Memory Market Update

3Q26 results wrap and 4Q26/2027 outlook; our thoughts on memory share prices

Technology - Semiconductors

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Overall, our impression from memory makers' 3Q26 results has a positive bias (EPS/margin beat against F/X headwinds, pricing upside, successful HBM price negotiation, and volume delivery). There were a few company-specific disappointments (e.g. SEC's lack of imminent shareholder return and Kioxia's weak CY4Q26 guidance); however, we view this to be temporary (SEC's shareholder return catalyst should be back in Jan-2027 and Kioxia's CY1Q27 growth should be above seasonal and ahead of peers). While end demand signals continue to be mixed between B2B (steady hyperscaler's AI capex spending growth with consensus upward revisions for next year) and B2C (PC/Mobile facing greater challenges), we believe that bottom-up memory S&D fundamentals should continue to be very solid through 2028E.

- **DRAM - Fundamentals keep surprising on the upside.** In 3Q26, DRAM prices once again surprised on the upside, driving mild beats across the board (DRAM ASP up 23% Q/Q vs. our expectation of high-teens - 20% up Q/Q). Incremental surprise was in the 4Q bit-guidance with memory makers guiding DD% Q/Q increase and the industry likely exiting 2026 with high-20% y-y B/G. Memory makers began shipping HBM4 and guided to HBM4 bit/revenue crossover in 3Q26/4Q26E but more importantly guided to narrowing profitability vs. conventional DRAM heading into 2027E upon successful price negotiation. We have been guiding that an aggressive HBM ASP increase could be a double edged sword (stronger memory earnings vs. demand destruction) but believe smooth negotiation across the board implies largely manageable risk at the end customers (JPMe: +96% HBM ASP increase in 27E). Memory makers have unanimously voiced demand outstripping supply beyond 2027 (some guiding 2027 memory is de-facto sold-out), and we believe such guidance should provide relief once earnings begin to prove resilience amidst the market's AI funding and sustainability concerns.

Figure 1: DRAM - 3Q26A key metrics, 4Q guidance, and industry outlook

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DRAM	3Q26A B/G (Q/Q)	3Q26A ASP (Q/Q)	4Q26E bit guidance	26 vs. 25 (y/y)	Industry outlook
SEC	Low-to-mid %	~20% Q/Q	+Mid-to-high-10%	~+30%	Tight through 2028
SKH	~+10%	+High-20% Q/Q	+Mid-20% Q/Q (1cnm, M15X ramp)	~+30%	Achievable demand +mid-20%; shortage through 2030
MU (Aug-Qtr)	+MSD%	+High-10%	n/a	~+20%	Expect DRAM bit shipment to grow low-20% in CY27/28 Tight through 28; >75% of FY27 committed
Industry	+6%	+23%	+mid-teens%	~+27%	

Source: Company data. J.P. Morgan estimates for the implied annual B/G after penciling-in the 4Q guidance

Table 1: HBM - 3Q26A key metrics, 4Q guidance, industry outlook

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HBM	3Q26A	4Q26E	Industry outlook
SEC	HBM4 sales >3x Q/Q; ~60% of HBM4 revenue; HBM share = DRAM share	HBM4 > HBM3E in bit/revenue; M15X at full capacity by YE	2027 HBM sold out; In-house 4nm base die
SKH	HBM4 volume shipment began; yields above plan	Higher HBM4 and server sales	Volume/pricing finalized; profit gap vs. conventional DRAM narrows
MU	HBM revenue grew faster than company total	Ramp across more customers	Majority of 27 HBM bits contracted at significantly higher prices; HBM4E volume in CY27

Source: Company data

- **NAND - No signs of a downcycle in the near-term.** Contrary to market belief

See page 8 for analyst certification and important disclosures, including non-US analyst disclosures.

