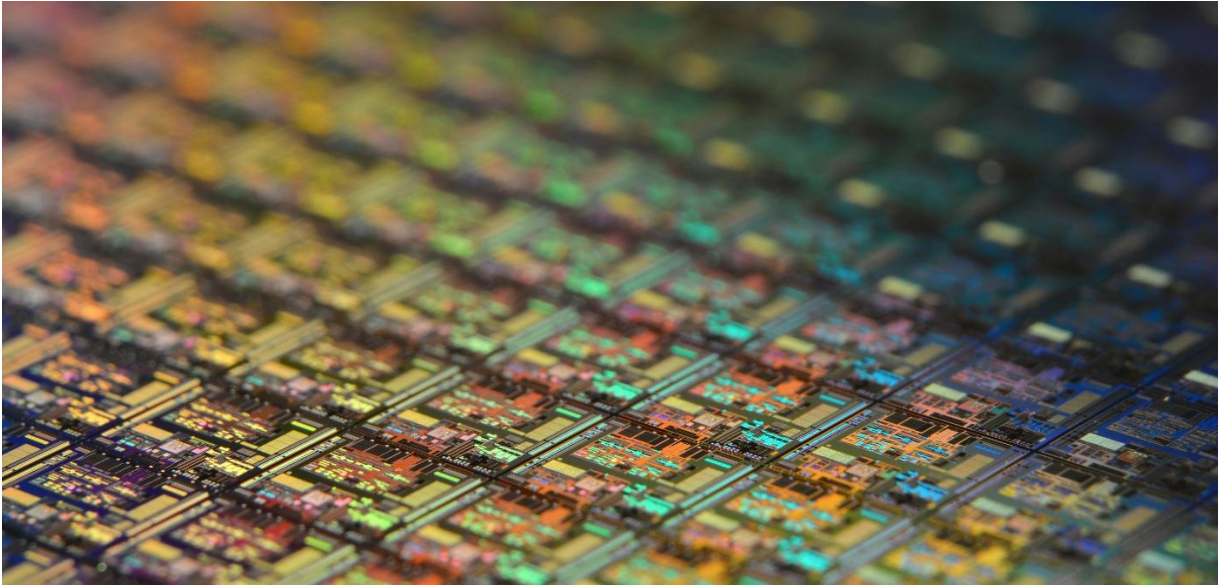


TECHNOLOGY RESEARCH

Global Semiconductor Market View



Source: Unsplash (original photo by Laura Ockel)

Summary

Driven by Artificial Intelligence (“AI”) related demand, the semiconductor industry is experiencing an upturn. Global semiconductor revenue rose by 23.2% year-on-year (“y-o-y”) in 3Q 2024 while silicon wafer shipments (as a measure of semiconductor chip volume) rose at a slower rate of 6.8% y-o-y in 3Q 2024. Meanwhile, global semiconductor equipment billings rose by 18.9% y-o-y in 3Q 2024.

The semiconductor industry has historically been cyclical and reasons for its cyclicity include economic growth and inventory build-up. Inventory build-up due to excessive capacity expansion by manufacturers or weak semiconductor demand may induce an industry downturn, while rising semiconductor demand (e.g., due to economic growth) may induce an industry upturn.

The current upturn followed an industry downturn in 2023, where companies dealing with Personal Computers (“PCs”) and smartphones faced difficulties in clearing excess inventories hoarded after the COVID-19 chip shortage. The chip shortage was due to customers bringing forward their purchases of PCs and smartphones in line with the then-lockdowns and accompanying remote work trends.

Up to 3Q 2024, the sale of NVIDIA’s AI chips has been the main driver of the current upturn. However, the ongoing semiconductor recovery has shown signs of broadening although we expect a limited broadening of demand beyond chips used in AI data centres. Growth in the automotive and industrial markets may remain slow, while the growth in the PC and smartphone markets may also remain lacklustre as the introduction of on-device AI has had little impact on the shipment of personal devices thus far.

Looking ahead, official sources forecasted global semiconductor revenue to rise by 11.2% y-o-y in 2025 and silicon wafer shipments to rise by 9.5% y-o-y in 2025. However, limited growth in demand for chips beyond those related to AI data centres may dampen global semiconductor revenue growth to 6.0% y-o-y in 2025. Global semiconductor equipment sales are expected to rise by 6.8% y-o-y in 2025.

Given the nature of the current upturn, companies involved in the general manufacture of advanced chips used in AI data centres are likely to benefit. In contrast, SGX-listed semiconductor firms may experience a limited upside as they may deal mainly with mature-node chips as well as equipment which may not be used in the manufacture of advanced-node AI chips.

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SEMICONDUCTOR INDUSTRY OVERVIEW

(I) REVIEW OF 3Q 2024

Based on data provided by the World Semiconductor Trade Statistics (“WSTS”), global semiconductor revenue rose by 23.2% from US\$134.7 billion in 3Q 2023 to US\$166.0 billion in 3Q 2024.

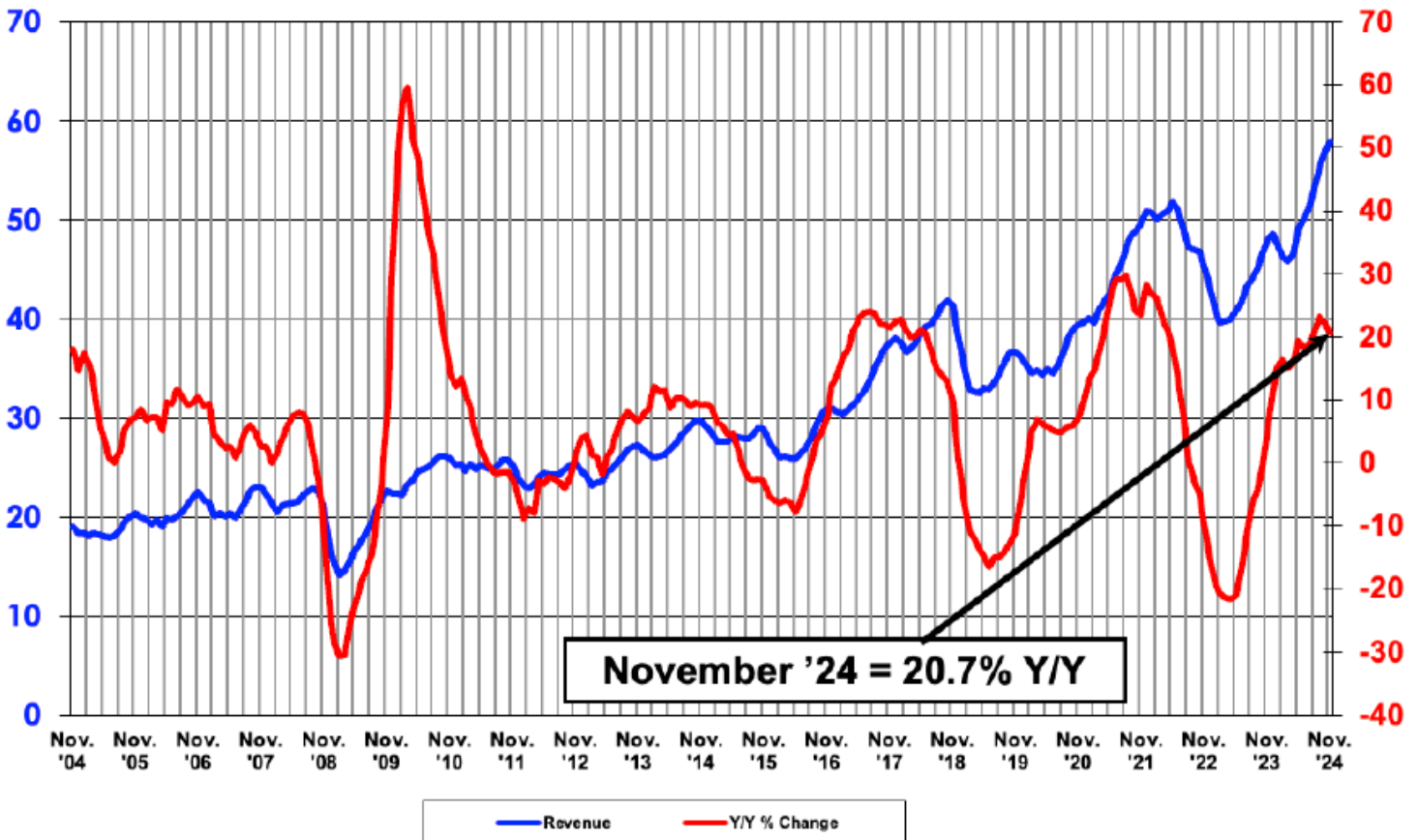
WSTS forecasted in December 2024 that global semiconductor revenue would rise by 19.0% year-on-year (“y-o-y”) from US\$526.9 billion in 2023 to US\$626.9 billion in 2024, and commented that it “revised its 2024 projections upwards” to reflect “improved performance in second and third quarter of 2024, particularly in the computing sector”. WSTS added that “the Americas and Asia Pacific are set to lead the recovery, with anticipated growth rates of 38.9% and 17.5%, respectively”.

