

Pounding the Table

Many times I have found stocks which offer high reward and relatively low risk, where the risk/reward profile is highly stacked in the investor's favor. It is my job after all to find such situations. Although I do not put stock in the "efficient market" notion that greater reward must *necessarily* be accompanied by greater risk, it is still generally true that these mispricings do carry a specific form of risk. When one finds a stock that is grossly mispriced, it is generally because market participants are skeptical of the future prospects or see risks to the business model, etc. An investor's job is to carefully analyze the company and determine whether these risks and uncertainties are real and significant or minor and illusory. Nevertheless, the investor can be wrong and the market participants can be right, in which case the investor may pay dearly for his mistake (or not, if he was careful to keep a sufficient margin of safety).

Rarely do I find a stock where the future is so clear, where the future is already happening, where the risks have diminished to the point that the investment is truly a no-brainer to double or triple over time. Where the company is clearly worth 2-3x the present stock price and yet there are no real risks to speak of. Such a situation is a pound-the-table buy.

We discussed our thesis on Silicon Motion at length a while back (see our Position Paper from Q2 2017) and have provided a number of updates since. But recent changes in Silicon Motion's industry and competitive positioning, changes which the market so far is overlooking, leave Silicon Motion as tremendously undervalued and with minimal risk. Right now, Silicon Motion is a pound-the-table buy. A breathtaking opportunity such like I have rarely seen. It is hard to fully convey my conviction and enthusiasm and the breathtakingness of the opportunity through writing alone. But please, as you read this paper, please imagine me there in the room with you pounding the table.

Quick Recap

As a quick reminder, Silicon Motion is a fabless semiconductor company, i.e., they develop, design, and sell the chips, but they outsource the actual manufacturing. Their market is flash controller chips which manage the NAND flash ubiquitous in modern computing. Wherever there is NAND flash, there must be a controller, often one from Silicon Motion.

Silicon Motion has worked its way up the value chain. From their humble beginnings of making controllers for USB keys and the like (low volume, low price, less sticky business), they then entered into and excelled in the eMMC market for smartphones (high volume, higher price). They slowly built relationships with the NAND flash manufacturers and moved further up the value chain to client SSDs (high volume, even higher price), a market segment which they entered mid-2014 and have won 25%+ market share in a few short years.

Over the years, Silicon Motion has outcompeted and outexecuted the competition. Even Marvell, a much larger heavyweight player, was unsuccessful in effectively competing with Silicon Motion. After continually losing design wins to Silicon Motion's superior solutions, Marvell eventually pivoted towards the enterprise SSD market and deemphasized the client SSD market. Silicon Motion has established itself as the premier merchant supplier for flash controllers, about four times the size of their largest competitor.

The biggest risk facing them has always been, not other merchant suppliers, but the in-house controller teams of the NAND flash makers themselves and the fear that NAND flash makers would take over the entire controller market for themselves, instead of continuing to outsource their controller needs. Indeed, this



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has occurred at times. Most notably, during the smartphone market's transition from eMMC to UFS, SK Hynix chose to develop their own in-house UFS controller rather than use Silicon Motion's controller as they previously did for eMMC.

Ultimately, these fears were proven overblown. Although Silicon Motion did take a hit from the lost business, it was prolonged over a few years, during which time they more than replaced the lost business with growth in other market segments and with other NAND flash partners. Indeed, Silicon Motion has gone on to become a major supplier of UFS controllers today. The longer trend has shown that NAND flash manufacturers are outsourcing their controller needs more and more over time and concentrating their own efforts where they can add value – at the high end of the market and in the NAND flash manufacturing itself. They have little incentive to compete for the high-volume lower-margin (relatively speaking) business that Silicon Motion excels in.

Silicon Motion has been highly profitable throughout, in better times and in tougher times. They have been highly cash generative, disciplined, shareholder friendly, and have maintained a cast-iron balance sheet (very high cash, no debt). They have remained focused on their business, executed well, continued innovating through downturns, and have built an enviable business.

As Silicon Motion entered 2021, management laid out their multi-year guidance, with goals to reach \$1 billion in revenue by 2023 (close to double their near-record 2020 revenues) while maintaining gross margin of 50% and substantially improving their operating margin to 30%. As Silicon Motion stressed at the time, this guidance was solely based on their present business lines and customers and was not accounting for future market segments or customer wins that had not yet materialized. This was an ambitious plan, nearly doubling their revenues and nearly tripling their profits in just three years. That would amount to an annualized growth of revenues and profits exceeding 20% and 40% respectively, hardly growth to be sneezed at. But that is not quite what actually happened. What actually happened has been even better.

