



# **SEMICON Korea Members Day 2025**

## **Building the Future: AI Investment, Equipment & Materials Market Outlook**

September 25, 2025

**Clark Tseng**

Sr. Director, Market Intelligence

SEMI

# Agenda

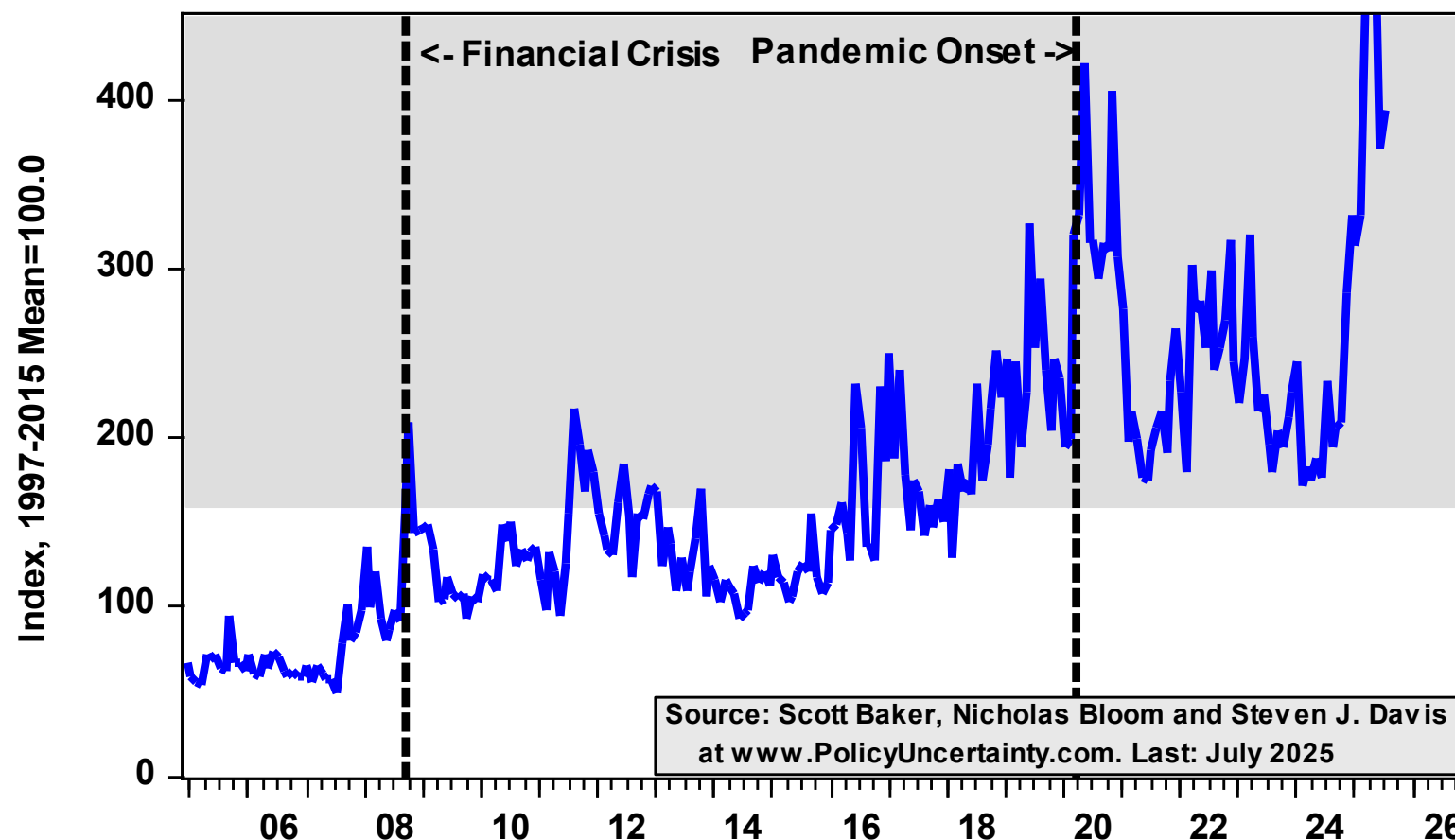
- **Near-Term Economic Uncertainty**
- **AI Changes Everything - Cloud to Edge to Equipment**
- **Semiconductor Equipment Market and Japan Investment**
- **Material Market Outlook**

# Near-Term Economic Uncertainty



# Policy Uncertainty Remains Extremely High

## Global Economic Policy Uncertainty

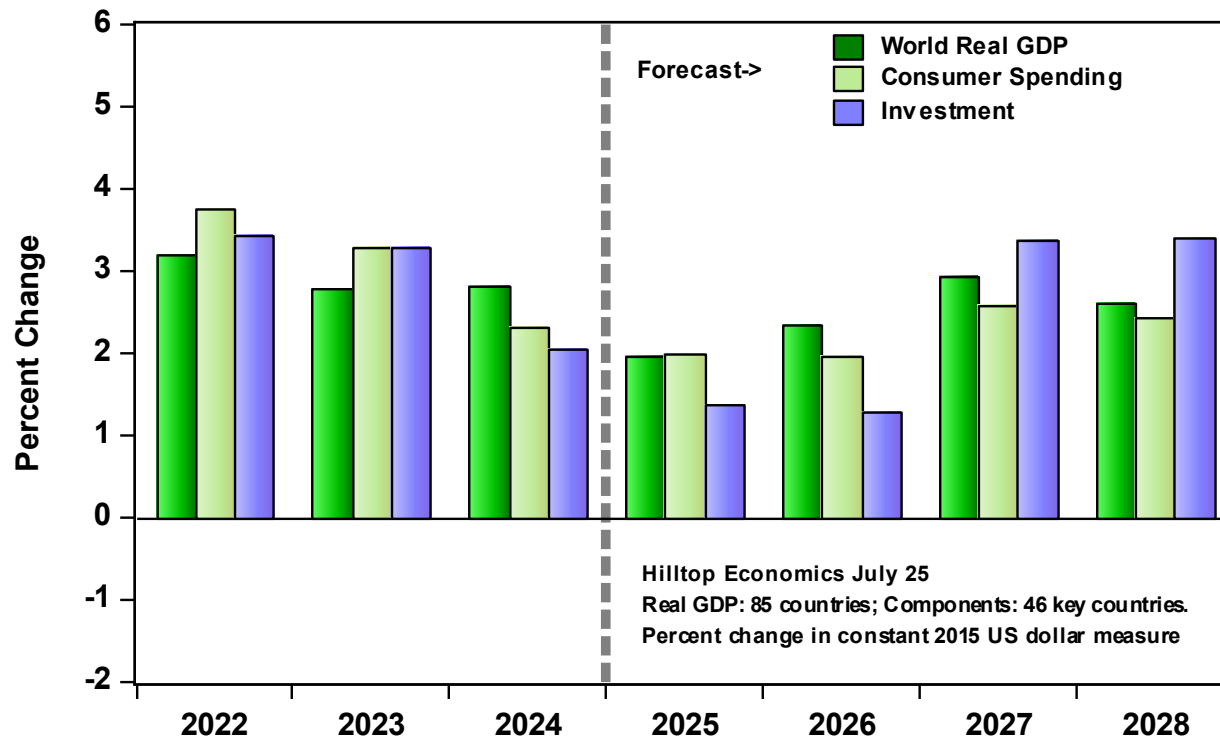


Source: SEMI ESF (Econometric Semiconductor Forecast), July 2025

# Economic Outlook

*Global Growth Drops Below Pre-Pandemic Trend*

**World Real GDP and Key Components Growth**  
**2024: 2.8% 2025: 1.9% 2026: 2.3% 2027: 2.9%**



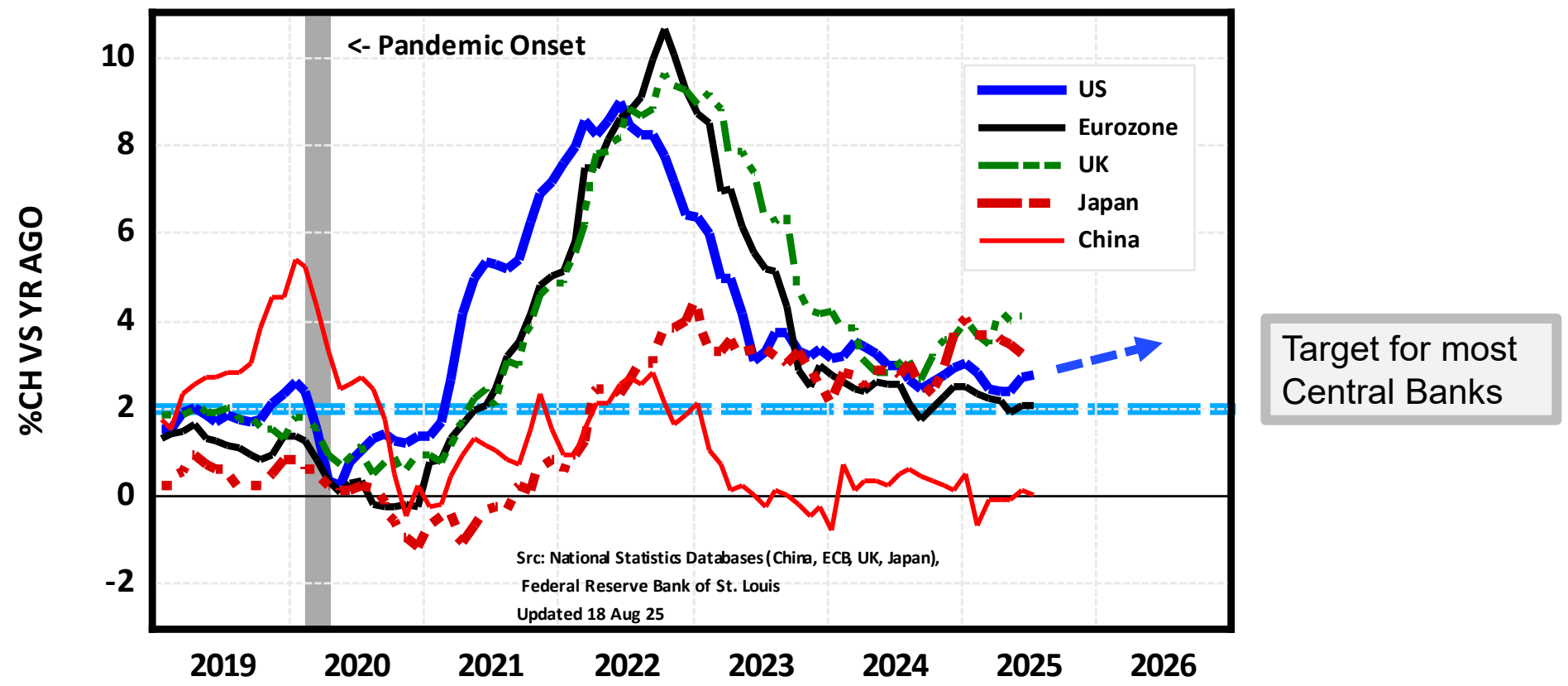
Source: SEMI ESF (Econometric Semiconductor Forecast), July 2025

