

---

**Market Commentary: January**

**While 2023 saw a downturn in semiconductor demand, semiconductor stocks outperformed the broader market.**

Following three years of very strong COVID induced growth, the semiconductor industry faced a downturn during 2023 – the seventh since 1990. Global sales fell approximately 10-12% as customers worked through inventories built up during widespread supply chain disruption following the pandemic, and a weakened macro-outlook dampened demand. Memory chips (semiconductors used for internal storage within a computer) performed particularly badly, with weak consumer demand and excess channel inventory on the whole causing prices for DRAM and NAND memory chips (which make up the majority of the segment) to fall by over 50% in the first half of the year (Gartner). Nonmemory chips fared far better during the downturn however, facing an overall decline of ~3% during the year. While they felt similar headwinds such as weakened demand and excess channel inventory, pricing held up – in fact, excluding memory, pricing per unit was up double digit. In addition, the demand for non-memory chips for Artificial Intelligence purposes offset the majority of declines elsewhere.

Somewhat counterintuitively, the Semiconductor market was the best performing GICS Industry during 2023, the MSCI World Semiconductor Index rising 90% over the year vs the MSCI World's 24%. While this was in part driven by the strength of one Magnificent Seven stock in particular, Nvidia (+238% USD), broad based gains were seen across the market, with the average semiconductor stock within the Philadelphia Semiconductor Index up 45%. The industry was the best performing in January 2024 too, and as the Fund's largest overweight industry position, this acted as a material benefit to Fund performance.

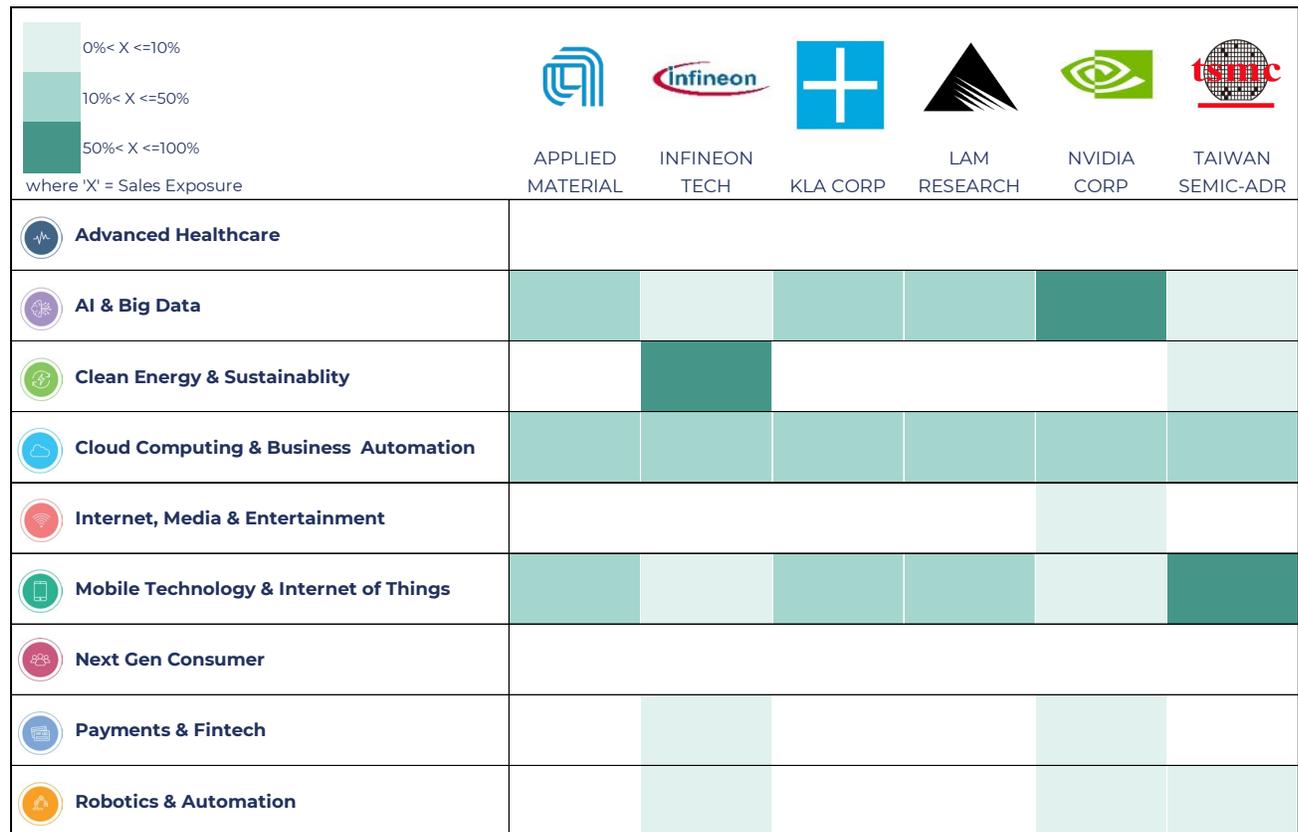
**The Fund's overweight position to the industry is a function of our bottom up process**

While we are certainly bullish on the long term outlook of the Semiconductor industry and note the exposure to many secular growth themes, our overweight position is a result of our investment process – focusing on 'bottom up' stock selection, rather than attempting to make 'top down' macro calls.

Within the Fund, our bottom up approach focuses on four key tenets: Growth, Quality, Valuation and Conviction.

- **Growth** drives long term returns – we focus on companies with exposure to long term secular growth themes, that are expected to grow faster than the market over time, and may offer more predictable, sustainable growth
- **Quality** protects against downside risks – we focus on high and consistent return on capital, balance sheet strength, and sustainable competitive advantages
- **Valuation** is important – we aim to avoid overpaying for (uncertain) future growth
- **Conviction** - high active share, 30 stock, equally weighted portfolio, long-term, low-turnover approach.

Our six holdings in the Semiconductor Industry are exposed across many of the growth themes we have identified, while also exhibiting the characteristics we seek in terms of growth, quality, and valuation.



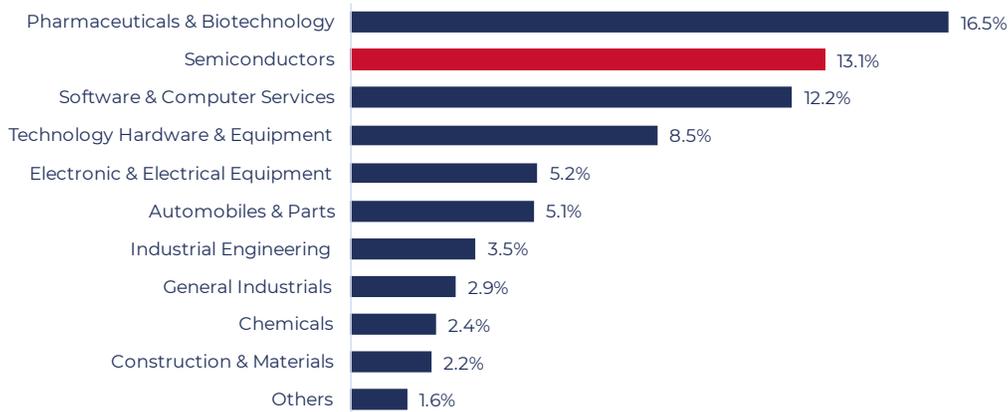
Source: Guinness Atkinson Asset Management estimates from company reports and literature