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on NAND entering a price downcycle as early as 4Q26E, citing inventory buildup and China capacity addition, we believe the NAND industry fundamentals are resilient without signs of price cuts/downcycles in the near-term. While we acknowledge the genuine price growth deceleration, we believe Kioxia's December-quarter guidance miss is due to company-specific issues (pull-ins in Sep-Q and push-outs to March-Q). We sense a diverging NAND industry B/G outlook (MU guiding as high as mid-20% B/G in 27E vs. SKH guiding high-teens%) and we believe this is largely due to differences in capacity ramp timing. Structurally speaking, the KV-cache offload driven eSSD demand is ongoing and we believe cost-efficient NAND solutions will continue to gain interest from CSP customers for AI model optimization. Of note, based on our checks, we believe China NAND makers are mostly focused on manfaucturing consumer-related applications and see limited threat to the international eSSD demand.

Table 2: NAND - 3Q26A key metrics, 4Q guidance, outlook

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NAND	3Q26A B/G (Q/Q)	3Q26A ASP (Q/Q)	4Q26E bit guidance	26 vs. 25 (y/y)	Industry outlook
SEC	+MSD%	+high-10%	+Mid-10%	+18%	NAND to be undersupplied
SKH	Slightly down	+mid-20%	+MSD%	+17%	Achievable demand: high-teens%
MU (Aug-Qtr)	~+10%	~+30%	+single-digit% growth	+24%	Expect CY27/28 NAND bit shipment to grow ~mid-20%
Kioxia	Low-to-mid 10%	~+mid-20%	flat Q/Q	+17%	2027 sold-out; supply deficit; 50% LTA target
SNDK	Low-to-mid 10%	+HSD%	volume/price up q/q	+7%	Multi-year customer agreements
Industry	+7%	+7%	+7%	~+17%	

Source: Company data, J.P. Morgan estimates for the implied annual B/G after penciling-in the 4Q guidance.

- **LTA coverage expanding across memory makers.** We believe investors' attention on LTAs has somewhat subsided as investors worry about the memory cycle as early as in 27. Ironically, 3Q26 earnings marked every memory maker guiding 2027 as part of the LTA contracts with a greater number of customers (i.e. SEC/SKH have both expanded the LTA customer scope) with a few contracts extended beyond 2030. Broadly speaking, memory makers guide at least 50%+ LTA coverage scope in 27/28 and we believe SEC is the most proactive in LTAs highlighting 60-70% LTA coverage scope by 2030.

Figure 2: LTA details update (as of 3Q26A)

As of 3QCY26	MU	SEC	SKH	SNDK	Kioxia
Number of Agreements	- 26 SCAs signed to date (vs. 2Q: 16 SCA) - Visibility extended to 2031 for two agreements	- 10 signed, 10 more negotiating.	- ~14 key customers incl. major CSPs	- 8 NBMs	- ~10 LTAs concluded
Volume coverage	n.a. (2Q: ~20% of DRAM volume / ~1/3 of NAND)	- Target 60%-70% of capacity by 2030 / HBM sold out in 27	- >50% of 27/28 capacity - Aims to keep ~50%+ over the medium term	- >50% of bits in FY2027; - ~2/3 of bits in FY2028	- >1/3 of FY27 bits under contract - Targeting 50% LTA volume coverage for CY2028
Revenue Coverage (when complete)	- ~35% of revenue by 2030 - Ultimate ambition still ~50% of revenue through 2030	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	- SCAs signed into 2031 (vs. 2Q 5 years (DC/Consumer), 3 years (Auto))	- 5-year term, subject to annual negotiations - (rolling basis, can add additional year)	- 5 years on average - extensions under discussion	Up to 5 years; Weighted average duration 4+ years	Up to 5 years
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
Incremental in 3Q		- More LTA customers; HBM sold out in 27 with target prices.	- +4 customers; DRAM/HBM effectively sold-out through 29		- Guiding 2027 is sold out

Source: Company data.

