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Memory – Cycles vs. Super Cycles

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S. KOREA TECHNOLOGY

Asia Pacific
Industry View **Attractive**

Memory investing is less about pinpointing inflections or identifying data points – but it's about the market rewarding those who priced it first. AI is a compute problem, a memory problem, hence structurally different. In the later stages, however, still cyclical and reward is harder to come.

Fundamentals look bulletproof but a more cautious tale for stocks. The AI memory super cycle is here, yet the market is consciously refusing to pay a full multiple for unprecedented earnings. Just like past cycles, it suspects that may prove temporary – memory stocks have historically looked cheapest right at the top of the cycle, because analysts extrapolate boom prices into the future. The case for a Supercycle rests on the idea that this time is structurally different, which looks obvious by now with trillion dollar market cap. But separating the asset from the price of the asset (share price) is paramount following a 9x run in share prices.

Structurally higher AI secular growth riding on top of a cycle... is still a cycle. What's different is that this one is steeper, much steeper (nearly 7x higher $/Gb today vs. past peaks). Markets can certainly be wrong, but market prices themselves are part of the evidence set for how a memory cycle is perceived. The 'lazy' answer is: (1) nothing being different this time; or (2) the magnitude of the next downturn may be much smaller and the floor higher than in 2023. Both are conflicting views, but both can be right, as we have come a long way already – the memory super-cycle is real but it is also not the end of cyclicality. Hence, a structurally better memory cycle and attractive memory stocks prices do not have to go hand-in-hand. In other words, we think the easy money is past.

Navigating memory cycles – they often repeat previous cycles...but they rarely run like a train schedule: What ends this memory supercycle may not be AI demand softening but supply catching-up and/or a demand digestion. That may still be distant as memory prices stay firm through 2027, despite deceleration. Trying to figure out the exact start and end dates of cycle inflections is unrealistic. But our view is that one should build portfolios that are durable enough against the inevitability of cycle inflections with the understanding that they are a natural extension of markets, even if we don't know when they will occur.

In the current market, we are reminded that history does not always repeat itself (this time it's AI inference, last time it was cloud) – but it often rhymes. By studying what drives the previous cycle inflections, one can apply the remedies used to devise new ones from the similarity of the events.

From this, we believe that:

- It is better to be generous than conservative on valuations on the way up but

investors should be aware that the firm may have a conflict of

Research as only a single factor in making their investment decision.

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the opposite is true on the way down.

- It is better to be optimistic rather than cautious on earnings – price hikes tend to be greatly underestimated, especially in super cycles. The opposite is also true.
- It is better to be contrarian when looking for exit points well ahead of cycle inflections.

Super Cycles – Not The End of Cyclicality

Memory fundamentals look bulletproof but a more cautious tale for stocks. Samsung reported the highest earnings among all companies worldwide with US$80bn in operating profits in CY3Q26 which is the largest ever by a technology company, displacing NVDA US $64bn (2QFY27). For a company that sells a commodity and the single priciest component inside an AI server (not the logic chip), it is remarkable. Yet, both Samsung and Hynix shares lag 35% below peak, trade below historical peak P/E of 4x on peak earnings (currently at 3-4x NTM P/E) implying that Mr. Market seems less convinced that this time is different. Despite significant LTA commitments and market expectations of more muted cyclicality, memory makers are being modeled as if the old boom-bust cycle still governs. In this demand-led super cycle, we think super profits will eventually bring on new supply, with inevitable consequences for returns and ultimately for share prices.

Exhibit 1: Samsung world No.1 profit...

