Semiconductors: the key to unlocking to-day's global economy

Published 1 February 2023

Christopher Gannatti, CFA
Global Head of Research

At WisdomTree, we spend a lot of time writing about resources. There are certain commodity resources that will help the world transition to 'greener' sources of energy. There are certain food resources necessary to feed a growing global population. There are certain monetary resources that allow different economies to pay to secure different standards of living for their populations.

But one thing that events of 2022 made clear was that access to one type of thing—semiconductors—might be the key that unlocks the capability of further participation in the world's economy.

Follow the money

'Follow the money' is an expression frequently used as a tool to help an observer to better understand what is important in a given economic system. A quick look back at 2022 shows us1:

- In September 2022, Intel pledged to invest at least $20 billion in Ohio in two new factories to make semiconductors.
- In October 2022, Micron indicated expectations to spend $20 billion by the end of the decade—and eventually perhaps $100 billion over time—on a new manufacturing site in upstate New York.
- In December 2022, Taiwan Semiconductor Manufacturing Co. (TSMC), indicated a plan to increase investment in Arizona to a figure around $40 billion and build a second new factory to create advanced chips.
- US companies, generally, have pledged nearly $200 billion for chip manufacturing projects since early 2020.
- China is working on a more than 1 trillion yuan (roughly $143 billion) support package for its semiconductor industry, seeking to counter the impact of US restrictions2.

On 30 September 2022, we had Chris Miller, author of the recent bestselling book Chip War on the Behind the Markets podcast. Chris' book gives an excellent historical foundation to help in understanding where we are today—that access to cutting edge semiconductors is deemed to be the primary determinant in participating in the next phases of global economic growth during the 2020's. In his book, you see how this dynamic impacted3:

1. The Cold War: namely how the US was able to allocate resources in ways that promoted the miniaturisation of semiconductor technology, while the Soviet Union was unable to keep up.

2. The current dynamics we are seeing with China vs. the US. There are certain links in the 'semiconductor value chain' that are currently in US control, which means that the US can denote certain types of technologies that it doesn't want to end up in China. While it doesn't mean that China would never gain these technologies on its own, the degree of expertise required to attain them is something expected to take both massive financial resources and years of time.

3. Japan's rise in the 1980's, and subsequent stagnation. Japan's companies went 'all-in' on memory chips. In the 1970's and 1980's, this move was deemed prescient, and Intel CEO Andy Grove's move toward logic chips—what we think of as central processing units (CPUs) today—was viewed as an existential bet. When the market shifted to valuing CPUs more highly and memory chips becoming commoditised, Japan was flat-footed.

4. If one is looking at recent military conflicts where weapons are actively deployed, one can see a notable difference—for instance between the NATO-supplied weapons Ukraine is using vs. Russia's standard arsenal. There is a reason why Ukraine has had the success that it has even if one looks at the size of Russia's perceived military might and figures the scale is anything but balanced.

Illustrating the cyclicality of semiconductors

Even if people read the above and agree about the world's focus on semiconductors, the recent equity market performance of many of the stocks has been quite poor. While we wouldn't say we could 'pick the bottom', be it in the performance of semiconductor companies or really any others, it is always notable to bring back the longer context. Figure 1 looks at the PHLX Semiconductor Sector Index (SOX Index) to give an impression of the valuation of semiconductor stocks.

- The run up in valuation of semiconductor stocks between roughly January 2019 to roughly January 2021 was significant—we see the trailing price-to-earnings (P/E) ratio go from just below 15.0x to around 35.0x (and is possibly one reason why we've seen such a correction). The market seems to fluctuate around an average somewhere between 20.0x and 25.0x; in each case where it has gotten above those levels, it has ultimately come back.
- The last time the P/E ratio of semiconductor companies was below that of the S&P 500 Index for a period of time, it presaged a subsequent run up in valuation. We cannot say for sure that this will always be the case, but we can note that the business activity of the companies does tend toward a boom-and-bust pattern. Demand outpaces supply. There is capital spending. Capacity increases. Then, eventually, supply outpaces demand. Prices drop. Capital expenditures go down. Inventories eventually drop. And the cycle repeats and repeats.

- The difference now, if there is one, is that interest rates are much higher and we are faced with what may be a general global recession. It doesn't mean we need semiconductors any less in the medium to long term, but it may impact the speed with which we work through this cycle. Short term, we may see a lot of volatility, even if we believe in the long term we could be looking at a strong opportunity.

Figure 1: Semiconductors have a history of trending ups and downs with respect to valuation (1 April 2013 to 6 January 2023)

Source: WisdomTree, Bloomberg. Period from 4 January 2013 to 6 January 2023. SOX Index is the Philadelphia Stock Exchange Semiconductor Index. P/E ratio stands for the trailing 12-month price-to-earnings ratio.

Historical performance is not an indication of future performance and any investments may go down in value.

Thematic universe or semiconductor universe?

In 2021, WisdomTree put together its 'Thematic Universe'—a classification system through which we are able to look at sensible groupings of thematic investment strategies. This is really our attempt to bring orderly updates to the gigantic menu of options that growth-oriented equity investors face today.

Amongst our more than 40 different thematic sub clusters, shown in Figure 1, we pose one simple question: can you find even one of these topical areas that could find scale and excel without making use of semiconductors?

The diversity of semiconductors is truly astonishing. Certain parts of our daily lives are being facilitated by older, less capable semiconductors while other parts are being powered by chips much closer to the 'cutting edge.' If anyone is thinking about smartphones, the more capable models of the iPhone 14 are running 4 nanometre chips, which is close to the most advanced level that the world can currently make4.