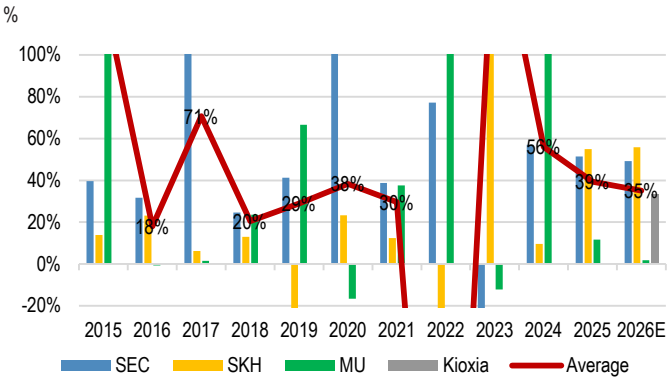
- **2026E TSR ranking: SKH > SEC > Kioxia in Asia, more commentary from SNDK over MU.** Heading into 3Q26 result season, investors have been increasingly scrutinizing shareholder return plans, demanding higher payout ratios on the back of resilient earnings. Our order of preference in the Asian memory space on shareholder return execution is as follows: 1) SKH (TSR surprise on the upside of W100T in 26E which was pleasantly followed up after lifting the shareholder return pool from <50% to >50% FCF); 2) SEC (sticking to its ~50% FCF payout and W90-W110T return in FY26E, albeit with limited surprises of lifting the total pool in 3Q26A earnings conference); and 3) Kioxia (meeting the minimum investors expectations through dividend but with unclear definition of 100% excess cash and lack of an imminent buyback, in our view). From the U.S. memory space (both stocks covered by Harlan Sur), SNDK has announced a TSR nearing ~88% of FCF in CY3Q, albeit the absolute size is minute compared to Asian memory suppliers. Lastly, MU shared little information on share buyback/dividend

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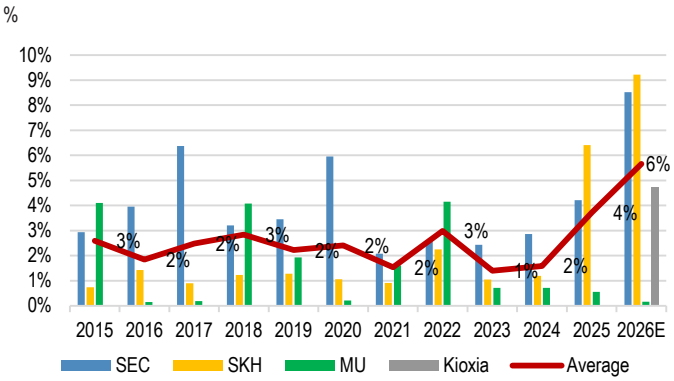
payout policy due to the CHIPS Act. We believe TSR will continue to act as an important barometer for valuation multiples and view SKH as the company that is executing the most smoothly.

Figure 3: FCF payout across major memory makers



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

Figure 4: TSR yield across major memory makers



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

Table 3: TSR details across major memory makers

	Shareholder return policy details as of 3Q26A	% of FCF	TSR yield (vs. avg 26E mkt cap)
SKH	W100T in FY26; Div > W30T and buyback > W60T	>50% FCF (25-27E)	~9%
SEC	W90-110T in FY26; 30T Div; 15T buyback; Remaining W55T-75T	<50% FCF (24-26E)	~9%
SNDK	$5bn buyback in FQ1 ($9.5bn over two qtrs, ~4% of shares); 10.5bn remaining authorization	~88% of FQ1 FCF; 100% of excess cash	~8%
MU	Div $0.15/qtr; buyback authorization unlocks on Dec 9	100% of excess cash (policy)	<1%
Kioxia	Divdend Yen 90/shr (Yen 800bn buyback in CY2Q); no buyback	100% of excess cash in the mid-to-long term (policy)	5%