**Semiconductor companies are an important driver of global innovation, and thus, need to be innovative themselves**

Semiconductors act as some of the fundamental building blocks for technological advancement. Companies across end-markets are continually demanding increasingly complex, high-performing and efficient chips, across an expanding number of number of applications and different system requirements – all to drive innovation within their own products. For semiconductors to continue servicing these increasing demands, they need to innovate themselves. At the 'leading edge' - the most advanced and cutting-edge semiconductors – innovation is focused on shrinking the size of the 'node', and thus increasing the number of transistors per chip. Over several decades, progress in this area has seemingly followed Moore's Law. That is, that the number of transistors on a chip will double every two years, leading to an exponential increase in computational power and efficiency. TSMC has been at the forefront of this technological progress and are able to produce chips at the 3nm 'node', with a 2nm node offering 30% more efficiency expected by 2025. Even at the 'trailing edge' – older, more mature semiconductors – innovation is still important. Here, rather than pushing the limits of what is possible and where size may not be as important (such as in power chips), innovation is focused on improving the reliability and efficiency of chips, potentially through material science. Infineon is an example in this space, using a different architecture named "trench" technology which has superior performance in power semiconductors, as well as investing in innovative materials such as Silicon Carbide. To facilitate this innovation, the semiconductor industry is one the most R&D intensive second only to Pharma in 2022.

**R&D Intensity by Industry**

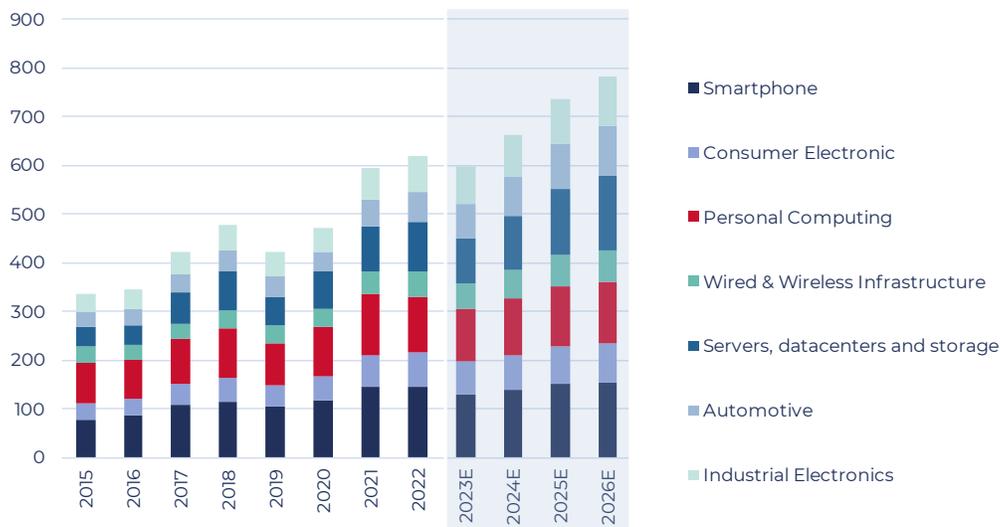
R&D as a percentage of sales, 2022



Source: EU Industrial R&D Investment Scoreboard; IC Insights; Guinness Atkinson Asset Management

While this is clearly a significant cost for semiconductor companies, a high investment allocation to R&D not only creates high barriers to new entrants, but allows the industry to continue growing, not only through providing improved, more complex and powerful semiconductors, but facilitating the development of new technologies in different categories and industries – as seen with the progress made in generative artificial intelligence across sectors over the course of 2023. Consequently, the semiconductor market has grown rapidly over the past decade. The below chart shows data and estimates taken from a presentation from ASML at the beginning of 2023, highlighting not only the significant historical growth (9.1% compound annual growth rate between 2015-2023) across a broad range of end-markets, but the significant growth expectations going forward. While these estimates did not reflect the ~10% decline seen in 2023 (the actual end market size ended at ~\$530bn, according to Gartner), they are also unlikely to reflect the longer term consequence of progress made with respect to generative AI during the year. Assuming the market can reach \$1 trillion by 2030-2032 (as multiple sources suggest e.g. IDC, Gartner and McKinsey), this would deliver a ~7-10% CAGR (2023-2030) – relatively in line with the historical trend.

**Semiconductor End-Market Size (\$,Bn)**



Source: ASML Investor Day November 2022, Annual Report 2022 (released February 2023)

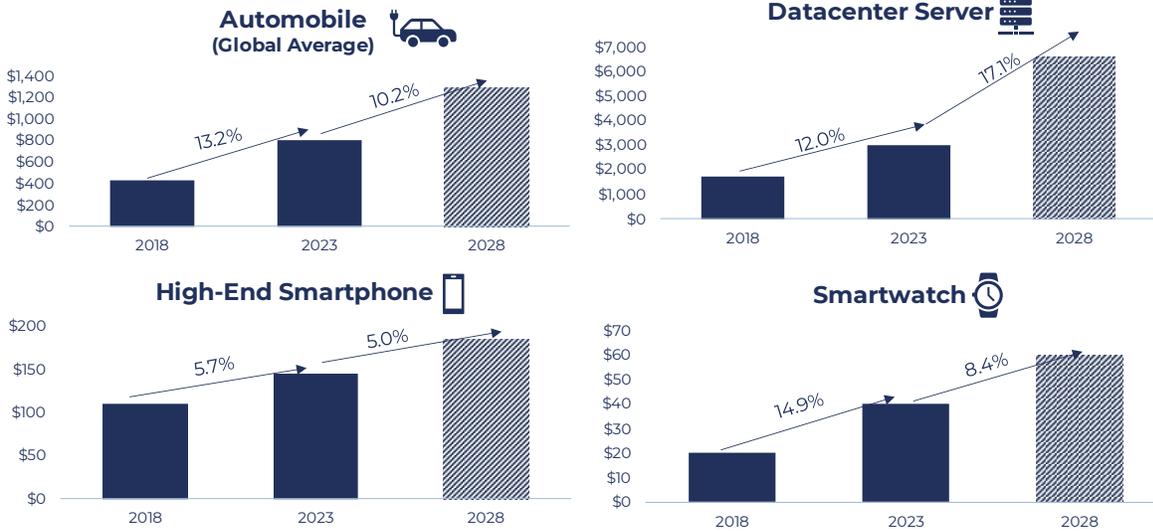
**Two of the fastest growing end-markets through to 2030 are expected to be Automotive and Datacenter, but growing ‘Semiconductor Content Per Device’ is not unique to these industries.**

**Automotive:** Growth in the auto’s semiconductor end-market (14% annually through to 2030, Bernstein) is expected to far outpace the broader sector, with long term trends such as digitalization, electrification and autonomous driving increasing the complexity and content of semiconductors within vehicles. Semiconductor content per vehicle averaged around US\$600-700 in 2021, and has nearly doubled from \$320 per car in 2014. It is expected to reach \$2000 by 2030. Semi content roughly doubles from an internal combustion engine vehicle to a battery or plug-in hybrid electric vehicle, and the expectation that EV’s (full or hybrid) will make up more than 50% of car production by 2027, a significant tailwind to demand. In addition, the increasing complexity and prevalence of infotainment systems will also drive semiconductor content within vehicles.

**Datacenter:** Datacenter is expected to be the second fastest growth sector over the remainder of the decade (+13% CAGR, Bernstein). We have seen rapidly increasing demand for cloud computing capacity across industries, not only due to more businesses and industries migrating on-premise infrastructure over to the cloud, but the rise of ‘Big Data’ and more data-centric analytics boosting demand for more efficient servers, and thus more complex, efficient and powerful CPUs and GPUs. Furthermore, advances in Artificial Intelligence, particularly following developments in generative AI during 2023, requires specialized hardware that has the ability to handle complex and energy intensive computations, with datacenters providing the necessary infrastructure for both the training and running of AI systems.