Massive Growth Spurt

What actually happened is that instead of reaching this doubling of revenue and tripling of profits in 2023 as originally planned just a few months ago, they are now set to reach those levels in 2022. In fact, they almost reached all that tremendous growth this year alone, with 2021 revenue set to clock in at more than \$900 million and their current run rate already at the \$1 billion mark today. With more growth to come. This growth is *not* a temporary one-off bump, but a *permanent* change in Silicon Motion's market positioning as various industry changes move the controller market towards Silicon Motion's camp, while their main competition decreases significantly.

Let me repeat. Silicon Motion is experiencing a *permanent* step-up in revenues and margins. They are undergoing massive growth this year, with revenue growth close to 70% (after a near record-breaking 2020), to be followed by rapid growth next year, and further growth in years to come. At the same time, their margins are improving significantly due to the increased operating leverage, and margins can be expected to improve even further.

Yet the market is still awarding Silicon Motion a stock price close to its mid-2018 stock price when revenues were flat, guidance was cut, and they were experiencing serious competitive risks. Although the outlook has become brighter and clearer as the year has progressed, and management (who have historically guided conservatively and spoken with caution) has shared these positive developments quite emphatically,



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nevertheless the stock is right where it was in March before the multiple “beat-and-raise” quarters the company has achieved since. At the present price, the stock is trading at a P/E of about 12 (and when deducting the cash-heavy balance sheet, a P/E of under 10!) off of 2021 numbers (to be finished in just a few short months). This for a company in *middle* of a massive growth spurt whose main risks are vanishing. It is truly a breathtaking opportunity.

Semiconductor Chip Shortage

As was widely reported, one of the many knock-on effects of COVID-19 has been stress on the supply chain in multiple ways. The semiconductor industry has been no exception, and chip manufacturing has been undergoing, and continues to undergo, a major shortage of manufacturing capacity. This is especially felt in the more mature nodes (55 nm chips, 28 nm chips, 14 nm chips, etc.) that flash controllers need, where TSMC (the world’s largest chip foundry, who manufactures more than half of all outsourced chips worldwide), Samsung, and the other foundries are not in any hurry to add more fresh capacity.

Silicon Motion is a fabless chip designer and uses TSMC for all their chip manufacturing needs. You would be forgiven if you thought, that given the environment, Silicon Motion has had trouble producing chips due to lack of manufacturing capacity. And you would be right! Silicon Motion has repeatedly stated that they are unable to secure enough foundry capacity to satisfy all their orders and that they are forced to delay and turn down business as backlog grows. Silicon Motion’s controllers are a small but crucial part of the broader ecosystem, essential for any device that includes NAND flash, a fact appreciated both by TSMC and their mutual major end customers. Silicon Motion has therefore been allocated extra foundry capacity to facilitate their chip production, but Silicon Motion needs even more. Due to the capacity constraints, Silicon Motion has only grown 2021 revenue a *mere* 70%!

This comes after a near record-breaking revenue in 2020, where revenues grew just over 18% from 2019. For next year, 2022, Silicon Motion expects to continue to suffer from capacity constraints, but has nevertheless stated clearly that they have secured meaningfully more capacity from TSMC for next year. Silicon Motion has not yet unveiled formal guidance for 2022, and we are obviously more than a year away from actual 2022 results, but based on various assumptions and inputs, we expect Silicon Motion to grow revenues *at least* 30% in 2022.

With capacity constrained throughout the industry, both by TSMC and other suppliers in the chain (particularly packaging & assembly and substrate), Silicon Motion’s suppliers have predictably hiked prices to their customers, including to Silicon Motion. On the other hand, Silicon Motion’s large customers are generally under long-term contracts with Silicon Motion. In addition to contractually locked-in prices, these contracts customarily include additional discounts as volume levels are achieved. You would be forgiven if you thought that Silicon Motion is being squeezed between their suppliers and their customers, putting pressure on their margins. And you would be right! Due to the contract price lock-in with their customers and volume discounts on one hand and increasing costs from their suppliers on the other hand, Silicon Motion has indeed been experiencing pressure on their margins. Which is why Silicon Motion has only *expanded* margins a *mere* 35%! Operating margin has *increased* from 20% to 27% over the year, due to increased operating leverage from the huge increase in revenues and careful cost management and execution on Silicon Motion’s part. As the above margin pressures recede and as long-term contracts negotiated now reflect the present cost structure, and as



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they continue to benefit from increased operating leverage from further revenue growth, we expect margins to continue to increase in 2022 and beyond.