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

- **Server sales mix reaching mid-to-high 60% in DRAM; 40%+ in NAND.** The CSP-driven AI upcycle is forcing memory makers to prioritize server memory production, tightening the industry ASPs, and raising the server sales mix across the board. Based on company filings and guidance, we estimate server sales mix rising to 60%+ in DRAM (server DRAM and HBM combined) vs. 50%+ in 25A and on-road to reach 70%+ in 27E. For NAND, we believe SEC/SKH carries 60%+ exposure to the server segment thanks to long-lasting dominance in eSSD/Solidigm acquisition, while the laggards such as SNDK/Kioxia carry relatively less server sales mix (40%-45% in 26E vs. 13%-mid-30% in 25A). The unprecedented server demand is likely to push the server sales mix even further, crowding out production volume for smartphones/PCs which will likely further weigh on the B2C end-market (likely reflected through price hikes (both component/set devices), unit correction, etc.). We believe the weak B2C earnings are likely to be easily offset by server demand strength, albeit believe the concentration risk is worth monitoring.

Table 4: Server compute memory revenue mix comparison across major memory makers

Server vs. B2C mix	3Q26A	2026 vs. 2025
SKH	High-60% (DRAM+NAND)	Mid-60% vs. High-50% in 25
SEC (Memory)	Mid-60% (DRAM+NAND)	Mid-to-high- 60% vs. Mid-to-high- 60% in 25
MU	Mid-60% (DRAM+NAND)	~70% vs. Mid-50% in 25
SNDK	Mid-40% (NAND)	40% vs. 13% in 25
Kioxia	Mid-40% (NAND)	Mid-40% vs. mid-30% in 25

Source: Company data, J.P. Morgan estimates for the implied 2026 vs. 2025.

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- **Sub-sector snapshot: Demand outstripping supply for servers; dwindling B2C demand.** 3Q26 earnings commentaries across AI ecosystem partners point to firm server demand with hyperscalers' capex rising +87% y-y in 3Q (~US$217bn) and higher 27E spend. AI related revenue accelerated in CY3Q26 (Azure: + 48%/GCP: +103%/AWS: +39) with guidance pointing to further acceleration in CY4Q26E (for Azure/AWS). Server ODM monthly results indicate server demand outstripping supply with memory being the major bottleneck (*report*), while consumer-related devices (smartphone/PC) struggles from chip-flations and price-hikes evidenced by INTC guiding DD% y-y PC unit TAM decline in 26/27E (*report*). We believe the end-demand outlook that memory makers are observing is consistent with the commentaries from the broader AI ecosystem partners. We do believe the underlying demand for servers (both general/AI) remains robust, backed by frontier AI labs competing for model launches and accelerated AI capex which will offset the B2C earnings weakness. Of note, our US H/W team expects AI capex across tier-1/tier-2 hyperscalers to reach $1.5trn in 27E vs. ~$800bn in 26E, a 87.5% growth (*report*).

Table 5: Market cap changes across AI ecosystem partners

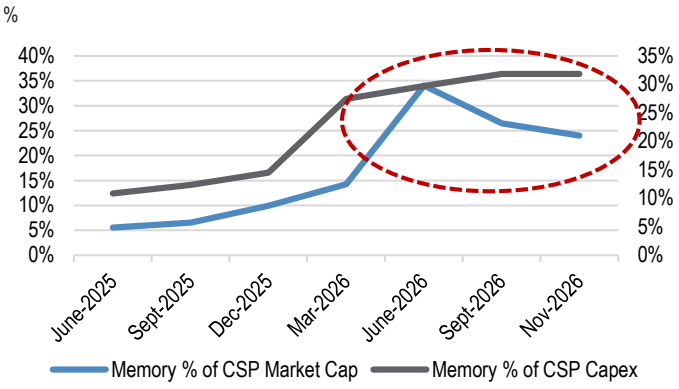
US$bn, %

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
3Q26	12,532	8,659	2,019	3,317	746	27,273	15,917	30,409	50,906
4Q26TD	11,421	7,516	1,854	2,739	599	24,129	13,354	27,990	51,984
% 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%
3Q26	13%	7%	3%	-12%	-18%	6%	-2%	0%	-3%
4Q26TD	-9%	-13%	-8%	-17%	-20%	-12%	-16%	-8%	2%
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%			
3Q26	46%	32%	7%	12%	3%	100%			
4Q26TD	47%	31%	8%	11%	2%	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 quarter.