- Global real GDP growth should drop well below its historical trend in 2025 and 2026, although this month's update raises the growth forecast by 0.2 percent from last month.
- Consumer spending in many countries registers modest gains as households adjust to mostly improving global inflation patterns.
- Investment growth stays weak, as uncertainty about cross-border restrictions and legal arrangements causes many businesses to pause new investment until a more stable environment develops.

# US Tariff Policy Bumps US Inflation and Alters Global Trade Patterns

*Consumer inflation at or near target only in the Eurozone; it's heading up in US and UK, too high in Japan and too low in China*

CPI Inflation



# Near-Term Economic Backdrop

Economic uncertainty remains extremely high, although markets are adjusting

Global economic growth below trend and at risk of weakening even more

- US tariffs and policy changes artificially alter the business environment
  - Inflationary in the US, deflationary elsewhere if increases are not reciprocated
- Global trade war risk down so far as the US is the only country raising barriers with its trading partners, but altering trade patterns reduces growth in the next few years

Elevated risk of recession in the US, influencing the global outlook

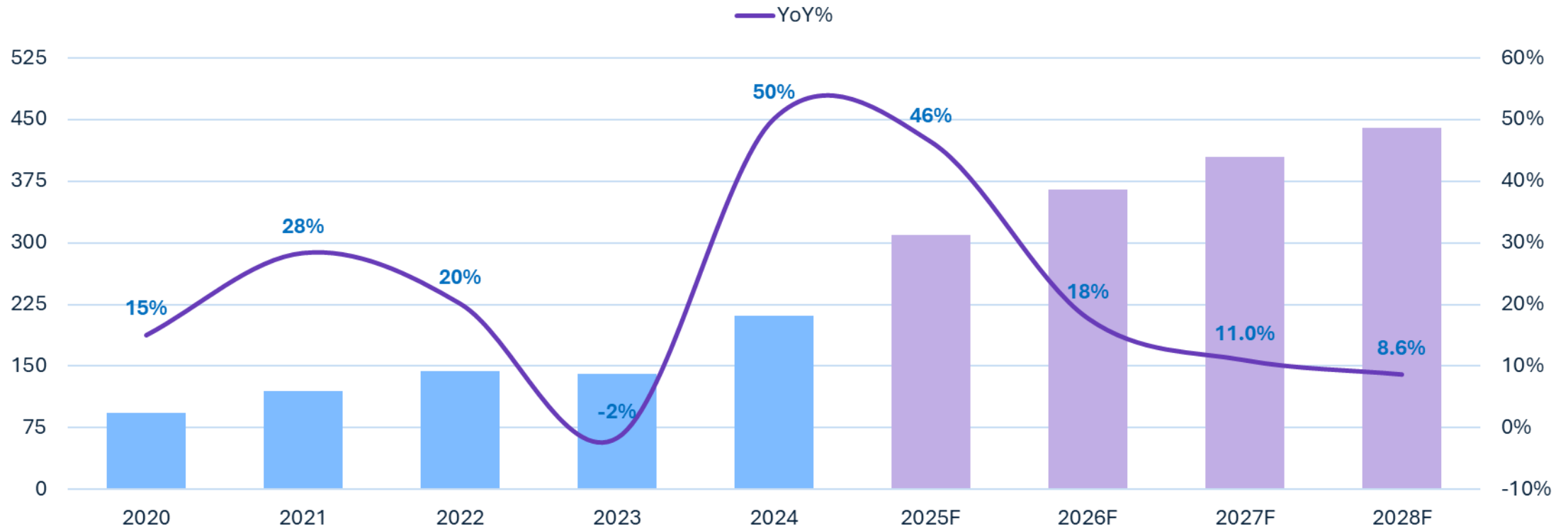
- Consumption bifurcated: stronger in high income, weaker in middle and low income
- Investment: mixed but surveys indicate many businesses are now putting plans on hold
  - Major exception: AI-related investments in compute, datacenter, power, infrastructure, etc.

Geopolitical risks and ongoing wars remain an uncertain wild card

# AI Changes Everything – From Cloud to Edge to Equipment

# AI-Driven Cloud Infrastructure Spending Shows Sustained Growth Through 2028 Forecast

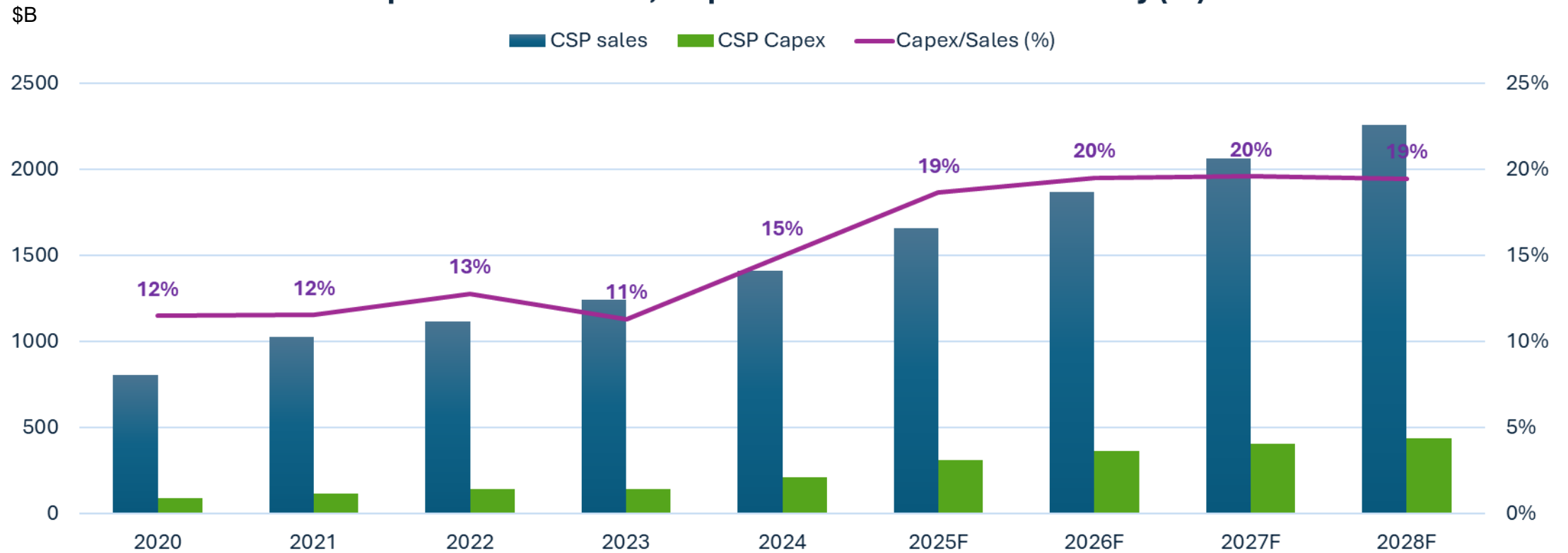
## Top Four CSP Capex Spending (\$B)



