

## Semi Constructive On Semiconductors

Semiconductors normally perform well during the recovery phase of the business cycle but given our dual-track outlook for U.S. exceptionalism paired with international weakness, **its too soon to expect a recovery in the most globally cyclical exposed segments of the industry.** The safest way to invest remains in logic-adjacent components which power the rapid buildout of artificial intelligence (“AI”) applications and data centers, until more defined international macro improvements take shape.

### A Cycle Unlike Others For Semis

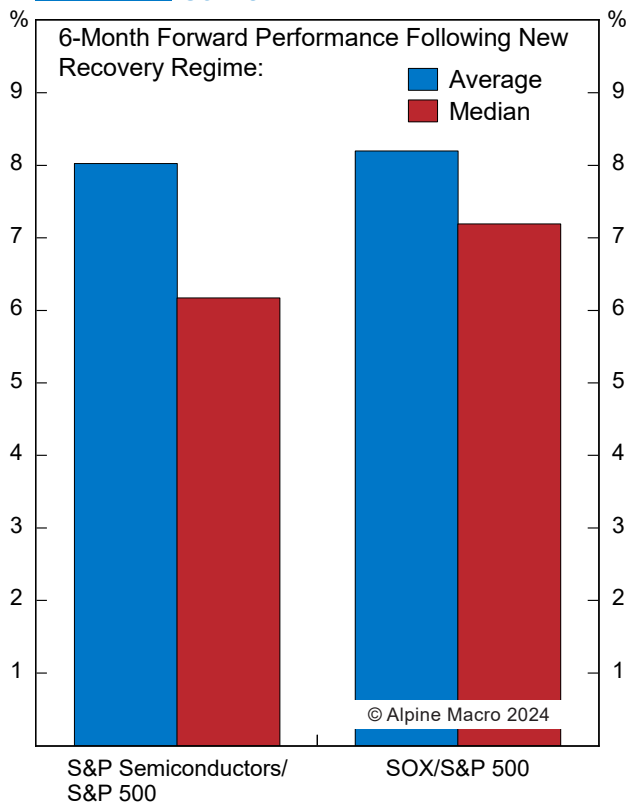
Our Equity Strategy Framework has identified a shift towards the Recovery phase of the business cycle as corporate profit growth broadens and the U.S. policy impulse turns positive. Historically, this regime has been lucrative for the semiconductor industry given its **early cyclical tendencies**, and **Chart 1** illustrates the benefits to semiconductor equities relative the broader market during 14 unique past Recovery phases.

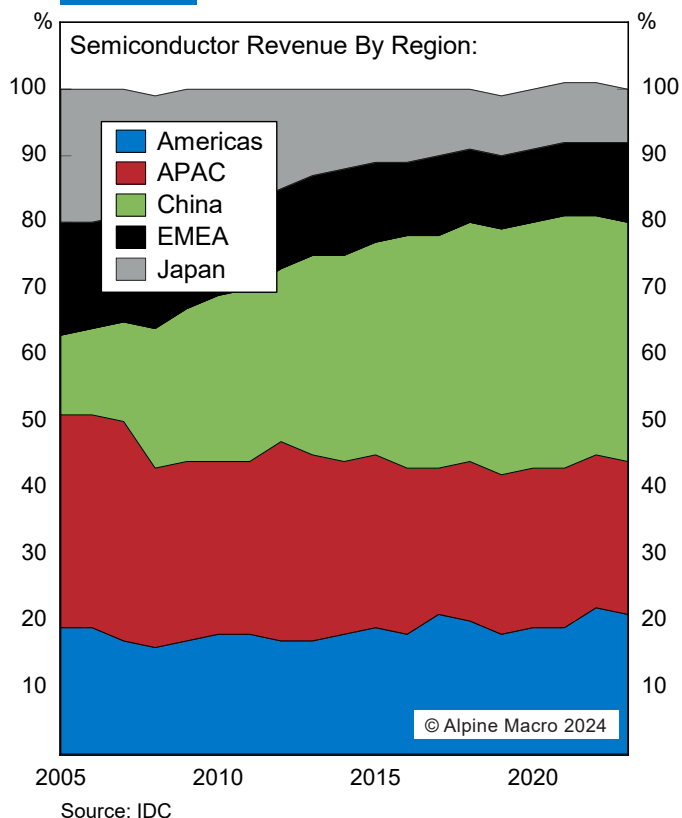
However, the bifurcation of U.S. economic resilience relative to international weakness makes this current episode unique and suggests caution in extrapolating historical investment patterns, especially in globally oriented cyclicals such as semiconductors. **Last year, the average share of non-U.S. revenue for the top ten S&P 500 semiconductors was 76% making it the most internationally exposed major industry (Chart 2).**

