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Super cycle or capital cycle?

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SUPER CYCLE OR CAPITAL CYCLE?

“I'm interested in memory because it's a filter through which we see our lives”

Kazuo Ishiguro

The share prices of the three companies which dominate the global DRAM memory semiconductor market – Micron in the US, and SK Hynix and Samsung Electronics in South Korea – have experienced a recent correction but remain up between 5x and 8x over the last 12 months. Regarded as among the biggest and most critical suppliers of picks and shovels to the AI gold rush, the trio happen to have been constituents of the Hosking Partners portfolio since inception over 10 years ago. As well as celebrating their success, we have recently been asking ourselves whether we saw this coming: was the original thesis for their inclusion in the portfolio the same reason why they have performed so strongly since then? Addressing this question should help us assess how much future upside remains for these stocks. Or after such a strong run, are they now overvalued as some market commentators are starting to suggest?¹

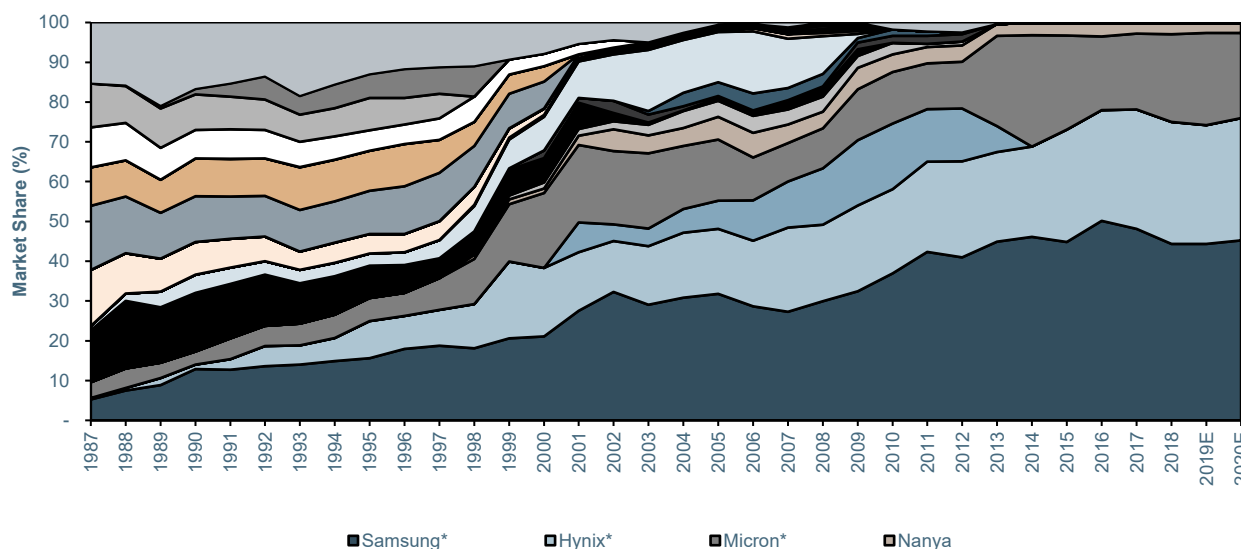
To understand the drivers of the DRAM industry, and in particular why it is dominated by three companies each with a market cap that has breached the US\$1 trillion mark, a little historical context is helpful. Wind the clock back to 1970, when Intel was the first semiconductor company to introduce DRAM memory chips. Then fast forward to 1985 and Intel's difficult decision to withdraw from DRAM to focus instead on logic chips; in the announcement of its exit decision at the time, it said “the high-volume commodity DRAM market continues to weaken as worldwide capacity becomes available, driving prices to unacceptable levels. As it weakens, it also drags down the prices of the value-added CMOS DRAM market. The volume of our CMOS ‘niche’ market is not large enough to make Intel profitable at these reduced prices”.

Intel was describing an industry characterised by extreme volatility of returns. The reason for this volatility was the remorseless logic of Moore's law, which stated that the number of transistors on a given area of silicon would double every two years or so. This translates into a typical cost reduction of 50% every two years, but fierce industry competition caused most of this cost benefit to be given up to customers in the form of ever lower prices per unit of memory, partly offset by increased volumes due to demand elasticity. Industry participants found themselves on a treadmill of ever larger capex investments in more advanced equipment every two years in order to offer customers the latest chips and so stay ahead of the falling prices. The pace of Moore's law, however, meant chip companies barely had time to generate a payback on their capex before they were required to step up to invest more capex in the next generation of chip-making machines. Against this backdrop of never-ending capex, prices went in just one direction. Between 1974 and 2013 the price of one megabyte of DRAM fell from \$81,920 to 0.7¢, a factor of 12 million to 1.

¹ See for example *Breaking Views: Why It's Too Late to Jump on the Bandwagon*
<https://www.breakingviews.com/columns/big-view/why-its-too-late-jump-chip-bandwagon-2026-05-22/>



The decades following Intel's decision to throw in the towel on DRAM were unsurprisingly characterised by relentless value destruction among the remaining industry players, resulting in numerous exits by bankruptcy or merger. In the quarter-century to 2014, the number of DRAM companies fell from more than thirty to effectively just three companies, with Micron, SK Hynix and Samsung holding 97% market share between them.