Source: Company data, SEMI estimate, 3Q 2025

# Stable CapEx/Sales Ratio Eases Concerns Over Overinvestment Through 2028

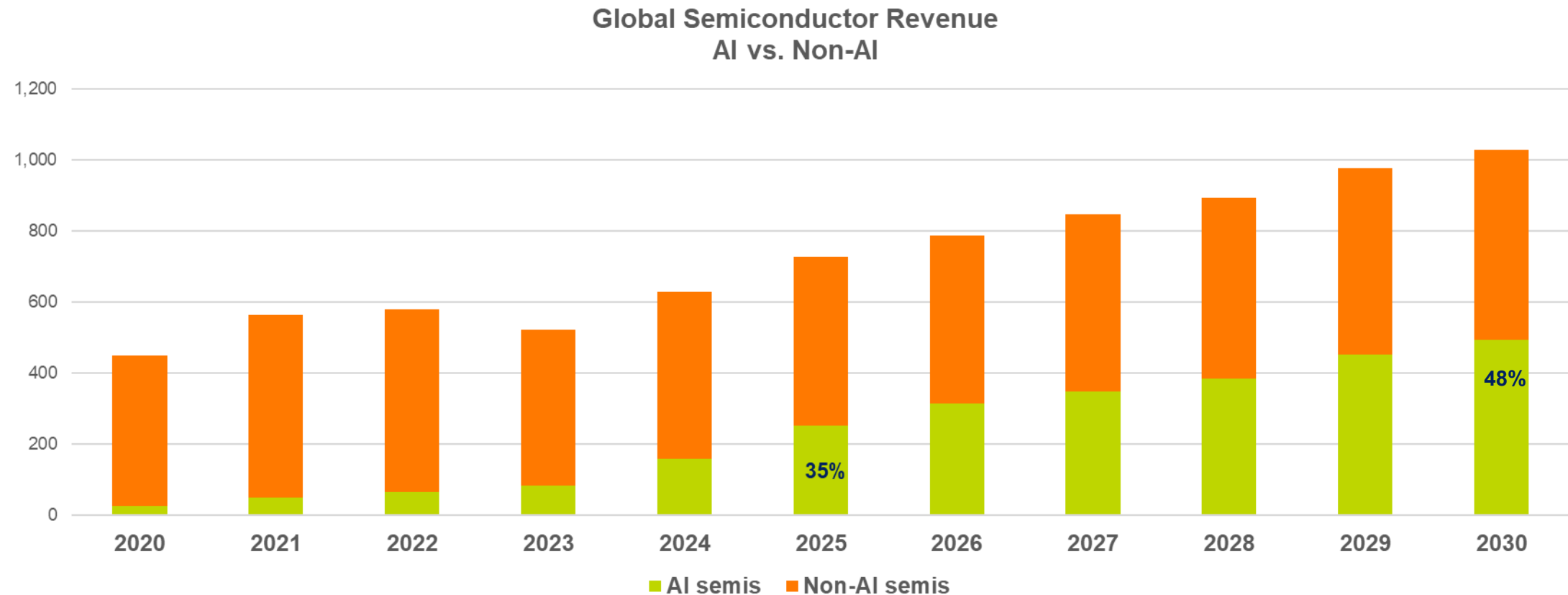
## Top Four CSP Sales, Capex and Investment Intensity (%)



Source: Company data, SEMI estimate, 3Q 2025

# AI Semi Surge: A \$1T+ Market by 2030

2020 - 2030 Revenue Trajectory and Segment Shifts



Source: SEMI, Morgan Stanley

# AI Beyond the Data Center

Inference Scaling Across Cloud to Edge to Client



## Cloud

Centralized computing for large-scale AI processing and data storage



## Edge

Processing data locally, near its source, enables real-time decision-making and reduces latency for applications

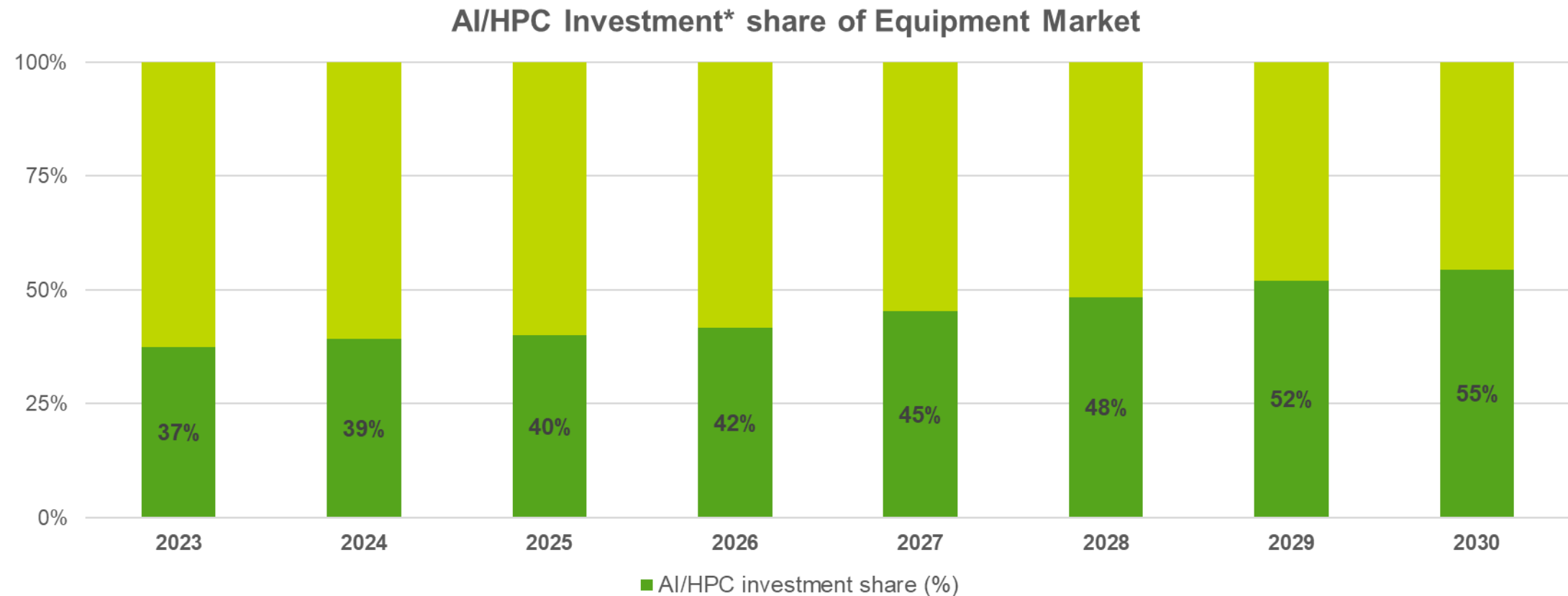


## Client

Running AI applications directly on user devices with personalized, responsive experiences and enhanced data privacy

# AI/HPC Investment to Drive Equipment Market Growth

*Leading-edge logic and Memory investment to count for half of the total equipment investment*



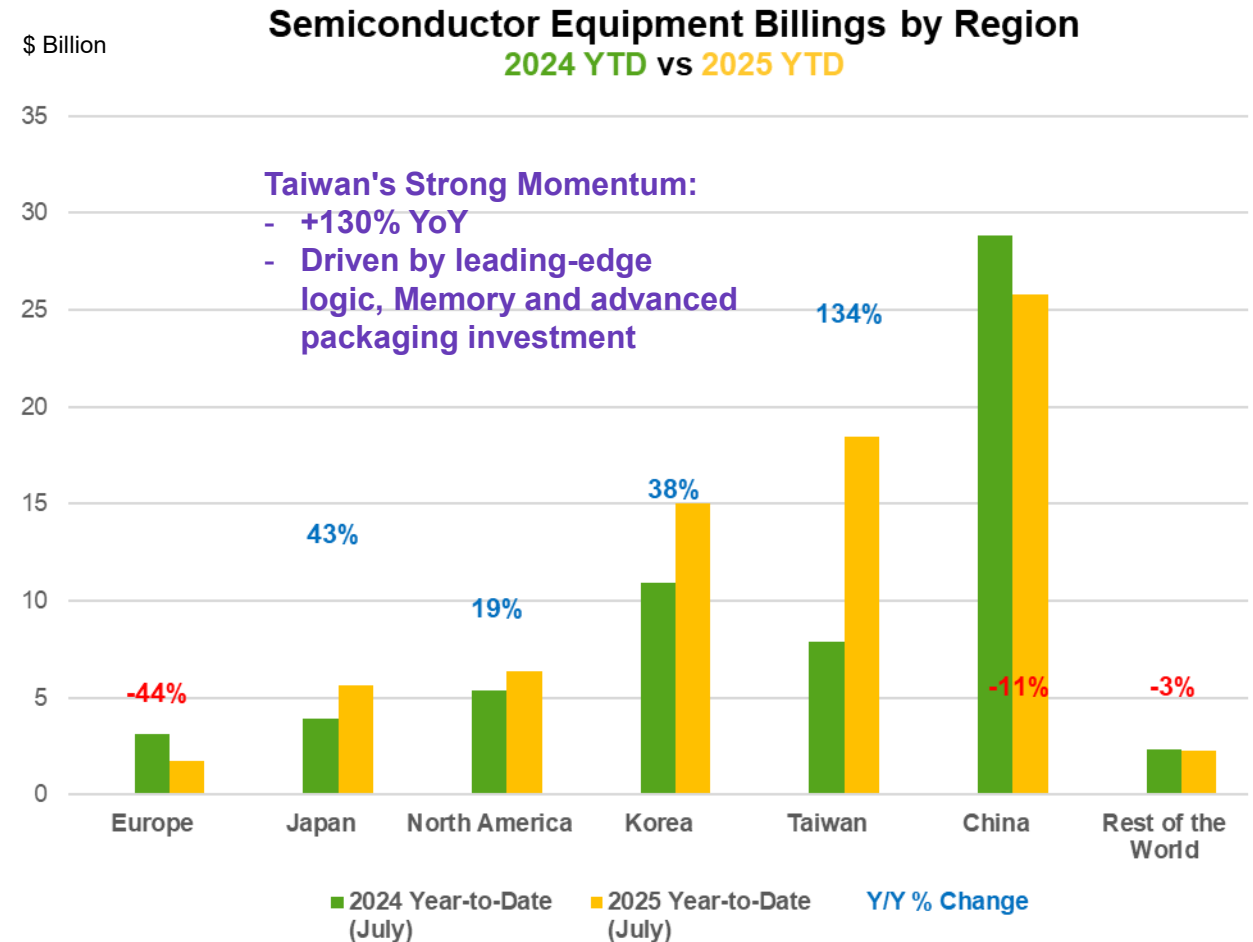
\*AI/HPC investment includes 7nm and below logic/foundry and related memory equipment spending  
Source: SEMI World Fab Forecast, 2Q 2025