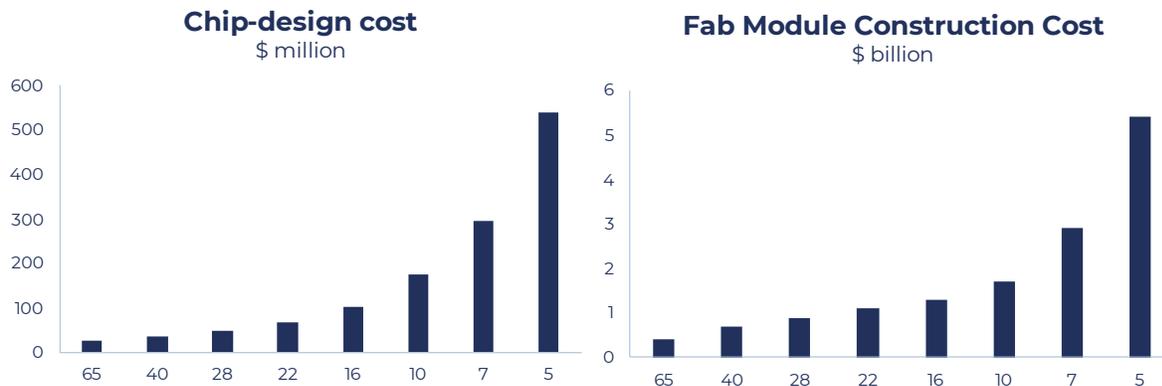
The increasing demands and complexity of the underlying products within these two industries is resulting in greater ‘Semiconductor content per device/unit’ (semiconductor content measured as the dollar amount). However, this phenomenon isn’t just present within Auto’s and Datacenter, but across many other use cases, as seen by the below estimates from Soitec.

**Semiconductor Content Per Device (\$)**  
 2018-2028 (Forecast)



Source: Guinness Atkinson Asset Management, Soitec Capital Markets Day 2023

**Facilitating the development of faster, more efficient and powerful chips at the leading edge is not cheap however.** We have already seen that the Semiconductor industry is one of the most R&D intensive industries globally, and part of this reason is the costs associated with fitting more transistors onto a given area. Advancing to smaller technologies becomes more and more complex, meaning that at each 'node' (the minimum distance between transistors on a chip) the cost increase is significant. The 'Chip design' cost can be seen below, showing an exponential rise in the development costs of each node. While no data is available yet, the 3nm node is expected to be ~\$1bn. The more significant cost, however, is the cost of the Fabrication Module (semiconductor factory), which is expected to be about \$5-6bn at the 5nm node. The cost of TSMC's 3nm proposed fabrication plant is estimated to be \$20bn, highlighting a significant acceleration in the costs required to progress the technology further.



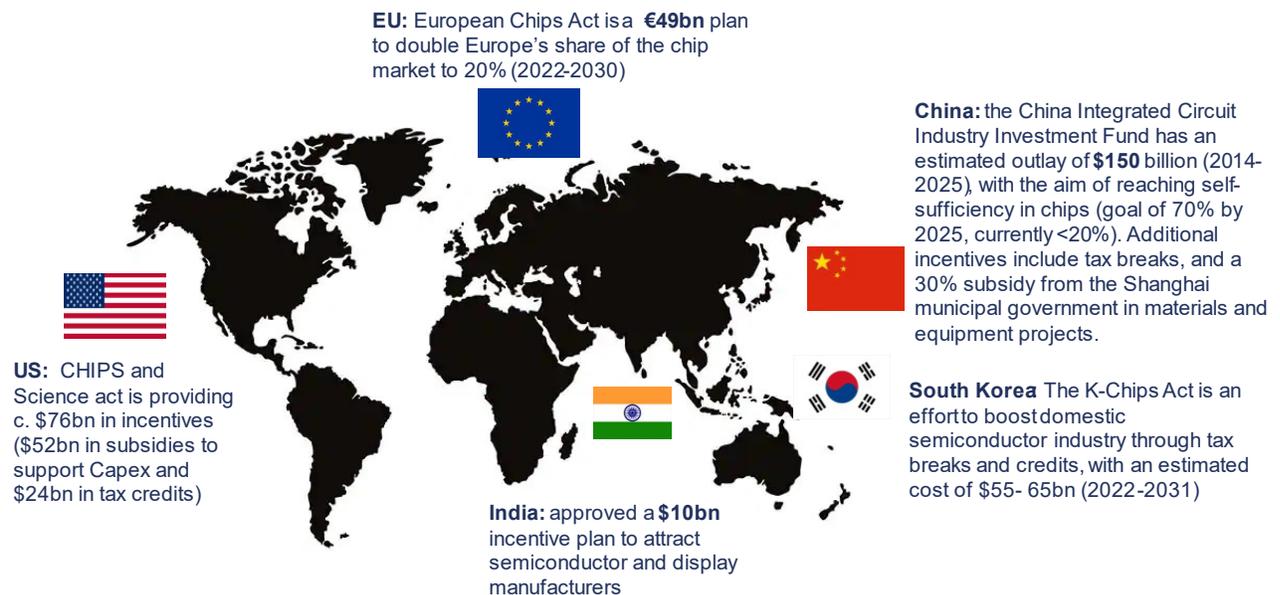
Source: McKinsey, IB, Guinness Atkinson Asset Management, August 2020

**Geopolitical tensions have driven governments to offer significant subsidies to accelerate the onshoring of chipmaking facilities.** The Covid-19 pandemic exposed vulnerabilities in the semiconductor supply chain, with varying lockdown measures across regions driving severe shortages in many areas of the chip markets. The global nature of the supply chain can be illustrated by this excerpt from Chris Miller’s Chip War.

*“A typical chip might be designed with blueprints from the Japanese-owned, UK-based company called Arm, by a team of engineers in California and Israel, using design software from the United States. When a design is complete, it’s sent to a facility in Taiwan, which buys ultrapure silicon wafers and specialised gases from Japan. The design is carved into silicon using [precision] tools produced primarily by five companies, one Dutch, one Japanese, and three Californian. [...] The chip is then packaged and tested, often in Southeast Asia, before being sent to China for assembly.”*

**- Chip War, Chris Miller**

The supply chain disruption exacerbated existing underlying tensions and concerns over national security and supply chain stability. Strained government relationships between the US and China have resulted in sanctions and restrictions over exports between the two countries since 2017, with the US ultimately aiming to limit China’s ability to acquire and manufacture chips at advanced nodes and thus slowing efforts to gain a meaningful foothold in industry and become self-sufficient. The US’s vulnerability is clear. While accounting for 25% of global semiconductor demand, the US possesses just 12% of global manufacturing capacity. Other regions have also weighed in to obtain their own slice of the rapidly growing and critical industry, with the EU, Japan, Korea and India all offering additional subsidies to incentivize chipmakers to build on their shores.



