see some pullback in the WFE run-rate in the next few Qs. In Europe, we rate ASML Neutral. In

Timothy Arcuri

Analyst
timothy.arcuri@ubs.com
+1-415-352 5676

Nicolas Gaudois

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

Kenji Yasui

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

Munjal Shah

Analyst
munjal.shah@ubs.com
+1-212-713 2113

Sunny Lin

Analyst
sunny.lin@ubs.com
+886-2-8722 7346

Francois-Xavier Bouvignies

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

Taewoo Lee

Analyst
taewoo.lee@ubs.com
+852-2971 6873

Diana Chang

Analyst
diana.chang@ubs.com
+1-212-713 1474

Jimmy Yoon

Associate Analyst
jimmy.yoon@ubs.com
+852-3712 4671

Jason Park

Associate Analyst
jason.s.park@ubs.com
+1-212-713 8728

APAC, we prefer Tokyo Electron and Eugene Tech.

WFE forecasts and share by supplier

Following reports from all chipmakers and SPE suppliers, we have updated our global capex and WFE model. We now estimate C2021 WFE of ~\$83.2B or +39% y/y (from \$75.0B) consisting of \$40.0B memory (\$18.4B DRAM (+39% Y/Y), \$21.7B NAND (+37% Y/Y) and \$43.2B foundry/logic (+40% Y/Y). For C2022E, DRAM, NAND, and foundry/logic WFE appear likely ~\$1.8B, ~\$1.0B, and ~\$6.2B higher than our prior model. Ergo, our full-year 2022 assumptions increase from \$81.75B to \$90.75B (+9.1% Y/Y) consisting of memory +6% (driven mostly by DRAM +13% Y/Y) and foundry/logic +12%. Looking into C2023, we estimate WFE of ~\$84.0B or down 7.4% Y/Y consisting of \$38.2B memory (down 10% Y/Y with DRAM down 12% Y/Y and NAND down 8%) and \$45.8B foundry/logic (down 6% Y/Y).

Among major spenders, we estimate Samsung spends ~\$24.6B WFE this year and ~\$26.2B/\$23.9B WFE in C2022/2023E. For YMTC, we model a steady ramp from ~\$1.0B 2019, \$2.25B 2020, to \$3.0B/\$3.0B in 2021/22. Hynix we model ~\$7.2B this year and up to \$8.5B/\$7.7B in 2022/23. We model TSMC WFE to go up from \$10.7B in 2020 to \$18.1B/\$19.0B/\$17.4B in 2021/22/23 and model INTC WFE spendings at at \$11.0B/\$13.0B in 2021/22.

On a bottom up basis (Figure 2), the largest changes to our forecasts are increases for both C2021 and C2022 at Samsung, increases in WFE in both years from INTC, increases in both years (albeit smaller magnitude) at TSMC, and increases at smaller players like UMC and GlobalFoundries.

Figure 1: Summary of capex/WFE forecast and capital intensity metrics

Semis Capex

SMM	2016	2017	2018	2019	2020	2021E	2022E	2023E
Memory Total	28,639	43,205	55,225	41,189	47,010	58,301	61,106	57,503
DRAM	9,398	16,364	25,053	17,816	23,790	27,877	31,824	29,431
NAND/non-volatile other	19,241	26,840	30,172	23,373	23,221	30,424	29,282	28,072
Large non Memory IDMs	10,761	12,885	14,692	18,960	16,384	23,359	23,182	22,226
Tier-one/two foundries	20,475	23,627	20,137	25,340	35,125	50,193	55,289	56,702
Other & SATS	10,517	12,365	16,746	16,122	19,049	25,027	26,362	26,624
Total	70,392	92,082	106,800	101,611	117,569	156,881	165,939	163,055
Capex YoY %								
Memory Total	11.3%	50.9%	27.8%	-25.4%	14.1%	24.0%	4.8%	-5.9%
DRAM	-24.3%	74.1%	53.1%	-28.9%	33.5%	17.2%	14.2%	-7.5%
NAND/non-volatile other	44.6%	39.5%	12.4%	-22.5%	-0.7%	31.0%	-3.8%	-4.1%
Large non Memory IDMs	-7.0%	19.7%	14.0%	29.1%	-13.6%	42.6%	-0.8%	-4.1%
Tier-one/two foundries	7.3%	15.4%	-14.8%	25.8%	38.6%	42.9%	10.2%	2.6%
Total	8.8%	30.8%	16.0%	-4.9%	15.7%	33.4%	5.8%	-1.7%
Segment % of total								
Memory Total	40.7%	46.9%	51.7%	40.5%	40.0%	37.2%	36.8%	35.3%
DRAM	13.4%	17.8%	23.5%	17.5%	20.2%	17.8%	19.2%	18.0%
NAND/non-volatile other	27.3%	29.1%	28.3%	23.0%	19.8%	19.4%	17.6%	17.2%
Logic	15.3%	14.0%	13.8%	18.7%	13.9%	14.9%	14.0%	13.6%
Foundries ex DRAM	29.1%	25.7%	18.9%	24.9%	29.9%	32.0%	33.3%	34.8%
Semis revenue, SMM								
Memory Total	76,769	123,974	157,967	106,432	117,342	158,415	218,904	181,077
DRAM	41,179	72,802	99,308	62,475	64,152	97,866	146,759	123,935
NAND/non-volatile other	32,023	47,227	54,227	40,180	49,454	56,600	68,196	53,193
other	3,573	3,944	4,273	3,777	3,736	3,949	3,949	3,949
Non-memory	262,057	288,111	310,812	305,670	321,718	378,581	403,029	436,129
Total	338,826	412,085	468,778	412,101	439,060	536,997	621,933	617,206
% YoY	1.1%	21.6%	13.8%	-12.1%	6.5%	22.3%	15.8%	-0.8%
IC revenue, SMM								
Memory Total	76,769	123,974	157,967	106,432	117,342	158,415	218,904	181,077
DRAM	41,179	72,802	99,308	62,475	64,152	97,866	146,759	123,935
NAND/non-volatile other	32,023	47,227	54,227	40,180	49,454	56,600	68,196	53,193
other	3,573	3,944	4,273	3,777	3,736	3,949	3,949	3,949
Non-memory	199,926	219,036	235,321	226,725	242,618	291,571	311,669	339,287
Total	276,695	343,010	393,288	333,157	359,960	449,986	530,572	520,363
% YoY	0.8%	24.0%	14.7%	-15.3%	8.0%	25.0%	17.9%	-1.9%
Capex Intensity %								
Memory Total	37.3%	34.8%	35.0%	38.7%	40.1%	36.8%	27.9%	31.8%
DRAM	22.8%	22.5%	25.2%	28.5%	37.1%	28.5%	21.7%	23.7%
NAND	60.1%	56.8%	55.6%	58.2%	47.0%	53.8%	42.9%	52.8%
Non-memory	15.9%	17.0%	16.6%	19.8%	21.9%	26.0%	26.0%	24.2%
Total	20.8%	22.3%	22.8%	24.7%	26.8%	29.2%	26.7%	26.4%
Total (excluding discretes)	25.4%	26.8%	27.2%	30.5%	32.7%	34.9%	31.3%	31.3%

WFE

SMM	2016	2017	2018	2019	2020	2021E	2022E	2023E
Memory Total	16,977	26,400	34,350	22,850	29,050	40,000	42,250	38,200
DRAM	6,100	9,100	15,550	10,250	13,200	18,350	20,800	18,350
NAND	10,877	17,300	18,800	12,600	15,850	21,650	21,450	19,850
Non-memory Total	18,323	20,750	19,500	28,050	30,950	43,200	48,500	45,800
Logic	5,800	5,500	6,750	9,900	8,200	12,550	15,300	14,700
Foundry	12,523	15,250	12,750	18,150	22,750	30,650	33,200	31,100
Total	35,300	47,150	53,850	50,900	60,000	83,200	90,750	84,000
YoY %								
Memory Total	6.0%	55.5%	30.1%	-33.5%	27.1%	37.7%	5.6%	-9.6%
DRAM	-30.5%	49.2%	70.9%	-34.1%	28.8%	39.0%	13.4%	-11.8%
NAND	50.3%	59.0%	8.7%	-33.0%	25.8%	36.6%	-0.9%	-7.5%
Non-memory Total	6.3%	13.2%	-6.0%	43.8%	10.3%	39.6%	12.3%	-5.6%
Logic	2.8%	-5.2%	22.7%	46.7%	-17.2%	53.0%	21.9%	-3.9%
Foundry	8.0%	21.8%	-16.4%	42.4%	25.3%	34.7%	8.3%	-6.3%
Total	6.1%	33.6%	14.2%	-5.5%	17.9%	38.7%	9.1%	-7.4%
Segment % of total								
Memory Total	48.1%	56.0%	63.8%	44.9%	48.4%	48.1%	46.6%	45.5%
DRAM	17.3%	19.3%	28.9%	20.1%	22.0%	22.1%	22.9%	21.8%
NAND	30.8%	36.7%	34.9%	24.8%	26.4%	26.0%	23.6%	23.6%
Non-memory Total	51.9%	44.0%	36.2%	55.1%	51.6%	51.9%	53.4%	54.5%
Logic	16.4%	11.7%	12.5%	19.4%	13.7%	15.1%	16.9%	17.5%
Foundry	35.5%	32.3%	23.7%	35.7%	37.9%	36.8%	36.6%	37.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
WFE Intensity %								
Memory Total	22.1%	21.3%	21.7%	21.5%	24.8%	25.3%	19.3%	21.1%
DRAM	14.8%	12.5%	15.7%	16.4%	20.6%	18.8%	14.2%	14.8%
NAND	34.0%	36.6%	34.7%	31.4%	32.0%	38.3%	31.5%	37.3%
Non-memory	7.0%	7.2%	6.3%	9.2%	9.6%	11.4%	12.0%	10.5%
Total	10.4%	11.4%	11.5%	12.4%	13.7%	15.5%	14.6%	13.6%
Total (excluding discretes)	12.8%	13.7%	13.7%	15.3%	16.7%	18.5%	17.1%	16.1%

Source : Company reports, UBSe

Figure 2: Summary of forecast changes

Estimate Changes

	2015	2016	2017	2018	2019	2020E			2021E			2022E			2023E
						Old Est	New Est	Delta	Old Est	New Est	Delta	Old Est	New Est	Delta	New Est
Capex (\$MM)															
Memory Total	25,723	28,639	43,406	55,225	41,189	46,647	47,010	0.8%	53,230	58,301	9.5%	57,829	61,106	5.7%	57,503
DRAM	12,419	9,398	16,712	25,053	17,816	23,427	23,790	1.5%	24,663	27,877	13.0%	30,277	31,824	5.1%	29,431
NAND/non-volatile other	13,304	19,241	26,693	30,172	23,373	23,221	23,221	--	28,567	30,424	6.5%	27,552	29,282	6.3%	28,072
Large non Memory IDMs	11,573	10,761	13,178	14,692	18,960	16,071	16,384	1.9%	22,290	23,359	4.8%	16,970	23,182	36.6%	22,226
Tier-one/two foundries	19,088	20,475	23,626	20,137	25,340	35,125	35,125	--	45,668	50,193	9.9%	46,249	55,289	19.5%	56,702
Other & SATS	8,287	10,517	11,872	16,746	16,122	18,944	19,049	0.6%	23,086	25,027	8.4%	23,470	26,362	12.3%	26,624
Total	64,671	70,392	92,082	106,800	101,611	116,788	117,569	0.7%	144,275	156,881	8.7%	144,518	165,939	14.8%	163,055
WFE (\$MM)															
Memory Total	16,017	16,977	25,900	34,350	22,850	28,850	29,050	0.7%	34,650	40,000	15.4%	39,450	42,250	7.1%	38,200
% Y/Y Growth		6.0%	52.6%	32.6%	-33.5%	26.3%	27.1%		20.1%	37.7%	13.9%		5.6%		-9.6%
DRAM	8,780	6,100	9,100	15,550	10,250	13,000	13,200	1.5%	14,800	18,350	24.0%	19,000	20,800	9.5%	18,350
% Y/Y Growth		-30.5%	49.2%	70.9%	-34.1%	26.8%	28.8%		13.8%	39.0%	28.4%		13.4%		-11.8%
NAND	7,237	10,877	16,800	18,800	12,600	15,850	15,850	--	19,850	21,650	9.1%	20,450	21,450	4.9%	19,850
% Y/Y Growth		50.3%	54.4%	11.9%	-33.0%	25.8%	25.8%		25.2%	36.6%	3.0%		-0.9%		-7.5%
Non-memory Total	17,241	18,323	21,250	19,500	28,050	31,150	30,950	(0.6%)	40,350	43,200	7.1%	42,300	48,500	14.7%	45,800
% Y/Y Growth		6.3%	16.0%	-8.2%	43.8%	11.1%	10.3%		29.5%	39.6%	4.8%		12.3%		-5.6%
Logic	5,640	5,800	5,750	6,750	9,900	8,400	8,200	(2.4%)	11,350	12,550	10.6%	13,000	15,300	17.7%	14,700
% Y/Y Growth		2.8%	-0.9%	17.4%	46.7%	-15.2%	-17.2%		35.1%	53.0%	14.5%		21.9%		-3.9%
Foundry	11,600	12,523	15,500	12,750	18,150	22,750	22,750	--	29,000	30,650	5.7%	29,300	33,200	13.3%	31,100
% Y/Y Growth		8.0%	23.8%	-17.7%	42.4%	25.3%	25.3%		27.5%	34.7%	1.0%		8.3%		-6.3%
Total	33,258	35,300	47,150	53,850	50,900	60,000	60,000	--	75,000	83,200	10.9%	81,750	90,750	11.0%	84,000
% Y/Y Growth		6.1%	33.6%	14.2%	-5.5%	17.9%	17.9%		25.0%	38.7%	9.0%		9.1%		-7.4%
WFE by Top Spenders (\$MM)															
Intel	5,000	5,975	6,014	8,350	8,828	8,049	7,742	(3.8%)	9,850	10,985	11.5%	10,500	13,000	23.8%	12,000
Micron	2,750	3,533	2,918	5,675	5,194	3,330	3,330	--	4,980	5,428	9.0%	6,136	6,608	7.7%	6,608
Global Foundries	1,650	1,350	1,100	1,500	413	250	250	--	250	500	100.0%	250	1,250	400.0%	1,250
Western Digital	947	1,099	433	749	648	600	600	--	900	900	--	1,225	1,225	--	1,225
Samsung	8,191	7,097	16,654	14,718	10,671	19,299	19,663	1.9%	22,140	24,644	11.3%	23,399	26,233	12.1%	23,905
SK Hynix	4,206	3,898	5,284	8,064	5,510	4,509	4,509	--	5,327	7,203	35.2%	9,151	8,522	(6.9%)	7,685
Japan Memory	1,161	1,967	2,974	2,462	2,226	2,864	2,864	--	2,864	2,864	--	3,273	3,273	--	3,068
Sony	1,365	250	670	650	1,800	1,000	1,300	30.0%	1,800	2,450	36.1%	1,600	2,000	25.0%	1,750
TSMC	5,233	6,137	7,065	6,226	10,796	10,703	10,703	--	17,875	18,127	1.4%	17,188	19,042	10.8%	17,386
UMC	1,219	1,700	1,188	715	360	448	448	--	471	1,244	164.0%	471	1,085	130.1%	739
Nanya		200	478	331	122	125	125	--	250	275	10.0%	250	250	--	250
SMIC	980	1,706	1,555	1,750	1,700	3,500	3,500	--	2,000	2,000	--	2,000	2,000	--	2,000
Hua Hong						810	810	--	600	685	14.2%	600	570	(5.0%)	300
Shanghai Huali				250	250	750	750	--	800	800	--	800	800	--	800
YMTC			250	1,000	1,000	2,250	2,250	--	3,000	3,000	--	3,000	3,000	--	3,000
Fujian Jinhua IC	--	--	--	500	--	--	--	NA	--	--	NA	--	--	NA	--
Chengdu Gaozhen	--	--	--	--	--	--	--	NA	--	550	NA	--	400	NA	750
Changxin Memory (Innotron)	--	--	175	250	750	750	750	--	1,000	1,000	--	1,000	1,000	--	750
Sement % of total															
Memory Total	48.2%	48.1%	54.9%	63.8%	44.9%	48.1%	48.4%		46.2%	48.1%		48.3%	46.6%		45.5%
DRAM	26.4%	17.3%	19.3%	28.9%	20.1%	21.7%	22.0%		19.7%	22.1%		23.2%	22.9%		21.8%
NAND	21.8%	30.8%	35.6%	34.9%	24.8%	26.4%	26.4%		26.5%	26.0%		25.0%	23.6%		23.6%
Non-memory Total	51.8%	51.9%	45.1%	36.2%	55.1%	51.9%	51.6%		53.8%	51.9%		51.7%	53.4%		54.5%
Logic	17.0%	16.4%	12.2%	12.5%	19.4%	14.0%	13.7%		15.1%	15.1%		15.9%	16.9%		17.5%
Foundry	34.9%	35.5%	32.9%	23.7%	35.7%	37.9%	37.9%		38.7%	36.8%		35.8%	36.6%		37.0%
WFE Intensity %															
Memory Total	20.7%	22.1%	20.9%	21.7%	21.5%	24.6%	24.8%		23.6%	25.3%		19.4%	19.3%		21.1%
DRAM	19.5%	14.8%	12.5%	15.7%	16.4%	20.3%	20.6%		17.5%	18.8%		15.1%	14.2%		14.8%
NAND	25.1%	34.0%	35.6%	34.7%	31.4%	32.0%	32.0%		34.1%	38.3%		27.8%	31.5%		37.3%
Non-memory	6.7%	7.0%	7.4%	6.3%	9.2%	9.7%	9.6%		11.1%	11.4%		10.9%	12.0%		10.5%
Total	9.9%	10.4%	11.4%	11.5%	12.4%	13.7%	13.7%		14.7%	15.5%		13.8%	14.6%		13.6%
Total (excluding discretes)	12.1%	12.8%	13.7%	13.7%	15.3%	16.7%	16.7%		17.7%	18.5%		16.3%	17.1%		16.1%

Source : Company reports, UBSe

Rolling WFE increases into our company models

As a result of our new WFE forecasts, we are adjusting estimates for our semi-cap universe (AMAT, KLAC, and LRCX). We use our new WFE assumptions for C2021e and 2022e and assume that LRCX gains share through 2022, AMAT gains in 2021 and holds that share in 2022, and KLAC's WFE share remains under pressure. As for our choice of estimates, we anchor to the 2-yr median of how SPE stocks have traded relative to the S&P500 - typically trading at a slight discount. We then make a slight adjustment for AMAT in particular, even though it has traded at the largest discount over this period. However, we assume that AMAT's multiple converges with LRCX and we apply 1x higher estimate in part because the spending mix should increasingly shift to DRAM - where AMAT has been very successful in gaining share over the past few years. To this end, Figure 15 shows that AMAT's overall memory share has held flat over the past few Qs but if we double click into the NAND and DRAM split, we can see from Figure 17 that AMAT's DRAM share has climbed to 21.1% in C1Q20 versus its average DRAM market share of 18.2% over '16-'19.

The point of all of this analysis, is that, minus LRCX, it seems that the market is already expecting WFE numbers in the range of our new numbers - a point that we have been making for the past few weeks that investors are already expecting ~\$90B WFE for C2022. LRCX estimates in particular still seem too low which is why this is the stock that we favor.

