



U.S. Semiconductor Capital Equipment

Water a Little Choppy but We Would Still Jump in; Prefer NAND Recovery

This is a choppy time for the semi cap group as we've seen the latest iteration of trade talks, which has weighed on the semiconductors for almost two years. We believe this is more noise than structural change; long term we still see a consolidated market that should grow at a slightly faster rate than the GDP+ semi market. We are introducing the Semiconductor Capital Equipment Industry with a Neutral view, as we like the Industry's characteristics driven by increasing spend per unit of capacity, but we don't see a clear near-term catalyst; near-term risk to estimates (elevated Logic spend and timing of Memory recovery) and the latest trade disruption need to be accounted for.

Company Ratings: We are initiating on LRCX (OW, PT \$315) given our preference for NAND vs Foundry/Logic, AMAT (EW, PT \$60) and KLAC (EW, PT \$170) with company-specific thoughts starting on p. 21. The key industry thoughts/debates are:

WFE in 2020 – Flat, Up, or Down? Six months ago WFE spend was expected up double digits on the back of robust Foundry/Logic and recovery in Memory. Fast forward to today, expectations are really across the board with Gartner/VLSI down 15%/7%, respectively, while companies are somewhere in between flat to still up double digits. We are modeling WFE +5% and do see some downside to company estimates, but valuations are much more reasonable here vs. semis even on those lower numbers.

Foundry Run-rate Seems Hot, Likely Down in 2H: We see a strong demand cycle given 1) China 5G basestation buildout, 2) AMD and NVDA at 7nm and a handset recovery led by Huawei and AAPL, but spending has likely gotten ahead of these drivers. TSMC capex spend was \$5.6B (+49% Y/Y) in Q4 and \$6.4B (+159%) in Q1, but is likely down 30-40% Q/Q in Q2 and down another 40% into 2H based upon their annual guidance of \$15-16B. Samsung (5nm) and SMIC help offset a little but we still see downside to Foundry spend in the 2H. Huawei block further complicates this but any shift to QCOM/MTK/Samsung should offset those lost volumes at TSMC and/or Samsung.

Better Growth Profile/Industry Dynamics Than Multiples Imply: WFE grew at 7% over the last five years vs growth in the Analog semi market at 2%, yet semi cap trades at a sharp discount. We understand customer concentration, end market exposure, and lower margins, but this market is consolidated with stable share (top 5 ~80%), strong capital returns, and significant barriers to entry (increasing R&D costs), which should warrant better multiples.

Less Concerned on Memory Recovery led by NAND: The Memory market had great '17/'18 but was down sharply in 2019. We are comfortable after a down 40%+ year that Memory spend should accelerate at some point led by NAND with DRAM improving later in the year. Spending per wafer continues to rise (128L underway) and DRAM moves to more advanced nodes. We understand spot pricing has been declining leading to concerns but we look for Mobile volumes in the 2H to help fill in the demand and expect equipment spend to continue as planned.

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PLEASE SEE ANALYST CERTIFICATION(S) AND IMPORTANT DISCLOSURES BEGINNING ON PAGE 50.

INITIATING COVERAGE

U.S. Semiconductor Capital Equipment

NEUTRAL

from N/A

For a full list of our ratings, price targets and earnings in this report, please see table on page 2

U.S. Semiconductor Capital Equipment

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Summary of our Ratings, Price Targets and Earnings Estimates in this Report

Company	Rating		Price	Price Target			EPS FY1 (E)			EPS FY2 (E)		
	Old	New		Old	New	%Chg	Old	New	%Chg	Old	New	%Chg
U.S. Semiconductor Capital Equipment	NR	Neu										
Applied Materials Inc. (AMAT)	N/A	EW	54.39	N/A	60.00	-	N/A	3.71	-	N/A	3.94	-
KLA Corporation (KLAC)	N/A	EW	173.00	N/A	170.00	-	N/A	9.99	-	N/A	9.86	-
Lam Research Corporation (LRCX)	N/A	OW	261.14	N/A	315.00	-	N/A	15.23	-	N/A	17.03	-

Source: Barclays Research. Share prices and target prices are shown in the primary listing currency and EPS estimates are shown in the reporting currency.

FY1(E): Current fiscal year estimates by Barclays Research. FY2(E): Next fiscal year estimates by Barclays Research.

Stock Rating: OW: Overweight; EW: Equal Weight; UW: Underweight; RS: Rating Suspended

Industry View: Pos: Positive; Neu: Neutral; Neg: Negative

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U.S. Semiconductor Capital Equipment – Investment Highlights

Jump Right in the Water's... Well a Bit Choppy; Group Lacking a Catalyst as Huawei Restriction Adds to Complications but We Still Like the Long-term Growth/Profile

This is a choppy time for the semi cap group as we've seen the latest iteration of the trade drama that has weighed on the semiconductor group for almost two years. Clearly, we are not going to fully discount the implications of the recent crackdown on equipment sales to China, and suppliers to Huawei, but we do believe this is more noise than a structural change. Long term, we still see a consolidated market that should grow at a slightly faster rate than the GDP+ semi market. The key here is that U.S. semi cap equipment companies maintain a dominant share in several critical categories and we don't see how it's possible that leading edge Logic or Memory is produced in the foreseeable future without US equipment. Wherein prior trade iterations, we saw Huawei navigate the semi block with a combination of non-US and domestic components. Longer term, yes, these continued trade escalations will likely further invigorate efforts to create alternatives to US components. But from here, we have a hard time handicapping which administration will oversee the trade policy next year and what the outcome will be. We assign a Neutral view to the Semiconductor Capital Equipment Industry to account for this latest trade disruption as well as some near-term risk to estimates (elevated Logic spend and slower Memory recovery) but we do like the long-term industry characteristics, driven by increasing spend per unit of capacity. We ultimately settled on the Industry EW as we just don't see a clear catalyst for the group. **We initiate on Lam Research (LRCX) as Overweight given our preference for NAND vs. Foundry/Logic and Applied Materials (AMAT) and KLA (KLAC) as Equal Weight.**

Key Debates

- Trade War and Export Restrictions – Overhang Yes but Impact May Not Be as Severe:**
 The U.S. has tightened military export restrictions to China, requiring U.S. companies to attain licenses to sell certain products and mentions semiconductor capital equipment. This comes on the back of a year that has seen a global trade war, tariffs, and bans on sales to ZTE and Huawei. Semi cap companies can still ship to China from non-US subsidiaries under this latest restriction, but any further tightening would materially impact WFE spend as China has grown to 25-30% revenue (majority of which are domestic customers). The second act of this was the tightening of restrictions on Huawei wherein equipment is not allowed to be sold outside of the U.S. if it will be used to produce Huawei designed chips. On May 18, 2020, the Nikkei reported that TSMC will stop building custom chips for Huawei. We understand that this is all part of a negotiation so it's hard to take this one action at face value. If true, we would expect to see orders from alternate suppliers (i.e., QCOM, MTK, Samsung) to increase as competitors try to take share from Huawei but one would have to think that such a drastic move does have some impact on overall demand in the interim. We don't see the announcement from last week that TSMC plans to build a new U.S. fab (N5 node starting in 2021 for production in 2024) as some sea change in Foundry spend and you have to figure the latest Huawei action only a day later further complicated TSMC's thinking. Net net, a scarier perceived cloud than reality but one nonetheless.
- WFE in 2020 – Flat, Up, or Down? We Believe Estimates Still Need to Come Down:** Six months ago, the signal was that WFE spend would be up double digits on the back of robust Foundry/Logic and a recovery in Memory. Fast forward to today, expectations are really across the board with Gartner/VLSI down 15%/7%, respectively, while companies are somewhere in between flat to still up that double digits. In Figure 3, we

show implied WFE (semi systems only ex-services) at \$51.7B, up 13% Y/Y. We believe the Industry estimates are too low, but do believe consensus estimates need to come down (Figure 4). As we highlight below, Foundry entered the year at very high levels and has yet to moderate for some vendors (pre this TSMC issue). We actually have more confidence in Memory recovering given the soft 2019 but acknowledge there is some risk as Data Center spend transitions to Mobile. We model WFE (semi only ex-services) at \$48B (+5%) assuming Foundry/Logic +9% and Memory -2%.

- **Foundry Run-rate Seems Hot, Likely Down in 2H:** Foundry saw significant growth in 2019 (Foundry/Logic +54% Y/Y with Foundry alone +70%+) as you saw spend on both the leading edge (5/7nm) to support 5G (Mobile and Infrastructure), Compute, and AI. We still see a strong demand cycle given 1) China 5G basestation buildout, 2) AMD and NVDA at 7nm and a handset recovery led by Huawei and AAPL, but spending has likely gotten ahead of these drivers. TSMC capex spend (Figure 7) was \$5.6B (+49% Y/Y) in Q4 and \$6.4B (+159%) in Q1 but is likely down 30–40% Q/Q in Q2 and down another 40% into 2H based upon their annual guidance of \$15-16B. Samsung and SMIC help offset a little in the 1H but we still see downside to Foundry spend in the 2H.

What We Like

- **Better Growth Profile Than Multiples Imply:** The WFE (wafer front-end) market grew at a 7% CAGR over the last 5 years ('14-'19) as Memory spend (9% CAGR) outpaced Foundry/Logic (6% CAGR). Looking at a longer horizon, these growth rates should be structurally better than the Analog semi market (~4% over last 10 years), but the semi cap group trades at a sharp discount. We understand customer concentration concerns and lower margin profile, but this market is consolidated with stable share and strong capital returns, which should warrant better long-term multiples (if the market is really sustainable at these levels - read below). There is some debate on the direction of 2020 given the COVID disruption and high Foundry spend to end the year, but we do believe the semi cap market should still see sustained long-term growth.
- **Consolidated Industry with Consistent Share and Less Cyclical:** In Figure 3, we show the top 5 semi cap companies (AMAT, ASML, LRCX, TEL, KLAC) have ~80% aggregate share. The Industry has significant barriers to entry given the increasing R&D costs and long-lived lifecycles (~3.5 years moving longer towards 5-7 years) with share within a particular product category driven more by end markets (DRAM vs. NAND etc) than share gains vs. a competitor. This translates into a stable margin profile with GMs of the top 5 companies up 1% on average during 2007–2019. We are the newbies so won't pitch too much of a GM fit on GMs but we do find it curious that AMAT and LRCX GMs are in the mid-40s while many of their customers have superior margins (TSMC, INTC, even Memory in good years). We did witness semi companies move away from growth at all costs to focus more on profitability and capital returns and wonder if this group can make the same transition. If the risk of charging more is that the customer moves away to alternate suppliers, then maybe the current 12–15x multiple is correct but we believe these franchises are more critical to their customers than they are getting compensated for... time will tell.
- **Less Concerned on Memory as It Should Return to Growth Led by NAND:** The Memory market drove WFE expansion with 69% Y/Y growth in 2017 and 36% in 2018 but was down sharply in 2019. The Memory market can be hard to predict, but we are comfortable after a down 40%+ year that Memory spend should accelerate at some point led by NAND with DRAM improving later in the year. Clearly the high Data Center spending levels should slow into the 2H, but we do believe the Mobile market is improving to help offset. On the technology front, spending per wafer continues to rise as it becomes more difficult to stack vertically in NAND (128L underway) and DRAM

moves to more advanced nodes. We forecast the Memory WFE market to decline 2% in '20 and grow 25% in '21.

- **Services Businesses Contribute to Less Cyclical Industry:** Industry cyclicity also becomes less of a concern, as market swings are largely partially offset by revenue streams from Services businesses (now 25-30%+ of mix). After a period of strong equipment growth (when most corrections happen), increasing services revenue tends to grow and helps offset the equipment fall-off.

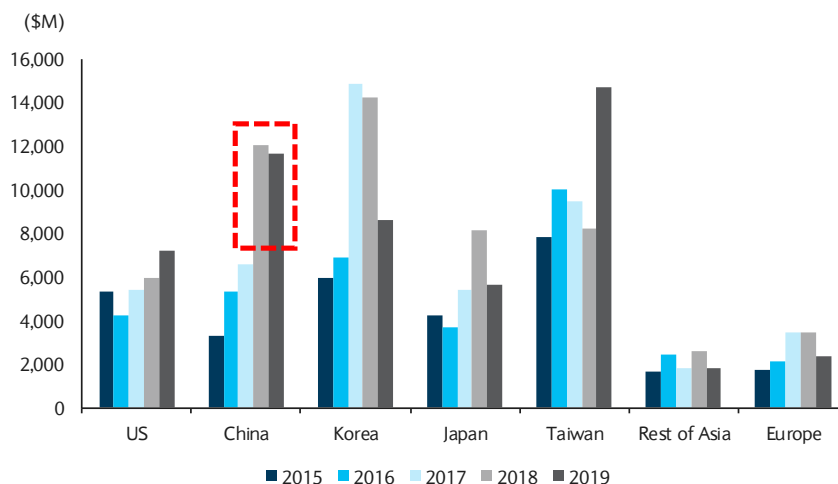
Key Debates

Trade War and Export Restrictions – Overhang Yes but Impact May Not be as Severe

The U.S. has tightened military export restrictions to China, requiring U.S. companies to attain licenses to sell certain products and mentions semiconductor capital equipment. This comes on the back of a year that has seen a global trade war, tariffs, and bans on sales to ZTE and Huawei. Semi cap companies can still ship to China from non-US subsidiaries under this latest restriction, but any further tightening would materially impact WFE spend as China has grown to 25–30% revenue (majority of which are domestic customers). The second act of this was the tightening of restrictions on Huawei wherein equipment is not allowed to be sold outside of the U.S. if it will be used to produce Huawei designed chips. On May 18, 2020, the Nikkei reported that TSMC will stop building custom chips for Huawei. We understand that this is all part of a negotiation so it's hard to take this one action at face value. If true, we would expect to see orders from alternate suppliers (i.e., QCOM, MTK) to increase as competitors try to take share from Huawei but one would have to think that such a drastic move does have some impact on overall demand in the interim. We don't see the announcement from last week that TSMC plans to build a new U.S. fab (N5 node starting in 2021 for production in 2024) as some sea change in foundry spend and you have to figure the latest Huawei action only a day later further complicated TSMC's thinking. Net net, probably a scary perceived cloud than reality but one nonetheless.

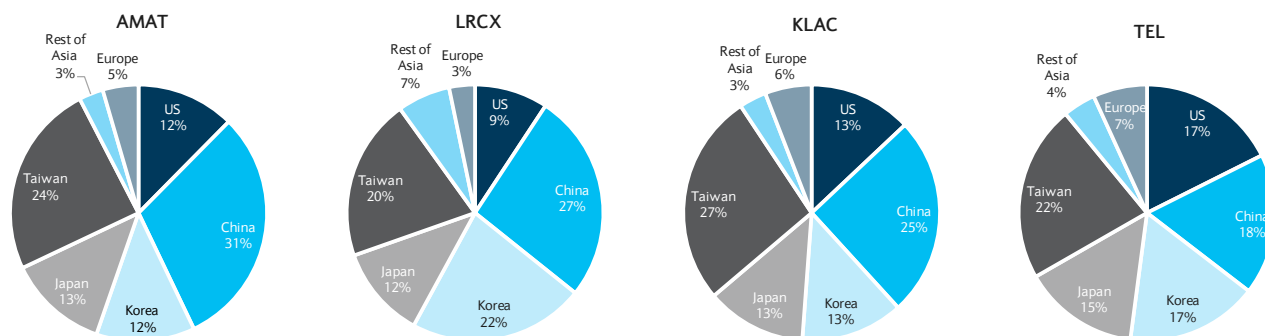
China exposure jumped significantly for the top 5 players in 2018 and remains at the same high percentage (22%) in 2019 (Figure 1). Excluding ASML (higher ASP EUV mostly outside China) that number is 26% while AMAT and LRCX have the highest China exposure comprising 31% and 26% of sales in 2019, respectively. China reached ~\$6B of total WFE spend in 2019 and the region was expected to contribute an additional \$2-3B in 2020. The majority of the China spend (60%+) comes from domestic China, across both Memory and Foundry. YMTC (a Chinese memory company) is likely a large contributor of the domestic spend as it builds out 128L products this year but Foundry is also a contributor, in fact, SMIC recently upped its annual capex by \$1B.

FIGURE 1
Top 5 China Revenue Spikes in 2018/2019



Source: Company Reports, Barclays Research

FIGURE 2
China Has Become the Largest Exposure



Source: Company Reports, Barclays Research

WFE in 2020 – Flat, Up, or Down? We Believe Estimates Still Need to Come Down

Six months ago the signal was that WFE spend would be up double digits on the back of robust Foundry/Logic and a recovery in Memory. Fast forward to today, expectations are really across the board with Gartner/VLSI down 15%/7%, respectively, while companies are somewhere in between flat to still up that double digits. In Figure 3, we show implied WFE (semi systems only ex-services) at \$51.7B, up 13% Y/Y. We believe the Industry estimates are too low, but do believe consensus estimates need to come down (Figure 4). As we highlight below, Foundry entered the year at very high levels and has yet to moderate for some vendors (pre this TSMC issue). We actually have more confidence in Memory recovering given the soft 2019 but acknowledge there is some risk as Data Center spend transitions to Mobile. We model WFE at \$48B (+5%) assuming Foundry/Logic +9% and Memory -2%.

FIGURE 3

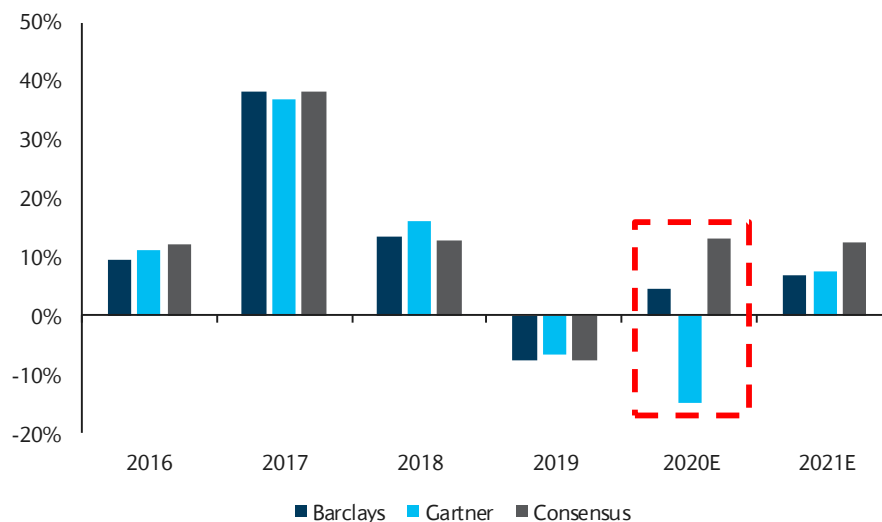
Consensus WFE Still up 13% in 2020

Semi Cap Companies: Top 20	Consensus Estimates for WFE Revenue (\$M)					Y/Y Change				% of Total			
	2017	2018	2019	2020E	2021E	2018	2019	2020E	2021E	2018	2019	2020E	2021E
Applied Materials (pro forma Kokusai)	\$11,186	\$11,511	\$10,573	\$12,684	\$13,986	3%	-8%	20%	10%	23%	23%	25%	24%
ASML	6,374	8,259	8,996	9,523	11,232	30%	9%	6%	18%	17%	20%	18%	19%
Lam Research	7,168	7,782	6,284	7,527	8,704	9%	-19%	20%	16%	16%	14%	15%	15%
Tokyo Electron	6,608	8,458	6,912	7,723	8,606	28%	-18%	12%	11%	17%	15%	15%	15%
KLA	3,080	3,269	3,169	4,114	4,477	6%	-3%	30%	9%	7%	7%	8%	8%
Screen	1,389	1,801	1,728	1,721	1,771	30%	-4%	0%	3%	4%	4%	3%	3%
Hitachi High-Technologies	1,031	1,166	1,204	1,219	1,320	13%	3%	1%	8%	2%	3%	2%	2%
ASM International	666	742	1,015	910	1,014	11%	37%	-10%	11%	2%	2%	2%	2%
Canon	497	695	551	531	543	40%	-21%	-4%	2%	1%	1%	1%	1%
SEMES	831	676	370	500	600	-19%	-45%	35%	20%	1%	1%	1%	1%
Wonik IPS	371	384	274	414	526	3%	-29%	51%	27%	1%	1%	1%	1%
Ebara	877	490	424	422	451	-44%	-13%	0%	7%	1%	1%	1%	1%
Nikon	617	618	827	808	730	0%	34%	-2%	-10%	1%	2%	2%	1%
Onto Innovation (pro forma Rudolph)	430	493	230	392	444	15%	-53%	71%	13%	1%	1%	1%	1%
NuFlare Technology	296	363	371	284	261	23%	2%	-24%	-8%	1%	1%	1%	0%
Axcelis Technologies	280	292	222	292	309	4%	-24%	32%	6%	1%	0%	1%	1%
Lasertec	106	135	223	348	673	27%	65%	56%	93%	0%	0%	1%	1%
Ulvac	189	287	218	201	220	52%	-24%	-8%	10%	1%	0%	0%	0%
Nova Instruments	174	192	167	183	214	11%	-13%	10%	17%	0%	0%	0%	0%
Eugene Technology	100	174	153	142	256	75%	-13%	-7%	81%	0%	0%	0%	0%
Top 20 WFE Revenue	42,271	47,788	43,912	49,937	56,338	13%	-8%	14%	13%	97%	96%	97%	97%
Others (Estimated)	1,518	1,573	1,702	1,702	1,821	4%	8%	0%	7%	3%	4%	3%	3%
Consensus WFE Revenue	\$43,788	\$49,361	\$45,614	\$51,639	\$58,160	13%	-8%	13%	13%	100%	100%	100%	100%
Top 5% of WFE	79%	80%	79%	81%	81%								

Source: Gartner, Company Reports, Bloomberg, Barclays Research

FIGURE 4

Industry Market Estimates Too Low While Consensus Still Needs to Come Down



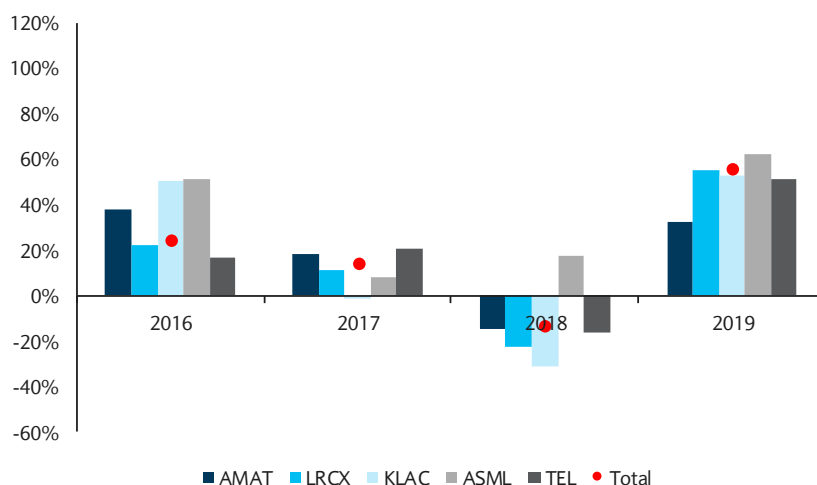
Source: Gartner, Bloomberg, Barclays Research

Foundry Run-rate Seems Strong, Likely Down in 2H

Foundry saw significant growth in 2019 (Foundry/Logic +54% Y/Y with Foundry alone +70%) as you saw spend on both the leading edge (5/7nm) to support 5G (Mobile and Infrastructure), Compute, and AI (Figure 5). We still see a strong demand cycle given 1) China 5G basestation buildout, 2) AMD and NVDA at 7nm, and a handset recovery led by Huawei and AAPL, but spending has likely gotten ahead of these drivers. This recent Huawei block is the swing factor as any shifts in suppliers away from TSMC to Samsung (Samsung 5G modem or QCOM) may cause a near-term spike in Foundry spending.

FIGURE 5

Significant Recovery in Foundry/Logic in 2019 After Weak 2018



Source: Company Reports, Barclays Research

On the Logic side, there is a reversion to the mean on Logic capital intensity as Intel returns to more normalized levels. Intel's Logic spend is still below normalized levels (total may not go up but logic spend within should increase) as they have been at 14nm since 2014, and need to spend more on 7/10nm. Intel plans to get back to a more normal 2-year cadence between nodes and the increased competition from AMD/TSMC should only accelerate the urgency.

FIGURE 6

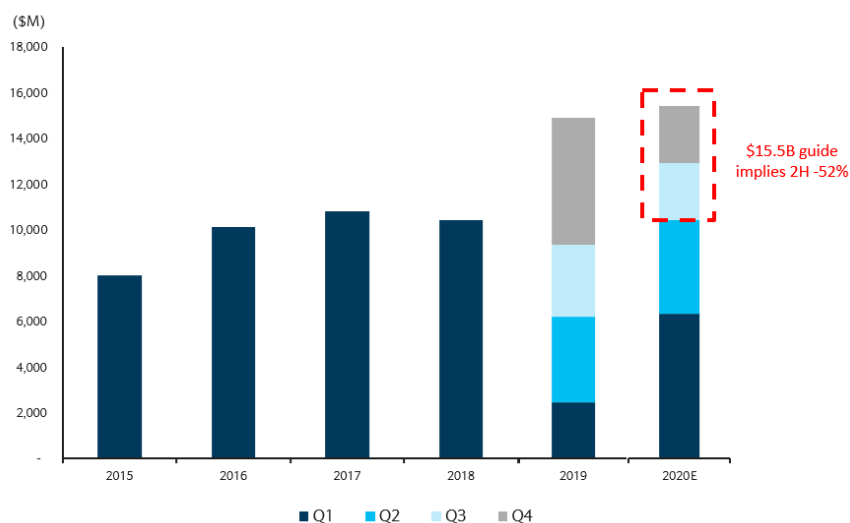
INTC Increasing CapEx Intensity and TSMC Returning to 15Y Average



Source: Company Reports, Barclays Research

TSMC capex spend (Figure 7) was \$5.6B (+49% Y/Y) in Q4 and \$6.4B (+159%) in Q1 but is likely down 30-40% Q/Q in Q2 and down another 40% into 2H based upon their annual guidance of \$15-16B. Samsung and SMIC help offset a little in the 1H but we still see downside to Foundry spend in the 2H.

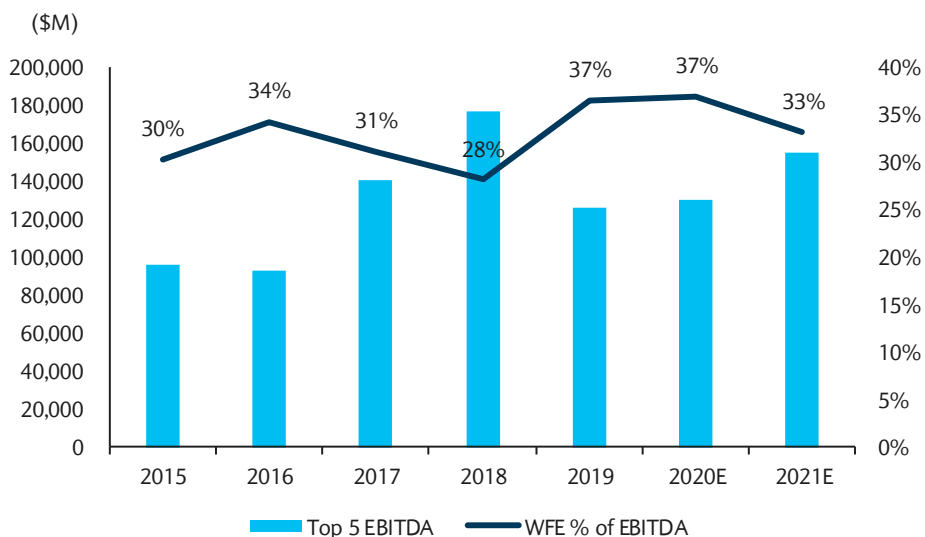
FIGURE 7
TSMC Capex Likely Declines in 2H20



Source: Company Reports, Barclays Research

Along with capex, another useful way to look at WFE market is WFE spend as % of customer EBITDA. Customers have increasingly invested in WFE over the last several years (particularly 2017/2018), which directly translates into their ability to pay for the spend as well as overall profitability. Figure 8, demonstrates the fact that while companies are spending a lot on WFE, they are also earning a healthy return. WFE intensity is expected to remain at the same high levels in 2020 (assuming WFE still up) as customers increase investments ahead of a strong Memory/5G deployment year, and things likely soften in 2021 as customers operate with new investments and profitability improves.