Source: Guinness Atkinson Asset Management, RBC Wealth Management

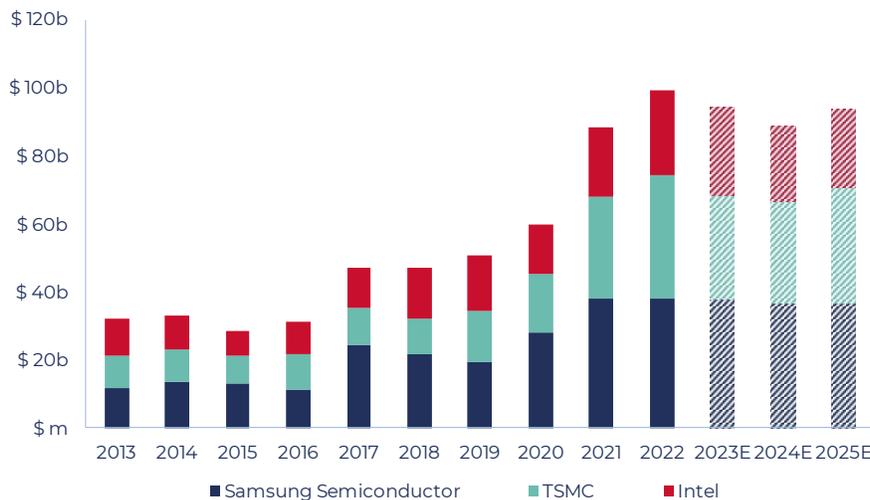
One concern with government subsidies is that they typically lead to the misallocation of capital, yet in the case of the semiconductor industry, we do not expect this to be the case, since these subsidies are coming at a time when companies need to ramp up on capacity in order to service the long-term

underlying growth trends. Either way, semiconductor equipment manufacturers such as Lam Research and KLA Corp stand to benefit from these long-term capex (capital expenditures) cycles.

**Foundries have responded with significant ramp-ups in CapEx.**

At the end of 2023, there were around 50 new semiconductor fabs being built globally (Z2Data), and an additional 23 expansions to existing sites. 40% of builds are in the US, with the value of US based semiconductor projects that are either announced, or under consideration, accounting for over \$200bn through to 20230 (McKinsey, ZData). Around 16 fabs are being built that will focus on 10nm nodes or smaller. Intel committed \$100bn to Capex on chip plants between 2022-2032, Samsung \$150bn in their foundry unit until 2030 and while TSMC slightly cut capex expectations to 2024, expectations remain above \$30bn annually. While 2023 and 2024 are expected to see slight year-on-year declines amongst the largest chipmakers with respect to Capex, this has been amidst a slight semiconductor downturn and high interest rate environment. Looking forward, in a stronger demand environment where interest rates are falling, we expect this spend to be at least stable, with the top 3 contributing at least \$80bn annually over 2023-2025. Even outside of the big 3 foundries, we have also seen Integrated Device Manufacturers such as Infineon (\$5.5bn over the next 5 years towards their Malaysian Kulim plant) and Texas Instruments (\$5bn annually to 2026) continuing to commit large-scale Capex despite a weakening demand environment.

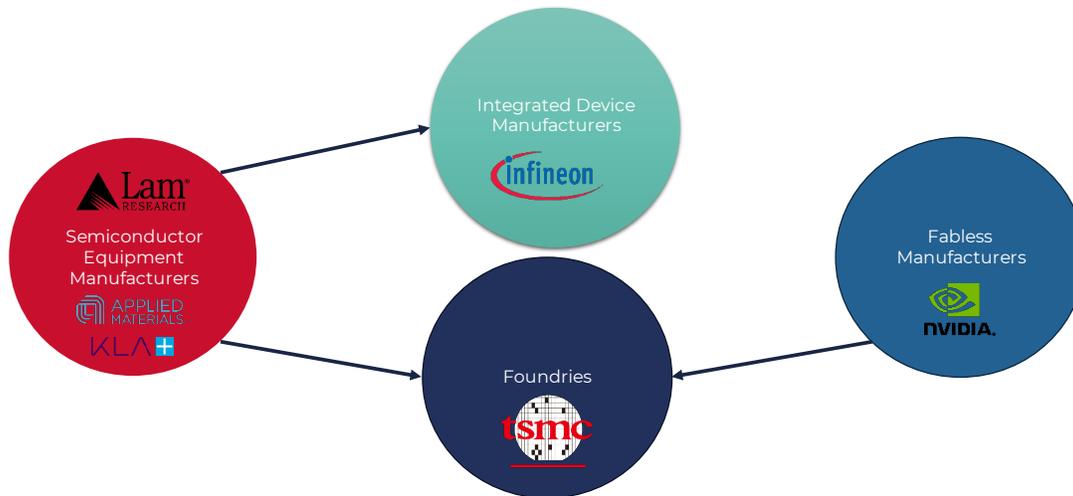
**Capital Expenditure of 3 Largest Foundries**



Source: Guinness Atkinson Asset Management, Bloomberg, Company reports

**Against this backdrop, we see significant opportunity across the value chain.** A simplified diagram of the Semiconductor value chain can be found below, along with Fund holdings within the sector. As a brief reminder, Semiconductor Equipment Manufacturers design, produce and sell equipment used in the fabrication of semiconductor devices, often specializing in areas such as photolithography, deposition and etching, or focusing on particular types of chips. They sell their equipment to foundries (or fabs), who specialize in the physical manufacture of semiconductors. ‘Fabless manufacturers’ are the designers of the chip, who outsource to foundries. An Integrated Device Manufacturer is essentially a fabless manufacturer and a foundry combined – they manufacture their own chips. Within the

Guinness Atkinson Global Innovators Fund, we hold a diversified set of semiconductor companies across regions and across the semiconductor value chain.



Source: Guinness Atkinson Asset Management

We can look at these companies across the tenets of the Fund.

**Growth opportunity:** We have already discussed the strong, underlying secular trends and growth within the industry, resulting in the expected ~7-10% annual industry growth between 2023-2030 – some of the key drivers being increasing semiconductor content per unit/device across industries, the shift towards electric vehicles and autonomous driving solutions (and more intelligent solutions in general), big data and artificial intelligence driving growth in data center demand, alongside rising demand for electronic devices in general and new technologies (Internet of Things, edge-computing, 5g etc). We have also discussed the significant capex requirements needed to achieve this.

Position in Value Chain	Company	Growth Thesis
Fabless Manufacturers		Nvidia is positioned at the center of exploding demand seen for Artificial Intelligence, possessing over 95% market share of the GPUs (graphics processing units) required for generative AI systems, establishing the firm as the dominant chipmaker for AI model training. While the risk to market share is certainly to the downside, this can more than be offset by the rapid growth and demand within the industry, and we expect the firm's strong IP and technological edge to offer a strong economic moat in this instance. And while AI may now be the core growth driver for the firm, Nvidia is also exposed to a number of other long term secular growth trends, including other areas of datacenter (high performance computing and edge computing/IoT), as well as the automotive industry (ADAS in particular). The firm is a natural beneficiary for the long-term secular trends discussed above.
Foundries		As is the case with Nvidia, TSMC is a natural beneficiary of the strong increasing demand for semiconductors across industries – particularly at the leading edge. The firm has been a pioneer in driving innovation at advanced nodes and is heavily investing in both fabs and R&D to

maintain this reputation and drive the growth of the future. As one of three companies that can produce chips at the 3nm node (and the only pure-play foundry) and a market share of 59% (54% in Q1 2022), the firm is firmly positioned at the forefront of technological process and will no doubt benefit from increasing demand across the semiconductor product spectrum.

Integrated  
Device  
Manufacturers



Infineon has positioned itself in some of the fastest growing areas of the semiconductor markets, in particular within Automotive and Green Energy transition. The firm has a leading position in Power Discrete and Modules, taking market share from 17-18% to 20% since 2016 and within the auto's power-semiconductor segment, the firm has 3x the share of its nearest competitor (>30%). This is also a firm who are investing heavily in innovation - the firm is regarded as the technological leader in Silicon Carbide (SiC), where the firm are now investing heavily in capacity (€5bn plant in Malaysia). The firm's SiC based chips offer higher performance within EV's and renewable energy products, in a segment of the market which is expected to undergo rapid market growth (~30% CAGR from 2022-2028), with Infineon's superior technology (trench technology vs planar, used by STM) expecting to drive market share gains from 20% to 30% over this period.