Figure 3: Summary of Estimate Change

Ticker	Rating	Price Target			Multiple				C2021					C2022					C2023				
		New	Old	Delta (%)	New	Old	Delta		UBSe	UBSe Old	Delta	Street	Delta	UBSe	UBSe Old	Delta	Street	Delta	UBSe	UBSe Old	Delta	Street	Delta
LRCX	Buy	\$745	\$725	2.8%	18x	20x	-2x	Rev (\$MM)	\$16,998	\$16,298	4.3%	\$16,040	6.0%	\$19,650	\$17,800	10.4%	\$17,370	13.1%	\$19,100	\$16,200	17.9%	-	-
								EPS	\$33.61	\$31.60	6.4%	\$30.74	9.3%	\$41.42	\$36.03	15.0%	\$34.26	20.9%	\$40.92	\$32.31	26.7%	-	-
AMAT	Neutral	\$140	\$130	7.7%	18x	17x	1x		\$23,819	\$23,819	---	\$23,675	0.6%	\$26,303	\$25,753	2.1%	\$25,767	2.1%	\$25,291	\$23,591	7.2%	\$25,428	(0.5)%
									\$7.02	\$7.02	---	\$7.02	(0.1)%	\$7.93	\$7.64	3.9%	\$7.68	3.3%	\$7.67	\$6.60	16.2%	\$7.69	(0.2)%
KLAC	Neutral	\$345	\$345	---	19x	20x	-1x		\$7,634	\$7,514	1.6%	\$7,530	1.4%	\$8,245	\$7,995	3.1%	\$8,016	2.9%	\$8,206	\$7,531	9.0%	-	-
									\$16.41	\$15.98	2.6%	\$16.16	1.5%	\$18.13	\$17.18	5.5%	\$17.36	4.4%	\$18.11	\$15.26	18.7%	-	-

Source : Company data, Factset, UBSe

Figure 4: Summary of Capex by top spenders

Semiconductor Capex by Top Spenders

		2013	% YoY	2014	% YoY	2015	% YoY	2016	% YoY	2017	% YoY	2018	% YoY	2019	% YoY	2020	% YoY	2021E	% YoY	2022E	% YoY	2023E	% YoY
N.America																							
Intel		10,711	(0)	10,105	(0)	7,326	(0)	9,625	0	11,778	22.4%	15,181	28.9%	16,213	6.8%	14,259	-12.1%	19,972		18,250		18,000	
	Logic/Foundry NAND	10,711	-2.9%	10,105	-5.7%	7,326	-27.5%	8,125	10.9%	9,278	14.2%	10,681	15.1%	14,438	35.2%	12,259	-15.1%	17,972		18,250		18,000	
Micron		1,368		2,790		4,342		6,091		5,390	-11.5%	8,730	62.0%	8,533	-2.3%	9,030	5.8%	9,318		11,200		11,200	
	DRAM NAND	631	-4.8%	1,116	76.8%	1,737	55.7%	2,589	49.0%	3,219	24.4%	4,365	35.6%	4,267	-2.3%	6,773	58.7%	5,125		6,720		6,720	
Texas Instruments		737	-26.3%	1,674	127.2%	2,605	55.6%	3,516	35.0%	2,380	-32.3%	4,365	83.4%	4,267	-2.3%	2,258	-47.1%	4,193		4,480		4,480	
	Logic Foundry	412	-16.8%	459	11.3%	551	20.1%	531	-3.6%	695	30.9%	1,131	62.7%	847	-25.1%	649	-23.4%	878		984		2,131	
Global Foundries		4,000	5.3%	3,500	-12.5%	2,750	-21.4%	2,250	-18.2%	2,000	-11.1%	2,500	25.0%	750	-70.0%	500	-33.3%	1,000		2,500		2,750	
	Western Digital NAND	859	11.6%	1,008	17.4%	1,353	34.2%	1,570	16.0%	788	-49.8%	1,070	35.8%	1,080	0.9%	1,000	-7.4%	1,500		1,750		1,750	
Europe																							
ST Micro		531	10.6%	496	-6.6%	467	-5.8%	607	30.0%	1,298	113.8%	1,262	-2.8%	1,137	-9.9%	1,183	4.0%	1,368	15.7%	1,486	8.6%	1,018	-31.5%
	Logic/Flash Logic	496	-44.5%	719	44.7%	902	25.5%	946	4.8%	1,092	15.5%	1,418	29.8%	808	-43.0%	1,129	39.7%	1,169	3.5%	1,246	6.6%	1,008	-19.1%
NXP	Logic	191	-23.9%	306	60.2%	342	11.9%	389	13.6%	618	58.9%	661	7.0%	594	-10.1%	454	-23.6%	696	53.3%	665	-4.5%	614	-7.7%
Korea																							
Samsung		11,643		12,961		12,929		11,178		23,547	110.7%	21,546	-8.5%	19,046		28,244		36,358		38,563		35,680	
	Memory DRAM	7,120	21.9%	10,456	46.9%	9,554	-8.6%	8,903	-6.8%	17,512	96.7%	18,185	3.8%	12,747	-29.9%	18,838	47.8%	24,689	31.1%	25,112	1.7%	22,229	-11.5%
		3,560		4,705		3,822		3,258		5,840	79.2%	10,184	74.4%	5,713	-43.9%	9,558		11,674		13,226		11,183	
	NAND Foundry/Logic	3,560		5,751		5,733		5,645		11,672	106.8%	8,001	-31.4%	7,034	-12.1%	9,280		13,015		11,886		11,046	
SK Hynix		4,523	-31.4%	2,505	-44.6%	3,375	34.7%	2,275	-32.6%	6,035	165.3%	3,361	-44.3%	6,299	87.4%	9,406	49.3%	11,669	24.1%	13,451	15.3%	13,451	0.0%
	Foundry/Logic DRAM	4,523	-31.4%	2,505	-44.6%	3,375	34.7%	2,275	-32.6%	6,035	165.3%	3,361	-44.3%	6,299	87.4%	9,406	49.3%	11,669	24.1%	13,451	15.3%	13,451	0.0%
		3,412	-1.9%	4,668	36.8%	6,186	32.5%	5,337	-13.7%	6,898	63.0%	14,206	63.3%	11,240	-20.9%	8,224	-26.8%	11,653	41.7%	14,203	21.9%	13,483	-5.1%
	DRAM NAND	2,167		3,268		4,949		3,522		4,349	23.5%	6,842	57.3%	7,093	3.7%	5,609		7,778		8,628		8,278	
		1,245		1,400		1,237		1,814		4,349	139.7%	7,364	69.3%	4,147	-43.7%	2,615		3,875		5,575		5,205	
Japan																							
Kioxia		1,435	58.7%	1,924	34.1%	1,857	-3.5%	3,333	79.5%	5,200	56.0%	4,091	-21.3%	3,182	-22.2%	3,818	20.0%	4,091	7.1%	4,091	0.0%	4,091	0.0%
	NAND Logic/other	1,076		1,202		929		2,667		4,940	85.3%	3,942	-20.2%	3,150	-20.1%	3,818		4,091		4,091		4,091	
	Logic	359		721		929		667		260	-61.0%	149	-42.6%	32	-78.7%	--		--		--		--	
Sony	Logic	687	-23.9%	661	-3.7%	1,950	195.0%	417	-78.6%	957	129.7%	1,182	23.5%	2,545	115.4%	1,813	-28.8%	2,850	57.2%	2,200	-22.8%	2,200	0.0%
Taiwan																							
TSMC		9,694	16.5%	9,522	-1.8%	8,051	-15.4%	10,228	27.0%	10,869	6.3%	10,376	-4.5%	14,891	43.5%	17,124	15.0%	30,212	76.4%	33,116	9.6%	34,772	5.0%
	Foundry UMC	1,092	-37.8%	1,429	30.8%	1,875	31.2%	2,834	51.1%	1,485	-47.6%	1,100	-25.9%	800	-27.3%	895	11.9%	2,262	152.8%	1,972	-12.8%	1,479	-25.0%
Inotera	DRAM	215	56.3%	613	185.1%	1,790	191.8%	1,341	-25.1%	--		--		--		--		--		--		--	
Nanya	DRAM	189	191.4%	222	17.1%	122	-45.2%	701	476.8%	956	36.3%	662	-30.7%	244	-63.2%	250	2.7%	550	120.0%	500	-9.1%	500	0.0%
China																							
SMIC		677	35.5%	959	41.7%	1,401	46.1%	2,625	87.4%	2,488	-5.2%	2,300	-7.6%	2,000	-13.0%	5,700	185.0%	3,800	-33.3%	3,000	-21.1%	3,000	0.0%
	Foundry Hua Hong																						
Shanghai Huali								263		750		500	-33.3%	600	20.0%	1,500	150.0%	1,142	-15.4%	950	-16.8%	500	-47.4%
	Foundry							200		1,000		2,000		3,000		3,250		4,000		4,000		4,000	0.0%
YMTC								200		1,000		2,000		3,000		3,250		4,000		4,000		4,000	
	Memory DRAM							200	#DIV/0!	1,000	400.0%	2,000	100.0%	3,000	50.0%	3,250	8.3%	4,000	0.0%	4,000	0.0%	4,000	0.0%
	NAND									1,000		2,000		3,000		3,250		750		750		750	
	Logic																	3,250		3,250		3,250	
Fujian Jinhua IC								--		1,000		2,000	100.0%	--	-100.0%	--	NA	--	NA	--	NA	--	NA
	DRAM Chengdu Gaozhen																						
Changxin Memory (Innotron)										1,000		1,000		500		1,600		750		400		1,200	
	DRAM																						
Others																							
Total		10,230	-5.8%	12,229	19.5%	10,477	-14.3%	9,927	-5.3%	10,473	5.5%	13,884	32.6%	13,601	-2.0%	15,596	14.7%	20,811	33.4%	22,012	5.8%	21,630	-1.7%
Wafer fab equipment		57,841	-1.5%	64,570	11.6%	64,671	0.2%	70,392	8.8%	92,082	30.8%	106,800	16.0%	101,611	-4.9%	117,569	15.7%	156,881	33.4%	165,939	5.8%	163,055	-1.7%
		27,473	-7.3%	31,953	16.3%	33,258	4.1%	35,300	6.1%	47,150	33.6%	53,850	14.2%	50,900	-5.5%	60,000	17.9%	83,200	38.7%	90,750	9.1%	84,000	-7.4%

Source : Company reports, UBSe

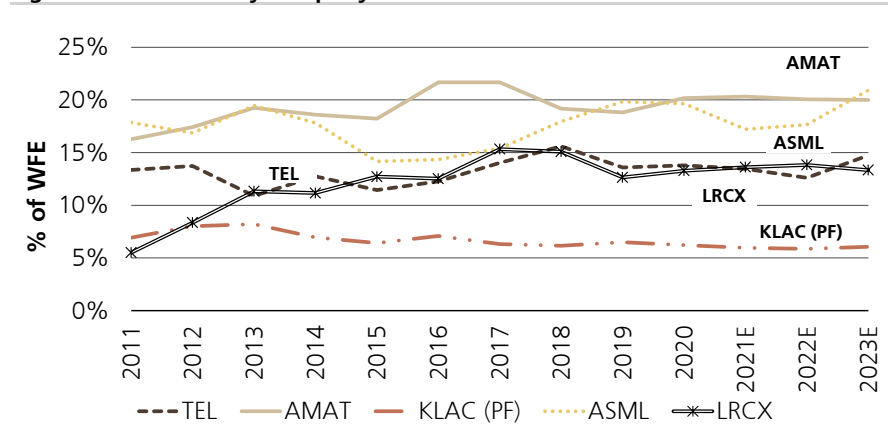
Figure 5: Summary of WFE by top spenders

WFE by Top Spenders		2013	% YoY	2014	% YoY	2015	% YoY	2016	% YoY	2017	% YoY	2018	% YoY	2019	% YoY	2020	% YoY	2021E	% YoY	2022E	% YoY	2023E	% YoY
Intel	Logic	6,130		5,150		5,000		5,975		6,014		8,350		8,828		7,742		10,985		13,000		12,000	
	Memory	6,130		5,150		5,000		975		1,375		2,475		888		1,000		1,100		13,000		12,500	
Micron		825		1,625		2,750		3,533		2,918		5,675		5,194		3,330		5,428		6,608		6,608	
	DRAM	381		650		1,200		1,424		1,610		2,837		3,797		2,540		3,331		4,368		4,368	
	NAND	444		975		1,550		2,110		1,309		2,837		1,397		790		2,097		2,240		2,240	
Global Foundries	Foundry	2,400		2,625		1,650		1,350		1,100		1,500		413		250		500		1,250		1,250	
Western Digital	NAND	601		706		947		1,099		433		749		648		600		900		1,225		1,225	
Samsung		6,904		7,478		8,191		7,097		16,654		14,718		10,671		19,663		24,644		26,233		23,905	
	Memory	3,738		5,725		5,828		5,505		12,430		12,366		6,262		13,079		17,059		17,490		14,893	
	DRAM	1,869		2,705		2,675		2,118		4,330		7,256		1,822		6,679		7,859		9,415		7,492	
	NAND	1,869		3,019		3,153		3,387		8,100		5,110		4,440		6,400		9,200		8,075		7,401	
	Logic/foundry	3,166		1,754		2,363		1,593		4,224		2,352		4,409		6,584		7,585		8,743		9,012	
SK Hynix		1,831		2,567		4,206		3,898		5,284		8,064		5,510		4,509		7,203		8,522		7,685	
	DRAM	1,083		1,797		3,464		2,483		2,501		4,264		3,610		3,009		5,063		5,177		4,719	
	NAND	747		770		742		1,415		2,783		3,800		1,900		1,500		2,140		3,345		2,967	
Kioxia		852		1,190		1,161		1,967		2,974		2,462		2,226		2,864		2,864		3,273		3,068	
	NAND	619		721		557		1,533		2,841		2,365		2,205		2,864		2,864		3,273		3,068	
	Logic/other	233		469		604		433		133		97		21		--		--		--		--	
Sony	Logic	481		463		1,365		250		670		650		1,800		1,300		2,450		2,000		1,750	
TSMC	Foundry	6,058		8,094		5,233		6,137		7,065		6,226		10,796		10,703		18,127		19,042		17,386	
UMC	Foundry	710		1,072		1,219		1,700		1,188		715		360		448		1,244		1,085		739	
Nanya	DRAM							200		478		331		122		125		275		250		250	
SMIC	Foundry	474		671		980		1,706		1,555		1,750		1,700		3,500		2,000		2,000		2,000	
Hua Hong	Foundry															810		685		570		300	
Shanghai Huali	Foundry															750		800		800		800	
YMTC								--		250		1,000		1,000		2,250		3,000		3,000		3,000	
	Memory	--		--		--		--		250		1,000		1,000		2,250		3,000		3,000		3,000	
	DRAM	--		--		--		--		--		--		--		--		--		--		--	
	NAND	--		--		--		--		250		1,000		1,000		2,250		3,000		3,000		3,000	
Fujian Jinhua IC	Logic	--		--		--		--		--		--		--		--		--		--		--	
Chengdu Gaozhen	DRAM	--		--		--		--		--		500		--		--		--		--		--	
Changxin Memory (Innotron)	DRAM	--		--		--		--		--		--		--		--		550		400		750	
OTHERS		208		313		555		387		392		661		633		406		545		493		533	
Total		27,473	(7.3%)	31,953	16.3%	33,258	4.1%	35,300	6.1%	47,150	33.6%	53,850	14.2%	50,900	(5.5%)	60,000	17.9%	83,200	38.7%	90,750	9.1%	84,000	(7.4%)
Wafer Fab Equipment (\$MM)		27,473		31,953		33,258		35,300		47,150		53,850		50,900		60,000		83,200		90,750		84,000	
Memory, \$MM		9,325		12,720		16,017		16,977		26,400		34,350		22,850		29,050		40,000		42,250		38,200	
YoY		32%		36%		26%		6%		56%		30%		(33%)		27%		38%		6%		(10%)	
DRAM		4,111		6,309		8,780		6,100		9,100		15,550		10,250		13,200		18,350		20,800		18,350	
YoY		50%		53%		39%		(31%)		49%		71%		(34%)		29%		39%		13%		(12%)	
NAND/other		5,214		6,411		7,237		10,877		17,300		18,800		12,600		15,850		21,650		21,450		19,850	
YoY		20%		23%		13%		50%		59%		9%		(33%)		26%		37%		(1%)		(7%)	
Foundry, \$MM		11,430		13,738		11,600		12,523		15,250		12,750		18,150		22,750		30,650		33,200		31,100	
YoY		(20%)		20%		(16%)		8%		22%		(16%)		42%		25%		35%		8%		(6%)	
Logic, \$MM		6,718		5,495		5,640		5,800		5,500		6,750		9,900		8,200		12,550		15,300		14,700	
YoY		(18%)		(18%)		3%		3%		(5%)		23%		47%		(17%)		53%		22%		(4%)	
check						--		--		--		--		--		--		--		--		--	
Foundry + logic, \$MM										20,750		19,500		28,050		30,950		43,200		48,500		45,800	
YoY												(6%)		44%		10%		40%		12%		(6%)	
% total																							
Memory		34%		40%		48%		48%		56%		64%		45%		48%		48%		47%		45%	
DRAM		15%		20%		26%		17%		19%		29%		20%		22%		22%		23%		22%	
NAND/other		19%		20%		22%		31%		37%		35%		25%		26%		26%		24%		24%	
Foundry		42%		43%		35%		35%		32%		24%		36%		38%		37%		37%		37%	
Logic		24%		17%		17%		16%		12%		13%		19%		14%		15%		17%		18%	
Total WFE		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%	

Source : Company reports, UBSe

With respect to what that means for WFE share of the major suppliers, we show that in the Figure below. After gaining ~140bps in C2020, we see AMAT maintain top share in C2021/2022E. For LRCX, we see C2021E another share gain year after gaining ~60bps share in C2020 and expect further share gains into C2022E. For KLAC, we remain quite negative on its WFE share as it appears to be losing share in C2020 even in a strong foundry/logic year and we expect share to plateau at ~6.0% range. For ASML, we believe share should continue to rise such that it should regain top share in C2023E. TEL, we see share not climbing back until C2023E.

Figure 6: WFE share by company



Source : Company reports, UBSe

Figure 7: WFE share by company, data

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
TEL	4,860	4,069	2,993	4,069	3,803	4,334	6,609	8,400	6,918	8,270	11,195	11,434	12,379
AMAT	5920.459	5161	5290	5940	6062	7650	10214	10324	9573	12,106	16,897	18,200	16,800
KLAC (PF)	2,518	2,373	2,255	2,221	2,133	2,500	2,981	3,320	3,303	3,728	4,962	5,320	5,095
ASML	6,491	4,996	5,350	5,692	4,711	5,061	7,258	9,666	10,097	11,790	14,327	16,024	17,562
LRCX	2,006	2,476	3,110	3,567	4,229	4,419	7,229	8,126	6,438	7,968	11,330	12,550	11,200
WFE	36,387	29,644	27,473	31,953	33,258	35,300	47,150	53,850	50,900	60,000	83,200	90,750	84,000
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
TEL	13.4%	13.7%	10.9%	12.7%	11.4%	12.3%	14.0%	15.6%	13.6%	13.8%	13.5%	12.6%	14.7%
AMAT	16.3%	17.4%	19.3%	18.6%	18.2%	21.7%	21.7%	19.2%	18.8%	20.2%	20.3%	20.1%	20.0%
KLAC (PF)	6.9%	8.0%	8.2%	7.0%	6.4%	7.1%	6.3%	6.2%	6.5%	6.2%	6.0%	5.9%	6.1%
ASML	17.8%	16.9%	19.5%	17.8%	14.2%	14.3%	15.4%	18.0%	19.8%	19.7%	17.2%	17.7%	20.9%
LRCX	5.5%	8.4%	11.3%	11.2%	12.7%	12.5%	15.3%	15.1%	12.6%	13.3%	13.6%	13.8%	13.3%

Source : Company Reports, UBSe

WFE run-rate analysis

Based on our global company models and historic share that these top 5 suppliers typically represent, we forecast the likely shape of WFE through 2021, 2022, and 2023. Based on company guidance and historical share of the major suppliers, we estimate that WFE was ~\$19.5B in CQ1:21, up from ~\$18.0B in CQ4. Based on company guidance for CQ2, we estimate WFE of ~\$20.5B for CQ2 and given our new full year number in the low \$80Bs, this should grow slightly into 2H in the mid \$21Bs for each of CQ3 and CQ4:21. However, if next year is going to be ~\$90B then obviously this still has a little bit of room to grow and we estimate that WFE grows into 1H:22, reaching a run rate of ~\$23B/Q for 1H and then moderating just slightly for 2H. It is challenging for us to see much growth beyond this, unless we start to see another step higher in WFE which would seem to have to come from pull-ins related to subsidies - something that the market would likely discount fairly heavily.

Figure 8: WFE data by company (2005-2010)

