CSET CENTER for SECURITY and EMERGING TECHNOLOGY

Summary of "Betting the House: Leveraging the CHIPS Act to Increase the U.S. Microelectronics Supply Chain Resilience"

The CHIPS and Science Act appropriated more than $52 billion to protect and promote the domestic semiconductor industry in the United States. Coverage has focused primarily on the $39 billion in incentives to re-shore semiconductor fabrication capabilities. Greater attention needs to be paid to the remaining billions of dollars intended to increase domestic production and innovation in associated parts of the microelectronics supply chain.

This report contends that U.S. semiconductor supply chain resilience only meaningfully increase only if efforts to re-shore fabrication are met with commensurate efforts to re-shore *upstream* material production along with *downstream* assembly, test, and packaging (ATP) of finished microelectronics.

- **U.S. production of materials consumed by the semiconductor industry is limited and U.S.-based ATP capacity is only ~3% of worldwide capacity.**
  - Asian countries and firms dominate materials supply and ATP capacity.
  - There are limited U.S. suppliers for upstream materials used in fabrication including highly purified elements, chemicals, and gases.
  - There are limited U.S. suppliers for downstream materials used in ATP including bonding wires, ceramics, substrates, lead frames, and resins.
- **Policymakers can target CHIPS Act provisions to cultivate the development of a resilient and innovative U.S. semiconductor industry** by:
  - Considering how to re-shore or near-shore priority material production and ATP capacities in light of regulatory, workforce, and economic comparative advantages.
  - Working with allies to build resilient supply chains in instances where an economic case for U.S.-based production is weak.
  - Supplying incentives to spur innovation in areas like materials science.
- **Policymakers should identify specific technology chokepoints and opportunities and target investments accordingly**, including:
  - In chemical production and recycling.
  - Substrate and printed circuit board (PCB) manufacturing.

For more information:

- Download the report: https://cset.georgetown.edu/publication/betting-the-house-leveraging-the-chips-and-science-act-to-increase-u-s-microelectronics-supply-chain-resilience
- Contact us: CSET@georgetown.edu