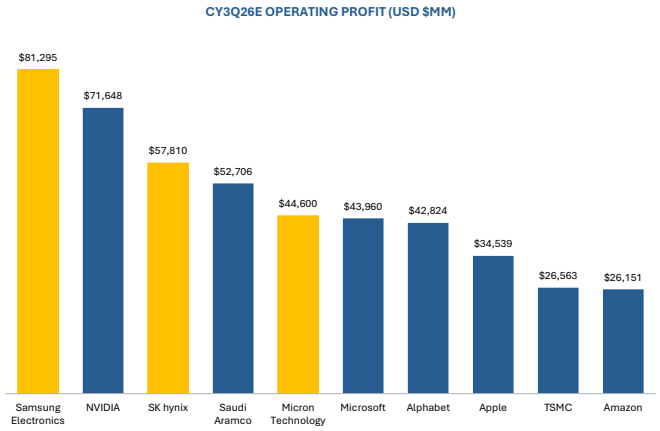
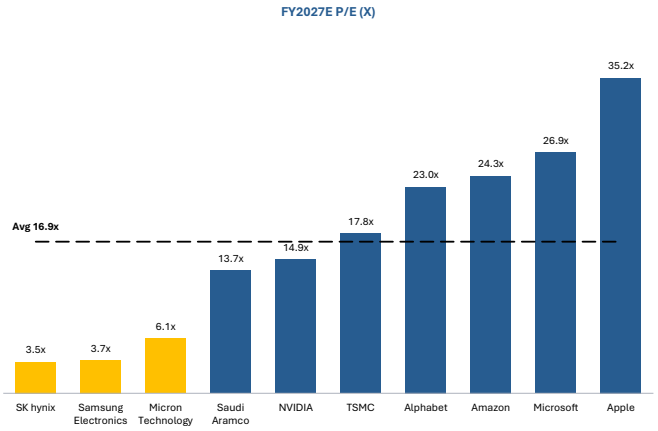


Exhibit 2: ... but trading well below



The good, the bad and the realistic

This time is truly different... The structural story remains compelling for memory – AI changes everything. The demand outlook is structural as AI data centres spending is the main driver of revenues, on-device AI is the next wave, physical AI, humanoid robots, self-driving cars, and even the AI data centres opportunity in space. Industry capacity is sold out years ahead, the majority under long-term contracts with price floors that never existed before and security cash deposits for some LTAs. The HBM market is forecast to triple to US$100 bn by 2028. This is what separates a Supercycle from an ordinary one.

- Demand from AI data center construction is outstripping what the industry can supply.
- Structurally higher margins.
- LTA changes the risk of capacity allocation – with locked-in customer commitments.
- HBM physically crowds out commodity DRAM.
- Every new model generation needs more memory per chip, and there are more chips being made.

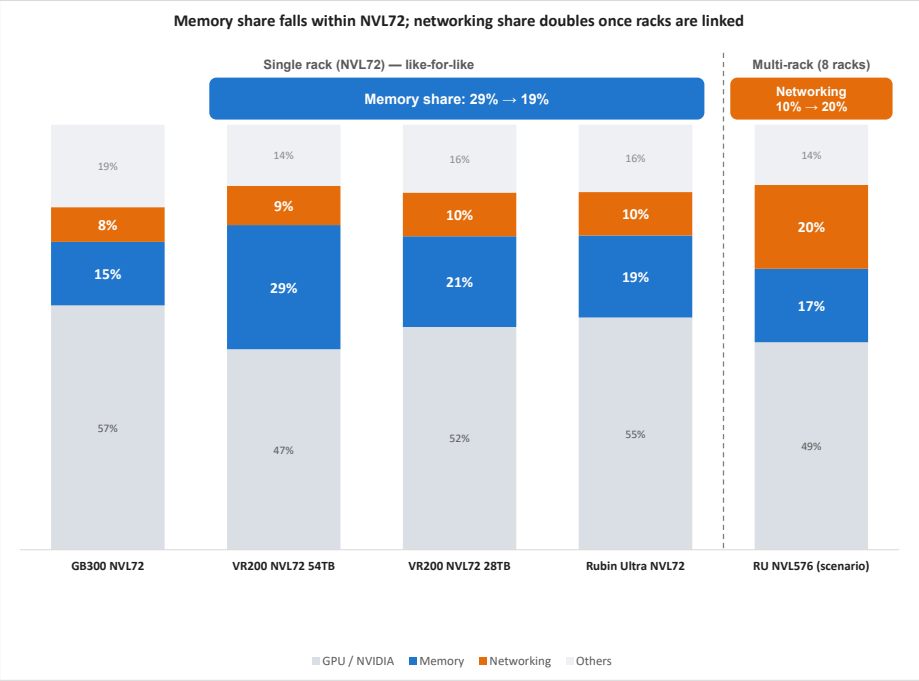
… or is this the top… But new capacity will come eventually, and quarterly memory WFE shipment showed how numbers keep climbing higher on equipment pull-ins and shipment all year. Compute gets cheaper, competition itself is the mechanism that drives the cost curve down and mean-reversion has never missed a beat on past memory cycles. Producers are all racing to deliver more intelligence per dollar per watt, and the philosophical disagreement about how to get there does not change where they are all going.