FIGURE 8
WFE Spend as % of Top 5 Customers' EBITDA Flat in '20, Pull-Back in '21



Source: Company Reports, Bloomberg, Barclays Research

*Top 5 Customers include Intel, Samsung, SK Hynix, Micron, TSMC

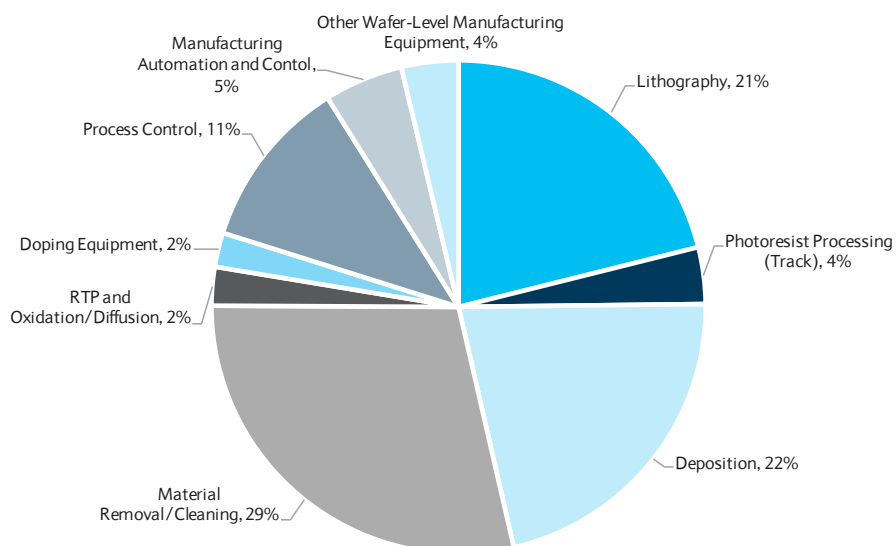
What We Like

Better Growth Profile Than Multiples Imply

The WFE (wafer front-end) market grew at 4-6% over the last 10-15 years and at a 7% CAGR over the last 5 years ('14-'19) as Memory spend (9% CAGR) outpaced Foundry/Logic (6% CAGR). Looking at a longer horizon, these growth rates are not much different than the overall Analog semi market (~4% over last 10 years), but the semi cap group trades at a sharp discount. We understand customer concentration concerns and lower margin profile but this market is consolidated with stable share, which should warrant better long-term multiples (if the market is really sustainable at these levels - read below). There is some debate on the direction of 2020 given the COVID-19 disruption and high Foundry spend to end the year, but we do believe the semi cap market should still see sustained long-term growth.

FIGURE 9

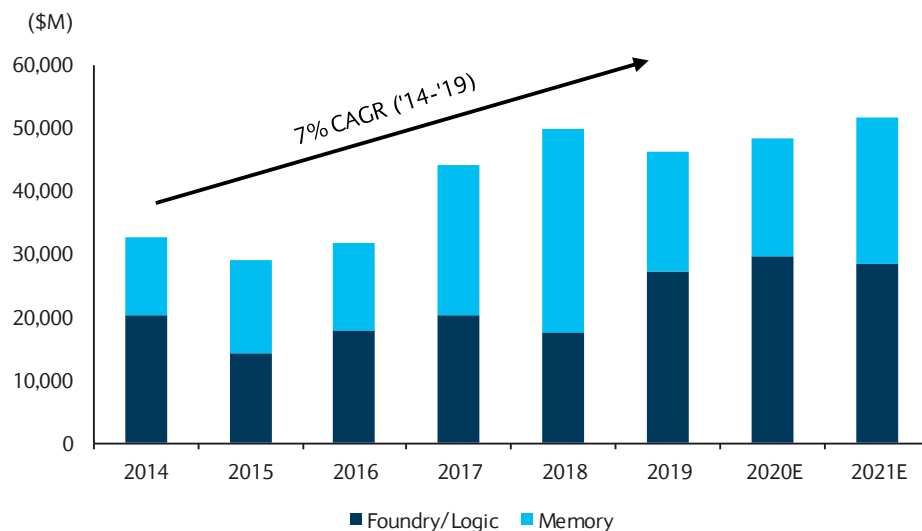
WFE by End Market Equipment Type (2019)



Source: Gartner, Barclays Research

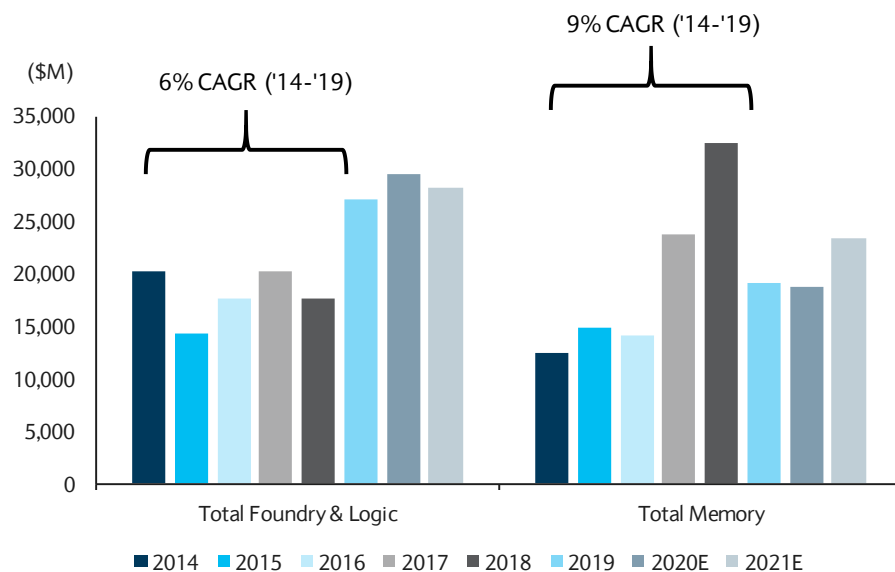
The overall WFE market grew at 7% CAGR over the last 5 years (Figure 10) and likely returns to that rate long-term. Similarly, Figure 11 highlights growth of the two main segments within the WFE market – Foundry/Logic and Memory, which grew at 6% CAGR and 9% CAGR from 2014-2019, respectively. As shown, Foundry/Logic saw pronounced growth in 2019 while Memory saw strongest growth in 2017/2018.

FIGURE 10
WFE Market Grew 7% Over Last Five Years



Source: Gartner, Company Reports, Barclays Research

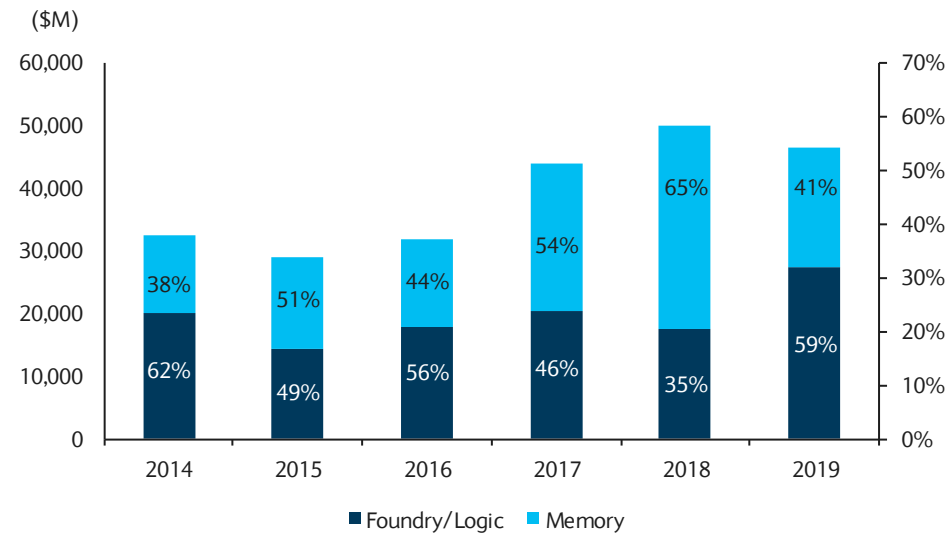
FIGURE 11
WFE Market Driven by Growth in Both Foundry/Logic and Memory



Source: Gartner, Company Reports, Barclays Research

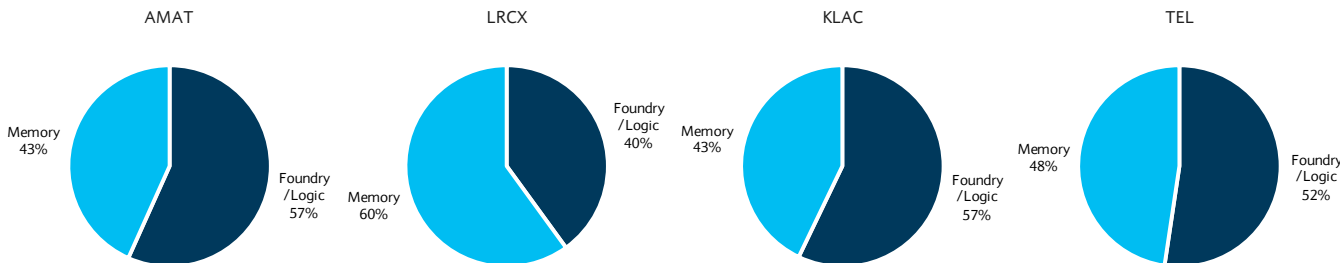
As mentioned above, 2019 was a strong year for Foundry/Logic while the Memory environment was quite weak, which explains the shift in spend from Memory to Foundry/Logic as well as the lower overall spend (Figure 12). Companies with higher exposure to Foundry/Logic, such as AMAT and KLAC, saw benefit from this shift while LRCX, which is more levered to Memory, saw less growth given the declining memory market (Figure 13).

FIGURE 12
WFE Declined in 2019 Given Weak Memory Market, Spend Shifts to Foundry/Logic



Source: Gartner, Company Reports, Barclays Research

FIGURE 13
Top 4 Product Revenue Exposure (2019): LRCX Levered to Memory, AMAT/KLAC Levered to Foundry/Logic



Source: Company Reports, Barclays Research

Figure 14 highlights 2017 as a strong year for LRCX as it grew faster than the market due to its high exposure to NAND memory, which was +70% Y/Y. In 2018, TEL was the clear outperformer given DRAM growth reached 89%, and the company is more disposed to DRAM vs. peers. KLAC and AMAT exceeded the market in 2019 as Foundry and Logic both saw a big spike (70% and 35% growth, respectively), and the companies had less exposure to the declining Memory market.

FIGURE 14

Memory Exposure Benefit LRCX in '17/TEL in '18, Foundry/Logic Help KLAC/AMAT in '19

Top 4 Total (Y/Y Change %)	2016	2017	2018	2019
AMAT	37.7%	18.4%	-14.8%	32.8%
LRCX	22.7%	11.1%	-22.4%	55.1%
KLAC	50.4%	-1.6%	-30.8%	53.3%
TEL	16.9%	20.8%	-15.8%	51.5%
Foundry/Logic	30.9%	14.3%	-18.7%	44.1%
AMAT	6.8%	54.4%	23.3%	-37.5%
LRCX	7.3%	72.1%	16.8%	-41.2%
KLAC	-7.8%	56.3%	45.8%	-41.3%
TEL	7.6%	90.3%	60.9%	-45.7%
Memory	5.5%	68.0%	32.0%	-41.4%
AMAT	21.4%	35.0%	5.4%	-10.7%
LRCX	12.6%	49.5%	6.0%	-21.8%
KLAC	21.9%	19.8%	6.2%	-9.4%
TEL	12.4%	52.6%	28.0%	-18.3%
Total	17.0%	40.7%	11.1%	-15.6%

Source: Company Reports, Barclays Research

Consolidated Industry with Consistent Share and Less Cyclicity

In Figure 3, we show the top 5 semi cap companies (AMAT, ASML, LRCX, TEL, KLAC) have ~80% aggregate share. The Semi Cap Equipment Industry has significant barriers to entry given the increasing R&D costs and long-lived lifecycles with share within a particular product category driven more by end markets (DRAM vs. NAND etc) than share gains vs. a competitor. This translates into a stable margin profile with GMs of the top 5 companies up 1% on average from '07-19. Industry cyclicity also becomes less of a concern, as market swings are largely partially offset by revenue streams from Services businesses (now 25-30%+ of mix). After a period of strong equipment growth (when most corrections happen), increasing services revenue tends to grow and helps offset the equipment fall-off.

Figure 15 shows a snapshot of share by tool type. From a high level, you can see that share hasn't moved around that much. AMAT is the leader in Deposition, LRCX in Material Removal and Cleaning (really Etch), and KLAC in Process Control. Tokyo Electron is a number 2 or 3 player in all markets other than Track.

FIGURE 15

Top 5 Share Consolidation by Different Equipment Types Continued from 2017 to 2019

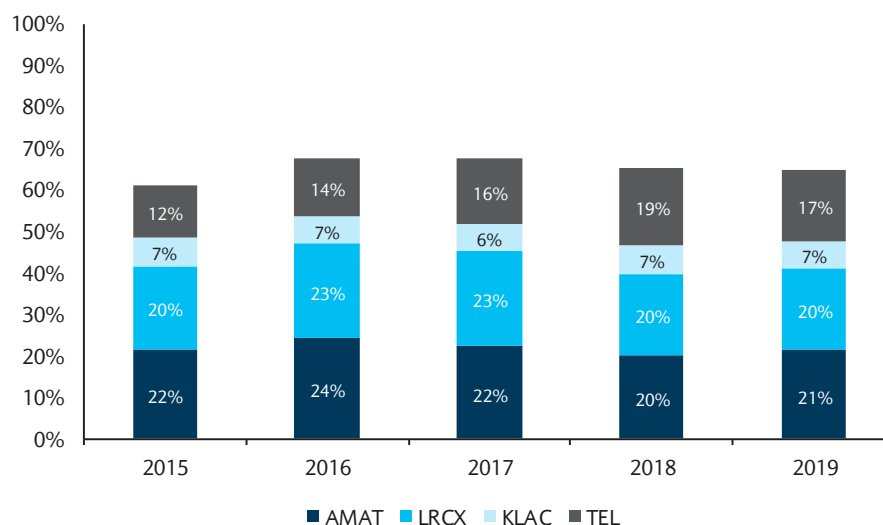
Equipment	2019 TAM (\$MM)	CAGR 2019-2024	Company Market Share (%)																		
			AMAT			ASML			KLA			LRCX			Tokyo Electron			Other			
			2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017	
Deposition	\$11,982	1.2%	44%	38%	41%	--	--	--	--	1%	--	--	19%	21%	21%	10%	13%	12%	26%	29%	26%
CVD	\$7,280	1.2%	30%	28%	30%	--	--	--	--	--	--	--	26%	27%	27%	17%	18%	18%	27%	26%	26%
Sputtering	\$2,677	1.3%	85%	74%	79%	--	--	--	--	3%	--	--	--	--	--	--	1%	1%	12%	24%	20%
Epitaxy	\$988	1.3%	74%	74%	83%	--	--	--	--	--	--	--	--	--	--	--	--	--	26%	26%	17%
ECD	\$493	0.5%	14%	16%	13%	--	--	--	--	--	--	--	81%	76%	77%	--	4%	7%	5%	4%	3%
Other	\$543	1.4%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100%	100%	100%
Material Removal & Cleaning	\$15,910	1.1%	18%	19%	20%	--	--	--	--	1%	--	--	34%	35%	35%	24%	25%	23%	23%	21%	22%
Dry Etch	\$10,806	1.1%	18%	18%	19%	--	--	--	--	1%	--	--	45%	46%	48%	28%	30%	27%	8%	6%	7%
Spray Processors	\$2,289	0.9%	--	--	--	--	--	--	--	--	--	--	16%	16%	13%	29%	25%	24%	55%	59%	63%
CMP and Post-CMP Clean	\$1,447	1.2%	66%	70%	71%	--	--	--	--	--	--	--	--	--	--	--	--	--	34%	30%	29%
Dry Strip	\$469	0.9%	--	--	--	--	--	--	--	--	--	--	18%	21%	17%	--	--	--	82%	79%	83%
Other	\$898	0.9%	--	--	--	--	--	--	--	--	--	--	15%	14%	13%	16%	21%	26%	68%	65%	60%
Process Control	\$6,243	2.2%	11%	11%	12%	5%	6%	6%	54%	51%	51%	--	--	--	--	--	--	--	30%	32%	31%
Wafer Inspection and Defect Review	\$3,094	2.3%	16%	15%	17%	5%	6%	6%	65%	63%	63%	--	--	--	--	--	--	--	15%	16%	15%
Lithography Metrology	\$1,840	1.9%	11%	14%	13%	9%	11%	10%	44%	37%	39%	--	--	--	--	--	--	--	36%	38%	37%
Thin-Film Metrology	\$970	2.5%	--	--	--	--	--	--	42%	41%	43%	--	--	--	--	--	--	--	58%	59%	57%
Other	\$339	1.8%	--	--	--	--	--	--	40%	42%	38%	--	--	--	--	--	--	--	60%	58%	62%
Lithography	\$11,705	3.0%	--	--	--	83%	83%	81%	--	--	--	--	--	--	--	--	--	--	16%	17%	19%
Photolith Processing (Track)	\$2,060	2.6%	--	--	--	--	--	--	--	--	--	--	--	--	--	91%	88%	87%	9%	12%	13%
Other Equipment	\$7,580	0.7%	19%	22%	24%	--	--	--	--	--	--	--	--	--	--	7%	9%	7%	73%	69%	69%
Total	\$55,480	1.7%	19%	18%	21%	18%	16%	14%	7%	5%	5%	14%	15%	16%	14%	15%	14%	29%	29%	30%	



Source: Gartner, Barclays Research

Looking at the overall market (Figure 16), share shifts are more a function of whether NAND or DRAM is strong in a given year. Over a longer horizon, share hasn't changed that much. Figure 16 highlights share by end market. You can see the strong performance by LRCX as 3D NAND was ramping and outperformance by TEL when DRAM was strong.

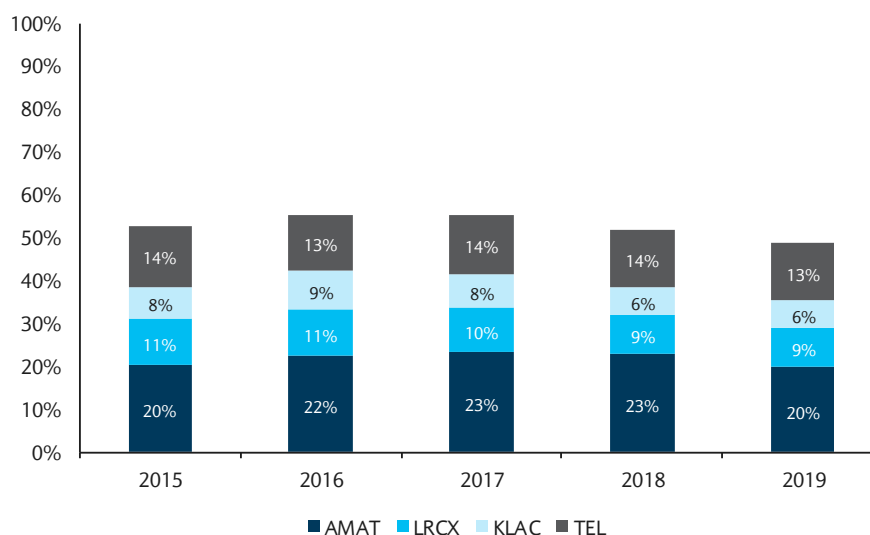
FIGURE 16
Modest Share Shifts in Memory Since 2015



Source: Company Reports, Barclays Research

Figure 17 shows the same breakout for Foundry/Logic. Overall, the top 4 players remained roughly the same in aggregate market share.

FIGURE 17
Top 4 Maintain Roughly Consistent Share of Total Foundry/Logic Market

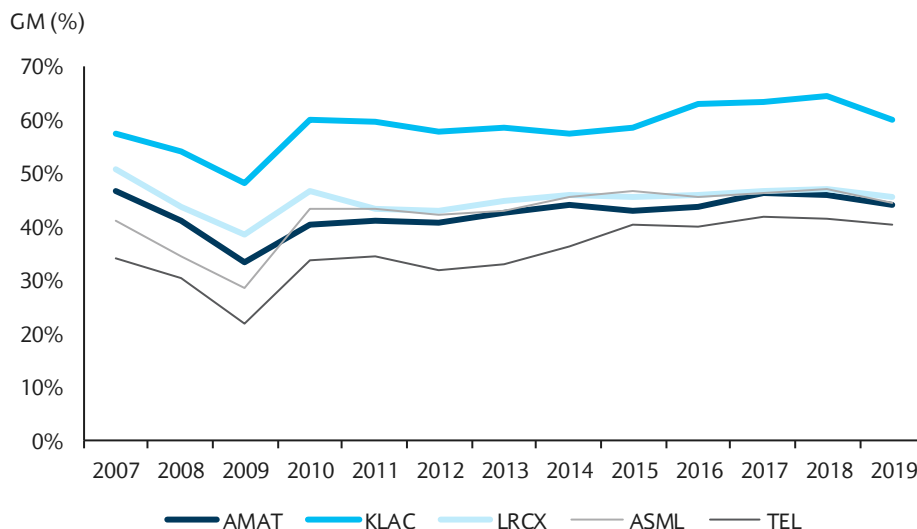


Source: Company Reports, Barclays Research

Altogether, the top 5 players continued to consolidate through both organic and inorganic growth. The market consolidation has led to sticky margins for the top 5 companies, with little fluctuation over several years. In combination, the top 5 margins grew 1% since 2007, and likely continue to remain stable with the ongoing market consolidation.

FIGURE 18

Consolidation Reinforces LT Margin Stability, Overall Average GM Grew 1% from '07-'19



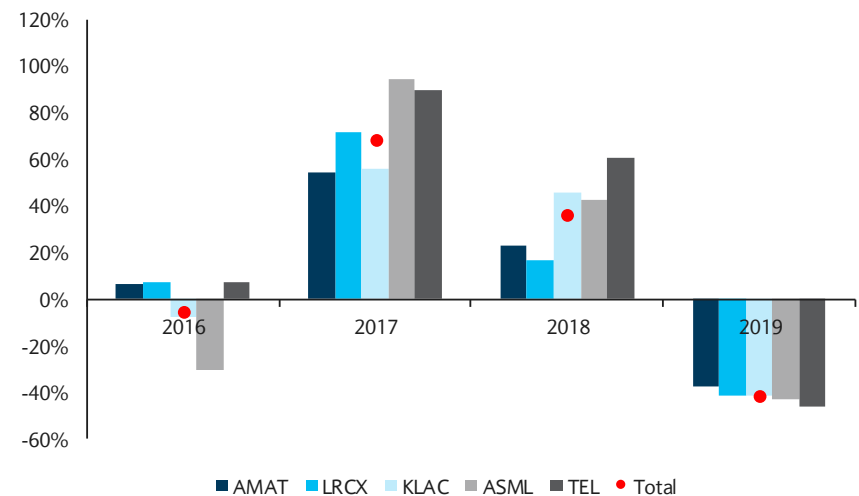
Source: Company Reports, Barclays Research

Less Concerned on Memory as It Should Return to Growth led by NAND

The Memory market drove WFE expansion with 69% Y/Y growth in 2017 and 36% in 2018 but was down sharply in 2019. The memory market can be hard to predict but we are comfortable after a down 40%+ year that Memory spend should accelerate at some point led by NAND with DRAM improving later in the year. Clearly, the high Data Center spending levels should slow into the 2H, but we do believe the Mobile market is improving to help offset. On the technology front, spending per wafer continues to rise as it becomes more difficult to stack vertically in NAND (128L underway) and DRAM moves to more advanced nodes. We forecast the Memory WFE market to decline 2% in '20 and grow 25% in '21.

While all major players did see memory growth in 2017 and 2018 (Figure 19), TEL stands out for having particular strength over the past few years while others have only more recently come back.

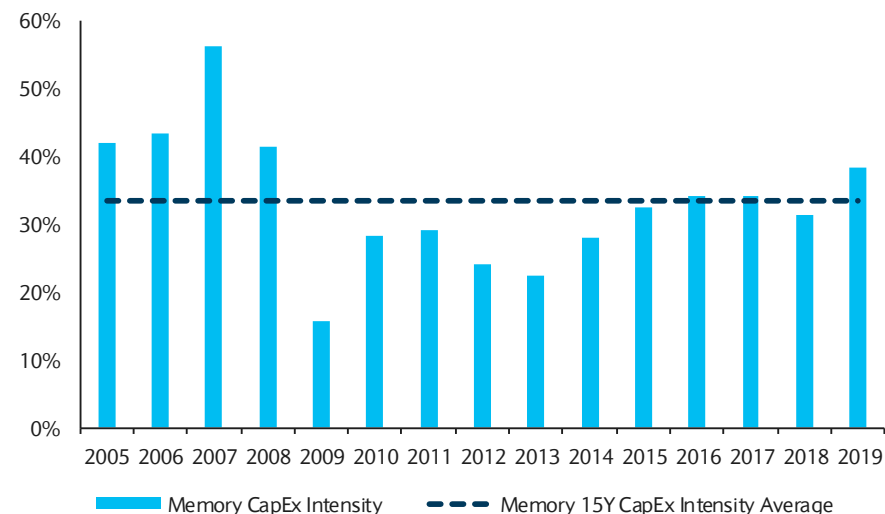
FIGURE 19
Strong Memory Revenue Growth in 2017/2018, Declines in 2019



Source: Company Reports, Barclays Research

Figure 20 shows the Memory capital intensity levels since 2005 and highlights levels reverting (and actually surpassing) toward the historical mean in 2019. We expect the intensity levels to continue on this trajectory as the need for more storage rises and companies must invest in the more complex technology transitions that are taking place (128L 3D stacking). Spending per wafer continues to rise as it becomes more difficult to stack vertically in NAND and DRAM moves to more advanced nodes, which in combination drive Memory capital intensity higher.

FIGURE 20
Memory Capex Intensity Reverting Towards Historical Mean



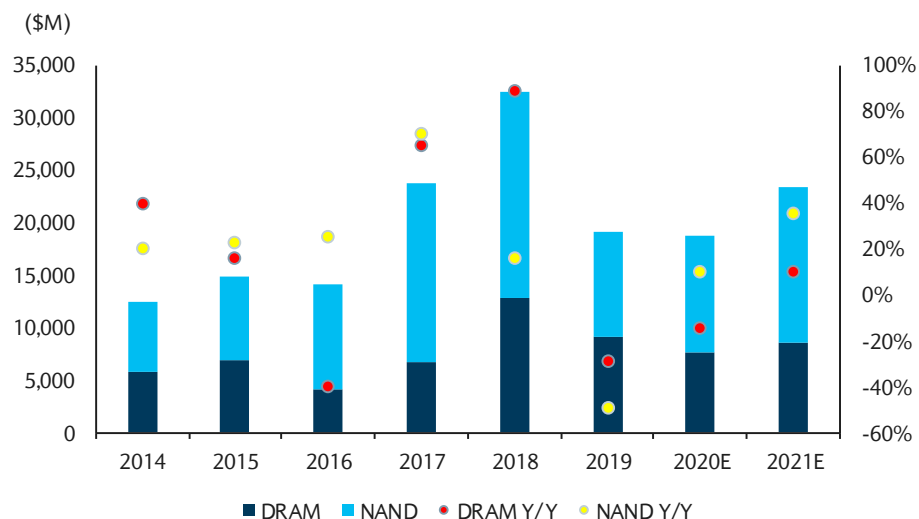
Source: IC Insights, Company Reports, Bloomberg, Barclays Research

Figure 21 shows Memory is expected to see some recovery in 2020 with growth following in 2021 after coming off a down year in 2019. Companies with high Memory exposure should benefit from stronger Memory trends going into 2020 and 2021, such as LRCX and TEL. As shown below, NAND returns to growth in 2020 and 2021 while DRAM grows to a

lesser extent. Given this trend, we would expect LRCX (more levered to NAND) to benefit more than TEL (more levered to DRAM).

