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A look at semiconductors through a sustainability lens

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What sustainability factors do investors consider when analyzing the semiconductor industry? We delve into a comprehensive sustainability data analysis of the sector, using NVIDIA as an example.

With reports of increased emissions from Microsoft (up 30% since 2020) and Alphabet (up 13% y/y) due to investments in artificial intelligence (AI) and data center infrastructure, we see increased questions around the sustainability of the semiconductor companies that are powering this growth.

What sustainability factors are considered for semiconductor companies?

Fabrication facilities, where chips are manufactured, are capital- and resource-intensive; the manufacturing process at these facilities requires significant water consumption and generates harmful waste. Given the heavy competition on intellectual property and talent, social factors are significant as well. With the financial potential presented by the transition to a low-carbon economy, assessing the sustainability of semiconductor companies is not just a risk, but also an opportunity story. Applications for semiconductor companies across energy efficiency and other greentech products are wide, meaning the impact of products and services should not be understated. So, CIO's sustainability scores methodology assigns relatively even weights across the various sustainability topics, and we see ESG rating providers like MSCI and S&P assign relatively equal weights to the E/S/G pillars for semiconductor companies, too.

However, the sustainability factors investors may want to consider could vary depending on whether the semiconductor company is a manufacturer or a "fabless" semiconductor company (also known as designers). Semiconductor design companies (like NVIDIA) avoid insourcing the manufacturing process, making topics like carbon emissions and water consumption less material. For example, TSMC (a semiconductor manufacturer) has Scope 1 (direct) and Scope 2 (indirect) carbon intensity of 170 tCO2/USDmn and water intensity of 444 m3/USDmn, compared to NVIDIA's 5 tCO2/USDm and

15 m3/USDmn, based on data from S&P Trucost. Putting it into context, for every USD 1mn of revenue, TSMC emits the equivalent carbon as 20 residential homes in the US over a year (per the EPA GHG Calculator). This is comparable to the weighted average of the MSCI AC World Index.

While most sustainability assessments treat semiconductor manufacturers and designers the same, greater materiality considerations could be granted to the downstream value chains and human capital of fabless semiconductor companies. Additionally, the power demand of AI, part of chip manufacturers' scope 3 emissions (category 11—use of sold products), remains a key consideration.

How does the market view the sustainability characteristics of NVIDIA and semi companies?
NVIDIA, the name most in the spotlight in the industry, receives positive scores from most sustainability ratings (i.e., assessments of a company's operational sustainability). MSCI rates NVIDIA AAA and ranks it in the top 1% in its industry, S&P scores NVIDIA at 59/100, above the industry average of 25, and Sustainalytics assigns a low-risk rating of 13.2 (where lower is better), in the 97th percentile in the industry. Using the proprietary CIO sustainability scores, NVIDIA scores a 6.8/10, in the 99th percentile of the semiconductor industry.

Beyond NVIDIA, the semiconductor industry's median headline score is 4.0, compared to 3.5 for the broader covered universe. Beyond the median, we see a number of names scoring above average in the sector, while we are mindful of longer-term risks and opportunities. Investors should use sustainability data and scores in conjunction with fundamental investment analysis, and not use sustainability data in isolation to make investment decisions. Sustainability scores and data may be used as a starting point, but not a conclusion.

Despite high sustainability ratings, sustainable funds are underweight NVIDIA, with an average weight of 3.7% compared to the stock's 4.2% weight in the MSCI AC World Index, according to research by Goldman Sachs. As the focus on the enablers of the AI investment opportunity continues, we expect sustainability-focused investors to look for better relative performance—and transparency —in managing human capital as well as energy and water consumption. We also expect additional engagement efforts on these topics to continue. See the June 2024 SI Perspectives report for a view on climate risk and AI, and the proxy season.

Takeaways for investors

- As investors position to take advantage of the opportunity related to AI enablers, we see sufficient opportunities among companies in the semiconductor industry that are leading on sustainability factors.
- Sustainability issues are many and varied, affecting companies, people, and geographies differently. Being "sustainable" is a spectrum, not a binary assessment, and depends on the underlying investment strategy's intent.
- We consider ESG leader strategies to be those that invest in companies that manage sustainability risks and opportunities better than peers.

Read the full report **Sustainable Investing Perspectives: Semiconductors, three reasons to invest in people, and transition risk for real estate** 9 July 2024.

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