1. China is a major swing factor (*Tech Bytes: China Memory – Reshaping Global Competition (26 Aug 2026)*), where state-backed CXMT is expanding fast in DRAM and HBM3 while YMTC already a legitimate global competitor in NAND.

- **YMTC is already at scale and globally competitive.** It holds roughly 12–13% of the global NAND market – most of it sold domestically – on a 294-layer X-stacking process, running around 200k wafers per month with ~45% domestic-tool adoption.
- **CXMT is at scale and shipping DDR5 and HBM3.** It's main HBM3 customers are from China CSPs and AI chip design houses and we estimate about 20% HBM market share in China.

2. AI data center rack content could be another factor. GPUs currently account for roughly half of total Vera Rubin cluster cost, memory about 29% with the remaining 23% is networking, power, cooling, and facilities. As data centers shift to multi-racks (scale out) and next generation iterations, networking content value increases significantly at the expense of memory content while GPUs stay relatively unchanged.

Exhibit 3: AI data center rack content



… But both can be right. We have come a long way already. The easy money is past, stocks are up 9 fold since the start of the cycle (September 2025), all within USD$1tr

market cap, and not pricing a normal outlook. The memory super-cycle is real but it is also not the end of cyclicality. The cycle amplitude is steeper and duration may be much longer this time, but the path to a trillion market cap is already here and has priced-in a great deal of that run. Hence, a structurally better memory cycle and attractive memory stocks prices do not have to go hand-in-hand.

What comes next?

Historically, memory companies have been poor at predicting their own inflection points. In this context, management guidance tends to confirm trends that the market already knows. What ends a memory cycle is never demand softening but supply catching up and/or demand digestion – reaching a point where there is enough HBM supply, ABF, CoWoS packaging capacity, enough fab output to flip deficit to surplus, resulting in hyperscaler buying pauses to absorb what it already bought. This happened in 2000, 2016, 2019, and 2022. This is unlikely to happen in 2026 and most of 2027 given lead times for new capacity additions. It is reasonable to say that every smart person in the AI industry is looking for ways to alleviate the 'memory wall' from every angle given that memory reached nearly half the cost of the most important chip in the world.

Putting the current memory group stock consolidation in the context of previous memory super cycles, the cycle upturn may be reaching a relatively mature stage relative to market expectations that may be more advanced due to the positives in AI capex spend to meet insatiable demand trends. While it appears reasonable to assume that a lot of good news is discounted, with the ~180% average performance for memory stocks YTD, a sustained cyclical upturn would require the memory group's contract pricing to rise another c. 70% QoQ from current levels in DRAM (vs. c. 700% YoY peak in 3Q26 and 160% YoY in 2017's past super cycle peak). This seems out of reach and the market is now left with incoming massive capital returns.

Based on the average earnings upgrade for Asian memory stocks of 432% this year, it should be clear that consensus is "erring on the side of an unprecedented cycle turn" consistent with our base case assumption and market expectations, which is a sharp upturn and durable/elongated cycle with visibility into 2027 (Samsung) and beyond (Micron, SK hynix).

Exhibit 4: Memory EPS revisions breadth (3M avg) — DRAM turning down first

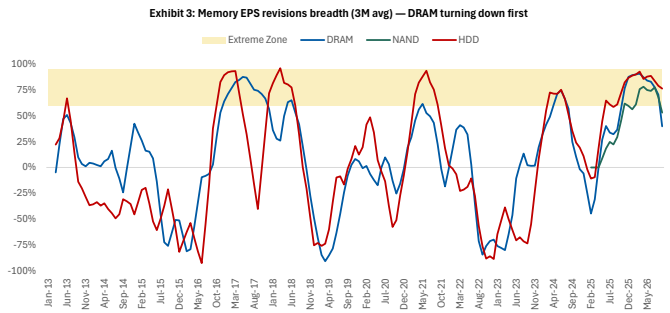
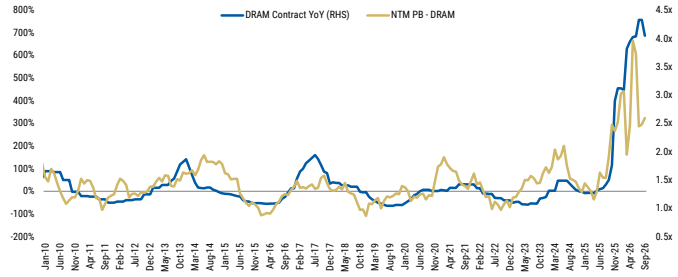