The Semiconductor Industry Association (“SIA”) noted in January 2025 that global (or worldwide) semiconductor revenues rose by 20.7% y-o-y in November 2024 as shown in **Exhibit 1**. SIA provides data and statistics on the global semiconductor industry through WSTS.

Exhibit 1: Worldwide Semiconductor Revenues

Worldwide Semiconductor Revenues Year-to-Year Percent Change

Billions/\$



Source: WSTS (cited by SIA in January 2025)

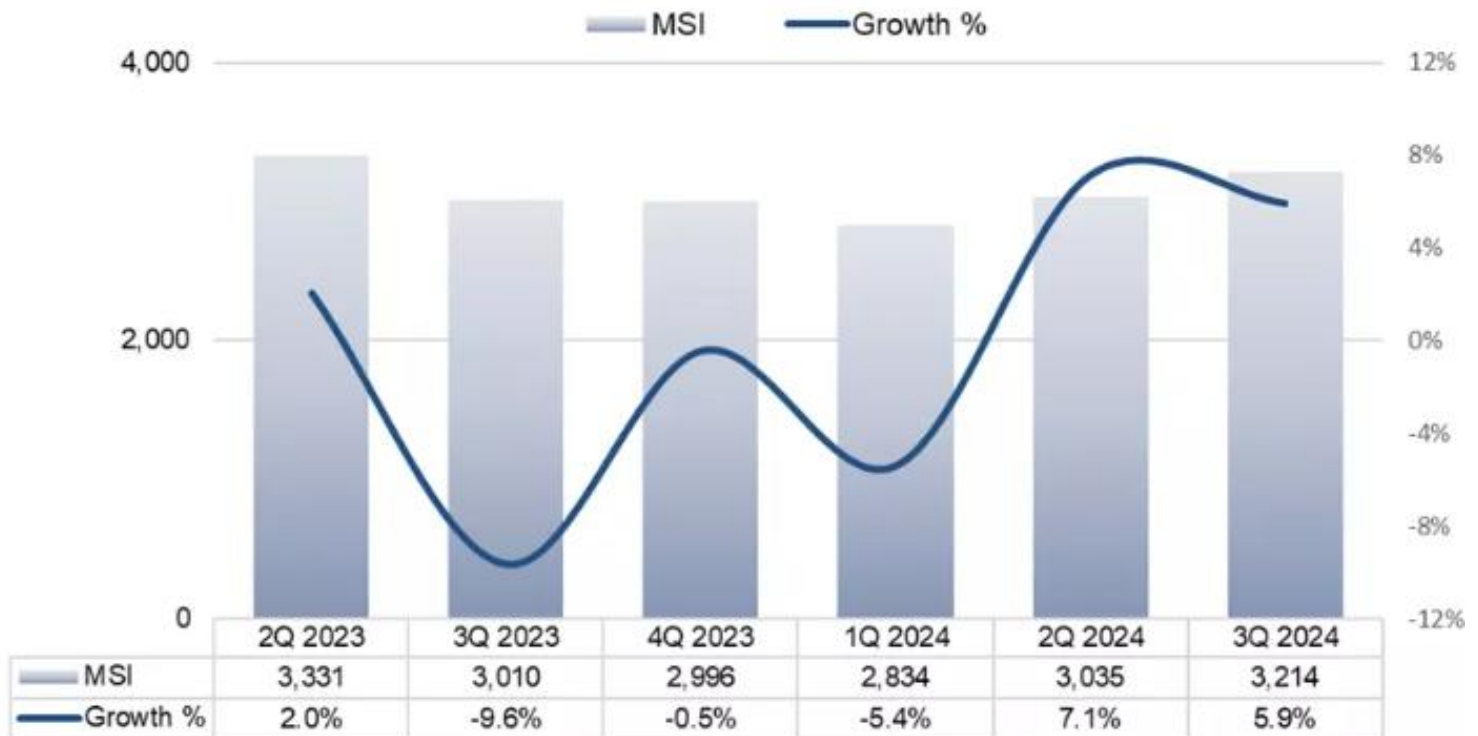
However, the Semiconductor Equipment and Materials International (“SEMI”) noted in November 2024 that silicon wafer shipments rose by 6.8% from 3,010 Million Square Inches (“MSI”) in 3Q 2023 to 3,214 MSI in 3Q 2024 as shown in **Exhibit 2**. Silicon wafer shipments rose at a slower rate as compared to the growth of global semiconductor revenue.

Silicon wafer shipments may better reflect semiconductor chip volume¹ than semiconductor revenue as silicon wafers are the material on which semiconductor chips are etched.

The Chairman of SEMI Silicon Manufacturers Group, Lee Chungwei, was quoted as commenting that inventory levels “have declined throughout the supply chain but generally remain high” and that demand for “advanced wafers used for AI continues to be strong”. Lee Chungwei added though that “silicon wafer demand for automotive and industrial uses continues to be muted, while the demand for silicon used for handset and other consumer products has seen some areas of improvement” such that wafer shipments in 2025 “are not yet expected to return to the peak levels of 2022”.

Exhibit 2: Global Silicon Wafer Shipments (MSI)

Worldwide Silicon Wafer Shipments (MSI)
Semiconductor Applications Only



Note: “Growth %” corresponds to quarter-on-quarter (“q-o-q”) growth in this Exhibit.
Source: SEMI (published November 2024)

¹ Semiconductor revenue may rise faster than silicon wafer shipments due to revenue from Artificial Intelligence (“AI”) chips. For instance, Gartner noted in May 2024 that AI chip revenue was expected to rise by 32.8% from US\$53.7 billion in 2023 to US\$71.3 billion in 2024 while CNBC noted in March 2024 that an AI chip can cost between \$25,000 (currency unstated) and \$40,000. Assuming that the average cost of an AI chip was US\$30,000 in both 2023 and 2024, AI chip volume would thus rise from 1.8 million in 2023 to 2.4 million in 2024—of which both figures would be less than 0.001% of the “Nearly 1 trillion” semiconductor chips sold in 2023 as noted by SIA.

Meanwhile, SEMI, together with the Semiconductor Equipment Association of Japan (“SEAJ”), noted in December 2024 that global semiconductor equipment billings rose by 18.9% from US\$25.6 billion in 3Q 2023 to US\$30.4 billion in 3Q 2024. The breakdowns of semiconductor equipment billings by region in 3Q 2023 and 3Q 2024 are shown in **Exhibit 3**.