Semiconductor  
Equipment  
Manufacturers

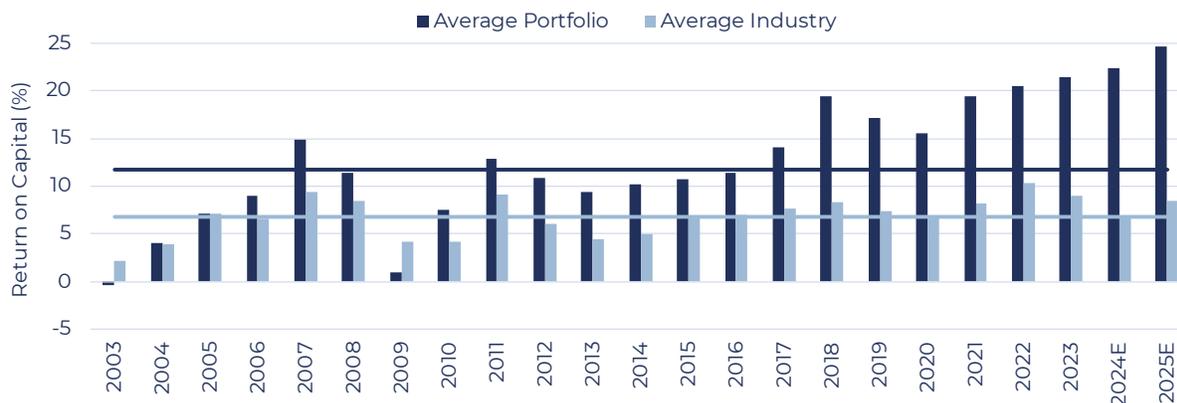


We have discussed in detail the significant capex requirements for the future growth of the semiconductor industry – all supported by long term, secular growth themes (artificial intelligence, cloud computing, energy transition, electric vehicles and autonomous driving etc) alongside the significant government subsidies on offer across regions to drive onshoring. Demand for new fabrication plants, both for technological advancement as well as capacity build-out, have resulted in significant capex commitments by firms such as TSMC, Intel, Samsung, Infineon and Texas Instruments. Together, these offer a significant tailwind for Semiconductor Equipment Manufacturers such as Applied Materials, KLA and Lam Research. Each is a market leader in some market vertical (KLA in Process Control, Lam in Etch and Applied Materials in Deposition and Epitaxy), offering significant exposure to these capacity build-outs. The 'growth' on offer for Semi Equipment Manufacturers is likely to be less cyclical and more consistent than the wider market, with multi-year factory build-outs allowing consistent demand – even if the underlying semiconductor market periodically weakens.

**Quality:** Within the Fund, we place significant emphasis on the 'Quality' of the firm. We believe that 'Quality' helps to mitigate against downside risks that a firm may be subject to – this is especially important for semiconductor stocks, which although have faced significant growth historically, has been highly cyclical. We have attempted to identify high quality names within the industry using analysis of financial metrics such as return on capital, balance sheet strength, margin profile, as well as from a more qualitative perspective. Our portfolio holdings demonstrate a superior Return on Capital to the broader Semiconductor market, as seen over a 20 year history. And while the market has seen declines since 2022, expected to continue next year, our average holding has shown continued growth over the same period. Over the past 5 years, our average holding has delivered a CFROI of 18.9% vs the average semiconductor industry member of 8.4%.

**Average Return on Capital**

Guinness Atkinson Global Innovators Current Semiconductor Holdings vs GICS Semiconductor Industry Members

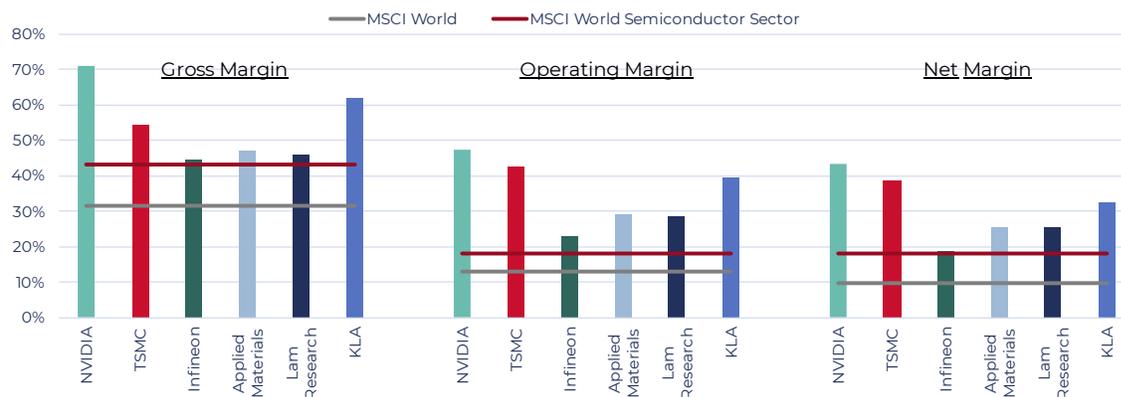


Source: Guinness Atkinson Asset Management, Credit Suisse

Fund holdings within the Semiconductor sector also offer a far superior margin to the MSCI World benchmark, and better than the MSCI World Semiconductor sector.

**Margin Profile**

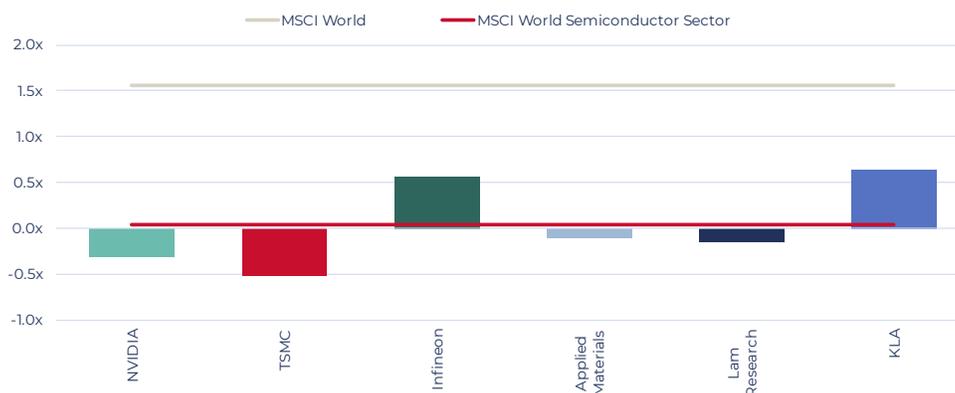
Guinness Atkinson Global Innovators Semiconductor Holdings vs Benchmark and Sector



Source: Guinness Atkinson Asset Management, MSCI, Bloomberg, Company Reports

Our companies also exhibit greater balance sheet strength than the benchmark, with an average Net Debt to EBITDA of 0x (the maximum being 0.6x), in-line with the MSCI World Semiconductor sector (likely skewed by Nvidia's large weighting) but materially below the MSCI World benchmark 1.6x.