FIGURE 21

NAND Drives Recovery in 2H20 After Weak 2019, Growth in NAND/DRAM in 2021

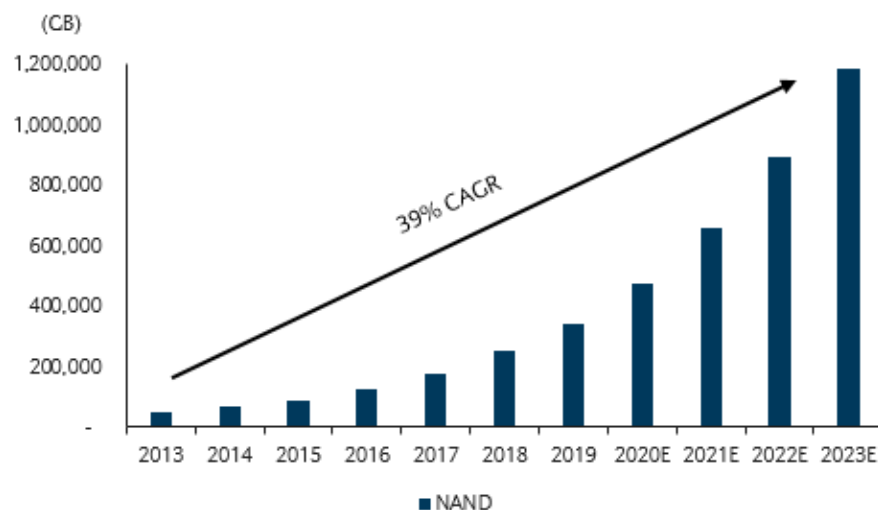


Source: Gartner, Company Reports, Barclays Research

Long-term bit growth is a good gauge for the memory market as it indicates market demand sentiment. As a result, a strong forecast for bit growth may help indicate a healthy supply/demand environment. Figure 22 shows NAND bit growth at 39% CAGR (2013-2023), signalling an improving market and likely increased capex on Memory by vendors. LRCX directly benefits from the stronger NAND market as it is most exposed to NAND out of the top players.

FIGURE 22

NAND Annual Bit Growth at Strong 39% CAGR ('13-'23E)

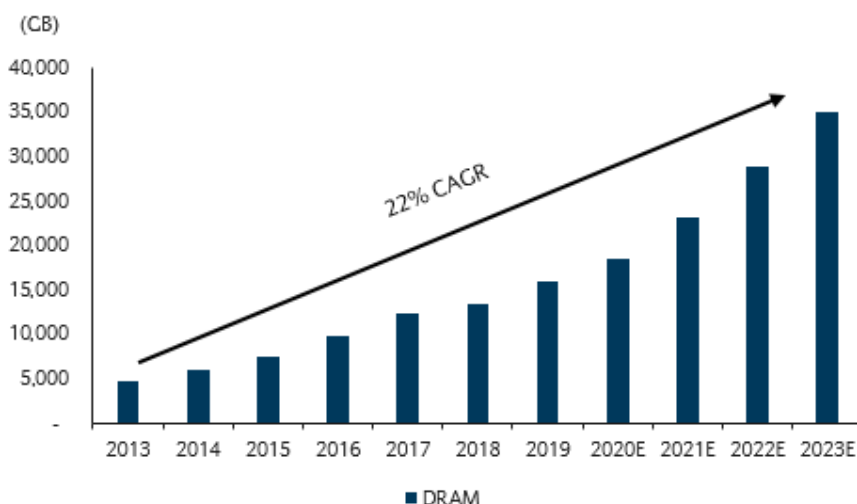


Source: Gartner, Barclays Research

DRAM bit growth is also on a robust growth trajectory at a 22% CAGR (2013-2023), although not as strong as NAND (Figure 23). TEL is actually more levered to DRAM vs. NAND (26% vs. 21% in 2019, respectively), which likely lessens revenue growth and share

gains vs. peers more highly levered to NAND (LRCX). However, TEL should still see some overall benefit with DRAM growth later this year and next year.

FIGURE 23

DRAM Annual Bit Growth at 22% CAGR, Lower in 2020

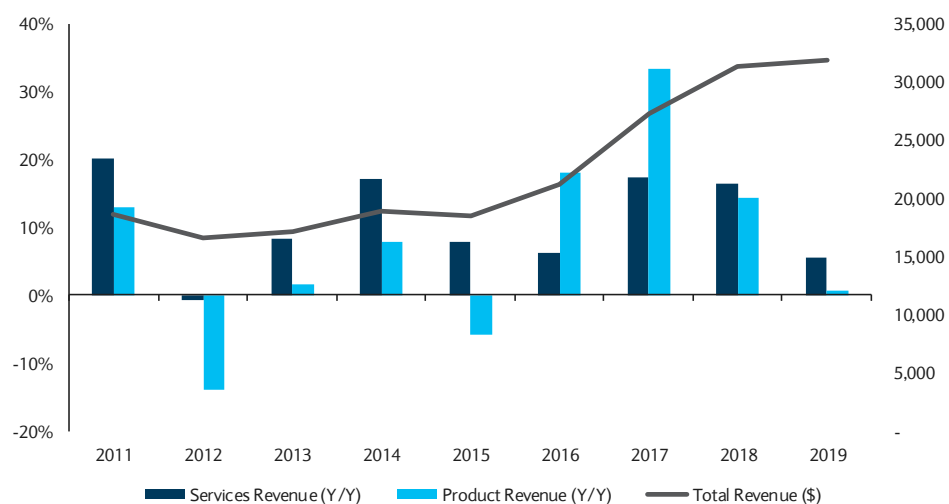
Source: Gartner, Barclays Research

Services Businesses Contribute to Less Cyclical Industry

Services revenue functions as a stabilizing buffer against volatility in equipment sales caused by unpredictable industry cycles. The underlying drivers of Services businesses are mainly the size of the installed base and growing complexity of leading node technologies. In other words, the more advanced equipment a semi-cap company has sold to a customer, the more likely the customer also needs a service agreement to operate the equipment at its highest capacity possible. These service agreements could be structured as subscription-based in nature and could provide stable recurring revenues for semi cap companies.

As shown in Figure 24, the top 5 companies' services revenues have steadily grown during the last 4 years and outgrown the product revenue CAGR by 2% (14% vs. 12%) while maintaining a similar percentage of the total revenues. For example, in 2019 when the overall WFE spending dropped, services revenues provide muting effects against the industry cyclicalities as new equipment adds from 2018 turned into more re-occurring services revenue. Services represents 25-30% of revenue and should continue to buoy these names during weaker equipment demand periods.

FIGURE 24

Services Revenue Helps Mute Product Cyclicity

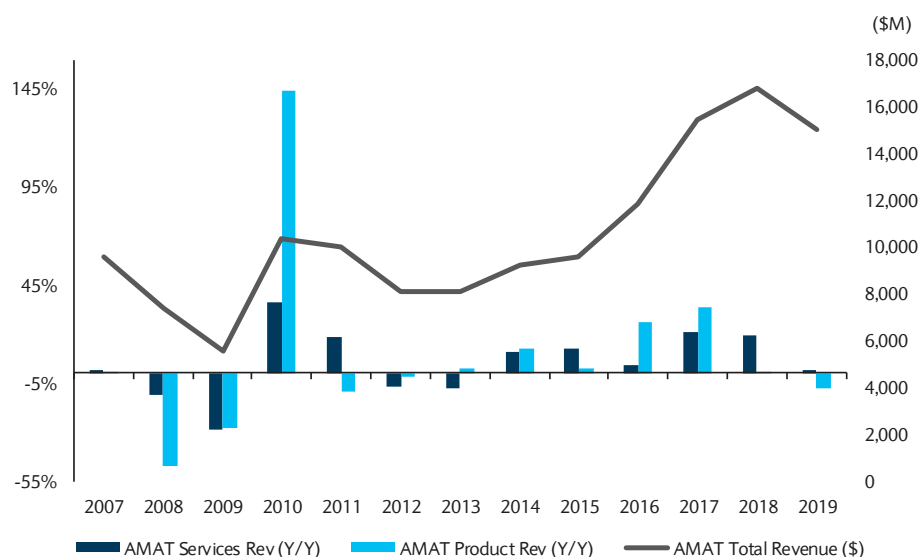
Source: Company Reports, Barclays Research

*Services revenue represents combination of AMAT, ASML, KLAC reported Services revenue

AMAT's Applied Global Services (AGS) segment is a case study that demonstrates the stabilization effects of a Services business. AGS has provided a wide range of services like helping customers improve equipment/fab performances, upgrade/refurbish spares, and utilize AMAT's automation software to achieve greater efficiency. This business has grown every year since 2013 when AMAT made a strategic shift to focus more on long-term subscription-type service agreements over transactional services because of significantly higher ROI on service agreements. AMAT has been adding about 1,000 service agreements per year, and the agreements now take up more than half of the total Services revenue. As a result, AGS recently generated its record Services revenue of about \$1 billion in Q1 FY2020 with more room to grow.

As shown in Figure 25, AGS outgrew the Semiconductor Systems segment's 9-year CAGR by 2% (8% vs. 6%) while consistently maintaining a stable percentage of the total revenue. In general, the Services business helps offset weak product years, such as in 2011 and 2018/2019, which came after strong years of Product business in 2010 and 2016/2017, ultimately stabilizing the total revenue and muting cyclicity.

FIGURE 25
AMAT's Services Stabilize Total Revenue During Weak Periods



Source: Company Reports, Barclays Research

Key Investment Points by Company

Applied Materials Inc. (AMAT)

Positives

- **Cheapest of the Bunch:** At face value, AMAT currently trades at a 2-turn discount to LRCX and a 4-turn discount to KLAC. The company is the largest and most diversified name, which eases some cyclicalities and should give them some valuation credit. We are below the Street and on those numbers, the stock trades at ~14x. Net net, still some room in the multiple even on our numbers and if the company is in fact right on its growth prospects, this would be the best value in the group.
- **See More Upside than Downside in Memory:** We are comfortable with the trajectory of Memory after a down 40%+ year and Memory spend should accelerate at some point led by NAND with DRAM improving later in the year. AMAT has the largest Memory business and we are comfortable with where the bar is set for the 2H (model DRAM/NAND in tandem +4.8% 2H/1H) as slowing Data Center spending level is offset by an improving Mobile market.
- **Display Accelerates in the 2H with Exposures We Like:** Display is another area where we are biased more positively as Mobile will make up almost 40% of the business this year (vs. prior 30%) and is driven by OLED in handsets. The company gets about 2-3.8x times equipment spend in OLED devices vs. standard LCD models. In the long run we think the transition to OLED smartphones continues to accelerate and we think this offsets any potential headwinds in the TV segment of the business.

Negatives

- **Most Potential Downside to 2H Estimates:** AMAT took the most bullish approach to guiding the 2H indicating strong double digit growth in the Semi Systems business for the FY. As we've highlighted, we still believe the water is a bit choppy and despite the strong bookings, customers' spend (like TSMC's) is down significantly in the 2H and

Samsung already saw some robust growth (Korea +48% in April). We acknowledge smaller players may add capacity but the setup looks a bit too rosy.

- **Biggest China Exposure:** China was 31% of sales in 2019. In all fairness, this number is 23% ex Display but even Display has some long-term risks if this trade war continues to escalate. Total WFE spend for the China market was \$6B in 2019 moving to \$8-9B fed by domestic Memory and Foundry. The concern is that the country still has no viable Memory product and the recent Huawei block puts SMIC's expansion in question.

We initiate on AMAT with EW rating. Our price target of \$60 is based on 15x our CY21E EPS of \$4.06. Our CY20 revenue/EPS are \$16.38B/\$3.65 and CY21 are \$17.39B/\$4.06.

FIGURE 26
Barclays Estimates

Revenue and EPS Estimates - Barclays vs. Consensus					
		Jul Q	Oct Q	CY20	CY21
BARCLAYS	Revs	\$4,100	\$4,221	\$16,385	\$17,386
	EPS	\$0.90	\$0.96	\$3.65	\$4.06
CONSENSUS	Revs	\$4,167	\$4,327	\$16,697	\$18,494
	EPS	\$0.95	\$1.01	\$3.80	\$4.43

Source: Company Reports, Bloomberg and Barclays Research \$ millions except EPS

FIGURE 27
AMAT Trading Roughly in Line with 10-Yr Median Fwd P/E at 12.7x



Source: Bloomberg, Barclays Research

KLA Corporation (KLAC)

Positives

- **Numbers Most Realistic for the 2H:** KLAC is reiterating a more cautious outlook vs. peers in the 2H with expectations for WFE flat Y/Y. The material change vs. expectations to begin the year is the view that the DRAM ramp may push into '21. In

our view, this outlook could prove conservative and leaves estimates in a better place vs. peers.

- **EUV and Advanced Memory Driving Process Control SAM:** KLAC's Process Control TAM is moving to \$7.5B in 2023 from \$6B today as EUV is critical for the move to 7/5nm and below. Advanced Memory patterning should also help contribute to market growth and we like this exposure in equipment spend as KLAC has 4x the Process Control of the nearest competitor.
- **E-Beam a Secular Trend:** Traditional optical inspection becomes less precise at 7nm and 5nm and e-beam will ultimately be required. The issue facing the industry is that the e-beam inspection is slow and likely needs integration into a current system for high-quality and high-throughput. The Gen-5 EUV extension helps integrate optical inspection with e-beam and should help KLAC take share. This is a \$250M market that KLAC will leverage its existing optical lead to compete with existing leader ASML (HMI acquisition) and is an integration play.
- **Orbotech Expands TAM:** KLAC also has exposure to the broader OLED trend with the acquisition of Orbotech. We think the move to more OLED devices will happen in a matter of time and KLAC will participate in this ramp.

Negatives

- **Process Control Not as Critical in Memory:** Memory patterning is often repetitive, and lines within fabs do not shift from product to product, which limits the amount of testing required. This is inevitably reducing the amount of Memory exposure of KLAC vs. LRCX.
- **Top of Trading Range:** KLAC is trading at the top of its long-term trading range. While the premium margins and higher market share could warrant a premium vs. its peers, they also benefitted from the strong Foundry/Logic spend, which could revert in the 2H.

We initiate on KLAC with EW rating. Our price target of \$170 is based on 15x our CY21E EPS of \$11.29. Our CY20 revenue/EPS are \$5.56B/\$9.41 and CY21 are \$6.02B/\$11.29.

FIGURE 28
Barclays Estimates

Revenue and EPS Estimates - Barclays vs. Consensus					
		Jun Q	Sep Q	CY20	CY21
BARCLAYS	Revs	\$1,408	\$1,328	\$5,563	\$6,019
	EPS	\$2.37	\$2.14	\$9.41	\$11.29
CONSENSUS	Revs	\$1,404	\$1,358	\$5,559	\$6,050
	EPS	\$2.38	\$2.21	\$9.41	\$11.37

Source: Company Reports, Bloomberg and Barclays Research \$ millions except EPS

FIGURE 29

KLAC Approaches High End of 10-Yr Historical Fwd P/E of 15.4x

Source: Bloomberg, Barclays Research

Lam Research (LRCX)*Positives*

- **Highly Levered to Memory, NAND Spend Tailwind:** LRCX has the highest exposure to Memory at over 60% of sales with a very high share within NAND specifically. The Memory market drove WFE expansion with 69% Y/Y growth in 2017 and 36% in 2018 but was down sharply in 2019. The Memory market can be hard to predict but we are comfortable after a down 40%+ year that Memory spend should accelerate at some point led by NAND with DRAM improving later in the year.
- **Targeting 4-8% Share Gains Across Etch and Deposition:** LRCX has opportunities to gain share as ALD is used for applications such as critical spacers (vs. Furnace), Gapfill (vs. CVD/SOD), and Metal (PVD/CVD). ALD is well suited for high-aspect-ratio and 3D structures driving opportunities in both Logic (finFET) and 3D NAND. In Etch, the company has a very high share within NAND and should benefit as manufacturers move to 128L and beyond.
- **EUV Photoresist Opportunity:** LRCX's Dry Photoresist technology can disrupt the \$2B Photoresist Processing (Track) market where TEL has 90%+ share. This technology extends the resolution, productivity, and yield of EUV Lithography by creating a more effective barrier to the EUV photons.

Negatives

- **NAND Cyclical:** As we highlight above, the NAND market tends to be more cyclical than Logic as double digit growth in 2017/2018 turned into a 40% decline in 2019. We do like this exposure into 2021 given the most recent reset but the NAND exposure will impact the multiple that investors will ultimately pay in good years.
- **Consensus OW:** We realize we are new to the space but even from the semi guy this seems like the most consensus long of the group. We understand this doesn't mean the stock can't work but it does leave a higher bar for execution.

We initiate on LRCX with OW rating. Our price target of \$315 is based on 15x our CY21E EPS of \$20.77. Our CY20 revenue/EPS are \$10.16B/\$15.87 and CY21 are \$11.52B/\$20.77.

FIGURE 30
Barclays Estimates

Revenue and EPS Estimates - Barclays vs. Consensus					
		Jun Q	Sep Q	CY20	CY21
BARCLAYS	Revs	\$2,602	\$2,524	\$10,160	\$11,525
	EPS	\$4.05	\$3.86	\$15.87	\$20.77
CONSENSUS	Revs	\$2,674	\$2,658	\$10,509	\$12,090
	EPS	\$4.06	\$4.05	\$16.05	\$20.35

Source: Company Reports, Bloomberg and Barclays Research \$ millions except EPS

FIGURE 31
LRCX Trades Midpoint of 10-Yr Historical Fwd P/E



Source: Bloomberg, Barclays Research

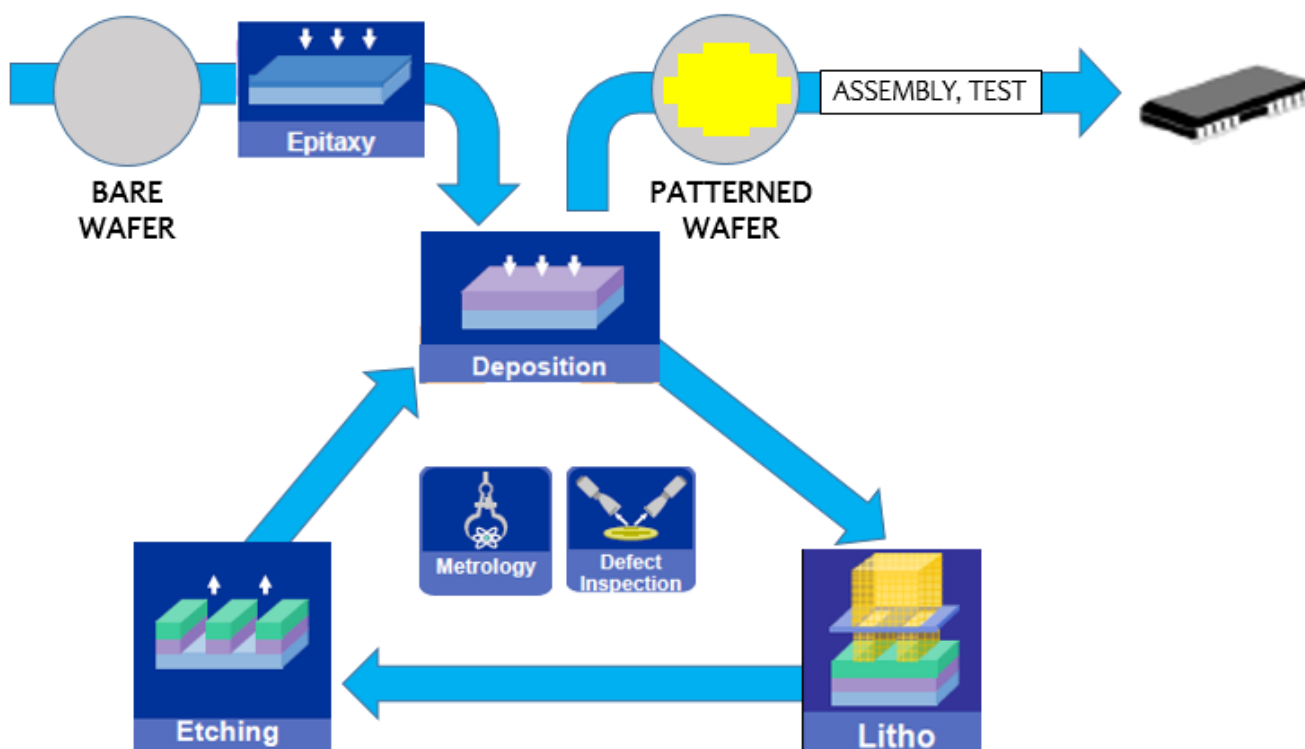
Semi Cap Background

The Semiconductor Manufacturing Process Overview

- **Deposition (\$12B)** – “Layering” process used to grow, coat, or transfer a conducting or insulating material to form thin films onto the wafer. The two main types of Deposition are Chemical Vapor (CVD) and Physical Vapor (PVD).
- **Lithography (\$11.7B)** – Process of printing images of chips onto wafers. This is one of the most critical of the production steps as the projected image represents the required circuit patterns, which are then built up over numerous layers, into the chip. Through the transmission of light via the lithography stepper, parts of the wafer are exposed and parts not. The latter sections can then be removed.
- **Material Removal & Cleaning (\$15.9B)** – Dry Etch involves a vacuum process in which plasma is used to selectively remove material from wafers. Wet Etch involves Lithography in order to create patterns in a material using Photoresist to protecting the layers underneath from the Etch.

- **Process Control (\$6.2B)** – Used for inspection and measurement to remove defects and increase yields.
- **Photoresist Processing (\$2.1B)** – A process that covers specific areas of a wafer with a light sensitive film (photoresist). These layers help create intricate pattern formation and protect wafer from chemical influences during Etch process.

FIGURE 32

Semiconductor Manufacturing Process Overview

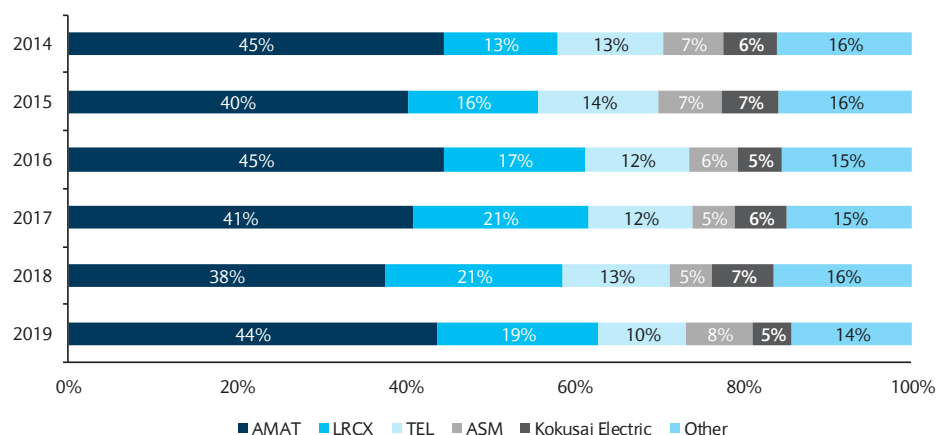
Source: AMAT Company Reports, Barclays Research

Deposition

Deposition is the process of creating layers of insulating (plastic) and conducting (metal) materials on a wafer surface. Physical Vapor Deposition (PVD) and Chemical Vapor Deposition (CVD) are the two main techniques in which material can be deposited on a wafer. PVD is one method used to deposit metal on a wafer, and involves a gas being accelerated towards a metal target in a high vacuum environment and the gas physically knocks-off tiny amounts of metal material, depositing a thin layer of desired material on the wafer. CVD is a technology used to deposit materials on the wafer surface by decomposing gaseous molecules. A gas containing metal/insulator precursors is combined in a reaction chamber with some form of energy. This combination activates a chemical reaction on the wafer surface, forming a thin film of solid material. CVD has several sub categories which vary in temperature and pressure of the process.

AMAT operates in many of the equipment types, but holds the dominant market share in Deposition (Figure 33). The company has also partaken in a lot of M&A transactions that has allowed it to hold market share in a variety of different equipment areas.

FIGURE 33
AMAT Leads in Deposition Market Since 2014



Source: Gartner, Barclays Research

AMAT has maintained 38-45% share of Deposition market since 2014, and regained roughly 6 points of share in 2019 given the upswing in Foundry/Logic vs. Memory (Figure 34). LRCX has also seen share gains over the last 6 years (more stable over last 3), while players such as TEL and Kokusai Electric gave up share.

FIGURE 34
Deposition Segment Competitive Landscape (2014-2019)

Company Name	Share (%)						Revenue (Y/Y%)				
	2019	2018	2017	2016	2015	2014	2019	2018	2017	2016	2015
Applied Materials	43.8%	37.6%	40.8%	44.6%	40.2%	44.6%	5.5%	-1.2%	42.4%	19.0%	-10.0%
Lam Research	19.1%	21.0%	20.8%	16.8%	15.6%	13.4%	-17.9%	8.2%	92.5%	16.0%	15.7%
Tokyo Electron	10.4%	12.7%	12.4%	12.2%	14.2%	12.6%	-25.7%	9.6%	57.5%	-7.4%	12.8%
ASM International	7.9%	5.1%	4.9%	5.9%	7.4%	7.1%	41.0%	10.4%	31.0%	-15.4%	3.9%
Kokusai Electric	4.7%	7.3%	6.3%	5.2%	6.9%	6.5%	-41.1%	23.5%	88.3%	-18.8%	5.9%
Wonik IPS	2.3%	2.9%	3.0%	1.7%	1.7%	1.7%	-28.4%	3.1%	171.1%	6.8%	3.6%
Aixtron	2.0%	2.0%	1.7%	2.2%	2.3%	2.6%	-10.0%	23.7%	23.1%	2.9%	-14.7%
Ulvac	1.4%	2.2%	1.5%	1.7%	1.6%	1.9%	-43.6%	51.5%	42.9%	10.7%	-14.5%
AMEC	1.1%	1.0%	0.7%	NM	NM	NM	3.2%	60.0%	NM	NM	NM
Veeco	1.1%	1.5%	1.4%	1.4%	3.2%	3.2%	-33.9%	15.3%	49.4%	-51.5%	-1.8%
Eugene Technology	1.0%	1.0%	0.6%	0.7%	0.5%	0.5%	-7.4%	74.8%	48.1%	35.9%	-2.1%
TES	1.0%	1.2%	1.5%	1.5%	0.9%	1.0%	-25.9%	-10.7%	56.6%	68.6%	-5.8%
Jusung Engineering	1.0%	0.9%	0.8%	1.1%	0.9%	0.7%	-7.3%	28.7%	12.0%	37.7%	23.7%
KLA	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	NM	NM	NM	NM	NM
NAURA	0.9%	0.3%	0.3%	NM	0.1%	0.2%	135.1%	12.7%	NM	NM	NM
Evatec	0.7%	1.3%	1.4%	1.5%	1.2%	0.0%	-7.1%	3.7%	42.2%	32.2%	NM
NuFlare Technology	0.2%	0.1%	0.1%	NM	0.0%	0.0%	29.2%	53.2%	NM	NM	NM
Ebara	0.1%	0.1%	0.1%	0.7%	0.2%	0.1%	-8.6%	-2.3%	-68.0%	202.0%	259.4%
Orbotech	NM	1.2%	1.1%	1.3%	1.3%	0.0%	NM	18.3%	28.9%	4.7%	NM
Ultratech	NM	0.0%	0.1%	0.1%	0.1%	0.1%	NM	-100.0%	-18.3%	4.3%	69.7%
Others	0.5%	0.5%	0.5%	1.6%	1.6%	3.9%	-9.8%	9.7%	-54.3%	7.8%	-60.2%
Total Market	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-8.7%	7.1%	55.4%	7.5%	-0.3%

Source: Gartner, Barclays Research

By sub-segment within Deposition, AMAT holds majority share in Epitaxy, CVD, Plasma CVD, and Sputtering (strong share gains in 2019) while LRCX has most share in Nontube LPCVD, and ECD. ASM is strong in ALD Tools, and Kokusai Electric has dominant share of Tube CVD.

