

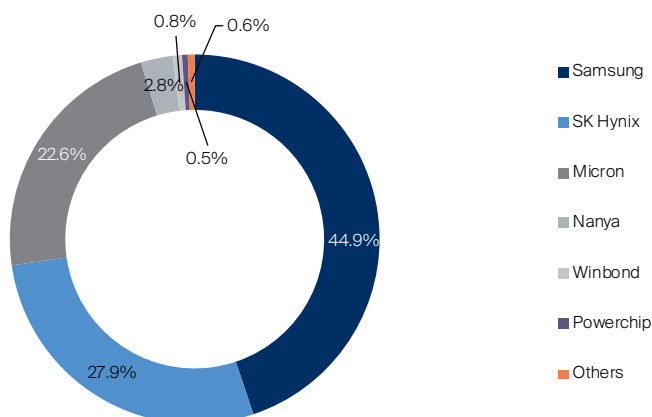


This quarter, we share with investors our views on a recently established position in the memory industry through SK Hynix. Before we delve in details of our investment thesis, it is worth reminding readers of two important points on our investment process. We recognize that through our regular quarterly pieces on various themes reflected in our portfolio, we may have inadvertently given an impression that our portfolio is managed through a top-down thematic approach. Whilst we are mindful of broader industry themes and attuned to opportunities in our space that can potentially provide portfolio exposure to attractive industry themes, it is important to emphasize that our idea generation is entirely bottom up driven. Prospective investment candidates must meet our strict screening parameters of profitability, leverage, earnings growth/visibility and supportive corporate governance track-record. Our regular screening process has continually enabled us to discover new ideas. We can then apply our extensive investment experience and our in-depth fundamental research framework to validate which opportunities indeed represent true, valuable and sustainable businesses to invest in. Secondly, it is worth pointing out the somewhat unusual nature of SK Hynix being a large-cap. Our investors may recall that early on, we abandoned our initial purist stance of limiting our universe strictly to mid and small capitalization companies and opened to possibility to selectively invest in large cap companies to the extent that they meet all the fundamental criteria we demand from potential investment candidates. In this paper, we hope to illustrate our investment process at work: how SK Hynix initially came into the screen and our subsequent research process to determine its attractiveness as an investment in the Fund.

Idea Origination and Background

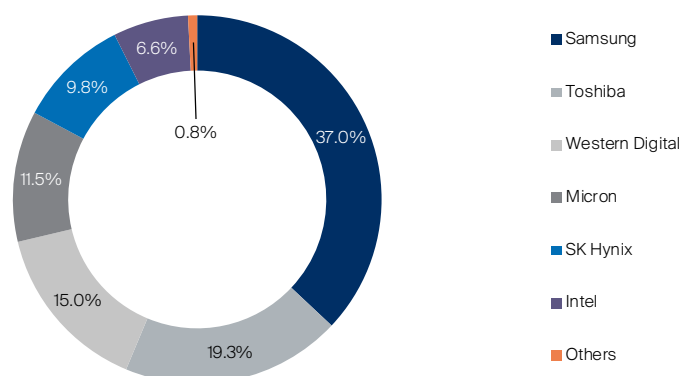
During our weekly team meeting review of our quantitative screen, we were surprised to see SK Hynix pop-up on the screen given its well-known and covered nature. As a background, SK Hynix along with Samsung, Micron, Western Digital, Toshiba and Intel are the main suppliers for DRAM (Dynamic Random Access Memory) and NAND flash memory (the name NAND has a more technical background but in brief, it stands for Not AND, referring to the type of logic gate used in each memory cell). Simply put, DRAM is required for computer processing whereas NAND flash is used for data storage. Another key difference is that DRAM loses data quickly when power is removed, whereas NAND do not require power to retain its data. SK Hynix's market share by revenue is globally ranked second in DRAM, fifth in NAND, with the exposure of the latter (around 80% of its NAND revenue) concentrated in the more profitable mobile segment. Hence SK Hynix has been highly profitable during the expansion/peak phases of its business cycle. Currently it is delivering 61% gross margin, 36% net margin and still enjoying a reasonably strong demand outlook (in terms of volume). So, the natural question to us was, "Why is SK Hynix trading at a low valuation of 4-5x FY18 P/E?".

