Global Memory Market

Global Memory TAM and S&D update: Stock correction is behind us but memory crisis is still ongoing

- **Higher Memory TAM driven by both pricing and volume, S-D shortage continues for the next two years.** Reflecting CoWoS and new PC/Server assumptions, we raise our FY26E-28E memory TAM by 4-8% (vs. *May-26 model*) and expect S-D shortage to continue (degree of shortage worsening in FY27E followed by a slight improvement into FY28E). Memory bid-to-supply ratio is still 70-80% for next year (vs. 90% during the pandemic peak), and the content growth slowdown as well as the spec adjustment are the natural next steps as we introduce new projections (*table 9*). HBM is where we have the most revisions amidst a longer 8Hi product-cycle, slower 12Hi ramp, and delay in 16Hi adoption, while revising up next year's pricing outlook to +42% y-y. Memory demand broadening out from GPU to CPU appears to have been underestimated by investors (conceptually well known but actual S-D impact underlooked) and remains a key source of potential upward revisions to demand.
- **Memory scale-out: content optimization to handle greater tokens.** We view the downward revision in memory content for SOCAMM (1.5TB per CPU to 768GB) and Rubin Ultra (8-Hi/12-Hi HBM4E downticked from 16-Hi HBM4E) as a means for customers to cope with supply shortages and handle greater tokens for longer context windows/AI inferencing applications. We do not disagree that memory content optimization itself is a negative demand driver, but argue that greater AI silicon production (GPUs and Vera/Rosa CPU) will offset the weakness (AI CPU unit TAM expected to grow 155% CAGR). The degree of shortage from the DD% gap between supply and demand growth is narrowing slightly, but we view the impact on memory fundamentals as limited. The nature of the supply crisis is unchanged and we remain optimistic on agentic AI-related memory demand growth prospects.
- **Memory value share within CSP capex concern is slightly alleviated post 2Q26 results.** Major US hyperscalers reported strong cloud revenue growth momentum (2Q26 combined revenue from AWS/MSFT/GCP at US$106bn or +43% y-y and the growth rate accelerating continuously from +35% y-y last quarter or +23% from a year ago) and conveyed aggressive spending appetite for this year/next year (consensus capex for three CSP and Meta raised by 6%/17% post results). This sets up a favorable environment for memory value gain potential, and we forecast memory value share rising to 31%/49% in 2026E/27E from <10% in the pre-AI era. In our conversations with investors, many agree on the higher value of shares, giving credit to the importance of memory's role in AI compute systems. However, the generally "above 50%" value share figure stood out as a stretched level by investors and we believe additional hyperscale capex (i.e. Memory value share within CSP capex drops well below the 50%) will be required for investors to view the AI capex trade thesis as more sustainable.
- **Multiple capacity additions are insufficient to outgrow demand.** Major memory makers are pulling-forward capacity to ease the shortages and we forecast DRAM WSPM to reach 2.85M by 28-end from 1.9M in 25A-end, but still shy of expected demand mainly due to 2-2.5 years of leadtime from groundbreaking to production ramp. HBM die penalty (3-4x penalty) and increasing HBM mix (32% capacity mix by 28E-end) are factors that will

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constrain supply growth in 24%. Based on our estimates, 300K of additional wafer capacity is required for supply-demand to be in balance in 2028E, and we find the probability of this to be low.

- **Gleaning details on LTA.** LTAs (Long Term Agreements) in 2QCY26 revealed favorable terms for memory makers with the prepayment mix (20-25% of the LTA value) indicating strong bargaining power and large volume contribution (50-70%). Opaque pricing structures are still the missing puzzle, but we see a flexible pricing structure allowing memory makers to leverage the current shortage market, albeit with a smoother price curve (DRAM ASP rising 29%/7% in 27/28E after a 235% rally in 26E). It is also important to note that the majority of LTAs are centered around AI/server compute, carrying a 30-40% price premium over the rest.
- **Flash Memory Summit 2026 reinforced that the AI "memory wall" is still a primary bottleneck**. Driven by longer context length, KV cache, agentic worklaods, as well as memory cost burden (both DRAM/HBM), we have witnessed accelerating interest in lower cost memory/storage tiers. This is a clear positive for NAND-based solutions (eSSD and emerging High Bandwidth Flash, HBF) and a modest positive for conventional DRAM (DDRx/LPDDRx), especially via CXL memory pooling/offload. A major theme was next-gen memory architectures like HBF, positioning a new tier between HBM and SSD: stacked NAND (8-hi/16-hi) targeting up to 512GB capacity and ~0.4–3TB/s bandwidth, albeit ecosystem/software enablement remains a key gating factor. Other approaches include system-level disaggregation of compute-intensive prefill (HBM XPU) vs. memory-intensive decode (HBM and/or HBF). On the storage side, eSSD architectures such as NVIDIA SCADA (GPU-direct-to-eSSD) and CMX (GPU→DPU→eSSD) aim to optimize latency/bandwidth by workload. Net/net, inference memory constraints should lift demand for DRAM (via CXL) and potentially more NAND for near-GPU memory and high-speed storage.
- **Investment recommendation - 3Q26 will likely be an expectation reset quarter, but we remain bullish on memory.** After a strong four quarters of outperformance over the overall AI ecosystem (figure 6), memory shares experienced a 25% correction in 3Q26TD largely due to a peak-out sentiment amidst: a) series of near-term EPS expectation misses; b) slower-than-expected CSP AI capex spending; and c) mainstream memory content optimization. We acknowledge that the road to a valuation re-rating will take time relative to upward EPS revisions, driven by share appreciation; however, we see strong upside to memory stock prices trading at earnings and P/E valuation metric on a smoothening earnings trajectory from LTA and a higher shareholder return profile. We remain OW on our global memory coverage: **Korea Memory** (SEC > SKH in the near-term), **Micron** in the U.S., **Kioxia** in Japan, and **NYT/Winbond** in Taiwan.
- **What are the next key catalysts? Shareholder returns catalyze valuation expansion.** Key catalysts are: 1) AI capex and demand update (i.e. memory stocks showing high correlation with CSP capex trends); 2) memory spec development update (upgrade or downgrade based on supply availability); and 3) shareholder return update. Memory suppliers have historically had a negligible <2% yield, but we expect a significant shift over the next 2–3 years. SEC's shareholder return program (2024–26E) and SKH's policy (ending 27E) should drive special dividends and buybacks, potentially yielding 16-20% for SEC/SKH in the next two years. This marks a departure from past cycles, as durable earnings from LTAs and elevated margins underpin higher returns. Alongside the LTA mechanism, we believe a clear capital allocation with shareholder return plan is a key driver if investors are to give credit to the durability of memory earnings.

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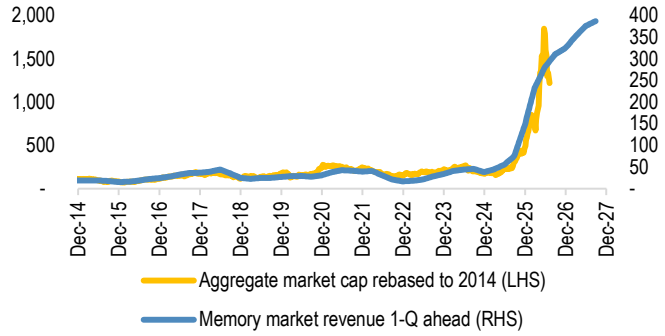
Key charts

Figure 1: Aggregate market cap vs leading memory market revenue trend (1Q ahead)

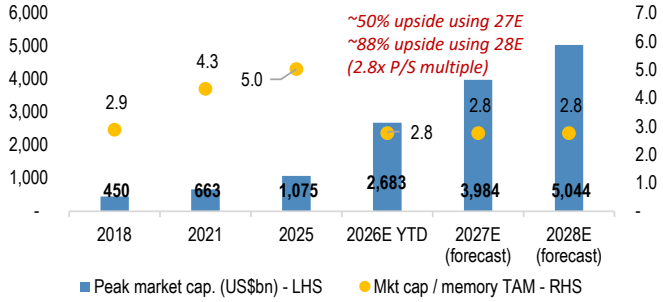
Rebased as of 1/1/2014, US$bn-RHS



Source: WSTS, OMDIA, Bloomberg Finance L.P., J.P. Morgan estimates. Note: Market cap includes SEC, SK Hynix, Micron, Nanya Technology, Western Digital. Kioxia / SNDK added from 1Q25 and excluded WDC.

Figure 2: Memory TAM vs peak market cap/TAM analysis

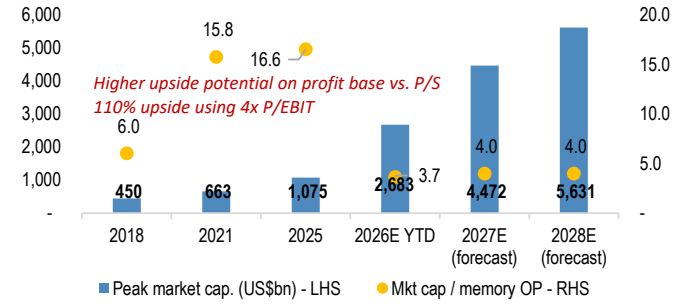
US$bn, peak mkt cap/TAM (x)



Source: Bloomberg Finance L.P., WSTS, Company data, J.P. Morgan estimates. Note: Market cap numbers only include SEC, SKH, and MU.

Figure 3: Memory TAM vs peak market cap/memory OP analysis

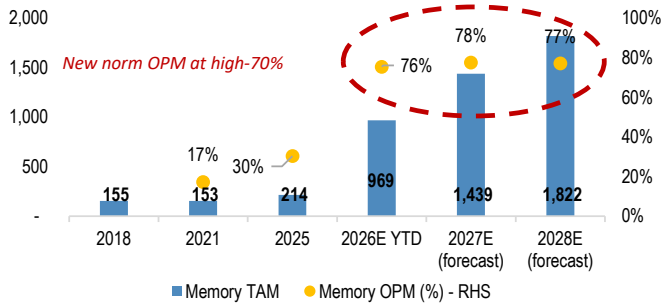
US$bn, peak mkt cap/memory EBIT (x)



Source: Bloomberg Finance L.P., WSTS, Company data, J.P. Morgan estimates. Note: Market cap numbers only include SEC, SKH, and MU.

Figure 4: Memory TAM vs Memory OPM

US$bn, % - RHS



Source: Bloomberg Finance L.P., WSTS, Company data, J.P. Morgan estimates. Note: Market cap numbers only include SEC, SKH, and MU.

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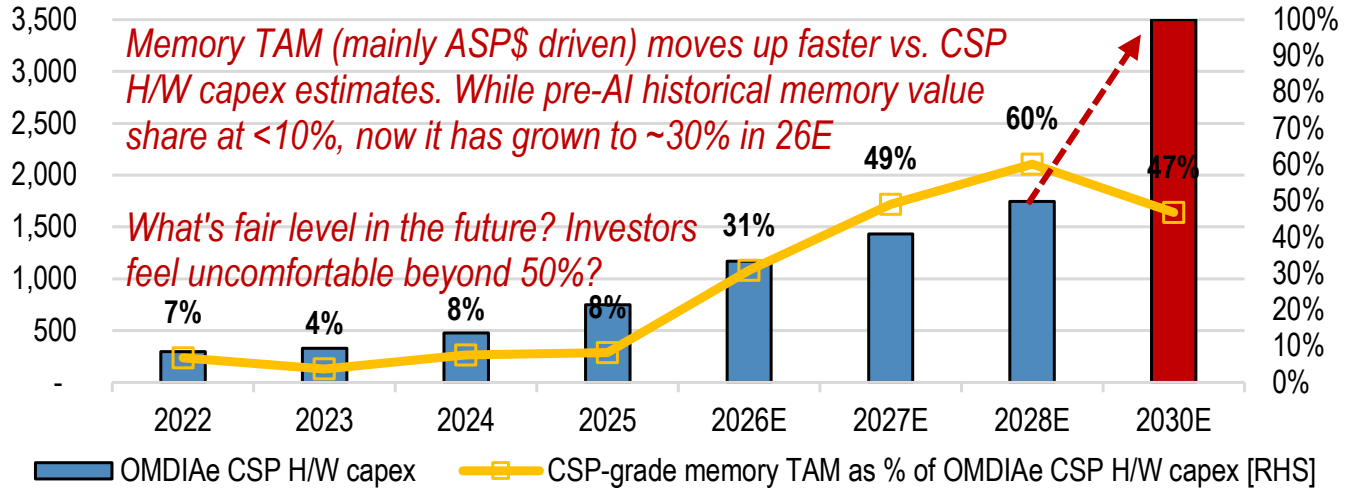
Figure 5: CSP capex and AI memory % share

US$bn, % - RHS



Source: Company data, Bloomberg Finance L.P., J.P. Morgan estimates.

Figure 6: Market cap changes across AI ecosystem partners

US$bn, %

US$bn	Top 4 US CSP	AI semi	Foundry	Memory	SPE	AI ecosystem mkt cap.	SOX	NASDAQ index	DOW Jones index
1Q24	8,122	3,286	632	595	285	12,920	5,795	18,255	39,807
2Q24	8,871	4,178	772	623	272	14,717	6,991	19,683	39,119
3Q24	8,652	4,172	784	491	225	14,324	6,900	20,061	42,330
4Q24	9,243	4,736	850	395	210	15,435	7,306	21,012	42,544
1Q25	8,162	3,718	711	423	190	13,204	6,040	19,278	42,002
2Q25	10,027	5,517	940	557	272	17,313	8,481	22,679	44,095
3Q25	10,979	6,496	1,111	721	329	19,636	10,022	24,680	46,398
4Q25	11,508	6,667	1,280	1,145	415	21,014	10,608	25,250	48,063
1Q26	9,907	6,196	1,424	1,411	471	19,409	10,738	23,740	46,342
2Q26	11,092	8,061	1,962	3,776	909	25,800	16,313	30,276	52,319
3Q26TD	12,479	8,465	1,931	2,832	715	26,422	15,071	29,488	54,349
% changes									
1Q24	16%	57%	26%	11%	33%	25%	37%	8%	6%
2Q24	9%	27%	22%	5%	-5%	14%	21%	8%	-2%
3Q24	-2%	0%	1%	-21%	-17%	-3%	-1%	2%	8%
4Q24	7%	14%	8%	-19%	-7%	8%	6%	5%	1%
1Q25	-12%	-21%	-16%	7%	-10%	-14%	-17%	-8%	-1%
2Q25	23%	48%	32%	31%	43%	31%	40%	18%	5%
3Q25	9%	18%	18%	30%	21%	13%	18%	9%	5%
4Q25	5%	3%	15%	59%	26%	7%	6%	2%	4%
1Q26	-14%	-7%	11%	23%	14%	-8%	1%	-6%	-4%
2Q26	12%	30%	38%	168%	93%	33%	52%	28%	13%
3Q26TD	13%	5%	-2%	-25%	-21%	2%	-8%	-3%	4%
mkt cap. mix within the AI ecosystem									
1Q24	63%	25%	5%	5%	2%	100%			
2Q24	60%	28%	5%	4%	2%	100%			
3Q24	60%	29%	5%	3%	2%	100%			
4Q24	60%	31%	6%	3%	1%	100%			
1Q25	62%	28%	5%	3%	1%	100%			
2Q25	58%	32%	5%	3%	2%	100%			
3Q25	56%	33%	6%	4%	2%	100%			
4Q25	55%	32%	6%	5%	2%	100%			
1Q26	51%	32%	7%	7%	2%	100%			
2Q26	43%	31%	8%	15%	4%	100%			
3Q26TD	47%	32%	7%	11%	3%	100%			

Source: Bloomberg Finance L.P., Note: 1) Top 4 CSP includes GOOG/MSFT/AMZN/META; 2) AI semi includes NVDA/AMD/AVGO/MRVL; 3) Foundry includes TSMC; 4) Memory includes SKH/MU/SEC; 5) SPE includes LRCx, TEL, Advantest; 6) NASDAQ and DJIS in index vs others in absolute market cap; 7) Market cap based on qtr-end; 8) colors indicate % performance rank within the qtr.

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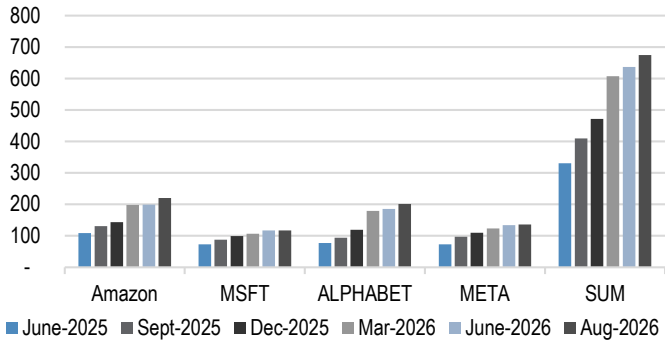
Figure 7: US major CSP capex spending forecast (26E)

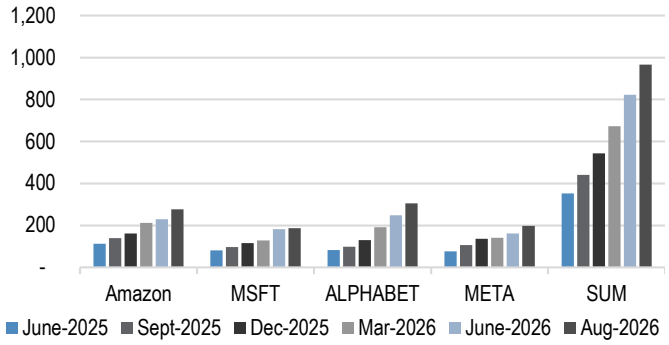
US$bn



Source: Bloomberg Finance L.P.

Figure 8: US major CSP capex spending forecast (27E)

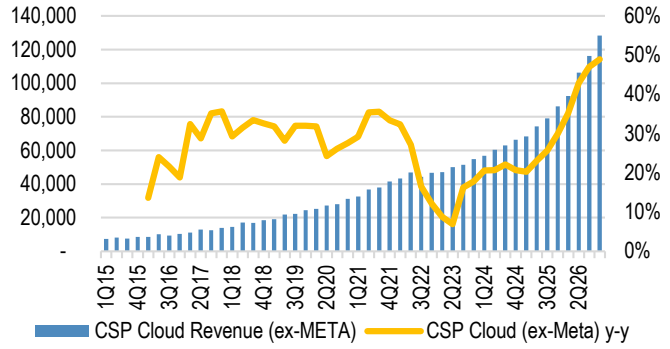
US$bn



Source: Bloomberg Finance L.P.

Figure 9: CSP cloud quarterly revenue (ex-Meta) and y-y trend

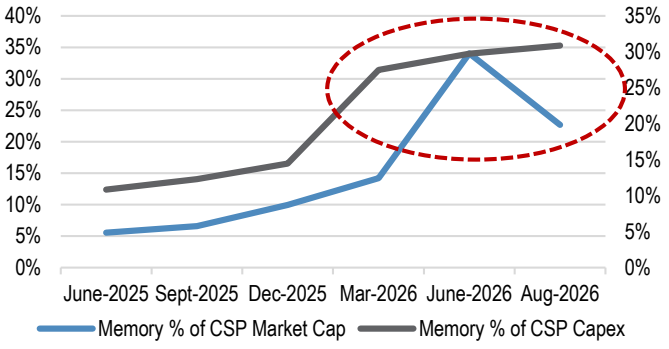
US$bn, % - RHS



Source: Company data, Bloomberg Finance L.P.