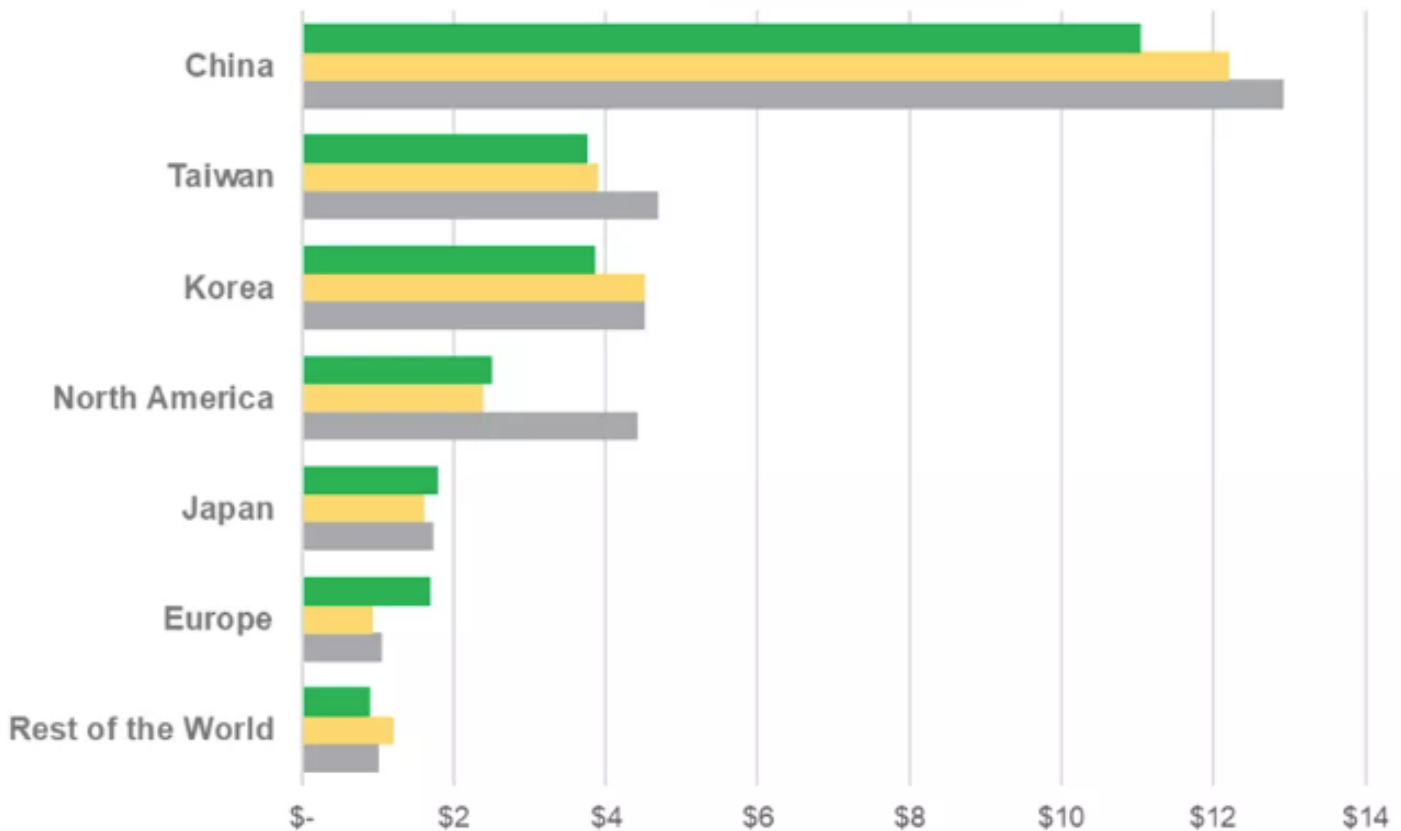
Excluding China (to account for regulations restricting the export of semiconductor equipment to China), global semiconductor equipment billings rose by 20.3% from US\$14.5 billion in 3Q 2023 to US\$17.5 billion in 3Q 2024.

The president and CEO of SEMI, Ajit Manocha, noted that the growth of semiconductor equipment billings in 3Q 2024 was “driven by investments aimed at supporting proliferation of Artificial Intelligence as well as production of mature technologies”, with “North America posting the largest year-over-year gain while China continues to lead in spending”.

Exhibit 3: Semiconductor Equipment Billings by Region

Semiconductor Equipment Billings By Region (US\$B)

■ 3Q 2023 ■ 2Q 2024 ■ 3Q 2024

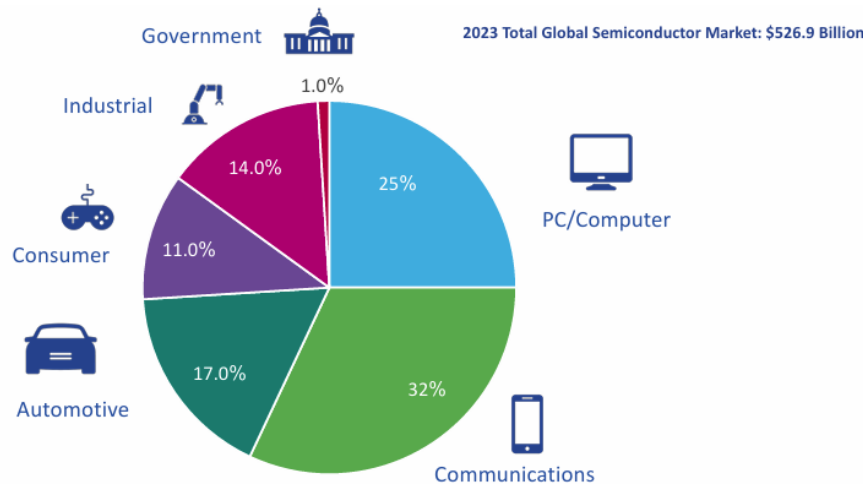


Source: SEMI & SEAJ (dated December 2024)

(II) DEMAND SOURCES & CYCLICALITY OF THE SEMICONDUCTOR INDUSTRY

Semiconductors are used in a wide range of applications such as laptops, cars and planes. According to the SIA, worldwide semiconductor demand in 2023 was mainly driven by consumer applications with Government (including military end-use) and Industrial contributing only around 15.0% of revenue as shown in **Exhibit 4**.

Exhibit 4: End-Use Categories of Semiconductor Chips



Note: Military end-use is included in Government.
Sources: World Semiconductor Trade Statistics (WSTS).

Section 2: Global Market - 8 -

Source: WSTS (cited by SIA in May 2024)

The semiconductor industry has historically been cyclical. According to Regions Asset Management, reasons include economic growth and inventory build-up. Regions Asset Management noted in February 2019 that in “periods of high demand” (e.g., due to economic growth), semiconductor manufacturers’ profits rise such that they invest the profits into expanding capacity. However, the expanded capacity may exceed demand such that manufacturers accumulate inventory thus lower prices. In turn, the “falling revenue growth” would induce an industry downturn. Regions Asset Management also noted that “weak product demand” may likewise lead to an inventory buildup and induce a downturn.

Oxford Economics added in November 2023 that “the industry’s extremely high fixed costs” incentivise manufacturers “to continue producing as long as they make marginal profit” such that “high output amid falling demand creates inventories”.

The industry cyclical may be most evident with memory chips. Semiconductor Business Intelligence, a semiconductor market research provider, elaborated in May 2024 that when the market “is near a peak, memory prices are so elevated that smartphone and PC prices become prohibitive” such that “consumers stop buying” and an industry downturn begins. However, when the market is “At the bottom” and “memory is sold at a loss, PCs and smartphones are so cheap that a replacement cycle initiates the next semiconductor upcycle”. Semiconductor Business Intelligence also mentioned that the memory chips cycle “has the most potent effect” on the cyclical of the larger semiconductor industry.

However, supply factors may contribute less to the cyclical of the memory market (and, perhaps, the larger semiconductor industry) in the future. According to Orbis Investment Management, an asset manager, “brutal” industry dynamics have led the number of “major memory producers” to shrink from 14 in the 1990s to three (as noted in April 2023) such that the remaining major players, Samsung, Micron and SK Hynix, have exhibited oligopolistic behaviour like announcing production cuts amid perceived peak inventory levels. The fall in memory cyclical may not fully materialise though as Nikkei Asia reported in January 2025 that, amid “mounting U.S. restrictions”, Chinese firm ChangXin Memory Technologies has started to “produce commercially viable dynamic random access memory (DRAM) chips” and may increasingly compete for global memory market share.

The recent recovery in semiconductor revenue and volume followed an industry downturn in 2023. According to WSTS's data, worldwide semiconductor revenue fell by 8.2% from US\$574.1 billion in 2022 to US\$526.9 billion in 2023. Meanwhile, according to SEMI's data, silicon wafer shipments fell by 14.3% from 14,713 MSI (3,679 MSI in 1Q + 3,704 MSI in 2Q + 3,741 in 3Q + 3,589 in 4Q) in 2022 to 12,602 MSI (3,265 MSI in 1Q + 3,331 MSI in 2Q + 3,010 MSI in 3Q + 2,996 in 4Q) in 2023.