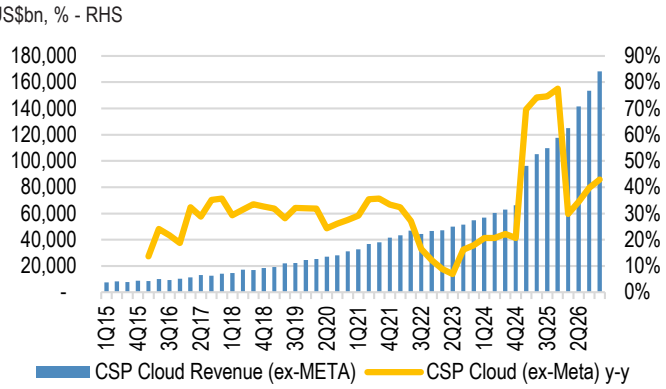
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Figure 5: Memory as % of CSP market cap vs. capex comparison (2026E)



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

Figure 6: CSP cloud quarterly revenue (ex-Meta) and y-y trend

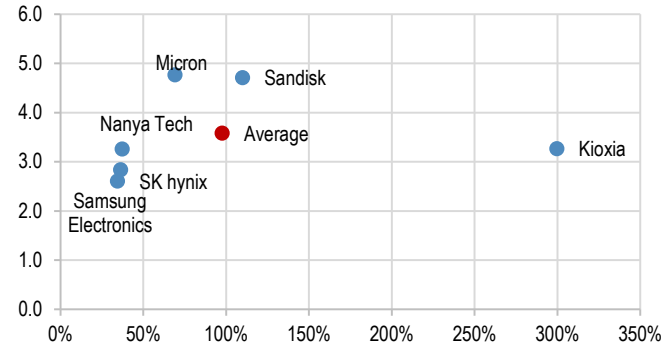


Source: Bloomberg Finance L.P., J.P. Morgan estimates. *note: 2023-2026E number impacted by MSFT's new revenue classification

- **Memory trading at <3.5x 27E P/E vs. 98% EPS CAGR in 26-28E.** Memory stocks that were once trading at 6-7x P/E have significantly de-rated on AI sustainability/funding concerns, HBM de-specs, disbelief in the elongated upcycle and now trade at <3.5x P/E while the EPS has not seen any correction helped by memory shortages across the industry and LTAs. The order visibility is extending as we progress through the year, but we believe the market is anticipating AI funding risk and power bottleneck driven memory downcycle as early as in 1H27E. This puts memory in a tricky spot as investors debate between "too-cheap to ignore" vs. "it is cheap for a reason." We believe EPS cuts are unlikely to happen in the next 6M as the memory S-D gap is too wide to narrow over a short period of time and memory earnings will have a buffer protected by LTAs and prepayments.

Figure 7: Memory: 26-28E EPS CAGR vs. 27E P/E

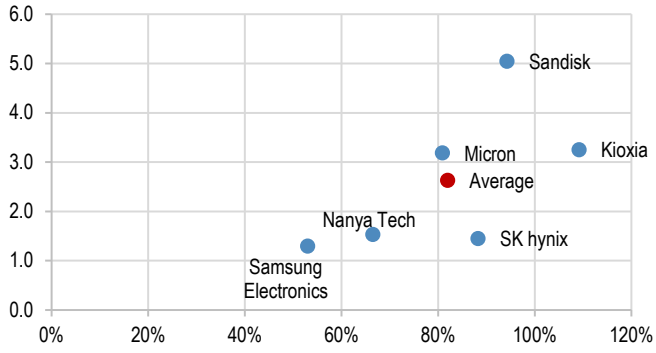
X-axis represents EPS CAGR; Y-axis represents 2027E P/E



Source: Bloomberg Finance L.P.