Figure 2: WisdomTree's Thematic Universe

Source: WisdomTree. Classification as of WisdomTree's quarterly market analysis, 30 September 2022. Darker shaded boxes indicate areas where WisdomTree has a thematic strategy that may reasonably be considered as part of that grouping.

Historical performance is not an indication of future performance and any investments may go down in value.

We would make sure to note even if each of the clusters requires semiconductors, not all of the clusters would require access to the world's most advanced semiconductors. You might have seen the articles about the US restricting Nvidia from selling its A100 chips to China, but when people are unable to source new vehicles because of a lack of semiconductors, it wouldn't be correct to assume that most chips in cars are on the same level of the A100. There are chips that could cost more than $1000, and there are chips that can cost closer to $1, and everything in between.

2023: an entry point for semiconductors (or related thematic strategies)?

In 2022, we spent a lot of time talking about cybersecurity. Even if the share prices of the companies, generally, did not perform well, the story of cybersecurity being a necessity was and remains to be very clear. We would argue that, if we continue to live in a world where electronics are touching us many times daily, the story of semiconductors being a necessity is even clearer. However, even if we can make a case that we always need semiconductors, the share price performance of the companies is certainly not always positive.

As we noted earlier, semiconductors have historically been characterised by a high degree of cyclicality, meaning lots of booms and busts as opposed to a path of steadily increasing returns. 2019 and 2020 were quite positive years, leading to companies increasing capital expenditures…which leads to increasing the supplies of semiconductors…which eventually leads to supply outpacing demand and prices of different chips falling. All semiconductors are not created equal, the Nvidia A100 chips in datacentres to train the most advanced artificial intelligence models has one source of demand, whereas the inexpensive chips used in high volumes in the automotive industry have a different source of demand. There were different arguments advanced about how in sync or out of sync the different types of semiconductor demand might or might not be5, but the general trend of share price performance was more negative than positive in 2022.

Then, suddenly, in November 2022 we (and many others) saw Warren Buffett's Berkshire Hathaway place an investment of more than $4 billion into TSMC6. Any investment in TSMC can have myriad underlying drivers but, broadly speaking, most modern conveniences that we enjoy in the Western world would face significant headwinds without the benefit of TSMC's products.

At WisdomTree, we can't say we can call the bottom on semiconductors, but we can say that few things capture as much of the world's focus…and money. We tend to like semiconductors tied to specific, advanced functions, like semiconductors specifically designed for autonomous driving applications or semiconductors specifically designed to aid in training advanced artificial intelligence models. While people can decide on individual companies, we think that artificial intelligence cannot exist without semiconductors, so it's possible to gain diversified exposure to semiconductors participating in this specific area for those interested.

1 Source: Unless otherwise stated within these bullets, Clark, Don & Ana Swanson. "U.S. Pours Money Into Chips, but Even Soaring Spending Has Limits." The New York Times. 1 January 2023.

2 Source: Zhu, Julie. "Exclusive: China readying $143 billion package for its chip firms in face of U.S. curbs." Reuters. 14 December 2022.

3 Source: Miller, Christopher. Chip War: The Fight for the World's Most Critical Technology. Simon & Schuster, Inc. 2022.

4 Source: Ting-Fang, Cheng. "TSMC reaffirms 'commitment to Taiwan' despite US chip push." Financial Times. 3 January 2023.

5 Source: Sundstrom et al. “Semiconductors: A Less Cyclical Future.” PIMCO Blog. 10 June 2022.

6 Source: Platt, Eric. “Warren Buffett’s Berkshire Hathaway buys $4bn stake in chipmaker TSMC.” Financial Times. 15 November 2022.

Related blogs

+ What’s happening in semiconductors? The next chapter

+ Many Megatrends Depend on Semiconductors. What’s Happening in the Space?

Related products

+ WisdomTree Artificial Intelligence UCITS ETF - USD Acc (WTAI/INTL)

Important Risks Related to this Article

Important Information

Marketing communications issued in the European Economic Area ("EEA"): This document has been issued and approved by WisdomTree Ireland Limited, which is authorised and regulated by the Central Bank of Ireland.

Marketing communications issued in jurisdictions outside of the EEA: This document has been issued and approved by WisdomTree UK Limited, which is authorised and regulated by the United Kingdom Financial Conduct Authority.

WisdomTree Ireland Limited and WisdomTree UK Limited are each referred to as "WisdomTree" (as applicable). Our Conflicts of Interest Policy and Inventory are available on request.

For professional clients only. The information contained in this document is for your general information only and is neither an oer for sale nor a solicitation of an oer to buy securities or shares. This document should not be used as the basis for any investment decision. Investments may go up or down in value and you may lose some or all of the amount invested. Past performance is not necessarily a guide to future performance. Any decision to invest should be based on the information contained in the appropriate prospectus and aer seeking independent investment, tax and legal advice.

The application of regulations and tax laws can oen lead to a number of dierent interpretations. Any views or opinions expressed in this communication represent the views of WisdomTree and should not be construed as regulatory, tax or legal advice. WisdomTree makes no warranty or representation as to the accuracy of any of the views or opinions expressed in this communication. Any decision to invest should be based on the information contained in the appropriate prospectus and aer seeking independent investment, tax and legal advice.

This document is not, and under no circumstances is to be construed as, an advertisement or any other step in furtherance of a public oering of shares or securities in the United States or any province or territory thereof. Neither this document nor any copy hereof should be taken, transmitted or distributed (directly or indirectly) into the United States.

Although WisdomTree endeavours to ensure the accuracy of the content in this document, WisdomTree does not warrant or guarantee its accuracy or correctness. Where WisdomTree has expressed its own opinions related to product or market activity, these views may change. Neither WisdomTree, nor any ailiate, nor any of their respective oicers, directors, partners, or employees accepts any liability whatsoever for any direct or consequential loss arising from any use of this document or its contents.