Figure 10: Memory as % of CSP market cap vs. capex comparison (2026E)

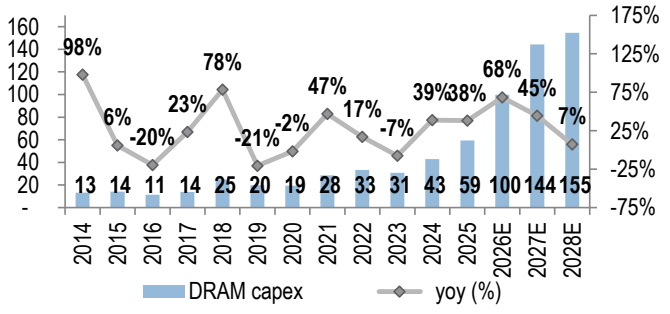
%



Source: Bloomberg Finance L.P., J.P. Morgan estimates.

Figure 11: DRAM capex and Y/Y trend

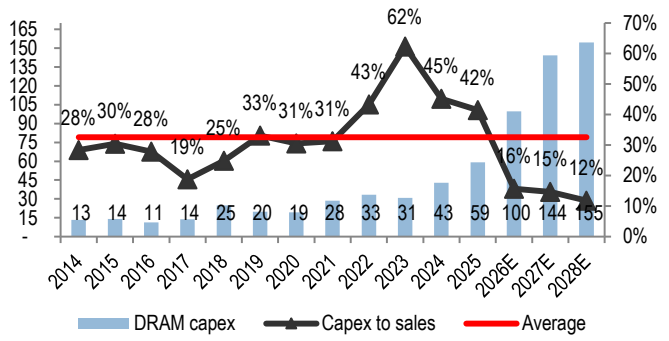
US$bn, %



Source: Company data, J.P. Morgan estimates.

Figure 12: DRAM capital intensity

US$bn, %



Source: Company data, J.P. Morgan estimates.

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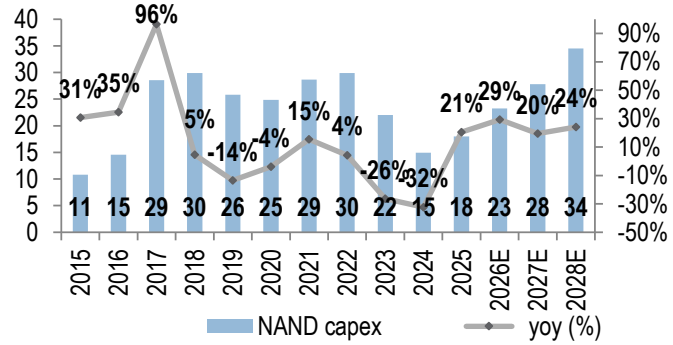
Figure 13: NAND capex and Y/Y trend

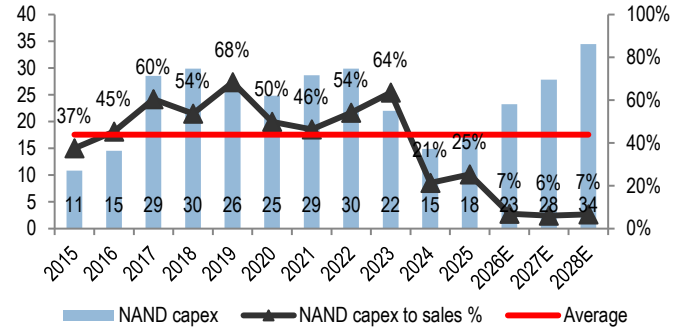
US$bn, %



Source: Company data, J.P. Morgan estimates.

Figure 14: NAND capital intensity

US$bn, %



Source: Company data, J.P. Morgan estimates. Note: Average from 2011-25.

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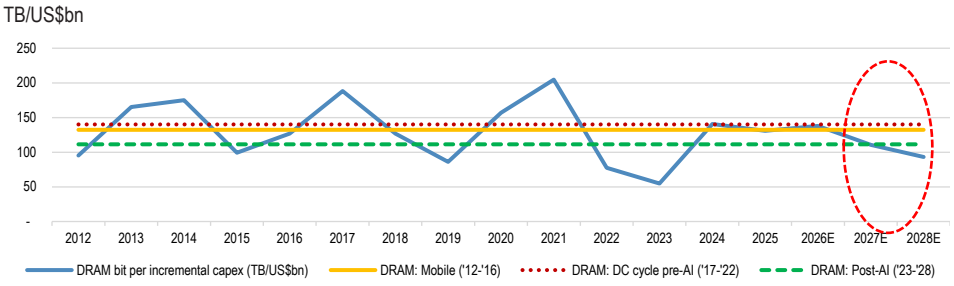
Memory thesis is changing: Moving capex from negative to neutral narrative

Memory stocks' narrative quickly changes based on the stage of the cycle; capex and production discipline are usually a welcome signal to the investors and it reacts as a strong downside support driver especially during a down-cycle (i.e. production cutbacks through active utilization rate controls). During the turnaround-to-mid-point of the cycle, capex spending is usually neutral to the industry as investors weigh the EPS upgrade and growth momentum over the capital allocation. As the sector enters a mature up-cycle, this is when capex headlines become extremely important to manage as a series of capex increases makes investors nervous, reminding them of risks associated with end demand uncertainty (e.g. memory makers ended up over-investing in the later stages of the up-cycle, resulting in over-supply soon afterwards).

Compared to previous down-cycles ('18-19 after the first stage of CSP capex cycle after the datacenter boom in 17-18 or '22-23 after the pandemic demand), we sense two distinct differences in terms of the capex cycle. First, we have noticed a flattening DRAM bit per incremental capex spending trend in the past three years, where bit production output tends to be below the initial expectation. Due to the unprecedented large shortage in the market, additional greenfield investment needs are the highest ever; however, physical constraints remain high and the capex requirement to add a new fab is rising quickly, not to mention higher EUV intensity per new wafer. Besides, as wafer allocation to HBM continues to rise, higher wafer-to-die penalty results in lower bit per wafer productivity. This results in a productivity drop in bits per incremental capex vs. the previous cycles implying higher capex requirements. Higher capex spending then becomes a given factor rather than optionality for memory makers and we believe such a revision should be reflected as a debottlenecking initiative rather than a lack of capex discipline in our view.

Figure 15: DRAM bit per incremental capex trend



Source: Company data, WSTS, J.P. Morgan estimates.

Contrary to DRAM, the NAND industry's bit per incremental capex increase is accelerating, a similar sign to that of previous cycles. Key difference is a more aggressive technology migration toward 300L/400L vs. the past. Given that almost all fab space within global memory makers is allocated to DRAM, NAND makers' priority is to gain bit productivity increase from the same amount of wafer capacity. Such a figure does not reflect the potential supply crunch from rising SLC/HBF (based on SLC-stacked memory) and there is a chance for the number to decline eventually. Another factor to consider is the absolutely lower capex and substantially lower capital intensity at NAND vs. DRAM. Between the two industries, the over-supply risk from higher

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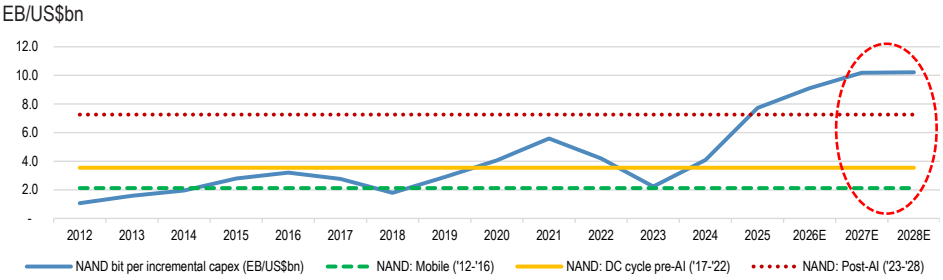
capex is greater in the NAND space. However, in our base case scenario, we equally view the supply shortage continuing in both DRAM/NAND.

Figure 16: NAND bit per incremental capex trend



Source: Company data, WSTS, J.P. Morgan estimates.

How much capacity is needed for supply balance?

As per our estimates, the required amount of supply for DRAM and NAND S-D to be in balance by 2028 is 5.5EB / 76EB respectively. Usually capex spending impacts the following 12-18 months' supply bit increase; therefore, memory makers need to raise FY27E capex immediately in order to resolve the shortage. Otherwise, the supply shortage is likely to continue. Indeed, we have seen a sharp rise in capex spending among major memory suppliers and have reflected all the publicly available projects. Yet, it is insufficient. We think it will be physically extremely challenging for memory makers to secure an additional 300k (for DRAM) or 45k (for NAND) wafer capacity within the next year.

Table 1: DRAM and NAND: Capacity/Capex required to make the S-D in equilibrium

DRAM S-D shortage (28E) - EB	5.0
DRAM required for 28E S-D balance (EB)	5.5
Capex required for S-D balance (US$bn)	58
Incremental capex required vs. FY27E est.	41%
WSPM eqv to Capex requirement	299
NAND S-D shortage (28E) - EB	63
NAND required for 28E S-D balance (EB)	76
Capex required for S-D balance (US$bn)	7
Incremental capex required vs. FY27E est.	27%
WSPM eqv to Capex requirement	44

Source: Company data, WSTS, J.P. Morgan estimates.

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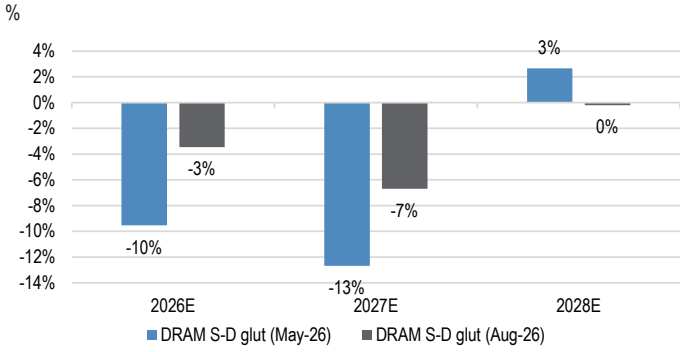
Content optimization as a coping mechanism

The memory industry saw broad content optimization across SOCAMM and HBM with NVDA halving SOCAMM content for Vera CPU (originally 1.5TB halved to 768GB per CPU) and reducing HBM content for Rubin Ultra (16-Hi HBM4E to 8-Hi/12-Hi HBM4E) and Rubin GPU (JPMe: two SKU variations adopting 288GB or 192GB HBM4). We have advocated that the primary reason behind content optimization was to cope with the limited memory supply. Despite the broad-based content optimization, our view remains unchanged that content optimization is more of a coping mechanism that won't dent the memory shortage situation. We do not disagree that content optimization is an indirect way of saying that memory demand is cut and ultimately lessening the S-D glut. Overall, we view memory content optimization as a process of AI scaling out from scaling-up.

Compared to our previous forecast of the gap between supply and demand y-y% growth (DD% gap in 26/27E based on May-26 data), we expect the gap to soften to a single-digit%, but still expect the slope of the shortage to worsen heading into 2027, especially for DRAM. As a matter of fact, the absolute S-D shortage gap remains elevated and is likely to expand further y-y through FY28, per our estimates.

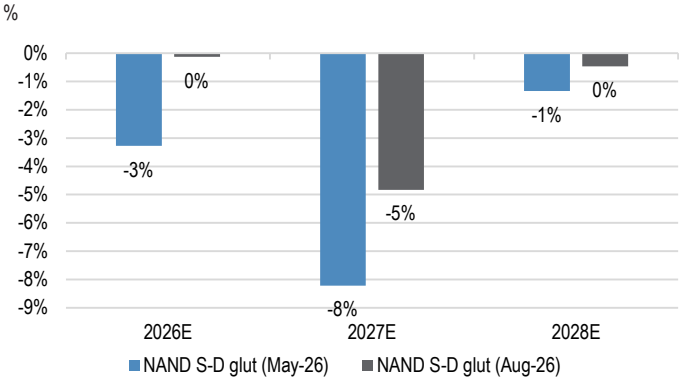
Historically, the narrowing S-D gap has meant softening memory ASP upward revisions - which still holds true, in our view, but is less significant in this condition of the market. Memory ASP is at record-highs every quarter, and we believe the degree of shortage is expected to worsen in 27E implying limited probablity of memory ASP declining on a Q-Q basis. We have been highlighting the higher for longer memory upcycle as the core investment thesis and we continue to see the memory upcycle continuing through 28E-end (20 quarters of y-y ASP increase since 1Q24 vs. historical 6-7Q of upcycle in the past two decades). Although the slope of price y-y is expected to decelerate, we expect memory fundamentals to remain strong with content optimization as a healthy adjustment rather than the beginning of the downcycle signal. It is important to note that absolute pricing is likely to move up continuously as the majority of LTA contracts are centered around server compute memory carrying 30-40% price premium over consumer electronic applications.

Figure 17: DRAM S-D glut vs. May-26



Source: J.P. Morgan estimates.

Figure 18: NAND S-D glut vs. May-26



Source: J.P. Morgan estimates.

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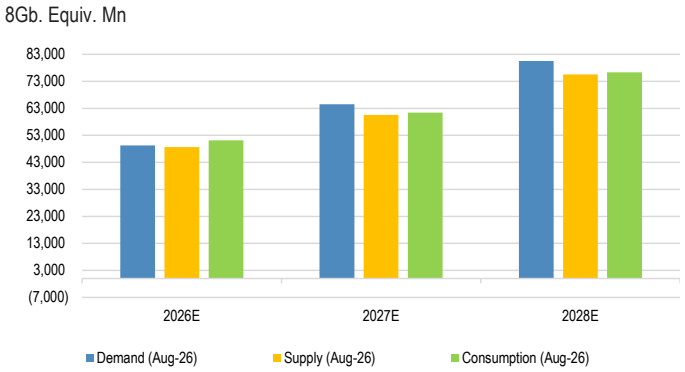
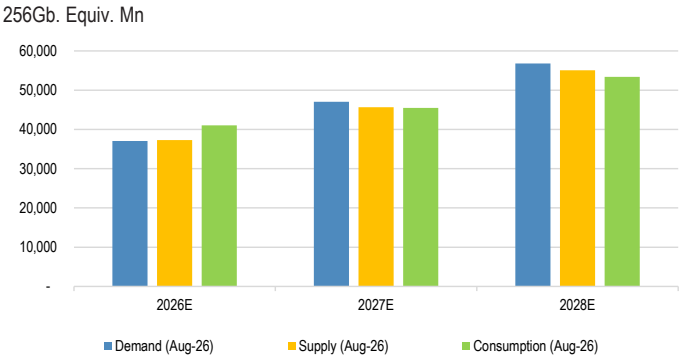
Figure 19: DRAM absolute demand/supply/consumption



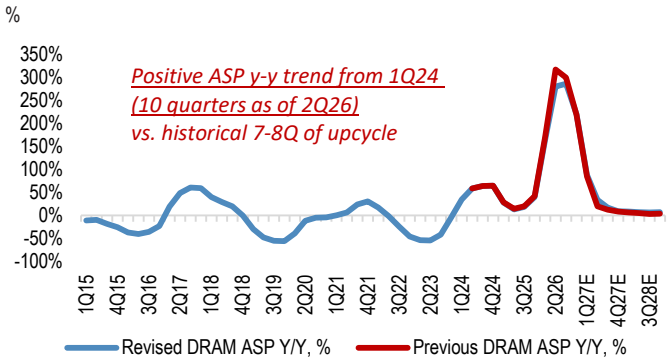
Source: J.P. Morgan estimates.

Figure 20: NAND absolute demand/supply/consumption



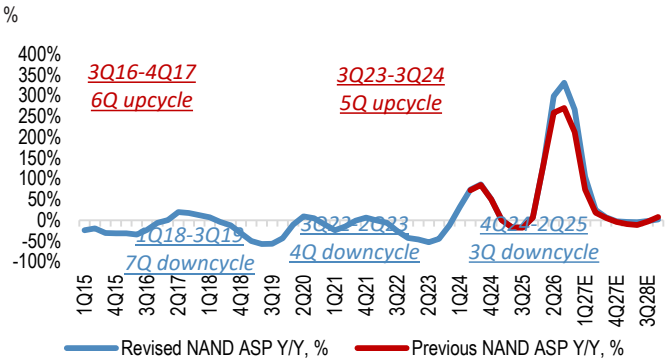
Source: J.P. Morgan estimates.

Figure 21: DRAM ASP Y/Y% change vs previous assumptions



Source: WSTS, J.P. Morgan estimates.

Figure 22: NAND ASP Y/Y% change vs previous assumptions



Source: WSTS, J.P. Morgan estimates.

DRAM WSPM map by players

Earlier capacity pull-in from memory makers spooked investors as it has historically been a signal of a cycle peak-out. The argument stands true in the event of a demand slowdown, but we see limited evidence of AI demand slowing down or memory being devalued in the AI ecosystem. In a tight supply market environment, we expect memory supply growth to be the leading indicator of demand and ultimately earnings growth, more so than memory ASP which has limited room for upside risk, in our view.

In response to surging demand, memory vendors are pulling-forward capacity, accelerating technology migration, and announcing new capacity to ensure stable supply of memory. We share our bottom-up capacity forecast by players:

- **SKH:** incremental capacity coming online from M15X (1bnm based, mostly dedicated to HBM) and Yongin cluster 1 with the first phase ramping in March -27 and subsequent fabs coming online throughout 28E and towards the end of the decade. We presume 65-70K wfpm as design capacity per phase and eventually project Hynix capacity doubling by 2030E vs. 26E.
- **SEC:** Incremental capacity from P4 (210K wfpm max capacity) and the new greenfield PT5 fab with initial wafer-out from 4Q27E. For future greenfield fabs, we expect SEC to optimize the land in PT and prioritize finishing cleanroom construction at Yong-in (NRD-K) prior to groundbreaking at Honam (report for

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details).

- **MU:** Relative to SEC and SKH, we see limited capacity coming online from MU throughout 1H27E. MU's new greenfield fab is expected to rollout from 2Q27E (ID1 fab from Boisde Idaho and the PSMC P5 fab). We expect the Hiroshima fab 2 to begin ramping from end-28E with the NY fab contributing to bits towards the end of the decade, largely in-line with management guidance.
- **NYT & China Memory**: From 60K wfpm capacity, the company is accelerating the capacity expansion over the next three years - first new capacity wafer tape-in will begin mid-2027E and additional capacity installation currently anticipated to be 36K/45K by 28/29E-end. According to OMDIA, nearly 300K wfpm is currently installed. We assume the pace of capacity expansion to be largely similar through 28/29E-end.