Product	2005				2006				2007				2008				2009				2010			
	1Q'05	2Q'05	3Q'05	4Q'05	1Q'06	2Q'06	3Q'06	4Q'06	1Q'07	2Q'07	3Q'07	4Q'07	1Q'08	2Q'08	3Q'08	4Q'08	1Q'09	2Q'09	3Q'09	4Q'09	1Q'10	2Q'10	3Q'10	4Q'10
ASML	\$423	\$374	\$888	\$774	\$665	\$1,056	\$1,091	\$1,263	\$1,126	\$1,120	\$1,159	\$1,236	\$1,228	\$1,134	\$887	\$501	\$132	\$249	\$656	\$638	\$874	\$1,173	\$1,328	\$1,782
Euro FX																								
AMAT	\$1,553	\$1,468	\$1,690	\$1,154	\$1,666	\$1,829	\$1,825	\$1,716	\$1,980	\$2,061	\$1,810	\$1,491	\$1,523	\$939	\$886	\$653	\$324	\$571	\$774	\$1,111	\$1,608	\$1,675	\$1,742	\$1,779
LRCX	\$228	\$227	\$244	\$313	\$411	\$509	\$574	\$621	\$458	\$524	\$450	\$440	\$505	\$353	\$235	\$156	\$116	\$192	\$275	\$397	\$577	\$521	\$608	\$673
KLAC	\$464	\$410	\$400	\$402	\$429	\$483	\$531	\$544	\$607	\$626	\$578	\$514	\$476	\$462	\$406	\$273	\$208	\$177	\$230	\$315	\$349	\$430	\$551	\$619
TEL	\$1,276	\$914	\$952	\$737	\$1,053	\$926	\$1,187	\$1,179	\$1,507	\$1,207	\$1,642	\$1,244	\$1,580	\$885	\$754	\$498	\$575	\$159	\$339	\$596	\$890	\$871	\$1,330	\$1,119
JPY FX																								
ex TEL	\$2,668	\$2,479	\$3,222	\$2,643	\$3,170	\$3,877	\$4,022	\$4,144	\$4,170	\$4,331	\$3,996	\$3,681	\$3,733	\$2,888	\$2,414	\$1,583	\$779	\$1,189	\$1,935	\$2,461	\$3,408	\$3,799	\$4,227	\$4,852
incl TEL	\$3,944	\$3,393	\$4,174	\$3,380	\$4,223	\$4,803	\$5,208	\$5,322	\$5,677	\$5,538	\$5,638	\$4,925	\$5,313	\$3,773	\$3,168	\$2,081	\$1,354	\$1,348	\$2,274	\$3,057	\$4,298	\$4,669	\$5,557	\$5,971
Big 3 US																								
Memory																								
ASML	\$106	\$145	\$662	\$359	\$275	\$473	\$793	\$776	\$478	\$663	\$1,147	\$830	\$209	\$1,003	\$151	\$71	\$125	\$170	\$386	\$449	\$690	\$739	\$797	\$1,176
AMAT	\$823	\$543	\$727	\$531	\$957	\$982	\$885	\$1,246	\$1,338	\$1,194	\$899	\$646	\$562	\$341	\$593	\$94	\$88	\$217	\$233	\$557	\$723	\$691	\$486	\$370
LRCX	\$146	\$120	\$126	\$250	\$218	\$203	\$431	\$460	\$357	\$383	\$382	\$352	\$384	\$265	\$169	\$75	\$65	\$92	\$160	\$178	\$374	\$359	\$346	\$269
KLAC	\$136	\$100	\$138	\$90	\$95	\$170	\$91	\$236	\$296	\$273	\$253	\$235	\$193	\$64	\$44	\$4	\$18	\$14	\$23	\$41	\$105	\$142	\$174	\$101
TEL	\$650	\$306	\$423	\$509	\$722	\$739	\$826	\$1,037	\$1,223	\$749	\$654	\$797	\$491	\$222	\$192	\$152	\$64	\$156	\$223	\$411	\$677	\$646	\$564	\$524
ex TEL	\$1,211	\$908	\$1,653	\$1,230	\$1,546	\$1,829	\$2,200	\$2,718	\$2,469	\$2,513	\$2,680	\$2,062	\$1,348	\$1,673	\$957	\$244	\$296	\$493	\$802	\$1,225	\$1,892	\$1,931	\$1,803	\$1,916
incl TEL	\$1,862	\$1,214	\$2,076	\$1,739	\$2,268	\$2,567	\$3,026	\$3,755	\$3,692	\$3,262	\$3,334	\$2,860	\$1,839	\$1,894	\$1,148	\$396	\$360	\$649	\$1,025	\$1,635	\$2,569	\$2,577	\$2,366	\$2,440
DRAM % of Memory (reported)	78%	68%	84%	58%	53%	54%	61%	76%	76%	63%	69%	56%	57%	68%	86%	68%	68%	61%	61%	69%	73%	63%	60%	53%
NAND % of Memory (reported)	22%	32%	16%	42%	47%	46%	39%	24%	24%	37%	31%	44%	43%	32%	14%	32%	32%	39%	39%	31%	27%	37%	40%	47%
F/L																								
ASML	\$317	\$194	\$165	\$415	\$460	\$665	\$362	\$526	\$677	\$332	\$12	\$415	\$708	\$173	\$650	\$170	-\$14	\$113	\$309	\$225	\$280	\$968	\$594	\$723
AMAT	\$730	\$925	\$963	\$623	\$920	\$871	\$785	\$509	\$601	\$420	\$443	\$431	\$498	\$452	\$570	\$153	\$171	\$326	\$397	\$579	\$694	\$844	\$1,188	\$1,239
LRCX	\$82	\$107	\$118	\$63	\$193	\$305	\$144	\$161	\$101	\$142	\$67	\$88	\$121	\$88	\$66	\$81	\$51	\$100	\$116	\$219	\$202	\$162	\$261	\$404
KLAC	\$253	\$234	\$190	\$248	\$253	\$226	\$325	\$245	\$214	\$273	\$207	\$177	\$194	\$274	\$227	\$137	\$113	\$122	\$156	\$199	\$178	\$232	\$283	\$400
TEL	\$320	\$319	\$375	\$369	\$544	\$187	\$551	\$423	\$386	\$211	\$174	\$266	\$253	\$282	\$447	\$129	\$100	\$190	\$414	\$544	\$433	\$551	\$919	\$755
ex TEL	\$1,382	\$1,459	\$1,436	\$1,349	\$1,825	\$2,068	\$1,615	\$1,441	\$1,592	\$1,167	\$730	\$1,111	\$1,521	\$988	\$1,513	\$540	\$320	\$661	\$978	\$1,222	\$1,355	\$2,206	\$2,327	\$2,767
incl TEL	\$1,702	\$1,778	\$1,810	\$1,717	\$2,370	\$2,255	\$2,166	\$1,865	\$1,979	\$1,378	\$903	\$1,377	\$1,774	\$1,270	\$1,960	\$669	\$421	\$852	\$1,392	\$1,767	\$1,788	\$2,756	\$3,246	\$3,521
WFE																								
Total	\$7,722	\$6,222	\$6,020	\$6,082	\$7,330	\$7,580	\$9,017	\$8,765	\$8,931	\$9,408	\$9,335	\$8,225	\$8,955	\$6,480	\$5,257	\$3,937	\$2,569	\$2,169	\$3,565	\$4,595	\$5,933	\$7,158	\$8,770	\$9,836
Memory	\$2,697	\$1,891	\$2,740	\$2,313	\$2,573	\$2,821	\$3,991	\$4,159	\$4,786	\$4,319	\$4,269	\$3,595	\$3,800	\$3,090	\$2,426	\$1,228	\$847	\$936	\$1,231	\$1,501	\$3,150	\$3,150	\$3,300	\$3,850
% total																								
% total (reported)																								
DRAM	\$2,111	\$1,284	\$2,314	\$1,350	\$1,362	\$1,516	\$2,425	\$3,154	\$3,620	\$2,738	\$2,961	\$2,022	\$2,168	\$2,107	\$2,096	\$831	\$577	\$575	\$750	\$1,037	\$2,284	\$1,973	\$1,966	\$2,041
NAND/other	\$586	\$607	\$426	\$963	\$1,211	\$1,305	\$1,566	\$1,006	\$1,166	\$1,580	\$1,307	\$1,573	\$1,632	\$983	\$330	\$397	\$270	\$361	\$481	\$464	\$866	\$1,177	\$1,334	\$1,809
DRAM % of Memory (estimated)	78%	68%	84%	58%	53%	54%	61%	76%	76%	63%	69%	56%	57%	68%	86%	68%	68%	61%	61%	69%	73%	63%	60%	53%
DRAM % of Memory (reported)	78%	68%	84%	58%	53%	54%	61%	76%	76%	63%	69%	56%	57%	68%	86%	68%	68%	61%	61%	69%	73%	63%	60%	53%
NAND % of Memory (estimated)	22%	32%	16%	42%	47%	46%	39%	24%	24%	37%	31%	44%	43%	32%	14%	32%	32%	39%	39%	31%	27%	37%	40%	47%
F/L	\$5,025	\$4,331	\$3,280	\$3,769	\$4,758	\$4,759	\$5,026	\$4,605	\$4,146	\$5,089	\$5,066	\$4,630	\$5,155	\$3,390	\$2,831	\$2,709	\$1,722	\$1,233	\$2,334	\$3,094	\$2,783	\$4,008	\$5,470	\$5,986
Total				\$25,952				\$32,549				\$36,005				\$24,698				\$12,884				\$31,593
Memory				\$9,650				\$13,540				\$16,978				\$10,531				\$4,528				\$13,464
DRAM				\$7,058				\$8,457				\$11,341				\$7,201				\$2,939				\$8,264
NAND/other				\$2,592				\$5,083				\$5,637				\$3,330				\$1,589				\$5,201
F/L				\$16,302				\$19,009				\$19,027				\$14,167				\$8,356				\$18,129

Source : Company Reports, UBSe

Figure 9: WFE data by company (2011-2016)

	2011				2012				2013				2014				2015				2016			
	1Q'11	2Q'11	3Q'11	4Q'11	1Q'12	2Q'12	3Q'12	4Q'12	1Q'13	2Q'13	3Q'13	4Q'13	1Q'14	2Q'14	3Q'14	4Q'14	1Q'15	2Q'15	3Q'15	4Q'15	1Q'16	2Q'16	3Q'16	4Q'16
Product																								
ASML	\$1,757	\$1,738	\$1,658	\$1,338	\$1,380	\$1,294	\$1,315	\$1,007	\$895	\$1,211	\$1,272	\$1,972	\$1,409	\$1,733	\$1,172	\$1,378	\$1,405	\$1,256	\$1,085	\$965	\$944	\$1,417	\$1,382	\$1,319
Euro FX																								
AMAT	\$1,783	\$1,726	\$1,067	\$1,344	\$1,777	\$1,545	\$870	\$969	\$1,291	\$1,272	\$1,243	\$1,484	\$1,584	\$1,476	\$1,434	\$1,446	\$1,560	\$1,635	\$1,494	\$1,373	\$1,587	\$1,786	\$2,127	\$2,150
LRCX	\$611	\$597	\$381	\$418	\$548	\$631	\$709	\$588	\$684	\$833	\$733	\$860	\$957	\$848	\$722	\$777	\$928	\$1,006	\$1,085	\$896	\$774	\$986	\$1,042	\$1,282
KLAC	\$664	\$720	\$633	\$501	\$550	\$708	\$591	\$524	\$580	\$570	\$561	\$544	\$670	\$570	\$477	\$504	\$565	\$580	\$461	\$528	\$523	\$731	\$562	\$684
TEL	\$1,553	\$1,114	\$1,333	\$861	\$1,463	\$1,057	\$1,056	\$494	\$916	\$449	\$928	\$700	\$1,467	\$967	\$909	\$726	\$1,054	\$822	\$1,059	\$867	\$894	\$819	\$1,428	\$1,193
JPY FX																								
ex TEL	\$4,815	\$4,781	\$3,739	\$3,600	\$4,255	\$4,178	\$3,485	\$3,088	\$3,449	\$3,887	\$3,810	\$4,860	\$4,621	\$4,627	\$3,805	\$4,105	\$4,458	\$4,478	\$4,124	\$3,762	\$3,828	\$4,920	\$5,113	\$5,435
incl TEL	\$6,368	\$5,895	\$5,071	\$4,461	\$5,717	\$5,235	\$4,541	\$3,582	\$4,365	\$4,336	\$4,738	\$5,560	\$6,087	\$5,595	\$4,714	\$4,831	\$5,513	\$5,300	\$5,184	\$4,628	\$4,722	\$5,739	\$6,541	\$6,628
Big 3 US					\$2,875	\$2,884	\$2,171	\$2,081	\$2,554	\$2,676	\$2,537	\$2,888	\$3,211	\$2,894	\$2,633	\$2,727	\$3,053	\$3,221	\$3,040	\$2,796	\$2,885	\$3,503	\$3,731	\$4,116
Memory																								
ASML	\$457	\$1,025	\$969	\$548	\$345	\$349	\$394	\$131	\$268	\$545	\$483	\$690	\$939	\$953	\$328	\$896	\$773	\$591	\$607	\$425	\$394	\$496	\$221	\$514
AMAT	\$480	\$471	\$204	\$411	\$315	\$339	\$96	\$204	\$326	\$457	\$500	\$502	\$632	\$563	\$427	\$742	\$886	\$1,144	\$751	\$650	\$1,298	\$642	\$477	\$1,406
LRCX	\$257	\$332	\$212	\$176	\$219	\$290	\$298	\$117	\$212	\$383	\$352	\$550	\$632	\$500	\$362	\$554	\$758	\$747	\$830	\$554	\$702	\$742	\$665	\$850
KLAC	\$149	\$179	\$92	\$68	\$132	\$87	\$67	\$72	\$129	\$253	\$256	\$250	\$155	\$131	\$219	\$222	\$96	\$359	\$170	\$253	\$105	\$212	\$236	\$287
TEL	\$730	\$385	\$210	\$418	\$266	\$143	\$95	\$94	\$271	\$244	\$561	\$544	\$479	\$333	\$435	\$538	\$539	\$378	\$519	\$416	\$492	\$401	\$614	\$477
ex TEL	\$1,342	\$2,007	\$1,477	\$1,203	\$1,012	\$1,065	\$856	\$524	\$935	\$1,638	\$1,592	\$1,993	\$2,357	\$2,147	\$1,336	\$2,413	\$2,513	\$2,841	\$2,359	\$1,883	\$2,498	\$2,092	\$1,599	\$3,057
incl TEL	\$2,073	\$2,392	\$1,687	\$1,622	\$1,278	\$1,208	\$951	\$618	\$1,206	\$1,882	\$2,153	\$2,537	\$2,836	\$2,480	\$1,771	\$2,951	\$3,052	\$3,220	\$2,878	\$2,299	\$2,990	\$2,493	\$2,213	\$3,534
DRAM % of Memory (reported)	34%	30%	33%	36%	28%	53%	48%	49%	49%	50%	37%	34%	52%	59%	56%	67%	66%	48%	45%	61%	38%	38%	34%	36%
NAND % of Memory (reported)	66%	70%	67%	64%	72%	47%	52%	51%	51%	50%	63%	66%	48%	41%	44%	33%	34%	52%	55%	39%	62%	62%	66%	64%
F/L																								
ASML	\$989	\$790	\$492	\$880	\$975	\$1,064	\$751	\$792	\$555	\$415	\$1,251	\$1,212	\$559	\$774	\$753	\$485	\$649	\$1,160	\$448	\$438	\$626	\$885	\$1,101	\$717
AMAT	\$1,235	\$768	\$722	\$1,007	\$1,654	\$828	\$645	\$1,159	\$1,225	\$746	\$890	\$1,067	\$1,032	\$1,002	\$907	\$684	\$818	\$863	\$693	\$625	\$668	\$1,573	\$1,356	\$1,351
LRCX	\$354	\$265	\$168	\$242	\$329	\$341	\$411	\$471	\$472	\$450	\$381	\$310	\$326	\$348	\$461	\$385	\$391	\$498	\$323	\$299	\$301	\$382	\$404	\$543
KLAC	\$403	\$418	\$345	\$357	\$323	\$493	\$353	\$348	\$335	\$323	\$288	\$294	\$516	\$439	\$257	\$272	\$469	\$220	\$290	\$274	\$419	\$519	\$326	\$397
TEL	\$824	\$628	\$427	\$1,131	\$798	\$507	\$464	\$687	\$633	\$434	\$686	\$566	\$719	\$646	\$532	\$496	\$584	\$444	\$540	\$451	\$402	\$418	\$814	\$716
ex TEL	\$2,980	\$2,242	\$1,727	\$2,486	\$3,282	\$2,726	\$2,160	\$2,769	\$2,587	\$1,934	\$2,809	\$2,882	\$2,433	\$2,563	\$2,378	\$1,827	\$2,327	\$2,742	\$1,754	\$1,636	\$2,014	\$3,359	\$3,188	\$3,008
incl TEL	\$3,804	\$2,870	\$2,154	\$3,618	\$4,080	\$3,233	\$2,624	\$3,455	\$3,220	\$2,368	\$3,495	\$3,449	\$3,151	\$3,209	\$2,910	\$2,323	\$2,910	\$3,186	\$2,294	\$2,087	\$2,416	\$3,777	\$4,001	\$3,724
WFE																								
Total	\$9,760	\$9,842	\$8,805	\$7,867	\$8,935	\$8,177	\$6,886	\$5,502	\$6,373	\$6,367	\$6,359	\$8,324	\$9,074	\$8,019	\$7,055	\$7,776	\$8,597	\$8,217	\$8,802	\$7,616	\$6,945	\$8,849	\$9,457	\$10,092
Memory	\$3,554	\$4,077	\$2,849	\$2,067	\$2,144	\$2,208	\$1,653	\$1,045	\$1,554	\$2,061	\$2,504	\$3,207	\$3,400	\$3,000	\$2,150	\$4,199	\$4,242	\$4,459	\$4,108	\$3,208	\$3,964	\$3,738	\$3,294	\$5,962
% total	36%	41%	32%	26%	24%	27%	24%	19%	24%	32%	39%	39%	37%	37%	30%	54%	49%	54%	47%	42%	57%	42%	35%	59%
% total (reported)																								
DRAM	\$1,224	\$1,223	\$935	\$738	\$532	\$1,036	\$708	\$456	\$817	\$1,117	\$1,006	\$1,170	\$1,477	\$1,467	\$1,005	\$2,360	\$2,819	\$2,128	\$1,863	\$1,954	\$1,519	\$1,420	\$1,124	\$2,120
NAND/other	\$2,330	\$2,854	\$1,913	\$1,329	\$1,612	\$1,172	\$945	\$589	\$737	\$944	\$1,498	\$2,036	\$1,923	\$1,533	\$1,145	\$1,839	\$1,424	\$2,331	\$2,244	\$1,254	\$2,445	\$2,318	\$2,170	\$3,842
DRAM % of Memory (estimated)	34%	30%	33%	36%	25%	47%	43%	44%	53%	54%	40%	37%	43%	49%	47%	56%	66%	48%	45%	61%	38%	38%	34%	36%
DRAM % of Memory (reported)	34%	30%	33%	36%	28%	53%	48%	49%	49%	50%	37%	34%	52%	59%	56%	67%	66%	48%	45%	61%	38%	38%	34%	36%
NAND % of Memory (estimated)	66%	70%	67%	64%	75%	53%	57%	56%	47%	46%	60%	63%	57%	51%	53%	44%	34%	52%	55%	39%	62%	62%	66%	64%
F/L	\$6,206	\$5,765	\$5,956	\$5,800	\$6,791	\$5,969	\$5,233	\$4,457	\$4,820	\$4,306	\$3,855	\$5,117	\$5,674	\$5,019	\$4,905	\$3,577	\$4,355	\$3,758	\$4,695	\$4,408	\$2,982	\$5,111	\$6,163	\$4,130
Total				\$36,387				\$29,644				\$27,473				\$31,953				\$33,258				\$35,300
Memory				\$12,547				\$7,082				\$9,325				\$12,720				\$16,017				\$16,977
DRAM				\$4,120				\$2,732				\$4,111				\$6,309				\$8,780				\$6,100
NAND/other				\$8,427				\$4,350				\$5,214				\$6,411				\$7,237				\$10,877
F/L				\$23,840				\$22,562				\$18,148				\$19,233				\$17,241				\$18,323

Source : Company Reports, UBS

Figure 10: WFE data by company (2017-2023E)