# Semiconductor Equipment Market Forecast

# Robust YTD Semiconductor Equipment Billings Growth

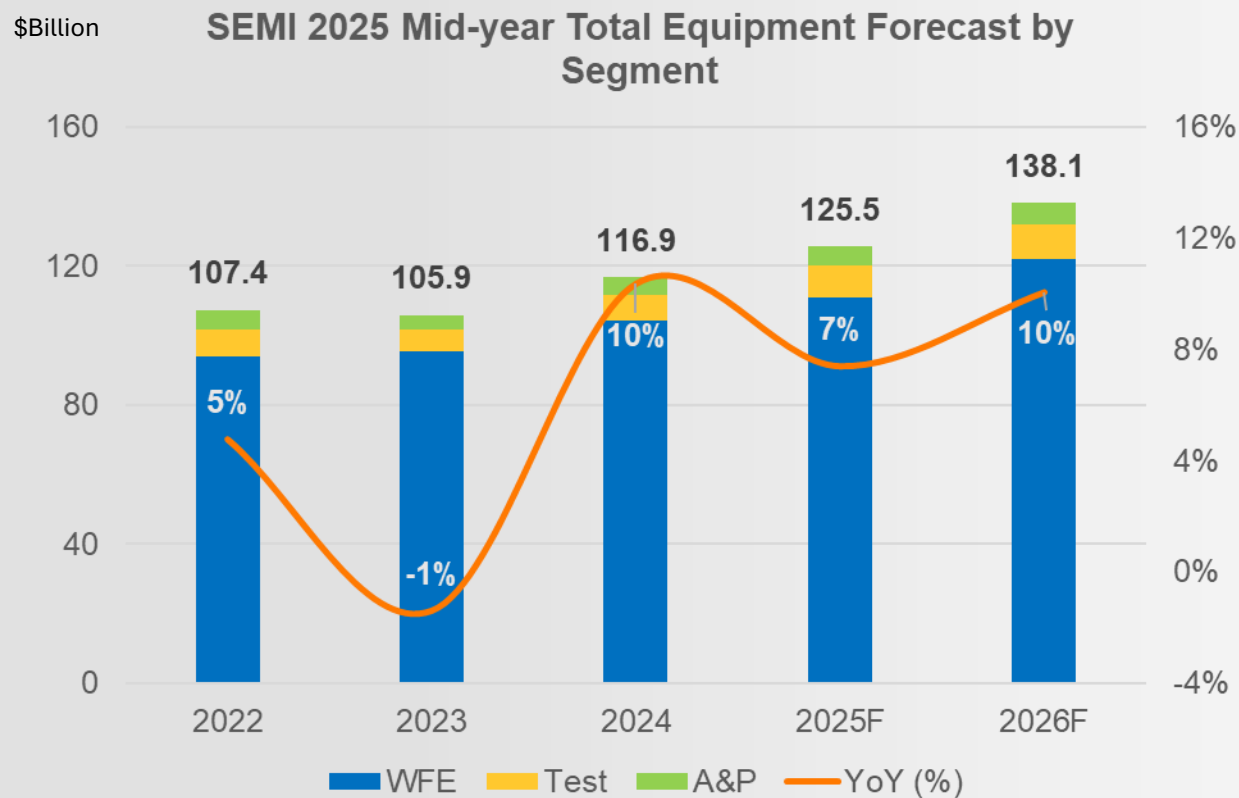
## *Regional Insights and Dynamics as of July 2025*

- Total semiconductor equipment billings reached \$75 billion year-to-date (as of July '25), representing a 20% increase compared to \$62 billion during the same period in 2024.
- Taiwan and Korea exhibited the strongest year-over-year growth, driven by investments in AI-related semiconductors, particularly in GPUs and HBM.
- In contrast, China experienced a 11% decline year-over-year, primarily due to market normalization.
- Europe also saw a significant decline, as the demand for automotive and industrial applications remains weak.



Source: SEMI Equipment Market Data Subscription (EMDS), August 2025

# SEMI® Mid-Year Total Equipment Forecast OEM Perspective



Total equipment includes wafer fab (WFE), test, and assembly & packaging;  
WFE = WPE + M/R + Fab Facilities. Total Equipment does NOT include Wafer Manufacturing Equipment.

The **2025 Total Equipment Market** is expected to **grow 7.4% to reach \$125 billion. Growth is expected to continue in 2026**

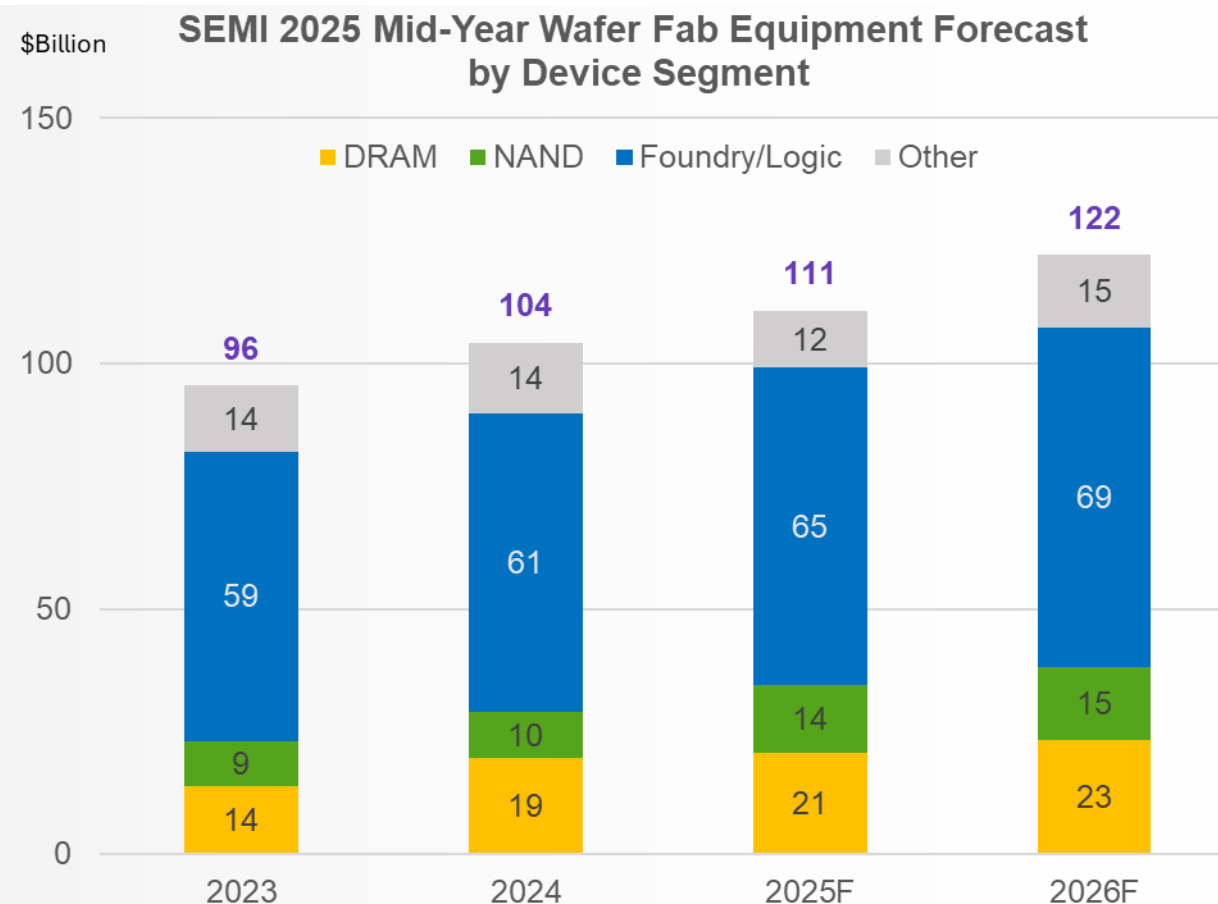
- **WFE** (Wafer Fab Equipment): Expected to grow by 6% in 2025 and 10% in 2026, reaching a total of \$122 billion by 2026.
- **Test** equipment is projected to grow by 23% in 2025 and 5% in 2026, totaling \$9.8 billion by 2026.
- **A&P** (Assembly & Packaging) equipment is expected to rebound by 8% in 2025 and 15% in 2026, reaching a total of \$6.3 billion by 2026.

**2026** is expected to see a **10% increase**, pushing the market to **surpass \$138 billion** and setting a new record.

# SEMI® WFE Market Forecast by Device Segments

- The overall WFE\* market is expected to reach **\$111B by 2025** and is projected to grow by 10% to reach **\$122B in 2026**.
- **Foundry and Logic** spending is expected to grow by 6.7% in 2025, reaching \$65B. A growth of 6.6% is projected for 2026, driven by investment in leading-edge nodes, with further growth of 13% anticipated in 2027.
- **DRAM spending** is projected to increase by 6% to \$21B in 2025, followed by a 12% rise to \$23B in 2026, driven by capacity expansion and investment in HBMs.
- **NAND spending** is expected to surge by 42% growth in 2025, recovering from a lower baseline. An additional growth of 10% is anticipated in 2026.

\*WFE = WPE + M/R + Fab Facilities.