Exhibit 5: DRAM YoY vs. PB



Can memory shares underperform before upgrades have peaked? In short, we think yes: In Exhibit 2, we illustrate some of the historical data with an overlay of share price and

consensus earnings trajectory. Over the long term, there is a close correlation between share price and earnings, although there is an offset, with shares having historically fallen before earnings peaked – i.e., the shares no longer outperform even if the upgrade cycle has not ended.

- **Memory shares outperformed four months before earnings peaked** in the 2008 cycle, four months in 2012, and eight months in 2018.
- With decelerating revenue growth and margin improvement moderating, we think **earnings estimate revisions have limited upside** – sell-side estimates have become a lagging indicator at this point.
- Staying with stocks that have **a margin of safety on valuation seems prudent** before growth peaks.

Anatomy of previous super cycles

- **Low valuations at cycle peak.** In 4Q17, the MSCI Asia Semi sector 12-month forward P/E was 13.3x at peak – this fell to c.10.0x by 4Q18.
- Stocks looking "cheap" does not stop forced selling.
- **The sector declined much sooner than earnings estimates** – at the time EPS peaked, it traded at c. 10x on average.
- Current P/E valuations are 34% (semis) and 39% (hardware) above the 2018/19 peak, but are 14% (semis) and 25% (hardware) below their most recent peak in the 2023/24 cycle.
- **The earnings upgrade cycle is uneven** and stays robust for the AI computing segment while decelerating for memory – this could take several months. In general terms, companies are showing robust financial health – and are structurally stronger than in 2018/19.

Although we can say that these are materially better companies now (in terms of balance sheet and return on invested capital), there are some reasons why returns are already higher and could remain so:

- Demand trends have been unusually strong in some important new emerging segments, especially AI-led (HBM, SOCAMM, CXL, SRAM).
- We don't know where AI architectures are heading. Transformers dominate today, but the field moves fast and the adoption of AI agents only began with 'Open Claw' in January 30, 2026.
- Managements generally appear focused on profitability (lessons learned from the 2022 crash) but have been more focused on bringing supply to keep up with insatiable compute demand.
- However, there is very little inventory build from over-ordering to meet a pull-forward of demand. The fact remains that sector ROE and margins are well above long-term averages, while our leading earnings model is pointing to significant increases.

The inconsistency of prosperity. Market behavior can be difficult to predict – i.e., regardless of the ultimate outcome, markets may move to price in a peak followed by a new downturn without waiting for any confirmation. This creates opportunities to benefit

from such divergence, and is the basis of our stock recommendations.

- Valuations are not a good predictor of future returns. Risk-reward is likely to improve marginally from here with industry and consensus upgrades likely only just moderating.
- Management of memory companies is generally bullish and rarely show less optimism. Relying on companies to call a downturn is ineffective.
- Semiconductors and memory is always cyclical.
- It is always good to take a step back and reassess when stocks stock repeatedly go down on good news.

Stock implications

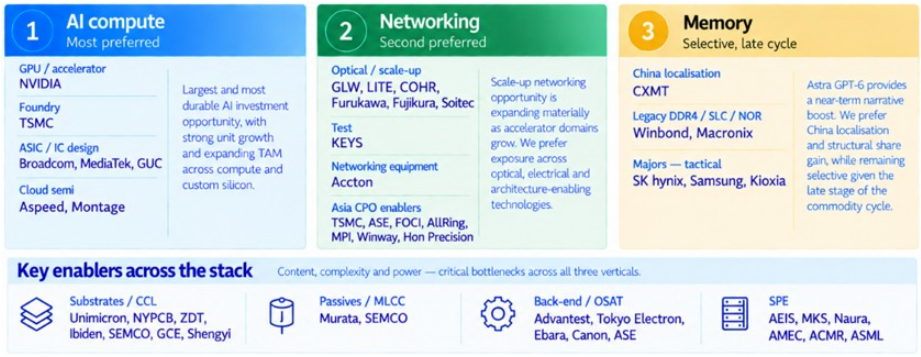
Favored: We continue to favor AI computing and networking supply chain over memory on a relative basis. Our preference is mainly earnings revisions, content growth (new specs) or product cycle/unit growth:

- High-quality, idiosyncratic factors
- Early-cycle commodity plays (i.e., accelerating YoY)
- Content growth – HV/DC ; and
- Areas offering higher pricing leverage on earnings – CCL, ABF, power semis.

