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Issue Brief

US-China Tech Rivalry: The Geopolitics of Semiconductors

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Summary

The United States and China are locked in a high-stakes contest for dominance in computing power. In response to US sanctions and export controls, China has ramped domestic chip design and manufacturing, aiming to create an all-Chinese semiconductor supply chain that reduces dependence on foreign technologies.

Introduction

The US–China chip war has only grown fiercer amid trade tensions and shifting policies. While the United States seeks to limit China's role in the world's chip supply network, China has been working intensively to cut its dependence on overseas semiconductor technologies and boost domestic chip manufacturing capabilities. China aims to "build an all-Chinese supply chain" regarding semiconductor production as part of its broader strategy to attain technological supremacy.[1]

The ongoing conflict highlights the growing 'weaponisation' of semiconductor supply chains, as both nations employ economic statecraft through sanctions, tariffs and export controls, with significant ripple effects across the global supply chains. This brief analyses the semiconductor strategy adopted by the United States between 2017 and 2025, encompassing the first Trump administration, the Biden administration, and the current second Trump administration, focusing on China's strategic responses to these policy shifts and highlighting some of the broader implications.

US' Semiconductor Strategy

The most disruptive challenge to the US leadership position in semiconductors has come from China, whose aggressive state-led industrial policies and heavy subsidies aim to achieve self-sufficiency and global competitiveness. China, having a vast reserve of rare earth and being its most prominent exporter, aims to become a dominant semiconductor manufacturer worldwide, which has strained US–China ties in recent years. This rise triggered a fundamental shift in US semiconductor policy. The current US semiconductor policy has broadly two goals *vis-à-vis* China. First, it seeks to establish a secure supply chain and increase domestic manufacturing. Second, it aims to reduce China's dominance in the global supply chains of chips so that China can no longer threaten US tech superiority.[2]

Securing the Supply Chain

During his first term, President Donald Trump took several significant steps to secure the US semiconductor supply chain and boost domestic manufacturing as part of his broader 'America First' economic and national security agenda.[3] The Trump administration also laid early groundwork for what would later become the Chips for America Act in 2020, pushing Congress for funding to support domestic

[1] Manish Shakdwipee and Wei Xu, **"China's Role in Supply-Chain Strategies"**, MSCI, 8 January 2024.

[2] Matt Sheehan, **"Biden's Unprecedented Semiconductor Bet"**, Carnegie Endowment for International Peace, 27 October 2022.

[3] John Neuffer, **"Our 2017 Policy Plan to Spur U.S. Semiconductor Industry Growth and Innovation"**, Semiconductor Industry Association, 2 February 2017.

semiconductor manufacturing and research. The administration also tried to bring major semiconductor producers, such as TSMC, the world's top contract chipmaker, into establishing facilities in the United States. This effort paid off in 2020, when TSMC announced a US$ 12 billion investment to build a fabrication facility in Arizona.

The Biden administration intensified the chip war, expanding the scope and scale of export controls and sanctions. Biden applied the small yard, tall fence approach—the strategy aimed at restricting the exchange of crucial technologies like cutting-edge AI chips, semiconductor fabrication equipment and quantum computing, while keeping other trading alternatives open.[4] The idea is to keep this 'small yard' of critical technologies highly secured ('high fence') with stringent export controls and investment restrictions, while allowing broader, less-sensitive economic exchanges with China to continue.

The Biden administration also focused on domestic capacity building through legislation like the CHIPS and Science Act of 2022. The act offered billions in subsidies for onshore semiconductor manufacturing and research and tightened export controls on advanced AI and semiconductor technologies critical to China's tech ambitions. The act allocated US$ 53 billion to boost US semiconductor production, spurring over US$ 395 billion in private investments and creating more than 115,000 jobs since 2021.[5]

The current Trump administration has been focusing on pushing the same goals promoted by Biden, but more aggressively. As of August 2025, Trump announced a 100 per cent tariff rate on foreign semiconductors, while companies that establish research or manufacturing operations in the US would be exempt from these tariffs. However, they might still face tariffs if they fail to fulfil their investment commitments.[6]

The Trump administration also incentivised manufacturers to build plants domestically.[7] On 1 July, the administration proposed increasing federal tax credits for eligible semiconductor firms from 25 per cent to 35 per cent for domestic projects. The administration recently established a new entity, the US Investment Accelerator, to take charge of the Chips Act programme and accelerate corporate investments within the United States. This body is responsible for overseeing the execution of the

[4] Erin Watson, **"Chips, Clouds, and Checkpoints: The New AI Export Battlefield Under Trump 2.0"**, Observer Research Foundation, 17 March 2025.