The growth Silicon Motion is experiencing is real and permanent. Although during shortages of supply customers often double order and build inventory, this is not the case for Silicon Motion's controllers. Inventory is not building up, not by Silicon Motion and not by their customers, as the controllers are being incorporated into end products pretty much immediately as delivered. Nor is the growth a temporary post-COVID phenomenon. Their growth is actually not so much from growth in end market products, some of which may indeed be temporary post-COVID bumps, but from accelerated market share gains. Smaller merchant suppliers and even in-house controller teams are having trouble sourcing the foundry capacity needed to manufacture controllers, and customers are turning to Silicon Motion for their controller needs instead. Once designed into a slot, Silicon Motion will typically keep the slot for years to come, especially for major OEM programs (the SSDs that are sold built-in with a Dell, HP, Lenovo computer, etc.) which tend to be extra sticky and which comprise the majority of their market share gains. In fact, Silicon Motion has some visibility into product roadmaps and design wins a few years into the future, and they are *increasing* their design wins and product share both next year and the years after.

End Markets and Competition

Silicon Motion presently serves 3 major end markets, and in each of these end markets, they are experiencing a major growth spurt and decreased competition. The three end markets are eMMC, UFS, and client SSD. eMMC controllers are used by low-end smartphones and the IoT market (such as set-top boxes, smart speakers, smart TVs, home security, etc.). UFS controllers are taking over the premium and mainstream segments of the smartphone market. And client SSD controllers provide the controllers for the drives found in PCs, laptops, game consoles, and external drives, and are sometimes even used in data centers as well.

eMMC

eMMC is legacy technology. Until a few years ago, eMMC was the standard for the smartphone market, but it is now being replaced by UFS, except in the low-end segment. Silicon Motion has historically had a strong position in eMMC, being the sole supplier for SK Hynix's eMMC division, which was the number two player in the eMMC market. In recent years, Silicon Motion has expanded their presence in the eMMC market through a slew of module makers. (Module makers are mid-tier companies which do not manufacture NAND flash, but purchase NAND flash from the manufacturers and combine it with third-party controllers to provide solutions to end-users. Some of the module makers, such as Kingston, are themselves quite large and can be as important as OEMs themselves.) These module makers have greatly expanded the reach of Silicon Motion's eMMC controllers, with Silicon Motion being basically the sole significant merchant supplier for eMMCs.

But the story is getting even better. This year, Silicon Motion's eMMC sales received a major boost from Samsung's decision to exit the eMMC market. This was partially due to the February ice storm in Texas that caused major power outages. Samsung shut down their Austin fabs temporarily in anticipation of the power outages, and had issues bringing them back online for more than a month. Samsung's temporary fab closure exacerbated an already tight chip market, with this fab responsible, among many other chips, for the majority of Samsung's in-house controllers. Samsung has decided to shift their resources to higher-value chips



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and is exiting the legacy eMMC controller market which is relatively lower margin compared to their other chip opportunities.

Samsung's exit leaves Silicon Motion as the largest player in the eMMC market. Although eMMC is indeed legacy technology, do not be misled. It has a very long tail as NAND flash is incorporated in all sorts of new devices as the IoT market expands, with eMMC being the standard used for these lower end applications. This is on top of eMMC's traditional use for low-end smartphones, itself a high-volume market. Silicon Motion has grown its eMMC division greatly this year, and with Samsung's exit, they have further room to grow their share even as the eMMC end markets continue to expand.

UFS

UFS is the replacement technology for eMMC in the premium and mainstream smartphone segment. Although the market was initially nervous when SK Hynix chose to source their UFS controllers in-house, subsequent events have shown that these fears were overblown. Silicon Motion has gained share in UFS as the sole supplier to Micron, who has done very well in the UFS market with support from Silicon Motion's controllers. This year, Silicon Motion has added another UFS customer and continued its growth in the UFS segment. Next year, Silicon Motion's share in this segment is poised to grow even more as they add another five UFS customers and continue to take market share in a growing market.