Table 2: DRAM - WSPM forecast by player by fab

Kwfpm

12" eq., K wspm	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	1Q28E	2Q28E	3Q28E	4Q28E	1Q29E	2Q29E	3Q29E	4Q29E
SK hynix	**560**	**565**	**575**	**590**	**605**	**635**	**660**	**680**	**705**	**725**	**750**	**785**	**800**	**825**	**850**	**900**
M10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M12																
Wuxi 1	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Wuxi 2	90	90	90	100	100	100	100	100	95	95	95	95	95	95	95	95
M14	160	165	175	175	175	170	160	160	160	160	155	155	155	155	150	150
M15X	-	-	10	20	35	65	85	85	85	85	85	85	85	85	85	85
M16	200	200	190	185	185	180	175	175	175	175	175	175	170	170	170	170
Y1-1					-	10	30	50	70	70	70	70	70	70	70	70
Y1-2									10	30	50	65	65	65	65	65
Y1-3									-	-	10	30	50	65	65	65
Y1-4													-	10	30	50
Y1-5													-	-	10	30
Y1-6													-	-	-	10
Samsung	**670**	**695**	**715**	**755**	**765**	**765**	**790**	**840**	**865**	**885**	**915**	**935**	**965**	**995**	**1,055**	**1,085**
Line 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Line 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Line 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Line 15	160	160	160	160	160	160	160	160	155	155	155	155	155	155	155	155
Line 16	70	70	70	70	65	65	65	65	65	65	65	65	65	65	65	65
Line 17	95	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
PT1	100	100	95	95	95	95	95	95	95	95	95	95	95	95	95	95
PT2	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PT3	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PT4	45	75	100	140	155	155	180	210	210	210	210	210	210	210	210	210
PT5					-	-	-	20	50	70	100	120	150	180	210	210
PT6 (PT5-2)													-	-	15	30
NRG-K													-	-	15	30
Y1																
Micron	**305**	**305**	**305**	**305**	**305**	**340**	**375**	**395**	**425**	**440**	**455**	**490**	**525**	**560**	**575**	**590**
Fab 4 (ex-Manassas)	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Fab 15 (ex-Hiroshima 1)	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Hiroshima 2									-	-	-	15	30	45	45	45
Boise fab (Idaho)					-	20	40	60	75	90	90	110	130	150	165	180
PSMC P5 fab					-	15	30	30	45	45	60	60	60	60	60	60
NY fab																
Fab 16 (ex-Rexchip)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Fab 11 (ex-Inotera)	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Fab 1 + Fab 2	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Nanya	**62**	**62**	**62**	**62**	**62**	**62**	**67**	**72**	**77**	**82**	**87**	**90**	**90**	**90**	**90**	**97**
Winbond	**28**	**29**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**
Powerchip	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**
Other (incl. China)	**290**	**290**	**300**	**300**	**330**	**350**	**370**	**390**	**400**	**430**	**450**	**470**	**500**	**530**	**550**	**570**
Global WSPM	**1,955**	**1,986**	**2,032**	**2,087**	**2,142**	**2,227**	**2,337**	**2,452**	**2,547**	**2,637**	**2,732**	**2,845**	**2,955**	**3,075**	**3,195**	**3,317**

Source: Company data, J.P. Morgan estimates.

Table 3: NAND - WSPM forecast by player by fab

Kwfpm

	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	1Q28E	2Q28E	3Q28E	4Q28E	1Q29E	2Q29E	3Q29E	4Q29E
SK hynix	**165**	**165**	**165**	**165**	**165**	**165**	**165**	**165**	**165**	**165**	**175**	**185**	**185**	**185**	**195**	**205**
Samsung	**395**	**395**	**395**	**395**	**395**	**395**	**395**	**395**	**395**	**395**	**395**	**395**	**400**	**405**	**410**	**415**
Micron	**105**	**105**	**110**	**110**	**115**	**115**	**115**	**115**	**115**	**115**	**125**	**135**	**135**	**145**	**155**	**155**
Kioxia	**400**	**410**	**420**	**420**	**430**	**430**	**430**	**435**	**440**	**440**	**440**	**440**	**450**	**450**	**450**	**450**
Solidigm	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**60**	**60**	**60**	**60**	**65**	**65**	**65**	**65**
Others (incl. China)	**160**	**160**	**160**	**170**	**180**	**190**	**205**	**205**	**205**	**220**	**220**	**235**	**250**	**265**	**280**	**280**
Global WSPM	**1,280**	**1,290**	**1,305**	**1,315**	**1,340**	**1,350**	**1,365**	**1,370**	**1,380**	**1,395**	**1,415**	**1,450**	**1,485**	**1,515**	**1,555**	**1,570**

Source: Company data, J.P. Morgan estimates.

Can memory supply surprise on the upside? Especially in 2028E?

The short answer is no. Triangulating capacity data and based on our bottom-up bit/wafer assumptions by technology nodes, we expect the possibility of memory supply growth of 30% y-y in 2028E (vs. current assumption of 25% growth, slightly behind demand growth) requires : 1) meaningful production rotation from HBM to DRAM, an additional 70-80K wfpm of additional wafer rollout on an annual basis, and significant technology acceleration pulling forward to 1dnm technology node. Based on the

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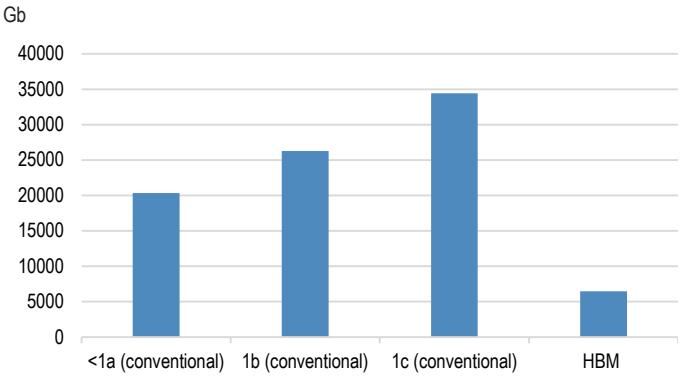
aforementioned WSPM map, we believe it is extremely physically challenging to scale up a new DRAM greenfield fab at the moment.

Growing wafer allocation to HBM is another big factor that squeezes DRAM supply growth. We currently expect HBM wafers to account for 31% of DRAM supply in 2028E vs.<20% in 2025A. We also highlight that the HBM die penalty stands at 3-4x compared to conventional DRAM, implying 3-4 conventional DRAM wafers to produce an equivalent amount of bits for HBM.

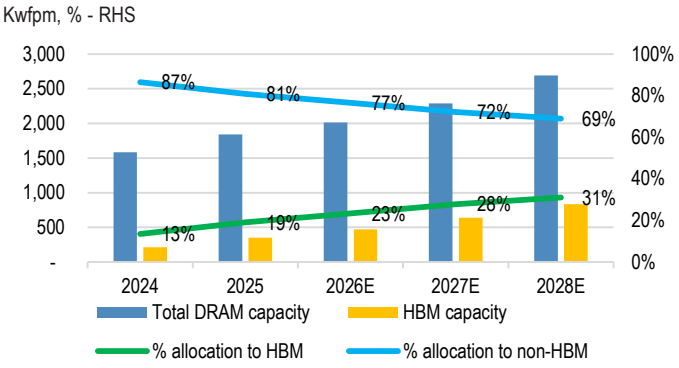
Based on our current estimates, we expect demand growth to outpace supply growth over the next two years and do not anticipate an oversupply situation as a base case scenario. This bodes well for the memory ASP trend despite the recent concerns about content optimization.

Figure 23: Memory bit/wafer assumption



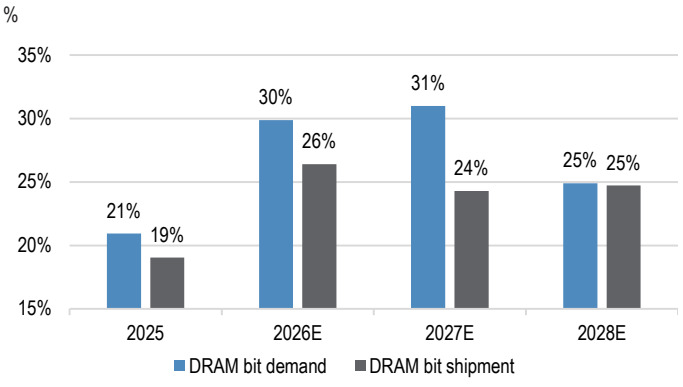
Source: J.P. Morgan estimates.

Figure 24: DRAM capacity and HBM % allocation



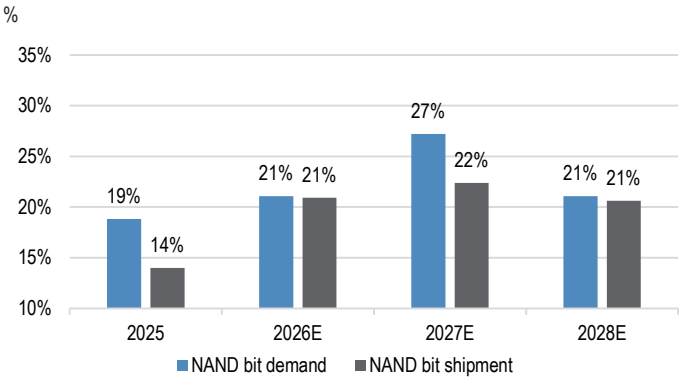
Source: Company data, J.P. Morgan estimates.

Figure 25: DRAM bit demand vs bit supply



Source: J.P. Morgan estimates.

Figure 26: NAND bit demand vs bit supply



Source: J.P. Morgan estimates.

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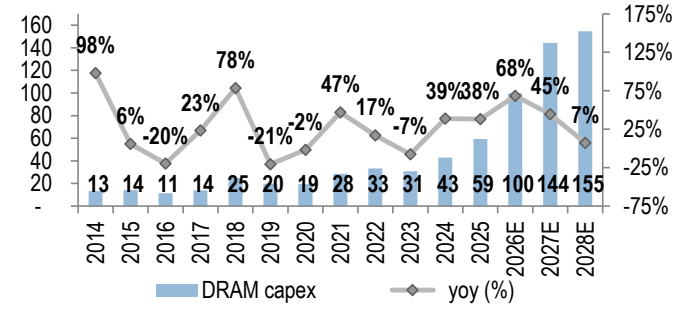
Figure 27: DRAM capex and Y/Y trend

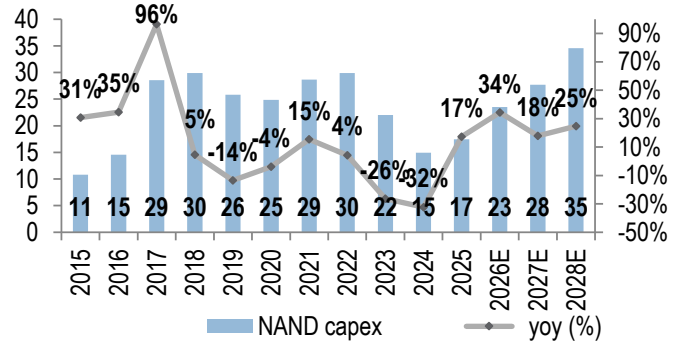
US$bn, %



Source: Company data, J.P. Morgan estimates.

Figure 28: NAND capex and Y/Y trend

US$bn, %



Source: Company data, J.P. Morgan estimates.

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Shareholder returns to catalyze re-rating

Over the past two decades, shareholder returns from memory makers didn't qualify as the core investment thesis given the negligible yield of <2%. Over the next 2-3 years, however, we expect visible shareholder returns from memory makers to catalyze a share re-rating factor underpinned by durable earnings locked in by LTA and elevated profit margins.

The current SEC and SKH shareholder return policy mandates that the company share 50% of accumulated FCF with shareholders (dividends were the primary redistribution tool over buybacks). SEC's current shareholder return program lives through 2024-26E, thus we expect a meaningful hike in shareholder returns in the form of special dividends (or share buybacks) creating a sweet 8% cash yield through 2026-27E (equivalent to a 16% yield).

For SKH, the company's shareholder return program ends in 2027E, implying that the official deadline is around late-2027. On the other hand, given stronger 2026-YTD EBITDA generation and additional cash flow from the Kioxia stake sale, we believe earlier shareholder return is currently seriously under review. Given the significant share price pullback from the peak in June, we believe share buyback would be a more effective corporate action over the special dividend program. Kioxia (¥800bn share buyback - report) has set a good example of moving ahead of peers and keeping its shareholder return policy dialogue engaged with an active stance, in our view.

Memory stocks have invariably moved in tandem with ASP trends and the degree of upward/downward EPS revisions, and we sense investors' lack of confidence in memory stocks given likely limited EPS upgrades from ASP hikes amid overloaded margins (70%+ memory OPM). We argue that this time is different, largely because of improving shareholder returns and the LTA mechanism that allows memory makers to enjoy durable and elevated earnings profiles. We foresee a 16-20% cash yield over the next two years for SEC/SKH.

Table 4: TSR yield comparison

%

	Total shareholder return yield (%) comparison						
	2025A	2026E	2027E	24A-26E	27E-29E(if 29E is flat)	27E-29E(if 29E up 20%)	27E-29E(if 29E down 70%)
SEC (ordinary)	2%	8%	8%	17%	42%	45%	32%
SK Hynix	7%	5%	17%	15%	36%	38%	29%
Kioxia	0%	4%	8%	4%	45%	49%	32%

Source: Company data, J.P. Morgan estimates. Note: Assume 50% FCF payout in 2029E.

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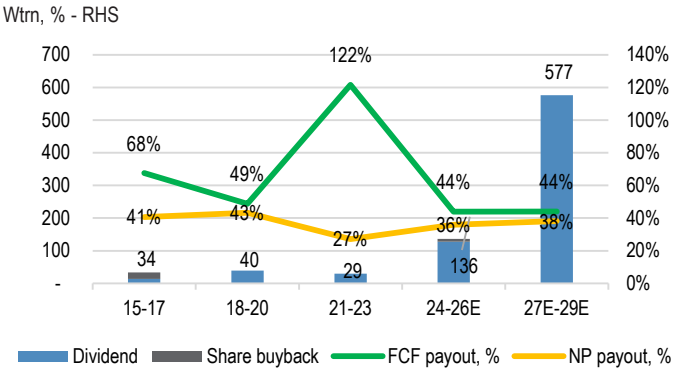
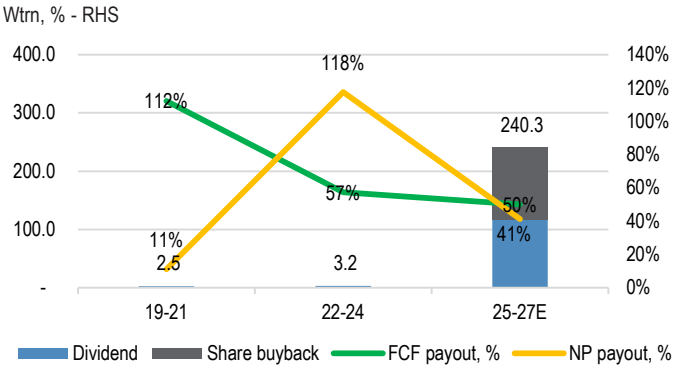
Figure 29: SEC - TSR yield



Source: Company data, J.P. Morgan estimates. Note: (1) Assume flat FCF in 2029E; (2) FCF payout to common shares in 2024-26E and 2027E-29E.

Figure 30: SKH - TSR yield



Source: Company data, J.P. Morgan estimates.

Table 5: SEC cash return sensitivity

Won bn	2024	2025	2026E	2027E	2028E
SEC FCF	21,434	34,661	253,402	379,361	466,251
Theoratical payout, %	50%	50%	50%	50%	50%
Theoratical cash return	10,717	17,331	126,701	189,681	233,126
SEC NP	34,451	45,207	299,695	441,123	535,372
Theoratical payout, %	35%	39%	42%	**30%**	**30%**
Actual cash payout, %	57%	51%	49%	35%	34%
Actual cash return	**12,223**	**17,836**	**124,690**	**132,337**	**160,612**
Dividend	9,823	11,236	124,690	132,337	160,612
Buyback	2,400	6,600	-	-	-
Cash return mix, %					
Dividend	80%	63%	**100%**	**100%**	**100%**
Buyback	20%	37%	**0%**	**0%**	**0%**
Shareholder return per share	**1,799**	**2,648**	**18,806**	**19,960**	**24,224**
Dividend (ordinary)	1,446	1,668	18,806	19,960	24,224
Dividend (preferred)	1,447	1,669	18,807	19,961	24,225
Buyback (ordinary)	353	979	-	-	-
Buyback (preferred)	353	987	-	-	-
# of shares	**6,793**	**6,736**	**6,630**	**6,630**	**6,630**
Ordinary	5,970	5,920	5,828	5,828	5,828
Preferred	823	816	802	802	802
Shareholder return yield, %	**2.6%**	**3.8%**	**8.3%**	**8.8%**	**10.7%**
Ordinary	2.0%	2.3%	8.0%	8.5%	10.3%
Preferred	2.5%	2.9%	11.1%	11.7%	14.2%
Ordinary	71,638	71,406	235,000	235,000	235,000
Preferred	58,804	57,300	170,100	170,100	170,100

Source: Company data, J.P. Morgan estimates.

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Table 6: SKH - cash return analysis

Won bn	2024	2025	2026E	2027E	2028E
SKH FCF	16,015	26,100	158,793	290,402	360,323
Theoratical payout, %	50%	50%	50%	50%	50%
Theoratical cash return	8,007	13,050	79,396	145,201	180,161
SKH NP	19,797	42,920	265,767	328,866	409,319
NP payout, %	8%	33%	21%	51%	23%
Actual cash payout, %	10%	55%	35%	58%	26%
Actual cash return	**1,547**	**14,345**	**55,806**	**167,497**	**93,629**
Dividend	1,547	2,105	26,486	94,197	49,649
Buyback	-	12,240	29,320	73,300	43,980
Cash return mix, %					
Dividend	100%	15%	47%	56%	53%
Buyback	0%	85%	53%	44%	47%
Cash return per share	**2,124**	**20,128**	**78,821**	**245,236**	**139,122**
Dividend (ordinary)	2,204	3,000	**38,000**	140,176	**75,000**
Buyback (ordinary)	-	17,444	42,067	109,079	66,436
Total number # of shares	**728**	**713**	**708**	**683**	**673**
Outstanding shares	702	702	697	672	662
Treasury shares	26	11	11	11	11
Cash yield, %	**1.2%**	**6.5%**	**5.4%**	**16.7%**	**9.5%**
Share price	179,000	309,000	1,466,000	1,466,000	1,466,000
Buyback amount (mn)			**20**	**50**	**30**
Buyback amount, %			2.8%	7.1%	4.4%

Source: Company data, J.P. Morgan estimates.