Source: Bernstein. Dec 2018. * Portfolio holdings.

A sensible question at this stage might be why the end point should be three DRAM companies rather than two or just one. The reason why the clock stopped on the game of musical chairs with three players still standing was that by 2014, in the case of DRAM, Moore's law had started to break down. Once transistor nodes had approached the scale of 10 nanometres, sheer physics meant it was increasingly difficult to shrink their size at the same pace, so capex for the three survivors was slowed, price deflation moderated and returns slowly recovered.

Despite the less crowded cast of players, DRAM nevertheless remained a cyclical industry. The long lead times to install new chip manufacturing equipment, and the scale economies which require the expensive equipment to run at full utilisation, make it difficult to match supply of chips to variable end demand. This demand is itself a function of replacement cycles and product launches for PC and handsets, as well as myriad other factors. The consequence is that inventory shortages are followed by gluts, mirrored by profits booming then collapsing.

What gave us confidence to invest in DRAM in 2014 was belief in the new-found capex discipline of the consolidated industry, demonstrated by signalling behaviour which we were able to observe at the time, and the expectation that this would result in higher lows and higher highs in each cycle, allowing through-cycle returns to recover. This is capital cycle theory: the slowing of Moore's law was restricting the entry of capital into the DRAM industry, and this would lead to higher returns. So it turned out, with operating profits for the three DRAM survivors reaching ever higher troughs and peaks over the most recent decade, setting up the opportunity for counter-cyclical adding and trimming in the Hosking Partners portfolio as share prices fluctuated between less than 1x and up to 3x book value. The



exception to this was post-Covid, when in 2023 both SK Hynix and Micron fell into a loss as DRAM prices collapsed once the super-elevated demand from stay-at-home purchases of electronic goods in the lockdown years eventually came to an end.



Source: Hosking Partners, FactSet. 31 Oct 2013 to 29 May 2026. Charts on a log scale.

The end for this pattern of fairly predictable peaks and troughs was signalled on 30 November 2022, which saw the release of Chat-GPT. The AI chatbot soon went viral on social media, and the AI boom took off. Exploding demand for DRAM met constrained supply, as high-bandwidth memory (HBM), a recently introduced form of specialist DRAM which is essential for AI training and inference, requires four times the wafer capacity of conventional DRAM. The result is high prices for the undersupplied HBM, and at the same time the capacity given over to making HBM has resulted in reduced supply of conventional DRAM which itself has therefore experienced a squeeze in prices. In this demand-led super cycle, valuations of the DRAM stocks which had historically been anchored around 1x book value, shot up.

We remain cautious about the overall economics of the AI boom. When tokens are no longer priced below cost by the hitherto loss-making AI labs, will the use cases for AI still make economic sense? We are wary of the fallacy of composition: while there are many high-return use cases for a finite number of enterprises which can justify paying full price for tokens, not all use cases will have similarly high returns, in which case the total addressable market may be smaller than it first appears. As we write, the DRAM stocks are experiencing a pullback from recent euphoria which saw sharp jumps in their share prices in May. We are not the only ones attempting to resolve the implications of, on the one hand, never-ending reports of AI changing the world and on the other hand, concerns about increasingly heavy capex spend by the hyperscalers and unresolved bottlenecks delaying the timing of new datacentres coming online.



The challenge of assessing the impact of AI demand is different from understanding the stable supply dynamics in DRAM which were the basis of our original investment thesis. The same uncertainty is shared by the management of the companies who, with fresh memories of previous cycles, now require their customers to enter into long-term supply agreements with binding volume commitments and up-front payment. We regard this as sensible behaviour, although only time will tell whether these long-term agreements will turn out to be enforceable.

We also draw comfort from the DRAM companies' ability to add capacity to meet unsatisfied demand being constrained by the time it takes to build new chip fabs: the shell structure and the cleanrooms may take up to a year to construct, but installation of utilities and equipment and then ramp up can take another six months. Once wafer input begins, the lead time for HBM is another five or six months, even before the back-end packaging process. On the other hand, high prices always incentivise new supply: a particular concern is new supply from Chinese competitor CXMT, which is likely to IPO this year to raise funds for capacity growth despite its technology still lagging the established players.

In contrast to the heroic valuation assumptions suggested for the forthcoming IPOs of the AI labs (OpenAI, Anthropic and SpaceX), the DRAM companies trade on forward p/e ratios which are in the range of 6x and 10x. The market is saying that it does not believe this time is different, as new supply will sooner or later cause the prices of DRAM chips to fall. Our instinct has been cautiously to take profits as the share prices reach new highs, maintaining some exposure as the companies continue to benefit from the essential role that memory plays in the AI arms race but reducing our ownership as valuation based on book value becomes more extended. Our original DRAM thesis has worked out, but chips are currently not 'cheap as chips'. In this demand-led super cycle, super profits will eventually bring on new supply, with inevitable consequences for returns and ultimately for share prices.

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