1Q18 Global Branded DRAM Market Share



Source: DRAMeXchange

1Q18 Global Branded NAND Flash Market Share



Source: DRAMeXchange

Just Another Boom and Bust Cycle?

The main issue with memory is that it has always been perceived as a commoditized industry with boom and bust cycles: where continual price erosion is almost necessary as a trade off for market expansion, and players rush to expand capacity during boom times only to see massive new capacity come on-line as the cycle turns. Hence, after a period of high memory prices (DRAM and NAND prices appreciated as much as 200% in the last two years depending on specifications), investors are naturally weary of an imminent price correction. Generally, for most commodity cycles, the higher the prices and the longer the up-cycle, the more significant the fall in prices. For the memory industry, like any other commodity, supply and demand are the main drivers for pricing. In this current cycle for memory chipmakers, the prices for both DRAM and NAND have risen significantly as robust underlying demand coincided with capacity constraints for both. Despite memory chipmakers' attempts to expand capacity by both increasing wafer capacity and bit growth (memory is measured in bits and bit growth measures the bits produced per wafer), they failed to keep up with the pace of demand. We recognize that current memory prices are high and likely at or near to the peak of the cycle, hence the valuations are low (4-5x FY18 P/E) because they are based on peak earnings. In other words, the market has very limited earnings visibility, does not place much trust on the analyst's forecasts,



and therefore anticipates a sharper correction in prices than analysts are incorporating into their forecasts. Arguably, memory chipmakers are now trading on a 'real' P/E (based on normalized and average cycle earnings) that is much higher than the current 4-5x levels. However, considering the changing demand dynamics of the DRAM market, the technical limitations for significant future bit growth and the significant industry consolidation of memory chipmakers over the past decade, we believe there are enough reasons for us to question some common preconceptions of this industry. Thus, we reluctantly pose the dangerous question: "Is this time different?"

Better DRAM Demand and Supply Dynamics

To appreciate the current DRAM and NAND industry dynamics, we need to understand what these two types of memory are used for and what are the causes behind the current tightness. DRAM is the key component needed for computing calculations. As the world's needs for analytics continue to increase at an exponential rate, it is not difficult to see this trend driving robust demand for DRAM. Some obvious examples of such data intensive processing application are artificial intelligence, big data customer profiling, virtual reality and/or augmented reality, edge computing (e.g. video surveillance cameras used to simply record analog images, but now increasingly, they simultaneously record and analyze such images locally rather than at a central server) etc. We are moving towards a future where every data point, collected online or offline, will be analyzed and cross-analyzed against seemingly unrelated data to create a giant information matrix that has no end. NAND, on the other hand, is used for storage. It is a non-volatile memory (i.e. data can be retained even when there is no power), NAND can deliver both high performance and high storage capacity at a relative low cost. Like DRAM, it is not hard to envision ever rising demand for memory storage in an increasingly data intensive future.

Both DRAM and NAND have traditionally served the PC, mobile and enterprise server markets, but the higher than expected demand at play in the current cycle has been driven by the proliferation of hyperscale servers, more commonly known as datacenters or cloud (interestingly, this coincides well with our research and subsequent investment in various datacenter supply chain players as detailed in our 3Q17 newsletter, *The Rise of Data Centers*). Since DRAM and NAND serve different purposes, the recent pricing cycle for both types of memory has been driven by different factors (although both have benefitted by the rise of hyperscale datacenters). We would argue that pricing dynamics in this cycle for DRAM has been driven by higher than expected demand whereas NAND's pricing has been more related to unexpected supply constraint. The proliferation of the data intensive processing applications leading to a seemingly limitless need for computing power, has translated into higher than expected demand dynamics driving and supporting DRAM prices this cycle.