Figure 8: Memory: 26/27E RoE vs. 27E P/B

X-axis represents 26/27E RoE; Y-axis represents 2027E P/B



Source: Bloomberg Finance L.P.

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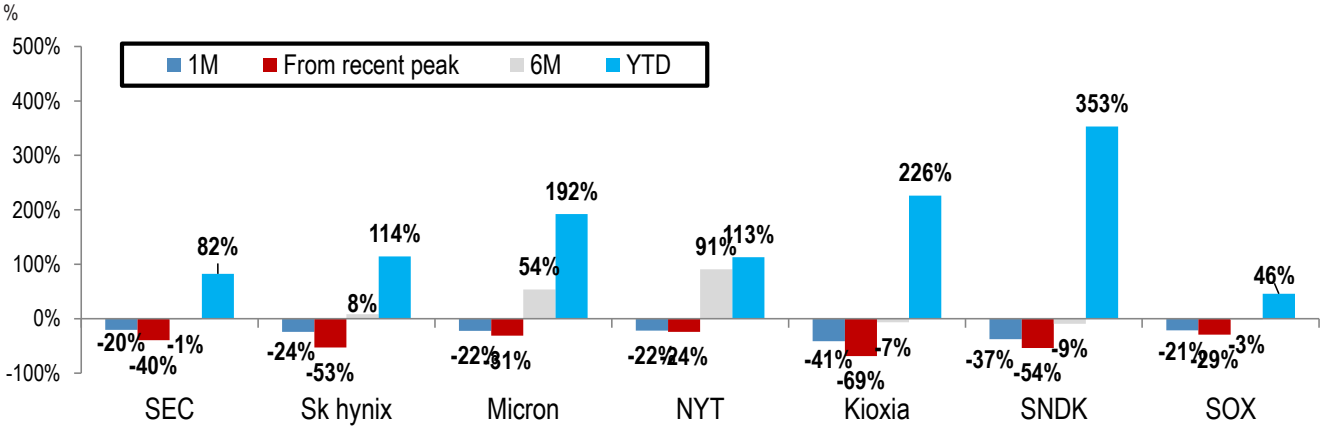
Table 6: Memory valuation table

Company	Mkt Cap	P/E (x)		P/B (x)		RoE (%)		Sales growth (%)		OPM (%)		EPS CAGR
	(US$bn)	26E	27E	26E	27E	26E	27E	26E	27E	26E	27E	28E vs. 26E
Samsung Electronics	954.7	4.7	2.8	2.1	1.3	52%	53%	117%	41%	53%	60%	36%
Micron	943.1	11.4	4.8	7.0	3.2	77%	85%	256%	109%	76%	83%	69%
SK hynix	759.7	3.9	2.6	2.7	1.4	106%	71%	269%	63%	79%	81%	34%
Sandisk	153.0	16.2	4.7	8.5	5.0	61%	128%	175%	146%	60%	80%	110%
Kioxia	118.1	35.9	3.3	14.5	3.3	53%	166%	37%	328%	35%	80%	300%
Nanya Tech	43.2	5.4	3.3	2.8	1.5	72%	61%	516%	62%	77%	80%	37%
Average	**2,971.9**	**12.9**	**3.6**	**6.3**	**2.6**	**70%**	**94%**	**229%**	**125%**	**63%**	**77%**	**98%**

Source: Bloomberg Finance L.P.

- **Memory stocks are down 45% from recent peaks; Bullish on the sector but stay selective.** Memory stocks have corrected 45% from the 2026-peak (vs. SOX: -29%) as the skepticism around AI funding quickly flipped the sentiment amidst the market anticipating memory to be the biggest victim once the correction occurs (equally saying memory was the biggest beneficiary from AI). Amidst the depressed market sentiment, shareholder returns were the catalyst that we hoped for and was well-executed by SKH, but the stock further corrected post 3Q26 earnings implying the bearish sentiment will likely continue until the end-market concerns are resolved (i.e. AI funding, AI monetization, etc.). We believe memory fundamentals are solid with memory pricing likely to remain elevated in 27E, but believe the stock will likely remain range-bound in the near-term due to a lack of imminent catalysts. On a medium-term basis, we continue to view risk-reward as attractive and remain OW across all our coverage companies and rank our next three months order of preference based on shareholder return policy upside: SKH (OW) > SEC (OW) > Kioxia (OW).