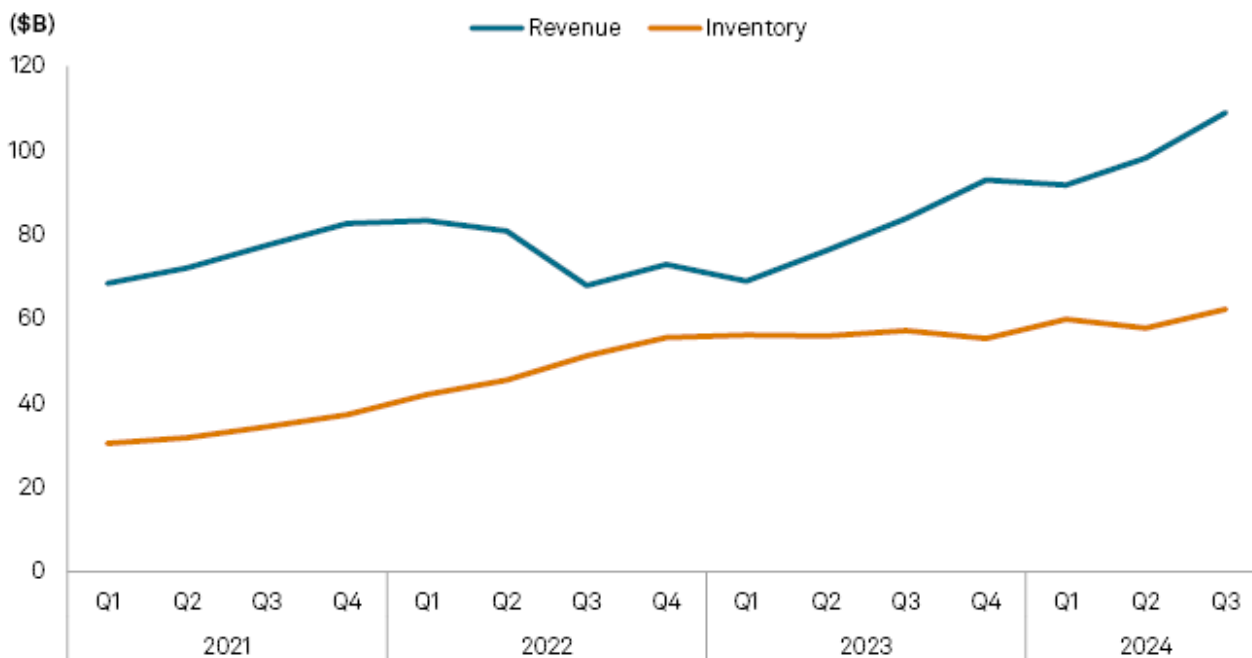
S&P Global Market Intelligence noted in September 2023 that the downturn in 2023 was due to lower demand and an inventory glut. S&P Global Market Intelligence mentioned that the "semiconductor market at large" (excluding AI-related companies), especially "those companies in the laptop and smartphone end markets", was facing trouble in "clearing out high excess inventories" accumulated during the COVID-19 pandemic. Semiconductor revenue thus fell from 2Q 2022 to 1Q 2023 while inventories rose in the same period as shown in **Exhibit 5**.

The Economist noted in October 2022 that consumers "brought forward" their purchases during COVID-19 (due to the then-lockdowns and accompanying remote work trends). Quantitative Finance Director at the Stevens Institute of Technology, George Calhoun, added in October 2022 that the "brought forward" purchases led to a chip shortage, to which manufacturers "tried to overcorrect by excessive purchases and hoarding behaviors".

On the current industry upturn, S&P Global Market Intelligence noted in December 2024 that "semiconductor demand was mainly driven by chips used for AI, primarily those from advanced chipmaker NVIDIA Corp" until 3Q 2024. However, S&P Global Market Intelligence updated that the ongoing semiconductor recovery has been expanding beyond NVIDIA and that the "broader semiconductor sector is showing early signs of recovery in terms of clearing inventory" in 3Q 2024.

S&P Global Market Intelligence added that the "Gap between semiconductor revenues and inventories" has been widening further in 3Q 2024 as shown in **Exhibit 5**. S&P Global Market Intelligence commented that automotive "saw a notable recovery in the Chinese electric vehicle industry and a smaller ramp in the US", while "PCs and personal electronics also experienced an increase in demand".

Exhibit 5: Revenues and Inventories of Semiconductor Companies



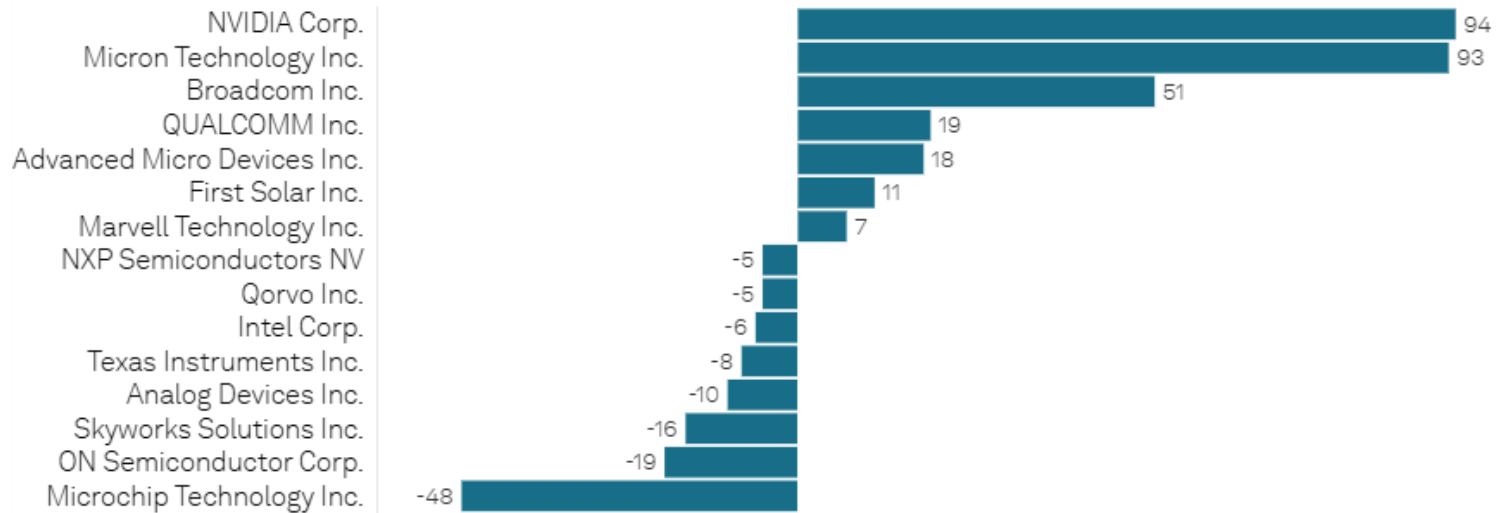
Data compiled Dec. 12, 2024.

Includes constituents in S&P Semiconductors Select Industry Index.

Source: S&P Global Market Intelligence (dated December 2024)

Accordingly, while eight out of the “15 key companies from the S&P 500 Semiconductors Index that represent various end markets” (including AI, automotive, mobile and industrial) recorded a fall in revenue on a y-o-y basis in 3Q 2024 as shown in **Exhibit 6**, S&P Global Market Intelligence noted that “only two recorded quarter-over-quarter revenue declines” in 3Q 2024 (as “compared with four in the second quarter”) as shown in **Exhibit 7**.