	2017				2018				2019				2020				2021				2022				2023			
	1Q'17	2Q'17	3Q'17	4Q'17	1Q'18	2Q'18	3Q'18	4Q'18	1Q'19	2Q'19	3Q'19	4Q'19	1Q'20	2Q'20	3Q'20	4Q'20	1Q'21	2Q'21E	3Q'21E	4Q'21E	1Q'22E	2Q'22E	3Q'22E	4Q'22E	1Q'23E	2Q'23E	3Q'23E	4Q'23E
Product																												
ASML																												
Euro	\$1,294	\$1,525	\$2,137	\$2,302	\$2,048	\$2,421	\$2,420	\$2,777	\$1,935	\$2,104	\$2,582	\$3,475	\$1,739	\$2,781	\$3,635	\$3,635	\$3,200	\$3,303	\$3,901	\$3,923	\$3,563	\$3,940	\$4,291	\$4,231	\$4,214	\$4,302	\$4,514	\$4,532
FX									\$1,689	\$1,851	\$2,326	\$3,131	\$1,584	\$2,439	\$3,096	\$3,198	\$2,730	\$2,735	\$3,230	\$3,248	\$2,950	\$3,262	\$3,553	\$3,503	\$3,490	\$3,562	\$3,738	\$3,753
AMAT	\$2,404	\$2,532	\$2,431	\$2,847	\$2,999	\$2,748	\$2,309	\$2,268	\$2,184	\$2,273	\$2,302	\$2,814	\$2,567	\$2,916	\$3,070	\$3,553	\$3,972	\$4,325	\$4,300	\$4,300	\$4,550	\$4,650	\$4,500	\$4,500	\$4,300	\$4,300	\$4,200	\$4,000
LRCX	\$1,544	\$1,710	\$1,802	\$1,893	\$2,192	\$2,381	\$1,554	\$1,715	\$1,612	\$1,536	\$1,355	\$1,759	\$1,648	\$1,865	\$2,148	\$2,307	\$2,545	\$2,725	\$3,010	\$3,050	\$3,450	\$3,250	\$2,950	\$2,900	\$2,850	\$2,900	\$2,800	\$2,650
KLAC	\$721	\$737	\$761	\$762	\$798	\$841	\$829	\$852	\$730	\$691	\$831	\$895	\$835	\$798	\$891	\$994	\$1,115	\$1,175	\$1,220	\$1,250	\$1,275	\$1,275	\$1,275	\$1,275	\$1,250	\$1,225	\$1,200	\$1,200
TEL	\$1,630	\$1,528	\$1,841	\$1,609	\$2,387	\$2,013	\$2,504	\$1,495	\$1,932	\$1,188	\$1,854	\$1,944	\$2,096	\$2,094	\$2,395	\$1,684	\$2,854	\$2,856	\$2,765	\$2,720	\$2,810	\$2,947	\$3,065	\$2,612	\$3,433	\$3,053	\$3,073	\$2,819
JPY									\$2,264	\$2,220	\$2,526	\$1,737	\$3,148	\$3,150	\$3,050	\$3,000	\$3,100	\$3,150	\$3,050	\$3,000	\$3,100	\$3,251	\$3,381	\$2,881	\$3,787	\$3,368	\$3,390	\$3,110
FX									1.08	1.06	1.05	1.03	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
ex TEL	\$5,963	\$6,504	\$7,131	\$7,803	\$8,037	\$8,391	\$7,112	\$7,612	\$6,461	\$6,604	\$7,070	\$8,943	\$6,789	\$8,360	\$9,745	\$10,490	\$10,832	\$11,528	\$12,431	\$12,523	\$12,838	\$13,115	\$13,016	\$12,906	\$12,614	\$12,727	\$12,714	\$12,382
incl TEL	\$7,594	\$8,032	\$8,972	\$9,412	\$10,425	\$10,404	\$9,617	\$9,107	\$8,394	\$7,793	\$8,924	\$10,886	\$8,885	\$10,454	\$12,140	\$12,174	\$13,687	\$14,384	\$15,196	\$15,242	\$15,648	\$16,062	\$16,081	\$15,518	\$16,048	\$15,780	\$15,787	\$15,201
Big 3 US	\$4,669	\$4,979	\$4,994	\$5,501	\$5,989	\$5,970	\$4,693	\$4,835	\$4,526	\$4,500	\$4,488	\$5,468	\$5,050	\$5,579	\$6,109	\$6,854	\$7,632	\$8,225	\$8,530	\$8,600	\$9,275	\$9,175	\$8,725	\$8,675	\$8,400	\$8,425	\$8,200	\$7,850
Memory																												
ASML	\$608	\$823	\$684	\$1,220	\$1,516	\$1,307	\$1,403	\$1,111	\$774	\$821	\$542	\$591	\$470	\$1,057	\$763	\$1,087	\$894	\$923	\$1,090	\$1,096	\$914	\$1,011	\$1,101	\$1,085	\$1,081	\$1,104	\$1,158	\$1,163
AMAT	\$1,250	\$1,342	\$1,216	\$1,765	\$2,039	\$1,649	\$1,385	\$1,270	\$917	\$1,159	\$967	\$900	\$1,129	\$1,312	\$1,289	\$1,492	\$1,748	\$1,871										
LRCX	\$1,127	\$1,248	\$1,189	\$1,457	\$1,841	\$1,905	\$1,197	\$1,355	\$984	\$983	\$867	\$914	\$923	\$1,138	\$1,246	\$1,569	\$1,578											
KLAC	\$260	\$236	\$350	\$541	\$622	\$580	\$473	\$520	\$277	\$352	\$357	\$358	\$259	\$319	\$276	\$408	\$346	\$376										
TEL	\$799	\$871	\$1,105	\$988	\$1,695	\$1,590	\$1,653	\$1,091	\$1,140	\$487	\$927	\$739	\$671	\$1,068	\$1,198	\$758	\$1,486	\$1,224	\$1,224	\$1,541	\$1,541	\$1,383	\$1,454	\$1,384	\$1,854	\$1,376	\$1,413	\$1,544
ex TEL	\$3,245	\$3,649	\$3,438	\$4,983	\$6,018	\$5,441	\$4,459	\$4,256	\$2,953	\$3,315	\$2,733	\$2,763	\$2,781	\$3,826	\$3,575	\$4,555	\$4,566	\$3,170	\$1,090	\$1,096	\$914	\$1,011	\$1,101	\$1,085	\$1,081	\$1,104	\$1,158	\$1,163
incl TEL	\$4,044	\$4,520	\$4,543	\$5,971	\$7,713	\$7,032	\$6,111	\$5,347	\$4,093	\$3,803	\$3,660	\$3,502	\$3,452	\$4,894	\$4,773	\$5,313	\$6,051	\$4,393	\$2,314	\$2,637	\$2,455	\$2,393	\$2,555	\$2,469	\$2,935	\$2,479	\$2,571	\$2,706
DRAM % of Memory (reported)	37%	28%	32%	37%	40%	37%	42%	36%	46%	46%	48%	42%	41%	42%	44%	37%	41%	32%										
NAND % of Memory (reported)	63%	72%	68%	63%	60%	63%	58%	64%	54%	54%	52%	58%	59%	58%	56%	63%	59%											
FL																												
ASML	\$881	\$1,087	\$1,209	\$1,186	\$533	\$1,114	\$1,016	\$1,666	\$1,161	\$1,284	\$2,040	\$2,885	\$1,269	\$1,724	\$2,872	\$2,791	\$2,306	\$2,380	\$2,811	\$2,827	\$2,649	\$2,929	\$3,190	\$3,145	\$3,133	\$3,198	\$3,356	\$3,369
AMAT	\$1,154	\$1,190	\$1,216	\$1,082	\$960	\$1,099	\$924	\$998	\$1,267	\$1,114	\$1,335	\$1,914	\$1,438	\$1,604	\$1,781	\$2,061	\$2,224	\$2,454										
LRCX	\$417	\$462	\$613	\$436	\$351	\$476	\$357	\$360	\$628	\$553	\$488	\$845	\$725	\$727	\$902	\$738	\$967											
KLAC	\$461	\$501	\$411	\$221	\$176	\$261	\$357	\$332	\$453	\$339	\$474	\$537	\$576	\$479	\$615	\$586	\$769	\$799										
TEL	\$832	\$657	\$737	\$606	\$692	\$423	\$851	\$404	\$792	\$701	\$927	\$1,205	\$1,425	\$1,026	\$1,198	\$926	\$1,369	\$1,632	\$1,541	\$1,179	\$1,269	\$1,565	\$1,611	\$1,228	\$1,580	\$1,677	\$1,661	\$1,276
ex TEL	\$2,913	\$3,241	\$3,449	\$2,924	\$2,019	\$2,950	\$2,654	\$3,356	\$3,509	\$3,289	\$4,336	\$6,180	\$4,008	\$4,534	\$6,169	\$6,177	\$6,267	\$5,634	\$2,811	\$2,827	\$2,649	\$2,929	\$3,190	\$3,145	\$3,133	\$3,198	\$3,356	\$3,369
incl TEL	\$3,745	\$3,898	\$4,185	\$3,530	\$2,711	\$3,372	\$3,505	\$3,760	\$4,301	\$3,990	\$5,263	\$7,384	\$5,433	\$5,560	\$7,367	\$7,103	\$7,635	\$7,265	\$4,352	\$4,005	\$3,918	\$4,493	\$4,801	\$4,374	\$4,713	\$4,875	\$5,016	\$4,645
WFE																												
Total	\$10,709	\$11,610	\$12,139	\$12,693	\$13,900	\$13,900	\$13,350	\$12,750	\$11,750	\$11,025	\$12,875	\$15,250	\$12,250	\$14,000	\$15,750	\$18,000	\$19,500	\$20,500	\$21,500	\$21,700	\$23,000	\$23,000	\$22,500	\$22,250	\$22,000	\$21,000	\$21,000	\$20,000
Memory	\$5,480	\$6,162	\$7,044	\$7,714	\$9,788	\$9,200	\$8,000	\$7,150	\$6,150	\$5,800	\$5,550	\$5,350	\$5,350	\$7,300	\$7,150	\$9,250	\$9,250	\$9,500	\$10,250	\$11,000	\$11,000	\$10,500	\$10,250	\$10,000	\$10,000	\$9,500	\$8,700	
% total	51%	53%	58%	61%	70%	66%	60%	56%	52%	53%	43%	35%	44%	52%	45%	51%	47%	46%	48%	51%	48%	46%	47%	46%	45%	48%	45%	44%
% total (reported)									49%	49%	41%	32%	39%	47%	39%	44%	44%											
DRAM	\$2,049	\$1,711	\$2,279	\$2,928	\$4,604	\$4,032	\$3,904	\$3,011	\$2,777	\$2,641	\$2,612	\$2,220	\$2,400	\$3,250	\$3,350	\$4,200	\$3,850	\$4,000	\$5,000	\$5,500	\$5,250	\$5,250	\$5,250	\$5,050	\$5,000	\$4,250	\$4,500	\$4,600
NAND/other	\$3,430	\$4,451	\$4,765	\$4,786	\$5,184	\$5,168	\$4,096	\$4,139	\$3,373	\$3,159	\$2,938	\$3,130	\$2,950	\$4,050	\$3,800	\$5,050	\$5,400	\$5,500	\$5,250	\$5,500	\$5,750	\$5,250	\$5,250	\$5,200	\$5,000	\$5,750	\$5,000	\$4,100
DRAM % of Memory (estimated)	37%	28%	32%	38%	47%	44%	49%	42%	45%	46%	47%	41%	45%	45%	47%	45%	42%	42%	49%	50%	48%	50%	50%	49%	50%	43%	47%	53%
DRAM % of Memory (reported)	37%	28%	32%	37%	40%	37%	42%	36%	46%	46%	48%	42%	41%	42%	44%	37%	41%											
NAND % of Memory (estimated)	63%	72%	68%	62%	53%	56%	51%	58%	55%	54%	53%	59%	55%	55%	53%	55%	58%	58%	51%	50%	52%	50%	50%	51%	50%	58%	53%	47%
FL	\$5,230	\$5,448	\$5,095	\$4,979	\$4,112	\$4,700	\$5,350	\$5,600	\$5,600	\$5,225	\$7,325	\$9,900	\$6,900	\$6,700	\$8,600	\$8,750	\$10,250	\$11,000	\$11,250	\$10,700	\$12,000	\$12,500	\$12,000	\$12,000	\$12,000	\$11,000	\$11,500	\$11,300
Total				\$47,150				\$53,850				\$50,900				\$60,000				\$83,200				\$90,750				\$84,000
Memory				\$26,400				\$34,350				\$22,850				\$29,050				\$40,000				\$42,250				\$38,200
DRAM				\$9,100				\$15,550				\$10,250				\$13,200				\$18,350				\$20,800				\$18,350
NAND/other				\$17,300				\$18,800				\$12,600				\$15,850				\$21,650				\$21,450				\$19,850
FL				\$20,750				\$19,500				\$28,050				\$30,950				\$43,200				\$48,500				\$45,800

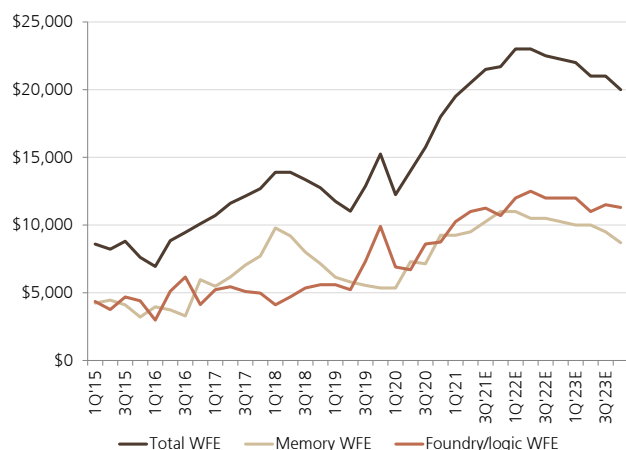
Source : Company Reports, UBS

Why do we spend so much time on quarterly WFE?

Understanding quarterly SPE dynamics is important because stocks are, contrary to opinion among some investors, highly correlated with this; ergo, we believe if quarterly WFE is not going to grow, stocks are unlikely to go up. The same is true even as we disaggregate the memory and foundry/logic segments.

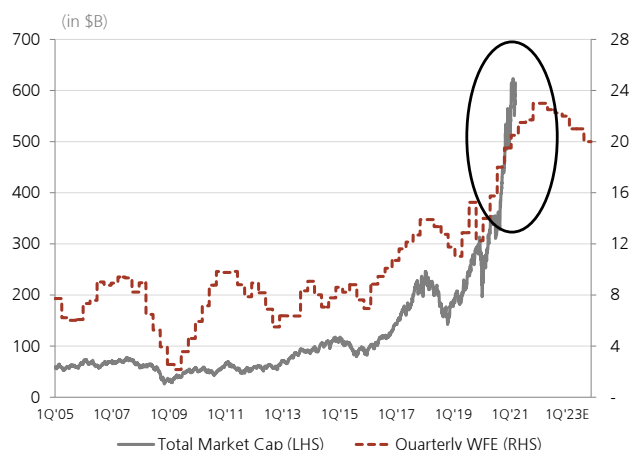
Overall, because quarterly WFE still have some upside, this should be constructive for stocks and prevent a significant correction, until WFE starts to roll over more significantly in 2H:22 if we are right about 2023 being down. Even so, minus LRCX, we just do not see a lot of upside for stocks from these levels unless the market is going to re-rate stock multiples from here - unlikely given the entrance of subsidies.

Figure 11: Quarterly WFE run-rate



Source : Company reports, UBSe

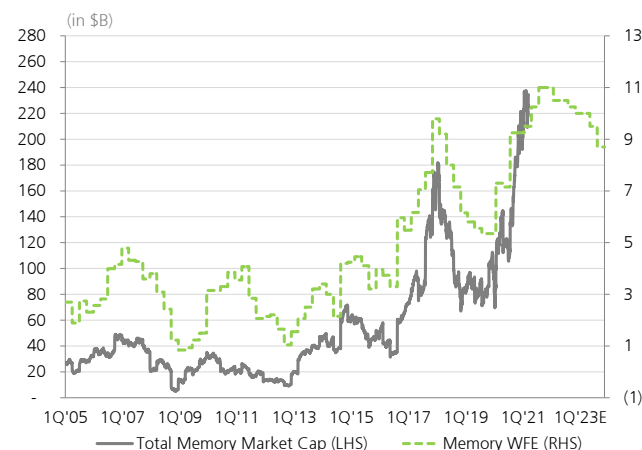
Figure 12: ... stocks are highly correlated to this metric



Source : Factset, Company reports, UBSe

Note: Total market capitalization includes ASML, AMAT, KLAC, LRCX, and Tokyo Electron

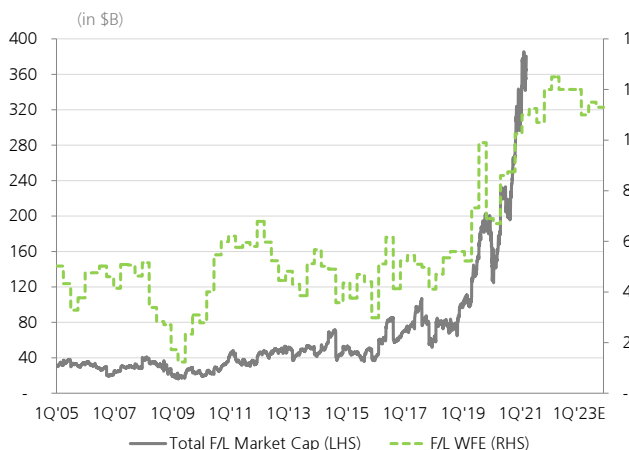
Figure 13: SPE stocks are well correlated to WFE run-rate, and memory appears biased higher...



Source : Factset, Company reports, UBSe

Note: Total memory market capitalization is calculated by taking individual market capitalization segmented in any given quarter by reported memory split

Figure 14: ... but foundry/logic is not likely to grow much if any



Source : Factset, Company Reports, UBSe

Note: Total foundry/logic market capitalization is calculated by taking individual market capitalization segmented in any given quarter by reported foundry/logic split

We then compare share to each segment – this does not change much but we still want to show this analysis. Note for memory, it is hard to break this down further because major suppliers like ASML and KLAC have stopped segmenting their memory segments further into DRAM and NAND. Most investors when considering relative exposure look at reported revenue by segment but we think this is incorrect. Rather, we think what is a better indicator is the SHARE of the actual dollars being spent in that segment.

When we compare these numbers, we conclude the following:

AMAT: overall share of foundry/logic dollars and memory dollars is about the same, indicating a fundamentally balanced customer profile. The data does support recent share gains in foundry/logic with a few 100bps of share gain in recent Qs even as spending in this segment has remained very strong. Memory share has been fairly static but because AMAT does segment DRAM and NAND, based on our segment estimates, we can see that in DRAM AMAT has gained share (See below Figure).

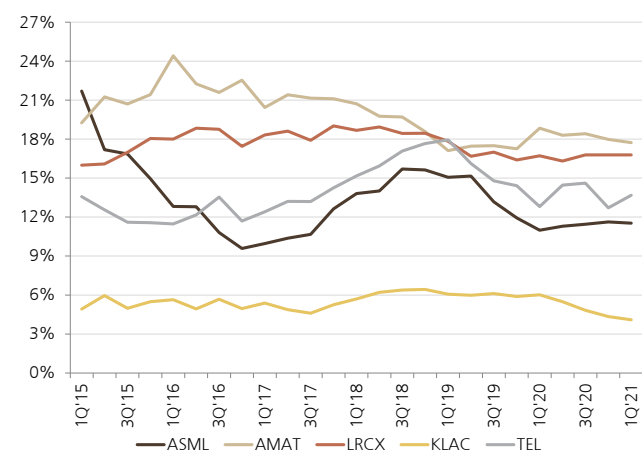
LRCX: has the 2nd highest share of memory dollars and 2nd lowest share of foundry/logic dollars with the share gap being the largest of any company in the sector. Recent share trends have been unremarkable, holding share in both segments.

KLAC: overall share of foundry/logic dollars and memory dollars is about the same, indicating a fundamentally balanced customer profile, which is counter to what many investors believe that KLAC is "over-indexed" to foundry/logic. Recently, share has stagnated and we do not anticipate much WFE share gain.

Tokyo Electron: overall share is roughly similar between the segments, though it has lost share in recent Qs in memory with some uplift in foundry/logic.

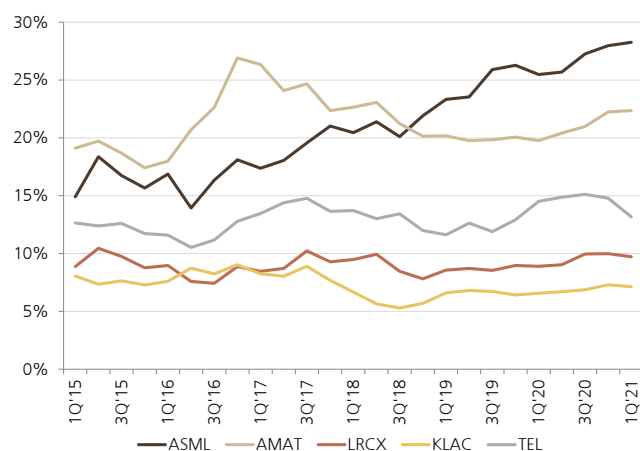
ASML: With significant recent gains of foundry/logic spending dollars as EUV has ramped, the data suggests ASML now has close to 30% share of all foundry/logic WFE dollars a number which is not quite 2x its share in memory, but close. This makes ASML by far the most over-indexed to foundry/logic especially considering its significant recent share gain since 2018 although we also believe there is still room for this share to increase in the mid-term when we progress to High-NA. We are now starting to see DRAM adoption of EUV and we believe ASML could see some share gain here although it will likely be much less dramatic as the layer adoption will be more limited (3-4 layers in Samsung 1a DRAM node compared to 14 layers in Samsung 5nm Foundry node). As we have said many times, this share gain is likely going to make it challenging for other suppliers to gain foundry/logic share as EUV ramps.

Figure 15: Share of memory WFE dollars, TTM



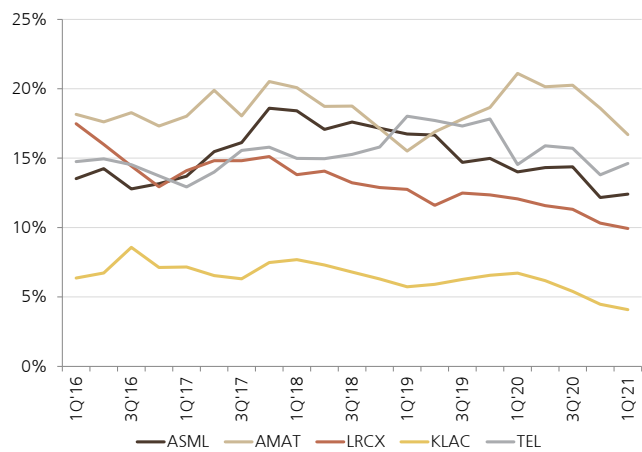
Source : Company reports, UBSe

Figure 16: Share of foundry/logic WFE dollars, TTM



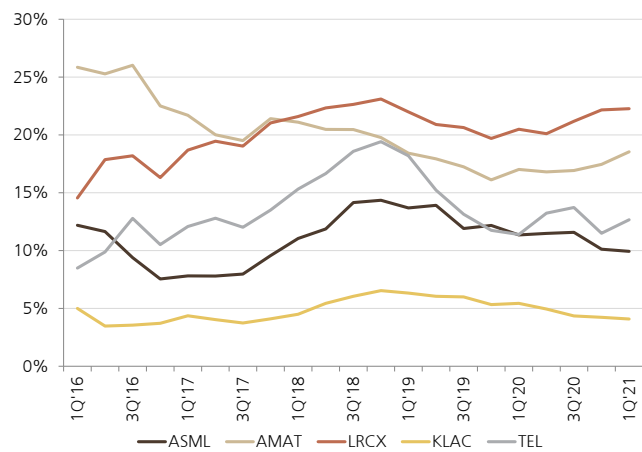
Source : Company reports, UBSe

Figure 17: DRAM WFE share TTM



Source : Company reports, UBSe

Figure 18: NAND WFE share TTM



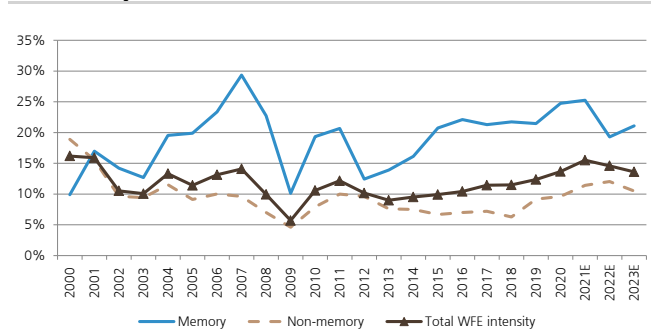
Source : Company reports, UBSe

WFE intensity analysis

From a high level, annual WFE intensity has been less volatile in recent years and trending up annually consistently for the past 5-7 years - in part as 450mm technology has not been developed (the only other way to reduce capital intensity beside process node migration). This is going to keep some upward pressure on WFE intensity, certainly versus the historic 10 and 20yr range of ~11-11.5%. Part of the recent increase has also been due to indigenous China building out manufacturing against relatively little revenue – which also tends to skew the numbers higher. This factor is unlikely to go away either. So, the right longer-term number is clearly higher than the 11-11.5% longer-term average and maybe even a bit higher than the ~13.6% average from 2019-2021 - but we don't think much higher.

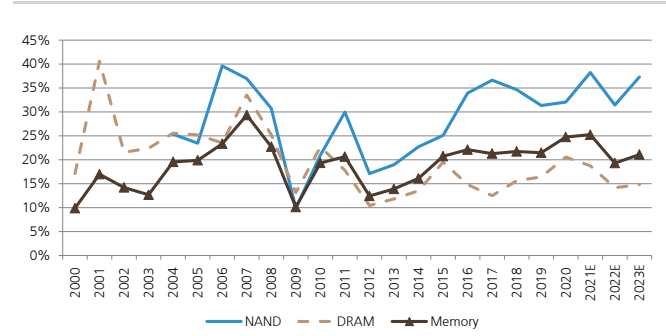
If we look by segment, we can see that NAND has been and likely will remain high, but DRAM has remained in a band that oscillates around mid teens - a much healthier level for that sector than DRAM where China is entering and consolidation must take place.

Figure 19: WFE intensity is rising in part due to a shift to memory in years past and a rise in foundry/logic intensity in recent Qs



Source : Company reports, UBSe

Figure 20: Within memory, intensity remains benign in DRAM but NAND is close to record levels

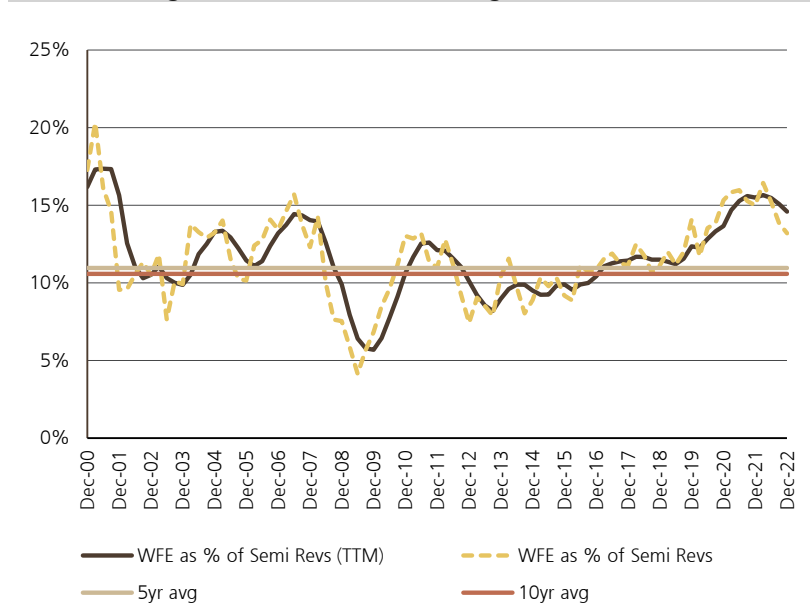


Source : Company reports, UBSe

If we take the analysis back farther, we see the degree to which WFE intensity has become less cyclical but has certainly been rising in recent years and due to the lack of 450mm, this should continue to run much higher than historic levels.

