Regulation Guidelines & Policy Analysis

CHIPS Act, EU AI Act, Export Controls

CHIPS and Science Act (USA)

Overview:
Enacted August 2022. $52.7B in subsidies for semiconductor manufacturing and R&D; in the United States. Goal: reduce dependency on Asian semiconductor production and strengthen domestic supply chain resilience.

Funding Allocation:
- $39B for manufacturing incentives
- $13.2B for R&D; and workforce development
- $500M for international cooperation
- Investment tax credit: 25% for fab construction

Major Recipients:
- Intel: $8.5B for Arizona, Ohio, New Mexico fabs
- TSMC: $6.6B for Arizona fabs (4nm, 3nm, 2nm)
- Samsung: $6.4B for Texas fab expansion
- Micron: $6.1B for New York memory fab
- GlobalFoundries: $1.5B for Malta, NY expansion

Guardrails and Restrictions:
Recipients cannot expand advanced semiconductor manufacturing capacity in China for 10 years. This particularly impacts Intel and Samsung, which have existing China operations. Violation results in full subsidy repayment.

Impact Assessment:
Expected to add 500K wafers per month of domestic capacity by 2030. However, this represents only 15% of global advanced node production. Taiwan concentration risk remains significant through 2028.

EU AI Act

Overview:
World's first comprehensive AI regulation, approved March 2024. Establishes risk-based framework for AI systems, with implications for semiconductor companies supplying AI infrastructure.

Risk Categories:

- Unacceptable Risk: Banned (social scoring, real-time biometric surveillance)
- High Risk: Strict requirements (healthcare, critical infrastructure, law enforcement)
- Limited Risk: Transparency obligations (chatbots, deepfakes)
- Minimal Risk: No restrictions (spam filters, video games)

Foundation Model Requirements:
Models with >10^25 FLOPs (e.g., GPT-4, Claude) must:
- Conduct systemic risk assessments
- Implement cybersecurity measures
- Report serious incidents
- Ensure energy efficiency
This affects demand for large-scale GPU clusters in EU.

Semiconductor Industry Impact:
GPU sales for high-risk AI applications require customer compliance verification. Nvidia, AMD, and Intel must implement tracking systems for EU sales. Estimated compliance cost: $200-300M annually for major chip makers.

Enforcement Timeline:
- Prohibited AI: Ban effective February 2025
- Foundation models: Compliance by August 2025
- High-risk AI: Full compliance by August 2026
Penalties: Up to €35M or 7% of global revenue

US Export Controls on Advanced Chips

October 2022 and October 2023 Rules:
Restrict export of advanced chips and semiconductor manufacturing equipment to China. Specifically targets AI and supercomputing applications.

Restricted Products:
- GPUs: Nvidia A100/H100/H200, AMD MI250/MI300
- Chip-making equipment: EUV lithography, advanced deposition tools
- Design software: EDA tools for sub-16nm processes
- Parameters: >300 TOPS for AI, >600GB/s interconnect bandwidth

China-specific Products:
Nvidia created "China versions" with reduced specs:
- A800 (vs A100): 400GB/s interconnect vs 600GB/s
- H800 (vs H100): 300GB/s interconnect vs 900GB/s
October 2023 rules closed these loopholes.

Financial Impact:
- Nvidia: $5B annual revenue loss (10% of data center segment)
- AMD: $1B annual revenue impact
- ASML: Cannot sell EUV systems to China (estimated $3-4B opportunity cost)
- Applied Materials: Restricted from selling advanced tools ($2B revenue impact)

Strategic Implications:
Accelerates China's domestic semiconductor development efforts. Increased funding for SMIC, Huawei, and local equipment makers. Long-term risk of parallel technology ecosystems and reduced US market share.

China Semiconductor Policy

Response to US Export Controls:
"Big Fund Phase III": $47B fund for domestic semiconductor development. Focus on equipment self-sufficiency and mature node (28nm+) capacity expansion.

Rare Earth Export Restrictions:
China controls 80% of rare earth processing. December 2023 export controls on gallium and germanium affect semiconductor and solar panel manufacturing globally.

Cybersecurity and Data Laws:
All companies operating in China must store data locally and pass security reviews. This affects cloud providers using US chips and creates compliance complexity.