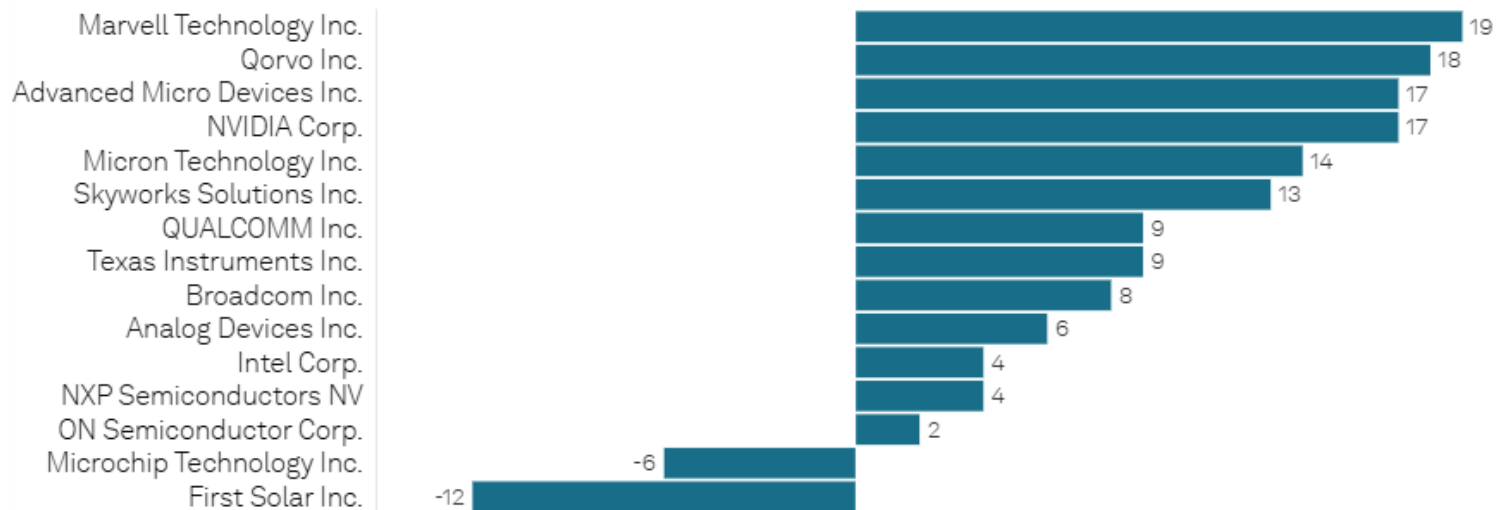
Exhibit 6: Year-on-Year Revenue Growth of Semiconductor Companies



Data compiled Dec. 12, 2024.

Source: S&P Global Market Intelligence (dated December 2024)

Exhibit 7: Quarter-on-Quarter Revenue Growth of Semiconductor Companies



Data compiled Dec. 12, 2024.

Source: S&P Global Market Intelligence (dated December 2024)

However, the broadening of the semiconductor recovery beyond AI-related chips may be limited. Based on its survey of 11 analysts, Nikkei Asia noted in January 2025 that the growth of the semiconductor industry in 2025 may still “rely on artificial intelligence” due to rising demand related to data centres. Citing Microsoft’s expected \$80 billion (currency unstated) investment “in AI data centers by the fiscal year ending in June” as an example, Nikkei Asia noted that AI data centre investments by U.S. tech companies would be the main driver of semiconductor growth.

Nikkei Asia added that demand will be “particularly strong for the graphics processing units (GPUs) and high bandwidth memory (HBM)”. Citing Statista, Nikkei Asia noted that the “global GPU market will grow to \$270 billion in 2029” or “four times the current size”. Nikkei Asia also cited a manufacturer’s estimate that the HBM market would “more than triple its current size to \$100 billion in 2030”.

In contrast, Nikkei Asia mentioned that “a recovery in the market for non-AI chips, including for automobiles and industrial equipment, is anticipated to be slow” such that demand “for non-cutting-edge chips and commodity-grade memory is likely to worsen from January to March and remain flat from April to June”. Nikkei Asia attributed the weak demand for non-AI chips mainly to “sluggish demand for electric vehicle chips” as “market conditions” for automotive chips are expected to “continue to deteriorate from April to June due to sluggish EV sales in Europe and the U.S.”. Nikkei Asia also noted that there was an ongoing “oversupply of PC and smartphone products”, although the oversupply is “likely to end in the April-June quarter” in line with “inventory adjustments for smartphone chips progresses in January to March”.

Industry sources seem to indicate too that the introduction of on-device AI may contribute little to the growth of Personal Computer (“PC”) & smartphone shipments (and thus, to the larger industry recovery) in 2025.

Based on its survey results, U.S. tech trade-in comparison site SellCell noted in December 2024 that “73% of iPhone users and 87% of Samsung users say AI features add little to no value, highlighting widespread apathy across both brands”.

Tom’s Hardware, a technology media site, added in December 2024 that the “AI PC seems to have a major issue because there’s not much use right now for running AI locally on a PC” and that “popular services like ChatGPT run in the cloud and don’t require a brand-new AI PC”. Tom’s Hardware further noted that PC demand has been driven instead by “the general desire to upgrade, as new chips with AI hardware also feature faster CPU and GPU cores”. Citing TrendForce, a market research firm, Tom’s Hardware highlighted that “users upgrading to Windows 11 PCs from older Windows 10 devices” are expected to “drive more sales than AI” in 2025.

While the ongoing semiconductor recovery may broaden slightly beyond AI-related chips, semiconductor demand growth in 2025 may thus continue to be driven mainly by demand for leading-edge AI chips (e.g., GPU logic chips and HBM memory chips) as well as others that may also be used in AI data centres (e.g., communication chips), although growth in end-use markets may differ across geographical regions (e.g., automotive semiconductor chip volume may grow faster in China than in the U.S. or Europe).

(III) FORECASTS FOR 2025

WSTS forecasted in December 2024 that the global semiconductor revenue is expected to rise by 11.2% from US\$626.9 billion in 2024 to US\$697.2 billion in 2025. WSTS noted that the “growth will be driven predominantly by the Logic and Memory sectors, which together are projected to exceed \$400 billion in value” and that the forecast “includes a year-over-year growth of over 17% for Logic and 13% for Memory”.

SEMI forecasted in October 2024 that global silicon wafer shipments would rise by 9.5% from 12,174 MSI in 2024 to 13,328 MSI in 2025 as shown in **Exhibit 8**, at a lower rate than the growth in global semiconductor revenue. SEMI noted that silicon wafer shipment growth is “expected to continue through 2027 to meet increasing demand related to AI and advanced processing”. SEMI added that “new applications in advanced packaging and high-bandwidth memory (HBM) production, which require additional wafers”, will contribute to the “rising need for silicon wafers”.

Exhibit 8: Forecasted Silicon Wafer Shipments (2024–2027)



Source: SEMI (www.semi.org), October 2024

Source: SEMI (dated October 2024)

However, Semiconductor Intelligence (“SC-IQ”), a semiconductor consulting firm, provided in November 2024 a weaker forecast of the semiconductor industry. SC-IQ was founded by Bill Jewell, who “served on the board of directors of WSTS and was Chairman of the Americas Chapter from 1999 to 2003 and World chairman from 2003 to 2005” according to SC-IQ’s website.

SC-IQ forecasted that semiconductor revenue may grow by 6.0% y-o-y in 2025 (instead of 11.2% y-o-y as forecasted by WSTS) based on its assumptions of:

- Continued “though decelerating” growth in AI
- “Healthy” AI-driven memory demand but with “moderating” prices
- “Mediocre” growth for PCs and smartphones
- “Relatively weak” automotive market
- Softened consumer demand due to “Potential higher tariffs”

In the analysis leading to its forecast, SC-IQ made reference to the forecasted y-o-y growth in drivers of semiconductor revenue as shown in **Exhibit 9** (updated with the latest forecasts from IDC and S&P Global Mobility). The continued semiconductor recovery in 2025 may thus be driven mainly by the growth of revenue from server-related chips.