[5] **"Two Years after the CHIPS and Science Act, Biden-Harris Administration Celebrates Historic Achievements in Bringing Semiconductor Supply Chains Home, Creating Jobs, Supporting Innovation, and Protecting National Security"**, Biden White House Archives, 9 August 2024.

[6] Erin Hale, **"How Will Trump's Semiconductor Tariffs Affect the Global Chip Industry?"**, *Al Jazeera,* 20 August 2025.

[7] Dylan Butts, **"Chipmakers Get Larger Tax Credits in Trump's Latest 'Big Beautiful Bill'"**, *CNBC*, 2 July 2025.

Chips and Science Act. The initiative aims to motivate companies to invest heavily in the US by streamlining regulatory requirements, expediting the permitting process, coordinating efforts among federal and state agencies, enhancing access to national resources, and helping cut fab costs in the US by as much as 10 per cent.

The administration also launched investigations under Section 301 and Section 232 of the Trade Expansion Act targeting semiconductor imports and critical minerals essential for chip manufacturing.[8] This involved probes into imports of mature-node chips from China and critical mineral processing, aiming to reduce dependence on adversarial suppliers and strengthen domestic supply chains. On the domestic front, the administration facilitated historic private-sector investments, securing a landmark US$ 200 billion commitment from Micron Technology to expand semiconductor manufacturing and R&D in states like Idaho, New York and Virginia.[9]

The Trump administration also laid the groundwork for potential revisions to the CHIPS and Science Act to secure the domestic supply chain of semiconductors.[10] The administration would use tariffs instead of giving billions in subsidies to companies like Taiwan's TSMC to build factories in the US. Similarly, firms that accepted US government funding but continued to expand operations overseas could face penalties or be required to return part of the funds. These policy shifts were designed to enhance US self-sufficiency in chip production and lessen dependence on international supply chains.

Reducing China's dominance in the global supply chain

Since Trump's first term, multiple restrictions have been placed on China with the intention of weakening China's position in the worldwide supply chain. Four layers of supply chain restrictions can be identified as part of the US's semiconductor strategy.[11]

- The first layer includes restrictions on the direct sale of semiconductors made with US technology. The two leading Chinese semiconductor companies, ZTE (in 2018) and Huawei (in 2019), were added to the Commerce Department's Entity List, which banned these companies from buying US exports without a license. Later, the US added eight more Chinese tech firms to the Entity List, including HiSilicon, a Huawei-affiliated entity.

[8] **"Trump Administration Initiates Section 232 Investigations on Polysilicon and Unmanned Aircraft Systems"**, White & Case, 16 July 2025.

[9] **"Micron and Trump Administration Announce Expanded U.S. Investments in Leading-Edge DRAM Manufacturing and R&D"**, Micron, 12 June 2025.

[10] **"CHIPS Act 2.0: Strengthening the Chip 4 Alliance or Driving it Apart?"**, Indo-Pacific Studies Center.

[11] Matt Sheehan, **"Biden's Unprecedented Semiconductor Bet"**, no. 2.

- As part of the second layer of its semiconductor strategy, the United States targeted restrictions on Semiconductor Manufacturing Equipment (SME), highly specialised machinery essential for fabrication plants to produce chips. Washington pressured the Dutch government to block ASML from receiving export licenses that would have allowed it to sell its most cutting-edge tools to Chinese manufacturers. In December 2020, China's leading chip-making company, Semiconductor Manufacturing International Corporation (SMIC), was added to the US Entity List.

- The third layer involved cutting off Chinese access to many key components used to make SME. In October 2022, the Biden administration introduced a new export controls policy on artificial intelligence (AI) and semiconductor technologies to China. The policy prohibited leading US AI chipmakers, such as Nvidia and AMD, from selling their advanced chips used in AI and supercomputing to China.[12]

- The fourth layer prevents US citizens and residents from working with Chinese semiconductor companies.[13] Chinese design companies are also being prevented from accessing fabrication plants running American tools, domestic fabs would be denied US-made manufacturing equipment, and Chinese equipment suppliers could no longer secure components sourced from the United States.