**Net Debt to EBITDA Profile**  
 Guinness Atkinson Global Innovators Semiconductor Holdings vs  
 Benchmark and Sector



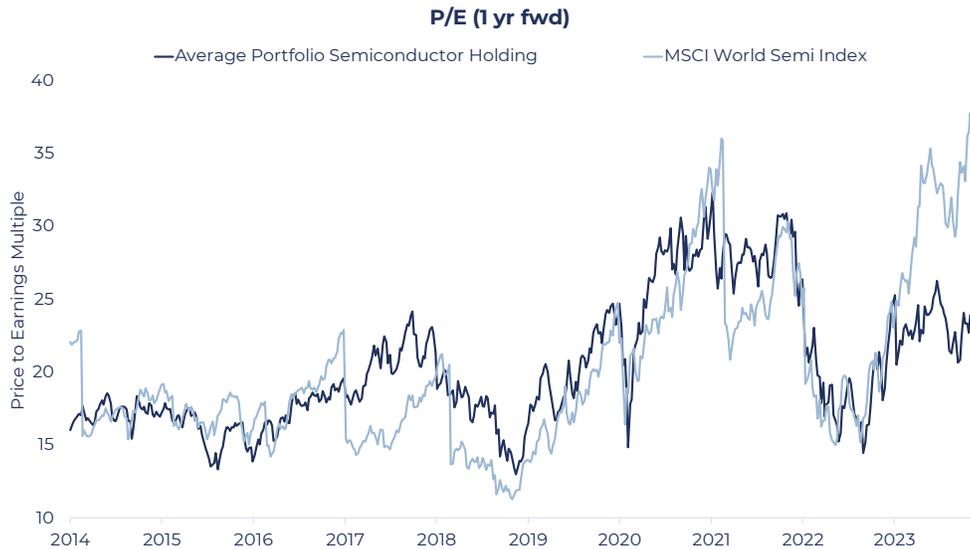
Source: Guinness Atkinson Asset Management, MSCI, Bloomberg, Company Reports

We also note the competitive advantages these businesses have:

- **High Capex Requirements create high barriers to entry** – while a high capex spend impacts the bottom-line of the firm, it also acts as a high barrier to entry for new entrants, who are unable to fund the high upfront costs.
- **Specialization creates economies of scale, another barrier to entry that reduces competition** – Many of our companies compete in highly specialized areas e.g. Infineon with power chips. Semiconductor design and manufacturing require deep expertise, and focusing on a specific type of chip allows a company to concentrate its efforts and resources on mastering the intricacies of that particular technology, but also create density in demand and thus economies of scale.
- **High IP industry** – Our companies have been operational for over 20 years, generating significant IP during that period. New entrants in any vertical would need to invest heavily to develop similar economies of learning.
- **These firms have a global presence.** While trade war risks offer substantial risk to companies with Chinese exposure, these risks are mitigated by a diversified revenue stream. Having diversification across our semiconductor holdings with respect to both region (e.g. Infineon is European based, TSMC is based in Taiwan), and place in the value chain (e.g. trailing edge firms such as Infineon are facing less scrutiny than the likes of leading-edge firms such as Nvidia with respect to trade risks) helps potentially reduce the overall portfolio risk.
- **Long term secular growth trends, more stable returns.** As discussed previously, the semiconductor industry is subject to multiple long term secular growth themes, which we believe will drive more consistent demand over the medium leading to lower cyclicality within the industry overall, and our holdings in particular.

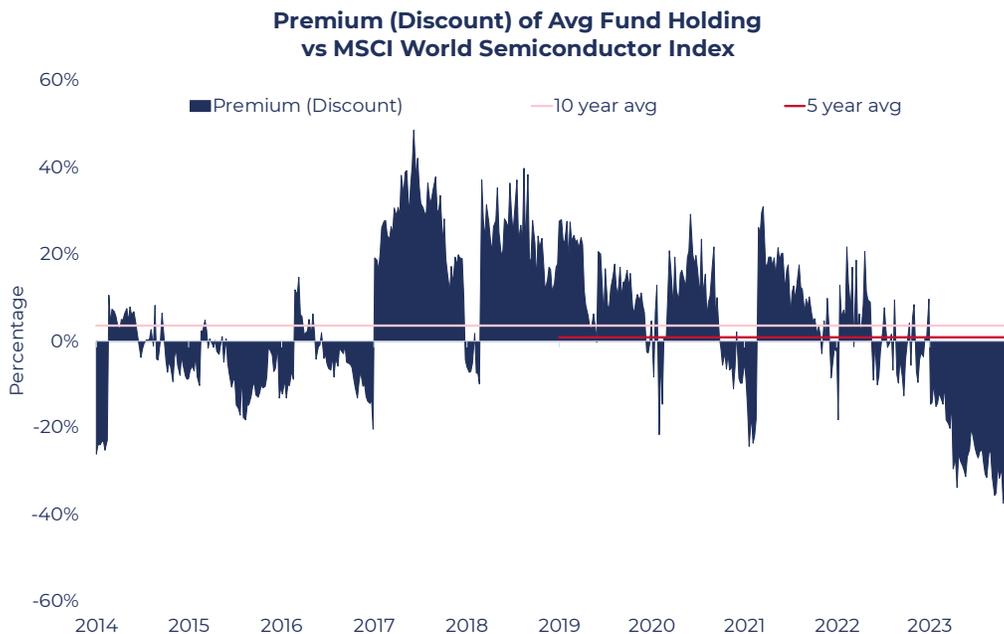
**Valuation**

Despite their superior characteristics, our holdings have, on average, typically been in line with the MSCI World Semiconductor Index valuation.



Source: Guinness Atkinson Asset Management, MSCI, Bloomberg

However, recently a significant discount has emerged.



Source: Guinness Atkinson Asset Management, MSCI, Bloomberg

With the exception of Nvidia, all of our holdings are at a discount to the MSCI World Information Technology index and the MSCI World Semiconductor index today.



Source: Guinness Atkinson Asset Management, MSCI, Bloomberg

We therefore continue to see good opportunities for the fund holdings in the semiconductor sector and believe they continue to have good pathways for future growth, and potential outperformance.

**Individual Stock Performance over the month**



**Meta (+10.2% USD)**

**Meta ended the month as the Fund's second top performer** (after Nvidia, already discussed in detail in the prior section). After suffering a tumultuous 2022, in which the stock ended the year as the Fund's bottom performer (-64.2% USD in 2022), Meta offset all of this negative performance in what was a stellar 2023 (+194.1% USD). This positive momentum continued into January, in what was quite a light 'news-flow' month, but with the stock benefiting from the outperformance of 'growth' and 'cyclicals', the stock outperformed the MSCI World by +8.2%. In February last year, after suffering significant criticism over spending plans related to the Metaverse in 2022, Meta shifted their focus towards their cost structure, cutting back on large-scale spending plans on Metaverse through their Reality Labs program, alongside making significant headcount reductions. More promisingly, from our perspective, was the underlying strength in the firm's core platform - after three consecutive quarters of negative top-line growth, revenues accelerated consecutively across the year, from -4.8% in 4Q22 (released in Q1) to 23.2% in 3Q23 (released in Q4). Daily Active Users and Average Revenues per User also accelerated throughout the year, driving 3Q23 advertising revenues of +23.5% year-on-year in 3Q23 – surprising to the upside for the 5th successive quarter. The firm's 'reels' product has been a key driver of this improvement, proving itself to be highly effective at driving greater engagement, while Meta has proven highly successful at monetizing nascent products, which should offer a continued tailwind into 2024. At its core, Meta achieved better engagement, more effective monetization, alongside a leaner cost base over 2023, allowing operating margins to return from all-time lows at the end of last year to a

level slightly ahead of their long run average by 3Q23. This is all while being subjected to a better operating environment. Positive sentiment around the stock continued throughout January, with multiple brokers upgrading their estimates for the firm ahead of the February earnings release. Meta's fundamental characteristics are looking stronger than ever, and we continue to see long-term growth for the firm.