Exhibit 9: Forecasted Year-on-Year Change in Semiconductor Drivers (2025)

| Semiconductor Drivers | Unit | y-o-y % change | | Source |
|-----------------------|------------|---------------------|---------------------|--------------------------------------|
| | | 2024 ⁽¹⁾ | 2025 ⁽²⁾ | |
| Servers | US\$ | 65.3% | 19.7% | IDC (dated Jan 2025) |
| Smartphones | shipments | 6.4% | 1.7% ⁽³⁾ | IDC (dated Nov 2024 & Jan 2025) |
| PCs | shipments | 1.0% | 4.3% | IDC (dated Dec 2024 & Jan 2025) |
| Light vehicles | production | (1.6%) | (0.4%) | S&P Global Mobility (dated Dec 2024) |

⁽¹⁾ Actual or Estimate. ⁽²⁾ Forecast.

⁽³⁾ Based on IDC’s forecasted five-year CAGR of 2.6% (2023–2028) and estimated growth of 6.4% y-o-y in 2024 based on preliminary data. As estimated by $(\frac{1.026^5}{1.064})^{\frac{1}{4}}$.

Source: IDC (published November 2024 to January 2025), S&P Global Mobility (published December 2024), SC-IQ, FPA

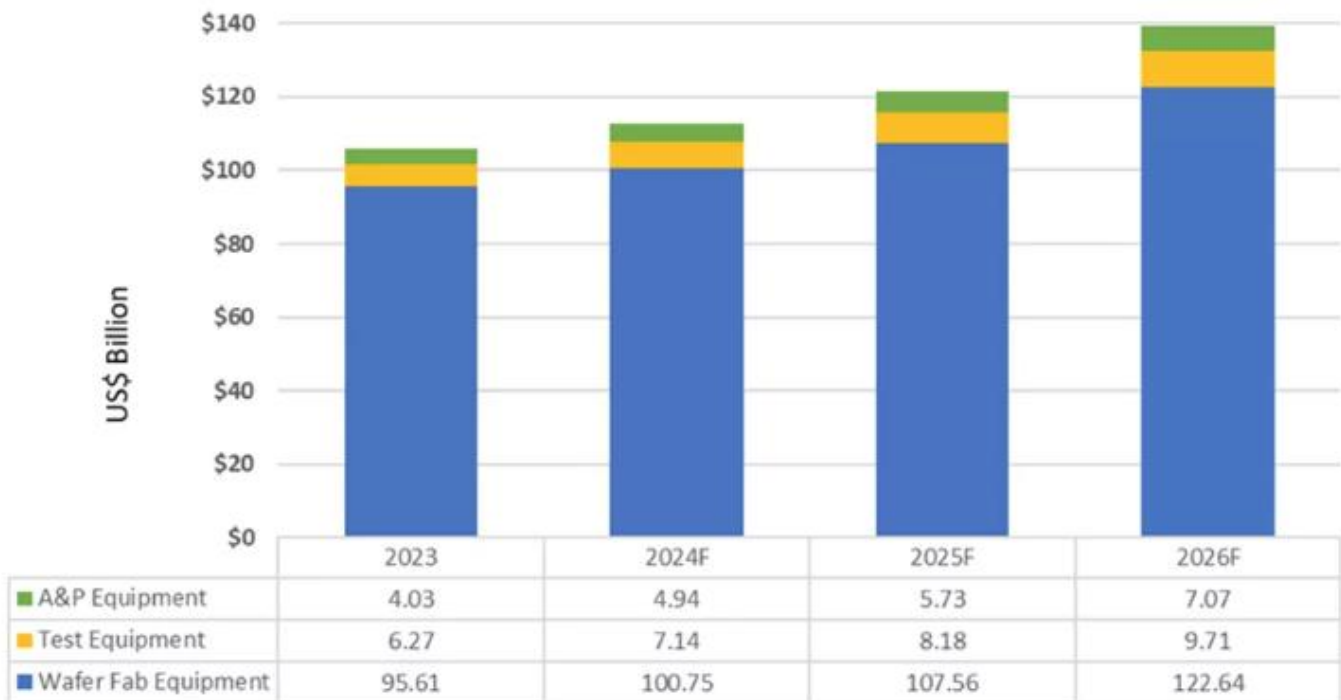
Meanwhile, SEMI projected in December 2024 that global semiconductor equipment sales would rise by 6.8% from US\$100.8 billion in 2024 to US\$107.6 billion in 2025 as shown in **Exhibit 10**.

SEMI noted that the growth of wafer fabrication equipment sales in 2025 and 2026 is expected to be driven by “increased demand for advanced logic and memory applications”. SEMI also noted that the growth of back-end equipment is expected to be driven by the “increasing complexity of semiconductor devices for high-performance computing and the expected increase in demand in the mobile, automotive, and industrial end-markets”.

SEMI also commented that “China, Taiwan and Korea are expected to remain the top three destinations for equipment spending through 2026”, with China “projected to maintain the top position over the forecast period as the region’s equipment purchases continue to remain resilient”. However, SEMI added that while equipment spending for most regions is expected to rise in 2025, “China is expected to see a contraction in 2025 following significant investments over the past three years”.

Exhibit 10: Forecasted Global Semiconductor Equipment Sales (2024–2026)

SEMI 2024 Year-end Total* Equipment Forecast by Segment (US\$ Billion)



Source: SEMI Equipment Market Data Subscription (EMDS), December 2024

*Total equipment includes new wafer fab, test, and assembly and packaging. Total equipment excludes wafer manufacturing equipment. Totals may not add due to rounding.

Source: SEMI (dated December 2024)

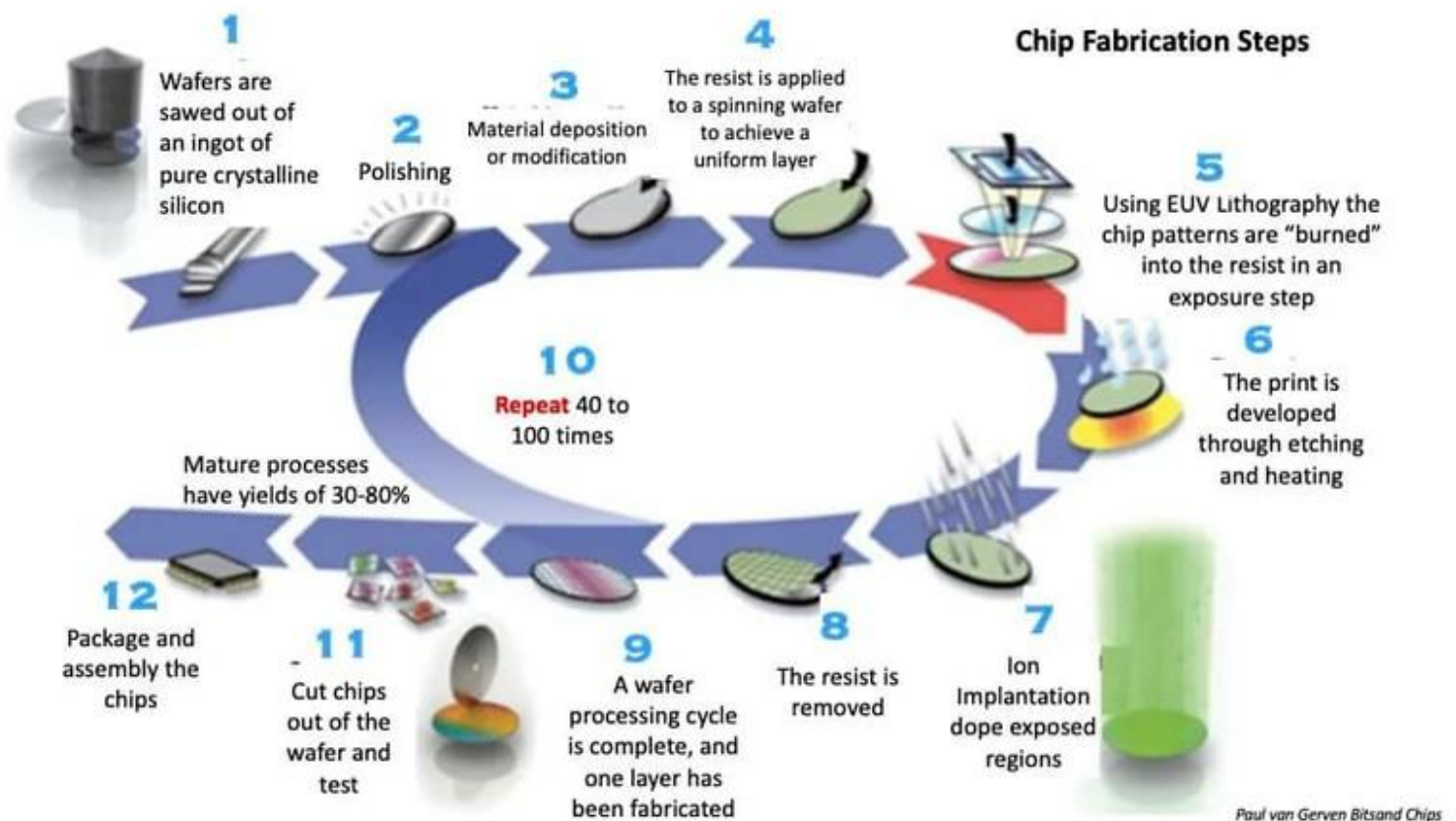
SEMICONDUCTOR SUPPLY CHAIN

With a clearer view of the ongoing industry upturn, we will now discuss the semiconductor supply chain to better understand which industry players may be more likely to benefit from the current upturn.