### NVDA Is Lonely At The Top

The large cap Semiconductor Index has nearly tripled the S&P 500 this year but only one company (NVDA) has outperformed the industry and just six (30%) have led the broader index. Recent trends have been even worse by some measures as the breadth of out-performance remains poor while the overall industry

**Chart 1 Recovery Regimes Are Good For Semis**

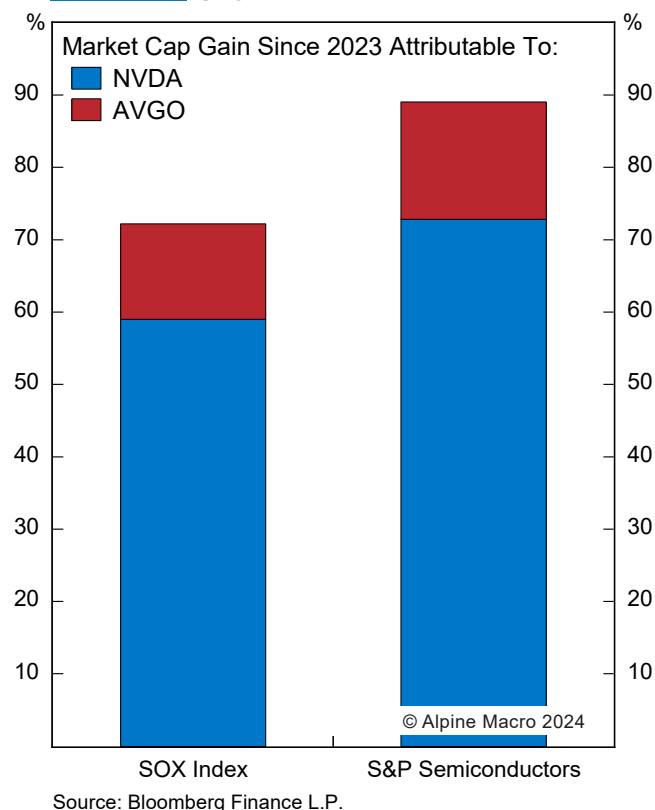
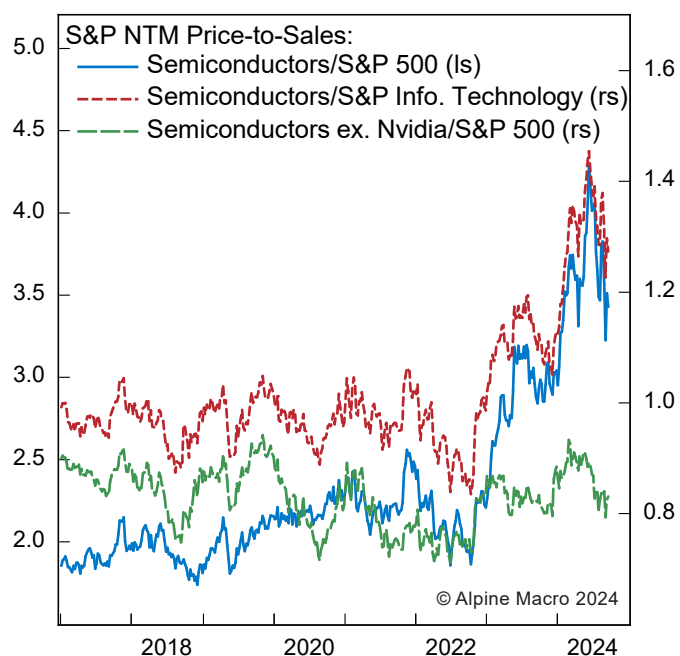