FIGURE 35

Deposition Sub-Segment Market Share (2017-2019): AMAT Gains Share in Sputtering and Overall Deposition

Competitive Landscape	2019 TAM (\$MM)	AMAT			LRCX			TEL			ASM			Kokusai Electric			Other		
		2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017
Epitaxy	\$988	74%	74%	83%	--	--	--	--	--	--	20%	17%	12%	--	--	--	7%	9%	5%
CVD	7,280	30%	28%	30%	26%	27%	27%	17%	18%	18%	10%	6%	6%	8%	11%	9%	9%	9%	10%
Tube CVD	1,123	--	--	--	--	--	--	46%	38%	42%	4%	3%	2%	50%	59%	56%	--	--	--
Nontube Reactor CVD	6,157	35%	35%	36%	31%	33%	32%	12%	14%	13%	11%	7%	7%	--	--	--	11%	11%	12%
ALD Tools	1,412	3%	3%	4%	12%	20%	15%	28%	27%	31%	41%	29%	30%	--	--	--	16%	21%	19%
Nontube LPCVD	1,022	15%	13%	12%	44%	40%	43%	33%	41%	36%	--	--	--	--	--	--	8%	5%	8%
Plasma CVD	3,724	53%	52%	54%	34%	35%	35%	--	--	--	3%	2%	1%	--	--	--	9%	10%	10%
Sputtering	2,677	85%	74%	79%	--	--	--	--	1%	1%	--	--	--	--	--	--	15%	24%	20%
ECD	493	14%	16%	13%	81%	76%	77%	--	4%	7%	--	--	--	--	--	--	5%	4%	3%
Other	543	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100%	100%	100%
Total Deposition	\$11,982	44%	38%	41%	19%	21%	21%	10%	13%	12%	8%	5%	5%	5%	7%	6%	14%	16%	15%

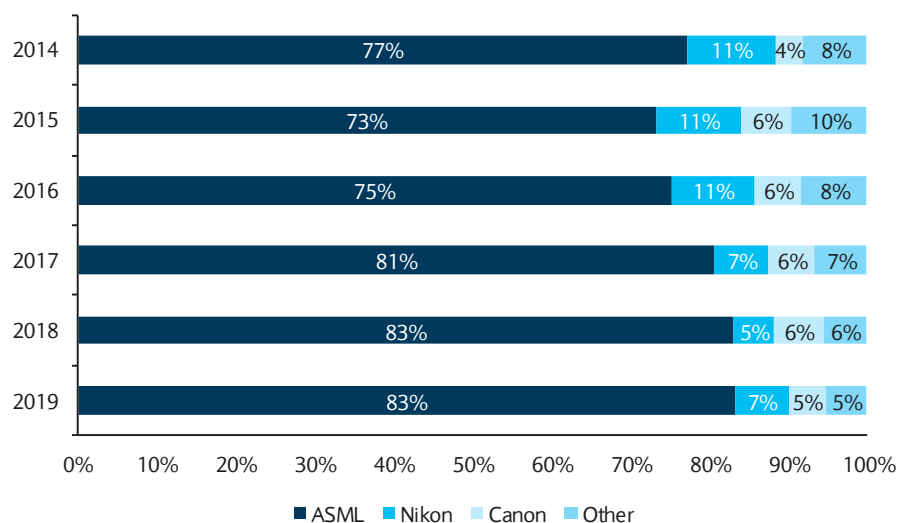
Market share

Source: Gartner, Barclays Research

Lithography

Lithography is the process of printing images of chips onto wafers, and it is among the most critical of the production steps given it provides the ability to build finer and finer circuit structures on the wafer. A laser creates light (of different wavelengths) that shines through the reticle (or mask) and a reduction lens, casting an image on the wafer, which presents the desired circuit pattern. ASML is the market share leader in Lithography, and the company is also the sole manufacturer of lithography machines that use extreme ultraviolet light (EUV) (Figure 36), which is today's leading edge tool.

FIGURE 36

ASML Maintains Majority Share of Lithography Market

Source: Gartner, Barclays Research

ASML is the clear share leader in Lithography as it reached 83% of the market in 2019 (Figure 37). Nikon and Canon are the only other two notable players in this market, and they've only retained ~7% and ~5% market shares, respectively. ASML is the sole provider of advanced EUV systems. Nikon still ships DUV ArFi (immersion) systems while Canon is stronger in iLine and KrF.

FIGURE 37

Lithography Segment Competitive Landscape (2014-2019)

Company Name	Share (%)						Revenue (Y/Y%)				
	2019	2018	2017	2016	2015	2014	2019	2018	2017	2016	2015
ASML	83.3%	83.1%	80.7%	75.1%	73.2%	77.2%	4.1%	36.2%	39.2%	7.4%	-16.6%
Nikon	6.8%	5.1%	6.8%	10.6%	11.0%	11.2%	36.3%	-0.6%	-16.2%	1.2%	-13.6%
Canon	4.7%	6.2%	5.8%	6.0%	6.4%	3.6%	-20.7%	39.8%	26.8%	-1.7%	55.9%
NuFlare Technology	3.0%	3.1%	3.3%	4.0%	5.7%	4.5%	0.7%	21.8%	7.8%	-25.5%	10.6%
Suss MicroTec	0.5%	0.6%	0.7%	0.5%	0.5%	0.4%	-10.3%	23.6%	59.8%	4.9%	17.2%
Veeco	0.5%	0.8%	0.7%	0.0%	NM	NM	-32.5%	51.4%	NM	NM	NM
Applied Materials	0.3%	0.2%	0.5%	0.5%	0.5%	0.1%	52.6%	-39.2%	14.7%	23.3%	265.0%
EV Group	0.3%	0.3%	0.4%	0.5%	0.5%	0.4%	1.6%	12.0%	5.2%	-6.1%	22.2%
Rudolph Technologies	0.1%	0.1%	0.2%	0.2%	0.2%	0.1%	7.2%	-50.7%	24.6%	-21.4%	287.7%
Ultratech	NM	0.0%	0.2%	1.5%	1.3%	0.9%	NM	-100.0%	-78.7%	16.8%	30.9%
Others	0.5%	0.5%	0.7%	1.1%	0.8%	1.8%	13.1%	-1.8%	-18.9%	40.6%	-60.8%
Total Market	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	3.9%	32.3%	29.7%	4.6%	-12.0%


Source: Gartner, Barclays Research

Within Lithography, ASML and Nikon sell steppers for semiconductor patterning, while the rest of the market players focus on Advanced Packaging Lithography (Figure 38), used in the manufacturing of masks and micro-structures.

FIGURE 38

Lithography Sub-Segment Market Share (2017-2019)

Competitive Landscape	2019 TAM (\$MM)	ASML			Nikon			Canon			Other		
		2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017
Steppers (including EUV)	\$11,017	88%	89%	87%	7%	5%	7%	4%	6%	6%	--	--	0%
Advanced Packaging Lithography	255	--	--	--	--	--	--	27%	24%	19%	73%	76%	81%
Other	433	--	--	--	--	--	--	--	--	--	100%	100%	100%
Total Lithography	\$11,705	83%	83%	81%	7%	5%	7%	5%	6%	6%	5%	6%	7%

 Market share

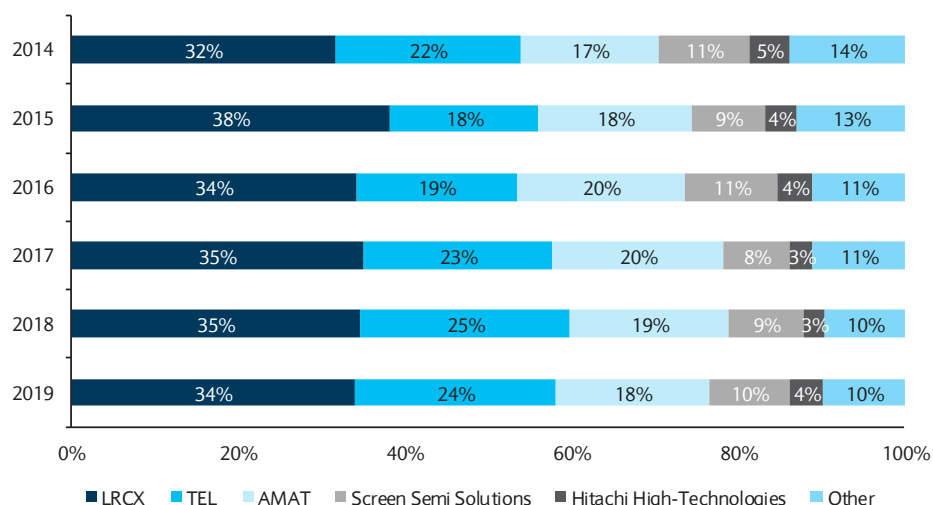
Source: Gartner, Barclays Research

Material Removal & Cleaning

Etch helps remove selected areas from the surface of the wafer in order for other materials to be deposited. Dry Etching is an important step that involves a vacuum process in which plasma is used to selectively remove materials from wafers, and the remaining material forms the circuit patterns on each chip. Wet Etching involves Lithography in order to create patterns in a material using photoresist while also protecting the layers underneath; material is dissolved when immersed in a chemical solution. CMP steps are inserted throughout manufacturing to condition the wafer, remove layers, control thickness, etc. LRCX is the majority share leader in overall Material Removal & Cleaning, followed by TEL as the second largest (Figure 39).

FIGURE 39

Material Removal & Cleaning Segment Dominated by LRCX and TEL



Source: Gartner, Barclays Research

LRCX, Tokyo Electron, and Applied Materials have all seen some degree of share gains in Material Removal and Cleaning since 2014, which reiterates the market consolidation going on as the top 5 players take share from smaller players in the market (Figure 40).

FIGURE 40

Material Removal & Cleaning Segment Competitive Landscape (2014-2019)

Company Name	Share (%)						Revenue (Y/Y%)				
	2019	2018	2017	2016	2015	2014	2019	2018	2017	2016	2015
Lam Research	34.0%	34.7%	35.1%	34.2%	38.3%	31.7%	-13.0%	11.7%	43.6%	6.0%	27.8%
Tokyo Electron	24.1%	25.2%	22.7%	19.2%	17.8%	22.3%	-15.1%	25.4%	66.0%	27.7%	-15.3%
Applied Materials	18.3%	19.0%	20.5%	20.3%	18.4%	16.5%	-14.6%	4.8%	41.3%	31.1%	17.6%
Screen Semiconductor Solutions	9.7%	8.9%	7.9%	11.0%	8.8%	10.9%	-3.8%	26.9%	1.6%	48.2%	-14.6%
Hitachi High-Technologies	4.0%	2.5%	2.8%	4.2%	3.8%	4.8%	40.4%	2.0%	-6.9%	30.5%	-15.0%
Ebara	2.6%	2.6%	2.9%	3.4%	2.5%	2.8%	-12.9%	0.5%	20.9%	63.2%	-4.9%
SEMES	1.3%	3.2%	4.4%	2.5%	5.2%	5.0%	-60.7%	-18.3%	144.5%	-42.6%	11.1%
KLA	1.0%	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
NAURA	0.8%	0.3%	0.2%	NM	NM	NM	122.5%	94.8%	NM	NM	NM
Mattson Technology	0.8%	0.4%	0.7%	0.8%	0.8%	1.1%	60.3%	-27.8%	24.7%	5.2%	-16.9%
AMEC	0.7%	0.5%	0.3%	0.6%	0.6%	0.6%	38.4%	96.9%	-32.9%	8.5%	11.3%
PSK	0.7%	1.2%	1.1%	0.9%	0.8%	1.2%	-44.7%	17.8%	83.9%	22.9%	-24.3%
TES	0.1%	0.2%	0.3%	0.1%	0.0%	0.3%	-48.1%	-13.8%	273.8%	221.1%	-84.0%
Tokyo Seimitsu	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	-18.9%	67.6%	-21.8%	40.4%	77.8%
Kokusai Electric	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	35.1%	110.1%	-59.1%	NM	NM
Orbotech	NM	0.5%	0.5%	0.5%	0.5%	0.0%	NM	22.8%	38.8%	5.5%	NM
Suss MicroTec	NM	0.1%	0.1%	0.1%	0.1%	0.1%	NM	6.1%	62.3%	8.9%	28.6%
Others	1.6%	0.4%	0.4%	2.1%	2.1%	2.9%	1.1%	12.4%	-70.8%	16.6%	-22.3%
Total Market	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-12.1%	12.9%	40.2%	18.5%	5.8%

Source: Gartner, Barclays Research

By sub-segment within Material Removal & Cleaning, LRCX is specifically known for its Dry Etch (\$10.8B TAM) and Conductor Etch business (Figure 41). Strength in this area is expected to grow as 3D architectures and new materials rely on Etch processes. 3D NAND is the primary driver for Dry Etch as it requires very precise, high aspect ratio Etch capability. TEL is another large player in the space, holding majority share of Dielectric Etch, and also has decent share of Spray Processors. AMAT's strong suit is CMP and Post-CMP Clean.

FIGURE 41

Material Removal & Cleaning Sub-Segment Market Share (2017-2019)

Competitive Landscape	2019 TAM (\$MM)	LRCX			TEL			AMAT			Other		
		2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017
Spray Processors	\$2,289	16%	16%	13%	29%	25%	24%	--	--	--	55%	59%	63%
Dry Etch	10,806	45%	46%	48%	28%	30%	27%	18%	18%	19%	9%	6%	7%
Dielectric Etch	4,216	36%	37%	41%	61%	59%	54%	--	--	--	4%	3%	4%
Conductor Etch	6,590	51%	53%	53%	7%	6%	6%	30%	33%	33%	13%	8%	9%
CMP and Post-CMP Clean	1,447	--	--	--	--	--	--	66%	70%	71%	34%	30%	29%
Other	1,368	1%	1%	1%	1%	1%	2%	--	--	--	98%	97%	97%
Total Material Removal and Cleaning	\$15,910	34%	35%	35%	24%	25%	23%	18%	19%	20%	23%	21%	22%

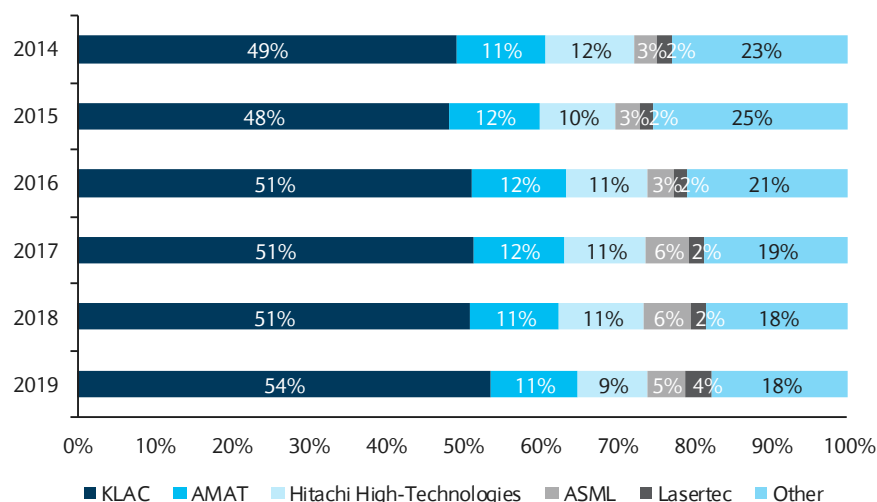
Market share

Source: Gartner, Barclays Research

Process Control

Process Control is used for inspection and measurement to identify defects and increase yields. This step is very important as all kinds of processes must be monitored, before and after each step is completed. This market is expected to grow (Gartner estimates 2% CAGR '19-'24) as complexity increases at more complex nodes including adoption of EUV, which brings additional challenges. KLAC has majority share in the Process Control market, ending 2019 with 54% share of the market (Figure 42). In times of high Foundry/Logic demand/growth, KLAC benefits in terms of Process Control intensity.

FIGURE 42

KLAC Maintains Majority Share of Process Control Market

Source: Gartner, Barclays Research

In Process Control market, KLAC has seen pretty stable share gains over the last several years, reaching over half of the total market (~54% share). AMAT has maintained ~11% share while other smaller players slightly ticked up for the most part (Lasertec, Camtek, Zeiss, among others).

FIGURE 43

Process Control Segment Competitive Landscape (2014-2019)

Company Name	Share (%)						Revenue (Y/Y%)				
	2019	2018	2017	2016	2015	2014	2019	2018	2017	2016	2015
KLA	53.6%	51.1%	51.3%	51.2%	48.3%	49.2%	2.6%	15.9%	17.1%	17.8%	-4.0%
Applied Materials	11.3%	11.5%	11.9%	12.3%	11.7%	11.4%	-3.9%	12.8%	12.4%	17.6%	-0.2%
Hitachi High-Technologies	9.1%	11.1%	10.6%	10.6%	9.9%	11.7%	-20.4%	21.5%	16.8%	18.9%	-16.6%
ASML	4.9%	5.9%	5.7%	3.2%	3.2%	2.9%	-19.1%	21.5%	104.1%	13.5%	9.1%
Lasertec	3.6%	2.1%	2.0%	1.8%	1.7%	2.0%	64.1%	27.0%	23.8%	17.2%	-14.8%
Zeiss	2.7%	2.4%	3.0%	2.4%	2.8%	2.0%	9.2%	-6.1%	47.8%	-5.0%	35.2%
Nova Instruments	2.7%	3.0%	3.2%	2.6%	2.6%	2.1%	-13.1%	10.5%	42.1%	10.1%	20.6%
Nanometrics	2.6%	4.2%	3.9%	3.9%	3.6%	3.1%	-39.5%	24.6%	16.7%	20.4%	14.4%
Rudolph Technologies	2.1%	3.3%	3.3%	3.4%	4.0%	3.1%	-38.3%	13.2%	13.4%	-4.2%	27.0%
Camtek	2.0%	1.6%	1.4%	1.5%	1.5%	1.2%	8.2%	30.2%	10.6%	16.0%	21.3%
Semilab	1.6%	1.3%	1.0%	0.8%	0.7%	0.4%	20.4%	47.5%	57.0%	24.1%	78.8%
Onto Innovation	1.4%	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Nikon	0.6%	0.6%	0.6%	0.7%	0.9%	0.5%	-2.6%	11.6%	-1.9%	-2.3%	66.2%
Screen Semiconductor Solutions	0.3%	0.4%	0.3%	0.1%	0.2%	0.1%	-32.6%	78.1%	135.4%	-34.4%	60.1%
Veeco	0.2%	0.3%	0.1%	0.0%	NM	NM	-35.6%	253.4%	NM	NM	NM
Ultratech	NM	0.0%	0.2%	0.0%	0.2%	0.0%	NM	-100.0%	-18.3%	14.9%	368.4%
Others	1.4%	1.3%	1.5%	5.1%	8.7%	10.3%	12.5%	-1.2%	-66.0%	-35.6%	-16.8%
Total Market	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-2.6%	16.5%	16.7%	11.2%	-2.2%

Source: Gartner, Barclays Research

By sub-segment within Process Control, KLAC holds majority share in most categories, including Lithography Metrology, Wafer Inspection and Defect Review, and Patterned Wafer Inspection (Figure 44). The company also dominates the Thin-Film Metrology market as a distant individual leader.

FIGURE 44

Process Control Sub-Segment Market Share (2017-2019)

Competitive Landscape	2019 TAM (\$MM)	KLAC			AMAT			ASML			Other		
		2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017
Lithography Metrology	\$1,840	44%	37%	39%	11%	14%	13%	9%	11%	10%	36%	38%	37%
Thin-Film Metrology	970	42%	41%	43%	--	--	--	--	--	--	58%	59%	57%
Wafer Inspection and Defect Review	3,094	65%	63%	63%	16%	15%	17%	5%	6%	6%	15%	16%	15%
Patterned Wafer Inspection	1,605	72%	68%	72%	18%	16%	14%	9%	11%	10%	1%	5%	4%
Other	339	2%	2%	2%	--	--	--	--	--	--	98%	98%	98%
Total Process Control	\$6,243	54%	51%	51%	11%	11%	12%	5%	6%	6%	30%	32%	31%

 Market share

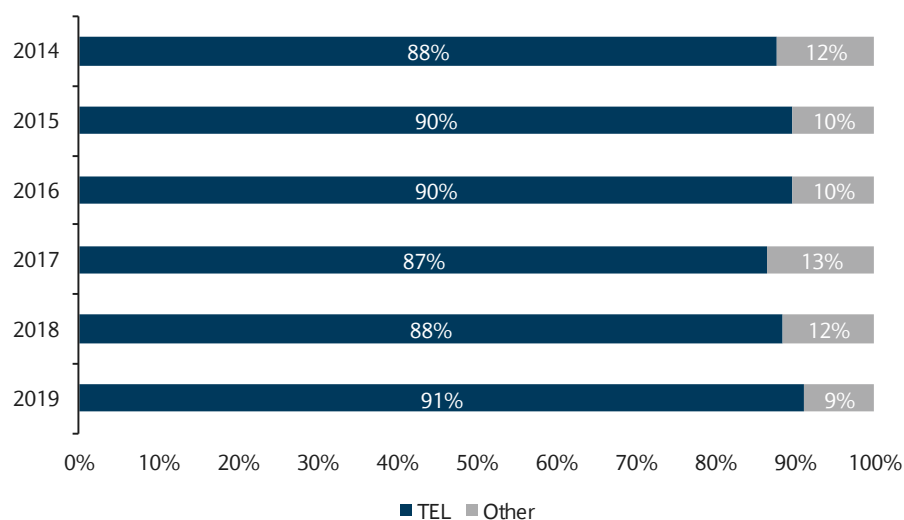
Source: Gartner, Barclays Research

Photoresist Processing

Photoresist Processing is one important aspect of Lithography; this process makes sure to cover certain areas of a wafer that either need to be removed or kept with a light sensitive film, known as photoresist. These photoresist layers essentially help create intricate pattern formation, and also protect the wafer substrate from chemical influences during the etch process. Tokyo Electron is the dominant leader that captures most of the total Photoresist Processing market (91% in 2019) followed by several other players (Figure 45, Figure 46, Figure 47).

FIGURE 45

Photoresist Processing Market Dominated by TEL



Source: Gartner, Barclays Research

FIGURE 46

Photoresist Processing Segment Competitive Landscape (2014-2019)

Company Name	Share (%)						Revenue (Y/Y%)				
	2019	2018	2017	2016	2015	2014	2019	2018	2017	2016	2015
Tokyo Electron	91.3%	88.5%	86.7%	89.8%	89.8%	87.8%	-6.0%	29.7%	18.7%	0.1%	-6.4%
Screen Semiconductor Solutions	5.6%	6.3%	5.2%	6.8%	6.2%	6.9%	-19.5%	52.8%	-5.2%	9.4%	-18.0%
SEMES	2.2%	4.4%	7.2%	2.8%	3.4%	4.5%	-48.1%	-23.3%	221.4%	-17.5%	-32.3%
Suss MicroTec	1.0%	0.8%	0.8%	0.6%	0.6%	0.7%	11.0%	34.2%	54.0%	2.8%	-18.2%
Total Market	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-8.3%	27.1%	22.9%	0.1%	-8.4%

Source: Gartner, Barclays Research

FIGURE 47

Photoresist Processing Segment Market Share (2017-2019)

Competitive Landscape	2019 TAM (\$MM)	TEL			Screen Semi Solutions			SEMES			Suss MicroTec		
		2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017
Total Photoresist Processing	\$2,060	91%	88%	87%	6%	6%	5%	2%	4%	7%	1%	1%	1%

Source: Gartner, Barclays Research

Operating Metrics

AMAT and LRCX have a very similar GM profile around 45-46% for CY21E that is right in-line with the front-end industry peers, while KLAC has the highest GM at 61%. Despite the similar GM profile, LRCX has a higher net margin at 25% for CY21E than AMAT at 21% both of which are above the industry median at 18%. KLAC is at the top of the range at 27%. As previously shown in Figure 18, the GMs for the top industry players have historically remained stable as the industry has continued to consolidate.

FIGURE 48
Operating Metrics

Operating Metrics											
(\$ in millions)											
	Revenue			Net Income		Revenue Growth		CY20E		CY21E	
	CY19	CY20E	CY21E	CY20E	CY21E	20/'19	21/'20	Gross Margin	Net Income Margin	Gross Margin	Net Income Margin
Applied Materials	\$15,017	\$16,385	\$17,386	\$3,365	\$3,726	9%	6%	44%	21%	45%	21%
Lam Research	\$9,549	\$10,160	\$11,525	\$2,328	\$2,885	6%	13%	45%	23%	46%	25%
KLA-Tencor	\$5,279	\$5,563	\$6,019	\$1,449	\$1,649	5%	8%	60%	26%	61%	27%

Front End											
Comparables*											
ASML	\$13,232	\$13,991	\$16,501	\$3,270	\$4,576	5.7%	17.9%	48%	23%	51%	28%
Tokyo Electron	\$10,302	\$11,126	\$12,317	\$1,914	\$2,244	8.0%	10.7%	41%	17%	43%	18%
ASM International	\$1,437	\$1,309	\$1,435	\$266	\$329	(8.9%)	9.6%	43%	20%	43%	23%
MKS Instruments	\$1,900	\$1,978	\$2,212	\$265	\$384	4.1%	11.8%	44%	13%	46%	17%
Onto Innovation	\$306	\$553	\$622	\$56	\$93	80.6%	12.6%	51%	10%	53%	15%
Nova Instruments	\$225	\$246	\$286	\$49	\$67	9.5%	16.2%	56%	20%	57%	23%
Acxels Technologies	\$343	\$452	\$486	\$35	\$49	31.9%	7.4%	40%	8%	42%	10%
Mean						19%	12%	46%	16%	48%	19%
Median						8%	12%	44%	17%	46%	18%

Semiconductor Test & Measurement											
Comparables*											
Teradyne	\$2,295	\$2,573	\$2,719	\$524	\$602	12.1%	5.7%	56%	20%	58%	22%
Advantest	\$2,492	\$2,637	\$2,716	\$477	\$482	5.8%	3.0%	56%	18%	56%	18%
FormFactor	\$589	\$605	\$645	\$87	\$97	2.7%	6.5%	44%	14%	45%	15%
Kulicke & Soffa Industries	\$527	\$632	\$761	\$40	\$65	19.9%	20.4%	46%	6%	46%	9%
Cohu	\$583	\$552	\$669	\$8	\$52	(5.4%)	21.3%	41%	2%	44%	8%
Mean						7%	11%	49%	12%	50%	14%
Median						6%	6%	46%	14%	46%	15%

Memory											
Comparables*											
Samsung Electronics	\$197,776	\$185,096	\$212,489	\$19,960	\$29,732	(6.4%)	14.8%	38%	11%	42%	14%
SK Hynix	\$23,169	\$26,145	\$32,336	\$3,787	\$7,265	12.8%	23.7%	37%	14%	46%	22%
Micron	\$20,637	\$20,476	\$25,912	\$2,905	\$6,498	(0.8%)	26.5%	34%	14%	39%	25%
Western Digital	\$15,582	\$17,276	\$18,318	\$1,494	\$2,296	10.9%	6.0%	32%	9%	35%	13%
Mean						4%	18%	35%	12%	40%	19%
Median						5%	19%	35%	12%	41%	18%

Foundry											
Comparables*											
TSMC	\$34,635	\$40,887	\$44,787	\$14,095	\$15,568	18.1%	9.5%	49%	34%	49%	35%
SMIC	\$3,116	\$3,648	\$4,114	\$249	\$285	17.1%	12.8%	23%	7%	22%	7%
UMC	\$4,797	\$5,625	\$5,817	\$421	\$550	17.3%	3.4%	19%	7%	21%	9%
Vanguard	\$916	\$1,091	\$1,173	\$190	\$220	19.1%	7.5%	32%	17%	33%	19%
HH Grace	\$933	\$958	\$1,191	\$101	\$132	2.7%	24.4%	24%	11%	24%	11%
TowerJazz	\$1,234	\$1,264	\$1,361	\$111	\$164	2.4%	7.7%	20%	9%	23%	12%
Mean						13%	11%	28%	14%	29%	16%
Median						17%	9%	23%	10%	24%	12%

Source: Company Reports, Bloomberg, and Barclays Research

* Comparable numbers use consensus estimates (as of 5/22/2020)

Comparable Valuation Analysis

FIGURE 49

Trading Metrics

Trading Metrics										
(\$ in millions, except per share data)										
	Stock Price	% of 52 Week High	Market Cap.	Enterprise Value	EV/Revenue		EV/EBITDA		P/E	
					CY20E	CY21E	CY20E	CY21E	CY20E	CY21E
Applied Materials	\$55.02	78.6%	\$50,008	\$51,363	3.1x	3.0x	11.5x	10.5x	15.1x	13.5x
Lam Research	\$262.97	76.4%	\$38,189	\$38,057	3.7x	3.3x	13.0x	11.7x	16.6x	12.7x
KLA-Tencor	\$177.92	93.9%	\$26,868	\$28,792	5.2x	4.8x	13.3x	12.0x	18.9x	15.8x