# SEMI® Test and Assembly/Packaging Equipment Market Forecast

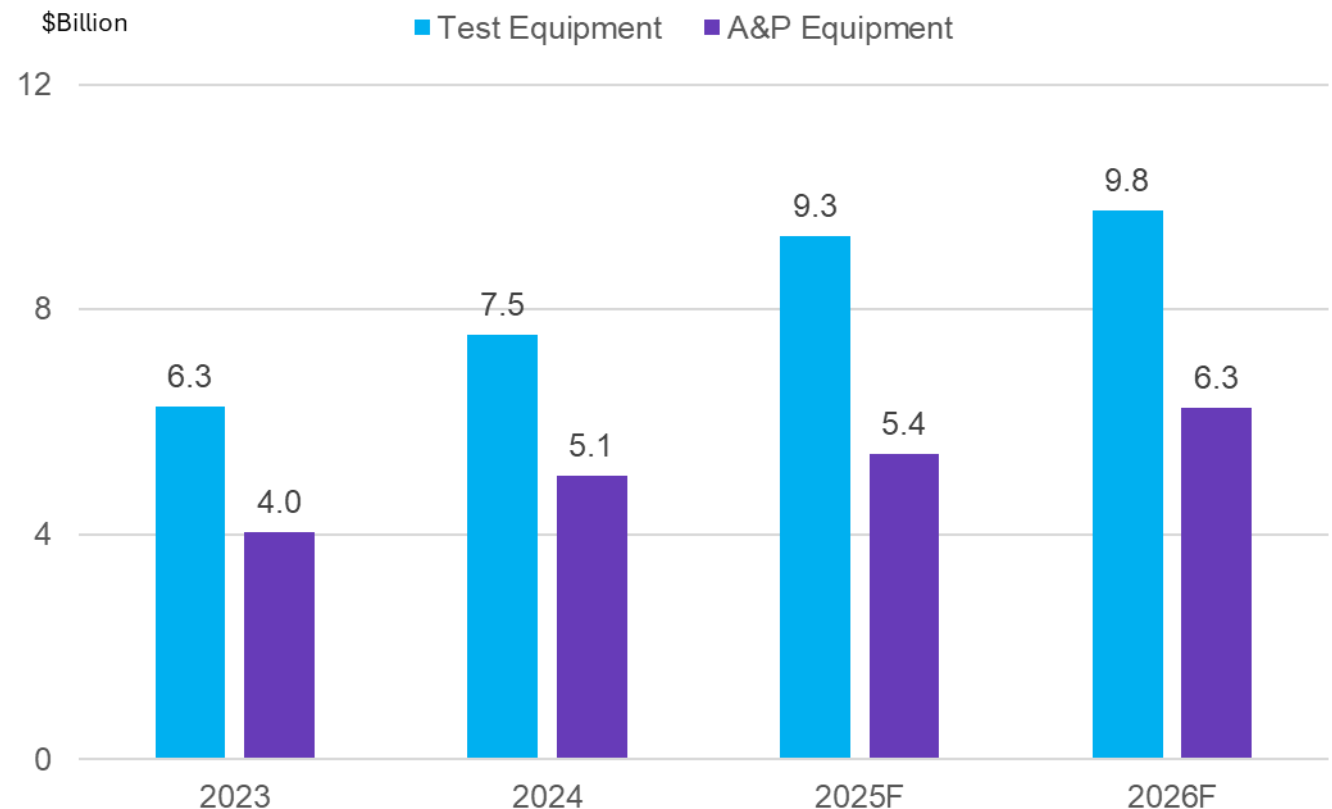
## Test Equipment

- The market is projected to experience significant growth, **surging by 23% in 2025, reaching \$9.3 billion**.
- This growth is primarily driven by strong demand for advanced applications, particularly in artificial intelligence (AI) and mobile applications. However, growth is expected to moderate in 2026, with an anticipated increase of 5%.

## Assembly & Packaging equipment

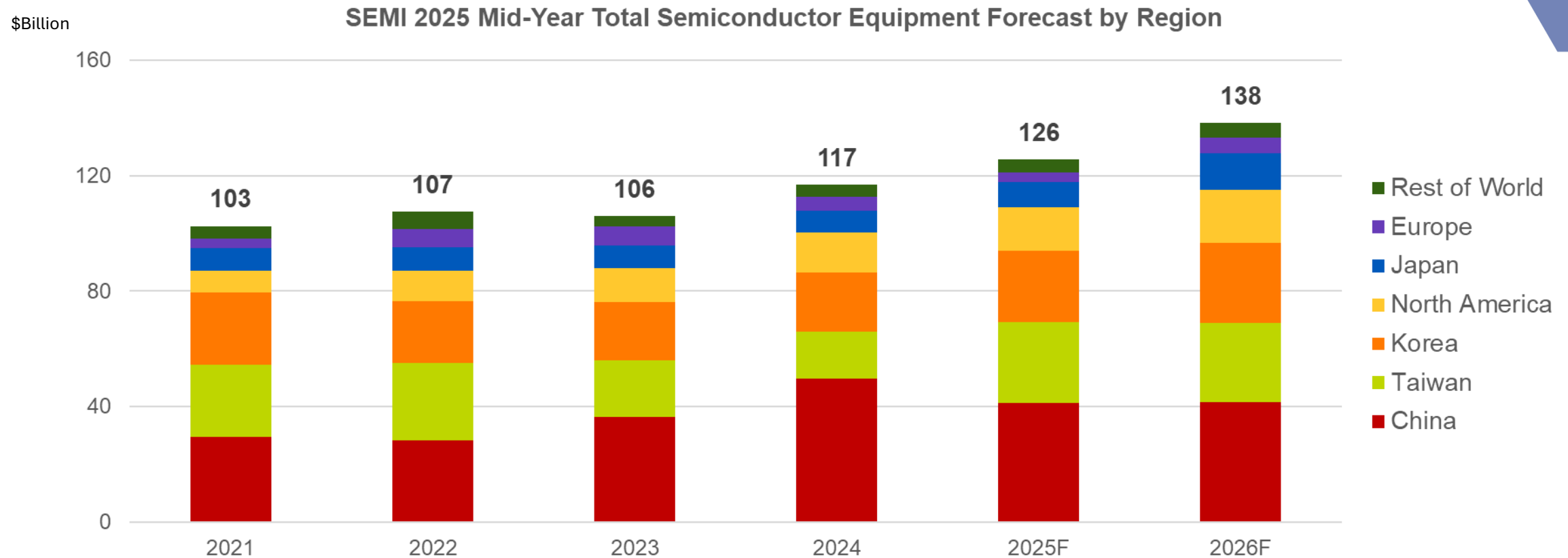
- The market is projected to grow by **8% in 2025**, reaching \$5.4 billion. Growth is expected to continue in **2026 with a 15% increase**.
- Key growth drivers include the demand for advanced packaging solutions to support AI and HPC applications, the increasing complexity of semiconductor devices and the expansion of key end-markets.

SEMI 2025 Mid-Year Test and Assembly/Packaging Equipment Forecast



Source: SEMI Equipment Market Data Subscription (EMDS), July 2025

# SEMI® Mid-Year Total\* Equipment Forecast by Region



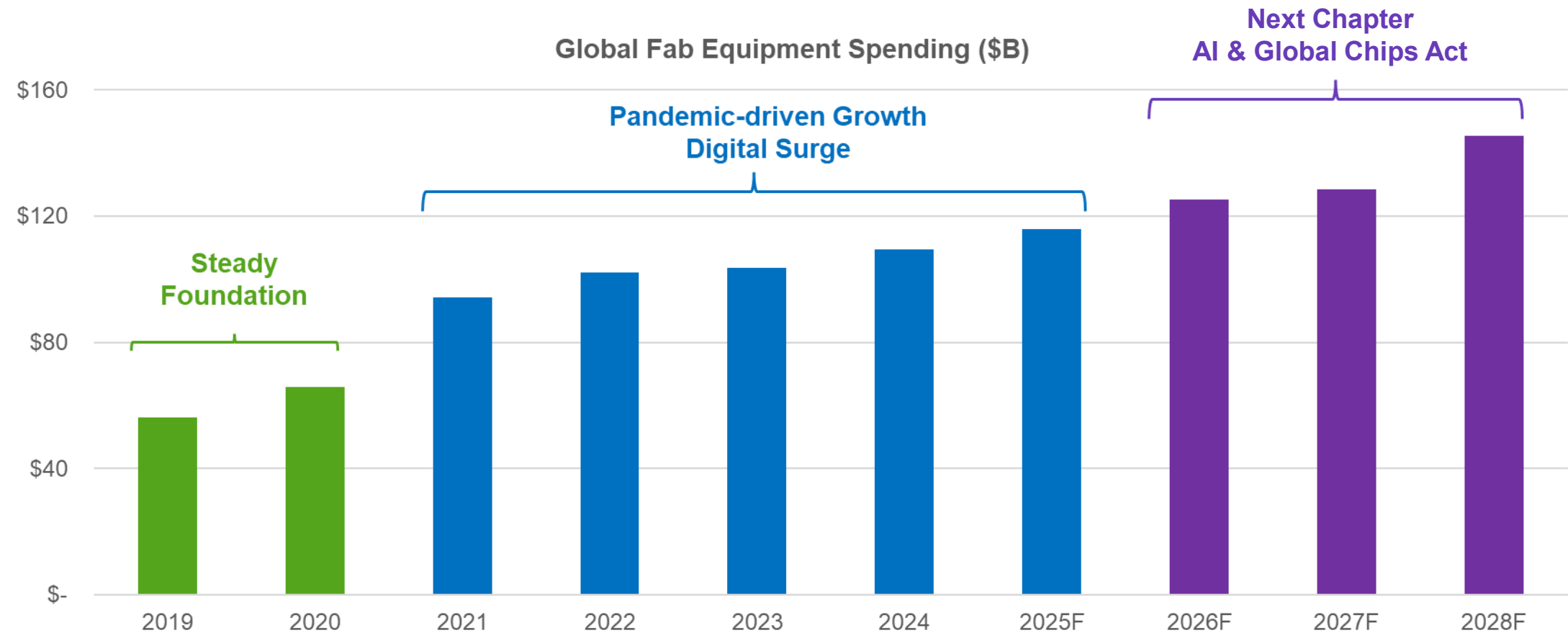
Source: SEMI Equipment Market Data Subscription (EMDS), July 2025

\* Total Equipment does NOT include Wafer Manufacturing Equipment.