**Chart 2** China Eating Greater Share Of Chips

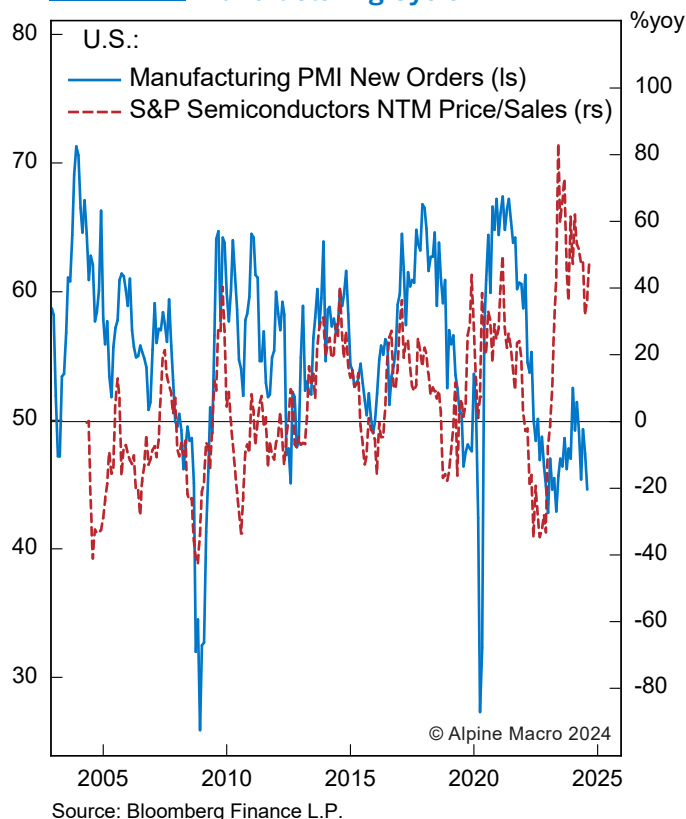
has been dragged down by losses from mega cap leadership.

Performance clustering accelerated in 2023 as major divides distinguished perceived beneficiaries of faster growing secular markets whereas the rest of the industry was largely left behind. Since 2023, nearly 90% of market cap gains for the S&P 500 Semiconductor Index have accrued to two companies as we show in [Chart 3](#).

Valuation in the large cap semiconductor industry doesn't scream "bargain" but it is reasonably attractive when normalizing for its top-heavy concentration and expected growth. [Chart 4](#) shows the industry trades well above its typical price-to-sales relationship to the overall tech sector and the S&P

**Chart 3** Semi Performance: Two Company Show**Chart 4** Valuation Reasonable When Normalizing For NVDA

**Chart 5** Semi Valuation Follows Manufacturing Cycle

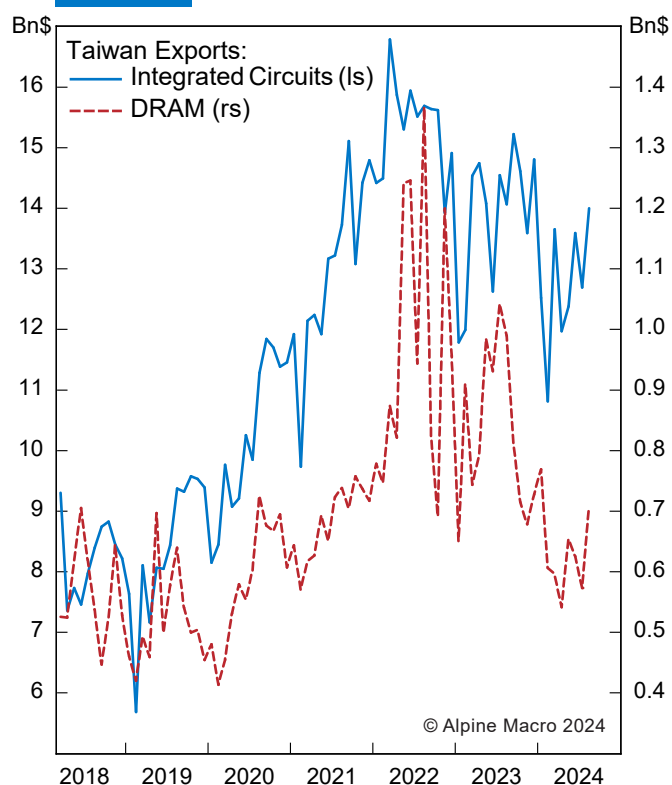


500 but its in line with averages when excluding NVDA. On a forward PEG basis, which accounts for earnings growth, the semiconductor industry attractively sits at 1x or less than half that of the S&P 500 (2.3x).