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Gleaning details on LTA

LTAs were a central point of discussion among investors, and we believe 2QCY26 results unraveled the LTA details, amount of volume/revenue coverage, and the protective mechanisms for memory makers to compensate for the pricing upside, in our view. Pricing details and ranges were vaguely guided (i.e. pricing band, differentiated pricing structures by customer/volume/applicaitons, flexible structure to capture the upside), but we walked away with the impression that the contract nature was fixed significantly in favor of memory makers. The prepayment mix out of the total LTA value (20%-25% of the LTA value as per MU and SEC) is evidence of which party had the bargaining power, in our view.

As we look into the 2H26 and 2027, we believe the missing puzzle is the impact of LTA on pricing trends (how much it will de-slope the pricing curve) and the willingness of end-customers to commit to LTA contracts, especially in the event of a memory pricing down-cycle. Unfortunately, we find the pricing impact too early to quantify given the uncertain schedule of LTA mix picking up to the guided volume coverage and how much the "flexible" pricing mix will impact the blended prices under a worsening shortage market in 2027. A relatively misunderstood element within LTA is the resilience of pricing. Majority of the LTA discussion is currently centered around server memory. CSP and AI related memory demand is likely to be the majority (over 70% of total bit demand and 85+% of total revenue) of the contract. Server memory solutions carry a significant price premium over non-server applications and we believe the LTA mix increase will be pricing/margin accretive from a mid-to-long term horizon.

Given the lack of quantitative metrics to quantify the impact of LTA and to verify the mechanism of LTA, we point to memory makers' shareholder return policy as an indirect datapoint to support our view of: 1) a multi-year memory upcycle; 2) growing role of memory in the AI value chain; and 3) ultimately a re-rating factor that proves durable and elevated memory earnings. As a result, we believe LTA and shareholder returns are very closely linked and expect memory makers' visible shareholder return policies (on top of DD% cash yield) to be a reason to accumulate the stock.

Table 7: LTA details announced across major memory makers in 2QCY26 earnings conference

As of 2QCY26	MU	SEC	SKH	US NAND maker	Kioxia
Number of Agreements	- 16 SCAs - (4 large + 3 medium customers + smaller auto)	- Finalized with top 5 global DC customers; - Final stages with 5 additional major accounts	- ~10 agreements (with key customers)	- 8 NBMs	- ~10 LTAs concluded
Volume coverage	- ~20% of DRAM volume - ~1/3 of NAND volume	- 60%-70% of total plant capacity	n.a.	- >50% of bits in FY2027; - ~2/3 of bits in FY2028	- Targeting 50% LTA volume coverage for CY2028
Revenue Coverage (when complete)	- ~50%+ of total revenue	n.a.	- Maintain an appropriate level based on market conditions - (not quantified)	- Minimum US$93.9bn total NBM revenue at floor pricing (actual expected above minimum)	n.a.
Term Length	- 5 years (DC/Consumer), 3 years (Auto)	- 5-year term, subject to annual negotiations - (rolling basis, can add additional year)	- 5 years on average - (specific conditions vary by customer/product)	Up to 5 years; Weighted average duration 4+ years	n.a.
Agreement Structure	- Take-or-pay, binding volume commitments	- Mutually binding contractual conditions; - Committed demand assurance; rolling contract-based	- Strategic partnerships beyond volume supply; - long-term volume commitments + deposits	- S-D commitments defined by year and by quarter; - Financial guarantees release toward end of each agreement	- Multiyear supply agreements; - Mutually binding contractual conditions
Price Band - Ceiling	- Current CQ2 2026 market price (existing products)	- Differentiated pricing models by customer and product	- Pricing structure will also not be uniform	Variable portion subject to ceilings (fixed + variable pricing blend)	n.a.
Price Band - Floor	- Guarantees GM above any prior cycle peak	- Minimum price floors established for mainstream products (sufficient to mitigate future investment risk)	- Range of pricing mechanisms to respond to price volatility	- Variable portion subject to floors; - Attractive (~80%) margins even at floor pricing	n.a.
Cash Deposits & Commitments	- US$22bn total ($18B cash)	- Substantial advance payments over multiyear period;	- Deposits incorporated to support contract fulfillment	- US$16.5bn financial guarantees (cash deposits + financial instruments); - mostly held by/through third-party institutions	- Financial mechanisms (e.g. deposits) incorporated
RPO/Prepayment	- US$400mn in 3QFY26; US$$10bn expected in 4QFY26	- Already received significant portion; - ~One-fourth of total received; balance expected to grow	n.a.	- US$59.8bn at quarter-end; - US$91.1bn incl. deals signed after quarter-end	n.a.
End Markets	- Data Center, Consumer, Automotive	- DRAM & NAND (AI/server-focused)	- Server DRAM, HBM, enterprise SSD (AI-focused)	- Datacenter and Edge (hyperscale/AI infrastructure)	- Data center/enterprise & hyperscale customers

Source: Company data.

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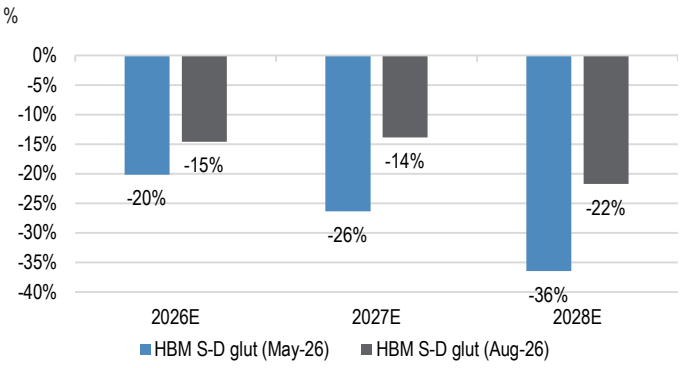
HBM: Softening shortage but still a shortage

HBM content reduction to cope with the market shortage condition

Based on our research, we picked up HBM spec downgrade signals for the NVDA-grade GPU Rubin Ultra (4 compute dies originally to 2 compute dies and the lite version adopting 8-Hi HBM4E instead of 16-Hi/12-Hi HBM4E) and the Rubin GPU (2 SKU variations with the lowest one adopting 192GB 12-Hi HBM4). We believe the primary reason is end-customers aiming to cope with the current shortage situation, a similar incident seen with SOCAMM spec downgrade (report). The HBM spec adjustment similarly calls for HBM bit demand to be cut, which carries a larger weight of negativity than positivity. We concur with both views and trim the HBM bit demand by 4-19% throughout 2026-28E to reflect conservative content assumptions. Our revision does not reflect the potential Rubin GPU demand upside from greater HBM supply availability, which remains an upside risk point.

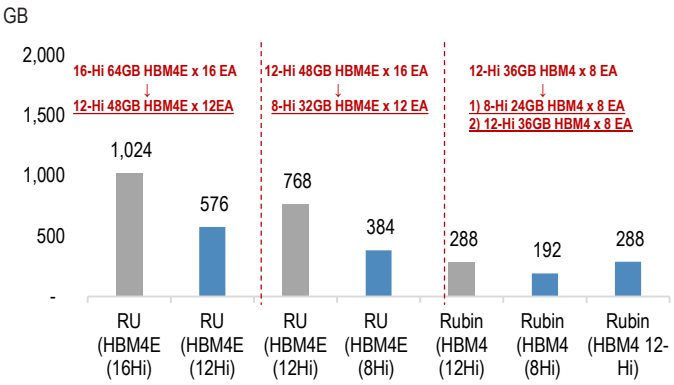
We believe the crux of the cycle comes from the supply and demand glut ratio more so than supply growth or demand cuts. After adjusting our merchant GPU/ASIC unit shipment assumptions (refer to CoWoS model update - report) along with much more conservative content assumptions (JPMe: assume 70% of SKUs adopt the downsized HBM specs for Rubin/Rubin Ultra GPU), we still see a DD% shortage across 2026-28E and see limited cracks in the HBM fundamentals that skews our view toward caution.

Figure 31: HBM S-D glut vs. May-26



Source: J.P. Morgan estimates.

Figure 32: HBM content assumption changes for NVDA grade GPU



Source: J.P. Morgan estimates.

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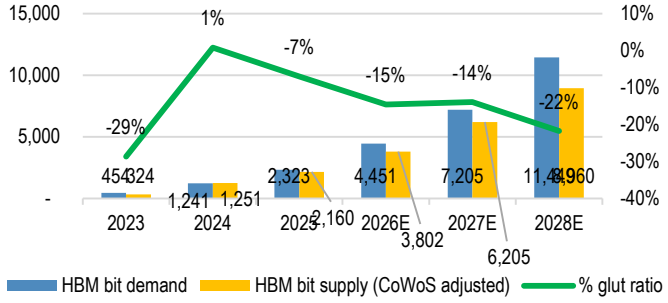
Figure 33: HBM S/D ratio (CoWoS adjusted)

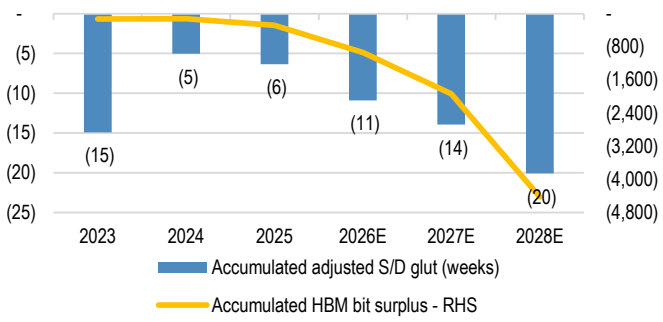
1GB equiv. Mn, % - RHS



Source: Company data, J.P. Morgan estimates.

Figure 34: Accumulated HBM bit surplus and glut ratio (weeks)

Weeks, 1GB equiv. Mn - RHS



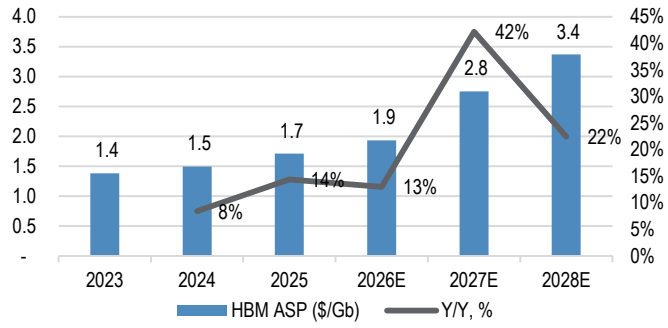
Source: Company data, J.P. Morgan estimates.

HBM ASP

We maintain our conservative HBM ASP view of blended pricing rising by 42% y-y in 2027E which we believe is far more reasonable but shy of the market's bullish expectation of 2x y-y. We project 30%-40% like-for-like HBM ASP hike with the magnitude of the hike different based on HBM performance specs (i.e. HBM4 die speed). By application, we expect the advanced HBM product generation to command a 15%-30% pricing premium vs. the previous generation (i.e. HBM4E trading at a ~20% price premium vs. HBM4 in 27E). Among the many variables that determine HBM pricing, we believe the current set-up points to individual suppliers' HBM performance (heat dissipation, die speed, etc.) and qualification status that determine pricing more so than HBM S-D. While it is too early to forecast the 2028 outlook, we conservatively assume <10% like-for-like price hikes and expect product-mix driven blended pricing growth (22% y-y growth in 2028E).

Figure 35: HBM ASP and Y/Y% trend

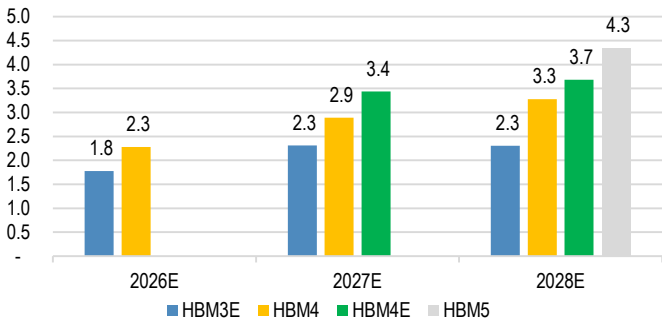
US$/Gb, % - RHS



Source: Company data, J.P. Morgan estimates.

Figure 36: HBM ASP by generation

%



Source: Company data, J.P. Morgan estimates.

HBM wallet share update

Based on SEC's smooth HBM4 progress and HBM4E roadmap, we expect SEC's HBM wallet share reaching 37-38% by 27/28E, largely in-line with SEC's target to reach HBM M/S similar to its DRAM M/S (= mid-to-high 30%). On top of a stable supply of its 12-Hi HBM4 to NVDA, SEC announced a >$200bn LTA contract with AVGO (link and report) in which we expect the majority of the contract value (90-95%) allocated to HBM for ASIC (likely TPU and other ASIC projects including OpenAI/Antrophic etc.). As a result, we expect SEC to gain M/S in both NVDA and ASIC segments. For HBM5,

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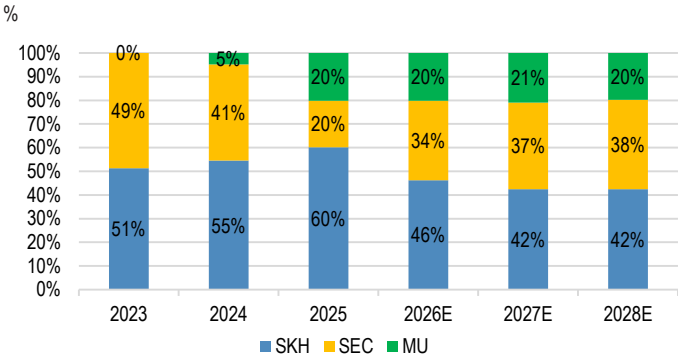
likely to be introduced in late-28E, we see memory makers taking a differentiated approach:

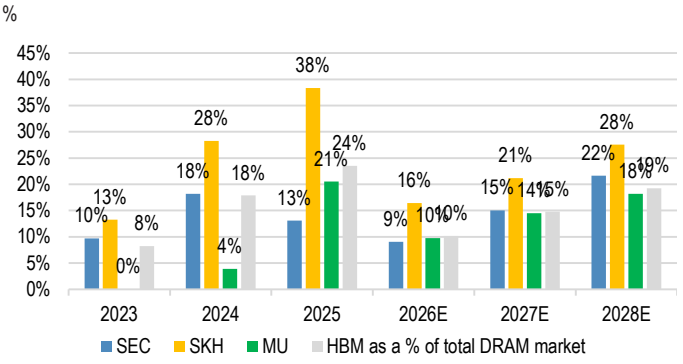
- **SEC:** Introduced HPB (Heat Path Block) architecture, a thermal management system that improves heat dissipation, and announced to adopt 2nm GAA base die for 50% faster speed vs. HBM4E (link). While distant, we expect SEC to simulatenously develop 16-HBM5 using TCB and HCB, finding the optimal solution between performance and economics.
- **SKH:** Introduced iHBM as an optimal solution for thermal management (link) and likely candidate for HBM5 product design. During the 2Q26 earnings conference, management highlighted HCB as the potential packaging solution for HBM5.
- **MU :** While uncertain, we sense limited signals from MU considering HCB as the next packaging technology for HBM5. Instead, local sources (link) highlight MU considering the Trench cooling solution (etching microscopic grooves into the silicon die and circulating cooling fluid in these channels) to improve thermal management.

Figure 37: HBM market share by sales



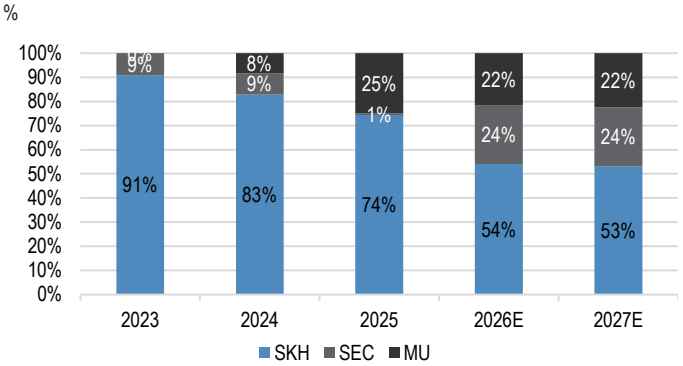
Source: Company data, J.P. Morgan estimates.

Figure 38: HBM sales mix by major players



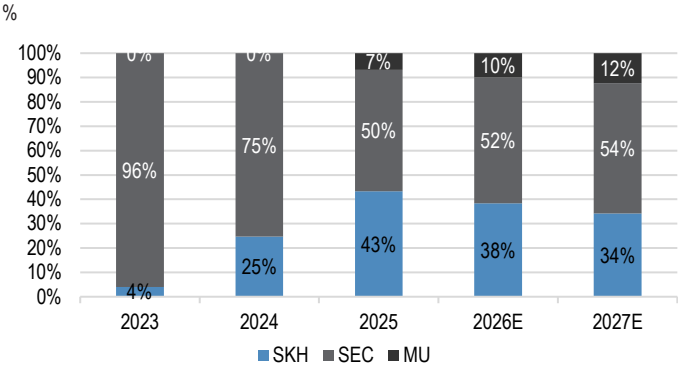
Source: Company data, J.P. Morgan estimates.

Figure 39: HBM wallet share within NVDA



Source: Company data, J.P. Morgan estimates.

Figure 40: HBM wallet share within ASIC



Source: Company data, J.P. Morgan estimates.

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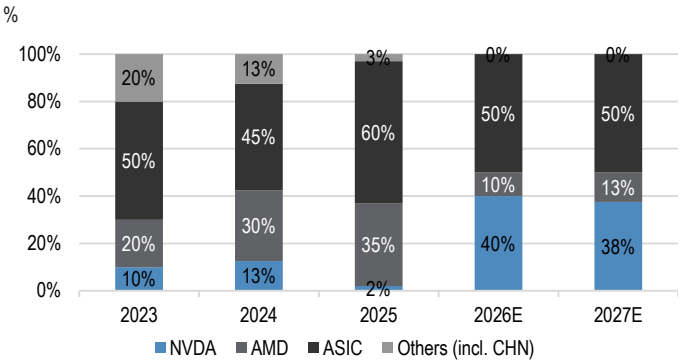
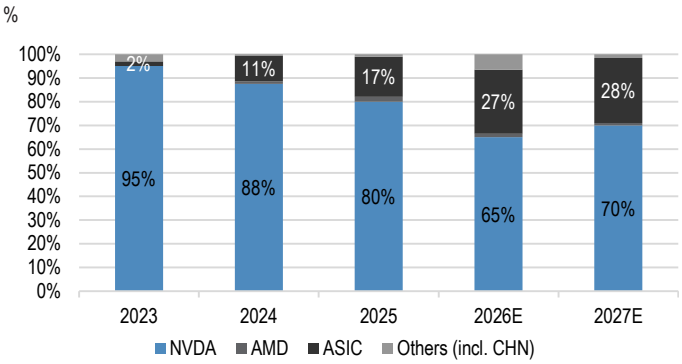
Figure 41: SEC - HBM sales mix by customers



Source: Company data, J.P. Morgan estimates.

Figure 42: SKH - HBM sales mix by customers



Source: Company data, J.P. Morgan estimates.