NAND pricing on the other hand, whilst supported by robust storage demand, has been primarily driven by the supply disruptions caused by the industry's migration from 2D to 3D production technology. The industry's performance requirements reached a point where 2D planar NAND is no longer enough, hence pushing engineers to adopt 3D NAND by stacking multiple NAND layers. During this transition process, leading players like Samsung Electronics and SK Hynix encountered difficulty with yield rates and were unable to meet the industry's NAND demand. The supply shortage was so severe that it forced NAND suppliers to prioritize their production towards higher value server applications, thus, resulting in slower SSD (Solid

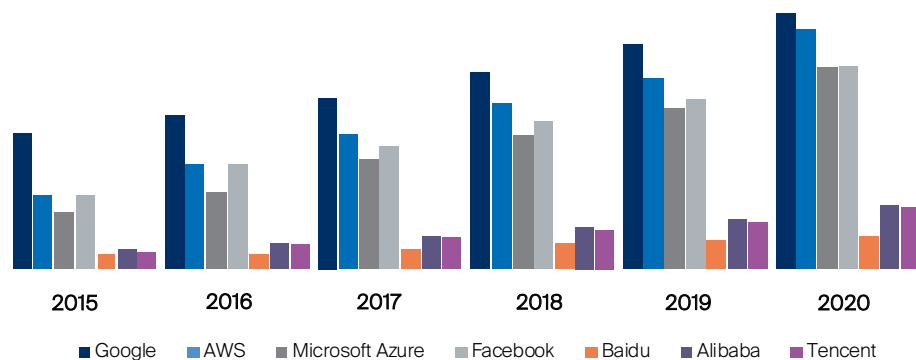


State Drive) penetration in PCs/laptops and limited NAND availability for lesser applications like Nintendo Switch etc. However, as most NAND memory suppliers completed their 2D to 3D migration and solved their initial lower yield challenges, they have been able to boost production volumes to catch up with demand. As this happened, naturally and expectedly, we saw NAND prices correct materially since the start of 2018, and consequently allowing SSD penetration in the PC market to resume (incidentally, this helps our investment in Silicon Motion, a leading designer of SSD controllers) as well as resolve the supply constraint in various low-end NAND applications. While the correction in NAND prices witnessed so far this year will have an adverse impact on SK Hynix's earnings expectation (and arguably its valuation multiples), our analysis suggests the magnitude will not be severe. This is because SK Hynix's revenue is almost 80% exposed to DRAM. In addition, the Company has recently benefitted from a mix improvement of its DRAM products as it shifts its volumes towards higher value server DRAM (as oppose to PC and mobile DRAM). Therefore, as it pertains to SK Hynix's valuation and future earnings growth prospects, it is far more crucial to understand the DRAM supply-demand dynamics.

We acknowledge that if DRAM supply outpaces demand growth, prices will inevitably correct, and the market's preconception of a typical boom and bust cycle for this industry will hold. However, two important considerations we put forward that would argue for a better demand and supply dynamics for the current (and arguably future) DRAM cycle. First, we consider the evolving nature of the sources of DRAM demand. Previously, the main consumer of DRAM was the PC and mobile markets but in recent years, hyperscale server market has grown to become a key component of demand. It is estimated that hyperscale server applications require 70% more DRAM content than those performed by traditional servers, given the greater computing and data analytics intensity.

It is also important to note that the proliferation of hyperscale servers not only translate into higher volume but also better pricing dynamics for the DRAM industry. This is because, while the PC/mobile markets are ultimately driven by fairly price sensitive retail consumers, the server market is driven by corporates. More recently most of the incremental growth from servers has come from the deployment of hyperscale servers by IT behemoths, namely Amazon, Google, Microsoft and Facebook. These players require higher and more complex DRAM specifications and tend to be less price sensitive. Thus, as a significant portion of DRAM demand shifts towards higher specification hyperscale servers, the DRAM market itself is becoming increasingly less price elastic. For these large and deep pocketed IT giants, industry leadership is crucial and hence their incessant obsession for market share dominance in their respective fields. They are focused on ensuring their computing infrastructure can attend to their complex data intensive processing needs, perform at top speed without compromising response times (especially during peak usage levels) and ultimately stay ahead of their competitors in all forms of future applications. Thus, for these players, their hyperscale servers and overall computing infrastructure are not viewed as costs in a traditional sense, but rather deemed as necessary investment to support future growth. Not surprisingly, these IT majors have announced capex increases of 50-200% this year and most memory chipmakers independently communicate that demand from the hyperscale server players is strong and with high visibility for the next 2-3 years.