**China's investment normalized, while spending in Taiwan and Korea is on the rise.**

# Global Fab Equipment Investment Trends

*From Stability to Acceleration: Tracking the \$56B to \$145B Growth Journey*

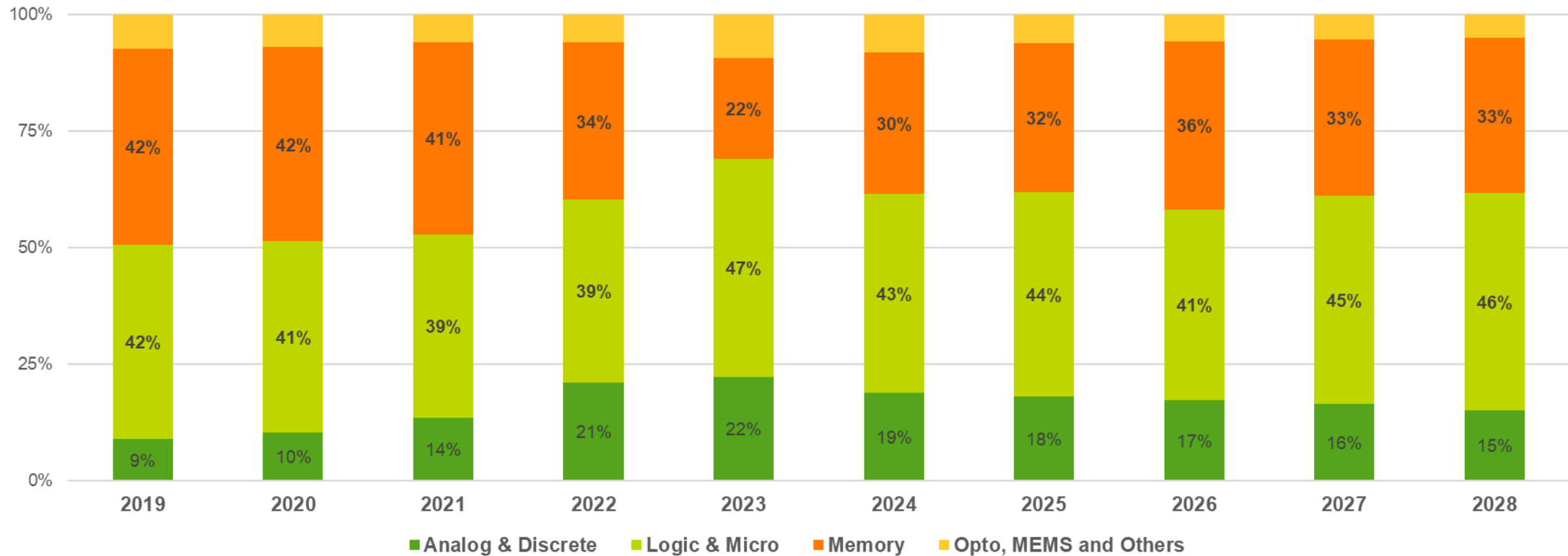


Source: SEMI World Fab Forecast, 3Q 2025

# The Composition of Fab Investment

*Shifting Patterns in Global Equipment Spending*

Global Fab Equipment Spending - Segment Share



Source: SEMI World Fab Forecast, 3Q 2025

# Key Market Drivers & Risks

*AI-driven demand is strong, but China's investment cycle is cooling*

## Market Drivers

- **AI Revolutionizes Equipment Demand and Advanced Packaging:** AI is the strongest secular driver of semiconductor equipment demand, prompting a “supercycle” of both front-end (WFE) and back-end (packaging/testing) equipment investments globally. Emerging techniques such as 3D-IC, heterogeneous chiplet packaging (e.g., FOPLP, CoWoS/P, HBM integration), and new interconnect standards are pivotal in enabling the scaling and performance leaps required by cloud and edge AI deployments.
- **High-Performance Computing and Memory Transition:** AI, high-performance computing, and memory transition (GAA, HBM, 3D stacking) are expected to drive multi-year equipment and infrastructure investment.

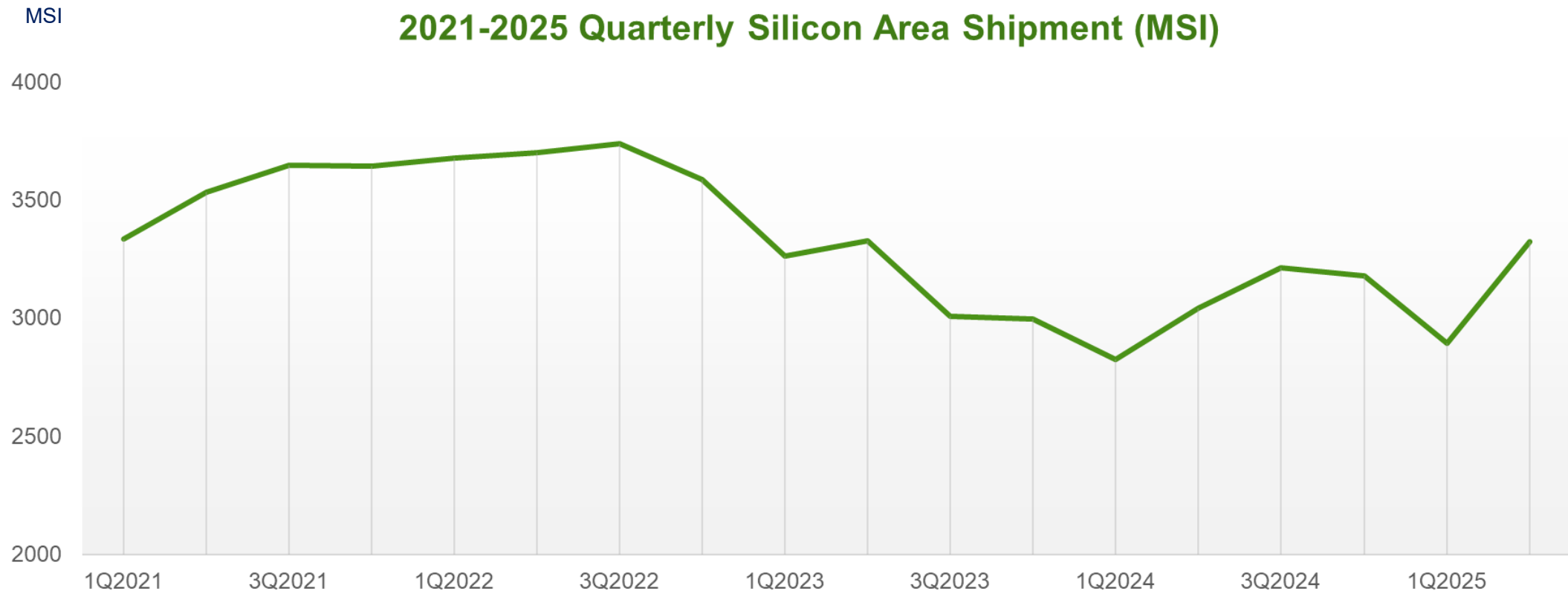
## Risks

- **Potential Slowdown of AI Investment and Adoption:** The slowdown in AI investment and adoption poses a significant risk.
- **US Tariffs and Export Controls:** US tariffs and export controls, along with the “China-for-China” manufacturing strategy, create uncertainties and drive regional supply chain shifts. Potential US tariffs exceeding 100% on imported chips and other items fuel uncertainty, with details pending.
- **Regional Supply Chain Shifts:** Companies with US plants, such as TSMC, Samsung, Amkor and GlobalWafers, are seen as better shielded from risks compared to mature-node Asia foundries and OSATs.