## Catalysts Needed To Broaden Breakout

The conditions necessary to spur a broader turnaround are twofold: 1) a global synchronized recovery, and 2) a flip towards expansion for goods and manufacturing segments which make up key end markets for semis. Chart 5 shows the strong relationship between the global manufacturing cycle and relative semi performance, while Chart 6 illustrates weakness in the export volume and unit prices for

**Chart 6** Chip Exports Substantially Off Peak



semi devices, a telltale signal of low demand relative to inventory glut.

We remain unconvinced that a positive inflection point is imminent for either element which puts segments of the industry at risk for disappointment as analysts have speculated a bottom to form in 2H 2024 for many cyclical end markets.

Corporate reporting season for the industry, which accelerates in late-October, will serve as a useful barometer to gauge visibility in unit shipments, average prices, and the investment cycle as companies layout guidance for FY2025. We anticipate the expected timeline for improvement across key global end markets will be pushed out one or two additional quarters.



## Follow The Money Across End Markets

In past decades, semiconductors exhibited commodity-like behavior and tracked supply cycles governed by wafer capacity, but the industry has since evolved as uses have diversified across many applications, user types, and geographies. As a result, the semi cycle tends to be faster (2-3 years) and more specific to the inventory cycles of certain devices or technologies, which are a feature of end market demand.

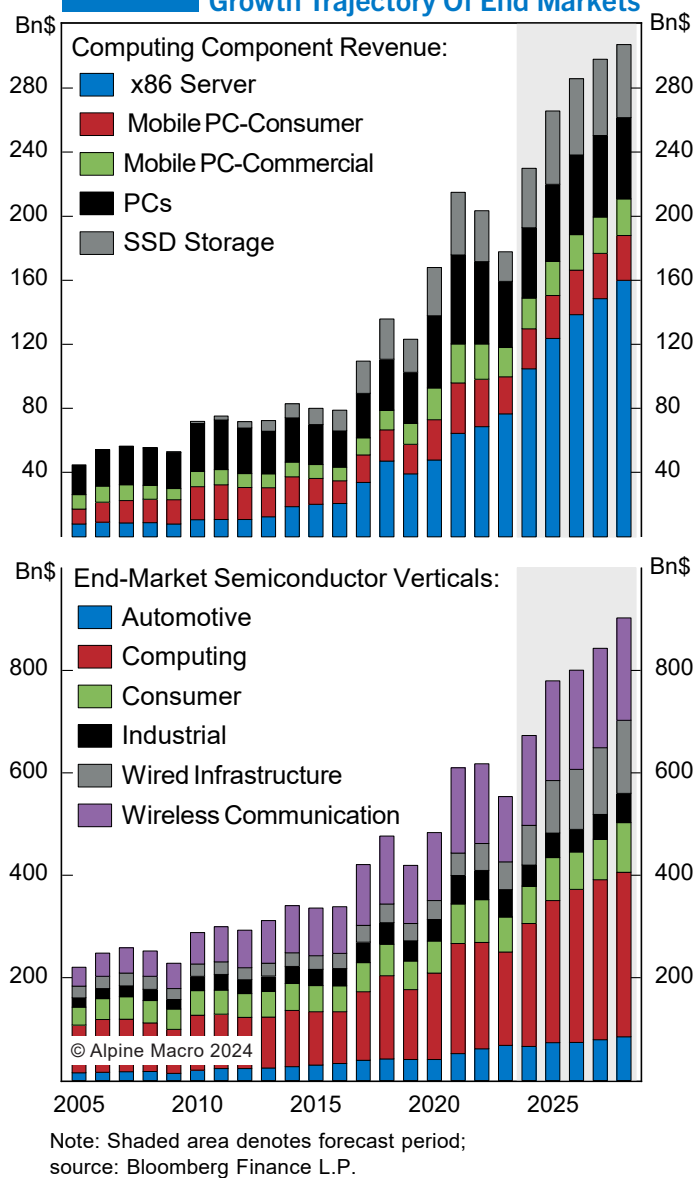
We break the demand structure for semis into six main end market verticals:

1. **Compute:** PCs, Servers, Displays, Drives, Storage
2. **Wireless Communication:** Wireless Phones, WLAN Access Points
3. **Wired Infrastructure:** Switches & Routers, Networking, Security Appliances
4. **Consumer:** Gaming, Wearables, Tablets, Smart Home, AR/VR
5. **Automotive:** Navigation, Entertainment, Smart Vehicle, Sensors
6. **Industrials:** Automation, Robotics, Aerospace Defense, Healthcare

## H(AI)ve's And H(AI)ve Nots Across Markets

The current backdrop for semis has been unique in that demand across most end markets has been contracting since 2022; with the notable exception for sophisticated logic and/or application

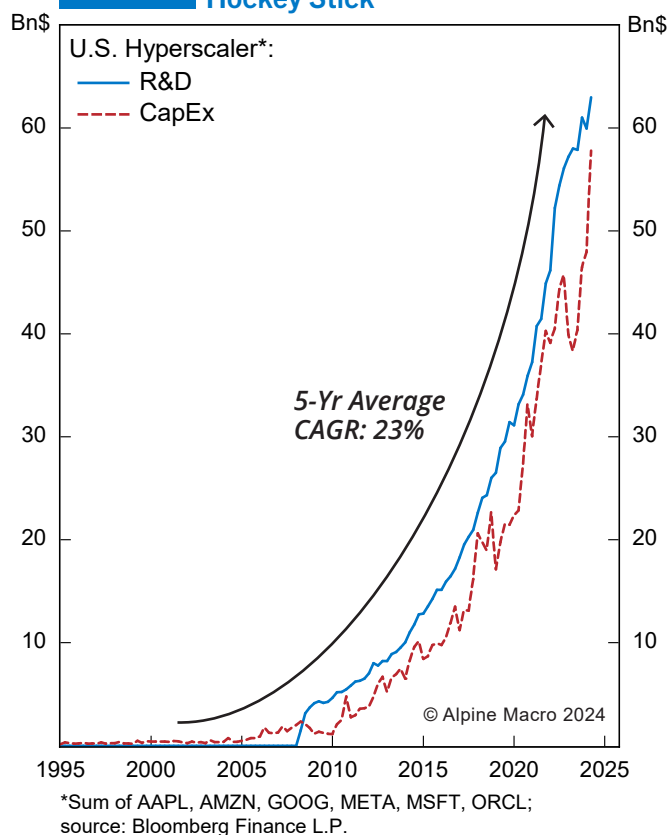
**Chart 7** Data Center & A.I. Compute Dwarf Growth Trajectory Of End Markets



specific products needed to power the insatiable demand for data centers and AI buildout. As we show in [Chart 7](#), the growth of the Computing vertical outpaces other end markets and is almost entirely due to data centers as opposed to legacy PC components.