**Anta Sports (-13.4% USD)**

**Following a difficult end to 2023, negative momentum continued into January for Anta Sports, ending the month as the bottom performer for the Fund.** China (and the Chinese Consumer Discretionary sector in particular) continued to come under pressure during the month as international investors pulled funds from the region after losing confidence that further economic stimulus from Beijing was on its way, despite a positive economic print for 2023. A solid Q4 operational update at the beginning of the month initially stemmed declines in the stock, as Anta, Fila and 'Other' brands accelerated high-teens, 25-30% and 55-60% respectively, but it was not enough to offset a broader sell-off in the region. Momentum turned more positive after Amer Sports, a Finnish subsidiary of Anta and maker of Wilson tennis rackets, announced plans to initiate the filing process for IPO in the US during the month, with the price range of shares at \$16-\$18, valuing the company at up to \$8.7bn. However, at the end of the month, the IPO ended up being priced well below this range pricing at \$13 a share, setting the valuation at \$6.4bn. Still, this represents a gain on the investment after a consortium led by Anta purchased Amer for \$5.2bn in 2019. Whilst we recognize the regional risks associated with the Chinese region, from a stock perspective, we remain confident in the long-term outlook of Anta Sports, which benefits from a number of long-term structural tailwinds. Beijing continues to promote exercise and sports, pouring billions into initiatives such as the "Healthy China 2030" Plan, which should serve to lift the sports industry's contribution to GDP. China's per capita spending on sportswear remains comparatively low at \$31, but as the middle class emerges, analysts expect this to rise to a similar level as Japan (\$110) by 2030 (US in comparison is \$307), and the country is experiencing rising participation rates in sports. The firm has a number of meaningful growth opportunities including geographical expansions as well as forays into the premium segment of the market. All in all, we believe the fundamentals behind the company remain strong, and underlying secular trends should serve to boost Anta's revenue profile into the long term.

We thank you for your continued support.

**Portfolio Managers**

Matthew Page, CFA      &      Dr Ian Mortimer, CFA

---

## Summary performance

Following the strong market rally seen in the final months of 2023, equity performance continued to tick up in January. A slight pullback in the first week of the year ended a nine-week bull run, but continued optimism of a 'soft-landing' later lifted the S&P 500 to all-time highs. The Fed's preferred inflation measure, Core PCE, continued to slow and came in below estimates at 2.9% YoY (vs 3.0% expected) during December, and economic data pointed to the strength of the US economy, with retail sales better than expected for December and initial jobless claims at their lowest level since December 2022. In an even greater indication of US economic strength, however, the Commerce Department announced at the end of the month that the economy grew 3.3% in the final quarter of 2023, well ahead of analyst expectations at 2%. While this strong economic and positive inflation data took equities higher, expectations of interest rate cuts were dialed back, dampening the strength of the rally, but not enough to overturn the strong positive momentum. At the end of last year, Fed Fund Futures were implying an 84% chance of a rate cut in the Fed's 2024 March meeting. By the end of January, however, this figure was just 34%, as Fed Chair Jay Powell poured cold water on the idea, causing the MSCI World to drop nearly 1% on the final day of the month.

During the month, relative performance of the Fund was driven by the following:

- The Fund benefitted from significant overweight positions to the two best performing industries, semiconductors and software, over the month. The semiconductor industry's contribution to Fund performance from an allocation perspective was supported by strong performance from Nvidia (+24.2% USD), the Fund's best performing stock over the month, and off-benchmark name TSMC (+8.6%), albeit offset by weakness in Infineon (-12.5% USD).
- From a stock selection perspective, the Fund also benefitted from strong stock selection within Health Care and Communication Services. In Healthcare, Novo Nordisk (+8.8% USD) was particularly strong, outperforming the MSCI World by 7.6% and the MSCI World Healthcare Index by 6.1%. Meta was the standout performer within Communication Services, delivering +10.2% and ending the month as the Funds second top performer.
- The Fund benefitted from a zero allocation to Energy, Consumer Staples, Utilities and Materials, which all underperformed the broader MSCI World index during the month.
- One of the biggest detractors to relative Fund performance was stock selection within Consumer Discretionary, with off-benchmark name Anta Sports (-13.4% USD), which suffered predominantly from regional headwinds as well as a slightly disappointing IPO of its subsidiary, Amer Sports.

as of 01.31.2024 (in USD)	1 year	3 years annualized	5 years annualized	10 years annualized
<b>Global Innovators, Investor Class<sup>1</sup></b>	28.70%	6.78%	15.42%	11.99%
<b>Global Innovators, Institutional Class<sup>2</sup></b>	29.02%	7.04%	15.71%	12.21%
<b>MSCI World Index NR</b>	16.99%	8.04%	11.39%	9.14%

as of 12.31.2023 (in USD)	1 year	3 years annualized	5 years annualized	10 years annualized
<b>Global Innovators, Investor Class<sup>1</sup></b>	39.34%	5.99%	17.31%	11.52%
<b>Global Innovators, Institutional Class<sup>2</sup></b>	39.70%	6.26%	17.60%	11.75%
<b>MSCI World Index NR</b>	23.79%	7.27%	12.80%	8.60%

All returns after 1 year annualized.

<sup>1</sup> Investor class (IWIRX) Inception 12.15.1998 Expense ratio\* 1.24% (net); 1.27% (gross)

<sup>2</sup> Institutional class (GINNX) Inception 12.31.2015 Expense ratio\* 0.99% (net); 1.10% (gross)

<sup>2</sup> Performance data shown for Global Innovators, Institutional Class (GINNX), prior to its launch date on 12/31/15, uses performance data from the Global Innovators, Investor Class (IWIRX).

*Performance data quoted represents past performance and does not guarantee future results. The investment return and principal value of an investment will fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original cost. Current performance of the Fund may be lower or higher than the performance quoted. For most recent month-end and quarter-end performance, [https://www.gafunds.com/our-funds/global-innovators-fund/#fund\\_performance](https://www.gafunds.com/our-funds/global-innovators-fund/#fund_performance) or call (800) 915-6566.*

\*The Advisor has contractually agreed to reimburse expenses (excluding Acquired Fund Fees and Expenses, interest, taxes, dividends on short positions and extraordinary expenses) in order to limit the Fund's Total Annual Operating Expenses to 1.24% for the Investor class and 0.99% for the Institutional class through June 30, 2026. To the extent that the Advisor absorbs expenses to satisfy this cap, it may recoup a portion or all of such amounts absorbed at any time within three fiscal years after the fiscal year in which such amounts were absorbed, subject to the expense cap in place at the time recoupment is sought, which cannot exceed the expense cap at the time of waiver. The expense limitation agreement may be terminated by the Board of the Fund at any time without penalty upon 60 days' notice.

**Mutual fund investing involves risk and loss of principal is possible. Investments in foreign securities involve greater volatility, political, economic and currency risks and differences in accounting methods. These risks are greater for emerging markets countries. The Fund also invests in medium and smaller companies, which will involve additional risks such as limited liquidity and greater volatility. The Fund's focus on the technology, internet and communications sectors are extremely competitive and subject to rapid rates of change.**

**Securities mentioned are not recommendations to buy or sell any security.**

Current and future portfolio holdings are subject to risk.

