

The Impact of the CHIPS Act on Intel’s Manufacturing Capacity and National Security Implications for the Department of Defense

Abstract

The United States remains heavily dependent on foreign sources for advanced semiconductors (SCs), posing national security risks. This thesis examines how the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act addresses vulnerabilities by promoting domestic production, focusing on Intel’s strategic response. It analyzes Intel’s integrated device manufacturing (IDM) 2.0 strategy, its efforts to expand U.S.-based fabrication, and challenges in achieving high-volume, leading-edge manufacturing for external customers. The study uses policy analysis, industry reports, and case comparisons to assess Intel’s role in reducing foreign reliance. Findings show that Intel’s expansion—supported by federal incentives—improves resilience, but U.S. capacity remains insufficient to meet domestic demand. Complete independence is unrealistic due to reliance on global supply chains for rare earth elements, back-end processing, and critical minerals. The research highlights China’s influence on the global value chain and risks from geopolitical tensions. It recommends sustained government investment, workforce development, and international cooperation to strengthen security and competitiveness. This thesis informs U.S. SC policy by mapping vulnerabilities and offering policy paths to reinforce defense-related technology supply chains.

Methods

- Utilized quantitative data, including industry reports and statistical figures, to evaluate Intel’s financial performance, production metrics, expansion efforts, and its position within the global SC industry.
- Utilized qualitative analysis through academic studies, think tank evaluations, and industry commentaries to provide contextual depth and interpret Intel’s strategies and their broader implications for the SC industry and Global Value Chain (GVC).
- Analyzed Intel’s operations through a comparative study, focusing on its expansion plans, technological advancements, financial performance, and operational strategies to establish its unique position within the SC industry.

Results & Impact

The CHIPS Act represents an important, albeit initial, step-in addressing vulnerabilities and bolstering the U.S. SC industry. While it has catalyzed discussions around reshoring and technological leadership, its impact remains difficult to quantify. The Act alone is insufficient to reshape the SC landscape, particularly as key players like TSMC maintain the bulk of their manufacturing capacity abroad. Intel continues to rely on external foundries for critical production processes.

Future Research

- Exploring new materials and production processes could significantly enhance SC performance and reduce manufacturing costs.
- Research aimed at developing strategies to strengthen the supply chain resilience is essential. This could include diversifying supply sources, advancing domestic ATP capabilities, and improving collaborative partnerships with allied nations to mitigate risks tied to single points of failure.
- Examining SC-related legislation in other countries can uncover best practices and lessons that could guide U.S. policy adjustments.



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