See Exhibit 6 – stock preference table.

Least favored: Downstream hardware stocks where risk of overbuild and margin pressure is greatest owing to higher input costs (memory pricing) and valuations are perceived to be highest.

Exhibit 6: Three AI buckets – compute first, networking second, memory selective



Memory channel checks

HBM

- **HBM pricing moves sharply higher in 2027 as expected.** Industry forecasts put blended HBM ASP to grow ~121% YoY. HBM4 is tracking at US$3.0–5.0/Gb and HBM4e at US$5.0/Gb or above.
- **Rubin HBM is ramping slower than planned.** VR200 NVL72 rack shipments in 2026 may come in below 10K, vs. an original target of about 15K, with meaningful

volume in 4Q26-1Q27. Blackwell is expected to account for ~78% of NVIDIA's high-end GPU shipments in 2026, with Rubin becoming mainstream after 1H27.

- **Yields remain the binding constraint**. HBM4 production continues to face technical and yield challenges across suppliers, which limits AI chip shipments. 8-high yields run about 5 percentage points above 12-high with a shorter cycle time, which is part of the appeal.
- **8-high to become the 2027 mainstream** configuration, driven by supply and cost rather than weaker demand. 8-high carries a 10-20% per-Gb premium over 12-high, as each stack still needs one base die. Lower HBM content per chip should support RDIMM and SOCAMM demand, as part of the inference KV cache moves to host memory.

Exhibit 7: HBM price forecast by generation (US$/Gb)

	2025	2026F	2027F
HBM3e	1.80	1.3–2.0	2.3–2.5
HBM4	2.05	2.05+	3.0–5.0
HBM4e	–	–	5.0+
HBM blended ASP	**1.77**	**1.74**	**3.84**
Blended ASP YoY	*18%*	*(1%)*	*121%*

Source: TrendForce

DRAM

- **Pricing momentum improves into 4Q26.** Industry data points to conventional DRAM contract prices up 10-15% QoQ, revised up from 3-8% previously. PC DRAM is tracking up 13-18% and server DRAM up 10-15%, while mobile DRAM slows to 0-5%. Consumer DRAM (DDR3/DDR4) remains the most undersupplied segment.
- **Server demand remains the key driver.** US hyperscalers released additional RDIMM orders after reviewing their 2027 build-out plans. Suppliers continue to prioritize server allocation, constrained by both front-end and back-end capacity.
- **Consumer demand stays weak.** Smartphone brands remain cautious given high memory costs. PC OEMs continue to pull in orders, aiming to build inventory above 10 weeks on concern about 2027 shortages.

- **PC DRAM supply set to shrink in 2027.** Korean suppliers' PC DRAM supply could fall more than 20% YoY in 2027 as capacity moves to server and HBM. Suppliers expect to reallocate any capacity PC OEMs do not take to server DRAM.
- **Legacy DDR4 remains the tightest.** DDR5 modules now sell at a 10% discount to DDR4, versus 6% in 2Q26. DDR4 supply is expected to fall about 20% in 2027 as major suppliers exit legacy nodes, while secondary supply shrinks as data centres extend server life and buy used RDIMMs.
- **Capex accelerating, but new output arrives late.** Industry data puts DRAM capex at about US$98bn in 2026 (+82% YoY) and US$150–160bn in 2027 (+~60%), mainly for new fabs. Meaningful bit output only starts in 2H27, so supply should stay short through end-2027.

NAND

- **Pricing also revised up 15-20% QoQ in 4Q26**, from 0-5%. eSSD is the only category still accelerating, at 23-28% QoQ (from 20–25% in 3Q26). Client SSD and eMMC/UFS slow to 5-10%, and wafers to 3-8%.
- **QLC eSSD adoption is broadening.** Several large US cloud have shifted from TLC SSD plus HDD to QLC SSD to store AI inference KV cache. QLC costs about one third of TLC for the same capacity, and agentic workloads are write-once, read-many, which limits the impact of QLC's shorter lifespan.
- **Divergence set to widen in 2027.** eSSD demand keeps growing, while consumer NAND may face downward price pressure as OEMs downgrade specifications and Chinese supply increases.
- **Consumer inventory is building and moving downstream.** Consumer-grade wafer inventory is rising at suppliers, who are clearing it through bundled sales. Module houses are taking on consumer stock in exchange for allocations of scarce components.