Top 10 holdings for Global Innovators Fund, as of 1/31/2024:

1. NVIDIA Corp	4.24%
2. Lam Research Corp	4.17%
3. Microsoft Corp	4.15%
4. KLA-Tencor Corp	4.03%
5. salesforce.com Inc	3.97%
6. Amphenol Corp.	3.96%
7. Intuit Inc	3.91%
8. Meta Platforms Inc. - Class A	3.80%
9. Mastercard Inc	3.78%
10. ABB Ltd	3.72%

For a complete list of holdings for the Global Innovators Fund, please visit: <https://www.gafunds.com/our-funds/global-innovators-fund/>

**The Fund's investment objectives, risks, charges and expenses must be considered carefully before investing. The statutory and summary prospectuses contain this and other important information and can be obtained by calling 800- 915-6565 or visiting [www.gafunds.com](http://www.gafunds.com). Read and consider it carefully before investing.**

**Earnings growth is not representative of the Fund's future performance.**

MSCI World Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets.

MSCI World Value Index captures large and mid-cap securities exhibiting overall value style characteristics across 23 Developed Markets countries. The value investment style characteristics for index construction are defined using three variables: book value to price, 12-month forward earnings to price and dividend yield.

MSCI World Growth Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of large and mid-cap securities exhibiting overall growth style characteristics across developed markets.

The MSCI World Equal Weighted Index represents an alternative weighting scheme to its market cap weighted parent index, the MSCI World Index. The index includes the same constituents as its parent. However, at each quarterly rebalance date, all index constituents are weighted equally, effectively removing the influence of each constituent's current price (high or low).

Compound annual growth rate, or CAGR, is the mean annual growth rate of an investment over a specified period of time longer than one year.

The Consumer Price Index (CPI) is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services. Indexes are available for the U.S. and various geographic areas.

The Purchasing Managers' Index (PMI) is an index of the prevailing direction of economic trends in the manufacturing and service sectors.

One basis point is equal to 1/100th of 1%, or 0.01%, or 0.0001, and is used to denote the percentage change in a financial instrument. The relationship between percentage changes and basis points can be summarized as follows: 1% change = 100 basis points and 0.01% = 1 basis point.

---

The Federal Open Market Committee (FOMC) consists of twelve members--the seven members of the Board of Governors of the Federal Reserve System; the president of the Federal Reserve Bank of New York; and four of the remaining eleven Reserve Bank presidents, who serve one-year terms on a rotating basis.

Standard deviation is a statistic that measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance. If the data points are further from the mean, there is a higher deviation within the data set. A volatile stock has a high standard deviation, while the deviation of a stable blue-chip stock is usually rather low.

Return on capital (ROC) measures a company's net income relative to the sum of its debt and equity value.

Active Share is a measure of the percentage of stock holdings in a manager's portfolio that differs from the benchmark index. Managers with high Active Share have been found to outperform their benchmark indexes.

EBITDA, or earnings before interest, taxes, depreciation, and amortization, is an alternate measure of profitability to net income. By including depreciation and amortization as well as taxes and debt payment costs, EBITDA attempts to represent the cash profit generated by the company's operations.

The net debt-to-EBITDA ratio is a debt ratio that shows how many years it would take for a company to pay back its debt if net debt and EBITDA are held constant.

The Nasdaq-100 (NDX) is a large-cap growth index. It includes 100 of the largest domestic and international non-financial companies listed on the Nasdaq Stock Market based on market capitalization.

The MSCI China Index captures large and mid cap representation across China A shares, H shares, B shares, Red chips, P chips and foreign listings (e.g. ADRs). With 717 constituents, the index covers about 85% of this China equity universe. Currently, the index includes Large Cap A and Mid Cap A shares represented at 20% of their free float adjusted market capitalization.

Beta is a measure of a stock's volatility in relation to the overall market.

Personal consumption expenditures (PCE), also known as consumer spending, is a measure of the spending on goods and services by people of the United States. According to the Bureau of Economic Analysis (BEA), a U.S. government agency, PCE accounts for about two-thirds of domestic spending and is a significant driver of gross domestic product (GDP)

R-squared ( $R^2$ ) explains to what extent the variance of one variable explains the variance of the second variable. R-squared is a statistical measure that represents the proportion of the variance for a dependent variable that's explained by an independent variable or variables in a regression model.

Duration: The duration number is a complicated calculation involving present value, yield, coupon, final maturity and call features. Fortunately for investors, this indicator is a standard data point provided in the presentation of comprehensive bond and bond mutual fund information. The bigger the duration number, provided in years, the greater the interest-rate risk or reward for bond prices. It can also be used to describe equities in a similar manner: a higher duration suggests most cash flows are expected far into the future, with a lower duration suggesting more stable cash flows over the short and long term.

---

Gross domestic product (GDP) is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period.

*Earnings per share (EPS)* is calculated as a company's profit divided by the outstanding shares of its common stock.

Price-Earnings (P/E) ratio is a valuation ratio of a company's current share price compared to its per-share earnings. Forward earnings differ from trailing earnings, which is the figure quoted more often, as they are a projection and not a fact.

Forward price-to-earnings (forward P/E) is a version of the ratio of price-to-earnings (P/E) that use forecasted earnings for the P/E calculation. While the earnings used in this formula are just an estimate and not as reliable as current or historical earnings data, there are still benefits to estimated P/E analysis

Cash Flow is the total amount of money, in cash, being transferred into and out of a business.

The multiples approach is a valuation theory based on the idea that similar assets sell at similar prices. It assumes that the type of ratio used in comparing firms, such as operating margins or cash flows, is the same across similar firms.

Multiple expansion is when a stocks valuation multiple (for example, their Price to Earnings ratio, or EV to EBITDA ratio) increases, meaning that the stock is now more expensive than before.

The MSCI World Information Technology Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of large and mid-cap equities across 23 developed markets, all classified within the Information Technology sector.

The S&P 500 Index features 500 leading U.S. publicly traded companies, with a primary emphasis on market capitalization.

Capital expenditures (CapEx) are funds used by a company to acquire, upgrade, and maintain physical assets such as property, technology, or equipment. CapEx is often used to undertake new projects or investments by a company.

EBITDA, or earnings before interest, taxes, depreciation, and amortization, is an alternate measure of profitability to net income

The MSCI World Semiconductors and Semiconductor Equipment Index is composed of large and mid-cap stocks across 23 Developed Markets (DM) countries\*. All securities in the index are classified in the Semiconductors and Semiconductor Equipment Industry Group (within the Information Technology sector)

The MSCI World Quality Index is based on MSCI World, its parent index, which includes large and mid cap stocks across 23 Developed Market (DM) countries. The index aims to capture the performance of quality growth stocks by identifying stocks with high quality scores based on three main fundamental variables: high return on equity (ROE), stable year-over-year earnings growth and low financial leverage.

The Goldman Sachs Non-Profitable Technology Index consists of non-profitable US listed companies in innovative industries. Tech is defined quite broadly to include new economy companies across Global Industry Classification Standard (GICS) industry groupings. The basket of tech stocks is optimized for liquidity with no name initially weighted greater than 4.65%

The MSCI USA Index is designed to measure the performance of the large and mid cap segments of the US market. With 625 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in the US.

A cash flow return on investment (CFROI) is a valuation metric that acts as a proxy for a company's economic return. This return is compared to the cost of capital, or discount rate, to determine value-added potential. CFROI is defined as the average economic return on all of a company's investment projects in a given year.

Forex (FX) refers to the global electronic marketplace for trading international currencies and currency derivatives. Most of the trading is done through banks, brokers, and financial institutions.

Year-over-year (YoY) sometimes referred to as year-on-year, is a frequently used financial comparison for looking at two or more measurable events on an annualized basis

One cannot invest directly in an index.

Distributed by Foreside Fund Services, LLC