Besides the restrictions mentioned above, in October 2023, the Commerce Department reduced the types of semiconductors that American companies can sell to China, citing the desire to close loopholes in existing regulations announced in 2022.[14] Advanced artificial intelligence chips, such as Nvidia's H800 and A800 products, will be affected, according to a regulatory filing from the US company. In September 2024, the Commerce Department banned the sale of connected and autonomous US vehicles equipped with Chinese and Russian software and hardware to protect national security and US drivers.[15]

In March 2025, additional chip restrictions were imposed by the Trump administration, blacklisting dozens of Chinese entities from trade in semiconductors and other advanced strategic technologies.[16] Similarly, in May 2025, the US

[12] Gregory C. Allen, **"Choking off China's Access to the Future of AI"**, Center for Strategic and International Studies, 11 October 2022.

[13] Ann Cao, **"US Citizens at Chinese Chip Firms Caught in the Middle of Tech War After New Export Restrictions"**, *South China Morning Post*, 11 October 2022.

[14] Michelle Toh and Kayla Tausche, **"US Escalates Tech Battle by Cutting China Off from AI Chips"**, *CNN*, 18 October 2023.

[15] Anne D'innocenzio, **"Biden Administration Seeks to Ban Chinese, Russian Tech in US Autonomous Vehicles"**, *AP News*, 23 September 2024.

[16] **"Commerce Further Restricts China's Artificial Intelligence and Advanced Computing Capabilities"**, Bureau of Industry and Security, 26 March 2025.

Department of Commerce ordered major American and international companies, such as Cadence, Synopsys, and Siemens EDA, to stop providing Electronic Design Automation (EDA), which is vital for semiconductor chip design, to China.

To close the loopholes that let China get its hands on powerful AI chips, the Trump administration is looking to tighten the rules around shipping advanced chips, like Nvidia's advanced AI processors, to Malaysia and Thailand. Although the US has already banned direct sales of Nvidia's top AI chips to China, there's concern that these chips are being routed through Southeast Asian countries to get around the ban. A draft of the Commerce Department rule aims to block this indirect supply chain, but the proposal has not been finalised yet and may change.[17]

According to officials from the US Commerce Department, the newly imposed rules were intended to hinder China's progress in building advanced AI systems that could have military applications. At the same time, the measures aim to weaken China's domestic semiconductor sector, which Washington views as a potential risk to the security of the United States and its allies.

China's Response

China has made substantial strategic investments and launched programmes to strengthen its role in the global semiconductor market. By 2005, China became the world's largest consumer of semiconductors, and by 2012, China had purchased more than half of the world's semiconductor consumption. China's share of total world semiconductor imports grew from 1 per cent to 23 per cent between 1995 and 2019. China became a substantial manufacturer of semiconductors, with 20 per cent of world semiconductor exports by 2019. Over these years, the PRC's response and strategy towards the US has been multifaceted. It comprises targeted sanctions and countermeasures, increasing semiconductor self-reliance, fostering regional tech alliances, and pushing for global adoption of its technological standards.

Reciprocal Restrictions

China has hit back with direct retaliation and strategic countermeasures to counter the US's strategy. Since 2023, China has restricted the export of at least 16 minerals and related products.[18] Most recently, on 4 April, it added seven rare earths (samarium, gadolinium, terbium, dysprosium, lutetium, scandium and yttrium) to that list as part of its retaliation against US tariffs. In 2024, China moved to restrict exports of key materials to the United States, citing national security reasons. The

[17] **"US Plans AI Chip Curbs on Malaysia, Thailand Over China Concerns"**, *The Economic Times*, 4 July 2025.

[18] **"China Restricts Exports of Rare Earths and Other Minerals. How Does the System Work?"**, *Reuters*, 25 April 2025.

ban covered gallium, germanium, antimony, and other critical minerals needed for producing semiconductors and batteries for electric vehicles. The new rules also added tighter scrutiny over how graphite shipments to the US are used.

Increasing Semiconductor Self-reliance

China's drive towards self-reliance in the semiconductor industry has accelerated dramatically in response to escalating US restrictions. China launched state-backed investments, such as the US$ 47.5 billion China Integrated Circuit Industry Investment Fund Phase III, in line with Xi Jinping's drive to achieve self-sufficiency for China in semiconductors.[19] Backed by financing from six of China's biggest state-owned lenders, such as Industrial and Commercial Bank of China (ICBC) and China Construction Bank, the fund highlights President Xi's broader effort to cement the country's role as a global technology power. The capital is directed not only into research and development, but also manufacturing and equipment production.