We estimate the 5yr average for WFE intensity is 11.0%, with the 10-yr average being 10.6%. We are currently running well above these levels and will examine this below.

Figure 21: 20yr WFE intensity has become less cyclical, but LT averages have not changed much and we are running above these levels

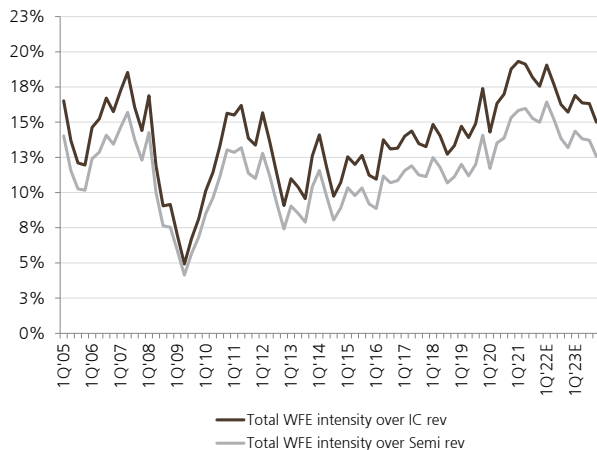


Source : Company reports, UBSe

When we examine this on a quarterly, 6mo, and TTM basis we see that overall WFE intensity (using the entire semiconductor industry revenue pie as the basis) has eclipsed 15% and will actually reach 16% for the next few Qs - a very high number by historic standards. On a TTM basis, however, we expect this number to start to drift lower as semiconductor revenue starts to out-grow WFE in C2022 and 2023 such that WFE intensity settles back into the mid 13% range in C2023 - a more sustainable number, and one that mirrors the 14% number that is assumed in AMAT's LT financial model.

By segment, this is being driven almost wholly by the non-memory (e.g. foundry/ logic) vertical as memory intensity remains consistent with historic ranges with NAND elevated and DRAM more subdued.

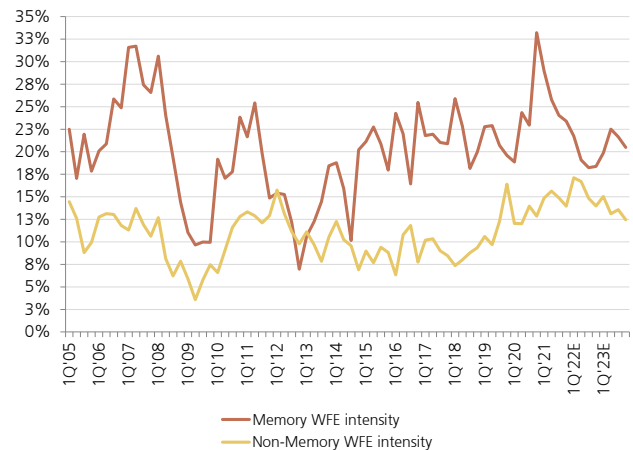
Figure 22: WFE Intensity, Quarterly



Source : Company reports, UBSe

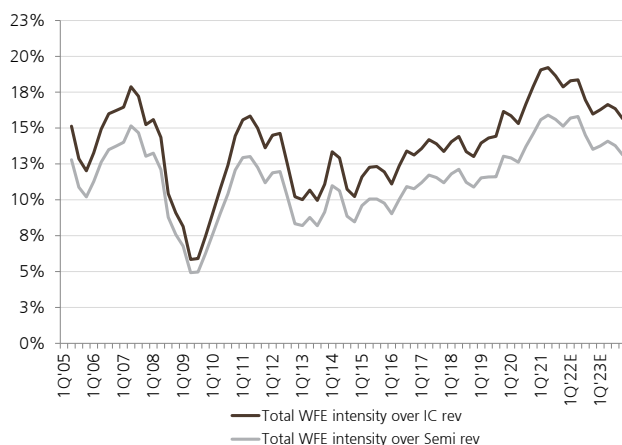
Note: Total WFE intensity over IC rev is calculated by WFE divided by UBSe IC revenue forecast. Total WFE intensity over Semi rev is calculated by WFE divided by UBSe Semi revenue forecast. Semi revenue includes IC as well as Discretes/Opto/Passive revenue.

Figure 23: WFE Intensity, Quarterly, By Segments



Source : Company reports, UBSe

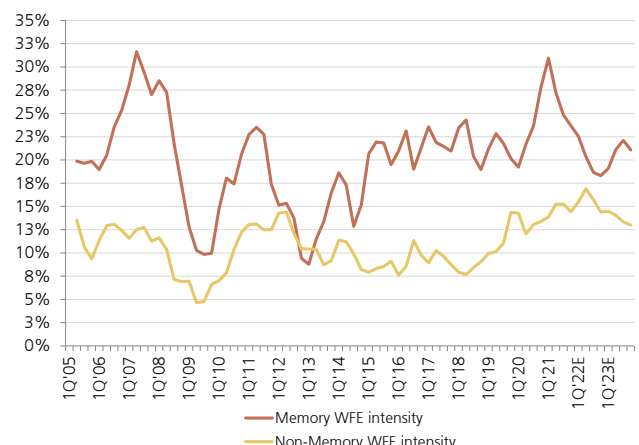
Figure 24: WFE Intensity, trailing 6 months



Source : Company reports, UBSe

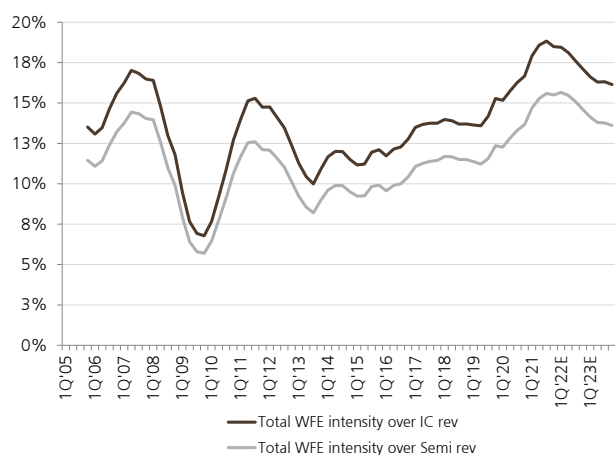
Note: Total WFE intensity over IC rev is calculated by WFE divided by UBSe IC revenue forecast. Total WFE intensity over Semi rev is calculated by WFE divided by UBSe Semi revenue forecast. Semi revenue includes IC as well as Discretes/Opto/Passive revenue.

Figure 25: WFE Intensity, trailing 6 months, By Segments



Source : Company reports, UBSe

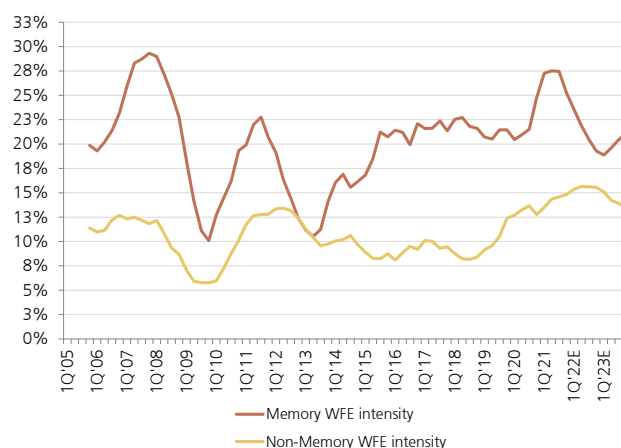
Figure 26: WFE Intensity, trailing 12 months



Source : Company reports, UBSe

Note: Total WFE intensity over IC rev is calculated by WFE divided by UBSe IC revenue forecast. Total WFE intensity over Semi rev is calculated by WFE divided by UBSe Semi revenue forecast. Semi revenue includes IC as well as Discretes/Opto/Passive revenue.

Figure 27: WFE Intensity, trailing 12 months, By Segments



Source : Company reports, UBSe

When looking at these numbers, we acknowledge a few potentially mitigating factors.

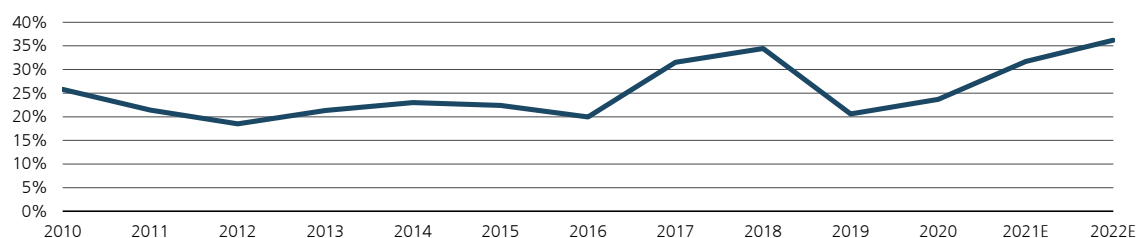
1. There are WFE dollars from C2020 and onwards - e.g. from YMTC – that are not supported by revenue given that China is trying to ramp its indigenous semiconductor industry.
2. When we measure WFE intensity, we typically measure it against revenue but chipmakers don't spend revenue dollars – they spend profit dollars. So this analysis holds true over time only if profitability in the industry remains fairly consistent.

So, to this end, we also analyzed semiconductor industry profit margins and considered WFE spending levels against this dollar pool. Semi industry profit levels have increased in recent years with industry OpM of 20% (2016), 32% (2017), 34% (2018), 21% (2019), and 24% (2020) over the past 5yrs. OpM of 32% in a down year for the industry is better than virtually any year prior to 2017 when memory took off (see Figure 28 and Figure 29).

Figure 28: Semis industry OpM has risen over the past few years...

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E
Total Revenue	211,934	227,918	231,288	248,457	277,723	272,877	302,731	373,218	433,172	384,227	430,687	499,848	573,650
Total OP	54,694	48,808	42,758	52,982	63,878	61,183	60,368	117,634	149,094	79,080	101,959	158,412	207,595
OpM	26%	21%	18%	21%	23%	22%	20%	32%	34%	21%	24%	32%	36%

Revenue and OP include top chipmakers such as Samsung, Intel, SK hynix, MU, AVGO, QCOM, etc

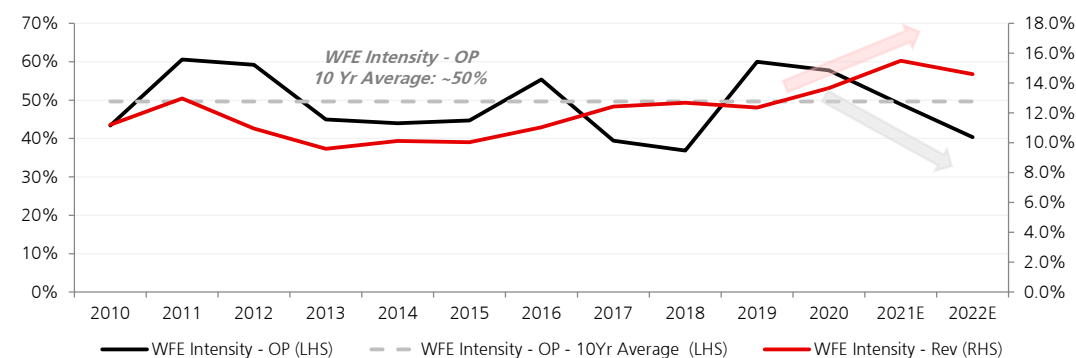


Source : Factset, Company reports, UBSe

NOTE: Revenue and OP numbers are based on Street estimates and this analysis includes the following companies - Samsung (semis only), INTC, TSMC, SK Hynix, MU, AVGO, QCOM (QCT starting in 2014), TXN, STM, WDC, NXPI, IFX, NVDA, Mediatek, Renesas, Sony (semis only), AMD, ADI, HiSilicon, ON, MCHP, SWKS, and Rohm

So when we consider WFE relative to industry OP, we do see that the WFE intensity is, in aggregate, much more benign. In fact, even though WFE intensity on a revenue basis is elevated by historic standards, the OP pool for the industry has expanded so much that WFE relative to OP is actually running below the median in C2021 and is dipping to very low levels in C2022. On this basis, it is therefore hard to see a major correction in WFE even as chip industry margins could come off in C2023.

Figure 29: ...so this is generally more supportive that these annual WFE levels may be more sustainable

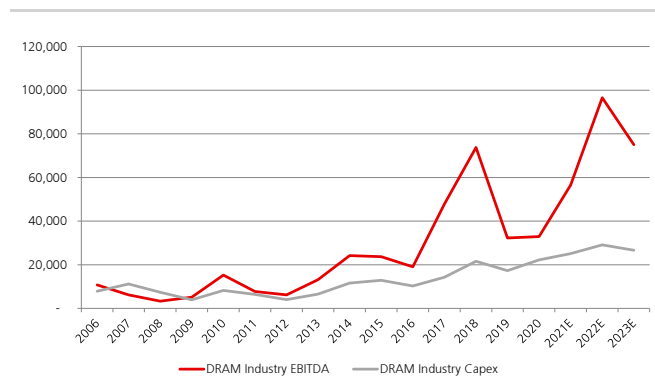


Source : Factset, Company reports, UBSe

We continue to hear a lot of concern about the sustainability of NAND investment. To this end, we have updated our analysis comparing NAND capex to overall industry EBITDA. During the last cycle downturn, EBITDA fell below industry capex, recovering to levels only slightly above capex in C2020. Given strong NAND capex, we still see total industry capex running above EBITDA this year, though given expanding EBITDA in 2022 (largely 1H), we should see EBITDA back above capex before falling back to levels far below capex in C2023. This does suggest some potential pressure on NAND capex in the C2023/2024 timeframe if our EBITDA forecasts prove correct.

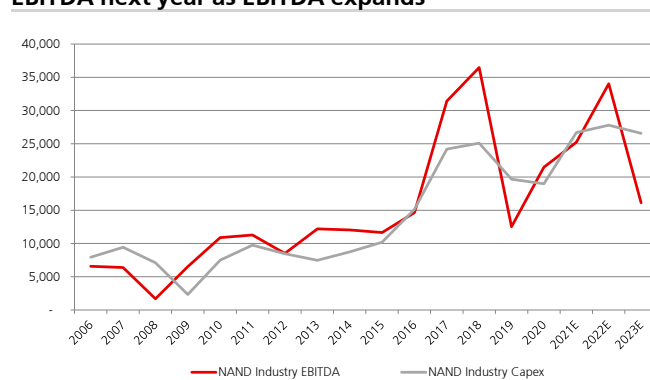
For DRAM, the situation is far more benign with industry EBITDA now far outpacing capex. Even in the down cycle years of 2016 and 2019, industry EBITDA still remained far above capex and we expect this to remain the case. This forms the backdrop for why we are so bullish over the longer-term on MU as the normalized margins of the industry should continue to expand and if major customers start to contract bits over a longer time frame, that could sacrifice some margin but in exchange for more visibility on ROI - a net positive (see Figures below).

Figure 30: DRAM industry Capex has been running way above the DRAM industry EBITDA for the past 10 years



Source : Factset, Company Reports, UBSe

Figure 31: NAND industry Capex is running above the NAND industry EBITDA in C21 but would come in below EBITDA next year as EBITDA expands



Source : Factset, Company Reports, UBSe

AMAT

Estimate Changes

We model FQ3:21E Revs/EPS of \$6.06B/\$1.85 compared to consensus of \$5.94B/\$1.77 and we model CY21/22E Revs/EPS of \$23.82B/\$7.02 \$26.30B/\$7.93 compared to consensus of \$23.68B/\$7.02 \$25.77B/\$7.68.

Figure 32: UBS vs. Street

	2018	2019	2020	2021/1F	2021/2F	2021/3F	2021/4F	2021	2022/1F	2022/2F	2022/3F	2022/4F	2022	2023	CY2018	CY2019	CY2020	CY2021	CY2022	CY2023
Revenues (\$MM)																				
UBS (New)	\$ 17,253	\$ 14,608	\$ 17,202	\$ 5,162	\$ 5,582	\$ 6,055	\$ 6,085	\$ 22,884	\$ 6,097	\$ 6,426	\$ 6,632	\$ 6,611	\$ 25,766	\$ 25,786	\$ 16,802	\$ 15,017	\$ 18,202	\$ 23,819	\$ 26,303	\$ 25,291
UBS (Old)						\$ 6,055	\$ 6,085	\$ 22,884	\$ 6,097	\$ 6,426	\$ 6,632	\$ 6,461	\$ 25,616	\$ 23,936				\$ 23,819	\$ 25,753	\$ 23,591
Consensus						\$ 5,937	\$ 6,039	\$ 22,720	\$ 6,117	\$ 6,255	\$ 6,462	\$ 6,536	\$ 25,370	\$ 25,442				\$ 23,675	\$ 25,767	\$ 25,428
Delta						2.0%	0.8%	0.7%	(0.3%)	2.7%	2.6%	1.1%	1.6%	1.3%				0.6%	2.1%	(0.5%)
EPS (Non-GAAP)																				
UBS (New)	\$ 4.45	\$ 3.04	\$ 4.16	\$ 1.39	\$ 1.63	\$ 1.85	\$ 1.80	\$ 6.66	\$ 1.74	\$ 1.92	\$ 1.99	\$ 2.00	\$ 7.65	\$ 7.84	\$ 4.20	\$ 3.21	\$ 4.58	\$ 7.02	\$ 7.93	\$ 7.67
UBS (Old)						\$ 1.85	\$ 1.80	\$ 6.66	\$ 1.74	\$ 1.92	\$ 1.99	\$ 1.91	\$ 7.57	\$ 6.77				\$ 7.02	\$ 7.64	\$ 6.60
Consensus						\$ 1.77	\$ 1.81	\$ 6.61	\$ 1.81	\$ 1.84	\$ 1.92	\$ 1.95	\$ 7.52	\$ 7.65				\$ 7.02	\$ 7.68	\$ 7.69
Delta						4.1%	(0.4%)	0.8%	(3.8%)	4.5%	3.8%	2.4%	1.8%	2.5%				(0.1%)	3.3%	(0.2%)

Source : Company data, Factset, UBSe

Figure 33: New vs. Old

	New	FY 2021 Old	% Change	New	FY 2022 Old	% Change
Revenue (\$MM)	\$22,884	\$22,884	--	\$25,766	\$25,616	0.6%
Y/Y Growth	33.0%	33.0%		12.6%	11.9%	
Gross Margin (Non-GAAP)	47.2%	47.2%	--	47.9%	47.8%	0.1%
Operating Margin	31.1%	31.1%	--	31.2%	31.0%	0.2%
Non-GAAP EPS	\$6.66	\$6.66	--	\$7.65	\$7.57	1.2%
Segment Revenue(\$MM)						
Semiconductor Systems Revenue	\$16,150	\$16,150	--	\$18,000	\$17,850	0.8%
Y/Y Growth	42.1%	42.1%		11.5%	10.5%	
Applied Global Services Revenue	\$4,953	\$4,953	--	\$5,696	\$5,696	--
Y/Y Growth	19.2%	19.2%		15.0%	15.0%	
Display and Adjacent Markets Revenue	\$1,646	\$1,646	--	\$1,950	\$1,950	--
Y/Y Growth	2.4%	2.4%		18.5%	18.5%	

Source : Company data, UBSe

Figure 34: Summary Model

Applied Materials, Inc. (AMAT) - Key Metrics (in \$MM except EPS)	C2017A	C2018A	C2019A	C2020E	FQ2A CQ1A	Estimates FQ3E CQ2E	FQ4:20E CQ3E	FQ1E CQ4E	C2021E	C2022E	F2017A	F2018A	F2019A	F2020A	F2021E	F2022E
Revenue	\$15,463	\$16,802	\$15,017	\$18,202	\$5,582	\$6,055	\$6,085	\$6,097	\$23,819	\$26,303	\$14,537	\$17,253	\$14,608	\$17,202	\$22,884	\$25,766
Y/Y Growth	31%	9%	(11%)	21%	41%	38%	30%	18%	31%	10%	34%	19%	(15%)	18%	33%	13%
Gross Margin	46.4%	45.9%	44.1%	45.3%	47.7%	47.7%	47.5%	47.2%	47.5%	47.9%	46.1%	46.3%	44.0%	45.1%	47.2%	47.9%
Opex	\$2,551	\$3,029	\$3,045	\$3,297	\$894	\$941	\$991	\$1,040	\$3,866	\$4,312	\$2,476	\$2,784	\$2,777	\$2,968	\$3,358	\$3,895
Y/Y Growth	6%	19%	1%	8%	13%	15%	21%	19%	17%	12%	6%	12%	(0%)	7%	13%	16%
Operating Margin	28.7%	27.8%	23.8%	27.2%	31.7%	32.2%	31.2%	30.1%	31.3%	31.6%	27.9%	29.0%	23.5%	26.3%	31.1%	31.2%
Non-GAAP EPS	\$3.64	\$4.20	\$3.21	\$4.58	\$1.63	\$1.85	\$1.80	\$1.74	\$7.02	\$7.93	\$3.25	\$4.45	\$3.04	\$4.16	\$6.66	\$7.65
FCF																
FFFO	\$4,429	\$3,155	\$3,400	\$4,238	\$1,187	\$1,518	\$1,965	\$1,635	\$6,306	\$6,201	\$3,609	\$3,787	\$3,247	\$3,804	\$6,092	\$6,181
Capex	\$484	\$552	\$410	\$441	\$204	\$65	\$65	\$65	\$399	\$260	\$345	\$622	\$441	\$422	\$455	\$260
FCF	\$3,945	\$2,603	\$2,990	\$3,797	\$983	\$1,453	\$1,900	\$1,570	\$5,907	\$5,941	\$3,264	\$3,165	\$2,806	\$3,382	\$5,637	\$5,921
% revenue	25.5%	15.5%	19.9%	20.9%	17.6%	24.0%	31.2%	25.8%	24.8%	22.6%	22.5%	18.3%	19.2%	19.7%	24.6%	23.0%
Segment Revenue																
Semi Systems	\$10,214	\$10,226	\$9,573	\$12,106	\$3,972	\$4,325	\$4,300	\$4,300	\$16,897	\$18,200	\$9,517	\$10,805	\$9,027	\$11,367	\$16,150	\$18,000
Y/Y Growth	34%	0%	(6%)	26%	55%	48%	40%	21%	40%	8%	38%	14%	(16%)	26%	42%	11%
Applied Global Service	\$3,221	\$3,838	\$3,889	\$4,313	\$1,203	\$1,275	\$1,320	\$1,367	\$5,165	\$5,833	\$3,017	\$3,756	\$3,854	\$4,155	\$4,953	\$5,696
Y/Y Growth	20%	19%	1%	11%	18%	23%	19%	18%	20%	13%	15%	24%	3%	8%	19%	15%
Display & Adjacent Markets	\$1,933	\$2,669	\$1,476	\$1,686	\$375	\$425	\$435	\$400	\$1,635	\$2,150	\$1,900	\$2,617	\$1,651	\$1,607	\$1,646	\$1,950
Y/Y Growth	43%	38%	(45%)	14%	3%	—	(10%)	(3%)	(3%)	31%	66%	38%	(37%)	(3%)	2%	18%
Other	\$95	\$88	\$79	\$97	\$32	\$30	\$30	\$30	\$122	\$120	\$103	\$87	\$83	\$73	\$135	\$120
Y/Y Growth	(43%)	(7%)	(10%)	23%	357%	50%	11%	(30%)	26%	(2%)	(44%)	(16%)	(5%)	(12%)	85%	(11%)
Segment Operating Income																
Semi Systems	\$3,478	\$3,270	\$2,759	\$4,074	\$1,542	\$1,687	\$1,677	\$1,634	\$6,540	\$6,690	\$3,173	\$3,634	\$2,475	\$3,728	\$6,167	\$6,749
Y/Y Growth	56%	(6%)	(16%)	48%	97%	76%	56%	30%	61%	2%	76%	15%	(32%)	51%	65%	9%
Applied Global Service	\$893	\$1,133	\$1,094	\$1,181	\$358	\$357	\$370	\$383	\$1,467	\$1,633	\$817	\$1,102	\$1,101	\$1,127	\$1,417	\$1,595
Y/Y Growth	25%	27%	(3%)	8%	40%	31%	16%	15%	24%	11%	18%	35%	(0%)	2%	26%	13%
Display & Adjacent Markets	\$491	\$693	\$220	\$321	\$65	\$85	\$87	\$80	\$317	\$469	\$505	\$679	\$297	\$294	\$302	\$417
Y/Y Growth	58%	41%	(68%)	46%	(13%)	2%	(11%)	23%	(1%)	48%	117%	34%	(56%)	(1%)	3%	38%
Other	(\$418)	(\$424)	(\$503)	(\$619)	(\$197)	(\$182)	(\$235)	(\$259)	(\$872)	(\$491)	(\$445)	(\$422)	(\$446)	(\$620)	(\$775)	(\$721)

Source : Company data, UBSe

Valuation

Our \$140 PT (from \$130) is based on ~18x (from ~17x) on C22E EPS of \$7.93 (from \$7.64). Our estimates were slightly higher on WFE estimates increase and our multiple is slightly higher.