Exhibit 8: DRAM earnings revisions breadth coming off recently...

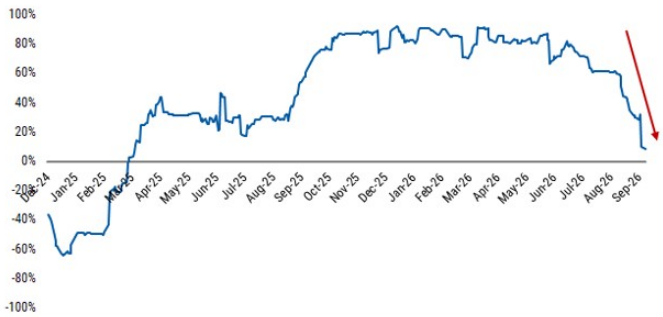


Exhibit 9: ...driven by all three major players

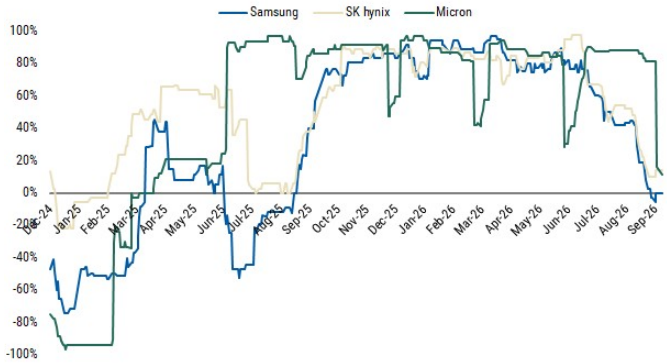


Exhibit 10: Samsung: EPS Revisions Breadth vs Share Price Performance Y/Y

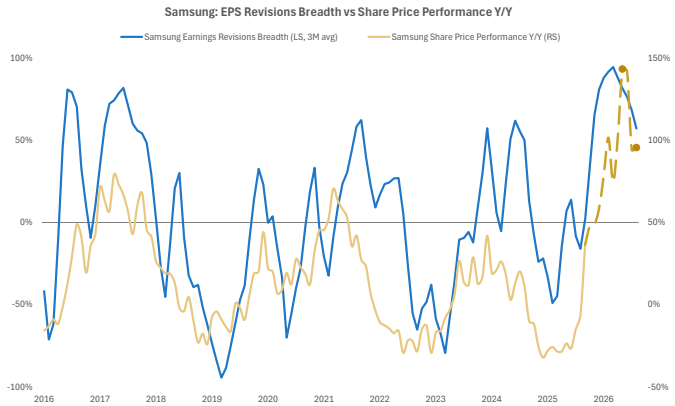


Exhibit 11: SK hynix: EPS Revisions Breadth vs Share Price Performance Y/Y

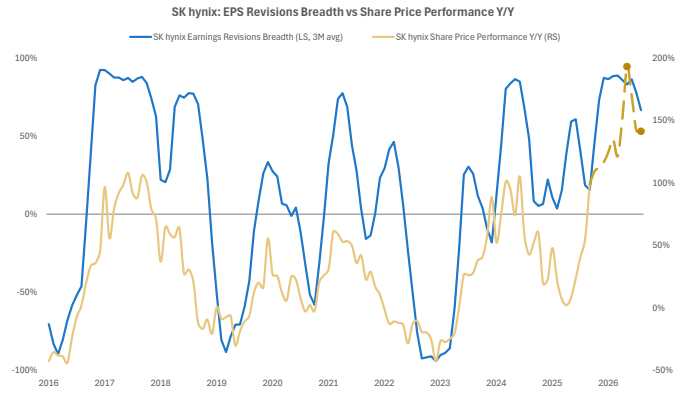


Exhibit 12: DRAM spot & contract price

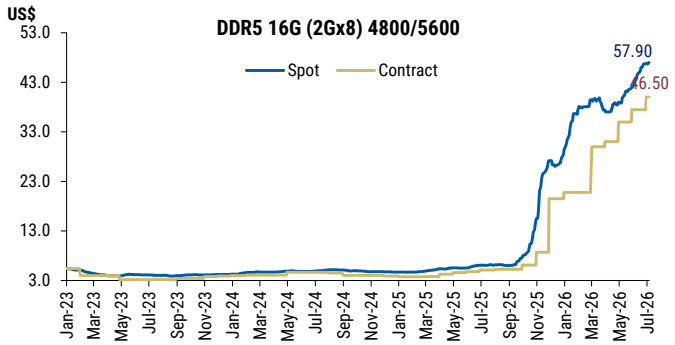
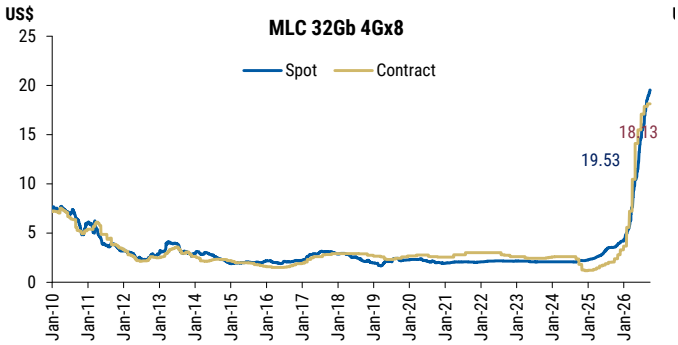


Exhibit 13: NAND spot & contract price



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Prices: SK hynix (000660.KS) – ₩1,792,000, Samsung Electronics (005930.KS) – ₩262,000, NVIDIA Corp. (NVDA.O) – $229.28, TSMC (2330.TW) – NT$2,550.00, Broadcom Inc. (AVGO.O) – $361.54, MediaTek (2454.TW) – NT$4,760.00, Global Unichip Corp (3443.TW) – NT$6,400.00, Aspeed Technology (5274.TWO) – NT$19,835.00, Montage Technology Co Ltd (6809.HK) – HK$283.80, Corning Inc (GLW.N) – $156.35, Lite-On Technology Corporation (2301.TW) – NT$297.50, Coherent Corp (COHR.N) – $328.22, Furukawa Co., Ltd. (5715.T) – ¥5,730.00, Fujikura (5803.T) – ¥4,628.00, Soitec SA (SOIT.PA) – €167.55, Keysight