Front End

Comparables*										
ASML	\$317.75	98.6%	\$135,264	\$134,993	9.6x	8.2x	31.9x	23.4x	40.5x	28.9x
Tokyo Electron	\$205.16	85.5%	\$32,347	\$29,206	2.6x	2.4x	11.0x	9.2x	16.9x	16.9x
ASM International	\$110.70	85.1%	\$5,895	\$5,315	4.1x	3.7x	14.5x	13.2x	20.3x	16.8x
MKS Instruments	\$99.79	81.4%	\$5,472	\$5,933	3.0x	2.7x	12.2x	10.1x	19.8x	14.3x
Onto Innovation	\$32.08	74.2%	\$1,530	\$1,262	2.3x	2.0x	12.5x	8.5x	20.8x	14.3x
Nova Instruments	\$45.17	99.6%	\$1,319	\$1,154	4.7x	4.0x	17.4x	13.4x	25.3x	19.3x
Axcelis Technologies	\$24.84	85.9%	\$826	\$706	1.6x	1.5x	13.5x	10.2x	26.0x	17.7x
Mean					4.0x	3.5x	16.1x	12.6x	24.2x	18.3x
Median					3.0x	2.7x	13.5x	10.2x	20.8x	16.9x

Semiconductor Test & Measurement

Comparables*										
Teradyne	\$61.74	76.4%	\$10,333	\$9,893	3.8x	3.6x	13.2x	11.9x	20.2x	17.6x
Advantest	\$48.30	79.2%	\$9,762	\$8,682	3.3x	3.2x	18.7x	11.6x	23.0x	19.8x
FormFactor	\$24.32	85.1%	\$1,853	\$1,700	2.8x	2.6x	15.1x	13.7x	22.5x	19.9x
Kulicke & Soffa Industries	\$22.43	77.8%	\$1,393	\$892	1.4x	1.2x	11.4x	7.7x	29.6x	14.9x
Cohu	\$15.33	57.5%	\$634	\$852	1.5x	1.3x	20.6x	8.5x	83.6x	13.1x
Mean					2.6x	2.4x	15.8x	10.7x	35.8x	17.1x
Median					2.8x	2.6x	15.1x	11.6x	23.0x	17.6x

Memory

Comparables*										
Samsung Electronics	\$40.52	77.6%	\$234,216	\$162,684	0.9x	0.8x	3.3x	2.6x	13.5x	9.1x
SK Hynix	\$67.65	76.7%	\$47,633	\$54,937	2.1x	1.7x	4.3x	3.1x	13.0x	6.8x
Micron	\$45.22	73.2%	\$49,826	\$47,880	2.3x	1.8x	5.8x	4.9x	17.7x	8.2x
Western Digital	\$42.69	59.0%	\$12,734	\$19,668	1.1x	1.1x	5.4x	4.6x	8.5x	6.0x
Mean					1.6x	1.3x	4.7x	3.8x	13.2x	7.5x
Median					1.6x	1.4x	4.9x	3.9x	13.2x	7.5x

Foundry

Comparables*										
TSMC	\$9.94	84.4%	\$252,423	\$241,311	5.9x	5.4x	9.3x	8.4x	18.1x	16.5x
SMIC	\$2.26	81.7%	\$11,872	\$18,536	5.1x	4.5x	12.8x	10.8x	52.9x	42.3x
UMC	\$0.51	88.0%	\$6,153	\$5,591	1.0x	1.0x	2.8x	2.8x	14.9x	11.2x
Vanguard	\$2.34	83.4%	\$3,797	\$3,537	3.2x	3.0x	10.0x	9.0x	20.1x	17.4x
HH Grace	\$2.04	65.0%	\$2,537	\$2,600	2.7x	2.2x	14.6x	7.4x	23.8x	21.2x
TowerJazz	\$19.60	76.3%	\$2,103	\$1,665	1.3x	1.2x	5.1x	4.3x	19.2x	13.0x
Mean					3.2x	2.9x	9.1x	7.1x	24.8x	20.3x
Median					3.0x	2.6x	9.7x	7.9x	19.6x	17.0x

Source: Company Reports, Bloomberg, and Barclays Research

* Comparable numbers use consensus estimates

Priced as of 5/22/2020

Investment Risks & Risk to Our Thesis

- **Foundry Could Improve with Shift in Capex:** Foundry capex could prove to be stronger than expected in the 2H of this year if Huawei is hampered and competitors ramp to take share. It's unlikely TSMC cuts in this scenario and Foundry capex could actually tick higher if Samsung captures more of the Huawei modem business through Samsung or QUALCOMM. The higher Foundry capex brings upside for the group vs. our expectations.
- **China Issues May Limit Growth Potential:** China restrictions are a hurdle that we believe the group likely works around but any further tightening of the restrictions/rules could materially impact semi cap equipment group. If China sales impacted long term the group could see material downside as names have 20-30% exposure.
- **Slower Than Expected Memory Ramp:** If Memory ramps slower than expected in the 2H or Mobile doesn't offset some Data Center slowdown, our thesis is materially impacted. In this scenario, the group would lack a driver in the 2H and have material downside to numbers.
- **COVID-19 Impact Larger Than Expected:** If the global impact from COVID is more than expected, this could lead to a global economic downturn, which would impact demand for semi units and in turn equipment and capacity.

FIGURE 50

AMAT Income Statement

Applied Materials Period Ending \$ in millions	Jan-19 1Q	Apr-19 2Q	Jul-19 3Q	Oct-19 4Q	Jan-20 1Q	Apr-20 2Q	Jul-20 3QE	Oct-20 4QE	Jan-21 1QE	Apr-21 2QE	Jul-21 3QE	Oct-21 4QE	Jan-22 1QE	2019 FY	2020 FYE	2021 FYE	2019 CY	2020 CYE	2021 CYE
Revenues	\$3,753.0	\$3,539.0	\$3,562.0	\$3,754.0	\$4,162.0	\$3,957.0	\$4,100.1	\$4,221.4	\$4,106.3	\$4,198.2	\$4,339.0	\$4,469.1	\$4,379.4	\$14,608.0	\$16,440.5	\$17,112.5	\$15,017.0	\$16,384.8	\$17,385.6
QoQ	-6.5%	-5.7%	0.6%	5.4%	10.9%	-4.9%	3.6%	3.0%	-2.7%	2.2%	3.4%	3.0%	-2.0%						
YoY	-10.7%	-22.5%	-20.3%	-6.5%	10.9%	11.8%	15.1%	12.5%	-1.3%	6.1%	5.8%	5.9%	6.7%	-15.3%	12.5%	4.1%	-10.6%	9.1%	6.1%
Cost of Goods	2,078.0	2,000.0	1,996.0	2,111.0	2,295.0	2,192.0	2,296.0	2,355.6	2,283.1	2,330.0	2,395.1	2,458.0	2,408.6	8,185.0	9,138.6	9,466.2	8,402.0	9,126.7	9,591.8
Gross Profit	\$1,675.0	\$1,539.0	\$1,566.0	\$1,643.0	\$1,867.0	\$1,765.0	\$1,804.0	\$1,865.9	\$1,823.2	\$1,868.2	\$1,943.9	\$2,011.1	\$1,970.7	\$6,423.0	\$7,301.9	\$7,646.3	\$6,615.0	\$7,258.1	\$7,793.9
R&D	516.0	508.0	515.0	515.0	552.0	550.0	550.0	552.0	553.0	564.1	567.1	570.1	571.1	2,054.0	2,204.0	2,254.2	2,090.0	2,205.0	2,272.2
SG&A	234.0	237.0	231.0	240.0	247.0	239.0	239.0	240.0	239.0	243.8	244.8	245.8	246.8	942.0	965.0	973.3	955.0	957.0	981.1
Total Operating Expenses	750.0	745.0	746.0	755.0	799.0	789.0	789.0	792.0	792.0	807.8	811.8	815.8	817.8	2,996.0	3,169.0	3,227.5	3,045.0	3,162.0	3,253.4
Operating Income	\$925.0	\$794.0	\$820.0	\$888.0	\$1,068.0	\$976.0	\$1,015.0	\$1,073.9	\$1,031.2	\$1,060.4	\$1,132.0	\$1,195.2	\$1,152.9	\$3,427.0	\$4,132.9	\$4,418.8	\$3,570.0	\$4,096.1	\$4,540.5
Interest Income (Exp)	(32.0)	(28.0)	(28.0)	(29.0)	(33.0)	(47.0)	(46.0)	(44.6)	(44.1)	(41.9)	(40.3)	(38.4)	(36.1)	(117.0)	(170.6)	(164.7)	(118.0)	(181.6)	(156.7)
Interest Income (Exp)	(60.0)	(60.0)	(58.0)	(59.0)	(59.0)	(61.0)	(61.0)	(58.9)	(60.3)	(60.3)	(60.4)	(60.6)	(60.6)	(237.0)	(239.9)	(241.6)	(236.0)	(241.2)	(241.9)
Interest and other income	28.0	32.0	30.0	30.0	26.0	14.0	15.0	14.3	16.2	18.3	20.2	22.2	24.5	120.0	69.3	76.9	118.0	59.5	85.2
Profit Before Taxes	893.0	766.0	792.0	859.0	1,035.0	929.0	969.1	1,029.3	987.1	1,018.4	1,091.8	1,156.8	1,116.8	3,310.0	3,962.3	4,254.1	3,452.0	3,914.5	4,383.8
Taxes	114.0	106.0	100.0	115.0	131.0	112.0	140.5	149.2	148.1	152.8	163.8	173.5	167.5	435.0	532.8	638.1	452.0	549.8	657.6
Net Income - Pro Forma (Incl ESC)	\$779.0	\$660.0	\$692.0	\$744.0	\$904.0	\$817.0	\$828.6	\$880.0	\$839.0	\$865.7	\$928.0	\$983.3	\$949.3	\$2,875.0	\$3,429.6	\$3,616.0	\$3,000.0	\$3,364.6	\$3,726.2
EPS - Pro Forma (incl ESO)	\$0.81	\$0.70	\$0.74	\$0.80	\$0.98	\$0.89	\$0.90	\$0.96	\$0.91	\$0.94	\$1.01	\$1.07	\$1.04	\$3.04	\$3.71	\$3.94	\$3.21	\$3.65	\$4.06
EPS - GAAP	\$0.80	\$0.70	\$0.61	\$0.75	\$0.96	\$0.82	\$0.87	\$0.93	\$0.88	\$0.91	\$0.98	\$1.05	\$0.99	\$2.86	\$3.57	\$3.83	\$3.02	\$3.49	\$3.94
Dividend Per Share	\$0.20	\$0.21	\$0.21	\$0.20	\$0.22	\$0.22	\$0.22	\$0.22	\$0.22	\$0.22	\$0.22	\$0.22	\$0.22	\$0.82	\$0.86	\$0.35	\$0.82	\$0.87	\$0.88
Fully Diluted Shares	965.0	948.0	937.0	931.0	927.0	923.0	922.0	921.0	920.0	919.0	918.0	917.0	916.0	945.4	923.3	918.4	934.9	921.5	917.5
<i>Percent of Sales</i>																			
Gross Margin	44.6%	43.5%	44.0%	43.8%	44.9%	44.6%	44.0%	44.2%	44.4%	44.5%	44.8%	45.0%	45.0%	44.0%	44.4%	44.7%	44.1%	44.3%	44.8%
R&D	13.7%	14.4%	14.5%	13.7%	13.3%	13.9%	13.4%	13.1%	13.5%	13.4%	13.1%	12.8%	13.0%	14.1%	13.4%	13.2%	13.9%	13.5%	13.1%
SG&A	6.2%	6.7%	6.5%	6.4%	5.9%	6.0%	5.8%	5.7%	5.8%	5.8%	5.6%	5.5%	5.6%	6.4%	5.9%	5.7%	6.4%	5.8%	5.6%
Operating Margin	24.6%	22.4%	23.0%	23.7%	25.7%	24.7%	24.8%	25.4%	25.1%	25.3%	26.1%	26.7%	26.3%	23.5%	25.1%	25.8%	23.8%	25.0%	26.1%
Taxes	12.8%	13.8%	12.6%	13.4%	12.7%	12.1%	14.5%	14.5%	15.0%	15.0%	15.0%	15.0%	15.0%	13.6%	13.7%	15.3%	13.1%	14.0%	15.0%
Net Income	20.8%	18.6%	19.4%	19.8%	21.7%	20.6%	20.2%	20.8%	20.4%	20.6%	21.4%	22.0%	21.7%	19.7%	20.9%	21.1%	20.0%	20.5%	21.4%
<i>Sequential Change</i>																			
R&D	-0.4%	-1.6%	1.4%	0.0%	7.2%	-0.4%	0.0%	0.4%	0.2%	2.0%	0.5%	0.5%	0.2%	1.7%	7.3%	2.3%	2.1%	5.5%	3.0%
SG&A	-1.7%	1.3%	-2.5%	3.9%	2.9%	-3.2%	0.0%	0.4%	-0.4%	2.0%	0.4%	0.4%	0.4%	-3.8%	2.4%	0.9%	-2.7%	0.2%	2.5%
Reconciliation of Pro Forma to GAAP																			
Purchased Intangibles	14.0	14.0	13.0	14.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	55.0	52.0	52.0	54.0	52.0	52.0
Other	(6.0)	(20.0)	108.0	32.0	(1.0)	49.0	15.0	15.0	15.0	15.0	15.0	5.0	25.0	114.0	78.0	50.0	119.0	94.0	60.0
Net Income - GAAP	\$771.0	\$666.0	\$571.0	\$698.0	\$892.0	\$755.0	\$800.6	\$852.0	\$811.0	\$837.7	\$900.0	\$965.3	\$911.3	\$2,761.0	\$3,351.6	\$3,566.0	\$2,827.0	\$3,218.6	\$3,614.2
GAAP Shares	965.0	948.0	937.0	931.0	927.0	923.0	922.0	921.0	920.0	919.0	918.0	917.0	916.0	965.2	937.9	932.0	934.9	921.5	917.5
EPS - GAAP	\$0.80	\$0.70	\$0.61	\$0.75	\$0.96	\$0.82	\$0.87	\$0.93	\$0.88	\$0.91	\$0.98	\$1.05	\$0.99	\$2.86	\$3.57	\$3.83	\$3.02	\$3.49	\$3.94

Source: Company Reports, Barclays Research Estimates

FIGURE 51
AMAT Balance Sheet

Applied Materials Period Ending \$ in millions	Jan-19 1Q	Apr-19 2Q	Jul-19 3Q	Oct-19 4Q	Jan-20 1Q	Apr-20 2Q	Jul-20 3QE	Oct-20 4QE	Jan-21 1QE	Apr-21 2QE	Jul-21 3QE	Oct-21 4QE	Jan-22 1QE	2019 FY	2020 FYE	2021 FYE	2019 CY	2020 CYE	2021 CYE
BALANCE SHEET																			
Assets																			
Cash and cash equivalents	\$3,192.0	\$3,116.0	\$3,014.0	\$3,129.0	\$3,424.0	\$5,281.0	\$4,258.4	\$4,749.1	\$5,587.0	\$6,220.4	\$6,866.8	\$7,588.5	\$8,494.5	\$3,129.0	\$4,749.1	\$7,588.5	\$3,424.0	\$5,587.0	\$8,494.5
Short-term Investments	520.0	507.0	547.0	489.0	536.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	489.0	423.0	423.0	536.0	423.0	423.0
Accounts Receivable	2,444.0	2,264.0	2,373.0	2,533.0	2,679.0	2,625.0	2,703.4	2,783.4	2,707.4	2,768.1	2,860.9	2,946.6	2,887.5	2,533.0	2,783.4	2,946.6	2,679.0	2,707.4	2,887.5
Inventory	3,703.0	3,677.0	3,539.0	3,474.0	3,472.0	3,725.0	3,784.7	3,882.8	3,763.3	3,840.7	3,948.0	4,051.6	3,970.3	3,474.0	3,882.8	4,051.6	3,472.0	3,763.3	3,970.3
Deferred Tax Assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other current assets	426.0	498.0	569.0	581.0	658.0	681.0	705.6	726.5	706.7	722.5	746.7	769.1	753.7	581.0	726.5	769.1	658.0	706.7	753.7
Total Current Assets	\$10,285.0	\$10,062.0	\$10,042.0	\$10,206.0	\$10,769.0	\$12,735.0	\$11,875.1	\$12,564.7	\$13,187.5	\$13,974.7	\$14,845.4	\$15,778.9	\$16,529.0	\$10,206.0	\$12,564.7	\$15,778.9	\$10,769.0	\$13,187.5	\$16,529.0
Long-term investments	1,588.0	1,609.0	1,650.0	1,703.0	1,713.0	1,678.0	1,678.0	1,678.0	1,678.0	1,678.0	1,678.0	1,678.0	1,678.0	1,703.0	1,678.0	1,678.0	1,713.0	1,678.0	1,678.0
Property and Equipment	1,456.0	1,494.0	1,513.0	1,529.0	1,555.0	1,534.0	1,514.1	1,494.3	1,474.6	1,455.0	1,435.5	1,416.1	1,315.3	1,529.0	1,494.3	1,416.1	1,555.0	1,474.6	1,315.3
Deferred comp plan investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goodwill, net	3,368.0	3,399.0	3,399.0	3,399.0	3,399.0	3,426.0	3,426.0	3,426.0	3,426.0	3,426.0	3,426.0	3,426.0	3,426.0	3,399.0	3,426.0	3,426.0	3,399.0	3,426.0	3,426.0
Other intangible assets, net	199.0	185.0	170.0	156.0	142.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	132.0	156.0	132.0	132.0	142.0	132.0	132.0
Equity investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deferred income taxes and other assets	2,026.0	2,026.0	2,031.0	2,031.0	2,189.0	2,310.0	2,310.0	2,310.0	2,310.0	2,310.0	2,310.0	2,310.0	2,310.0	2,031.0	2,310.0	2,310.0	2,189.0	2,310.0	2,310.0
Total Assets	\$18,922.0	\$18,775.0	\$18,805.0	\$19,024.0	\$19,767.0	\$21,815.0	\$20,935.2	\$21,605.0	\$22,208.1	\$22,975.7	\$23,826.9	\$24,741.0	\$25,390.3	\$19,024.0	\$21,605.0	\$24,741.0	\$19,767.0	\$22,208.1	\$25,390.3
Liabilities																			
Accounts Payable and Accrued Expenses	\$2,420.0	\$2,212.0	\$2,355.0	\$2,511.0	\$2,569.0	\$2,831.0	\$2,775.4	\$2,717.9	\$2,634.3	\$2,688.5	\$2,763.6	\$2,836.1	\$2,779.2	\$2,511.0	\$2,717.9	\$2,836.1	\$2,569.0	\$2,634.3	\$2,779.2
Accrued Liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Customer Deposits and Deferred Revenue	1,356.0	1,393.0	1,430.0	1,336.0	1,400.0	1,334.0	1,334.0	1,334.0	1,334.0	1,334.0	1,334.0	1,334.0	1,334.0	1,336.0	1,334.0	1,334.0	1,400.0	1,334.0	1,334.0
Income Taxes Payable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short-term debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Current Portion of LT Debt	0.0	0.0	0.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
Total Current Liabilities	\$3,776.0	\$3,605.0	\$3,785.0	\$4,447.0	\$4,569.0	\$4,765.0	\$4,709.4	\$4,651.9	\$4,568.3	\$4,622.5	\$4,697.6	\$4,770.1	\$4,713.2	\$4,447.0	\$4,651.9	\$4,770.1	\$4,569.0	\$4,568.3	\$4,713.2
Income Taxes Payable	1,303.0	1,326.0	1,253.0	1,275.0	1,298.0	1,238.0	1,238.0	1,238.0	1,238.0	1,238.0	1,238.0	1,238.0	1,238.0	1,275.0	1,238.0	1,238.0	1,298.0	1,238.0	1,238.0
Long-Term Debt	5,310.0	5,311.0	5,312.0	4,713.0	4,714.0	6,215.0	6,215.0	6,215.0	6,215.0	6,215.0	6,215.0	6,215.0	6,215.0	4,713.0	6,215.0	6,215.0	4,714.0	6,215.0	6,215.0
Deferred Compensation Plan Liability	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Noncurrent Liabilities	324.0	332.0	339.0	375.0	526.0	573.0	573.0	573.0	573.0	573.0	573.0	573.0	573.0	375.0	573.0	573.0	526.0	573.0	573.0
Total Liabilities	\$10,713.0	\$10,574.0	\$10,689.0	\$10,810.0	\$11,107.0	\$12,791.0	\$12,735.4	\$12,677.9	\$12,594.3	\$12,648.5	\$12,723.6	\$12,796.1	\$12,739.2	\$10,810.0	\$12,677.9	\$12,796.1	\$11,107.0	\$12,594.3	\$12,739.2
Shareholders' Equity																			
Common Stock	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9.0	\$9.0	\$9.0	\$9.0	\$9.0	\$9.0
Additional Paid-In Capital	7,265.0	7,396.0	7,460.0	7,595.0	7,550.0	7,687.0	7,687.0	7,687.0	7,687.0	7,687.0	7,687.0	7,687.0	7,687.0	7,595.0	7,687.0	7,687.0	7,550.0	7,687.0	7,687.0
Retained Earnings	23,032.0	23,502.0	23,880.0	24,386.0	25,085.0	25,638.0	24,813.7	25,541.1	26,227.7	26,941.2	27,717.3	28,558.8	29,265.1	24,386.0	25,541.1	28,558.8	25,085.0	26,227.7	29,265.1
Treasury Stock	(21,943.0)	(22,568.0)	(23,096.0)	(23,596.0)	(23,796.0)	(24.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	(154.0)	(138.0)	(137.0)	(180.0)	(188.0)	(315.0)	(315.0)	(315.0)	(315.0)	(315.0)	(315.0)	(315.0)	(315.0)	(180.0)	(315.0)	(315.0)	(188.0)	(315.0)	(315.0)
Total Shareholder's Equity	\$8,209.0	\$8,201.0	\$8,116.0	\$8,214.0	\$8,660.0	\$9,024.0	\$8,199.7	\$8,927.1	\$9,613.7	\$10,327.2	\$11,103.3	\$11,944.8	\$12,651.1	\$8,214.0	\$8,927.1	\$11,944.8	\$8,660.0	\$9,613.7	\$12,651.1
Total Liabilities & Equity	\$18,922.0	\$18,775.0	\$18,805.0	\$19,024.0	\$19,767.0	\$21,815.0	\$20,935.2	\$21,605.0	\$22,208.1	\$22,975.7	\$23,826.9	\$24,741.0	\$25,390.3	\$19,024.0	\$21,605.0	\$24,741.0	\$19,767.0	\$22,208.1	\$25,390.3
CHECK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VALUATION RATIOS																			
Profitability Ratios																			
Return On Invested Capital	50%	35%	30%	36%	46%	39%	40%	42%	39%	41%	43%	45%	42%	45%	43%	42%	37%	41%	44%
Return On Equity	45%	32%	28%	34%	43%	35%	35%	42%	36%	35%	35%	35%	31%	40%	41%	40%	34%	37%	38%
Return on Avg Equity *	19%	16%	13%	12%	12%	12%	13%	13%	13%	13%	13%	13%	13%	12%	13%	13%	12%	13%	13%
Return On Assets	16%	14%	12%	15%	18%	14%	15%	16%	15%	15%	15%	16%	14%	15%	16%	14%	14%	14%	14%
Return On Net Assets	43%	38%	32%	39%	49%	41%	42%	44%	43%	43%	45%	47%	45%	39%	43%	44%	38%	42%	45%
Return On Sales	21%	19%	16%	19%	21%	19%	20%	20%	20%	20%	21%	22%	21%	19%	20%	21%	19%	20%	21%

Source: Company Reports, Barclays Research Estimates

FIGURE 52

AMAT Cash Flow Statement

Applied Materials Period Ending \$ in millions	Jan-19 1Q	Apr-19 2Q	Jul-19 3Q	Oct-19 4Q	Jan-20 1Q	Apr-20 2Q	Jul-20 3QE	Oct-20 4QE	Jan-21 1QE	Apr-21 2QE	Jul-21 3QE	Oct-21 4QE	Jan-22 1QE	2019 FY	2020 FYE	2021 FYE	2019 CY	2020 CYE	2021 CYE
CASH FLOW																			
Cash Flow from Ops.																			
Net Income	\$771.0	\$666.0	\$571.0	\$698.0	\$892.0	\$755.0	\$800.6	\$852.0	\$811.0	\$837.7	\$900.0	\$965.3	\$911.3	\$2,706.0	\$3,299.6	\$3,514.0	\$2,827.0	\$3,218.6	\$3,614.2
Depreciation & Amortization	88.0	94.0	89.0	92.0	94.0	91.0	90.9	90.8	90.7	90.6	90.5	90.4	90.3	363.0	366.7	362.2	369.0	363.4	361.8
Stock Based Compensation expense	65.0	65.0	67.0	66.0	93.0	71.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	263.0	190.0	52.0	291.0	110.0	52.0
Deferred income taxes	41.0	8.0	8.0	(8.0)	30.0	(11.0)								49.0	19.0	0.0	38.0	(11.0)	0.0
Tax Benefit - option exercises														0.0	0.0	0.0	0.0	0.0	0.0
Other		(9.0)	(10.0)	0.0	15.0	7.0								(19.0)	22.0	0.0	(4.0)	7.0	0.0
Changes in Operating Assets and Liabilities	(131.0)	(24.0)	62.0	(22.0)	(137.0)	(278.0)	(218.2)	(256.5)	131.6	(99.7)	(149.2)	(139.2)	99.0	(115.0)	(889.7)	(256.6)	(121.0)	(621.1)	(289.1)
Other liabilities	13.0	7.0	5.0	(27.0)	25.0	(27.0)								(2.0)	(2.0)	0.0	10.0	(27.0)	0.0
Net Cash from Operations	\$834.0	\$800.0	\$787.0	\$826.0	\$987.0	\$635.0	\$686.2	\$699.4	\$1,046.3	\$841.6	\$854.3	\$929.4	\$1,113.6	\$3,247.0	\$3,007.6	\$3,671.6	\$3,400.0	\$3,066.9	\$3,738.9
Cash Flow from Investing																			
PP&E	(\$133.0)	(\$118.0)	(\$93.0)	(\$97.0)	(\$102.0)	(\$71.0)	(\$71.0)	(\$71.0)	(\$71.0)	(\$71.0)	(\$71.0)	(\$71.0)	(\$71.0)	(\$441.0)	(\$315.0)	(\$284.0)	(\$410.0)	(\$284.0)	(\$284.0)
Proceeds from sale of assets														0.0	0.0	0.0	0.0	0.0	0.0
Cash paid for acquisitions	0.0	(23.0)	(5.0)	0.0	0.0	(27.0)								(28.0)	(27.0)	0.0	(28.0)	(27.0)	0.0
Proceeds from sales and maturities of investments	464.0	442.0	479.0	555.0	368.0	667.0	667.0	667.0	667.0	667.0	667.0	667.0	667.0	1,940.0	2,369.0	2,668.0	1,844.0	2,668.0	2,668.0
Purchases of investments	(397.0)	(430.0)	(543.0)	(544.0)	(428.0)	(404.0)	(404.0)	(404.0)	(404.0)	(404.0)	(404.0)	(404.0)	(404.0)	(1,914.0)	(1,640.0)	(1,616.0)	(1,945.0)	(1,616.0)	(1,616.0)
Net ST Investments	0.0	0.0	0.0	0.0	0.0	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Purchases of IP licenses & Intangible Assets	0.0	0.0	0.0	0.0	0.0	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Proceeds from sale of other assets	0.0	0.0	0.0	0.0	0.0	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Net Cash from Investing	(\$66.0)	(\$129.0)	(\$162.0)	(\$86.0)	(\$162.0)	\$165.0	\$192.0	\$192.0	\$192.0	\$192.0	\$192.0	\$192.0	\$192.0	(\$443.0)	\$387.0	\$768.0	(\$539.0)	\$741.0	\$768.0
Cash Flows from Financing																			
Repurchase of common stock	(\$750.0)	(\$625.0)	(\$528.0)	(\$500.0)	(\$200.0)	(\$199.0)	(\$199.0)	(\$199.0)	(\$199.0)	(\$199.0)	(\$199.0)	(\$199.0)	(\$199.0)	(\$2,403.0)	(\$797.0)	(\$796.0)	(\$1,853.0)	(\$796.0)	(\$796.0)
Proceeds from common stock issuance	0.0	73.0	0.0	72.0	15.0	76.0								145.0	91.0	0.0	160.0	76.0	0.0
Proceeds from debt issuance, net	0.0	0.0	0.0	0.0	0.0	1,498.0	(1,499.0)	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	4.0	0.0	1.0	4.0
Proceeds from ESSP	0.0	0.0	0.0	0.0	0.0	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Excess Tax Benefit - option exercises	0.0	0.0	0.0	0.0	0.0	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Dividend to stockholders	(192.0)	(189.0)	(196.0)	(194.0)	(192.0)	(193.0)	(202.8)	(202.6)	(202.4)	(202.2)	(202.0)	(201.7)	(201.5)	(771.0)	(790.5)	(808.3)	(771.0)	(800.9)	(807.4)
Tax withholding payments for vested equity awards	(74.0)	(6.0)	(3.0)	(3.0)	(153.0)	(10.0)								(86.0)	(163.0)	0.0	(165.0)	(10.0)	0.0
Net Cash from Financing	(\$1,016.0)	(\$747.0)	(\$727.0)	(\$625.0)	(\$530.0)	\$1,172.0	(\$1,900.8)	(\$400.6)	(\$400.4)	(\$400.2)	(\$400.0)	(\$399.7)	(\$399.5)	(\$3,115.0)	(\$1,659.5)	(\$1,600.3)	(\$2,629.0)	(\$1,529.9)	(\$1,599.4)
Effect of exchange rates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Restricted cash					0.0	115.0								0.0	115.0	0.0	0.0	115.0	0.0
Cash and Cash eqv at beginning	\$3,440.0	\$3,192.0	\$3,116.0	\$3,014.0	\$3,129.0	\$3,424.0	\$5,281.0	\$4,258.4	\$4,749.1	\$5,587.0	\$6,220.4	\$6,866.8	\$7,588.5	\$3,440.0	\$3,129.0	\$4,749.1	\$3,192.0	\$3,424.0	\$5,587.0
Net increase in cash and cash eqv.	(248.0)	(76.0)	(102.0)	115.0	295.0	1,972.0	(1,022.6)	490.7	837.9	633.4	646.3	721.7	906.0	(311.0)	1,735.1	2,839.4	232.0	2,278.0	2,907.5
Cash and Cash eqv at end	\$3,192.0	\$3,116.0	\$3,014.0	\$3,129.0	\$3,424.0	\$5,281.0	\$4,258.4	\$4,749.1	\$5,587.0	\$6,220.4	\$6,866.8	\$7,588.5	\$8,494.5	\$3,129.0	\$4,749.1	\$7,588.5	\$3,424.0	\$5,587.0	\$8,494.5
CHECK	\$3,192.0	\$3,116.0	\$3,014.0	\$3,129.0	\$3,424.0	\$5,281.0	\$4,258.4	\$4,749.1	\$5,587.0	\$6,220.4	\$6,866.8	\$7,588.5	\$8,494.5	\$3,129.0	\$4,749.1	\$7,588.5	\$3,424.0	\$5,587.0	\$8,494.5
Cash Flow from Operations	\$834.0	\$800.0	\$787.0	\$826.0	\$987.0	\$635.0	\$686.2	\$699.4	\$1,046.3	\$841.6	\$854.3	\$929.4	\$1,113.6	\$3,247.0	\$3,007.6	\$3,671.6	\$3,400.0	\$3,066.9	\$3,738.9
Capex	(133.0)	(118.0)	(93.0)	(97.0)	(102.0)	(71.0)	(71.0)	(71.0)	(71.0)	(71.0)	(71.0)	(71.0)	(71.0)	(441.0)	(315.0)	(284.0)	(410.0)	(284.0)	(284.0)
Free Cash Flow	\$701.0	\$682.0	\$694.0	\$729.0	\$885.0	\$564.0	\$615.2	\$628.4	\$975.3	\$770.6	\$783.3	\$858.4	\$1,042.6	\$2,806.0	\$2,692.6	\$3,387.6	\$2,990.0	\$2,782.9	\$3,454.9
Free Cash Flow / Share	\$0.73	\$0.72	\$0.74	\$0.78	\$0.95	\$0.61	\$0.67	\$0.68	\$1.06	\$0.84	\$0.85	\$0.94	\$1.14	\$2.97	\$2.92	\$2.24	\$3.20	\$3.02	\$3.77
EBITDA	\$1,013.0	\$888.0	\$909.0	\$980.0	\$1,162.0	\$1,067.0	\$1,105.9	\$1,164.7	\$1,121.9	\$1,151.0	\$1,222.5	\$1,285.6	\$1,243.2	\$3,790.0	\$4,499.6	\$3,027.4	\$3,939.0	\$3,63.4	\$3,61.8
Net Borrowing	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$1,498.0	(\$1,499.0)	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$0.0	\$0.0	\$4.0	\$0.0	\$1.0	\$4.0
Free Cash Flow to Equity	\$701.0	\$682.0	\$694.0	\$729.0	\$885.0	\$2,062.0	(\$883.8)	\$629.4	\$976.3	\$771.6	\$784.3	\$859.4	\$1,043.6	\$2,806.0	\$2,692.6	\$3,391.6	\$2,990.0	\$2,783.9	\$3,458.9