Figure 35: Valuation

Valuation	New	Old
Non-GAAP EPS		
C2022	\$7.93	\$7.64
Multiple		
	18x	17x
Price Target		
	\$140	\$130

Source : UBS estimates

Multiple Justification

We increase our multiple by 1 turn to ~18x (from ~17x). Our multiple is based on the historical stock multiple relative to market - AMAT has been trading at ~0.79x S&P 500 multiple on a 2-yr median, which suggests a ~17x multiple (or ~0.79x of S&P500 current forward multiple of ~21x). Nonetheless, because of the share gains particularly in DRAM and the likelihood that mix shifts in that direction, we are using a higher multiple at ~18x.

Figure 36: AMAT vs S&P 500 PE



Current S&P 500 PE Multiple	21x
* AMAT 2-Yr Avg Premium / (Discount)	79%
Implied AMAT Multiple	17x

Source : Factset

Figure 37: Upside/Downside Spectrum



Source : UBSe

Upside (\$175): We assume C21/C22 total revs of \$21.6B/\$27.0B, Semi System/AGS to grow at 18%/10%, 25%/15% in C21/C22, respectively, and we assume gross margins of 49%/49% to arrive at C22 EPS of \$8.50. We then apply ~21x multiple to arrive at \$175 upside valuation.

Base (\$140): We assume C21/C22 total revs of \$23.8B/\$26.3B, Semi System/AGS to grow at 40%/8%, 20%/13% in C21/C22, respectively, and we assume gross margins of 48%/48% to arrive at C22 EPS of \$7.93. We then apply ~18x multiple to arrive at our \$140 PT.

Downside (\$85): We assume C21/C22 total revs of \$19.8B/\$24.2B, Semi System/AGS to grow at 10%/0%, 10%/5% in C21/C22, respectively, and we assume gross margins of 45%/43% to arrive at C22 EPS of \$5.50. We then apply ~15x multiple to arrive at \$85 downside valuation.

LRCX

Estimate Changes

We model FQ4:21E Revs/EPS of \$4.10B/\$7.84 compared to consensus of \$4.01B/\$7.55 and we model CY21/22E Revs/EPS of \$17.00B/\$33.61 \$19.65B/\$41.42 compared to consensus of \$16.04B/\$30.74 \$17.37B/\$34.26.

Figure 38: UBS vs. Street

	FY2019	FY2020	2021/1F	2021/2F	2021/3F	2021/4F	FY2021	2022/1F	2022/2F	2022/3F	2022/4F	FY2022	FY2023	CY2018	CY2019	CY2020	CY2021	CY2022	CY2023
Revenues (\$MM)																			
UBS	\$ 9,654	\$ 10,045	\$ 3,177	\$ 3,456	\$ 3,848	\$ 4,100	\$ 14,581	\$ 4,450	\$ 4,600	\$ 5,150	\$ 5,000	\$ 19,200	\$ 19,100	\$ 10,560	\$ 9,549	\$ 11,929	\$ 16,998	\$ 19,650	\$ 19,100
UBS (Old)						\$ 4,100	\$ 14,581	\$ 4,150	\$ 4,200	\$ 4,300	\$ 4,500	\$ 17,150	\$ 17,050				\$ 16,298	\$ 17,800	\$ 16,200
Consensus						\$ 4,009	\$ 14,490	\$ 4,042	\$ 4,141	\$ 4,256	\$ 4,347	\$ 16,786	\$ 17,424				\$ 16,040	\$ 17,370	-
Delta						2.3%	0.6%	10.1%	11.1%	21.0%	15.0%	14.4%	9.6%				6.0%	13.1%	-
EPS (Non-GAAP)																			
UBS	\$ 14.55	\$ 15.94	\$ 5.67	\$ 6.03	\$ 7.49	\$ 7.84	\$ 27.00	\$ 8.90	\$ 9.37	\$ 10.95	\$ 10.56	\$ 39.76	\$ 40.40	\$ 17.34	\$ 14.51	\$ 20.47	\$ 33.61	\$ 41.42	\$ 40.92
UBS (Old)						\$ 7.84	\$ 27.01	\$ 8.04	\$ 8.22	\$ 8.48	\$ 9.10	\$ 33.83	\$ 34.42				\$ 31.60	\$ 36.03	\$ 32.31
Consensus						\$ 7.55	\$ 26.74	\$ 7.73	\$ 7.97	\$ 8.24	\$ 8.56	\$ 32.49	\$ 34.47				\$ 30.74	\$ 34.26	-
Delta						3.8%	1.0%	15.2%	17.6%	32.9%	23.4%	22.4%	17.2%				9.3%	20.9%	-

Source : Company data, Factset, UBSe

Figure 39: New vs. Old

	New	FY 2021 Old	% Change	New	FY 2022 Old	% Change
Revenue (\$MM)	\$14,581	\$14,581	0.0%	\$19,200	\$17,150	12.0%
Y/Y Growth	45.2%	45.2%		31.7%	17.6%	
Gross Margin (Non-GAAP)	46.8%	46.8%	0.0%	47.0%	47.0%	0.0%
Operating Margin	31.3%	31.3%	0.0%	34.4%	32.9%	1.5%
Non GAAP EPS	\$27.00	\$27.01	(0.0%) --	\$39.76	\$33.83	17.5%
Shares Outstanding	145	145		141	141	

Source : Company data, UBSe

Figure 40: Summary Model

Lam Research Corporation (LRCX) - Key Metrics (in \$MM except EPS)												FISCAL YEAR SUMMARY					
	C2017A	C2018A	C2019A	C2020	FQ3 CQ1	Estimates FQ4:21E CQ2E	FQ1E CQ3E	FQ2E CQ4E	C2021E	C2022E		F2017A	F2018A	F2019A	F2020A	F2021E	F2022E
Systems	\$6,949	\$7,842	\$6,295	\$7,968	\$2,545	\$2,725	\$3,010	\$3,050	\$11,330	\$12,550		\$5,579	\$8,268	\$6,452	\$6,626	\$9,726	\$12,760
Y/Y Growth	70%	13%	(20%)	27%	54%	46%	40%	32%	42%	11%		49%	48%	(22%)	3%	47%	31%
Services	\$2,609	\$3,029	\$3,254	\$3,960	\$1,302	\$1,375	\$1,440	\$1,550	\$5,667	\$7,100		\$2,435	\$2,809	\$3,202	\$3,419	\$4,855	\$6,440
Y/Y Growth	14%	16%	7%	22%	52%	48%	40%	35%	43%	25%		14%	15%	14%	7%	42%	33%
Total Revenue	\$9,558	\$10,871	\$9,549	\$11,929	\$3,848	\$4,100	\$4,450	\$4,600	\$16,998	\$19,650		\$8,014	\$11,077	\$9,654	\$10,045	\$14,581	\$19,200
Y/Y Growth	50%	14%	(12%)	25%	54%	47%	40%	33%	42%	16%		36%	38%	(13%)	4%	45%	32%
Gross Margin	46.9%	46.9%	45.5%	46.7%	46.3%	46.8%	47.0%	47.0%	46.8%	47.0%		46.1%	47.4%	45.9%	45.9%	46.8%	47.0%
Opex	\$1,749	\$1,872	\$1,850	\$2,066	\$567	\$583	\$593	\$598	\$2,339	\$2,460		\$1,618	\$1,868	\$1,829	\$1,891	\$2,236	\$2,420
Y/Y Growth	19%	7%	(1%)	12%	16%	18%	13%	6%	13%	5%		13%	15%	(2%)	3%	18%	8%
Operating Margin	28.7%	29.6%	26.2%	29.4%	31.6%	32.5%	33.7%	34.0%	33.0%	34.5%		26.0%	30.5%	27.0%	27.1%	31.3%	34.4%
Non-GAAP EPS	\$13.70	\$17.34	\$14.51	\$20.47	\$7.49	\$7.84	\$8.90	\$9.37	\$33.61	\$41.42		\$9.96	\$17.87	\$14.55	\$15.94	\$27.00	\$39.76
Free Cash Flow																	
CFFO	\$2,039	\$3,131	\$2,585	\$2,342	\$1,165	\$848	\$1,279	\$1,288	\$4,580	\$5,903		\$2,029	\$2,656	\$3,176	\$2,126	\$3,000	\$5,434
Capex	\$224	\$291	\$243	\$257	\$90	\$103	\$134	\$138	\$464	\$542		\$157	\$273	\$303	\$203	\$347	\$576
FCF	\$1,815	\$2,841	\$2,343	\$2,085	\$1,075	\$745	\$1,145	\$1,150	\$4,116	\$5,361		\$1,872	\$2,382	\$2,873	\$1,923	\$2,653	\$4,858
% revenue	19.0%	26.1%	24.5%	17.5%	28.0%	18.2%	25.7%	25.0%	24.2%	27.3%		23.4%	21.5%	29.8%	19.1%	18.2%	25.3%
System Revenue Segments (shipments before Jun 2018)																	
DRAM	\$1,947	NA	\$1,273	\$1,362	\$356												
Y/Y Growth	72%	NA	NA	7%	35%												
NAND	\$5,267	NA	\$2,498	\$3,513	\$1,222												
Y/Y Growth	72%	NA	NA	41%	85%												
Memory	\$7,214	NA	\$3,771	\$4,875	\$1,578												
Y/Y Growth	72%	NA	NA	29%	71%												
Foundry	\$2,033	NA	\$1,767	\$2,425	\$789												
Y/Y Growth	3%	NA	NA	37%	54%												
IDM / Logic	\$720	NA	\$758	\$668	\$178												
Y/Y Growth	43%	NA	NA	(12%)	(17%)												

Source : Company data, UBSe

Valuation: Our \$745 PT (from \$725) is based on ~18x (from ~20x) on C22E EPS of \$41.42 (from \$36.03). While our estimates were slightly higher, our multiple is slightly lower when we look at the historical stock multiple relative to market.

Figure 41: Valuation

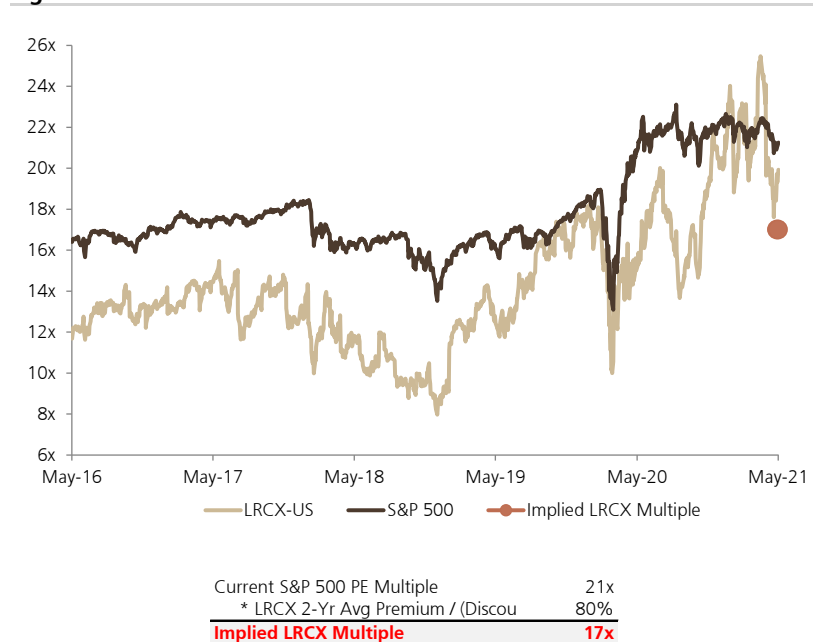
Valuation	New	Old
C2022 Non-GAAP EPS	\$41.42	\$36.03
Multiple	18x	20x
Price Target	\$745	\$725

Source : Company reports, UBS

Multiple Justification

We reduce our multiple by 2 turns to ~18x (from ~20x). Our multiple is based on the historical stock multiple relative to market. LRCX has been trading at ~0.80x S&P 500 multiple on a 2-yr median. We therefore apply ~18x multiple, which is ~0.80x of S&P500 current forward multiple of ~21x.

Figure 42: LRCX vs S&P 500 PE



Source : Factset

KLAC

Estimate Changes

We model FQ4:21E Revs/EPS of \$1.88B/\$4.04 compared to consensus of \$1.87B/\$3.98 and we model CY21/22E Revs/EPS of \$7.63B/\$16.41 \$8.24B/\$18.13 compared to consensus of \$7.53B/\$16.16 \$8.02B/\$17.36.

Figure 43: UBS vs. Street

	2019	2020	2021/1F	2021/2F	2021/3F	2021/4F	2021	2022/1F	2022/2F	2022/3F	2022/4F	2022	2023	CY2018	CY2019	CY2020	CY2021	CY2022	CY2023
Revenues (\$MM)																			
UBS (New)	\$ 4,569	\$ 5,806	\$ 1,539	\$ 1,651	\$ 1,804	\$ 1,884	\$ 6,878	\$ 1,947	\$ 1,999	\$ 2,043	\$ 2,053	\$ 8,042	\$ 8,278	\$ 4,304	\$ 5,279	\$ 6,073	\$ 7,634	\$ 8,245	\$ 8,206
UBS (Old)						\$ 1,884	\$ 6,878	\$ 1,902	\$ 1,924	\$ 1,993	\$ 2,003	\$ 7,822	\$ 7,803				\$ 7,514	\$ 7,995	\$ 7,531
Consensus						\$ 1,870	\$ 6,863	\$ 1,909	\$ 1,948	\$ 1,982	\$ 1,991	\$ 7,829	\$ 8,071				\$ 7,530	\$ 8,016	-
Delta						0.8%	0.2%	2.0%	2.6%	3.1%	3.1%	2.7%	2.6%				1.4%	2.9%	-
EPS (Non-GAAP)																			
UBS (New)	\$ 8.46	\$ 10.35	\$ 3.03	\$ 3.24	\$ 3.85	\$ 4.04	\$ 14.16	\$ 4.19	\$ 4.32	\$ 4.45	\$ 4.48	\$ 17.44	\$ 18.30	\$ 9.14	\$ 8.73	\$ 11.48	\$ 16.41	\$ 18.13	\$ 18.11
UBS (Old)						\$ 4.04	\$ 14.16	\$ 4.04	\$ 4.06	\$ 4.26	\$ 4.30	\$ 16.65	\$ 16.41				\$ 15.98	\$ 17.18	\$ 15.26
Consensus						\$ 3.98	\$ 14.10	\$ 4.09	\$ 4.24	\$ 4.34	\$ 4.29	\$ 16.96	\$ 17.30				\$ 16.16	\$ 17.36	-
Delta						0.4%	1.5%	2.4%	1.9%	2.7%	4.5%	2.8%	5.7%				1.5%	4.4%	-

Source : Company data, Factset, UBSe

Figure 44: New vs. Old

	FY 2021			FY 2022		
	New	Old	% Change	New	Old	% Change
Revenue (\$MM)	\$6,878	\$6,878	0%	\$8,042	\$7,822	3%
Gross Margin (Non-GAAP)	62.3%	62.3%	0.0%	62.4%	62.6%	-0.2%
OpEx	\$1,639	\$1,639	0.0%	\$1,819	\$1,715	6.1%
Operating Margin	38.5%	38.5%	0.0%	39.8%	39.2%	0.6%
Non-GAAP EPS	\$14.16	\$14.16	0%	\$17.44	\$16.65	5%
Services Revenue (\$MM)	\$1,669	\$1,669	0%	\$1,848	\$1,848	0%
FCF (\$MM)	\$2,157	\$2,157	0%	\$2,218	\$2,172	2%

Source : Company data, UBSe

Figure 45: Summary Model

KLA Corporation (KLAC) - Key Metrics													FISCAL YEAR SUMMARY				
(in \$MM except EPS)	C2017A	C2018A	C2019A	C2020E	FQ3A CQ1A	Estimates FQ4:20E CQ2E	FQ1E CQ3E	FQ2E CQ4E	C2021E	C2022E	C2023E		F2019A	F2020A	F2021E	F2022E	F2023E
Systems	\$2,981	\$3,320	\$3,913	\$4,510	\$1,375	\$1,450	\$1,507	\$1,540	\$5,872	\$6,307	\$6,075		\$3,392	\$4,329	\$5,209	\$6,194	\$6,245
Y/Y Growth	19%	11%	18%	15%	31%	35%	32%	24%	30%	7%	(4%)		7%	28%	20%	19%	1%
Services	\$817	\$985	\$1,365	\$1,563	\$428	\$434	\$440	\$459	\$1,762	\$1,938	\$2,131		\$1,177	\$1,478	\$1,669	\$1,848	\$2,033
Y/Y Growth	9%	21%	39%	15%	15%	13%	12%	11%	13%	10%	10%		34%	26%	13%	11%	10%
Revenue	\$3,798	\$4,304	\$5,279	\$6,073	\$1,804	\$1,884	\$1,947	\$1,999	\$7,634	\$8,245	\$8,206		\$4,569	\$5,806	\$6,878	\$8,042	\$8,278
Y/Y Growth	17%	13%	23%	15%	27%	29%	27%	21%	26%	8%	(0%)		13%	27%	18%	17%	3%
Gross Margin	63.5%	64.4%	60.2%	61.4%	62.9%	62.3%	62.3%	62.3%	62.4%	62.6%	62.6%		61.8%	60.8%	62.3%	62.4%	62.7%
Opex	\$976	\$1,064	\$1,449	\$1,515	\$407	\$414	\$432	\$447	\$1,700	\$1,911	\$1,974		\$1,219	\$1,598	\$1,639	\$1,819	\$1,953
Y/Y Growth	13%	9%	36%	5%	8%	12%	15%	14%	12%	12%	3%		17%	31%	3%	11%	7%
Operating Margin	37.8%	39.7%	32.7%	36.4%	40.4%	40.3%	40.1%	39.9%	40.1%	39.4%	38.5%		35.1%	33.2%	38.5%	39.8%	39.1%
Non-GAAP EPS	\$7.03	\$9.14	\$8.73	\$11.48	\$3.85	\$4.04	\$4.19	\$4.32	\$16.41	\$18.13	\$18.11		\$8.46	\$10.35	\$14.16	\$17.44	\$18.30
Free Cash Flow																	
CFFO	\$1,190	\$1,390	\$1,373	\$1,968	\$646	\$652	\$414	\$621	\$2,333	\$2,672	\$2,771		\$1,153	\$1,779	\$2,371	\$2,379	\$2,746
Capex	\$49	\$87	\$149	\$200	\$61	\$38	\$39	\$40	\$178	\$165	\$164		\$130	\$153	\$214	\$161	\$166
FCF	\$1,141	\$1,303	\$1,224	\$1,768	\$585	\$614	\$375	\$581	\$2,155	\$2,507	\$2,607		\$1,022	\$1,626	\$2,157	\$2,218	\$2,581
% revenue	30.1%	30.3%	23.2%	29.1%	32.4%	32.6%	19.3%	29.1%	28.2%	30.4%	31.8%		22.4%	28.0%	31.4%	27.6%	31.2%
Segment Revenue																	
Total Systems Revenue	\$2,981	\$3,320	\$3,913	\$4,510	\$1,375	\$1,450	\$1,507	\$1,540	\$5,872	\$6,307	\$6,075		\$3,392	\$4,329	\$5,209	\$6,194	\$6,245
Process control	\$2,981	\$3,320	\$3,144	\$3,518	\$1,115	\$1,175	\$1,220	\$1,250	\$4,760	\$5,100	\$4,875		\$3,099	\$3,369	\$4,175	\$5,020	\$5,025
Spec semis			\$171	\$298	\$77	\$85	\$90	\$90	\$342	\$379	\$377		\$53	\$270	\$308	\$367	\$385
FPD+PCB			\$375	\$485	\$142	\$140	\$142	\$145	\$569	\$608	\$603		\$126	\$497	\$519	\$587	\$615
Other			\$159	\$210	\$42	\$50	\$55	\$55	\$202	\$220	\$220		\$50	\$203	\$208	\$220	\$220
Total Service Revenue	\$817	\$985	\$1,365	\$1,563	\$428	\$434	\$440	\$459	\$1,762	\$1,938	\$2,131		\$1,177	\$1,478	\$1,669	\$1,848	\$2,033

Source : Company data, UBSe

Valuation: Our \$345 PT (unchanged) is based on ~19x (from ~20x) on C22E EPS of \$18.13 (from \$17.18). The multiple is based on the historical stock multiple relative to market.