Similarly, Chinese firms like Huawei and Lisuan deliver breakthroughs once deemed impossible under sanctions. Huawei, for example, managed to develop a cutting-edge 7nm chip without relying on US equipment.[20] PRC has worked around the restrictions by tapping into SMIC's 7nm manufacturing technology and using its design tools. Similarly, Lisuan is making waves with its G100 GPU, China's first domestically designed 6nm graphics processor. It is expected to enter limited production by the end of 2025, with full-scale manufacturing planned for 2026. By 2025, China's semiconductor self-sufficiency rate is expected to reach 50 per cent, with the government aiming for 100 per cent import substitution by 2030.

Fostering Regional Tech Alliances

China is also collaborating with global partners to establish its position as a tech giant. For instance, the Asia–Europe Third-Generation Semiconductor Science initiative is a collaborative effort to advance research and development of third-generation semiconductors.[21] It brings together leading universities, public institutes, government agencies and industry stakeholders from Asia and Europe. RISC-V China Summit is a major annual event dedicated to the RISC-V open-source processor ecosystem. RISC-V technology provides the foundational design known as the instruction set architecture (ISA), which creates processors integrated into semiconductor chips. The summit held in China is recognised as one of the world's

[19] **"China Sets Up Third Fund with $47.5 bln to Boost Semiconductor Sector"**, *Reuters,* 27 May 2024.

[20] Julian West, **"China's Semiconductor Surge: Riding the Wave of Self-Reliance"**, *AInvest,* 31 May 2025.

[21] **"SUSTech Hosts Asia-Europe 3rd-Generation Semiconductor Exchange Conference"**, *News SUStech*, 27 October 2018.

top three RISC-V professional conventions.[22] The summit emphasises international cooperation by bringing together global companies, research institutions and open-source communities to contribute to and accelerate chip design and semiconductor technology innovation.

Global Adoption of China's Technological Standards

Technical standards act as tools of global influence, as setting the rules for technology can boost a nation's tech leadership and strengthen its reputation worldwide. They can also be lucrative, since companies can earn from licensing their patented technologies when their standards are widely adopted. Early on, the PRC recognised the importance of setting technological standards and actively began working in this direction. China's most prominent initiative in this regard is its China Standards 2035 project, which was launched in 2020 as a continuation of the Made in China 2025 industrial policy. The programme sets out to frame the rules for future industries, including AI, 5G and the Internet of Things (IoT), to strengthen China's industrial base and boost its technological competitiveness. Complementing this effort, the National Standardisation Development Outline, referred to as the Outline, issued in 2021, provides a comprehensive blueprint for advancing China's standardisation agenda across multiple domains, including technology, environmental sustainability and social governance.[23]

To translate its ambitions into reality, China actively encourages participation in key organisations involved in setting standards for digital technologies, such as the International Organisation for Standardisation (ISO), International Electrotechnical Commission (IEC) and International Telecommunications Union (ITU). To encourage this, the government offers subsidies and financial incentives, while also granting rewards to experts and organisations whose contributions receive global recognition. At the same time, China is steadily expanding its presence in leadership roles across important technical committees and working groups within these organisations.[24]

Implications of US–China Rivalry

China's export bans on critical minerals have sent shockwaves through the global tech industry. Countries like Japan, South Korea and Taiwan are among the nations most affected by the trade war.[25] TSMC has long been a critical player in global chip

[22] **"RISC-V Summit China 2025: Innovation, Collaboration, and a Glimpse into the Future"**, *DeepComputing,* 23 July 2025.

[23] **"The CPC Central Committee and the State Council Issued the 'National Standardization Development Outline'"**, The Chinese Central Government's Official Web Portal, 10 October 2021.

[24] Enescan Lorci, **"Shaping the Digital Order: China's Role in Technology Standards and the Implications for Taiwan"**, Global Taiwan Institute, 5 January 2025.

[25] Kevin Honglin Zhang, **"Geoeconomics of US-China Tech Rivalry and Industrial Policy"**, *ScienceDirect.com,* July 2024.

production. But today, it faces the difficult task of balancing the competing demands of the US and China while trying to hold onto its edge in advanced technology.

South Korea is in a similar position. Companies like Samsung and SK Hynix dominate parts of the industry. Yet, the country is trying to balance its dependence on Chinese raw materials and its strategic partnerships with the US. The government has been investing in R&D and diversifying its supply chains to eliminate the risks associated with the ongoing rivalry. Japan, a significant supplier of semiconductor materials and equipment, has also taken steps to build up its domestic capacity. Closer cooperation with the US and other allies has become part of its strategy to cut reliance on China and strengthen its role in the broader technology market.