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HBM model assumption changes and other charts

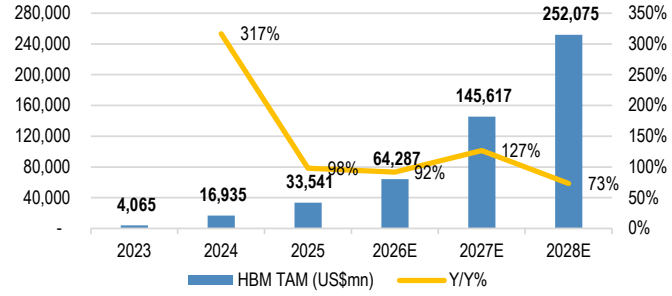
Table 8: HBM S-D estimate revision

	Revised			Previous			% difference		
	2026E	2027E	2028E	2026E	2027E	2028E	2026E	2027E	2028E
HBM bit demand (unit mn, 1GB eqv) - calendar year	**3,579**	**6,268**	**10,751**	**3,717**	**6,930**	**13,257**	**-4%**	**-10%**	**-19%**
NVDA	2,101	2,607	4,854	2,266	3,776	8,075	-7%	-31%	-40%
AMD	235	634	999	216	422	893	9%	50%	12%
Others	1,243	3,028	4,898	1,235	2,732	4,289	1%	11%	14%
HBM procurement demand (unit mn, 1GB eqv) - t+4 months	**4,451**	**7,205**	**11,449**	**4,788**	**9,039**	**13,929**	**-7%**	**-20%**	**-18%**
NVDA	2,298	3,095	5,060	2,360	3,923	8,121	-3%	-21%	-38%
AMD	358	706	1,112	236	438	911	52%	61%	22%
Others	1,796	3,404	5,276	1,404	2,683	4,426	28%	27%	19%
HBM bit supply (1GB eqv)	4,152	6,613	9,350	4,200	6,311	9,444	-1%	5%	-1%
HBM bit supply after CoWoS	**3,802**	**6,205**	**8,960**	**3,824**	**5,844**	**8,745**	**-1%**	**6%**	**2%**
CoWoS yield (%)	92%	94%	96%	91%	93%	93%	1%	1%	3%
HBM S-D glut ratio (%) : procurement year	**-15%**	**-14%**	**-22%**	**-20%**	**-35%**	**-37%**	**6%**	**21%**	**15%**
HBM S-D glut (weeks)	(7.6)	(7.2)	(11.3)	(10.5)	(18.4)	(19.4)	2.9	11.2	8.0
HBM S-D glut (weeks) - accumulated	(10.9)	(13.9)	(20.1)	(17.3)	(24.2)	(32.9)	6.4	10.2	12.8
HBM Industry revenue ($ mn)	**64,287**	**145,617**	**252,075**	**64,948**	**129,092**	**225,191**	**-1%**	**13%**	**12%**
HBM ASP (US$, 1Gb eqv)	1.9	2.8	3.4	1.9	2.6	3.0	0%	8%	13%

Source: J.P. Morgan estimates.

Figure 43: HBM TAM and Y/Y% growth

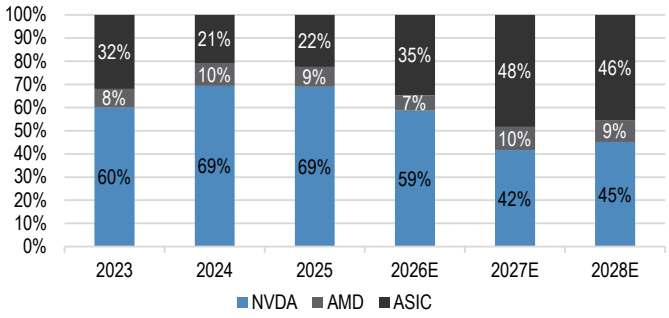
US$M, % - RHS



Source: Company data, J.P. Morgan estimates.

Figure 44: HBM bit demand breakdown by customers

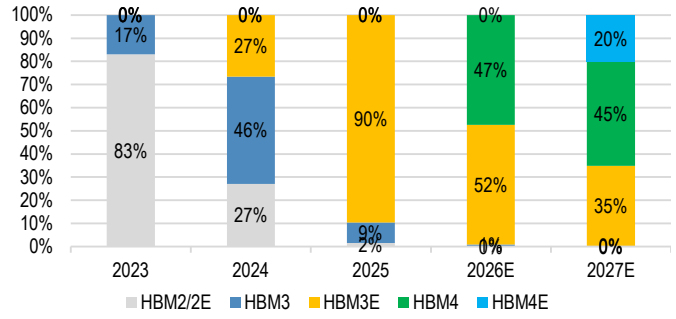
%



Source: Company data, J.P. Morgan estimates.

Figure 45: SEC - HBM sales mix by product application

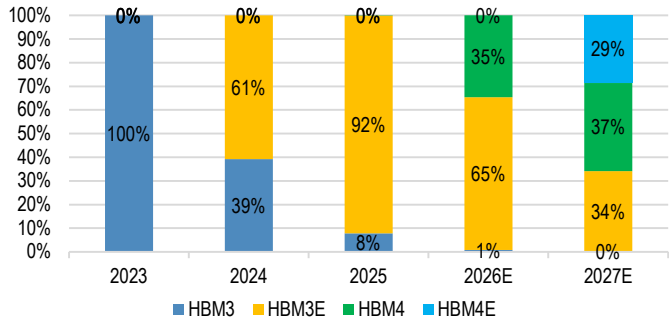
%



Source: Company data, J.P. Morgan estimates.

Figure 46: SKH - HBM sales mix by product application

%



Source: Company data, J.P. Morgan estimates.

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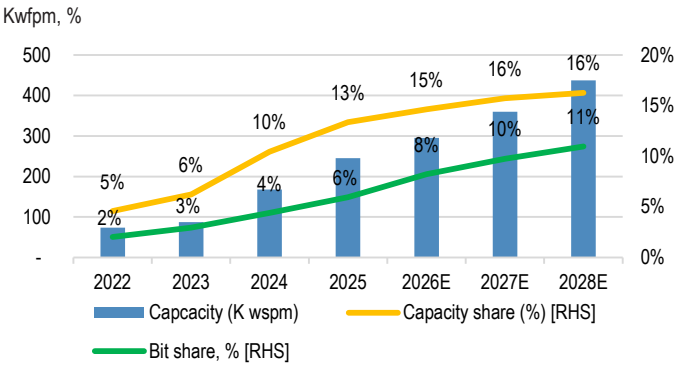
China competition update

The supply risk from Chinese competitors have lingered in the memory market for the past decade, and multiple sources highlight CXMT (Not Covered, 688825 CH) ramping capacity as high as 600K wfpm amid planning a new greenfield fab in Beijing (link). In a tight memory market situation, we believe the situation is similar for legacy DRAM makers as evidenced by the steep DDR4 spot and contract price increases. Based on our research and supply-chain checks, we expect CXMT's presence in the memory market to grow meaningfully, accounting for 16%/11% of capacity/bit share by 28E, respectively. We still see 2-3 years of technology gap between the leading memory makers that hinders from supply influx of advanced memory (i.e. High density 64GB/128GB server DRAM or HBM3E and above). Based on our estimates, we see ~60% bit/wafer discount between the leading memory makers and CXMT. We highlight CXMT's recent attempt to produce LPDDR6 and HBM should be read positively for the major memory makers given likely limited supply increase compared to manufacturing commoditized memory products.

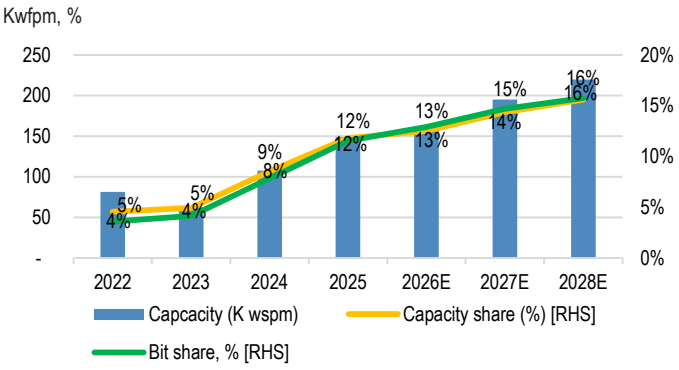
On the NAND side, our research indicates YMTC's bit/wafer is largely on par with the leading memory makers indicating limited technology gap. We expect YMTC's capacity/bit share to account for ~16% of the global supply by 2028E. This puts the risk of oversupply more in NAND vs. DRAM, on a relative basis. We expect the leading NAND makers to focus on manfuacturing high-end NAND (SLD based NAND or HBF) to widen the gap. Given the existence of US regulations, we believe YMTC's NAND will likely be for local uses. Recent news stating that YMTC is considering to manufacture DRAM (link) is a positve for the overall NAND S-D, in our view.

Figure 47: China DRAM - bit and capacity mix



Source: Company data, J.P. Morgan etsimates.

Figure 48: China NAND - bit and capacity mix



Source: Company data, J.P. Morgan estimates.

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Global memory model: Revisions

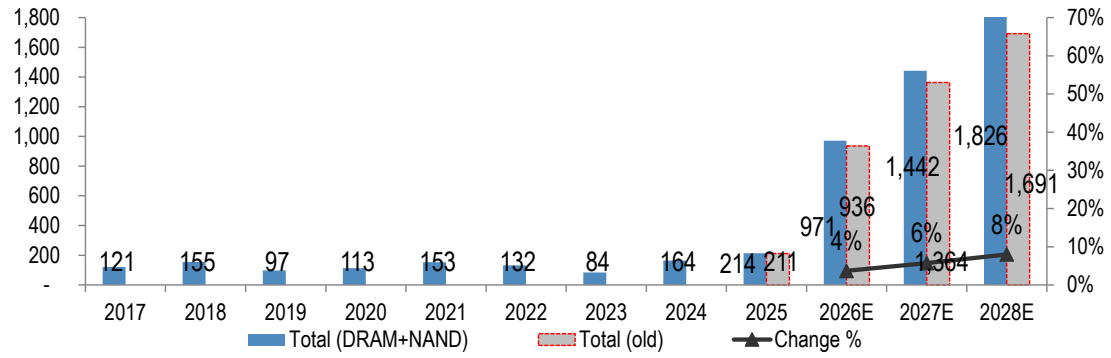
Table 9: J.P. Morgan Global Memory Model: Summary of changes

	Revised			Previous			Difference		
	2026E	2027E	2028E	2026E	2027E	2028E	2026E	2027E	2028E
Memory revenue	**970.9**	**1,441.7**	**1,826.2**	**936.3**	**1,363.6**	**1,691.3**	**4%**	**6%**	**8%**
DRAM revenue	634.1	982.9	1,310.3	636.0	970.0	1,236.8	0%	1%	6%
HBM revenue	64.3	145.6	252.1	64.9	129.1	225.2	-1%	13%	12%
NAND revenue	336.8	458.7	515.9	300.3	393.6	454.5	12%	17%	14%
Memory price									
DRAM ASP (8Gbe.)	12.4	16.0	17.2	12.9	16.0	16.7	-4%	0%	3%
HBM ASP (8Gbe.)	15.5	22.0	27.0	15.5	20.5	23.8	0%	8%	13%
NAND ASP (256Gbe.)	8.2	10.1	9.6	7.4	8.7	8.4	11%	16%	15%
Memory Consumption									
DRAM consumption (8Gbe.)	51,132	61,412	76,328	49,319	60,566	73,927	4%	1%	3%
NAND consumption (256Gbe.)	41,020	45,542	53,528	40,465	45,287	54,279	1%	1%	-1%
% growth assumption									
DRAM supply B/G	26%	24%	25%	23%	22%	24%	4%	3%	1%
NAND supply B/G	21%	22%	21%	20%	21%	21%	1%	1%	0%
DRAM ASP Y/Y%	236%	29%	7%	246%	24%	4%	-10%	5%	3%
NAND ASP Y/Y%	251%	23%	-4%	217%	17%	-4%	34%	6%	-1%
Shipments									
Desktops	63	64	66	57	57	58	10%	11%	14%
Notebooks	170	173	176	157	159	162	8%	9%	8%
Servers	15.7	19.5	22.9	15.6	18.9	21.0	1%	3%	9%
Smartphones	1,097	1,053	1,022	1,097	1,064	1,054	0%	-1%	-3%
SSDs	378	420	460	382	415	446	-1%	1%	3%
Average DRAM memory (MB)									
Desktops	10,860	10,370	10,028	10,904	10,451	10,124	0%	-1%	-1%
Notebooks	13,204	12,806	12,677	13,377	12,918	12,943	-1%	-1%	-2%
Servers	1,736,594	2,224,977	2,631,966	1,796,955	2,428,551	2,872,462	-3%	-8%	-8%
Smartphones	8,463	8,457	8,459	8,864	9,031	9,367	-5%	-6%	-10%
Average NAND memory (MB)									
SSDs	2,003,691	2,582,734	3,067,456	2,035,835	2,711,756	3,336,903	-2%	-5%	-8%
Smartphones	248,485	241,462	244,106	252,713	255,447	257,513	-2%	-5%	-5%
Supply assumptions									
DRAM (8Gbe., M)	48,689	60,552	75,596	47,138	57,379	71,035	3%	6%	6%
HBM (8Gbe., M)	4,152	6,613	9,350	4,200	6,311	9,444	-1%	5%	-1%
NAND (256Gbe., M)	37,302	45,650	55,062	37,106	44,984	54,407	1%	1%	1%
Memory capex	**123,049**	**172,113**	**189,100**	**114,882**	**151,747**	**183,297**	**7%**	**13%**	**3%**
DRAM	99,788	144,303	154,603	91,389	124,029	148,744	9%	16%	4%
NAND	23,261	27,809	34,497	23,493	27,718	34,553	-1%	0%	0%

Source: J.P. Morgan estimates.

Figure 49: Global memory market (DRAM+NAND) size and % change

US$bn, % - RHS



Source: WSTS, J.P. Morgan estimates.

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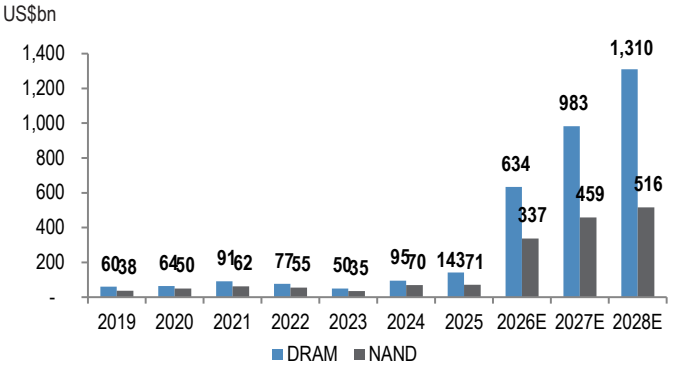
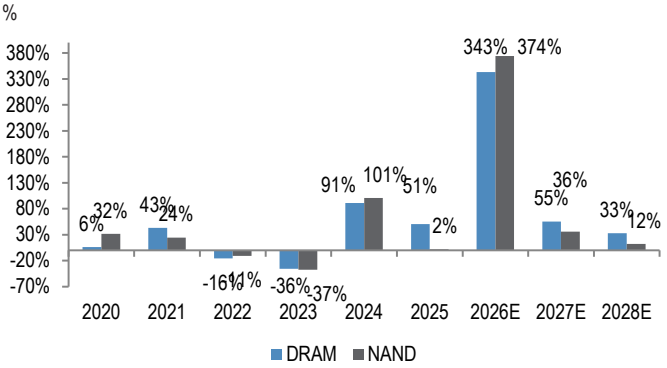
Figure 50: DRAM and NAND market size



Source: WSTS, J.P. Morgan estimates.

Figure 51: DRAM and NAND market growth rates



Source: WSTS, J.P. Morgan estimates.

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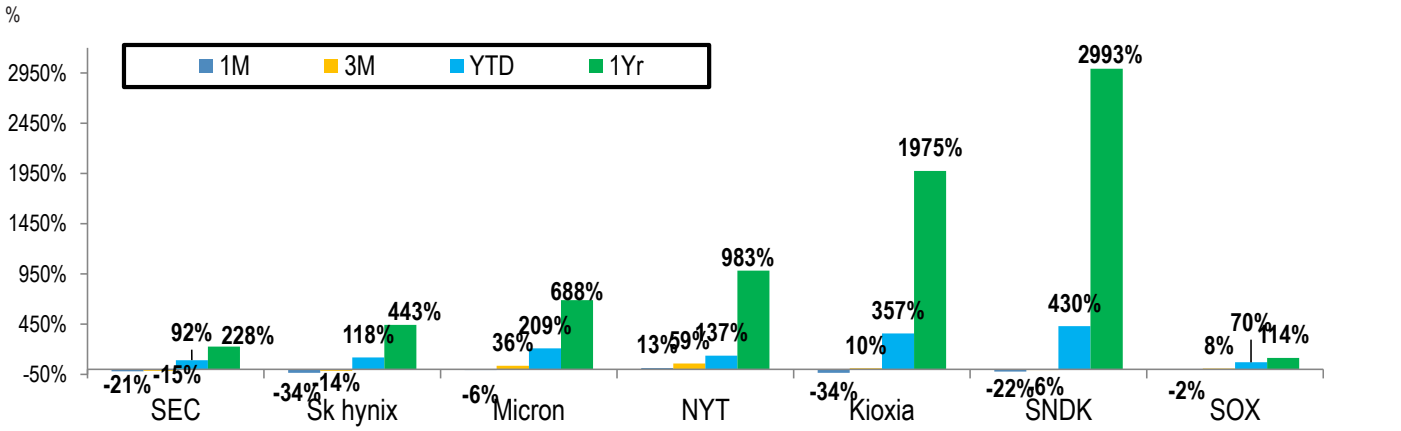
Share price related charts

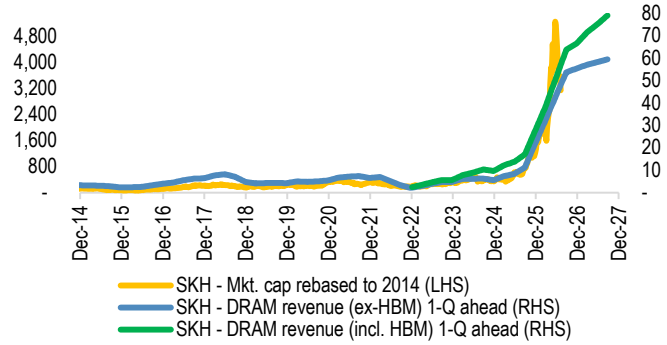
Figure 52: Global memory makers' share price performance including SOX (Philadelphia Semiconductor index)



Source: Bloomberg Finance L.P. Note: Past performance is not an indicator of future results

Figure 53: SKH market cap vs DRAM revenue comparison (1Q ahead)

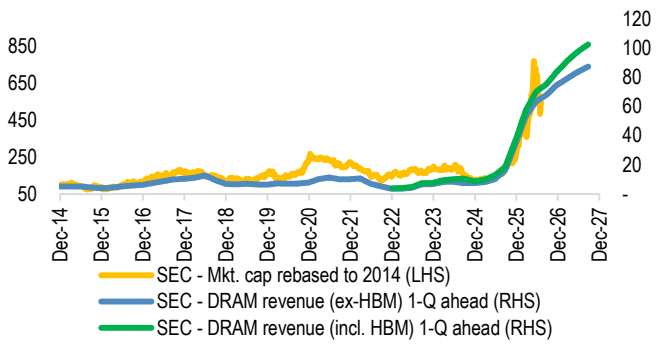
Rebased as of 1/1/2014, US$bn - RHS



Source: Company data, Bloomberg Finance L.P., J.P. Morgan estimates. Note: 3Q26 onwards are J.P. Morgan estimates.