According to SK Hynix, the semiconductor development process begins with product planning & design. SK Hynix noted in November 2024 that companies would conduct market research & analysis and consider relevant customer requirements, then translate the findings to design specifications. Once the planning is done, SK Hynix noted that the following chip design phase “includes selecting the product’s design architecture and function as well as finalizing its physical layout”.

Thereafter, semiconductor chips would be manufactured in three stages: wafer manufacturing, front-end process and back-end process. Silicon is first purified and sliced into wafers before the wafers are polished (steps 1 & 2 in **Exhibit 11**). The wafers are then sent to a fabrication plant (or “fab”) for the front-end process, whereby the wafers undergo steps from material deposition and etching to ion implantation (steps 3 to 10 in **Exhibit 11**). Afterwards, finished wafers are sliced into chips, which will then undergo the back-end process of testing and packaging (steps 11 & 12 in **Exhibit 11**).

Exhibit 11: Semiconductor Production Process



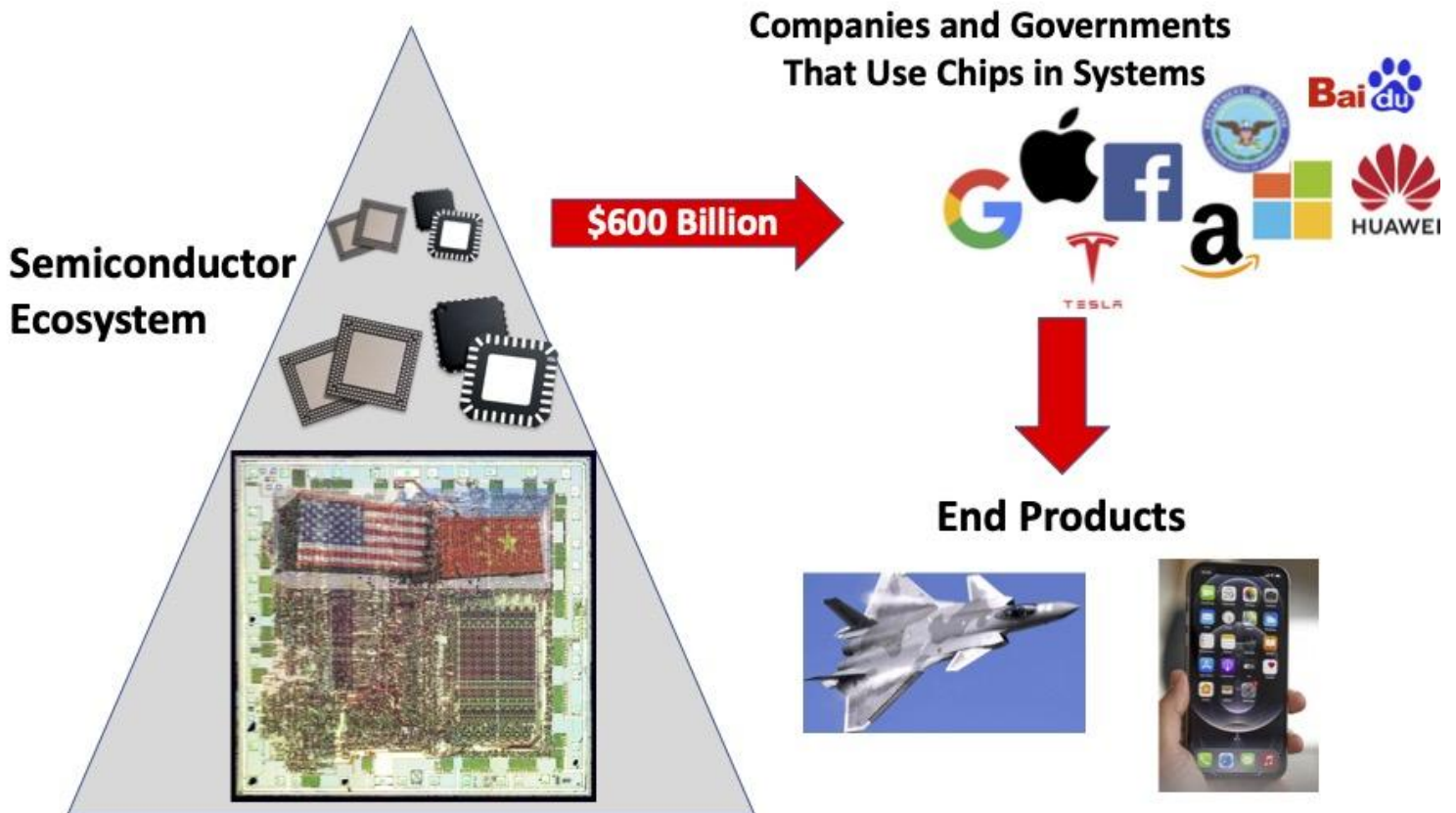
Source: Paul van Gerven Bitsand Chips

Steve Blank, an adjunct professor at Stanford University, added in January 2022 that finished semiconductor chips are sold to “companies and government agencies”, who then “design the chips into systems and devices (e.g. iPhones, PCs, airplanes, cloud computing, etc.), and sell them to consumers, businesses, and governments” as shown in **Exhibit 12**.

Companies involved in the general manufacture of semiconductor chips (e.g., TSMC) are thus likely to benefit from a recovery across end-use markets, although the impact may depend on both the type of chip produced and the production volume (e.g., AI logic chips may command higher prices but may be demanded in lower volumes).

However, companies involved in the design, manufacture or use of semiconductor chips for a specific end-use market may benefit mainly from the recovery of the specific end-use market (e.g., NXP Semiconductors is likely to benefit mainly from growth in the automotive or industrial markets).

Exhibit 12: Extended Semiconductor Ecosystem



Source: Steve Blank (published January 2022)