Major tech firms like Intel and NVIDIA face revenue risks from declining access to Chinese markets. NVIDIA, for example, has cautioned that the export restrictions could wipe out billions in revenue. Apple, too, is feeling pressure and has started looking at other production bases, like India and Vietnam, to cut back on its reliance on China.

While the US and China compete for technological supremacy, India is leveraging this rivalry to accelerate its semiconductor ambitions. Though it may not yet compete with powerhouses like Taiwan or China for the most advanced chip production, India is working towards positioning itself as a critical and trusted third hub in semiconductor supply chains. The 'Make in India' initiative of 2014 laid the foundations for increased electronics manufacturing, including semiconductors. This paved the way for the Production-Linked Scheme (PLI) for semiconductor manufacturing, which was launched in December 2021 with a total outlay of Rs 76,000 crore. This scheme aims to boost domestic manufacturing and attract investments in the semiconductor value chain.[26]

With government-backed initiatives like the Semicon India Programme and the India Semiconductor Mission (ISM), the country is rapidly building capacity and fostering a strong domestic ecosystem. As part of the ISM, in May 2025, India approved its sixth semiconductor manufacturing facility, a joint venture between HCL and Foxconn.[27] The US Department of State is working with ISM to explore and expand opportunities in the semiconductor ecosystem. The International Technology Security and Innovation (ITSI) Fund, created by the CHIPS Act, supports this partnership. The US$ 500 million programme aims to strengthen defence innovation and increase operational coordination, technology sharing and industrial cooperation between the two nations.[28]

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[26] Anika Chhillar, **"Evaluating India's PLI Scheme for Semiconductors"**, Observer Research Foundation, 6 December 2024.

[27] **"Cabinet Approves Semiconductor Unit in Uttar Pradesh"**, Press Information Bureau, Cabinet Secretariat, Government of India, 14 May 2025.

[28] Sonu Vivek, **"US, India Join Hands to Expand Semiconductor Industry. All You Need to Know"**, *India Today,* 10 September 2024.

Unlike the US and China, which are heavily focused on achieving technological self-sufficiency at the most advanced process nodes, India is prioritising the development of fabrication capabilities in the 28–90 nanometre range, targeting sectors such as automotive, telecom, and industrial automation, where global demand remains high.[29] Additionally, India is investing in research on next-generation technologies like 2D materials, aiming to position itself at the forefront of future semiconductor innovation.

For example, US chipmakers such as Micron Technology have begun shifting part of their production to India after Beijing used economic pressure to retaliate against American firms. Alongside scaling up its research and development work in the country, Micron is investing US$ 2.75 billion in its first central backend semiconductor facility in India. The new Assembly, Testing, Marking and Packaging (ATMP) plant is being built in Sanand, Gujarat. Tata Electronics is setting up a semiconductor fabrication unit in the Dholera Special Investment Region, with an estimated cost of Rs 91,000 crore.

Union Minister Ashwini Vaishnaw recently announced India's first indigenous semiconductor chip, which is expected to launch this year.[30] This marks an essential step in reducing dependence on imports and strengthening India's position in the global semiconductor industry. By leveraging the global supply chain shift and strategic alliances with global players, India is not only mitigating the risks posed by US–China tensions but also emerging as a viable third hub in the international semiconductor market to be a leader in manufacturing and innovation.

Conclusion

The growing rivalry between the US and China over semiconductors has become one of the sharpest points of tension in their relationship. The effects have extended far beyond the US and China. Supply chains have been chaotic, and numerous states are rethinking their approach. The balancing act has been delicate for smaller powers—maintaining ties with the US and China while safeguarding their technological futures. The US–China semiconductor war is more than just an industry-specific conflict. It is a proxy for broader geopolitical competition, with long-term consequences for power distribution, stability in international supply chains, and the future of economic interdependence.

[29] Melissa Cyrill and Yashoda Kapur, **"India's Semiconductor Sector: Tracking Government Support and Investment Trends"**, *India Briefing*, 17 July 2025.

[30] **"At Global Investors Summit 2025, Shri Ashwini Vaishnaw Announces India's First Indigenous Semiconductor Chip to be Ready for Production by 2025"**, Press Information Bureau, Ministry of Electronics & IT, Government of India, 25 February 2025.

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