Figure 54: SEC market cap vs DRAM revenue comparison (1Q ahead)

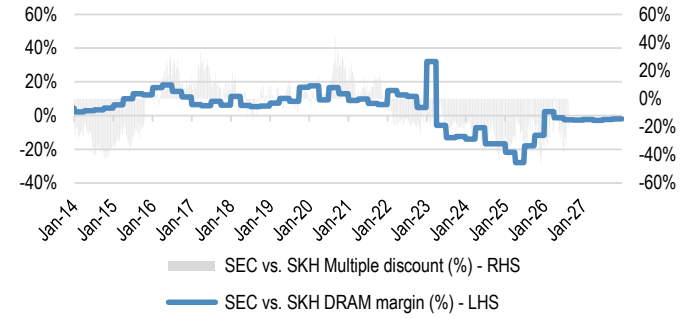
Rebased as of 1/1/2014, US$bn - RHS



Source: Company data, Bloomberg Finance L.P., J.P. Morgan estimates. Note: 3Q26 onwards are J.P. Morgan estimates.

Figure 55: SEC vs SKH: DRAM margin difference vs FTM P/B multiple discount rate

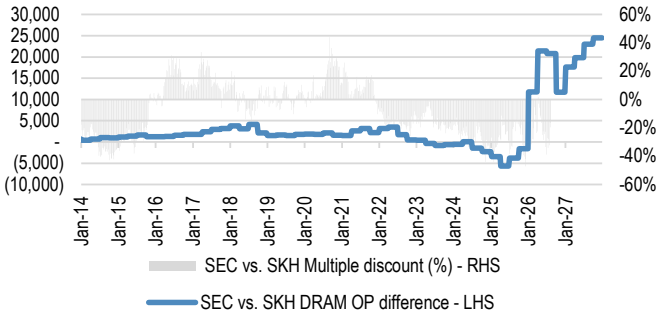
%



Source: Company data, Bloomberg Finance L.P., J.P. Morgan estimates. Note: 3Q26 onwards are J.P. Morgan estimates.

Figure 56: SEC vs SKH: absolute DRAM OP difference vs FTM P/B multiple discount rate

Wbn, % - RHS



Source: Company data, Bloomberg Finance L.P., J.P. Morgan estimates. Note: 3Q26 onwards are J.P. Morgan estimates.

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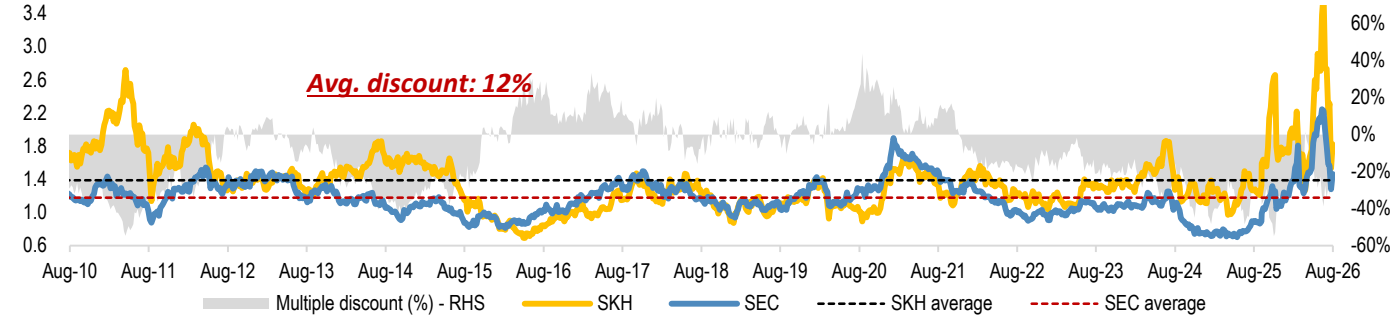
Figure 57: 12M FWD P/B multiple comparison between SKH and SEC

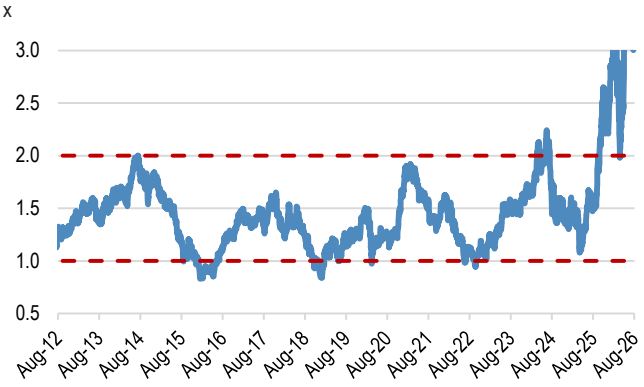
x, % - RHS



Source: Company data, Bloomberg Finance L.P., J.P. Morgan estimates.

Figure 58: Average P/B multiple for top 3 DRAM makers

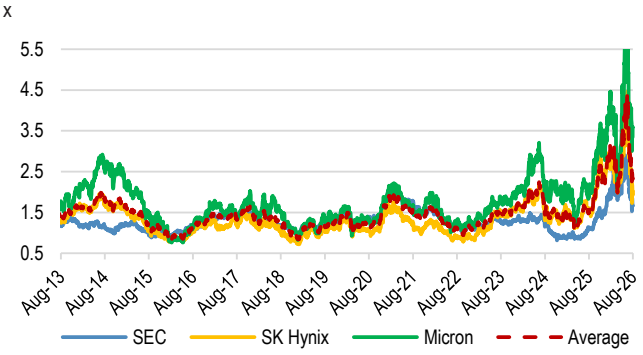
x



Source: Bloomberg Finance L.P.

Figure 59: 12M Forward P/B multiple trend for DRAM makers

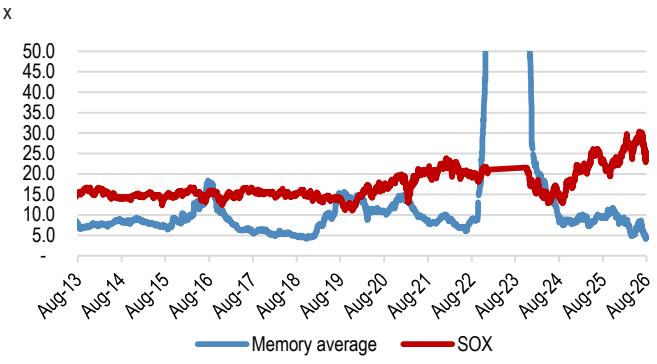
x



Source: Bloomberg Finance L.P.

Figure 60: Average P/E multiple for top 3 DRAM makers vs. SOX

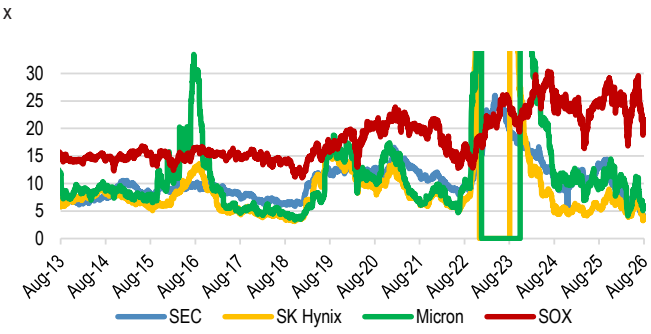
x



Source: Bloomberg Finance L.P. Note: 23/24 not meaningful from loss making.

Figure 61: 12M Forward P/E multiple trend for DRAM makers vs. SOX

x



Source: Bloomberg Finance L.P. Note: 23/24 not meaningful from loss making.

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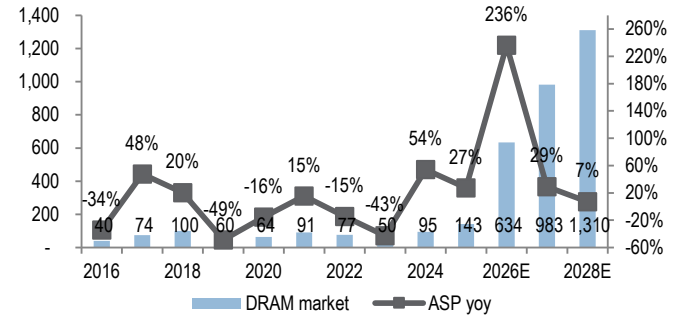
DRAM update

Figure 62: DRAM market revenue and ASP YoY change

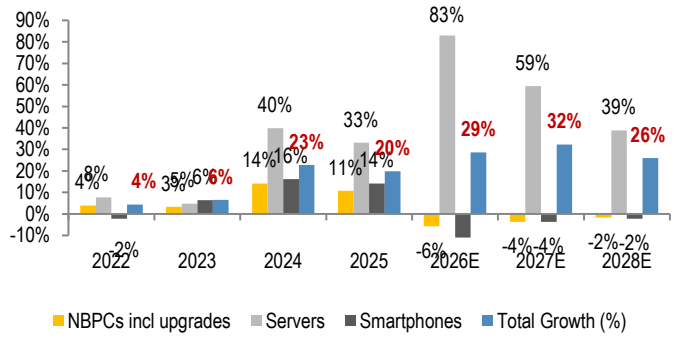
US$bn, %



Source: WSTS, J.P. Morgan estimates

Figure 63: DRAM bit demand growth Y/Y by key applications

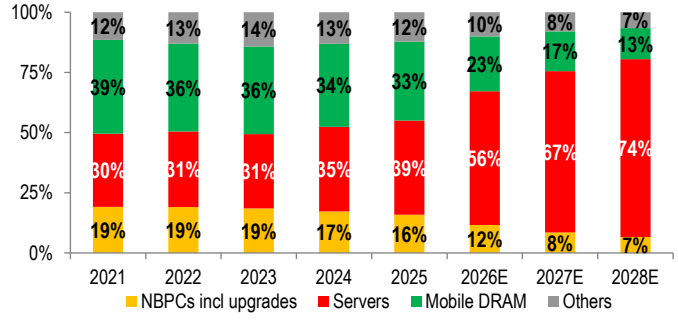
%



Source: Gartner®, IDC, OMDIA, J.P. Morgan estimates. Note: Server includes HBM.

Figure 64: DRAM bit demand mix

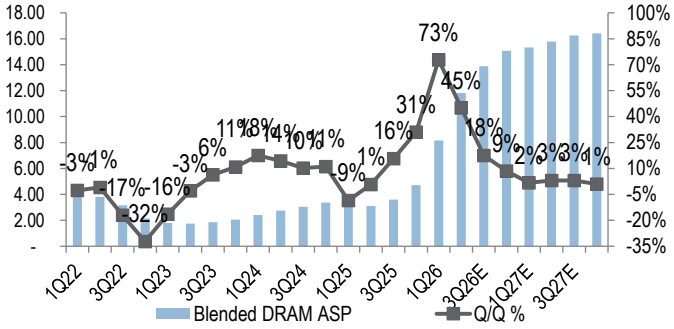
%



Source: Gartner®, J.P. Morgan estimates.

Figure 65: Blended quarterly DRAM ASP and Q/Q trend

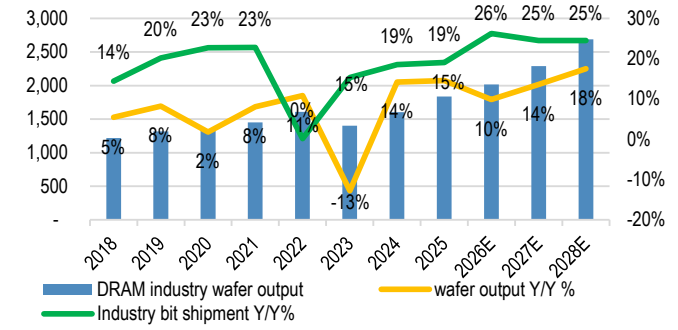
ASP stated in 8Gb eq. ($), %



Source: WSTS, J.P. Morgan estimates.

Figure 66: DRAM WSPM and bit shipment Y/Y% trend

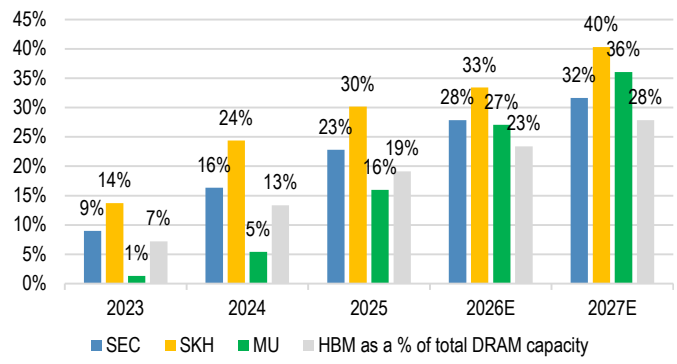
Kwfpm, % - RHS



Source: Company data, OMDIA, J.P. Morgan estimates.

Figure 67: HBM % capacity mix by players and industry

%



Source: Company data, J.P. Morgan estimates.

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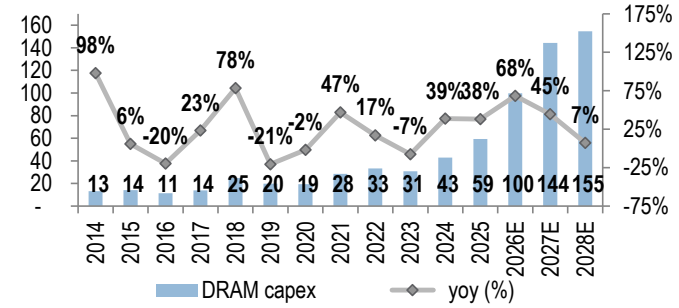
Figure 68: DRAM capex and Y/Y trend

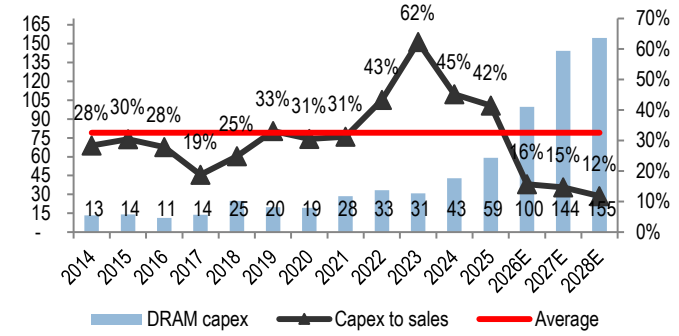
US$bn, %



Source: Company data, J.P. Morgan estimates.

Figure 69: DRAM capital intensity

US$bn, %



Source: Company data, J.P. Morgan estimates.

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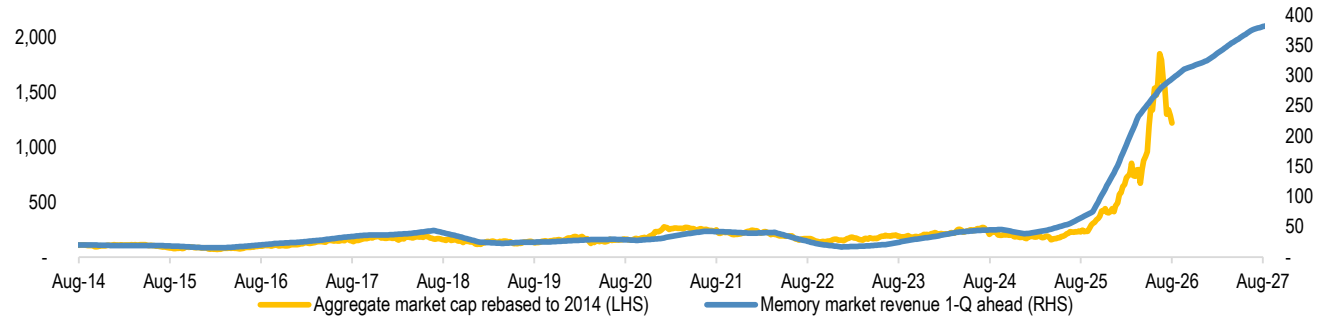
Memory market cap vs key financial indicators

Figure 70: Aggregate market cap vs leading memory market revenue trend (1Q ahead)

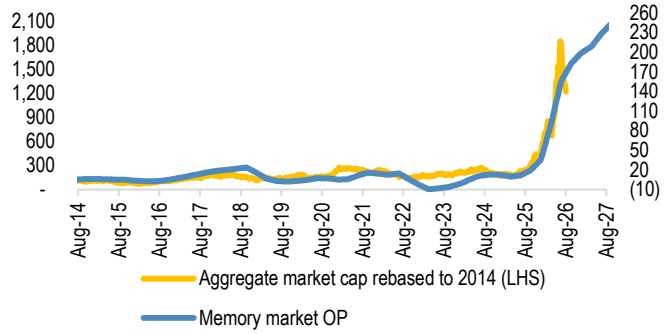
Rebased as of 1/1/2014, US$bn-RHS



Source: WSTS, Bloomberg Finance L.P., J.P. Morgan estimates. Note: Market cap includes SEC, SK Hynix, Micron, Nanya Technology, Western Digital. Kioxia / SNDK added from 1Q25 and excluded WDC. Note: 3Q26 onwards are J.P. Morgan estimates.

Figure 71: Aggregate market cap vs. memory industry absolute OP

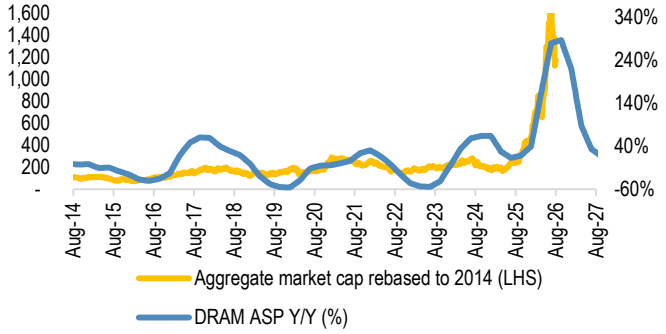
Rebased as of 1/1/2014, US$bn-RHS



Source: WSTS, OMDIA, Bloomberg Finance L.P., J.P. Morgan estimates. Note: Market cap includes SEC, SK Hynix, Micron, Nanya Technology, Western Digital. Kioxia / SNDK added from 1Q25 and excluded WDC. Note: 3Q26 onwards are J.P. Morgan estimates.