Technologies Inc (KEYS.N) – $381.42, Accton Technology Corporation (2345.TW) – NT$1,885.00, ASE Technology Holding Co. Ltd. (3711.TW) – NT $442.00, FOCI Fiber Optic Communications Inc (3363.TWO) – NT$652.00, AllRing Tech Co. (6187.TWO) – NT$1,490.00, MPI Corporation (6223.TWO) – NT$6,390.00, WinWay Technology Co Ltd (6515.TW) – NT$6,890.00, Hon Precision (7769.TW) – NT$2,615.00, Winbond Electronics Corp (2344.TW) – NT$87.80, Macronix International Co Ltd (2337.TW) – NT$102.00, KIOXIA Holdings (285A.T) – ¥19,325.00, Unimicron (3037.TW) – NT$1,270.00, Nan Ya PCB (8046.TW) – NT$1,420.00, Zhen Ding (4958.TW) – NT$574.00, Ibiden (4062.T) – ¥12,270.00, Samsung Electro-Mechanics (009150.KS) – ₩1,522,000, Gold Circuit Electronics Ltd. (2368.TW) – NT$1,375.00, Shengyi Technology Co Ltd (600183.SS) – ¥129.96, Murata Manufacturing (6981.T) – ¥7,129.00, Advantest (6857.T) – ¥38,630.00, Tokyo Electron (8035.T) – ¥12,445.00, Ebara (6361.T) – ¥4,870.00, Canon (7751.T) – ¥4,619.00, Advanced Energy Industries Inc. (AEIS.O) – $302.77, MKS Inc. (MKSI.O) – $264.50, NAURA Technology Group Co Ltd (002371.SZ) – ¥615.97, Advanced Micro-Fabrication Equipment Inc (688012.SS) – ¥349.35, ACM Research Inc (ACMR.O) – $72.77, ASML Holding NV (ASML.AS) – €1,599.40