Source: Company Reports, Barclays Research Estimates

FIGURE 53
KLAC Income Statement

KLAC-Tencor Period Ending \$ in millions	Sep-18 1Q	Dec-18 2Q	Mar-19 3Q	Jun-19 4Q	Sep-19 1Q	Dec-19 2Q	Mar-20 3Q	Jun-20 4QE	Sep-20 1QE	Dec-20 2QE	Mar-21 3QE	Jun-21 4QE	Sep-21 1QE	Dec-21 2QE	2019 FY	2020 FYE	2021 FYE	2019 CY	2020 CYE	2021 CYE
Revenues	\$1,093.3	\$1,119.9	\$1,097.3	\$1,258.4	\$1,413.4	\$1,509.5	\$1,424.0	\$1,408.2	\$1,327.8	\$1,403.3	\$1,439.9	\$1,494.0	\$1,525.8	\$1,559.1	\$4,568.9	\$5,755.0	\$5,665.1	\$5,278.6	\$5,563.3	\$6,018.8
QoQ	2.2%	2.4%	-2.0%	14.7%	12.3%	6.8%	-5.7%	-1.1%	-5.7%	5.7%	2.6%	3.8%	2.1%	2.2%						
YoY	12.8%	14.8%	7.4%	17.6%	29.3%	34.8%	29.8%	11.9%	-6.1%	-7.0%	1.1%	6.1%	14.9%	11.1%	13.2%	26.0%	-1.6%	22.6%	5.4%	8.2%
Cost of Goods	380.5	407.3	439.3	517.0	554.2	592.2	552.8	563.3	529.8	558.5	571.6	591.6	598.1	611.2	1,744.1	2,262.5	2,251.6	2,102.7	2,204.4	2,372.5
Gross Profit	\$712.8	\$712.6	\$658.0	\$741.5	\$859.2	\$917.3	\$871.1	\$844.9	\$798.0	\$844.8	\$868.3	\$902.4	\$927.7	\$947.9	\$2,824.8	\$3,492.5	\$3,413.5	\$3,175.9	\$3,358.9	\$3,646.3
R&D	153.5	165.9	181.6	206.7	210.6	219.9	214.7	215.0	215.0	216.3	220.6	223.6	226.6	229.6	707.7	860.3	875.6	818.8	861.0	900.5
SG&A	109.8	109.1	129.4	163.0	165.0	171.3	163.3	165.0	165.0	166.3	169.6	170.6	171.6	172.6	511.4	664.6	671.6	628.7	659.6	684.5
Total Operating Expenses	263.3	275.1	311.0	369.7	375.6	391.2	378.1	380.0	380.0	382.6	390.3	394.3	398.3	402.3	1,219.1	1,524.9	1,547.1	1,447.5	1,520.7	1,585.0
Operating Income	\$449.5	\$437.6	\$347.1	\$371.7	\$483.6	\$526.0	\$493.1	\$464.9	\$418.0	\$462.2	\$478.0	\$508.1	\$529.4	\$545.7	\$1,605.8	\$1,967.6	\$1,866.4	\$1,728.4	\$1,838.2	\$2,061.2
Interest Income (Exp)	(16.3)	(17.3)	(21.9)	(37.6)	(38.7)	(37.9)	(38.2)	(40.1)	(40.0)	(39.9)	(39.7)	(39.5)	(39.4)	(39.8)	(93.1)	(155.0)	(159.1)	(136.1)	(158.2)	(158.4)
Interest Expense	(26.4)	(26.5)	(31.2)	(40.5)	(40.4)	(40.5)	(39.2)	(41.3)	(41.3)	(41.3)	(41.3)	(41.3)	(41.3)	(41.3)	(124.6)	(161.4)	(165.2)	(152.5)	(163.1)	(165.2)
Other Expense (Income)	(10.0)	(9.2)	(9.3)	(2.9)	(1.6)	(2.6)	(1.0)	(1.2)	(1.3)	(1.5)	(1.6)	(1.8)	(1.9)	(1.5)	(31.5)	(6.4)	(6.1)	(16.4)	(5.0)	(6.8)
Profit Before Taxes	433.1	420.2	325.1	334.1	444.9	488.1	454.8	424.8	378.1	422.4	438.3	468.6	490.1	505.9	1,481.2	1,806.2	1,701.2	1,575.9	1,675.1	1,896.0
Taxes	49.0	47.9	42.4	45.9	47.4	66.1	66.3	55.2	49.1	54.9	57.0	60.9	63.7	65.8	185.3	235.1	221.9	201.8	225.6	247.4
Gain (loss) attributable to non-controlling interest	0.0	0.0	(0.1)	(0.5)	(0.1)	(0.3)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.6)	(1.3)	(1.8)	(1.0)	(1.8)	(1.8)
Net Income - Pro Forma (Incl ESO)	\$384	\$372.3	\$282.8	\$288.7	\$397.6	\$422.2	\$388.9	\$370.0	\$329.3	\$367.9	\$381.8	\$408.1	\$426.8	\$440.6	\$1,295.9	\$1,571.2	\$1,479.2	\$1,374.0	\$1,449.4	\$1,648.7
EPS - Pro Forma	\$2.46	\$2.44	\$1.80	\$1.78	\$2.48	\$2.66	\$2.47	\$2.37	\$2.14	\$2.42	\$2.55	\$2.76	\$2.92	\$3.06	\$8.48	\$9.99	\$9.86	\$8.73	\$9.41	\$11.29
EPS - GAAP	\$2.54	\$2.42	\$1.23	\$1.35	\$2.16	\$2.40	\$0.50	\$2.14	\$1.94	\$2.23	\$2.38	\$2.61	\$2.79	\$2.95	\$7.53	\$7.20	\$9.15	\$7.14	\$6.81	\$10.72
Dividend Per Share	\$0.75	\$0.75	\$0.75	\$0.85	\$0.85	\$0.85	\$0.85	\$0.85	\$0.85	\$0.85	\$0.85	\$0.85	\$0.85	\$0.85	\$3.10	\$3.40	\$3.40	\$3.30	\$3.40	\$3.40
Fully Diluted Shares	156.1	152.6	157.2	161.9	160.1	158.6	157.2	156.0	154.0	152.0	150.0	148.0	146.0	144.0	152.8	157.3	150.0	157.4	154.1	146.1
Percent of Sales																				
Gross Margin	65.2%	63.6%	60.0%	58.9%	60.8%	60.8%	61.2%	60.0%	60.1%	60.2%	60.3%	60.4%	60.8%	60.8%	61.8%	60.7%	60.3%	60.2%	60.4%	60.6%
R&D	14.0%	14.8%	16.5%	16.4%	14.9%	14.6%	15.1%	15.3%	16.2%	15.4%	15.3%	15.0%	14.9%	14.7%	15.5%	14.9%	15.5%	15.5%	15.5%	15.0%
SG&A	10.0%	9.7%	11.8%	13.0%	11.7%	11.3%	11.5%	11.7%	12.4%	11.9%	11.8%	11.4%	11.2%	11.1%	11.2%	11.5%	11.9%	11.9%	11.9%	11.4%
Operating Margin	41.1%	39.1%	31.6%	29.5%	34.2%	34.8%	34.6%	33.0%	31.5%	32.9%	33.2%	34.0%	34.7%	35.0%	35.1%	34.2%	32.9%	32.7%	33.0%	34.2%
Taxes	11.3%	11.4%	13.0%	13.7%	10.7%	13.5%	14.6%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	12.5%	13.0%	13.0%	12.8%	13.5%	13.0%
Net Income	35.1%	33.2%	25.8%	22.9%	28.1%	28.0%	27.3%	26.3%	24.8%	26.2%	26.5%	27.3%	28.0%	28.3%	28.4%	27.3%	26.1%	26.0%	26.1%	27.4%
Sequential Change																				
R&D	1.0%	8.1%	9.4%	13.9%	1.9%	4.4%	-2.4%	0.1%	0.0%	0.6%	2.0%	1.4%	1.3%	1.3%	16.5%	21.6%	1.8%	31.1%	5.2%	4.6%
SG&A	-3.2%	-0.6%	18.6%	26.0%	1.2%	3.8%	-4.7%	1.0%	0.0%	0.8%	2.0%	0.6%	0.6%	0.6%	18.3%	30.0%	1.0%	43.0%	4.9%	3.8%
Reconciliation of Pro Forma to GAAP																				
Acquisition Related	5.6	4.3	103.8	102.3	73.2	60.9	55.5	51.5	46.5	41.5	36.5	31.5	26.5	21.5	216.0	241.1	156.0	340.3	195.0	116.0
Restructuring	0.0	0.0	0.0	0.0	0.0	2.0	5.4	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	2.0	7.0	0.0
Tax Impact	(17.4)	(1.0)	(13.6)	(31.9)	(22.3)	(21.5)	(23.6)	(17.2)	(15.2)	(13.2)	(11.2)	(9.2)	(7.2)	(5.2)	(64.0)	(84.6)	(48.8)	(89.4)	(69.2)	(32.8)
Debt Related	0.0	0.0	0.0	0.0	0.0	0.0	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.5	0.0	0.0	22.5	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	251.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	251.1	0.0	0.0	251.1	0.0
Net Income - GAAP	\$395.9	\$369.1	\$192.6	\$218.4	\$346.7	\$380.8	\$78.0	\$334.1	\$298.0	\$339.6	\$356.5	\$385.8	\$407.5	\$424.3	\$1,144.0	\$1,131.9	\$1,372.0	\$1,138.4	\$1,049.8	\$1,574.1
GAAP Shares	156.1	152.6	157.2	161.9	160.1	158.6	157.2	156.0	154.0	152.0	150.0	148.0	146.0	144.0	152.0	157.1	149.9	159.5	154.2	146.8
EPS - GAAP	\$2.54	\$2.42	\$1.23	\$1.35	\$2.16	\$2.40	\$0.50	\$2.14	\$1.94	\$2.23	\$2.38	\$2.61	\$2.79	\$2.95	\$7.53	\$7.20	\$9.15	\$7.14	\$6.81	\$10.72

Source: Company Reports, Barclays Research Estimates

FIGURE 54
KLAC Balance Sheet

KLAC Tencor	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jun-20	Sep-20	Dec-20	Mar-21	Jun-21	Sep-21	Dec-21	2019	2020	2021	2019	2020	2021
Period Ending \$ in millions	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	FY	FYE	FYE	CY	CYE	CYE
BALANCE SHEET																				
Assets																				
Cash and cash equivalents	\$1,649.5	\$1,794.0	\$1,092.2	\$1,016.0	\$988.3	\$939.9	\$946.2	\$1,275.9	\$1,586.5	\$1,781.7	\$2,036.5	\$2,302.2	\$2,622.6	\$2,948.2	\$1,016.0	\$1,275.9	\$2,302.2	\$939.9	\$1,781.7	\$2,948.2
Marketable securities	1,130.8	900.1	805.1	723.4	763.2	737.7	688.4	688.4	688.4	688.4	688.4	688.4	688.4	688.4	723.4	688.4	688.4	737.7	688.4	688.4
Accounts Receivable	602.2	658.1	958.0	990.1	1,066.2	1,191.0	1,119.3	1,083.2	1,021.4	1,079.5	1,107.6	1,149.2	1,173.7	1,199.3	990.1	1,083.2	1,149.2	1,191.0	1,079.5	1,199.3
Inventories	993.5	1,006.0	1,317.3	1,262.5	1,254.2	1,251.4	1,264.1	1,238.0	1,164.4	1,227.5	1,256.4	1,300.3	1,314.5	1,343.2	1,262.5	1,238.0	1,300.3	1,251.4	1,227.5	1,343.2
Deferred income taxes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prepaid Expenses and Other	145.0	127.4	270.1	323.1	283.8	257.5	300.5	297.2	280.3	296.2	303.9	315.3	322.0	329.1	323.1	297.2	315.3	257.5	296.2	329.1
Total Current Assets	\$4,521.0	\$4,485.5	\$4,442.6	\$4,315.1	\$4,355.7	\$4,377.4	\$4,318.5	\$4,582.6	\$4,740.9	\$5,073.3	\$5,392.7	\$5,755.4	\$6,121.2	\$6,508.1	\$4,315.1	\$4,582.6	\$5,755.4	\$4,377.4	\$5,073.3	\$6,508.1
Property and Equipment	291.2	306.4	411.9	448.8	475.2	490.0	497.7	415.3	332.3	248.8	164.8	80.3	(4.7)	(90.2)	448.8	415.3	80.3	490.0	248.8	(90.2)
Restricted Cash, Other Investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goodwill, net	360.4	360.5	2,172.9	2,211.9	2,263.7	2,299.8	2,043.1	2,043.1	2,043.1	2,043.1	2,043.1	2,043.1	2,043.1	2,043.1	2,211.9	2,043.1	2,043.1	2,299.8	2,043.1	2,043.1
Deferred income taxes	222.1	225.1	205.8	206.1	216.6	213.3	208.0	208.0	208.0	208.0	208.0	208.0	208.0	208.0	206.1	208.0	208.0	213.3	208.0	208.0
Purchased intangibles, net	25.1	23.8	1,694.3	1,560.7	1,549.2	1,492.5	1,437.8	1,437.8	1,437.8	1,437.8	1,437.8	1,437.8	1,437.8	1,437.8	1,560.7	1,437.8	1,437.8	1,492.5	1,437.8	1,437.8
Other Assets	225.2	204.0	260.1	266.0	368.9	377.8	340.8	340.8	340.8	340.8	340.8	340.8	340.8	340.8	266.0	340.8	340.8	377.8	340.8	340.8
Total Assets	\$5,645.1	\$5,605.3	\$9,187.6	\$9,008.5	\$9,229.4	\$9,250.7	\$8,845.9	\$9,027.6	\$9,102.9	\$9,351.8	\$9,587.3	\$9,865.4	\$10,146.2	\$10,447.7	\$9,008.5	\$9,027.6	\$9,865.4	\$9,250.7	\$9,351.8	\$10,447.7
Liabilities																				
Accounts Payable	\$154.9	\$152.5	\$206.2	\$202.4	\$221.4	\$256.6	\$243.2	\$247.6	\$221.2	\$233.2	\$238.7	\$247.1	\$249.8	\$255.2	\$202.4	\$247.6	\$247.1	\$256.6	\$233.2	\$255.2
Deferred system revenue	216.4	196.2	228.7	282.3	277.5	247.1	336.4	336.4	336.4	336.4	336.4	336.4	336.4	336.4	282.3	336.4	336.4	247.1	336.4	336.4
Deferred service revenue	166.3	168.9	182.1	206.7	201.2	204.3	214.2	214.2	214.2	214.2	214.2	214.2	214.2	214.2	206.7	214.2	214.2	204.3	214.2	214.2
Current portion of long-term debt	0.0	250.0	250.0	250.0	250.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	250.0	0.0	0.0	0.0	0.0	0.0
Other current liabilities	773.3	714.9	833.7	827.1	993.3	1,010.2	859.4	849.9	801.4	847.0	869.0	901.7	920.9	941.0	827.1	849.9	901.7	1,010.2	847.0	941.0
Total Current Liabilities	\$1,310.9	\$1,482.5	\$1,700.9	\$1,768.5	\$1,943.4	\$1,718.2	\$1,653.3	\$1,648.1	\$1,573.3	\$1,630.8	\$1,658.4	\$1,699.4	\$1,721.2	\$1,746.8	\$1,768.5	\$1,648.1	\$1,699.4	\$1,718.2	\$1,630.8	\$1,746.8
Long-Term Debt	\$2,237.9	\$1,988.4	\$3,172.6	\$3,173.4	\$3,174.1	\$3,399.9	\$3,443.9	\$3,443.9	\$3,443.9	\$3,443.9	\$3,443.9	\$3,443.9	\$3,443.9	\$3,443.9	\$3,173.4	\$3,443.9	\$3,443.9	\$3,399.9	\$3,443.9	\$3,443.9
Unearned revenue	80.9	90.5	90.6	98.8	101.0	100.0	100.4	100.4	100.4	100.4	100.4	100.4	100.4	100.4	\$98.8	\$100.4	\$100.4	\$100.0	\$100.4	\$100.4
Income taxes payable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deferred tax liability	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other long-term liabilities	448.0	446.3	575.6	587.9	643.0	663.7	675.9	675.9	675.9	675.9	675.9	675.9	675.9	675.9	587.9	675.9	675.9	663.7	675.9	675.9
Total Liabilities	\$4,077.7	\$4,007.7	\$6,302.0	\$6,330.8	\$6,549.8	\$6,562.8	\$6,520.8	\$6,515.6	\$6,440.7	\$6,498.3	\$6,525.8	\$6,566.8	\$6,588.7	\$6,614.3	\$6,330.8	\$6,515.6	\$6,566.8	\$6,562.8	\$6,498.3	\$6,614.3
Shareholders' Equity																				
Common stock and capital in excess of par value	\$596.2	\$619.3	\$1,989.9	\$2,017.3	\$1,999.8	\$2,017.5	\$2,019.1	\$2,019.1	\$2,019.1	\$2,019.1	\$2,019.1	\$2,019.1	\$2,019.1	\$2,019.1	\$2,017.3	\$2,019.1	\$2,019.1	\$2,017.5	\$2,019.1	\$2,019.1
Retained earnings	1,027.4	1,048.8	928.1	714.8	733.2	719.0	376.7	376.7	376.7	376.7	376.7	376.7	376.7	376.7	714.8	376.7	376.7	719.0	376.7	376.7
Accumulated other comprehensive income (loss)	(56.2)	(70.4)	(68.9)	(73.0)	(71.9)	(66.8)	(88.3)	(88.3)	(88.3)	(88.3)	(88.3)	(88.3)	(88.3)	(88.3)	(73.0)	(88.3)	(88.3)	(66.8)	(88.3)	(88.3)
Non-controlling interest in consolidated subsidiaries	0.0	0.0	36.5	18.6	18.5	18.2	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	18.6	17.8	17.8	18.2	17.8	17.8
Total Shareholder's Equity	\$1,567.4	\$1,597.6	\$2,885.6	\$2,677.7	\$2,679.6	\$2,688.0	\$2,325.2	\$2,512.0	\$2,662.2	\$2,853.5	\$3,061.4	\$3,298.6	\$3,557.5	\$3,833.4	\$2,677.7	\$2,512.0	\$3,298.6	\$2,688.0	\$2,853.5	\$3,833.4
Total Liabilities & Equity	\$5,645.1	\$5,605.3	\$9,187.6	\$9,008.5	\$9,229.4	\$9,250.7	\$8,845.9	\$9,027.6	\$9,102.9	\$9,351.8	\$9,587.3	\$9,865.4	\$10,146.2	\$10,447.7	\$9,008.5	\$9,027.6	\$9,865.4	\$9,250.7	\$9,351.8	\$10,447.7
CHECK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VALUATION RATIOS																				
Profitability Ratios																				
Return On Invested Capital	172%	153%	77%	23%	35%	38%	10%	36%	33%	39%	41%	45%	47%	50%	128%	29%	38%	111%	27%	45%
Return On Equity	98%	94%	48%	30%	52%	57%	12%	57%	47%	51%	50%	50%	49%	48%	71%	42%	55%	71%	39%	55%
Return on Avg Equity *	61%	101%	61%	55%	53%	53%	39%	44%	41%	38%	49%	47%	48%	47%	53%	44%	47%	53%	38%	47%
Return On Assets	28%	26%	8%	10%	15%	16%	4%	15%	13%	15%	15%	16%	16%	16%	13%	13%	14%	12%	11%	15%
Return On Net Assets	55%	55%	23%	26%	41%	44%	9%	40%	38%	41%	42%	45%	47%	48%	35%	34%	40%	33%	32%	44%
Return On Sales	36%	33%	18%	17%	25%	25%	5%	24%	22%	24%	25%	26%	27%	27%	25%	20%	24%	22%	19%	26%