Figure 72: Aggregate market cap vs. DRAM ASP Y/Y change

Rebased as of 1/1/2014, % - RHS



Source: WSTS, Bloomberg Finance L.P., J.P. Morgan estimates. Note: Market cap includes SEC, SK Hynix, Micron, Nanya Technology. Note: 3Q26 onwards are J.P. Morgan estimates.

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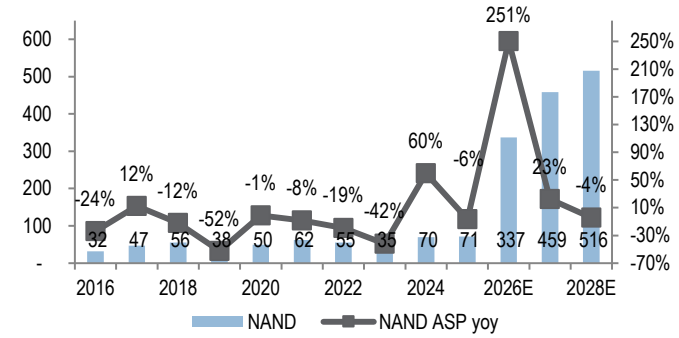
NAND update

Figure 73: NAND market revenue and ASP YoY change

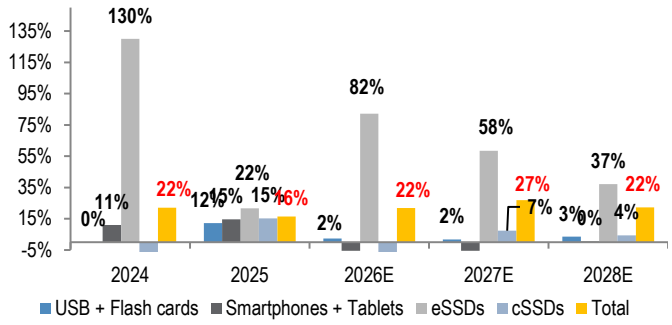
US$bn, %



Source: WSTS, J.P. Morgan estimates.

Figure 74: NAND demand growth Y/Y by key application

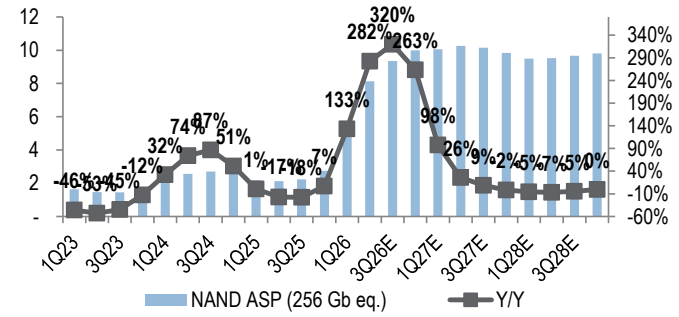
%



Source: OMDIA, WSTS, J.P. Morgan estimates.

Figure 75: NAND quarterly pricing trend and Y/Y trend

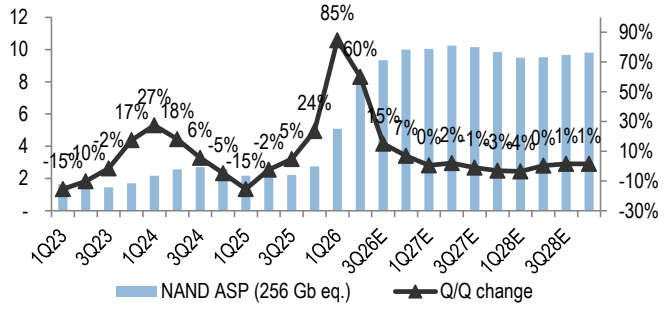
ASP stated in 256Gb eq. ($), %



Source: WSTS, J.P. Morgan estimates.

Figure 76: NAND quarterly pricing trend and Q/Q trend

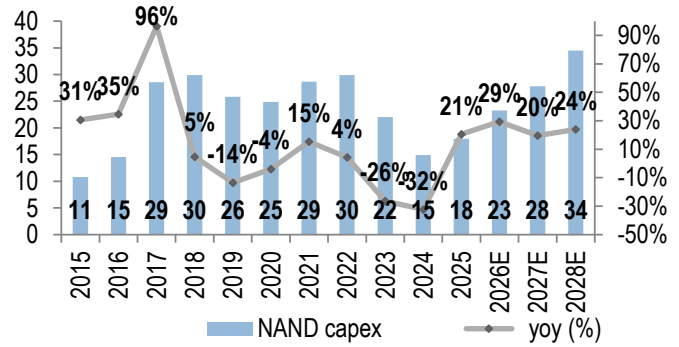
ASP stated in 256Gb eq. ($), %



Source: WSTS, J.P. Morgan estimates.

Figure 77: NAND capex and Y/Y trend

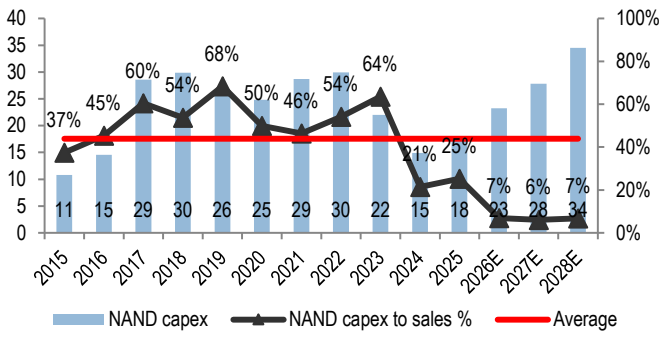
US$bn, %



Source: Company data, J.P. Morgan estimates.

Figure 78: NAND capital intensity

US$bn, %



Source: Company data, J.P. Morgan estimates. Note: Average from 2011-23.

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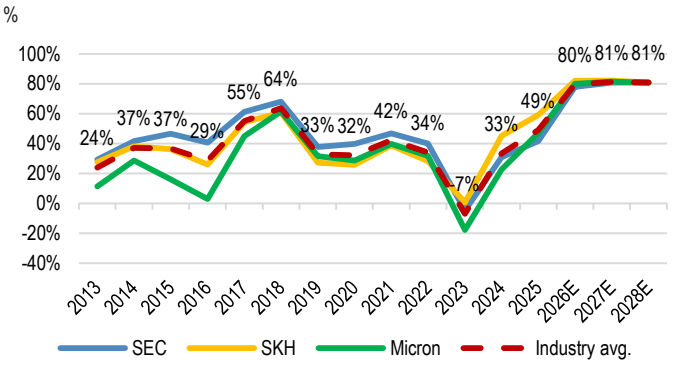
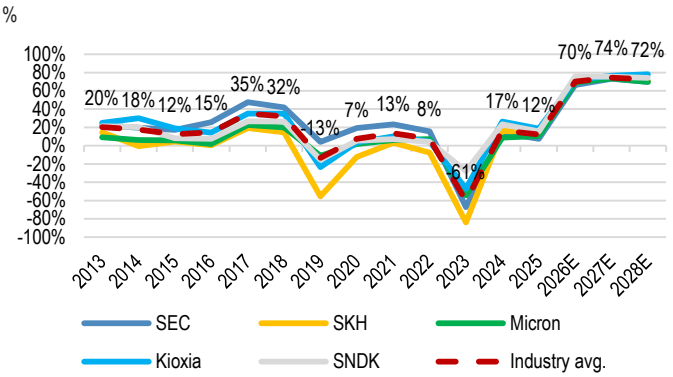
Memory OPM and spot price trend

Figure 79: DRAM OPM trend



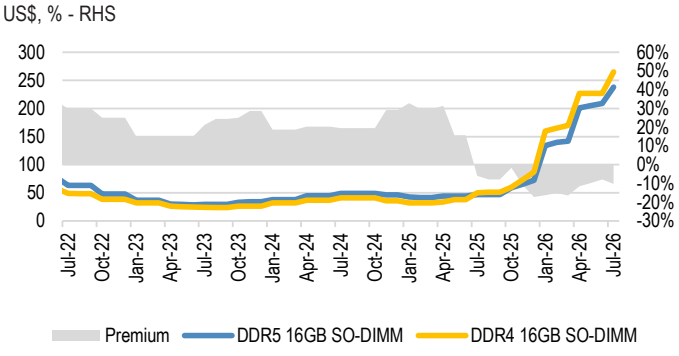
Source: OMDIA, company data, J.P. Morgan estimates.

Figure 80: NAND OPM trend



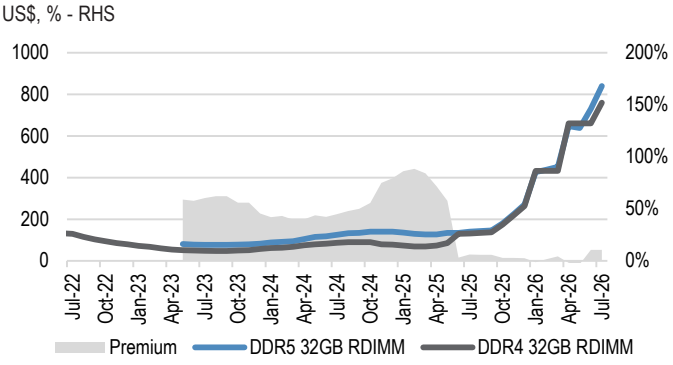
Source: OMDIA, company data, J.P. Morgan estimates.

Figure 81: DDR5 vs DDR4 SO-DIMM price trend



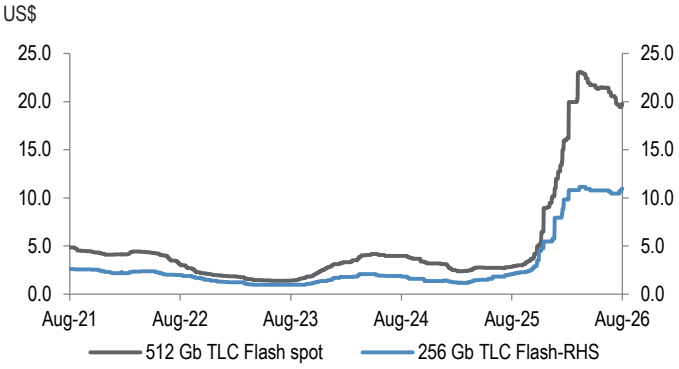
Source: Company data.

Figure 82: DDR5 vs DDR4 RDIMM price trend



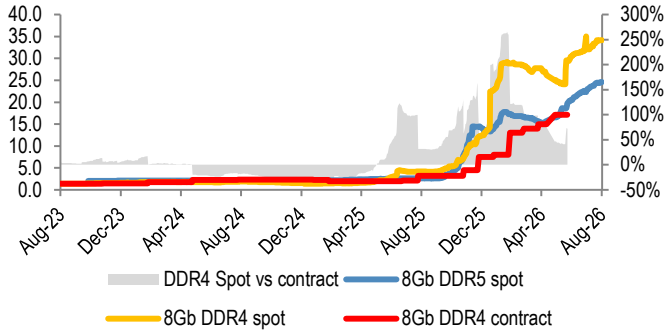
Source: Company data.

Figure 83: NAND spot price trend



Source: Bloomberg Finance L.P.

Figure 84: 8Gb DDR4 spot vs contract price trend



Source: Bloomberg Finance L.P.

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Appendix

Global DRAM model

Table 10: Global DRAM supply-demand model

8Gb. equivalent

	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	2024	2025	2026E	2027E	2028E
Total demand (M units)	**8,213**	**8,961**	**10,077**	**10,661**	**10,595**	**11,734**	**13,053**	**13,852**	**14,795**	**15,603**	**16,600**	**17,493**	**31,350**	**37,912**	**49,235**	**64,491**	**80,551**
Sequential growth (%)	-3%	9%	12%	6%	-1%	11%	11%	6%	7%	5%	6%	5%	22%	21%	29.9%	31.0%	24.9%
Y/Y growth (%)	16%	18%	23%	26%	29%	31%	30%	30%	40%	33%	27%	26%					
Total supply (M units)	**7,926**	**9,461**	**10,404**	**10,709**	**11,056**	**11,868**	**12,634**	**13,130**	**13,876**	**14,776**	**15,602**	**16,298**	**32,341**	**38,500**	**48,689**	**60,552**	**75,596**
Sequential growth (%)	-3%	19%	10%	3%	3%	7%	6%	4%	6%	6%	6%	4%	19%	19%	26.5%	24.4%	24.8%
Y/Y growth (%)	3%	15%	26%	31%	39%	25%	21%	23%	26%	25%	23%	24%					
Consumption (WSTS)	**8,027**	**9,357**	**10,382**	**10,916**	**11,751**	**12,628**	**13,229**	**13,525**	**14,120**	**15,000**	**15,819**	**16,473**	**32,669**	**38,682**	**51,132**	**61,412**	**76,328**
Sequential growth (%)	-3%	17%	11%	5%	8%	7%	5%	2%	4%	6%	5%	4%	24%	18%	32.2%	20.1%	24.3%
Y/Y growth (%)	3%	12%	25%	32%	46%	35%	27%	24%	20%	19%	20%	22%					
Inventory build-up	**(101)**	**103**	**23**	**(207)**	**(695)**	**(759)**	**(595)**	**(395)**	**(245)**	**(223)**	**(217)**	**(175)**	**-**	**-**	**-**	**-**	**-**
Cumulative inventory	1,784	1,888	1,910	1,703	1,008	249	(346)	(740)	(985)	(1,209)	(1,426)	(1,601)	1,885	1,703	(740)	(1,601)	(2,333)
Sufficiency ex inventory (%)	-1%	1%	0%	-2%	-6%	-6%	-4%	-3%	-2%	-1%	-1%	-1%	-1.0%	-0.5%	-4.8%	-1.4%	-1.0%
Sufficiency (%)	**5.2%**	**5.3%**	**4.7%**	**3.4%**	**0.7%**	**-1.0%**	**-1.8%**	**-2.1%**	**-2.2%**	**-2.4%**	**-2.6%**	**-2.7%**	**4.8%**	**3.9%**	**-6.2%**	**-4.0%**	**-4.0%**
Inventory weeks	2.8	2.9	2.8	2.3	1.3	0.3	(0.4)	(0.8)	(1.0)	(1.2)	(1.3)	(1.4)					
DRAM Revenues (US$, M)	**24,773**	**29,104**	**37,352**	**51,478**	**95,772**	**149,232**	**184,482**	**204,637**	**216,853**	**237,269**	**257,736**	**271,071**	**94,764**	**142,707**	**634,123**	**982,929**	**1,310,328**
Sequential growth (%)	-11%	17%	28%	38%	86%	56%	24%	11%	6%	9%	9%	5%	91%	51%	344%	55%	33%
Y/Y growth (%)	32%	27%	49%	85%	287%	413%	394%	298%	126%	59%	40%	32%					
DRAM ASP ($)	**3.09**	**3.11**	**3.60**	**4.72**	**8.15**	**11.82**	**13.95**	**15.13**	**15.36**	**15.82**	**16.29**	**16.46**	**2.90**	**3.69**	**12.40**	**16.01**	**17.17**
Sequential growth (%)	-9%	1%	16%	31%	73%	45%	18.0%	8.5%	1.5%	3.0%	3.0%	1.0%	54%	27%	236%	29%	7%
Y/Y growth (%)	28%	13%	19%	40%	164%	280%	288%	221%	88%	34%	17%	9%					
	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	2024	2025	2026E	2027E	2028E
Consumption vs. Demand	2%	-4%	-3%	-2%	-10%	-7%	-1%	2%	5%	4%	5%	6%	-4%	-2%	-4%	5%	6%
Consumption vs. Supply	-1%	1%	0%	-2%	-6%	-6%	-4%	-3%	-2%	-1%	-1%	-1%	-1%	0%	-5%	-1%	-1%

Source: WSTS, J.P. Morgan estimates, Gartner®.

Table 11: DRAM demand model

8Gb. equivalent (millions)

8Gb. Eq. Millions	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	1Q28E	2Q28E	3Q28E	4Q28E	2024	2025	2026E	2027E	2028E
PC DRAM	**1,446**	**1,381**	**1,403**	**1,341**	**1,220**	**1,280**	**1,449**	**1,420**	**1,254**	**1,276**	**1,407**	**1,345**	**5,332**	**5,905**	**5,571**	**5,369**	**5,282**
Desktop	158	162	167	179	132	147	173	192	146	153	168	182	617	732	666	644	649
Notebooks	564	524	569	535	449	493	636	588	495	509	625	549	2,050	2,354	2,192	2,167	2,177
Upgrades + Other EDP	724	695	667	627	640	640	640	640	614	614	614	614	2,665	2,819	2,713	2,558	2,456
Server	**5,063**	**6,046**	**7,388**	**8,060**	**9,606**	**10,185**	**10,981**	**11,576**	**13,479**	**14,423**	**14,964**	**15,939**	**10,911**	**14,520**	**26,557**	**42,348**	**58,806**
AI server (incl. SOCAMM)	726	893	1,231	1,199	2,165	2,148	2,347	2,544	3,579	3,729	3,645	4,040	844	1,685	4,049	9,204	14,993
GP Server	3,615	4,314	5,086	5,691	6,143	6,581	6,998	7,219	7,914	8,533	8,986	9,422	8,816	10,674	18,705	26,941	34,856
HBM	723	839	1,071	1,170	1,298	1,455	1,637	1,813	1,985	2,161	2,333	2,477	1,251	2,161	3,803	6,203	8,957
Mobile DRAM	**2,708**	**2,568**	**2,807**	**2,781**	**2,625**	**2,504**	**2,663**	**2,665**	**2,510**	**2,470**	**2,643**	**2,609**	**10,683**	**12,201**	**10,863**	**10,458**	**10,233**
Others	**1,085**	**1,188**	**1,239**	**1,303**	**1,136**	**1,241**	**1,295**	**1,361**	**1,191**	**1,298**	**1,355**	**1,424**	**4,070**	**4,526**	**4,815**	**5,033**	**5,269**
Consumer Electronics	446	516	524	546	451	521	529	551	455	526	534	557	1,830	1,984	2,032	2,052	2,073
Automotive Electronics	244	237	252	259	273	266	282	290	306	297	316	325	675	859	992	1,111	1,244
Industrial Electronics	329	352	374	397	342	366	389	413	356	380	405	429	1,280	1,370	1,452	1,510	1,570
Military/Civil Aerospace	67	83	89	101	71	88	94	107	75	93	100	113	285	314	340	360	382
Total	**10,302**	**11,183**	**12,838**	**13,484**	**14,588**	**15,210**	**16,389**	**17,022**	**18,435**	**19,467**	**20,369**	**21,318**	**30,997**	**37,152**	**47,807**	**63,209**	**79,590**

Source: Gartner®, J.P. Morgan estimates.