Figure 46: Valuation

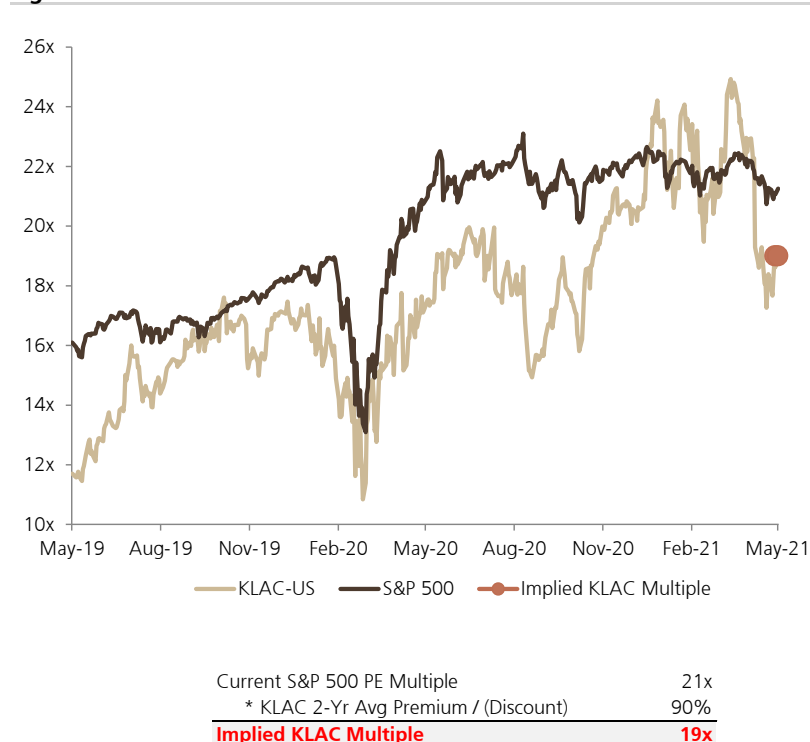
Valuation	New	Old
EPS (Non-GAAP)		
C2022	\$18.13	\$17.18
Multiple		
	19x	20x
Price Target		
	\$345	\$345

Source : Company reports, UBS

Multiple Justification

We decrease our multiple by 1 turn to ~19x (from ~20x). Our multiple is based on the historical stock multiple relative to market. KLAC has been trading at ~0.90x S&P 500 multiple on a 2-yr median. We therefore apply ~19x multiple, which is ~0.90x of S&P500 current forward multiple of ~21x.

Figure 47: KLAC vs S&P 500 PE



Source : Factset

Valuation Method and Risk Statement

We use various valuation methodologies for our universe of semiconductor and semiconductor equipment stocks depending on growth rates, profitability, cash flow, and catalyst timeframes. These include P/E, EV/EBITDA, EV/FCF, EV/Sales, and SOTP. Risk to upside and downside for our universe of semiconductor and semiconductor equipment stock include macroeconomic and geopolitical environments, M&A, market share loss/gain, currency fluctuations, tax policies, amongst others.

Our estimates for Eugene Technology's revenue and hence earnings are geared towards investments by several customers (mainly Samsung Electronics, SK Hynix and GlobalFoundries), so any unexpected revisions in the customers' investment plans are risks to our assumptions. For example if there are delays of the investments in Samsung Electronics' memory/logic fabs and/or GlobalFoundries' logic fabs, there would be risk on our earnings forecasts. We value Eugene Tech based on '21E PE.

We use a P/E valuation methodology on LRCX. Key downside risks include Macro, Trade, Regulatory risk & competition. LRCX has high exposure to memory and NAND in particular. Any demand shocks to memory could also impact our view on LRCX. On the other hand faster than expected AI, 5G uptake serve as upside risks.

Our Tokyo Electron PT is based on EV/EBITDA. Risk factors include (1) price pressure from clients, (2) M&A at competitors to share value, (3) M&A unrelated to core operations.

Wonik IPS: Our estimates for Wonik IPS's revenue and hence earnings are geared towards investments by several customers (mainly Samsung Electronics and SK Hynix), so any unexpected revisions in the customers' investment plans are risks to our assumptions. We value Wonik IPS based on '21E PE.

Required Disclosures

This report has been prepared by UBS Securities LLC, 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; certain additional disclosures concerning UBS research recommendations; and terms and conditions for certain third party data used in research report, please visit <https://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: 26 May 2021 07:18 PM GMT. UBS has designated certain Research department members as Derivatives Research Analysts where those department members publish research principally on the analysis of the price or market for a derivative, and provide information reasonably sufficient upon which to base a decision to enter into a derivatives transaction. Where Derivatives Research Analysts co-author research reports with Equity Research Analysts or Economists, the Derivatives Research Analyst is responsible for the derivatives investment views, forecasts, and/or recommendations. **Quantitative Research Review:** UBS publishes a quantitative assessment of its analysts' responses to certain questions about the likelihood of an occurrence of a number of short term factors in a product known as the 'Quantitative Research Review'. Views contained in this assessment on a particular stock reflect only the views on those short term factors which are a different timeframe to the 12-month timeframe reflected in any equity rating set out in this note. For the latest responses, please click <https://neo.ubs.com/quantitative>, or speak to your UBS sales representative for access to the report.

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.	52%	31%
Neutral	FSR is between -6% and 6% of the MRA.	36%	28%
Sell	FSR is > 6% below the MRA.	12%	22%
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 31 March 2021.

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. In some cases, this yield may be based on accrued dividends. **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 AG Hong Kong Branch: Jimmy Yoon, Nicolas Gaudois, Taewoo Lee. **UBS AG London Branch:** Francois-Xavier Bouvignies. **UBS Securities Japan Co., Ltd.:** Kenji Yasui. **UBS Securities LLC:** Diana Chang, Jason Park, Munjal Shah, Timothy Arcuri. **UBS Securities Pte. Ltd., Taipei Branch:** Sunny Lin.

Company Disclosures

Company Name	Reuters	12-month rating	Price	Price date
ASML ¹⁶	ASML.AS	Neutral	€547.30	25 May 2021
Applied Materials Inc ^{16,20}	AMAT.O	Neutral (CBE)	US\$137.50	25 May 2021
Eugene Technology	084370.KQ	Buy	Won46,000	26 May 2021
KLA Corporation ¹⁶	KLAC.O	Neutral	US\$317.92	25 May 2021
LAM Research Corp ¹⁶	LRCX.O	Buy	US\$640.37	25 May 2021
Micron Technology Inc ¹⁶	MU.O	Buy	US\$81.23	25 May 2021
Tokyo Electron	8035.T	Buy	¥46,960	26 May 2021

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.

16. UBS Securities LLC makes a market in the securities and/or ADRs of this company.

20. Because this security exhibits higher-than-average volatility, the FSR has been set at 15% above the MRA for a Buy rating, and at -15% below the MRA for a Sell rating (compared with 6/-6% under the normal rating system).

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.

Additional Prices: Wonik IPS, Won49100 (26 May 2021); Samsung Electronics, Won79800 (26 May 2021); TE Connectivity Ltd, US \$133.94 (25 May 2021); Intel Corp., US\$56.87 (25 May 2021); SK Hynix, Won123000 (26 May 2021); Source: UBS. All prices as of local market close.

Company profile and fee and risk statement under the Japanese Financial Instruments & Exchange Law

Company Name etc: UBS Securities Japan Co., Ltd., Financial Instruments & Exchange Firm, Kanto Local Financial Bureau (Kinsho) No.2633

Associated Memberships: Japan Securities Dealers' Association, the Financial Futures Association of Japan, and Type II Financial Instruments Firms Association and Japan Investment Advisers Association

UBS Securities Japan Co., Ltd. will receive a brokerage fee from clients of Wealth Management calculated by multiplying the executed amount by 1.10% at maximum (including tax) for trading domestic stocks; and by 1.375% at maximum (including tax) for trading foreign stocks. However, in the case of trading other than the auction market trading such as OTC trading and Tostnet trading, a higher fee may be charged based on an individual agreement with a client. The method of fee calculation is not explained here because fee varies depending on the market condition and the content of trading, etc. From the clients of the Investment Bank, UBS Securities Japan Co., Ltd. will receive a brokerage fee based on an individual contract and no standard upper limit or calculating method. For the trading of domestic stocks, consumption tax is added to the fee. For the trading of foreign stock, fee on the foreign stock exchange or foreign tax may be charged in addition to the domestic fee and tax. Those amounts may vary depending on the jurisdiction. There is a risk that a loss may occur due to a change in the price of the stock in the case of trading stocks, and that a loss may occur due to the exchange rate in the case of trading foreign stocks. There is a risk that a loss may occur due to a change in the price or performance of the properties in the portfolio in the case of trading REITs.

UBS Securities Japan Co., Ltd. will only receive the purchasing amounts for trading unlisted bonds (JGBs, municipals, government guaranteed bonds, corporate bonds) when UBS Securities Japan Co., Ltd. is the counterparty. There is a risk that a loss may occur due to a change in the price of the bond caused by the fluctuations in the interest rates, and that a loss may occur due to the exchange rate in the case of trading foreign bonds.

The Disclaimer relevant to Global Wealth Management clients follows the Global Disclaimer.

Global Disclaimer

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

This Document is provided solely to recipients who are expressly authorized by UBS to receive it. If you are not so authorized you must immediately destroy the Document.

Global Research is provided to our clients through UBS Neo, and 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 (each a system) as an approved means for distributing Global Research. 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 UBS Neo Platform Use Agreement (the "Neo Terms") together with any other relevant terms of use governing the applicable System.

When you receive Global Research via a third party vendor, e-mail or other electronic means, you agree that use shall be subject to this Global Research Disclaimer, the Neo Terms and where applicable the UBS Investment Bank terms of business (<https://www.ubs.com/global/en/investment-bank/regulatory.html>) and to UBS's Terms of Use/Disclaimer (<http://www.ubs.com/global/en/legalinfo2/disclaimer.html>). 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, provide 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.

In certain circumstances (including for example, if you are an academic or a member of the media) you may receive Global Research otherwise than in the capacity of a client of UBS and you understand and agree that (i) the Global Research is provided to you for information purposes only; (ii) for the purposes of receiving it you are not intended to be and will not be treated as a "client" of UBS for any legal or regulatory purpose; (iii) the Global Research must not be relied on or acted upon for any purpose; and (iv) such content is subject to the relevant disclaimers that follow.

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.

This document is a general communication and is educational in nature; 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. 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 judgment 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, structured derivative products and futures (including OTC derivatives) are not suitable for all investors. Trading in these instruments is considered risky and may be appropriate only for sophisticated investors. Prior to buying or selling an option, and for the complete risks relating to options, you must receive a copy of "The Characteristics and Risks of Standardized Options." You may read the document at <http://www.theocc.com/publications/risks/riskchap1.jsp> or ask your salesperson for a copy. Various theoretical explanations of the risks associated with these instruments have been published. Supporting documentation for any claims, comparisons, recommendations, statistics or other technical data will be supplied upon request. Past performance is not necessarily indicative of future results. Transaction costs may be significant in option strategies calling for multiple purchases and sales of options, such as spreads and straddles. Because of the importance of tax considerations to many options transactions, the investor considering options should consult with his/her tax advisor as to how taxes affect the outcome of contemplated options transactions.

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.

Prior to making any investment or financial decisions, any recipient of this document or the information should take steps to understand the risk and return of the investment and 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.

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.

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. In no circumstances may this document or any of the Information (including any forecast, value, index or other calculated amount ("Values")) 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 including, without limitation, for the purpose of tracking the return or performance of any Value or of defining the asset allocation of portfolio or of computing performance fees.

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.

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 <https://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 UBS 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 under English law or, if not carried out by UBS in the UK the law of the relevant jurisdiction in which UBS determines it carries out the activity) 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.

Within the past 12 months UBS AG, its affiliates or subsidiaries may have received or provided investment services and activities or ancillary services as per MiFID II which may have given rise to a payment or promise of a payment in relation to these services from or to this company.

Where Global Research refers to "UBS Evidence Lab Inside" or has made use of data provided by UBS Evidence Lab you understand that UBS Evidence Lab is a separate department to Global Research and that UBS Evidence Lab does not provide research, investment recommendations or advice. UBS Evidence Lab may provide services to other internal and external clients.

United Kingdom: This material is distributed by UBS AG, London Branch to persons who are eligible counterparties or professional clients. UBS AG, London Branch is authorised by the Prudential Regulation Authority and subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. **Europe:** Except as otherwise specified herein, these materials are distributed by UBS Europe SE, a subsidiary of UBS AG, to persons who are eligible counterparties or professional clients (as detailed in the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) Rules and according to MiFID) and are only available to such persons. The information does not apply to, and should not be relied upon by, retail clients. UBS Europe SE is authorised by the European Central Bank (ECB) and regulated by the BaFin and the ECB. **Germany:** Where an analyst of UBS Europe SE has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE. In all cases it is distributed by UBS Europe SE and UBS AG, London Branch. **Luxembourg, the Netherlands, Belgium and Ireland:** Where an analyst of UBS Europe SE has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE. In all cases it is distributed by UBS Europe SE and UBS AG, London Branch. **Turkey:** Distributed by UBS AG, London Branch. 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 AG, London Branch 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 Europe SE (spółka z ograniczoną odpowiedzialnością) Oddział w Polsce regulated by the Polish Financial Supervision Authority. Where an analyst of UBS Europe SE (spółka z ograniczoną odpowiedzialnością) Oddział w Polsce has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE (spółka z ograniczoną odpowiedzialnością) Oddział w Polsce. **Russia:** Prepared and distributed by UBS Bank (OOO). "Should not be construed as an individual Investment Recommendation for the purpose of the Russian Law" - Federal Law #39-FZ ON THE SECURITIES MARKET Articles 6.1-6.2. **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 Europe SE and distributed by UBS Europe SE and UBS Europe SE, Italy Branch. Where an analyst of UBS Europe SE, Italy Branch has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE, Italy Branch. **France:** Prepared by UBS Europe SE and distributed by UBS Europe SE and UBS Europe SE, France Branch. Where an analyst of UBS Europe SE, France Branch has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE, France Branch. **Spain:** Prepared by UBS Europe SE and distributed by UBS Europe SE and UBS Europe SE, Spain Branch. Where an analyst of UBS Europe SE, Spain Branch has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE, Spain Branch. **Sweden:** Prepared by UBS Europe SE and distributed by UBS Europe SE and UBS Europe SE, Sweden Branch. Where an analyst of UBS Europe SE, Sweden Branch has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE, Sweden 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). **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. **Israel:** This Material is distributed by UBS AG, London Branch. UBS Securities Israel Ltd is a licensed Investment Marketer that is supervised by the Israel Securities Authority (ISA). UBS AG, London Branch and its affiliates incorporated outside Israel are not licensed 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 AG, London Branch and its affiliates may prefer various Financial Assets to which they have or may have an 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 to persons who are Eligible Clients within the meaning of the Israeli Advisory Law, and this Material must not be furnished to, relied on or acted upon by any other persons. **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 report 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 report 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. **Brazil:** Except as otherwise specified herein, this material is prepared by UBS Brasil CCTVM S.A.¹ to persons who are eligible investors residing in Brazil, which are considered to be Investidores Profissionais, as designated by the applicable regulation, mainly the CVM Instruction No. 539 from the 13th of November 2013 (determines the duty to verify the suitability of products, services and transactions with regards to the client's profile). ¹UBS Brasil CCTVM S.A. is a subsidiary of UBS BB Servicos de Assessoria Financeira e Participacoes S.A. ("UBS BB"). UBS BB is an association between UBS AG and Banco do Brasil, of which UBS AG is the majority owner. **Mexico:** This report has been distributed and prepared by UBS Casa de Bolsa, S.A. de C.V., a subsidiary 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 report. Analysts do not receive any compensation from the persons or entities different from UBS Casa de Bolsa, S.A. de C.V., or different from entities belonging to the same financial group or business group of such **Hong Kong:** Distributed by UBS Securities Asia Limited. Please contact local licensed persons of UBS Securities Asia Limited in respect of any matters arising from, or in connection with, the analysis or document. **Singapore:** Distributed by UBS Securities Pte. Ltd. [MCI (P) 003/08/2020 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 report has been prepared by UBS Securities Japan Co., Ltd., UBS Securities Japan Co., Ltd. is the author, publisher and distributor of the report. 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. **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 report 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 Number: INZ000259830; 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 **Taiwan:** Except as otherwise specified herein, this material may not be distributed in Taiwan. Information and material on securities/instruments that are traded in a Taiwan organized exchange is deemed to be issued and distributed by UBS Securities Pte. LTD., Taipei Branch, which is licensed and regulated by Taiwan Financial Supervisory Commission. Save for securities/instruments that are traded in a Taiwan organized exchange, this material should not constitute "recommendation" to clients or recipients in Taiwan for the covered companies or any companies mentioned in this document. No portion of the document may be reproduced or quoted by the press or any other person without authorisation from UBS. **Indonesia:** This report is being distributed by PT UBS Sekuritas Indonesia and is delivered by its licensed employee(s), including marketing/sales person, to its client. PT UBS Sekuritas Indonesia, having its registered office at Sequis Tower Level 22 unit 22-1, Jl. Jend. Sudirman, kav.71, SCBD lot 11B, Jakarta 12190, Indonesia, is a subsidiary company of UBS AG and licensed under Capital Market Law no. 8 year 1995, a holder of broker-dealer and underwriter licenses issued by the Capital Market and Financial Institution Supervisory Agency (now Otoritas Jasa Keuangan/OJK). PT UBS Sekuritas Indonesia is also a member of Indonesia Stock Exchange and supervised by Otoritas Jasa Keuangan (OJK). Neither this report nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens except in compliance with applicable Indonesian capital market laws and regulations. This report is not an offer of securities in Indonesia and may not be distributed within the territory of the Republic of Indonesia or to Indonesian citizens in circumstance which constitutes an offering within the meaning of Indonesian capital market laws and regulations.

The disclosures contained in research documents produced by UBS AG, London Branch or UBS Europe SE shall be governed by and construed in accordance with English law.

UBS specifically prohibits the redistribution of this document in whole or in part without the written permission of UBS and in any event UBS accepts no liability whatsoever for any redistribution of this document or its contents or the actions of third parties in this respect. Images may depict objects or elements that are protected by third party copyright, trademarks and other intellectual property rights. © UBS 2021. The key symbol and UBS are among the registered and unregistered trademarks of UBS. All rights reserved.

Global Wealth Management Disclaimer

You receive this document in your capacity as a client of UBS Global Wealth Management. This publication has been distributed to you by UBS Switzerland AG (regulated by FINMA in Switzerland) or its affiliates ("**UBS**") with whom you have a banking relationship with. The full name of the distributing affiliate and its competent authority can be found in the country-specific disclaimer at the end of this document.

The date and time of the first dissemination of this publication is the same as the date and time of its publication.

Risk information:

You agree that you shall not copy, revise, amend, create a derivative work, provide to any third party, or in any way commercially exploit any UBS research, and that you shall not extract data from any research or estimates, 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.

This document is **for your information only**; 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. 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 judgment 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 (as defined below).

Prior to making any investment or financial decisions, any recipient of this document or the information should take steps to understand the risk and return of the investment and 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.

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.

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. In no circumstances may this document or any of the Information (including any forecast, value, index or other calculated amount ("Values")) 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 including, without limitation, for the purpose of tracking the return or performance of any Value or of defining the asset allocation of portfolio or of computing performance fees.

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.

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 (including between Global Wealth Management and UBS Global Research) 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 <https://www.ubs.com/disclosures>.

Research will initiate, update and cease coverage solely at the discretion of 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. 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.

Options and futures are not suitable for all investors, and trading in these instruments is considered risky and may be appropriate only for sophisticated investors. Prior to buying or selling an option, and for the complete risks relating to options, you must receive a copy of "Characteristics and Risks of Standardized Options". You may read the document at <https://www.theocc.com/about/publications/character-risks.jsp> or ask your financial advisor for a copy.

Investing in structured investments involves significant risks. For a detailed discussion of the risks involved in investing in any particular structured investment, you must read the relevant offering materials for that investment. Structured investments are unsecured obligations of a particular issuer with returns linked to the performance of an underlying asset. Depending on the terms of the investment, investors could lose all or a substantial portion of their investment based on the performance of the underlying asset. Investors could also lose their entire investment if the issuer becomes insolvent. UBS Financial Services Inc. does not guarantee in any way the obligations or the financial condition of any issuer or the accuracy of any financial information provided by any issuer. Structured investments are not traditional investments and investing in a structured investment is not equivalent to investing directly in the underlying asset. Structured investments may have limited or no liquidity, and investors should be prepared to hold their investment to maturity. The return of structured investments may be limited by a maximum gain, participation rate or other feature. Structured investments may include call features and, if a structured investment is called early, investors would not earn any further return and may not be able to reinvest in similar investments with similar terms. Structured investments include costs and fees which are generally embedded in the price of the investment. The tax treatment of a structured investment may be complex and may differ from a direct investment in the underlying asset. UBS Financial Services Inc. and its employees do not provide tax advice. Investors should consult their own tax advisor about their own tax situation before investing in any securities.