Source: Company Reports, Barclays Research Estimates

FIGURE 55
KLAC Cash Flow Statement

KLAC Tencor Period Ending \$ in millions	Sep-18 1Q	Dec-18 2Q	Mar-19 3Q	Jun-19 4Q	Sep-19 1Q	Dec-19 2Q	Mar-20 3Q	Jun-20 4Q	Sep-20 1QE	Dec-20 2QE	Mar-21 3QE	Jun-21 4QE	Sep-21 1QE	Dec-21 2QE	2019 FY	2020 FYE	2021 FYE	2019 CY	2020 CYE	2021 CYE
CASH FLOW																				
Cash Flow from Ops.																				
Net Income	\$395.9	\$369.1	\$192.6	\$217.3	\$346.4	\$380.3	\$78.0	\$334.1	\$298.0	\$339.6	\$356.5	\$385.8	\$407.5	\$424.3	\$1,175.0	\$1,138.8	\$1,379.9	\$1,136.7	\$1,049.8	\$1,574.1
Depreciation & Amortization	16.1	15.8	73.4	127.9	98.6	88.5	82.0	82.5	83.0	83.5	84.0	84.5	85.0	85.5	233.2	351.6	335.0	388.5	331.0	339.0
Stock-based compensation expense	16.1	15.7	34.2	28.2	26.9	26.8	31.3	28.8	26.5	24.3	22.4	20.6	19.0	17.4	94.2	113.8	93.8	116.1	110.9	79.4
Deferred income taxes	0.0	0.0	0.0	(27.5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(27.5)	0.0	0.0	(27.5)	0.0	0.0
Excess tax benefit from equity awards	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net gain on sale of marketable securities and other investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other gain/loss, net	3.0	1.8	0.1	(0.8)	12.8	(5.5)	16.6								4.1	23.9	0.0	6.6	16.6	0.0
Changes in Operating Assets and Liabilities	(49.8)	(120.2)	(136.8)	(19.6)	11.5	(102.4)	(22.5)	60.4	77.5	(79.6)	(37.1)	(55.9)	(23.5)	(35.8)	(326.3)	(53.0)	(95.2)	(247.3)	35.8	(152.4)
Net Cash from Operations	\$381.4	\$282.2	\$163.6	\$325.5	\$496.2	\$387.7	\$442.0	\$505.8	\$485.0	\$367.9	\$425.7	\$435.0	\$487.9	\$491.4	\$1,152.6	\$1,831.8	\$1,713.5	\$1,373.0	\$1,800.6	\$1,840.0
Cash Flow from Investing																				
Business acquisition	(\$11.8)	\$0.0	(\$1,806.5)	(\$0.0)	(\$78.5)	\$0.0	(0.1)								(\$1,818.3)	(\$78.6)	\$0.0	(\$1,885.0)	(\$0.1)	\$0.0
Capital expenditures	(22.3)	(26.4)	(26.0)	(55.8)	(32.6)	(34.9)	(\$43.4)	(43.4)	(43.4)	(43.4)	(43.4)	(43.4)	(43.4)	(43.4)	(130.5)	(154.3)	(173.8)	(149.2)	(173.8)	(173.8)
Proceeds from sale of assets	0.0	0.0	0.0	0.0	1.1	(1.1)	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Purchases of available-for-sale securities	0.0	(2.7)	0.0	(78.8)	(263.8)	(144.7)	(156.2)								(81.5)	(564.7)	0.0	(487.3)	(156.2)	0.0
Sales and maturities of available-for-sale securities	346.0	235.4	101.2	163.1	224.2	169.0	202.9								845.7	596.0	0.0	657.5	202.9	0.0
Purchases of trading securities	(4.6)	(27.5)	(30.3)	(18.6)	(9.0)	(12.9)	(46.8)								(81.0)	(68.7)	0.0	(70.8)	(46.8)	0.0
Proceeds from sale of trading securities	7.6	29.7	27.3	20.6	11.9	15.3	45.4								85.3	72.6	0.0	75.1	45.4	0.0
Other, net	0.0	0.0	(0.6)	0.0	0.0	1.1	0.0								(0.6)	1.1	0.0	0.5	0.0	0.0
Net Cash from Investing	\$314.9	\$208.6	(\$1,734.9)	\$30.4	(\$146.7)	(\$8.1)	\$1.8	(\$43.4)	(\$43.4)	(\$43.4)	(\$43.4)	(\$43.4)	(\$43.4)	(\$43.4)	(\$1,181.0)	(\$196.5)	(\$173.8)	(\$1,859)	(\$129)	(\$174)
Cash Flows from Financing																				
Proceeds from debt	\$0.0	\$0.0	\$2,086.3	(\$2.5)	\$0.0	\$250.0	\$742.0								\$2,083.8	\$992.0	\$0.0	\$2,333.8	\$742.0	\$0.0
Repayment of debt	0.0	0.0	(902.5)	0.0	0.0	(275.0)	(\$721.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(902.5)	(996.0)	0.0	(1,177.5)	(721.0)	0.0
Issuance of common stock	0.0	20.6	0.0	44.3	0.1	24.5	\$0.7								64.8	25.3	0.0	68.9	0.7	0.0
Tax withholding payments related to vested and released restrict	(27.0)	(3.2)	(0.4)	(6.9)	(23.5)	(12.2)	(5.0)								(37.5)	(40.7)	0.0	(43.1)	(5.0)	0.0
Common stock repurchases	(300.0)	(250.2)	(200.0)	(345.0)	(228.5)	(284.6)	(316.0)								(1,095.2)	(829.1)	0.0	(1,058.1)	(316.0)	0.0
Payment of dividends to stockholders	(122.8)	(114.6)	(113.6)	(121.4)	(121.6)	(134.7)	(133.3)	(132.6)	(130.9)	(129.2)	(127.5)	(125.8)	(124.1)	(122.4)	(472.3)	(522.3)	(513.4)	(491.3)	(526.0)	(499.8)
Excess tax benefit from equity awards	0.0	0.0	0.0	0.0	0.0	0.0	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Proceeds from issuance of common stock	0.0	0.0	0.0	0.0	0.0	0.0	0.0								0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	(0.5)	(0.6)	(0.1)	(0.0)	0.0								(1.2)	(0.1)	0.0	(1.2)	0.0	0.0
Net Cash from Financing	(\$449.7)	(\$347.5)	\$869.3	(\$432.1)	(\$373.6)	(\$432.0)	(\$432.6)	(\$132.6)	(\$130.9)	(\$129.2)	(\$127.5)	(\$125.8)	(\$124.1)	(\$122.4)	(\$360.0)	(\$1,370.9)	(\$513.4)	(\$2,702.3)	(\$1,567.3)	(\$499.8)
Effect of exchange rates	(1.5)	1.1	0.2	0.1	(3.6)	4.0	(4.9)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(0.0)	(4.5)	0.0	(10.3)	(4.4)	0.0
Cash and Cash eqv at beginning	\$1,404.4	\$1,649.5	\$1,794.0	\$1,092.2	\$1,016.0	\$988.3	\$939.9	\$946.2	\$1,275.9	\$1,586.5	\$1,781.7	\$2,036.5	\$2,302.2	\$2,622.6	\$1,404.4	\$1,016.0	\$1,275.9	\$1,794.0	\$939.9	\$1,781.7
Net increase in cash and cash eqv.	245.1	144.5	(701.8)	(76.2)	(27.6)	(48.5)	6.3	329.7	310.6	195.2	254.8	265.7	320.4	325.5	(388.4)	259.9	1,026.3	(854.1)	841.9	1,166.4
Cash and Cash eqv at end	\$1,649.5	\$1,794.0	\$1,092.2	\$1,016.0	\$988.3	\$939.9	\$946.2	\$1,275.9	\$1,586.5	\$1,781.7	\$2,036.5	\$2,302.2	\$2,622.6	\$2,948.2	\$1,016.0	\$1,275.9	\$2,302.3	\$939.9	\$1,781.7	\$2,948.2
CHECK	\$1,649.5	\$1,794.0	\$1,092.2	\$1,016.0	\$988.3	\$939.9	\$946.2	\$1,275.9	\$1,586.5	\$1,781.7	\$2,036.5	\$2,302.2	\$2,622.6	\$2,948.2	\$1,016.0	\$1,275.9	\$2,302.2	\$939.9	\$1,781.7	\$2,948.2
Cash Flow from Operations	\$381.4	\$282.2	\$163.6	\$325.5	\$496.2	\$387.7	\$442.0	\$505.8	\$485.0	\$367.9	\$425.7	\$435.0	\$487.9	\$491.4	\$1,152.6	\$1,831.8	\$1,713.5	\$1,373.0	\$1,800.6	\$1,840.0
Capex	(22.3)	(26.4)	(26.0)	(55.8)	(32.6)	(34.9)	(43.4)	(43.4)	(43.4)	(43.4)	(43.4)	(43.4)	(43.4)	(43.4)	(130.5)	(154.3)	(173.8)	(149.2)	(173.8)	(173.8)
Free Cash Flow	\$359.1	\$255.8	\$137.6	\$269.6	\$463.7	\$352.9	\$398.6	\$462.3	\$441.5	\$324.4	\$382.3	\$391.5	\$444.5	\$447.9	\$1,022.1	\$1,677.4	\$1,539.7	\$1,223.8	\$1,626.8	\$1,666.2
Free Cash Flow / Share	\$2.30	\$1.68	\$0.88	\$1.66	\$2.90	\$2.22	\$2.54	\$2.96	\$2.87	\$2.13	\$2.55	\$2.65	\$3.04	\$3.11	\$6.69	\$10.67	\$10.27	\$7.77	\$10.56	\$11.41
EBITDA	\$465.5	\$453.4	\$420.5	\$499.6	\$582.2	\$614.5	\$575.1	\$547.4	\$501.0	\$545.7	\$562.0	\$592.6	\$614.4	\$631.2	\$1,839.0	\$2,319.2	\$2,201.3	\$2,116.8	\$2,169.2	\$2,400.2
Net Borrowing	(\$27.0)	(\$3.2)	(\$0.4)	(\$6.9)	(\$23.5)	(\$12.2)	(\$5.0)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$37.5)	(\$40.7)	\$0.0	(\$43.1)	(\$5.0)	\$0.0
Free Cash Flow to Equity	\$332.1	\$252.6	\$137.3	\$262.7	\$440.1	\$340.6	\$393.6	\$462.3	\$441.5	\$324.4	\$382.3	\$391.5	\$444.5	\$447.9	\$984.6	\$1,636.7	\$1,539.7	\$1,180.7	\$1,621.9	\$1,666.2

Source: Company Reports, Barclays Research Estimates

FIGURE 56
LRCX Income Statement

Lam Research Period Ending \$ in millions	Sep-18 1Q	Dec-18 2Q	Mar-19 3Q	Jun-19 4Q	Sep-19 1Q	Dec-19 2Q	Mar-20 3Q	Jun-20 4Q	Sep-20 1Q	Dec-20 2Q	Mar-21 3Q	Jun-21 4Q	Sep-21 1Q	Dec-21 2Q	2019 FY	2020 FYE	2021 FYE	2019 CY	2020 CYE	2021 CYE
Revenues	\$2,330.7	\$2,522.7	\$2,439.0	\$2,361.1	\$2,165.7	\$2,583.5	\$2,503.6	\$2,602.3	\$2,523.9	\$2,530.2	\$2,636.8	\$2,797.3	\$2,973.2	\$3,117.4	\$9,653.6	\$9,855.1	\$10,488.2	\$9,549.4	\$10,160.0	\$11,524.7
YoQ	-25.4%	8.2%	-3.3%	-3.2%	-8.3%	19.3%	-3.1%	3.9%	-3.0%	0.3%	4.2%	6.1%	6.3%	4.9%						
YoY	-5.9%	-2.3%	-15.7%	-24.5%	-7.1%	2.4%	2.6%	10.2%	16.5%	-2.1%	5.3%	7.5%	17.8%	23.2%	-12.9%	2.1%	6.4%	-12.2%	6.4%	13.4%
Cost of Goods	1,250.2	1,355.3	1,339.5	1,276.3	1,182.4	1,402.2	1,343.6	1,431.2	1,388.1	1,384.0	1,437.1	1,518.9	1,611.5	1,683.4	5,221.2	5,359.5	5,728.2	5,200.4	5,547.0	6,250.9
Gross Profit	\$1,080.5	\$1,167.4	\$1,099.6	\$1,084.9	\$983.3	\$1,181.3	\$1,160.0	\$1,171.0	\$1,135.7	\$1,146.2	\$1,199.7	\$1,278.4	\$1,361.7	\$1,434.0	\$4,432.3	\$4,495.6	\$4,760.0	\$4,349.0	\$4,612.9	\$5,273.9
R&D	291.7	285.6	313.8	295.4	286.8	318.9	323.5	323.0	325.0	327.0	335.2	337.2	339.2	341.2	1,186.4	1,252.2	1,324.4	1,214.9	1,298.5	1,352.7
SG&A	158.9	154.3	173.6	153.6	142.8	160.8	163.0	162.0	163.0	164.0	167.3	168.3	169.3	170.3	640.3	628.6	662.6	630.8	652.0	675.1
Total Operating Expenses	450.5	439.8	487.4	449.0	429.6	479.6	486.5	485.0	488.0	491.0	502.5	505.5	508.5	511.5	1,826.7	1,880.7	1,986.9	1,845.6	1,950.5	2,027.8
Operating Income	\$630.0	\$727.6	\$612.1	\$635.9	\$553.7	\$701.7	\$673.5	\$686.0	\$647.7	\$655.2	\$697.3	\$772.9	\$853.3	\$922.6	\$2,605.6	\$2,614.9	\$2,773.1	\$2,503.4	\$2,662.4	\$3,246.0
Interest Income (Exp)	0.5	(29.8)	20.5	(7.7)	(12.7)	(13.9)	(29.8)	(31.4)	(32.5)	(30.9)	(29.5)	(26.5)	(23.3)	(21.7)	(16.4)	(87.8)	(119.4)	(13.8)	(124.6)	(101.1)
Profit Before Taxes	630.5	697.8	632.6	628.2	541.0	687.7	643.6	654.7	615.2	624.3	667.8	746.4	829.9	900.8	2,589.2	2,527.0	2,653.7	2,489.6	2,537.9	3,144.9
Taxes	75.1	69.6	48.3	69.4	61.4	85.9	53.3	54.2	50.9	51.7	55.3	61.8	68.7	74.6	262.4	254.8	219.7	265.1	210.1	260.4
Net Income - Pro Forma (Incl ESO)	\$555.5	\$628.2	\$584.4	\$558.8	\$479.6	\$601.8	\$590.4	\$600.5	\$564.3	\$572.6	\$612.5	\$684.6	\$761.2	\$826.2	\$2,326.8	\$2,272.2	\$2,434.0	\$2,224.5	\$2,327.7	\$2,884.5
EPS - Pro Forma	\$3.36	\$3.87	\$3.70	\$3.62	\$3.18	\$4.01	\$3.98	\$4.05	\$3.86	\$3.97	\$4.31	\$4.88	\$5.51	\$6.07	\$14.55	\$15.23	\$17.03	\$14.51	\$15.87	\$20.77
EPS - GAAP	\$3.23	\$3.51	\$3.47	\$3.51	\$3.09	\$3.43	\$3.88	\$3.95	\$3.76	\$3.83	\$4.20	\$4.80	\$5.60	\$6.09	\$13.71	\$14.35	\$16.59	\$13.49	\$15.42	\$20.70
Dividend Per Share	\$1.10	\$1.10	\$1.10	\$1.10	\$1.15	\$1.15	\$1.15	\$1.15	\$1.15	\$1.15	\$1.15	\$1.15	\$1.15	\$1.15	\$4.40	\$4.60	\$4.60	\$4.50	\$4.60	\$4.60
Fully Diluted Shares	165.3	162.2	157.8	154.5	150.7	150.1	148.2	148.2	146.2	144.2	142.2	140.2	138.2	136.2	159.9	149.2	143.0	153.3	146.7	138.9
Percent of Sales																				
Gross Margin	46.4%	46.3%	45.1%	45.9%	45.4%	45.7%	46.3%	45.0%	45.0%	45.3%	45.5%	45.7%	45.8%	46.0%	45.9%	45.6%	45.4%	45.5%	45.4%	45.8%
R&D	12.5%	11.3%	12.9%	12.5%	13.2%	12.3%	12.9%	12.4%	12.9%	12.9%	12.7%	12.1%	11.4%	10.9%	12.3%	12.7%	12.6%	12.7%	12.8%	11.7%
SG&A	6.8%	6.1%	7.1%	6.5%	6.6%	6.2%	6.5%	6.2%	6.5%	6.5%	6.3%	6.0%	5.7%	5.5%	6.6%	6.4%	6.3%	6.6%	6.4%	5.9%
Operating Margin	27.0%	28.8%	25.1%	26.9%	25.6%	27.2%	26.9%	26.4%	25.7%	25.9%	26.4%	27.6%	28.7%	29.6%	27.0%	26.5%	26.4%	26.2%	26.2%	28.2%
Taxes	11.9%	10.0%	7.6%	11.0%	11.4%	12.5%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	10.1%	10.1%	8.3%	10.6%	8.3%	8.3%
Net Income	23.8%	24.9%	24.0%	23.7%	22.1%	23.3%	23.6%	23.1%	22.4%	22.6%	23.2%	24.5%	25.6%	26.5%	24.1%	23.1%	23.2%	23.3%	22.9%	25.0%
Sequential Change																				
R&D	-11.0%	-2.1%	9.9%	-5.9%	-2.9%	11.2%	1.5%	-0.2%	0.6%	0.6%	2.5%	0.6%	0.6%	0.6%	-0.3%	5.5%	5.8%	0.4%	6.9%	4.2%
SG&A	-11.6%	-2.9%	12.6%	-11.5%	-7.0%	12.6%	1.4%	-0.6%	0.6%	0.6%	2.0%	0.6%	0.6%	0.6%	-7.3%	-1.8%	5.4%	-6.3%	3.4%	3.5%
Reconciliation of Pro Forma to GAAP																				
Acquisition Related	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Amortization of Intangibles	34.8	34.8	34.8	15.7	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	120.2	55.9	55.9	78.5	55.9	55.9
Stock Based Compensation	0.0	0.0	0.0	0.0	0.0	0.0	(0.8)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(0.8)	0.0	0.0	(0.8)	0.0
Restructuring	3.4	2.4	10.9	1.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.5	1.0	0.0	13.8	0.0	0.0
Tax Impact	(17.0)	21.3	(9.6)	(1.8)	(2.5)	72.2	1.4	0.0	0.0	5.0	0.0	(3.0)	(28.0)	(18.0)	(7.2)	71.1	2.0	58.2	6.4	(49.0)
Debt Related	0.9	0.9	1.0	1.2	1.2	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.9	4.3	3.8	4.5	3.8	3.8
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Income - GAAP	\$533.4	\$568.9	\$547.4	\$541.8	\$465.8	\$514.5	\$574.8	\$585.5	\$549.3	\$552.7	\$597.6	\$672.7	\$774.3	\$829.3	\$2,191.4	\$2,140.6	\$2,372.3	\$2,069.5	\$2,262.3	\$2,873.8
GAAP Shares	165.3	162.2	157.8	154.5	150.7	150.1	148.2	148.2	146.2	144.2	142.2	140.2	138.2	136.2	159.9	149.2	143.0	153.4	146.7	138.9
EPS - GAAP	\$3.23	\$3.51	\$3.47	\$3.51	\$3.09	\$3.43	\$3.88	\$3.95	\$3.76	\$3.83	\$4.20	\$4.80	\$5.60	\$6.09	\$13.71	\$14.35	\$16.59	\$13.49	\$15.42	\$20.70

Source: Company Reports, Barclays Research

FIGURE 57
LRCX Balance Sheet

Lam Research Period Ending \$ in millions	Sep-18 1Q	Dec-18 2Q	Mar-19 3Q	Jun-19 4Q	Sep-19 1Q	Dec-19 2Q	Mar-20 3Q	Jun-20 4QE	Sep-20 1QE	Dec-20 2QE	Mar-21 3QE	Jun-21 4QE	Sep-21 1QE	Dec-21 2QE	2019 FY	2020 FYE	2021 FYE	2019 CY	2020 CYE	2021 CYE
BALANCE SHEET																				
Assets																				
Cash and cash equivalents	\$2,568.1	\$3,359.8	\$4,931.6	\$3,658.2	\$4,607.2	\$3,035.9	\$3,961.6	\$6,423.2	\$7,033.3	\$7,619.2	\$7,990.9	\$7,638.5	\$8,174.9	\$8,780.8	\$3,658.2	\$6,423.2	\$7,638.5	\$3,035.9	\$7,619.2	\$8,780.8
Short-term Investments	1,050.9	275.7	1,209.3	1,773.0	983.7	1,647.9	1,431.6	1,431.6	1,431.6	1,431.6	1,431.6	1,431.6	1,431.6	1,431.6	1,773.0	1,431.6	1,431.6	1,647.9	1,431.6	1,431.6
Accounts Receivable	1,846.8	1,868.8	1,522.3	1,455.5	1,635.6	2,030.5	2,191.1	2,144.7	2,080.1	1,946.3	2,028.3	2,151.8	2,287.1	2,398.0	1,455.5	2,144.7	2,151.8	2,030.5	1,946.3	2,398.0
Inventory	1,874.2	1,703.3	1,622.2	1,540.1	1,483.4	1,528.6	1,674.7	1,808.7	1,677.9	1,673.0	1,737.1	1,836.1	1,947.9	2,034.9	1,540.1	1,808.7	1,836.1	1,528.6	1,673.0	2,034.9
Prepaid Expenses and Other	175.9	148.2	156.8	133.5	124.8	212.1	149.8	155.7	151.0	151.4	157.8	167.4	177.9	186.6	133.5	155.7	167.4	121.1	151.4	186.6
Total Current Assets	\$7,515.9	\$7,355.8	\$9,442.2	\$8,560.4	\$8,834.6	\$8,455.0	\$9,408.8	\$11,964.0	\$12,373.9	\$12,821.5	\$13,345.7	\$13,225.3	\$14,019.4	\$14,831.8	\$8,560.4	\$11,964.0	\$13,225.3	\$8,455.0	\$12,821.5	\$14,831.8
Property and Equipment	951.4	1,013.3	1,040.3	1,059.1	1,030.2	1,047.3	1,048.6	1,032.2	1,015.4	998.0	980.1	961.8	942.9	923.5	1,059.1	1,032.2	961.8	1,047.3	998.0	923.5
Restricted Cash, Other Investments	255.9	255.3	255.8	255.2	254.7	253.9	254.2	254.2	254.2	254.2	254.2	254.2	254.2	254.2	255.2	254.2	254.2	253.9	254.2	254.2
Goodwill, net	1,484.9	1,484.6	1,484.9	1,484.6	1,484.4	1,484.8	1,484.1	1,484.1	1,484.1	1,484.1	1,484.1	1,484.1	1,484.1	1,484.1	1,484.6	1,484.1	1,484.1	1,484.8	1,484.1	1,484.1
Other intangible assets, net	282.7	251.9	223.0	217.0	206.3	193.1	182.7	182.7	182.7	182.7	182.7	182.7	182.7	182.7	217.0	182.7	182.7	193.1	182.7	182.7
Other Assets	466.8	407.5	449.0	425.1	533.4	480.1	560.3	560.3	560.3	560.3	560.3	560.3	560.3	560.3	425.1	560.3	560.3	480.1	560.3	560.3
Total Assets	\$10,957.6	\$10,768.5	\$12,895.3	\$12,001.3	\$12,343.5	\$11,914.1	\$12,938.6	\$15,477.5	\$15,870.5	\$16,300.7	\$16,807.1	\$16,668.3	\$17,443.5	\$18,236.5	\$12,001.3	\$15,477.5	\$16,668.3	\$11,914.1	\$16,300.7	\$18,236.5
Liabilities																				
Accounts Payable	\$384.4	\$343.9	\$416.2	\$376.6	\$415.8	\$452.8	\$498.9	\$534.8	\$533.9	\$532.3	\$521.1	\$567.5	\$619.8	\$647.5	\$376.6	\$534.8	\$567.5	\$452.8	\$532.3	\$647.5
Accrued Expenses, Other Current Liabilities	1,347.9	1,203.6	1,046.9	946.6	990.0	1,114.0	1,024.8	1,065.2	1,033.1	1,035.7	1,079.3	1,145.0	1,217.0	1,276.0	946.6	1,065.2	1,145.0	1,114.0	1,035.7	1,276.0
Deferred Profit	542.3	432.2	378.4	381.3	406.7	366.4	539.6	539.6	539.6	539.6	539.6	539.6	539.6	539.6	381.3	539.6	539.6	366.4	539.6	539.6
Current portion of convertible notes, and	550.4	187.1	964.1	667.1	645.2	632.3	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	667.1	42.4	42.4	632.3	42.4	42.4
Total Current Liabilities	\$2,825.0	\$2,166.8	\$2,805.6	\$2,371.7	\$2,457.7	\$2,565.5	\$2,105.7	\$2,181.9	\$2,149.0	\$2,150.0	\$2,182.4	\$2,294.5	\$2,418.8	\$2,505.5	\$2,371.7	\$2,181.9	\$2,294.5	\$2,565.5	\$2,150.0	\$2,505.5
Long-Term Debt & Capital Leases, Less Current Portion	\$1,805.1	\$1,813.2	\$3,801.5	\$3,822.8	\$3,788.1	\$3,786.1	\$5,043.9	\$5,043.9	\$5,043.9	\$5,043.9	\$5,043.9	\$5,043.9	\$5,043.9	\$5,043.9	\$3,822.8	\$5,043.9	\$5,043.9	\$3,786.1	\$5,043.9	\$5,043.9
Income taxes payable	845.7	859.2	863.2	892.8	856.9	872.8	889.3	889.3	889.3	889.3	889.3	889.3	889.3	889.3	892.8	889.3	889.3	872.8	889.3	889.3
Other long-term liabilities	100.1	87.8	84.0	190.8	261.9	272.0	350.6	350.6	350.6	350.6	350.6	350.6	350.6	350.6	190.8	350.6	350.6	272.0	350.6	350.6
Total Liabilities	\$5,575.9	\$4,927.1	\$7,554.3	\$7,278.0	\$7,364.6	\$7,496.4	\$8,389.5	\$8,465.8	\$8,432.8	\$8,433.8	\$8,466.3	\$8,578.4	\$8,702.6	\$8,789.3	\$7,278.0	\$8,465.8	\$8,578.4	\$7,496.4	\$8,433.8	\$8,789.3
Commitments and contingencies																				
Temporary Equity, Convertible Notes, Min	\$58.8	\$57.0	\$49.8	\$49.4	\$42.6	\$38.3	\$11.5	\$11.5	\$11.5	\$11.5	\$11.5	\$11.5	\$11.5	\$11.5	\$49.4	\$11.5	\$11.5	\$38.3	\$11.5	\$11.5
Shareholders' Equity																				
Preferred Stock	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Common Stock	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Additional Paid-In Capital	6,195.0	6,256.9	6,315.5	6,409.4	6,456.5	6,528.8	6,577.8	6,577.8	6,577.8	6,577.8	6,577.8	6,577.8	6,577.8	6,577.8	6,409.4	6,577.8	6,577.8	6,528.8	6,577.8	6,577.8
Treasury stock, at cost	(9,582.4)	(9,573.5)	(10,509.8)	(11,602.6)	(11,680.7)	(12,673.3)	(12,918.7)	(12,918.7)	(12,918.7)	(12,918.7)	(12,918.7)	(12,918.7)	(12,918.7)	(12,918.7)	(11,602.6)	(12,918.7)	(12,918.7)	(12,673.3)	(12,918.7)	(12,918.7)
Accumulated other comprehensive loss	(57.7)	(64.7)	(62.7)	(64.0)	(72.6)	(60.2)	(112.7)	(112.7)	(112.7)	(112.7)	(112.7)	(112.7)	(112.7)	(112.7)	(64.0)	(112.7)	(112.7)	(60.2)	(112.7)	(112.7)
Retained Earnings	8,767.8	9,165.4	9,548.0	9,930.9	10,233.0	10,584.0	10,991.0	13,453.6	13,879.6	14,308.8	14,782.7	14,531.8	15,182.8	15,889.1	9,930.9	13,453.6	14,531.8	10,584.0	14,308.8	15,889.1
Total Shareholder's Equity	\$5,322.8	\$5,784.4	\$5,291.2	\$4,673.9	\$4,936.4	\$4,379.4	\$4,537.6	\$7,000.2	\$7,426.2	\$7,853.3	\$8,329.3	\$8,078.4	\$8,729.3	\$9,435.7	\$4,673.9	\$7,000.2	\$8,078.4	\$4,379.4	\$7,853.3	\$9,435.7
Total Liabilities & Equity	\$10,957.6	\$10,768.5	\$12,895.3	\$12,001.3	\$12,343.5	\$11,914.1	\$12,938.6	\$15,477.5	\$15,870.5	\$16,300.7	\$16,807.1	\$16,668.3	\$17,443.5	\$18,236.5	\$12,001.3	\$15,477.5	\$16,668.3	\$11,914.1	\$16,300.7	\$18,236.5
CHECK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VALUATION RATIOS																				
Profitability Ratios																				
Return On Invested Capital	69%	73%	57%	81%	68%	73%	75%	62%	59%	62%	70%	75%	84%	87%	71%	79%	63%	56%	74%	83%
Return On Equity	33%	43%	38%	41%	40%	42%	52%	52%	31%	30%	30%	32%	38%	38%	34%	46%	34%	36%	52%	37%
Return on Avg Equity *	30%	37%	31%	24%	22%	21%	20%	18%	18%	18%	18%	17%	18%	19%	24%	18%	17%	21%	18%	19%
Return On Assets	19%	21%	17%	18%	15%	17%	18%	15%	14%	14%	14%	16%	18%	18%	18%	14%	14%	17%	14%	16%
Return On Net Assets	43%	57%	49%	44%	44%	38%	42%	42%	41%	42%	45%	48%	53%	55%	45%	39%	42%	38%	43%	47%
Return On Sales	23%	23%	22%	23%	22%	20%	23%	23%	22%	22%	23%	24%	26%	27%	23%	22%	23%	22%	22%	25%