Figure 9: Global memory makers' share price performance, including SOX (Philadelphia Semiconductor index)



Source: Bloomberg Finance L.P.

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Appendix

Table 7: Hyperscalers - capex/AI sales commentaries from CY3Q26A earnings

	3Q capex	2026 capex	2027 capex commentaries	AI/cloud sales	AI sales outlook
MSFT	$45.2bn incl. finance leases (~75% short lived CPUs/GPUs)	Cut to ~$170bn CY (from $175bn); FQ2 >$50bn	Accelerates in 1H27	Azure $33.2bn, +48% (guide 44-45%); Microsoft Cloud $63.9bn, +30%; OpenAI 11% of revenue	Azure +49 50% cc in FQ2; Demand > supply
GOOG	$51.4bn (~65% servers/network)	Held $195-205bn	"Increase significantly"	Cloud $30.7bn, +103%; Cloud OPM 36%; TPU system sales a meaningful contributor; "tens of billions" of AI revenue YTD	Gemini app 1bn users; supply constrained
AMZN	$75.9bn cash capex	~$220bn held	"Meaningfully more"	AWS $46.0bn, +35.3% (6th straight acceleration), $184bn run rate; AI revenue growing triple digits; inference > half of AWS AI revenue	AWS >40% growth in 2027 and 2028; Trainium sold outside AWS from late 2027
META	$34.9bn (54% of revenue)	Narrowed to $135-145bn (low end raised)	"invest aggressively"	Revenue $64.6bn, +26%; Muse agents at 10m users in six weeks	4Q revenue $73 76bn; strong growth through 2027

Source: Company data.

Table 8: TSMC - capex/AI sales commentaries from CY3Q26A earnings

TSMC	3Q26A	4Q26E / outlook
Revenue	+16% Q/Q and +41% Y/Y	$52.3-$54.3bn (+14% Q/Q, +58% Y/Y)
AI revenue	HPC: 68% of sales (+22% Q/Q)	AI accelerator revenue CAGR mid-to-high 50% (24-29A)
Node-mix	2nm: 8% / 3nm: 33% / 5nm: 28%	Steep 2nm ramp in 4Q
Margins	GM: 66.4% / OPM: 58.7%	GM: 65-67% / OPM: 56.5-58.5%
Full-year	2026 USD revenue growth raised to ~44%	Capex: $13.8bn in 3Q

Source: Company data.

Table 9: AAPL/INTC- Earnings/B2C demand/Memory related commentaries from CY3Q26A earnings

Smartphone/PC	CY3Q26A	Outlook	Memory related commentaries
AAPL	Revenue $114.5bn, +12%; iPhone $57.6bn, +17% (iPhone Duo, 18 Pro); GM 47.9% incl. ~1pt tariff refund	Dec-qtr GM 45-46% vs 46.3% consensus; Mac and iPad supply constrained on memory	Pricing "unprecedented"; ex-tariff GM down ~1pt QoQ on memory; "even higher" in Dec qtr; increases continue beyond December as carry-in inventory benefit fades
INTC	Revenue $16.5bn, +21%; non-GAAP EPS $0.52 vs $0.38 guide; DCAI $7.3bn, +78% (best in 15 years); CCPG $8.1bn, ~5% YoY, ~9% QoQ	4Q revenue $15-16bn; DCAI +mid-teens% QoQ; CCPG down >20% QoQ; PC slowdown through at least 1H27	"Unprecedented memory crunch"; OEMs cutting inventory; correction into 1Q27, maybe 2Q; "not optimistic about next year in terms of memory"

Source: Company data.