Client SSD

Client SSD is another growing market where Silicon Motion is not only growing with the market but actively growing their market share as well. Silicon Motion has always had high market share with the module makers, supplying around 70% of their merchant controller needs. But with the lucrative OEM contracts, which tend to be higher value, higher volume, and stickier long-term relationships, their share was closer to 30%. Silicon Motion has diligently worked on these products and these relationships and are now witnessing the fruits of their labors from two and three years ago. In PCIe Gen3 controllers, Silicon Motion had only 25%-30% share with the OEMs. This year, they have grown their share to about 40%, with both their customers growing market share and additional new customers. In the upcoming PCIe Gen4 controller market (which will fully ramp up by the beginning of 2023), Silicon Motion has continued to gain market share, having won about 50% of the design wins and increased their customer base even further. They have gone from one NAND flash manufacturer customer last year to two this year (for their first iteration of PCIe Gen 4) to a total of eight customers next year (for their second iteration). Nor are they resting on their laurels; they are iterating quickly, with their next iteration due the year after, in 2023.

Competition

The common thread in all these markets is that Silicon Motion is growing its market share in growing markets, solidifying long-term relationships with sticky long-term customers, and seeing other suppliers exit the market, decreasing competition. In particular, the market has long feared that NAND flash manufacturers will use their in-house controller teams to squeeze Silicon Motion out of the market. Instead, we are witnessing the opposite. The NAND flash manufacturers are exiting the controller market and are increasingly turning to Silicon Motion to supply their controller needs in volume. This is removing the main competitive threat to Silicon Motion and is unlikely to reverse as the underlying technology and business incentives continue to militate in favor of outsourcing.



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Looking back over the long term trend, we see Marvell being pushed out of the market for client SSDs to pivot and refocus on enterprise SSDs. We see more and more NAND flash manufacturers choosing to source controllers from Silicon Motion, both for UFS and for client SSDs. We see OEM programs choosing Silicon Motion, with Silicon Motion winning a greater share of design slots each generation. Even a company like Kingston, which had a joint venture with Phison (a competitor of Silicon Motion) and historically used Phison controllers exclusively, has started using Silicon Motion controllers in significant numbers, ramping up further over time.

Even the last bastion of in-house controllers, Samsung, which historically and culturally has chosen to source all their controller needs in-house has now chosen to exit the eMMC controller market. There are even indications that Samsung may choose to outsource some controllers for client SSDs from merchant controller suppliers as well. If this does indeed occur, this would be great news for Silicon Motion, opening another whole line of potential growth for them from Samsung's approximately 30% share of the SSD market.

In much of the market, the flash controller wars are over, and Silicon Motion has won.

Future Growth

The growth story does not end here. In 2023 and beyond, Silicon Motion expects to continue to grow their share in their present end markets and to add new end markets as well. In 2023, Silicon Motion expects their enterprise SSD controllers to begin contributing meaningfully to revenues. The enterprise SSD controller market is a new field for Silicon Motion and has the potential to add very significant growth as it becomes a fourth substantial end market for the company's products. Silicon Motion has already shown its ability in designing and selling controllers as well as in moving up the value chain over the years, and we expect them to successfully break into and gain share in the enterprise market over time.

In addition, their Ferri division, which supplies the industrial and auto markets, although substantially smaller than their other divisions, is also doing very well. In particular, the auto market has the potential to add significant growth for the company as infotainment centers, telematics, and assisted driving capabilities continue to become richer and broader. This is increasing the need for NAND flash and hence for controllers. The auto market is an attractive market as it has higher value, higher margin products, and tends to comprise very sticky multi-year deals.

Finally, although their Shannon division, which supplies Chinese hyperscale data centers, has never quite reached the potential hoped for it, the potential is still there and can be viewed as at least a free option.

Valuation

With ~\$15 in net cash and almost-cash assets and a 2021 EPS that we expect to top \$5.30, \$67.66 (the closing price as of Friday, October 15) is way too cheap. That's a P/E ex-cash of under 10! For a company that is experiencing a massive growth spurt, growing close to 70% this year, 30%+ next year, and further growth in years to come. For a company that is experiencing a *permanent* step-up in revenues, with significant increases in operating margins and further increases to come. For a company whose main competitors (in-house controller teams) are exiting the market and ceding the field to them. I don't usually pound the table, but if any idea is a pound-the-table idea, this is it. And if you pass on the idea to others, make sure to pound the table as well.