Source: Company Reports, Barclays Research

FIGURE 58
LRCX Cash Flow Statement

Lam Research	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jun-20	Sep-20	Dec-20	Mar-21	Jun-21	Sep-21	Dec-21	2019	2020	2021	2019	2020	2021
Period Ending \$ in millions	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1QE	2QE	3QE	4QE	1QE	2QE	FY	FYE	FYE	CY	CYE	CYE
CASH FLOW																				
Cash Flow from Ops.																				
Net Income	\$533.4	\$568.9	\$547.4	\$541.8	\$465.8	\$514.5	\$574.8	\$585.5	\$549.3	\$552.7	\$597.6	\$672.7	\$774.3	\$829.3	\$2,191.4	\$2,140.6	\$2,372.3	\$2,069.5	\$2,262.3	\$2,873.8
Depreciation & Amortization	79.8	81.8	82.3	65.4	64.7	65.5	67.2	67.7	68.2	68.7	69.2	69.7	70.2	70.7	309.3	265.2	276.0	277.9	272.0	280.0
Deferred income taxes	(83.5)	20.8	(12.4)	70.1	(3.0)	77.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(5.0)	74.5	0.0	132.2	0.0	0.0
Equity-based comp expense	50.3	38.8	53.2	44.8	42.9	45.7	47.4	44.6	41.9	39.4	37.0	34.8	32.7	30.7	187.2	180.6	153.1	186.7	173.3	135.3
Income tax benefit on equity-based compensation plans		0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	0.0	0.0	0.0	0.0	0.0
Excess tax benefit on equity-based compensation plans		0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	0.0	0.0	0.0	0.0	0.0
Loss on extinguishment of debt		0.0	0.0	(0.1)	0.0	0.0	0.0	0.0							(0.1)	0.0	0.0	(0.1)	0.0	0.0
Amortization of note discounts and issuance costs	1.2	1.0	2.9	2.2	1.7	1.6	1.4								7.3	4.6	0.0	8.3	1.4	0.0
Other, net	2.2	(1.3)	(1.5)	(5.1)	4.0	(0.3)	7.8								(5.7)	11.5	0.0	(2.9)	7.8	0.0
Changes in Operating Assets and Liabilities	136.8	(67.5)	261.0	161.3	(112.0)	(396.6)	(157.2)	(17.3)	167.1	139.4	(120.0)	(120.0)	(133.4)	(119.8)	491.5	(683.1)	66.5	(86.4)	132.1	(493.2)
Net Cash from Operations	\$720.3	\$642.4	\$932.8	\$880.5	\$464.0	\$307.9	\$541.4	\$680.6	\$826.6	\$800.2	\$583.8	\$657.2	\$743.9	\$811.0	\$3,176.0	\$1,994.0	\$2,867.8	\$2,585.3	\$2,848.8	\$2,795.9
Cash Flow from Investing																				
Capital expenditures	(\$56.1)	(\$105.9)	(\$75.5)	(\$65.9)	(\$39.3)	(\$62.1)	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$303.5)	(\$204.1)	(\$205.5)	(\$242.8)	(\$205.5)	(\$205.5)
Business acquisition, net of cash acquired	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	0.0	0.0	0.0	0.0	0.0
Purchases of available-for-sale securities	(749.8)	(35.4)	(1,190.5)	(954.4)	(147.6)	(1,472.1)	(270.1)								(2,930.0)	(1,889.8)	0.0	(3,764.6)	(270.1)	0.0
Sales and maturities of available-for-sale securities	137.2	808.6	259.1	398.9	938.1	809.8	481.3								1,603.8	2,229.2	0.0	2,405.9	481.3	0.0
Transfers of restricted cash and investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	0.0	0.0	0.0	0.0	0.0
Repayment of notes receivable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	0.0	0.0	0.0	0.0	0.0
Proceeds from sale of business	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	0.0	0.0	0.0	0.0	0.0
Other, net	(3.7)	(0.4)	(1.3)	(2.1)	(0.5)	(10.0)	10.0								(7.4)	(0.5)	0.0	(13.9)	10.0	0.0
Net Cash from Investing	(\$672.3)	\$666.9	(\$1,008.2)	(\$623.5)	\$750.7	(\$734.3)	\$169.8	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$51.4)	(\$1,637.1)	\$134.8	(\$205.5)	(\$1,615.3)	\$15.6	(\$205.5)
Cash Flows from Financing																				
Principal payments on LT debt, cap. lease obligations & debt is	(\$79.8)	(\$6.4)	(\$30.2)	(\$1.2)	(\$29.0)	(\$18.0)	(\$617.6)	\$2.9	\$2.9	\$2.9	\$2.9	(\$797.1)	\$2.9	\$2.9	(\$117.7)	(\$661.7)	(\$788.6)	(\$78.3)	(\$609.1)	(\$788.6)
Net proceeds from issuance of long-term debt	0.0	0.0	2,476.7	0.0	0.0	0.0	0.0	2,000.0	0.0	0.0	0.0	0.0	0.0	0.0	2,476.7	2,000.0	0.0	2,476.7	2,000.0	0.0
Net proceeds from commercial paper	(0.1)	(359.5)	297.9	(300.0)	0.0	0.0	0.0	0.0							(361.8)	0.0	0.0	(2.2)	0.0	0.0
Proceeds from borrowings on revolving credit facility	0.0	0.0	0.0	0.0	0.0	0.0	1,250.0								0.0	1,250.0	0.0	0.0	1,250.0	0.0
Repayments of borrowings on revolving credit facility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	0.0	0.0	0.0	0.0	0.0
Excess tax benefit on equity-based compensation plans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							0.0	0.0	0.0	0.0	0.0	0.0
Treasury stock purchases	(1,735.9)	(1.5)	(934.6)	(1,108.6)	(78.1)	(1,005.1)	(245.4)								(3,780.6)	(1,328.6)	0.0	(3,126.4)	(245.4)	0.0
Dividends paid	(174.4)	(167.9)	(171.2)	(164.9)	(158.9)	(166.7)	(163.5)	(170.4)	(168.1)	(165.8)	(163.5)	(161.2)	(158.9)	(156.6)	(678.3)	(659.5)	(658.6)	(661.7)	(667.8)	(640.2)
Reissuance of treasury stock related to employee stock purcha	0.0	32.9	0.0	45.0	0.0	38.4	0.0								78.0	38.4	0.0	83.5	0.0	0.0
Proceeds from issuance of common stock	0.0	0.1	5.0	1.7	3.9	0.6	1.7								6.8	6.2	0.0	11.2	1.7	0.0
Other	(0.0)	(13.2)	0.0	(0.0)	0.0	0.0	0.3								(13.2)	0.3	0.0	(0.0)	0.3	0.0
Net Cash from Financing	(\$1,990.2)	(\$515.6)	\$1,643.5	(\$1,527.9)	(\$262.1)	(\$1,150.7)	\$225.5	\$1,832.5	(\$165.2)	(\$162.9)	(\$160.6)	(\$958.3)	(\$156.0)	(\$153.7)	(\$2,390.1)	\$645.1	(\$1,447.1)	(\$1,297.1)	\$1,729.8	(\$1,428.7)
Effect of exchange rates	(2.3)	(2.7)	4.1	(3.1)	(4.2)	5.1	(10.7)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(4.0)	(9.9)	0.0	(6.5)	(13.0)	0.0
Restricted Cash	0.4	0.6	(0.5)	0.6	0.5	0.7	(0.2)													
Cash and Cash eqv at beginning	\$4,512.3	\$2,568.1	\$3,359.8	\$4,931.6	\$3,658.2	\$4,607.2	\$3,035.9	\$3,961.6	\$6,423.2	\$7,033.3	\$7,619.2	\$7,990.9	\$7,638.5	\$8,174.9	\$4,512.3	\$3,658.2	\$6,423.3	\$3,359.8	\$3,035.9	\$7,619.2
Net increase in cash and cash eqv.	(1,944.2)	791.7	1,571.8	(1,273.4)	949.0	(1,571.3)	925.7	2,461.7	610.0	585.9	371.8	(352.5)	536.5	605.9	(854.0)	2,765.1	1,215.2	(323.9)	4,583.3	1,161.6
Cash and Cash eqv at end	\$2,568.1	\$3,359.8	\$4,931.6	\$3,658.2	\$4,607.2	\$3,035.9	\$3,961.6	\$6,423.2	\$7,033.3	\$7,619.2	\$7,990.9	\$7,638.5	\$8,174.9	\$8,780.8	\$3,658.2	\$6,423.3	\$7,638.5	\$3,035.9	\$7,619.2	\$8,780.8
CHECK	\$2,568.1	\$3,359.8	\$4,931.6	\$3,658.2	\$4,607.2	\$3,035.9	\$3,961.6	\$6,423.2	\$7,033.3	\$7,619.2	\$7,990.9	\$7,638.5	\$8,174.9	\$8,780.8	\$3,658.2	\$6,423.2	\$7,638.5	\$3,035.9	\$7,619.2	\$8,780.8
Cash Flow from Operations	\$720.3	\$642.4	\$932.8	\$880.5	\$464.0	\$307.9	\$541.4	\$680.6	\$826.6	\$800.2	\$583.8	\$657.2	\$743.9	\$811.0	\$3,176.0	\$1,994.0	\$2,867.8	\$2,585.3	\$2,848.8	\$2,795.9
Capex	(56.1)	(105.9)	(75.5)	(65.9)	(39.3)	(62.1)	(51.4)	(51.4)	(51.4)	(51.4)	(51.4)	(51.4)	(51.4)	(51.4)	(303.5)	(204.1)	(205.5)	(242.8)	(205.5)	(205.5)
Free Cash Flow	\$664.2	\$536.5	\$857.3	\$814.5	\$424.8	\$245.9	\$490.1	\$629.2	\$775.2	\$748.8	\$532.4	\$605.9	\$692.5	\$759.6	\$2,872.5	\$1,789.9	\$2,662.3	\$2,342.5	\$2,643.3	\$2,590.4
Free Cash Flow / Share	\$4.02	\$3.31	\$5.43	\$5.27	\$2.82	\$1.64	\$3.31	\$4.25	\$5.30	\$5.19	\$3.75	\$4.32	\$5.01	\$5.58	\$17.97	\$12.35	\$21.09	\$15.28	\$18.02	\$18.65
EBITDA	\$709.8	\$809.4	\$694.4	\$701.3	\$618.4	\$694.2	\$740.7	\$753.8	\$716.0	\$723.9	\$766.5	\$842.7	\$923.5	\$993.3	\$2,914.9	\$924.2	\$1,057.5	\$2,781.3	\$2,720.0	\$2,800.0
Net Borrowing	(\$0.1)	(\$359.5)	\$297.9	(\$300.0)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$361.8)	\$0.0	\$0.0	(\$2.2)	\$0.0	\$0.0
Free Cash Flow to Equity	\$664.1	\$177.0	\$1,155.1	\$514.5	\$424.8	\$245.9	\$490.1	\$629.2	\$775.2	\$748.8	\$532.4	\$605.9	\$692.5	\$759.6	\$2,510.8	\$1,789.9	\$2,662.3	\$2,340.4	\$2,643.3	\$2,590.4

Source: Company Reports, Barclays Research

U.S. Semiconductor Capital Equipment	Industry View: NEUTRAL
Applied Materials Inc. (AMAT)	Stock Rating: EQUAL WEIGHT

Income statement (\$mn)	2019A	2020E	2021E	2022E	CAGR
Revenue	14,608	16,441	17,113	N/A	N/A
EBITDA (adj)	3,790	4,500	4,781	N/A	N/A
EBIT (adj)	3,427	4,133	4,419	N/A	N/A
Pre-tax income (adj)	3,310	3,962	4,254	N/A	N/A
Net income (adj)	2,875	3,430	3,616	N/A	N/A
EPS (adj) (\$)	3.04	3.71	3.94	N/A	N/A
Diluted shares (mn)	945.4	923.3	918.4	N/A	N/A
DPS (\$)	0.82	0.86	0.35	N/A	N/A

Margin and return data	Average				
EBITDA (adj) margin (%)	25.9	27.4	27.9	N/A	27.1
EBIT (adj) margin (%)	23.5	25.1	25.8	N/A	24.8
Pre-tax (adj) margin (%)	22.7	24.1	24.9	N/A	23.9
Net (adj) margin (%)	19.7	20.9	21.1	N/A	20.6
ROA (%)	14.5	15.5	14.4	N/A	14.8
ROE (%)	40.4	40.8	39.9	N/A	40.4

Balance sheet and cash flow (\$mn)	CAGR				
Tangible fixed assets	1,529	1,494	1,416	N/A	N/A
Intangible fixed assets	3,399	3,426	3,426	N/A	N/A
Cash and equivalents	3,129	4,749	7,588	N/A	N/A
Total assets	19,024	21,605	24,741	N/A	N/A
Short and long-term debt	5,313	6,815	6,815	N/A	N/A
Other long-term liabilities	375	573	573	N/A	N/A
Total liabilities	10,810	12,678	12,796	N/A	N/A
Net debt/(funds)	2,184	2,066	-773	N/A	N/A
Shareholders' equity	8,214	8,927	11,945	N/A	N/A
Change in working capital	-920	2,154	3,096	N/A	N/A
Cash flow from operations	3,247	3,008	3,672	N/A	N/A
Capital expenditure	441	315	284	N/A	N/A
Free cash flow	2,806	2,693	3,388	N/A	N/A

Valuation and leverage metrics	Average				
P/E (adj) (x)	17.9	14.6	13.8	N/A	15.4
EV/sales (x)	3.6	3.2	2.9	N/A	3.2
EV/EBITDA (adj) (x)	13.8	11.6	10.3	N/A	11.9
Equity FCF yield (%)	5.5	5.4	2.4	N/A	4.4
P/Sales (x)	3.4	3.1	2.9	N/A	3.1
P/BV (x)	6.3	5.6	6.9	N/A	6.3
Dividend yield (%)	1.5	1.6	0.6	N/A	1.2

Price (22-May-2020)	USD 54.39
Price Target	USD 60.00

Why Equal Weight? We are EW given higher exposure to Foundry/Logic and see estimates as still too high.

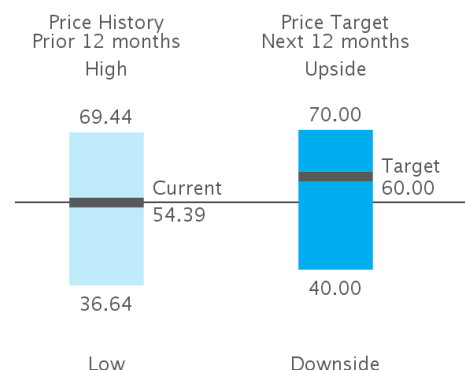
Upside case	USD 70.00
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Our upside case of \$70 is based upon 16x our upside CY21E EPS of \$4.50, which assumes resolution of China trade overhang, outperformance in Foundry/Logic.

Downside case	USD 40.00
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Our downside case of \$40 is based upon 11x our downside CY21E EPS of \$3.75, which assumes escalation of China Trade tensions, reduction of Foundry/Logic spend, and/or lack of recovery in Memory.

Upside/Downside scenarios



Source: Company data, Bloomberg, Barclays Research
Note: FY End Oct

U.S. Semiconductor Capital Equipment	Industry View: NEUTRAL
KLA Corporation (KLAC)	Stock Rating: EQUAL WEIGHT

Income statement (\$mn)	2019A	2020E	2021E	2022E	CAGR
Revenue	4,569	5,755	5,665	N/A	N/A
EBITDA (adj)	1,839	2,319	2,201	N/A	N/A
EBIT (adj)	1,606	1,968	1,866	N/A	N/A
Pre-tax income (adj)	1,481	1,806	1,701	N/A	N/A
Net income (adj)	1,296	1,571	1,479	N/A	N/A
EPS (adj) (\$)	8.48	9.99	9.86	N/A	N/A
Diluted shares (mn)	152.8	157.3	150.0	N/A	N/A
DPS (\$)	3.10	3.40	3.40	N/A	N/A

Margin and return data	Average				
EBITDA (adj) margin (%)	40.3	40.3	38.9	N/A	39.8
EBIT (adj) margin (%)	35.1	34.2	32.9	N/A	34.1
Pre-tax (adj) margin (%)	32.4	31.4	30.0	N/A	31.3
Net (adj) margin (%)	28.4	27.3	26.1	N/A	27.3
ROA (%)	12.7	12.5	13.9	N/A	13.0
ROE (%)	70.6	42.3	54.6	N/A	55.8

Balance sheet and cash flow (\$mn)	CAGR				
Tangible fixed assets	449	415	80	N/A	N/A
Intangible fixed assets	2,212	2,043	2,043	N/A	N/A
Cash and equivalents	1,016	1,276	2,302	N/A	N/A
Total assets	9,009	9,028	9,865	N/A	N/A
Short and long-term debt	3,423	3,444	3,444	N/A	N/A
Other long-term liabilities	N/A	N/A	N/A	N/A	N/A
Total liabilities	6,331	6,516	6,567	N/A	N/A
Net debt/(funds)	2,407	2,168	1,142	N/A	N/A
Shareholders' equity	2,678	2,512	3,299	N/A	N/A
Change in working capital	-784	N/A	N/A	N/A	N/A
Cash flow from operations	1,154	1,833	1,714	N/A	N/A
Capital expenditure	130	154	174	N/A	N/A
Free cash flow	1,023	1,678	1,540	N/A	N/A

Valuation and leverage metrics	Average				
P/E (adj) (x)	20.4	17.3	17.5	N/A	18.4
EV/sales (x)	6.5	5.1	5.0	N/A	5.5
EV/EBITDA (adj) (x)	16.1	12.7	12.9	N/A	13.9
Equity FCF yield (%)	3.9	6.2	1.4	N/A	3.8
P/Sales (x)	6.0	4.7	4.8	N/A	5.2
P/BV (x)	9.9	10.8	7.9	N/A	9.5
Dividend yield (%)	1.8	2.0	2.0	N/A	1.9

Price (22-May-2020) **USD 173.00**
Price Target **USD 170.00**

Why Equal Weight? We are EW as the company has higher exposure to Foundry/Logic and is under exposed to Memory but has the best set-up for numbers.

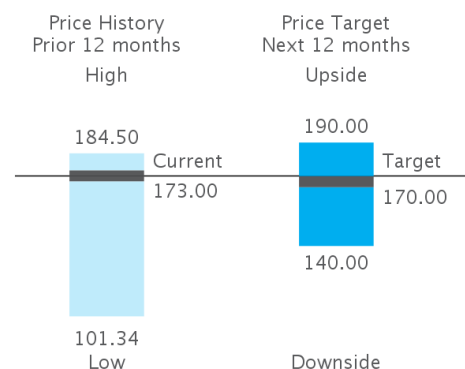
Upside case **USD 190.00**

Our upside case of \$190 is based upon 15x our upside CY21E EPS of \$12.50, which assumes resolution of China trade overhang, outperformance in Foundry/Logic.

Downside case **USD 140.00**

Our downside case of \$140 is based upon 14x our downside CY21E EPS of \$10.00, which assumes escalation of China Trade tensions, reduction of Foundry/Logic spend, and/or Lack of recovery in Memory.

Upside/Downside scenarios



Source: Company data, Bloomberg, Barclays Research
Note: FY End Jun

U.S. Semiconductor Capital Equipment					Industry View: NEUTRAL
Lam Research Corporation (LRCX)					Stock Rating: OVERWEIGHT

Income statement (\$mn)	2019A	2020E	2021E	2022E	CAGR
Revenue	9,654	9,855	10,488	N/A	N/A
EBITDA (adj)	2,915	2,660	2,855	N/A	N/A
EBIT (adj)	2,606	2,615	2,773	N/A	N/A
Pre-tax income (adj)	2,589	2,527	2,654	N/A	N/A
Net income (adj)	2,327	2,272	2,434	N/A	N/A
EPS (adj) (\$)	14.55	15.23	17.03	N/A	N/A
Diluted shares (mn)	159.9	149.2	143.0	N/A	N/A
DPS (\$)	4.40	4.60	4.60	N/A	N/A

Margin and return data	Average				
EBITDA (adj) margin (%)	30.2	27.0	27.2	N/A	28.1
EBIT (adj) margin (%)	27.0	26.5	26.4	N/A	26.7
Pre-tax (adj) margin (%)	26.8	25.6	25.3	N/A	25.9
Net (adj) margin (%)	24.1	23.1	23.2	N/A	23.5
ROA (%)	18.3	13.8	14.2	N/A	15.4
ROE (%)	33.7	45.8	33.9	N/A	37.8

Balance sheet and cash flow (\$mn)	CAGR				
Tangible fixed assets	1,059	1,032	962	N/A	N/A
Intangible fixed assets	1,485	1,484	1,484	N/A	N/A
Cash and equivalents	3,658	6,423	7,638	N/A	N/A
Total assets	12,001	15,477	16,668	N/A	N/A
Short and long-term debt	3,823	5,044	5,044	N/A	N/A
Other long-term liabilities	N/A	N/A	N/A	N/A	N/A
Total liabilities	7,278	8,466	8,578	N/A	N/A
Net debt/(funds)	165	-1,379	-2,595	N/A	N/A
Shareholders' equity	4,674	7,000	8,078	N/A	N/A
Change in working capital	189	3,593	1,149	N/A	N/A
Cash flow from operations	3,176	1,994	2,868	N/A	N/A
Capital expenditure	303	204	206	N/A	N/A
Free cash flow	2,873	1,790	2,662	N/A	N/A

Valuation and leverage metrics	Average				
P/E (adj) (x)	17.9	17.1	15.3	N/A	16.8
EV/sales (x)	4.0	3.8	3.4	N/A	3.8
EV/EBITDA (adj) (x)	13.3	14.0	12.6	N/A	13.3
Equity FCF yield (%)	6.9	4.6	1.0	N/A	4.2
P/Sales (x)	4.0	3.9	3.7	N/A	3.9
P/BV (x)	8.9	5.6	4.6	N/A	6.4
Dividend yield (%)	1.7	1.8	1.8	N/A	1.7

Price (22-May-2020)	USD 261.14
Price Target	USD 315.00

Why Overweight? We are OW as the company is highly levered to Memory, and should benefit from NAND spend tailwind at some point.

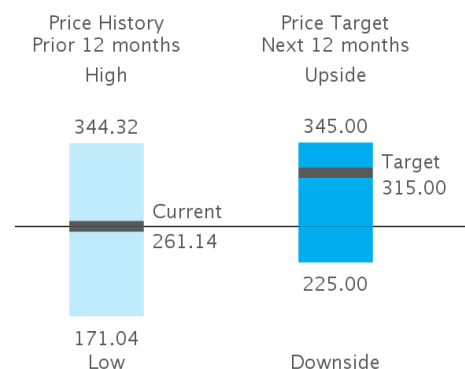
Upside case	USD 345.00
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Our upside case of \$345 is based upon 15x our upside CY21E EPS of \$23.00, which assumes faster/stronger growth in Memory market, greater than expected share gains in Etch and Deposition, and strength in EUV Photoresist opportunity.

Downside case	USD 225.00
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Our downside case of \$225 is based upon 12x our downside CY21E EPS of \$18.50, which assumes more cyclicality in NAND market, lower than expected share gains in Etch/Deposition, and no recovery in Memory market.

Upside/Downside scenarios



Source: Company data, Bloomberg, Barclays Research
Note: FY End Jun

Valuation Methodology and Risks

U.S. Semiconductor Capital Equipment

Applied Materials Inc. (AMAT)

Valuation Methodology: Our price target of \$60 is based on 15x our CY21E EPS of \$4.06.

Risks which May Impede the Achievement of the Barclays Research Valuation and Price Target: Escalation of China trade tensions would dampen growth potential, reduced spending in Foundry/Logic, and/or weakness in the Memory market.

KLA Corporation (KLAC)

Valuation Methodology: Our price target of \$170 is based on 15x our CY21E EPS of \$11.29.

Risks which May Impede the Achievement of the Barclays Research Valuation and Price Target: Escalation of China trade tensions would dampen growth potential, reduced spending in Foundry/Logic, and/or weakness in the Memory market.

Lam Research Corporation (LRCX)

Valuation Methodology: Our price target of \$315 is based on 15x our CY21E EPS of \$20.77.

Risks which May Impede the Achievement of the Barclays Research Valuation and Price Target: Weakness in Memory market (particularly NAND), escalation of China trade tensions would dampen growth potential, and/or reduced spending in Foundry/Logic.

Source: Barclays Research.

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We, Blayne Curtis and Thomas O'Malley, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

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Primary Stocks (Ticker, Date, Price)

Applied Materials Inc. (AMAT, 22-May-2020, USD 54.39), Equal Weight/Neutral, CD/CE/J

KLA Corporation (KLAC, 22-May-2020, USD 173.00), Equal Weight/Neutral, CD/CE/J

Lam Research Corporation (LRCX, 22-May-2020, USD 261.14), Overweight/Neutral, A/CD/CE/D/E/J/K/L/M

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Overweight - The stock is expected to outperform the unweighted expected total return of the industry coverage universe over a 12-month investment horizon.

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Below is the list of companies that constitute the "industry coverage universe":

U.S. Semiconductor Capital Equipment

Applied Materials Inc. (AMAT)

KLA Corporation (KLAC)

Lam Research Corporation (LRCX)

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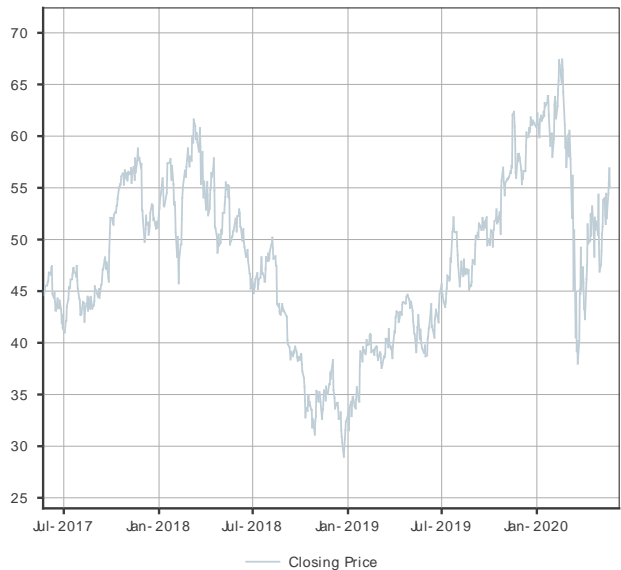
Applied Materials Inc. (AMAT / AMAT)
USD 54.39 (22-May-2020)

Stock Rating
EQUAL WEIGHT

Industry View
NEUTRAL

Rating and Price Target Chart - USD (as of 22-May-2020)

Currency=USD



Publication Date Closing Price Rating Adjusted Price Target

Source: Bloomberg, Barclays Research

Historical stock prices and price targets may have been adjusted for stock splits and dividends.

Source: IDC, Barclays Research

[Link to Barclays Live for interactive charting](#)

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Valuation Methodology: Our price target of \$60 is based on 15x our CY21E EPS of \$4.06.

Risks which May Impede the Achievement of the Barclays Research Valuation and Price Target: Escalation of China trade tensions would dampen growth potential, reduced spending in Foundry/Logic, and/or weakness in the Memory market.

IMPORTANT DISCLOSURES CONTINUED

KLA Corporation (KLAC / KLAC)

USD 173.00 (22-May-2020)

Stock Rating

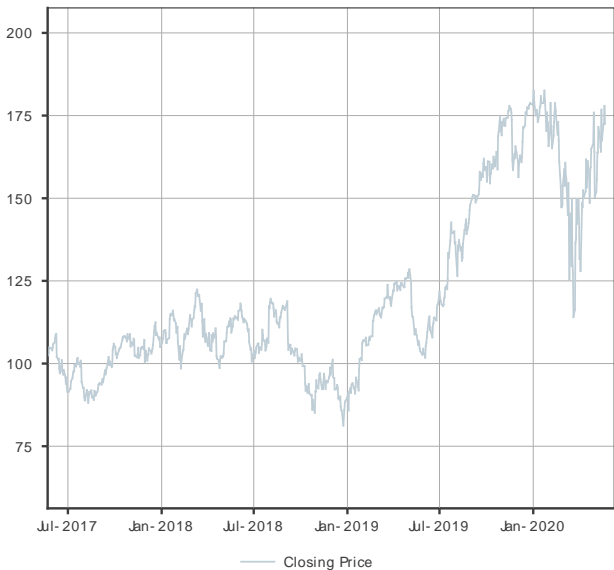
EQUAL WEIGHT

Industry View

NEUTRAL

Rating and Price Target Chart - USD (as of 22-May-2020)

Currency=USD



Publication Date Closing Price Rating Adjusted Price Target

Source: Bloomberg, Barclays Research

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Source: IDC, Barclays Research

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Valuation Methodology: Our price target of \$170 is based on 15x our CY21E EPS of \$11.29.

Risks which May Impede the Achievement of the Barclays Research Valuation and Price Target: Escalation of China trade tensions would dampen growth potential, reduced spending in Foundry/Logic, and/or weakness in the Memory market.

IMPORTANT DISCLOSURES CONTINUED

Lam Research Corporation (LRCX / LRCX)

USD 261.14 (22-May-2020)

Stock Rating

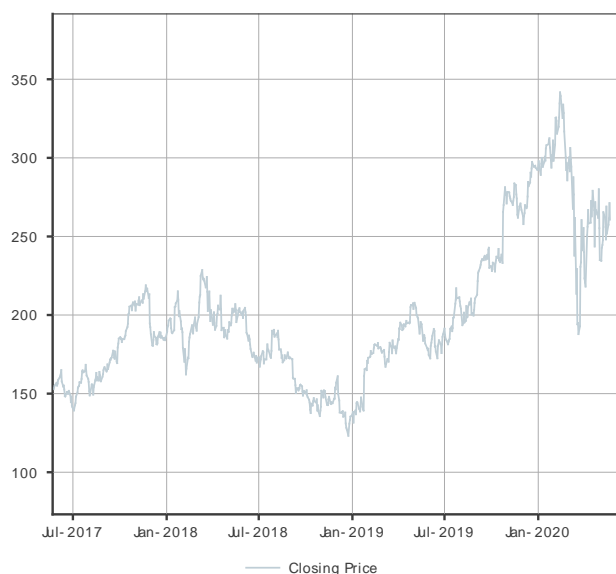
OVERWEIGHT

Industry View

NEUTRAL

Rating and Price Target Chart - USD (as of 22-May-2020)

Currency=USD



Publication Date	Closing Price	Rating	Adjusted Price Target
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Source: Bloomberg, Barclays Research

Historical stock prices and price targets may have been adjusted for stock splits and dividends.

Source: IDC, Barclays Research

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Valuation Methodology: Our price target of \$315 is based on 15x our CY21E EPS of \$20.77.

Risks which May Impede the Achievement of the Barclays Research Valuation and Price Target: Weakness in Memory market (particularly NAND), escalation of China trade tensions would dampen growth potential, and/or reduced spending in Foundry/Logic.

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