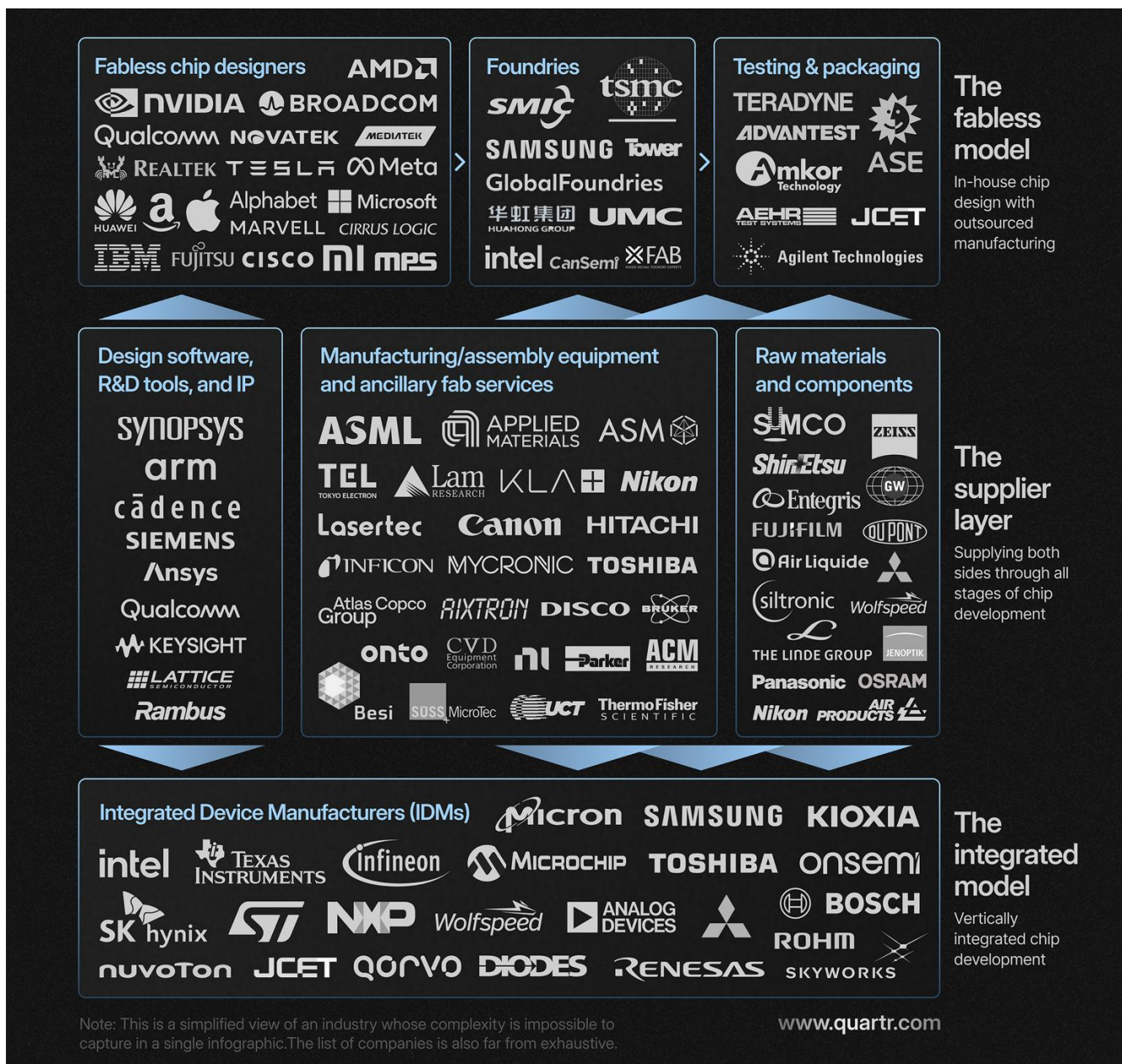
Next, we discuss the companies in the semiconductor supply chain as shown in **Exhibit 13**.

Fabless companies like NVIDIA and Qualcomm design the semiconductor chips but do not manufacture them. Instead, they engage foundries (who focus on the manufacture of semiconductor chips) like TSMC and GlobalFoundries to manufacture the designed chips. Foundries may outsource the back-end process of assembly, testing and packaging to companies like Amkor and Teradyne.

Equipment companies like ASML and Applied Materials provide equipment used in key steps of the manufacturing process.

Integrated Device Manufacturers (“IDMs”) like Samsung and Intel engage in both the design and manufacture of their own chips.

Exhibit 13: Semiconductor Supply Chain



Source: Quartr (post updated on September 2024)

SGX-LISTED INDUSTRY PLAYERS

Having discussed how the semiconductor supply chain works, we can now touch on SGX-listed semiconductor industry players. The three largest SGX-listed companies as at 17 January 2025 that have a relation to the semiconductor industry are Venture Corporation Limited (“Venture”; SGX:V03), UMS Integration Limited (“UMS”; SGX:558) and AEM Holdings Limited (“AEM”; SGX:AWX).

Venture has a market capitalisation of S\$3.7 billion as at 17 January 2025. Venture is a technology services, products and solutions provider that deals, at least in part, with semiconductor-related equipment.

UMS has a market capitalisation of S\$731.9 million as at 17 January 2025. UMS is an equipment manufacturing and engineering services provider to Original Equipment Manufacturers of semiconductors and related products.

AEM has a market capitalisation of S\$488.3 million as at 17 January 2025. AEM designs and manufactures semiconductor assembly & testing equipment as well as related tooling parts.

The Business Times (“BT”) reported in July 2024 that local semiconductor companies “may not directly benefit from the AI boom”. BT noted that local semiconductor firms focus on “mature-node chips” that are of process nodes “28 nanometres (nm) or more” as opposed to “cutting-edge AI chips” that are of process nodes “7 nm and smaller”. We note that SGX-listed semiconductor firms may also focus on equipment which may not be used in the production of advanced-node AI chips.

However, BT mentioned that there may be a “trickle-down effect of AI demand” as “AI requires more computing power, more memory space for databases, and faster connectivity speeds for high-volume data transmission”. BT added that the “chips that make this possible – by powering databases and communication networks – will continue to be mature-node chips”. Thus, BT noted that the “market for mature-node chips should have ample opportunities and stable demand in the long run”.

SGX-listed semiconductor industry players and their respective market capitalisations as at 17 January 2025 are shown in **Exhibit 14**.

Exhibit 14: SGX-Listed Semiconductor Industry Players

| Company | Ticker | Market Capitalisation (S\$ millions) |
|--------------------------------|--------|-----------------------------------------|
| Venture Corporation Limited | V03 | 3,681.5 |
| UMS Integration Limited | 558 | 731.9 |
| AEM Holdings Limited | AWX | 488.3 |
| Frencken Group | E28 | 474.1 |
| Grand Venture Technology | JLB | 286.7 |
| Micro-Mechanics (Holdings) Ltd | 5DD | 228.0 |
| Avi-Tech Holding | 1R6 | 39.3 |
| Global Testing | AYN | 34.0 |

Source: SGX Stock Screener, The Smart Investor, Simply Wall St, FPA

CONCLUSION

Driven by AI-related demand, the semiconductor industry is experiencing an upturn. Global semiconductor revenue rose by 23.2% y-o-y in 3Q 2024 while silicon wafer shipments (as a measure of semiconductor chip volume) rose at a slower rate of 6.8% y-o-y in 3Q 2024. Meanwhile, global semiconductor equipment billings rose by 18.9% y-o-y in 3Q 2024.

The semiconductor industry has historically been cyclical and reasons for its cyclicity include economic growth and inventory build-up. Inventory build-up due to excessive capacity expansion by manufacturers or weak semiconductor demand may induce an industry downturn, while rising semiconductor demand (e.g., due to economic growth) may induce an industry upturn. The industry's high fixed costs may exacerbate the inventory build-up during a downturn by incentivising manufacturers to maintain high output even when prices fall.

The current upturn followed an industry downturn in 2023, where companies dealing with PCs and smartphones faced difficulties in clearing excess inventories hoarded after the COVID-19 chip shortage. The chip shortage was due to customers bringing forward their purchases of PCs and smartphones in line with the then-lockdowns and accompanying remote work trends.

However, the industry may have begun clearing excess inventories in recent quarters. Thus, demand may be broadening beyond NVIDIA's AI chips as at 3Q 2024 although we expect a limited broadening of demand beyond chips used in AI data centres (e.g., GPU logic chips, HBM memory chips and communication chips). Growth in the automotive and industrial markets may remain slow. Growth in the PC and smartphone markets may also remain lacklustre as the introduction of on-device AI has had little impact on the shipments of personal devices thus far such that the migration of users to devices compatible with Windows 11 is expected to drive higher PC sales than AI.

Looking ahead, official sources forecasted global semiconductor revenue to rise by 11.2% y-o-y in 2025 and silicon wafer shipments to rise by 9.5% y-o-y in 2025. However, limited growth in demand for chips beyond those related to AI data centres may dampen global semiconductor revenue growth to 6.0% y-o-y in 2025. Global semiconductor equipment sales are expected to rise by 6.8% y-o-y in 2025.

Given the nature of the current upturn, companies involved in the general manufacture of advanced chips used in AI data centres are likely to benefit. In contrast, SGX-listed semiconductor firms may experience a limited upside as they may deal mainly with mature-node chips as well as equipment which may not be used in the manufacture of advanced-node AI chips.

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