Worldwide IDC Current Install Server Volume



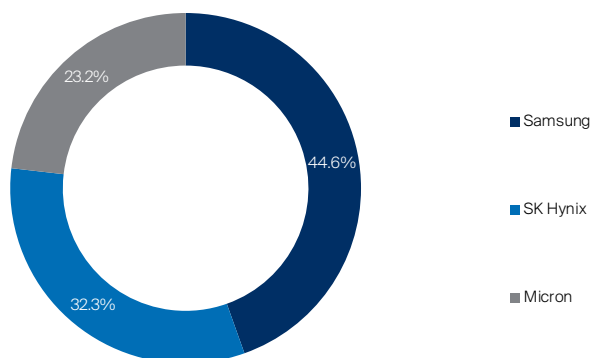
Source: DRAMeXchange

Now turning to the DRAM supply dynamics, one major factor to consider is how drastically the competitive landscape has changed. Over the years, the cyclicity of the memory industry has driven the market to significantly consolidate, with poorly managed players going out of business at the trough of the cycle and the number of competitive players in DRAM reduced from 32 to 3. In addition, the cost of node migration (the main lever that chipmakers use to achieve bit growth and cost down) is getting higher while the benefits are getting lower. For example, previously with node migration from 35nm to 25nm, DRAM makers could enjoy bit growth of around 40%+. Now with the recent node migration going from 20nm to 18nm, bit growth achieved was below 30%. Future node migrations are bound to yield even lower bit growth and present ever greater technical challenges of achieving adequate production yields during the transition stage. The combination of these two factors - less players and increasing cost/technical difficulties for node migration - should translate into greater capital expenditure discipline and more focus on profitability amongst the remaining players as the benefits of each node migration are not as obvious as before.

Conclusion

Considering the robust demand environment, a more consolidated industry structure and the increasing challenges/cost for chipmakers to expand capacity, DRAM prices are most likely to stabilize at or even correct slightly from current level, but significant price declines are unlikely in our view. These are the key reasons for why we see a less pronounced DRAM cycle going forward. With the remaining 3 main DRAM players (Samsung, SK Hynix and Micron, especially for server DRAM, where they are the only players with the technical capability) more focused on profitability as opposed to market share gains, along with strong demand from top customers and high barrier of entry, the DRAM industry can now be considered a good investment opportunity.

1Q18 Global Server DRAM Market Share



Source: DRAMeXchange

Relating back to our investment thesis on SK Hynix, the key driver for the stock is the trajectory of the DRAM market, which now accounts for the most significant part of its operations (certainly higher DRAM exposure than the market leader Samsung Electronics, and SK Hynix's server DRAM position is much closer to Samsung than overall DRAM). Admittedly, this has been historically a commoditized industry where investors have treaded with caution. However, with the stock trading at 4x FY18 P/E, the market currently pricing in a sharp correction in DRAM prices, and considering the positive structural improvements observed in the industry, we see SK Hynix as an attractive investment opportunity. Simplistically looking at its current and future earnings dynamics, we believe that for any year that DRAM pricing can be sustained at a reasonable level, SK Hynix should be an attractive investment in the next few years. We believe the market, on balance, is still tilted towards the view that the industry remains commoditized with sharp price adjustments over a cycle. Considering the positive changes in both demand and supply dynamics and looking at these implications going forward, we see SK Hynix as an opportunity to invest in a global leader with lucrative and sustainable DRAM business, and exposed to an industry with ever rising demand.