# Material Market Outlook

# Silicon Wafer Shipment Trends

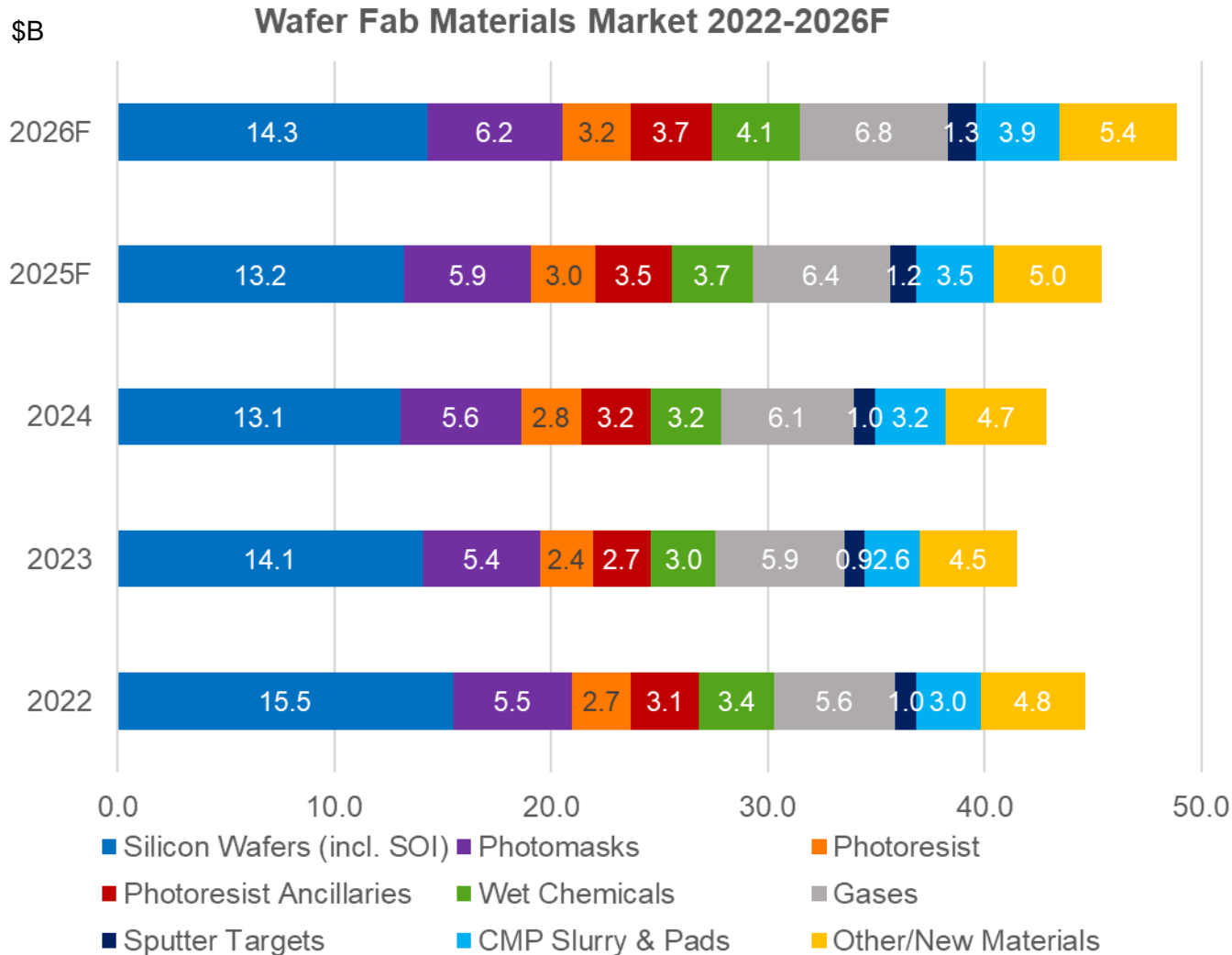
*Renewed shipment strength in 2Q25*



Source: SEMI Silicon Manufacturers Group (SMG), July 2025

**2Q 2025 MSI rebounded 15% QoQ and 9% YoY**

# Wafer Fab Materials Market Growth



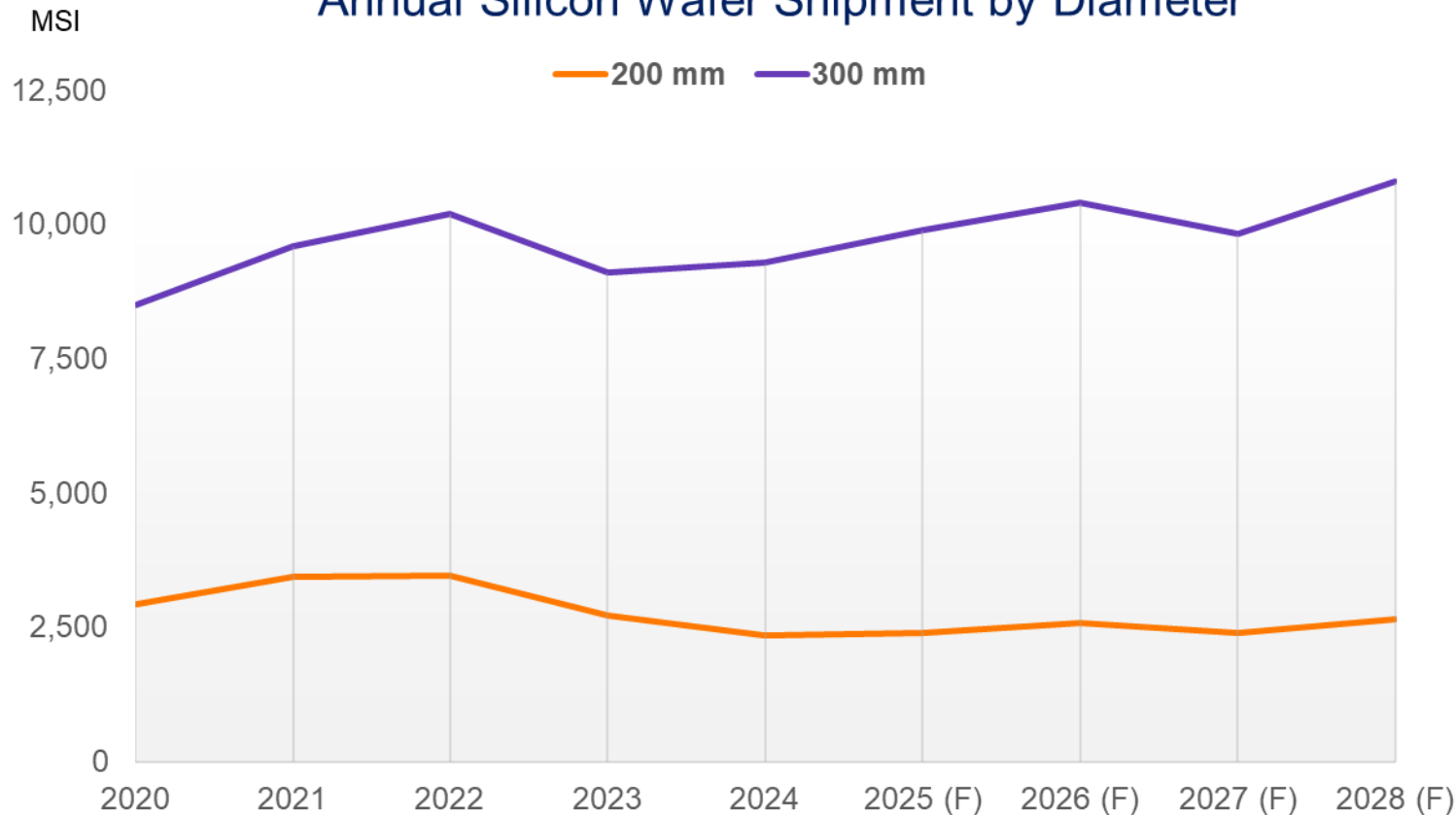
Source: SEMI, Materials Market Data Subscription (MMDS), July 2025

- The overall WFM market is projected to grow 6% to \$45.4B in 2025 and reach \$48.9B by 2026.
- **Silicon wafers** showing gradual recovery: The largest segment bottomed out at \$13.1B in 2024 and is forecasted to grow to \$13.2B in 2025 and \$14.3B in 2026.
- **Wet chemicals** experience healthy expansion: with 16% expansion to \$3.7B in 2025, continued growth expected reaching \$4.1B by 2026.
- Photolithography materials demonstrate resilience: Photomasks, **photoresist**, and **photoresist ancillaries** show consistent growth throughout the forecast period, with **photomasks** reaching \$6.2B by 2026.
- **CMP materials** recovery: CMP slurry & pads are projected to expand to \$3.5B in 2025 and \$3.9B in 2026.
- **Gases segment stabilizing**: Electronic gases are expected to grow 7% to \$6.8B by 2026.

# Silicon Shipments Trend by Diameter

*300mm Silicon wafers to see a healthy recovery in 2025 and 2026*

Annual Silicon Wafer Shipment by Diameter



Source: SEMI Silicon Wafer Market Monitor 1Q25 update, April 2025

- **Total Silicon MSI** shipments recorded a 2.5% decline in 2024, with growth expected to resume in 2025 and continue through 2028.
- **300mm wafer segment:**
  - Showed resilience with 2% growth in 2024
  - Expected to grow ~6.5% in 2025
  - Projected to reach new highs by 2028, exceeding 10,800 MSI
- **200mm wafer segment:**
  - Declined 13% in 2024 due to legacy applications slowdown
  - Projected 2% recovery in 2025 as inventory normalizes
  - Expected to stabilize around 2,500-2,700 MSI through 2028
- **Overall market outlook:**
  - Healthy recovery expected in 2025 and 2026 with ~5% growth
  - Continued expansion through 2027-2028, driven primarily by 300mm demand

# Photoresist Market Forecast

*Recovery and Growth Driven by Advanced Lithography and AI Demand*

## Market Recovery & Growth

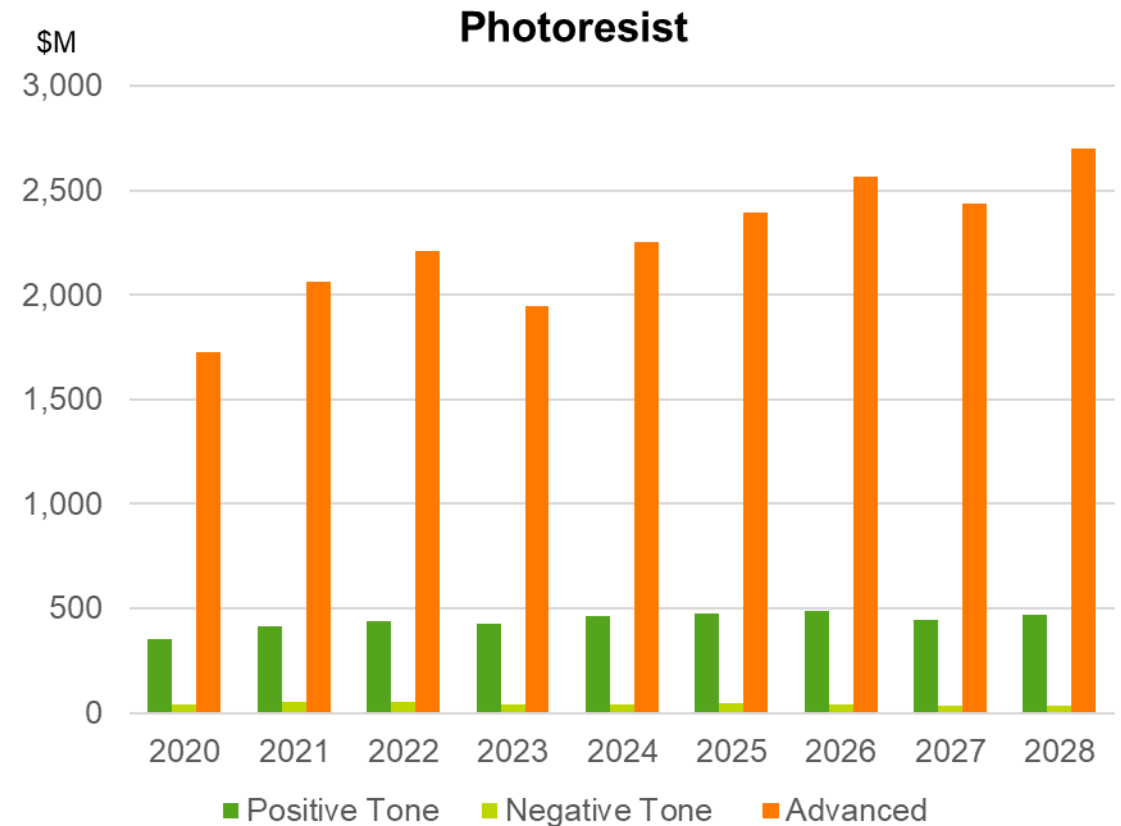
- 11% contraction in 2023 → 14% rebound in 2024
- \$3B market size by 2026, then stabilizing growth
- Recovery aligned with semiconductor industry cycles