Table 12: DRAM supply model

8Gb. equivalent (millions)

	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	1Q28E	2Q28E	3Q28E	4Q28E	2024	2025	2026E	2027E	2028E
SK hynix	2,242	2,795	3,013	3,028	3,014	3,240	3,583	3,989	4,111	4,245	4,397	4,569	4,955	5,279	5,482	5,639	8,933	11,077	13,827	17,322	21,354
Samsung	3,200	3,552	4,102	4,185	4,304	4,713	4,940	4,924	5,347	5,638	5,947	6,197	6,598	6,896	7,219	7,489	13,890	15,039	18,881	23,130	28,202
Micron	1,950	2,313	2,369	2,400	2,538	2,606	2,707	2,800	2,830	3,087	3,304	3,440	3,747	3,856	3,992	4,129	7,375	9,031	10,651	12,661	15,724
Nanya	92	152	192	216	203	203	193	182	187	191	196	251	273	279	303	328	421	652	782	825	1,183
Winbond	43	53	55	57	70	68	77	85	89	93	117	122	105	110	138	144	129	208	300	421	497
Powerchip	44	50	54	54	53	60	64	64	64	72	77	77	77	86	93	93	167	202	242	290	348
Others (incl. China)	355	546	620	770	873	978	1,070	1,085	1,247	1,450	1,563	1,642	1,729	2,046	2,216	2,298	1,425	2,291	4,007	5,903	8,288
Total	**7,926**	**9,461**	**10,404**	**10,709**	**11,056**	**11,868**	**12,634**	**13,130**	**13,876**	**14,776**	**15,602**	**16,298**	**17,484**	**18,551**	**19,441**	**20,120**	**32,341**	**38,500**	**48,689**	**60,552**	**75,596**

Source: OMDIA, company data, J.P. Morgan estimates.

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Table 13: DRAM capex by company

US$ mn

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	3,600	3,851	6,818	7,162	5,204	6,522	8,705	4,294	10,034	17,314	28,503	37,972	48,671
Samsung	3,882	6,018	11,819	7,291	9,204	14,008	13,652	16,702	19,083	19,824	32,834	46,853	49,301
Micron	2,100	2,800	4,400	4,000	3,250	5,000	5,626	3,300	5,500	13,300	26,360	38,800	39,200
Nanya	693	961	669	178	286	400	695	428	505	431	2,278	6,329	1,582
Winbond	79	250	273	304	267	349	1,415	445	537	208	633	633	633
Powerchip	40	50	357	250	188	200	230	180	180	150	180	216	216
Others (incl. China)	-	-	500	550	1,000	2,000	3,000	5,500	7,000	8,000	9,000	13,500	15,000
Total	**11,294**	**13,930**	**24,836**	**19,735**	**19,399**	**28,479**	**33,323**	**30,849**	**42,839**	**59,226**	**99,788**	**144,303**	**154,603**
Change (%)	**-20%**	**23%**	**78%**	**-21%**	**-2%**	**47%**	**17%**	**-7%**	**39%**	**38%**	**68%**	**45%**	**7%**

Source: OMDIA, company data, J.P. Morgan estimates

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Global NAND model

Table 14: Global NAND supply-demand model

256 Gb. equivalent

256Gb. Eq. (units in millions)	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	1Q28E	2Q28E	3Q28E	4Q28E	2024	2025	2026E	2027E	2028E
Demand	**6,342**	**7,189**	**8,274**	**8,786**	**8,510**	**9,115**	**9,530**	**9,880**	**10,549**	**11,373**	**12,278**	**12,912**	**13,395**	**13,963**	**14,593**	**15,091**	**25,746**	**30,591**	**37,035**	**47,112**	**57,043**
Sequential change (%)	-7%	13%	15%	6%	-3%	7%	5%	4%	7%	8%	8%	5%	4%	4%	5%	3%	20%	19%	21.1%	27.2%	21.1%
Y/Y change (%)	9%	16%	20%	29%	34%	27%	15%	12%	24%	25%	29%	31%	27%	23%	19%	17%			*0.1%*	*4.8%*	*0.5%*
Supply	**6,216**	**7,670**	**8,426**	**8,534**	**8,555**	**9,034**	**9,545**	**10,167**	**10,564**	**11,096**	**11,764**	**12,226**	**12,389**	**13,229**	**14,184**	**15,259**	**27,060**	**30,845**	**37,302**	**45,650**	**55,062**
Sequential change (%)	-8%	23%	10%	1%	0%	6%	6%	7%	4%	5%	6%	4%	1%	7%	7%	8%	14%	14%	20.9%	22.4%	20.6%
Y/Y change (%)	-7%	14%	23%	26%	38%	18%	13%	19%	23%	23%	23%	20%	17%	19%	21%	25%			(266)	1,462	1,981
Consumption	**6,254**	**7,317**	**8,120**	**8,652**	**9,603**	**10,345**	**10,396**	**10,675**	**10,768**	**11,206**	**11,691**	**11,878**	**11,816**	**12,781**	**13,885**	**15,046**	**27,836**	**30,343**	**41,020**	**45,542**	**53,528**
Sequential change (%)	-10%	17%	11%	7%	11%	8%	0%	3%	1%	4%	4%	2%	-1%	8%	9%	8%	26%	9.0%	35.2%	11.0%	17.5%
Y/Y change (%)	-9%	4%	15%	25%	54%	41%	28%	23%	12%	8%	12%	11%	10%	14%	19%	27%					
Inventory build-up	(38)	352	306	(118)	(1,048)	(1,311)	(851)	(508)	(203)	(111)	73	348	574	449	299	213	-	502	-	108	1,535
Cumulative inventory build up	3,757	4,109	4,416	4,297	3,249	1,938	1,088	579	376	265	339	687	1,261	1,709	2,008	2,222	3,795	4,297	579	687	2,222
Sufficiency (ex inventory)	-1%	5%	4%	-1%	-11%	-13%	-8%	-5%	-2%	-1%	1%	3%	5%	4%	2%	1%	-3%	2%	-9%	0%	3%
Sufficiency (incl. inventory)	**14.9%**	**15.2%**	**14.5%**	**12.1%**	**5.7%**	**1.5%**	**0.6%**	**0.2%**	**0.4%**	**0.3%**	**0.9%**	**2.2%**	**3.9%**	**4.2%**	**4.2%**	**4.0%**	**10.8%**	**15.8%**	**-7.7%**	**1.7%**	**7.0%**
Inventory weeks	7.4	7.8	7.9	7.2	5.1	2.9	1.6	0.8	0.5	0.3	0.4	0.8	1.4	1.8	2.0	2.1					
NAND revenues (US$, M)	**13,626**	**15,558**	**18,077**	**23,815**	**48,786**	**84,087**	**97,175**	**106,770**	**108,233**	**114,895**	**118,662**	**116,943**	**112,264**	**121,733**	**134,238**	**147,643**	**69,691**	**71,077**	**336,818**	**458,733**	**515,878**
Sequential change (%)	-23%	14%	16%	32%	105%	72%	16%	10%	1%	6%	3%	-1%	-4%	8%	10%	10%	101%	2%	374%	36%	12%
Y/Y change (%)	-8%	-14%	-5%	34%	258%	440%	438%	348%	122%	37%	22%	10%	4%	6%	13%	26%					
NAND ASP (256Gb. Eq.)	**2.18**	**2.13**	**2.23**	**2.75**	**5.08**	**8.13**	**9.35**	**10.00**	**10.05**	**10.25**	**10.15**	**9.85**	**9.50**	**9.52**	**9.67**	**9.81**	**2.50**	**2.34**	**8.21**	**10.07**	**9.64**
Sequential change (%)	-15%	-2%	5%	24%	85%	60%	15.0%	7.0%	0.5%	2.0%	-1.0%	-3.0%	-3.5%	0.3%	1.5%	1.5%	60%	-6%	251%	23%	-4%
Y/Y change (%)	1%	-17%	-18%	7%	133%	282%	320%	263%	98%	26%	9%	-2%	-5%	-7%	-5%	0%					

	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	1Q28E	2Q28E	3Q28E	4Q28E	2024	2025	2026E	2027E	2028E
Demand vs. Consumption	1%	-2%	2%	2%	-11%	-12%	-8%	-7%	-2%	1%	5%	9%	13%	9%	5%	0%	-8%	1%	-10%	3%	7%
Supply vs. Consumption	-1%	5%	4%	-1%	-11%	-13%	-8%	-5%	-2%	-1%	1%	3%	5%	4%	2%	1%	-3%	2%	-9%	0%	3%
Demand vs. Supply	2%	-6%	-2%	3%	-1%	1%	0%	-3%	0%	3%	4%	6%	8%	6%	3%	-1%	-5%	-1%	-1%	3%	4%

Source: OMDIA, company data, J.P. Morgan estimates

Table 15: NAND demand model

256 Gb. equivalent (millions)

NAND demand (256Gb. Eq., M)	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	1Q28E	2Q28E	3Q28E	4Q28E	2024	2025	2026E	2027E	2028E
USB	151	162	166	161	156	164	166	166	160	166	164	167	167	172	170	174	564	639	652	657	683
Flash cards	151	156	137	142	157	160	141	145	160	163	147	150	163	166	153	156	529	586	603	620	639
SSDs	**3,096**	**3,767**	**4,300**	**5,172**	**4,966**	**5,686**	**6,188**	**6,267**	**7,108**	**7,975**	**8,766**	**9,276**	**9,811**	**10,556**	**11,102**	**11,575**	**13,769**	**16,335**	**23,107**	**33,125**	**43,046**
Enterprise SSD	1,531	1,990	2,322	3,091	3,549	3,934	4,309	4,488	5,572	6,164	6,672	7,391	8,158	8,661	8,953	9,628	7,344	8,934	16,280	25,798	35,401
Client SSD/Others	1,565	1,776	1,978	2,080	1,416	1,752	1,879	1,779	1,536	1,812	2,095	1,886	1,653	1,896	2,149	1,947	6,424	7,400	6,827	7,328	7,645
Smartphones	**1,881**	**1,886**	**2,387**	**2,606**	**2,147**	**2,019**	**2,036**	**2,119**	**1,960**	**1,777**	**1,971**	**2,135**	**2,084**	**1,844**	**1,855**	**2,067**	**7,607**	**8,761**	**8,321**	**7,843**	**7,850**
Tablets	200	225	245	256	191	212	217	223	181	201	214	221	188	209	223	230	850	926	843	817	850
Feature phones	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	8	9	8	8	8
Others	614	639	658	693	674	699	711	749	731	758	771	812	793	823	839	886	2,310	2,603	2,832	3,072	3,340
Total	**6,095**	**6,836**	**7,895**	**9,032**	**8,293**	**8,942**	**9,460**	**9,670**	**10,302**	**11,042**	**12,035**	**12,764**	**13,207**	**13,773**	**14,345**	**15,091**	**25,636**	**29,858**	**36,366**	**46,144**	**56,415**

Source: IDC, Gartner®, J.P. Morgan estimates

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Table 16: NAND supply model

256 Gb. equivalent (millions)

NAND supply (256Gb. Eq., M)	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26E	4Q26E	1Q27E	2Q27E	3Q27E	4Q27E	1Q28E	2Q28E	3Q28E	4Q28E	2024	2025	2026E	2027E	2028E
SK hynix	854	1,447	1,388	1,547	1,377	1,562	1,602	1,682	1,749	1,819	1,892	1,929	1,968	2,086	2,253	2,388	4,749	5,236	6,222	7,389	8,695
Samsung	1,821	2,304	2,522	2,295	2,479	2,491	2,691	2,906	2,964	3,083	3,206	3,334	3,401	3,537	3,749	4,049	9,194	8,942	10,567	12,587	14,736
Micron	767	959	920	985	1,010	1,071	1,124	1,163	1,222	1,283	1,347	1,407	1,478	1,537	1,614	1,703	2,974	3,630	4,368	5,259	6,331
Kioxia	1,141	1,144	1,555	1,617	1,459	1,500	1,643	1,782	1,818	1,872	1,985	2,064	2,064	2,229	2,452	2,648	4,738	5,456	6,384	7,739	9,393
US NAND maker	903	956	1,070	1,090	1,110	1,260	1,285	1,285	1,362	1,444	1,531	1,623	1,623	1,736	1,892	1,978	3,286	4,020	4,940	5,960	7,229
Solidigm																	-	-	-	-	-
Others (incl. China)	730	860	970	1,000	1,120	1,150	1,201	1,349	1,450	1,595	1,804	1,868	1,856	2,104	2,224	2,494	2,120	3,560	4,819	6,717	8,678
Total	**6,216**	**7,670**	**8,426**	**8,534**	**8,555**	**9,034**	**9,545**	**10,167**	**10,564**	**11,096**	**11,764**	**12,226**	**12,389**	**13,229**	**14,184**	**15,259**	**27,060**	**30,845**	**37,302**	**45,650**	**55,062**

Source: OMDIA, company data, J.P. Morgan estimates

Table 17: NAND capex by company

US$ mn

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	1,400	4,072	7,569	4,632	3,303	4,268	5,733	1,936	1,463	1,548	2,818	3,252	5,734
Samsung	4,744	11,948	6,364	6,605	9,494	10,931	9,677	8,798	5,652	5,483	5,784	6,993	8,042
Micron	3,100	2,700	4,996	3,981	3,500	4,700	5,000	3,000	3,000	3,500	4,300	5,000	7,600
Solidigm	1,600	2,500	2,763	2,951	405	480	-	-	-	-	-	-	-
Kioxia + US NAND mal	3,700	4,850	5,200	5,500	5,800	5,800	6,000	5,300	2,300	3,450	5,059	5,565	6,121
Others (incl. China)		2,500	3,000	2,180	2,350	2,500	3,500	3,000	2,500	4,000	5,300	7,000	7,000
Total	**14,544**	**28,570**	**29,891**	**25,849**	**24,852**	**28,679**	**29,910**	**22,034**	**14,914**	**17,981**	**23,261**	**27,809**	**34,497**

Source: OMDIA, Company data, J.P. Morgan estimates.

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Companies Discussed in This Report (all prices in this report as of market close on 07 August 2026, unless otherwise indicated)
KIOXIA Holdings (285A)(285A.T/¥47,730/OW), Micron Technology(MU/$877.57/OW), Nanya Technology(2408.TW/NT $457.00/OW), SK hynix(000660.KS/W1,416,000/OW), Samsung Electronics(005930.KS/W231,000/OW), Winbond(2344.TW/NT$163.50/OW)

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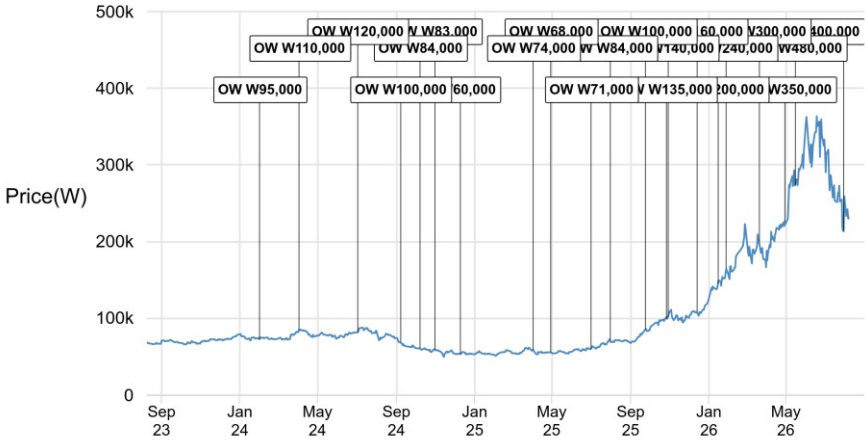
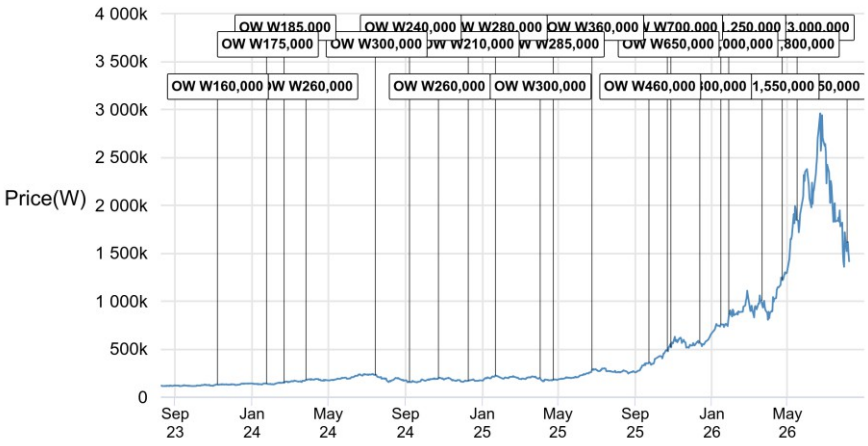
Samsung Electronics (005930.KS, 005930 KS) Price Chart



Source: Bloomberg Finance L.P. and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Oct 09, 2011. All share prices are as of market close on the previous business day.

Date	Rating	Price (W)	Price Target (W)
01-Feb-24	OW	72700	95,000
03-Apr-24	OW	85000	110,000
03-Jul-24	OW	81800	120,000
08-Sep-24	OW	68900	100,000
08-Oct-24	OW	61000	84,000
31-Oct-24	OW	59100	83,000
10-Dec-24	N	53400	60,000
03-Apr-25	OW	58800	74,000
30-Apr-25	OW	55800	68,000
02-Jul-25	OW	60200	71,000
01-Aug-25	OW	71400	84,000
25-Sep-25	OW	85400	100,000
27-Oct-25	OW	98900	135,000
30-Oct-25	OW	101700	140,000
14-Dec-25	OW	108500	160,000
16-Jan-26	OW	145000	200,000
29-Jan-26	OW	164300	240,000
22-Mar-26	OW	199800	300,000
30-Apr-26	OW	226500	350,000
17-May-26	OW	273500	480,000
30-Jul-26	OW	214000	400,000

SK hynix (000660.KS, 000660 KS) Price Chart



Source: Bloomberg Finance L.P. and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Dec 31, 2000. All share prices are as of market close on the previous business day.

Date	Rating	Price (W)	Price Target (W)
07-Nov-23	OW	133000	160,000
25-Jan-24	OW	141500	175,000
22-Feb-24	OW	149000	185,000
28-Mar-24	OW	181200	260,000
16-Jul-24	OW	230000	300,000
08-Sep-24	OW	156400	240,000
24-Oct-24	OW	196000	260,000
10-Dec-24	OW	168900	210,000
23-Jan-25	OW	225500	280,000
03-Apr-25	OW	197900	300,000
24-Apr-25	OW	181000	285,000
25-Jun-25	OW	278500	360,000
24-Sep-25	OW	361000	460,000
23-Oct-25	OW	481000	650,000
29-Oct-25	OW	519000	700,000
14-Dec-25	OW	571000	800,000
16-Jan-26	OW	756000	1,000,000
29-Jan-26	OW	862000	1,250,000
22-Mar-26	OW	1006000	1,550,000
23-Apr-26	OW	1220000	1,800,000
17-May-26	OW	1848000	3,000,000
05-Aug-26	OW	1609000	2,750,000

The chart(s) show J.P. Morgan's continuing coverage of the stocks; the current analysts may or may not have covered it over the entire period.
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IB clients**	83%	80%	73%
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