Important Information About Sustainable Investing Strategies: Sustainable investing strategies aim to consider and incorporate environmental, social and governance (ESG) factors into investment process and portfolio construction. Strategies across geographies and styles approach ESG analysis and incorporate the findings in a variety of ways. Incorporating ESG factors or Sustainable Investing considerations may inhibit the portfolio manager's ability to participate in certain investment opportunities that otherwise would be consistent with its investment objective and other principal investment strategies. The returns on a portfolio consisting primarily of sustainable investments may be lower or higher than portfolios where ESG factors, exclusions, or other sustainability issues are not considered by the portfolio manager, and the investment opportunities available to such portfolios may differ. Companies may not necessarily meet high performance standards on all aspects of ESG or sustainable investing issues; there is also no guarantee that any company will meet expectations in connection with corporate responsibility, sustainability, and/or impact performance.

Within the past 12 months UBS Switzerland AG, its affiliates or subsidiaries may have received or provided investment services and activities or ancillary services as per MiFID II which may have given rise to a payment or promise of a payment in relation to these services from or to this company.

If you require detailed information on disclosures of interest or conflict of interest as required by Market Abuse Regulation please contact the mailbox MAR_disclosures_twopager@ubs.com. Please note that e-mail communication is unsecured.

External Asset Managers / External Financial Consultants: In case this research or publication is provided to an External Asset Manager or an External Financial Consultant, UBS expressly prohibits that it is redistributed by the External Asset Manager or the External Financial Consultant and is made available to their clients and/or third parties.

Austria: This publication is not intended to constitute a public offer under Austrian law. It is distributed only for information purposes to clients of UBS Europe SE, Niederlassung Österreich, with place of business at Wächtergasse 1, A-1010 Wien. UBS Europe SE, Niederlassung Österreich is subject to the joint supervision of the European Central Bank ("ECB"), the German Central Bank (Deutsche Bundesbank), the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht), as well as of the Austrian Financial Market Authority (Finanzmarktaufsicht, FMA), to which this publication has not been submitted for approval. UBS Europe SE is a credit institution constituted under German law in the form of a Societas Europaea, duly authorized by the ECB. **Bahrain:** UBS is a Swiss bank not licensed, supervised or regulated in Bahrain by the Central Bank of Bahrain and does not undertake banking or investment business activities in Bahrain. Therefore, clients have no protection under local banking and investment services laws and regulations. **Brazil:** This report is only intended for Brazilian residents who are directly purchasing or selling securities in the Brazil capital market through a local authorized institution. **Canada:** The information contained herein is not, and under no circumstances is to be construed as, a prospectus, an advertisement, a public offering, an offer to sell securities described herein, solicitation of an offer to buy securities described herein, in Canada or any province or territory thereof. Any offer or sale of the securities described herein in Canada will be made only under an exemption from the requirements to file a prospectus with the relevant Canadian securities regulators and only by a dealer properly registered under applicable securities laws or, alternatively, pursuant to an exemption from the dealer registration requirement in the relevant province or territory of Canada in which such offer or sale is made. Under no circumstances is the information contained herein to be construed as investment advice in any province or territory of Canada and is not tailored to the needs of the recipient. To the extent that the information contained herein references securities of an issuer incorporated, formed or created under the laws of Canada or a province or territory of Canada, any trades in such securities must be conducted through a dealer registered in Canada or, alternatively, pursuant to a dealer registration exemption. No securities commission or similar regulatory authority in Canada has reviewed or in any way passed upon these materials, the information contained herein or the merits of the securities described herein and any representation to the contrary is an offence. In Canada, this publication is distributed by UBS Investment Management Canada Inc. **China:** This research report is neither intended to be distributed to PRC investors nor to provide securities investment consultancy services within the territory of PRC. **Czech Republic:** UBS is not a licensed bank in the Czech Republic and thus is not allowed to provide regulated banking or investment services in the Czech Republic. This communication and/or material is distributed for marketing purposes and constitutes a "Commercial Message" under the laws of Czech Republic in relation to banking and/or investment services. Please notify UBS if you do not wish to receive any further correspondence. **Denmark:** This publication is not intended to constitute a public offer under Danish law. It is distributed only for information purposes to clients of UBS Europe SE, Denmark Branch, filial af UBS Europe SE, with place of business at Sankt Annæ Plads 13, 1250 Copenhagen, Denmark, registered with the Danish Commerce and Companies Agency, under No. 38 17 24 33. UBS Europe SE, Denmark Branch, filial af UBS Europe SE is subject to the joint supervision of the European Central Bank ("ECB"), the German Central Bank (Deutsche Bundesbank), the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht), as well as of the Danish Financial Supervisory Authority (Finanstilsynet), to which this publication has not been submitted for approval. UBS Europe SE is a credit institution constituted under German law in the form of a Societas Europaea, duly authorized by the ECB. **Egypt:** Securities or other investment products are not being offered or sold by UBS to the public in Egypt and they have not been and will not be registered with the Egyptian Financial Supervisory Authority. **France:** This publication is not intended to constitute a public offer under French law, it does not constitute a personal recommendation as it is distributed only for information purposes to clients of UBS (France) S.A., French "société anonyme" with share capital of € 132.975.556, at 69 boulevard Haussmann F-75008 Paris, registered with the "Registre du Commerce et des Sociétés" of Paris under N° B 421 255 670. UBS (France) S.A. is a provider of investment services duly authorized according to the terms of the "Code monétaire et financier", regulated by French banking and financial authorities as the "Autorité de contrôle prudentiel et de résolution", to which this publication has not been submitted for approval. **Germany:** This publication is not intended to constitute a public offer under German law. It is distributed only for information purposes to clients of UBS Europe SE, Germany, with place of business at Bockenheimer Landstrasse 2-4, 60306 Frankfurt am Main. UBS Europe SE is a credit institution constituted under German law in the form of a Societas Europaea, duly authorized by the European Central Bank ("ECB"), and supervised by the ECB, the German Central Bank (Deutsche Bundesbank) and the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht), to which this publication has not been submitted for approval. **Greece:** UBS Switzerland AG and its affiliates (UBS) are not licensed as a bank or financial institution under Greek legislation and do not provide banking and financial services in Greece. Consequently, UBS provides such services from branches outside of Greece, only. This document may not be considered as a public offering made or to be made to residents of Greece. **Hong Kong:** This publication is distributed to clients of UBS AG Hong Kong Branch by UBS AG Hong Kong Branch, a licensed bank under the Hong Kong Banking Ordinance and a registered institution under the Securities and Futures Ordinance. UBS AG Hong Kong Branch is incorporated in Switzerland with limited liability. **India:** 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 Number INZ000259830; 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. **Indonesia:** This material was provided to you as a result of a request received by UBS from you and/or persons entitled to make the request on your behalf. Should you have received the

material erroneously, UBS asks that you kindly destroy/delete it and inform UBS immediately. Any and all advice provided and/or trades executed by UBS pursuant to the material will only have been provided upon your specific request or executed upon your specific instructions, as the case may be, and may be deemed as such by UBS and you. The material may not have been reviewed, approved, disapproved or endorsed by any financial or regulatory authority in your jurisdiction. The relevant investments will be subject to restrictions and obligations on transfer as set forth in the material, and by receiving the material you undertake to comply fully with such restrictions and obligations. You should carefully study and ensure that you understand and exercise due care and discretion in considering your investment objective, risk appetite and personal circumstances against the risk of the investment. You are advised to seek independent professional advice in case of doubt.

Israel: UBS is a premier global financial firm offering wealth management, asset management and investment banking services from its headquarters in Switzerland and its operations in over 50 countries worldwide to individual, corporate and institutional investors. In Israel, UBS Switzerland AG is registered as Foreign Dealer in cooperation with UBS Wealth Management Israel Ltd., a wholly owned UBS subsidiary. UBS Wealth Management Israel Ltd. is a Portfolio Manager licensee which engages also in Investment Marketing and is regulated by the Israel Securities Authority. This publication is intended for information only and is not intended as an offer to buy or solicitation of an offer. Furthermore, this publication is not intended as an investment advice and/or investment marketing and is not replacing any investment advice and/or investment marketing provided by the relevant licensee which is adjusted to each person needs. No action has been, or will be, taken in Israel that would permit an offering of the product(s) mentioned in this document or a distribution of this document to the public in Israel. In particular, this document has not been reviewed or approved by the Israeli Securities Authority. The product(s) mentioned in this document is/are being offered to a limited number of sophisticated investors who qualify as one of the investors listed in the first supplement to the Israeli Securities Law, 5728-1968. This document may not be reproduced or used for any other purpose, nor be furnished to any other person other than those to whom copies have been sent. Anyone who purchases the product(s) mentioned herein shall do so for its own benefit and for its own account and not with the aim or intention of distributing or offering the product(s) to other parties. Anyone who purchases the product(s) shall do so in accordance with its own understanding and discretion and after it has received any relevant financial, legal, business, tax or other advice or opinion required by it in connection with such purchase(s). The word "advice" and/or any of its derivatives shall be read and construed in conjunction with the definition of the term "investment marketing" as defined under the Israeli Regulation of Investment Advice, Investment Marketing and Portfolio Management Law, 1995. The Swiss laws and regulations require a number of mandatory disclosures to be made in independent financial research reports or recommendations. Pursuant to the Swiss Financial Market Infrastructure Act and the Financial Market Infrastructure Ordinance-FINMA, banks must disclose the percentage of voting rights they hold in companies being researched, if these holdings are equal to or exceed the statutory thresholds. In addition, the Directives on the Independence of Financial Research, issued by the Swiss Bankers Association, mandate a number of disclosures, including the disclosure of potential conflicts of interest, the participation within previous 12 months in any securities issues on behalf of the company being researched, as well as the fact that remuneration paid to the financial analysts is based generally upon the performance of (i) the new issues department or investment banking; or (ii) securities trading performance (including proprietary trading) or sales.

Italy: This publication is not intended to constitute a public offer under Italian law. It is distributed only for information purposes to clients of UBS Europe SE, Succursale Italia, with place of business at Via del Vecchio Politecnico, 3-20121 Milano. UBS Europe SE, Succursale Italia is subject to the joint supervision of the European Central Bank ("ECB"), the German Central Bank (Deutsche Bundesbank), the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht), as well as of the Bank of Italy (Banca d'Italia) and the Italian Financial Markets Supervisory Authority (CONSOB - Commissione Nazionale per le Società e la Borsa), to which this publication has not been submitted for approval. UBS Europe SE is a credit institution constituted under German law in the form of a Societas Europaea, duly authorized by the ECB.

Jersey: UBS AG, Jersey Branch, is regulated and authorized by the Jersey Financial Services Commission for the conduct of banking, funds and investment business. Where services are provided from outside Jersey, they will not be covered by the Jersey regulatory regime. UBS AG, Jersey Branch is a branch of UBS AG a public company limited by shares, incorporated in Switzerland whose registered offices are at Aeschenvorstadt 1, CH-4051 Basel and Bahnhofstrasse 45, CH 8001 Zurich. UBS AG, Jersey Branch's principal place of business is 1, IFC Jersey, St Helier, Jersey, JE2 3BX.

Luxembourg: This publication is not intended to constitute a public offer under Luxembourg law. It is distributed only for information purposes to clients of UBS Europe SE, Luxembourg Branch ("UBS LUX"), R.C.S. Luxembourg n° B209123, with registered office at 33A, Avenue J. F. Kennedy, L-1855 Luxembourg. UBS LUX is a branch of UBS Europe SE, a credit institution constituted under German law in the form of a Societas Europaea (HRB n° 107046), with registered office at Bockenheimer Landstrasse 2-4, D-60306 Frankfurt am Main, Germany, duly authorized by the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht – "BaFin") and subject to the joint prudential supervision of BaFin, the central bank of Germany (Deutsche Bundesbank) and the European Central Bank. UBS LUX is furthermore supervised by the Luxembourg prudential supervisory authority (Commission de Surveillance du Secteur Financier), in its role as host member state authority. This publication has not been submitted for approval to any public supervisory authority.

Malaysia: This material was provided to you as a result of a request received by UBS from you and/or persons entitled to make the request on your behalf. Should you have received the material erroneously, UBS asks that you kindly destroy/delete it and inform UBS immediately. Any and all advice provided and/or trades executed by UBS pursuant to the material will only have been provided upon your specific request or executed upon your specific instructions, as the case may be, and may be deemed as such by UBS and you. The material may not have been reviewed, approved, disapproved or endorsed by any financial or regulatory authority in your jurisdiction. The relevant investments will be subject to restrictions and obligations on transfer as set forth in the material, and by receiving the material you undertake to comply fully with such restrictions and obligations. You should carefully study and ensure that you understand and exercise due care and discretion in considering your investment objective, risk appetite and personal circumstances against the risk of the investment. You are advised to seek independent professional advice in case of doubt.

Mexico: This information is distributed by UBS Asesores México, S.A. de C.V. ("UBS Asesores"), an affiliate of UBS Switzerland AG, incorporated as a non-independent investment advisor under the Mexican regulation due to the relation with a Foreign Bank. UBS Asesores is registered under number 30060 and subject to the supervision of the Mexican Banking and Securities Commission ("CNBV") exclusively regarding the rendering of (i) portfolio management services, (ii) securities investment advisory services, analysis and issuance of individual investment recommendations, and (iii) anti-money laundering matters. This UBS publication or any material related thereto is addressed to Sophisticated or Institutional Investors located in Mexico. The compensation of the analyst(s) who prepared this report is determined exclusively by research management and senior management of any entity of UBS Group to which such analyst(s) render services.

Nigeria: UBS Switzerland AG and its affiliates (UBS) are not licensed, supervised or regulated in Nigeria by the Central Bank of Nigeria or the Nigerian Securities and Exchange Commission (SEC) and do not undertake banking or investment business activities in Nigeria. The investment products mentioned in this material are not being offered or sold by UBS to the public in Nigeria and they have not been submitted for approval nor registered with the Nigerian SEC. If you are interested in products of this nature, please let us know and we will direct you to someone who can advise you. The investment products mentioned in this material are not being directed to, and are not being made available for subscription by any persons within Nigeria other than the selected investors to whom the offer materials have been addressed as a private sale or domestic concern within the exemption and meaning of Section 69(2) of the Investments and Securities Act, 2007 (ISA).

Philippines: This material was provided to you as a result of a request received by UBS from you and/or persons entitled to make the request on your behalf. Should you have received the material erroneously, UBS asks that you kindly destroy/delete it and inform UBS immediately. Any and all advice provided and/or trades executed by UBS pursuant to the material will only have been provided upon your specific request or executed upon your specific instructions, as the case may be, and may be deemed as such by UBS and you. The material may not have been reviewed, approved, disapproved or endorsed by any financial or regulatory authority in your jurisdiction. The relevant investments will be subject to restrictions and obligations on transfer as set forth in the material, and by receiving the material you undertake to comply fully with such restrictions and obligations. You should carefully study and ensure that you understand and exercise due care and discretion in considering your investment objective, risk appetite and personal circumstances against the risk of the investment. You are advised to seek independent professional advice in case of doubt.

Poland: UBS is a premier global financial services firm offering wealth management services to individual, corporate and institutional investors. UBS is established in Switzerland and operates under Swiss law and in over 50 countries and from all major financial centres. UBS Switzerland AG is not licensed as a bank or as an investment firm under Polish legislation and is not permitted to provide banking and financial services in Poland.

Portugal: UBS Switzerland AG is not licensed to conduct banking and financial activities in Portugal nor is UBS Switzerland AG supervised by the Portuguese regulators (Bank of Portugal "Banco de Portugal" and Portuguese Securities Exchange Commission "Comissão do Mercado de Valores Mobiliários").

Russia: This document or information contained therein is for information purposes only and constitutes neither a public nor a private offering, is not an invitation to make offers, to sell, exchange or otherwise transfer any financial instruments in the Russian Federation to or for the benefit of any Russian person or entity and does not constitute an advertisement or offering of securities in the Russian Federation within the meaning of Russian securities laws. The information contained herein is not an "individual investment recommendation" as defined in Federal Law of 22 April 1996 No 39-FZ "On Securities Market" (as amended) and the financial instruments and operations specified herein may not be suitable for your investment profile or your investment goals or expectations. The determination of whether or not such financial instruments and operations are in your interests or are suitable for your investment goals, investment horizon or the acceptable risk level is your responsibility. We assume no liability for any losses connected with making any such operations or investing into any such financial instruments and we do not recommend to use such information as the only source of information for making an investment decision.

Saudi Arabia: UBS Saudi Arabia is authorised and regulated by the Capital Market Authority to conduct securities business under licence number 08113-37.

Singapore: This material was provided to you as a result of a request received by UBS from you and/or persons entitled to make the request on your behalf. Should you have received the material erroneously, UBS asks that you kindly destroy/delete it and inform UBS immediately. Clients of UBS AG Singapore branch are asked to please contact 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 report. UBS AG is incorporated in Switzerland with limited liability. UBS AG has a branch registered in Singapore (UEN S98FC5560C).

Spain: This publication is not intended to constitute a public offer under Spanish law. It is distributed only for information purposes to clients of UBS Europe SE, Sucursal en España, with place of business at Calle María de Molina 4, C.P. 28006, Madrid. UBS Europe SE, Sucursal en España is subject to the joint supervision of the European Central Bank ("ECB"), the German Central Bank (Deutsche Bundesbank), the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht), as well as of the Spanish supervisory authority (Banco de España), to which this publication has not been submitted for approval. Additionally it is authorized to provide investment services on securities and financial instruments, regarding which it is supervised by the Comisión Nacional del Mercado de Valores as well. UBS Europe SE, Sucursal en España is a branch of UBS Europe SE, a credit institution constituted under German law in the form of a Societas Europaea, duly authorized by the ECB.

Sweden: This publication is not intended to constitute a public offer under Swedish law. It is distributed only for information purposes to clients of UBS Europe SE, Sweden Bankfilial, with place of business at Regeringsgatan 38, 11153 Stockholm, Sweden, registered with the Swedish Companies Registration Office under Reg. No 516406-1011. UBS Europe SE, Sweden Bankfilial is subject to the joint supervision of the European Central Bank ("ECB"), the

German Central bank (Deutsche Bundesbank), the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht), as well as of the Swedish supervisory authority (Finansinspektionen), to which this publication has not been submitted for approval. UBS Europe SE is a credit institution constituted under German law in the form of a Societas Europaea, duly authorized by the ECB. **Taiwan:** This material is provided by UBS AG, Taipei Branch in accordance with laws of Taiwan, in agreement with or at the request of clients/prospects. **Thailand:** This material was provided to you as a result of a request received by UBS from you and/or persons entitled to make the request on your behalf. Should you have received the material erroneously, UBS asks that you kindly destroy/delete it and inform UBS immediately. Any and all advice provided and/or trades executed by UBS pursuant to the material will only have been provided upon your specific request or executed upon your specific instructions, as the case may be, and may be deemed as such by UBS and you. The material may not have been reviewed, approved, disapproved or endorsed by any financial or regulatory authority in your jurisdiction. The relevant investments will be subject to restrictions and obligations on transfer as set forth in the material, and by receiving the material you undertake to comply fully with such restrictions and obligations. You should carefully study and ensure that you understand and exercise due care and discretion in considering your investment objective, risk appetite and personal circumstances against the risk of the investment. You are advised to seek independent professional advice in case of doubt. **Turkey:** 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 in the Republic of Turkey. UBS Switzerland AG is not licensed by the Turkish Capital Market Board (the CMB) 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 CMB. However, according to article 15 (d) (ii) of the Decree No. 32 there is no restriction on the purchase or sale of the instruments by residents of the Republic of Turkey. **United Arab Emirates (UAE):** UBS is not a financial institution licensed in the United Arab Emirates (UAE) by the Central Bank of the UAE nor by the Emirates' Securities and Commodities Authority and does not undertake banking activities in the UAE. UBS AG Dubai Branch is licensed by the DFSA in the DIFC. **United Kingdom:** This document is issued by UBS Wealth Management, a division of UBS AG which is authorised and regulated by the Financial Market Supervisory Authority in Switzerland. In the United Kingdom, UBS AG is authorised by the Prudential Regulation Authority and is subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details about the extent of regulation by the Prudential Regulation Authority are available from us on request. A member of the London Stock Exchange. This publication is distributed to retail clients of UBS Wealth Management. **Ukraine:** UBS is not registered and licensed as a bank/financial institution under Ukrainian legislation and does not provide banking and other financial services in Ukraine. UBS has not made and will not make any offer of the mentioned products to the public in Ukraine. No action has been taken to authorize an offer of the mentioned products to the public in Ukraine and the distribution of this document shall not constitute financial services for the purposes of the Law of Ukraine "On Financial Services and State Regulation of Financial Services Markets" dated 12 July 2001. Accordingly, nothing in this document or any other document, information or communication related to the mentioned products shall be interpreted as containing an offer or invitation to offer, or solicitation of securities in the territory of Ukraine. Electronic communication must not be considered as an offer to enter into an electronic agreement or electronic instrument within the meaning of the Law of Ukraine "On Electronic Commerce" dated 3 September 2015. This document is strictly for private use by its holder and may not be passed on to third parties or otherwise publicly distributed. **USA:** Distributed to US persons by UBS Financial Services Inc. or UBS Securities LLC, subsidiaries of UBS AG. UBS Switzerland AG, UBS Europe SE, UBS Bank, S.A., UBS Brasil Administradora de Valores Mobiliários Ltda., UBS Asesores México, S.A. de C.V., UBS Securities Japan Co., Ltd., UBS Wealth Management Israel Ltd. and UBS Menkul Degerler AS are affiliates of UBS AG. UBS Financial Services Incorporated of Puerto Rico is a subsidiary of UBS Financial Services Inc. **UBS Financial Services Inc. accepts responsibility for the content of a report prepared by a non-US affiliate when it distributes reports to US persons. All transactions by a US person in the securities mentioned in this report should be effected through a US-registered broker dealer affiliated with UBS, and not through a non-US affiliate. The contents of this report have not been and will not be approved by any securities or investment authority in the United States or elsewhere. UBS Financial Services Inc. 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.**

© UBS 2021. The key symbol and UBS are among the registered and unregistered trademarks of UBS. All rights reserved.