## Segment Dynamics

- **Advanced Photoresist** dominates (80% of revenue, growing to 84% by 2028)
- EUV lithography driving renewed interest in negative photoresist
- **Positive photoresist** achieving single-digit growth

## Key Growth Drivers

- Increasing chip complexity and 3D architectures
- EUV lithography adoption across leading-edge nodes
- AI chips & high-performance computing demand
- Memory market stabilization supporting sustained growth



Source: SEMI Wafer Fab Materials Quarterly, 2Q 2025

# Photoresist Ancillaries Market Forecast

*Strong Recovery with Diverse Segment Dynamics Across the Process Chain*

## Market Recovery Pattern

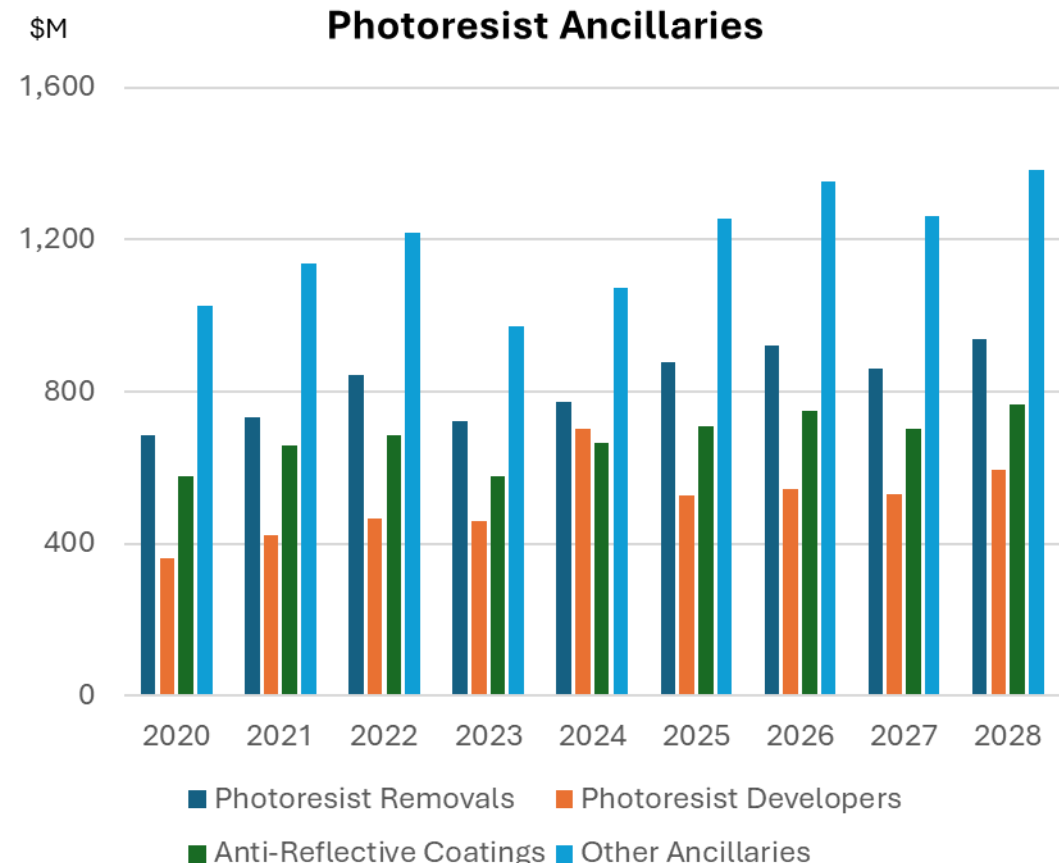
- 15% contraction in 2023 → 18% rebound in 2024
- \$3B market projection for 2025-2026

## Segment Breakdown

- **Photoresist Removals**: Sharp recovery in 2024 after 2023 decline
- **Photoresist Developers**: 50% surge in 2024, inventory digestion expected in 2025
- **Antireflective Coaters** (~20% of market), BARC representing majority, steady recovery pattern
- **Other Ancillaries** (~40% of market), 10% growth in 2024 after 2023 contraction

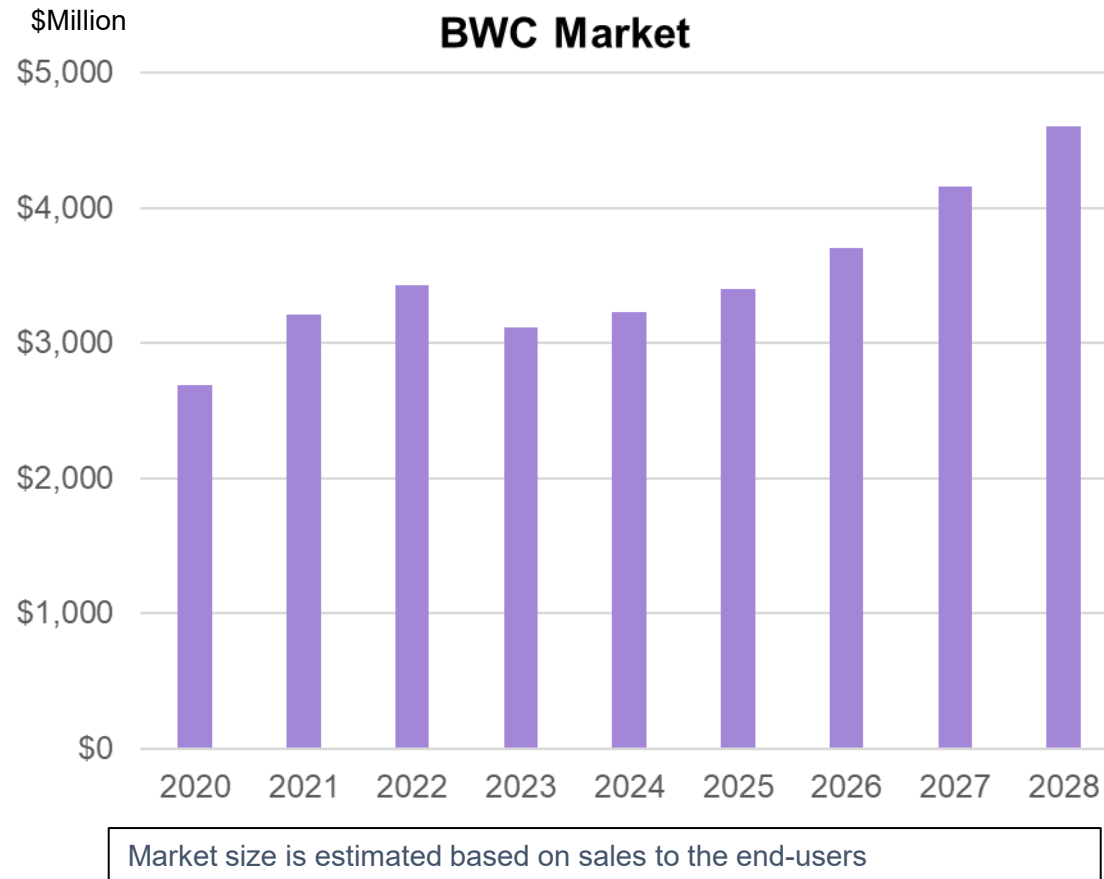
## Key Drivers

- Silicon MSI trends and fab utilization recovery
- Taiwan and China shipments driving developer growth
- Diverse segment dynamics across the process chain



Source: SEMI Wafer Fab Materials Quarterly, 2Q 2025

# Bulk Wet Chemicals: \$4.6B Market Driven by Semiconductor Complexity



## Market Trajectory

- \$2.7B → \$4.6B (2020-2028)
- 5-7% consistent annual growth

## Technology Complexity Drivers

- EUV lithography demands specialized chemical formulations
- 3D NAND scaling to 500+ layers increases chemical consumption per wafer
- AI chip boom requires premium wet chemical solutions

## Critical Market Dynamics

- Non-discretionary spend - essential for yield optimization
- Contamination control becomes more critical as chip values increase
- Supply chain vulnerability with concentrated manufacturing

# Summary



# Summary

*The market to experience an atypical seasonality in 2025*



**Near-term outlook will show mixed results due to trade uncertainty**

2025 begins with uncertainty around global trade policies. The push-pull dynamic leads to atypical seasonality for the remainder of the year as the industry adapts to shifting supply chain and tariff landscapes



**AI will be the primary growth driver of semiconductor industry for coming years**

Mid-term growth will be mainly driven by surging investment in AI data centers.

Edge AI will provide a long-term growth in the second half of this decade



**Equipment and Materials markets will expand as capacity increases and technology advances**

AI, HPC, memory transitions, and advanced packaging (GAA, HBM, 3D stacking, Chiplet) are expected to drive multi-year investments in equipment and materials.



# Thank You

[ctseng@semi.org](mailto:ctseng@semi.org)