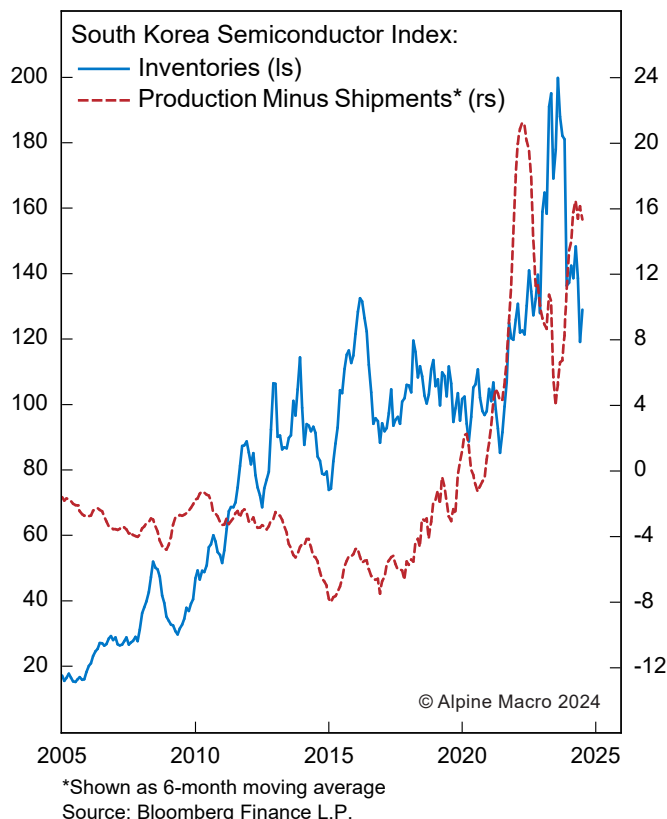
Logic chips operate as the “brain” enablers for artificial intelligence and big data applications, and there’s



**Chart 8** Hyperscaler Capex And R&D Is A Hockey Stick

no indication of letup in their demand rather we anticipate it to continue outpacing projections as order books for many devices are already backlogged into FY2026. Hyperscalers—a primary customer base that provides cloud computing and storage—continue to deploy CapEx and research & development at an astonishing pace as shown in **Chart 8**.

Conditions are not as supportive elsewhere, where the fall in demand from globally sensitive cyclical segments such as autos, industrials, and consumer has led declines in overall semi volume since a cyclical peak in 2022. Since that point, wafer and integrated circuit exports from semi powerhouses in Japan and Taiwan have fallen -19% and -17% respectively.

**Chart 9** Inventory Backlog Still Elevated As Production Exceeds Shipments

## Too Early For Broader Recovery

Investor optimism has been building that a trough will form in cyclical end markets during the late stages of 2024 however we expect that timeframe to slip as demand dynamics remain impaired across most device types. Still-elevated inventory levels in key markets, including South Korea as shown in **Chart 9**, point to more demand weakness as opposed to inventory burn which reflects negative trends for most categories.

Two main themes emerge which warrant investor caution given expectations for growth in coming periods:



1. There is a building risk that the uptake of tech hardware in legacy Compute and Wireless products, including Mobile PCs and 5G phones, will fall far short of lofty expectations for an upgrade cycle without a “killer app” to justify new AI-enabling features. **Investors may instead choose to delay purchases until tangible use cases for these technologies emerge.** That could lead to considerable downgrade of aggressive projections for some key products as shown in **Chart 10**.

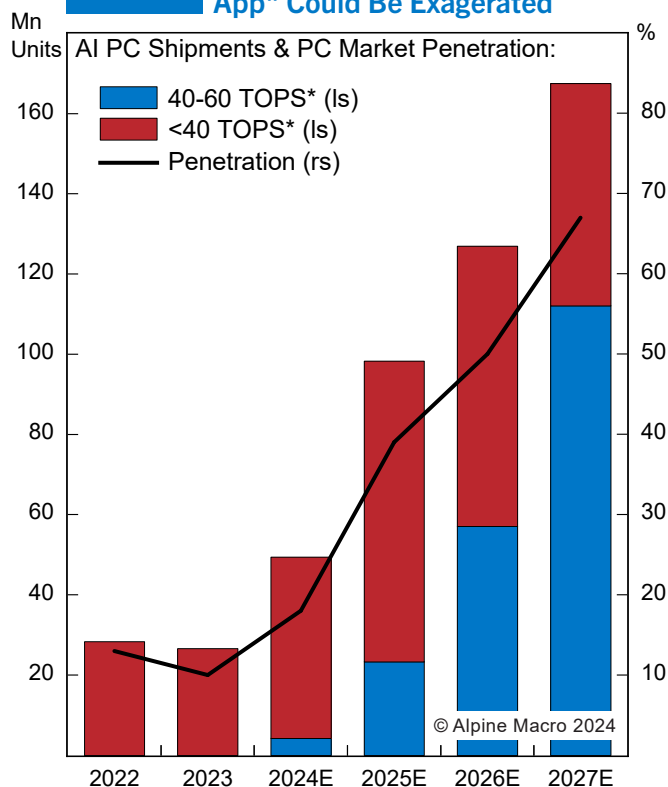
2. Companies continue to flag weakness in Automotive and core Industrial markets with little in the way of green shoots from indicators such as regional PMIs, vehicle sales, or commodities. Over the longer-term, these industries enjoy thematic tailwinds from the transition to electric/hybrid vehicles and near-shoring/automation however **these trends are overwhelmed by the global manufacturing downturn in addition to the destocking of inventory buildup** as we’ve detailed.

