2023 Chip Wars

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Amidst escalating tension between the US and China, the semiconductor industry has earned a special place in the front of policymakers' minds in both nations. Over the past year, we have witnessed a rapid escalation in the "Chip War" to perhaps the single biggest flashpoint in economic policy between the two countries. The conflict has also drawn in Taiwan, the EU, and Japan, all important players in the semiconductor industry. For investors, it touches three major investable subsectors:

1) Semiconductor design firms - such as Nvidia and AMD, who design the most advanced logic chips in the world, leveraging the latest fabrication processes.

2) Semiconductor manufacturers - such as TSMC in Taiwan and SMIC in China.

3) Wafer fabrication equipment (WFE) companies making advanced machinery that produce leading edge chips, in particular ASML, Applied Materials, Lam Research, KLA Tencor, and Tokyo Electron.

All of these companies have experienced a cross current of headwinds and tailwinds from recent policy changes, with varying impacts. Given many of these companies represent large and highly profitable oligopolies that represent the backbone of the global technology industry, we find the short- and long-term implications topical and worth understanding for investors.

Origin of semiconductor tensions - The beginnings of the conflict can be traced to 2014, when China created the China National Integrated Circuit Investment Fund, an approximately 100Bn RMB ($15Bn USD) semiconductor fund to invest in and develop national industry champions. This was followed by a subsequent 200Bn RMB ($30Bn USD) fund to be deployed over 2019-2024. Throughout this period, China also acquired a number of small foreign semiconductor companies, such as Mattson Technology and Silicon Solutions in the US.

This approach proved difficult to scale, however, as larger acquisitions such as Axitron in Germany and Lattice Semiconductor in the US were blocked by US regulators. Combined with a new US administration committed to a more hawkish approach to China, it also sparked a deeper re-evaluation of how the US should approach China's semiconductor ambitions. This had two main policy outcomes enacted over the second half of the Trump administration and the first half of the Biden administration:

1) Export restrictions placed initially on wafer fabrication equipment (WFE) vendors and subsequently on design firms, and;

2) The CHIPS act passed in 2022, a massive subsidy package primarily for the US domestic chip manufacturing industry.

These export restrictions would make the development of leading-edge chips in China extremely difficult and mean domestic manufacturing firms would be stuck with technology from the mid-2010s. Recently, rumors have surfaced that China is preparing an even larger domestic subsidy package in response.

Short term impacts: The shorter-term winners and losers of these policies are relatively straightforward. Short-term losers include: 1) Non-Chinese semiconductor design firms & 2) Non-Chinese wafer fabrication equipment (WFE) companies If the "leading edge" design and WFE firms cannot ship their most advanced products to China, they will see some level of demand destruction and domestic substitution. These companies have largely quantified this amount already, and Chinese customers have been stockpiling chip and equipment inventories for some time in anticipation, suggesting there has been some 'over earning' over the last year or two. Short-term winners include US manufacturers such as Intel and GlobalFoundries, who we expect will see some tailwind from subsidies.

Long-term impacts: However, the longer-term picture is more complex. Long-term winners include: 1) Chinese design firms - export restrictions may provide more oxygen to Chinese competitors design firms, especially with the rise of RISC V (the first widely adopted open-source instruction set architecture). While RISC V startups are a long way from threatening Nvidia or AMD, they provide an alternative technology pathway for investment by China. 2) Likewise, Chinese foundries such as SMIC or YMTC will have greater reason to turn to domestic WFE vendors such as NAURA in etching or SMEE in lithography, even if they are 10+ years behind foreign competitors. 3) US subsidies also remain open for foreign firms investing on US soil, and TSMC has been quick to announce two sites in Arizona, one in Japan, and active talks about an EU site. This means Intel will not get a free lunch either.

Conclusion: Ultimately, investors who have been comfortably invested in global semiconductor oligopolies will have an additional threat to watch - well funded and determined competition from China. However, like we have witnessed in aerospace or e-commerce, increased funding and even successful domestic firms may not have a significant impact on the market structure abroad. US semiconductor design champions may also benefit from a more diversified and heavily subsidized manufacturing footprint around the world. Still, it will be table stakes to monitor how this competition evolves over the coming years and decades.

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