In **Table 1** in the appendix, we provide an overview of drivers and our outlook for semiconductor end markets:

## Conclusion: One Trick Pony, But A Great Trick

The bottom line is that this Recovery phase is unlike others and most end markets for semiconductors are not yet positioned to inflect higher given the global nature of their cyclicity, however the ubiquity of big data and addressable market for artificial intelligence still enables certain channels to buoy the performance of the overall industry.

**Chart 10** Expectations For The Next "Killer App" Could Be Exaggerated



\*Trillions of operations per second, 40-60 TOPS considered for AI applications; source: Bloomberg Finance L.P.

Investors projecting imminent improvement in 2H 2024 appear more hopeful than informed at this point, although a turnaround in major international markets including China would cause us to revisit this outlook. We note the Chinese central bank, together with regulators, announced a slew of aggressive stimulus measures which our Emerging Market service expects will support Chinese equities to an extent but falls short of a “whatever it takes,” moment. In reaction, China hyperscalers surged along with U.S. semiconductor AI-enablers, highlighting the positive risk/reward skew for this segment.

**We favor companies with significant revenue exposure and leading technologies in the Computing**



(AI, data center) and Wired Infrastructure (net-working) verticals which stand to benefit from the continuation of established trends while enjoying the upside potential of a “killer app” or China stimulus but with less risk than pure cyclical segments.

Companies Within Preferred Verticals Include: INTC, NVDA, AVGO, AMD, MU, MRVL, WDC, MCHP, ON

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Table 1

End Market	Major Players	Revenue Share	2023 Growth	2024 Growth (Est)	2025 Growth (Est)	Notes	Outlook
Computing	INTL, NVDA, AVGO, AMD, MU, MRVL, WDC	35%	-12%	32%	16%	Strong secular growth in servers overwhelms all else  Vulnerability in elevated Mobile PC expectations on AI-enabled hardware with unproven tech benefit	+
Wireless Communication	AAPL, QCOM, AVGO, MU, SWKS	26%	-18%	38%	11%	Ambitious expectations for 5G phone growth (40%/18%) upgrade cycle in CY24 and CY25 with no obvious “killer app” to drive adoption	-
Wired Infrastructure	TXN, NXPI, ADI, MCHP, ON	12%	3%	43%	33%	Benefiting from surge of switches and offloading of enterprise networking to cloud-managed data centers	+
Consumer	AAPL, AMD, ADI, MCHP, WDC	11%	-18%	7%	15%	Consensus expects robust upgrade cycle for tablets, wearables, and smart TV/home  Easy comps but low visibility in product development	-
Automotive	TXN, NXPI, ADI, MCHP, ON	10%	10%	-3%	11%	Rebound in U.S., China, European vehicle sales slowing  Greater semi content on EVs/Hybrids vs ICE, but adoption slowing	N
Industrial	AVGO, NVDA, MCHP, MRVL	6%	-6%	-23%	15%	Short-Term: global manufacturing recession  Long-Term: near-shoring, automation, digital warfare	N



Investment Recommendations				
Strategic Recommendations (6 - 12 months)				
Recommendations	Open Date	Performance		Active Return
		Vehicle	S&P 500	
Long S&P Industrials	5/29/2024	11.10%	8.74%	2.36%
Long S&P Utilities	6/12/2024	14.92%	5.64%	9.28%
Long S&P 600	6/24/2024	9.68%	5.12%	4.56%
Short S&P Materials	7/24/2024	5.52%	7.06%	-1.54%
Long Regional Banks (KRX)	8/21/2024	2.61%	1.89%	0.72%





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