Semiconductors are a New Weapon of Geopolitics:

The U.S.–China Rivalry, AI, and the Future of Global Security

By

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Abstract

This thesis analyzes the U.S.–China technological rivalry and its impact on other key stakeholders, geopolitics, global and national security, and the emergence of the semiconductor–AI nexus. Once driven primarily by market forces, these small chips became new weapons of geopolitical power. Using qualitative and comparative analyses alongside case studies, this research contributes to the conversation by providing a comprehensive and up-to-date research of the semiconductor—AI nexus, a sector that remains underexplored in the existing literature. By analyzing semiconductor state policies and industry responses from Taiwan, Japan, South Korea, the EU, and the Netherlands, this study offers a comprehensive understanding of the complex semiconductor ecosystem and its implications for global dynamics. This thesis finds that semiconductors and artificial intelligence are a singular nexus of geopolitical competition, where states, driven by national security imperatives, engage in weaponized interdependence through economic statecraft (sanctions, alliances, tariffs, and strategic interdependencies) to gain technological sovereignty, strategic advantage, and geopolitical dominance. Overall, there is clear trend toward "techno-nationalism," with states prioritizing onshoring of production and supply-chain resilience, signaling a departure from the globalization trends of previous decades.

AUTHOR’S DECLARATION

I, the undersigned, Maksakova Anastasia, candidate for the MA degree in International Relations. declare herewith that the present thesis titled “Semiconductors are a New Weapon of Geopolitics: The U.S.–China Rivalry, AI, and the Future of Global Security” is exclusively my own work, based on my research and only such external information as properly credited in notes and bibliography. I declare that no unidentified and illegitimate use was made of the work of others, and no part of the thesis infringes on any person’s or institution’s copyright. I also declare that no part of the thesis has been submitted in this form to any other institution of higher education for an academic degree.

Vienna, 20 May 2025

Anastasia Maksakova

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Introduction

"Last year, the chip industry produced more transistors than the combined quantity of all goods produced by all other companies, in all other industries, in all human history. Nothing else comes close" (Miller 2022). A phrase "semiconductors/chips are new oil" perfectly characterizes the scale of the industry, due to indispensability of semiconductors for modern economic and technological development, geopolitical dominance and, also, its dependance on a very limited number of stakeholders. Without semiconductors, neither AI technologies, nor military development, nor mass production of gadgets is simply impossible, thus, stakes are no longer just on money, but on global leadership. Thus, at first solely driven by market forces, these small chips became new weapons of geopolitics. This shift is a main puzzle of this thesis, which will uncover why have ostensibly market-driven chip industries become overt tools of statecraft, and with what security consequences?

This thesis analyzes the U.S.–China technological rivalry, its impact on other key stakeholders, and its broader implications for geopolitics, global and national security, and the emergence of the semiconductor–AI nexus. Existing academic literature on semiconductors has shed light on the strategic significance of semiconductors on technological progress and economic strength of states (Allen 2023; Miller 2022; Bradford 2023). Many studies have looked at the U.S.–China rivalry through a political economy lens, focusing on economic policies and vulnerabilities of the supply chains (Aggarwal and Reddie 2021; Helleiner 2021) or through realist security dimensions, focusing on great power competition and geography of semiconductor supply chain (Bradford 2023; Miller 2022). However, little research has been published during and after the tornado of policy changes in 2022–2025, and thus does not capture the latest shifts in export controls, policies, tariffs, international agreements, and alliances. Comparatively few studies have analyzed the semiconductor industry's impact on AI development and vice versa, even though their nexus is driving current policy decisions. Moreover, existing research frequently focuses primarily on the U.S. and China, while the roles of other main stakeholders (e.g., Taiwan, South Korea, Japan, the EU, and the Netherlands) have been less analyzed in the context of global security and have not been integrated in one body of academic work. To bring it all together, there has been a lack of comprehensive, integrated up-to-date research on how post-2022 technology policies of main stakeholders are reshaping global security, power balances and geopolitical landscape through the lens of the semiconductor industry and its nexus with AI.

Thus, the primary research question guiding this study is: **How have U.S. and Chinese semiconductor policies reshaped the semiconductor and AI industries since 2022, and what impact have they had on great power competition and geopolitics?**

To unpack the puzzle further, this thesis asks these sub-questions: how have other key stakeholders (Taiwan, Japan, South Korea, EU, the Netherlands) responded to these shifts in power dynamics? Through what means have these states leveraged their positions in the semiconductor supply chain? In what ways has the race for semiconductor and AI technologies reshaped international security and global alliances? How do semiconductors enable and shape the advancement of artificial intelligence, and how does AI, in turn, influence semiconductor development?

This research contributes to the conversation by providing a comprehensive and up-to-date analysis of the semiconductor–AI nexus, a sector that remains underexplored in the existing literature. By analyzing semiconductor state policies and industry responses in Taiwan, Japan, South Korea, the EU, and the Netherlands, this research offers a comprehensive understanding of the complex web surrounding the semiconductor industry and its implications for global dynamics. Furthermore, this thesis provides a systematic analysis of how corporations and governments – across key stakeholder states – are adapting to the emerging techno-security landscape, and how technological dependencies and chokepoints have influenced global policy, security, and geopolitics since 2022 (Allen 2023; Shivakumar and Wessner 2022; Miller 2022).

From an interdisciplinary analysis of official strategies, industrial policies, and global market dynamics, this thesis finds that semiconductors and artificial intelligence are a singular nexus of geopolitical competition, where states, pushed by national security imperatives, turn to weaponized interdependence through the means of economic statecraft (sanctions, alliances, tariffs, and interdependencies) to gain technological sovereignty, strategic superiority and geopolitical dominance (Farrell and Newman 2019; Aggarwal and Reddie 2021; S. Lee 2024). Furthermore, the U.S.–China competition is reshaping existing geopolitical alliances, leading to new alliances such as the Chip 4 Alliance (U.S., Taiwan, Japan, and South Korea) (Chow 2025; Peterson 2022; Chu 2024). The EU, Japan, South Korea, the Netherlands and Taiwan in turn have adopted their own targeted policies to create more autonomy, mitigate risks from U.S.–China rivalry, and secure their positions in global supply chains (Pattheeuws et al. 2024; van der Veere 2024; Kumar 2023; Kamakura 2022). Finally, there is a growing trend toward "techno-nationalism," with states prioritizing onshoring of production and supply-chain resilience (Park 2023).

Methodologically, this thesis applied qualitative analysis and analyzed secondary academic literature, analytical reports, government papers, news sources, blogs, academic and think-tank literature, and official comments from significant parties. The study also employed case studies (e.g., a study of stakeholder's strategies and responses, U.S. export controls on China, and China's responses in shape of investments in its domestic sector to achieve self-sufficiency), as well as comparative analysis of the policies and strategies of key actors, examining how these dynamics fuel the rivalry and shape responses. This approach helps to create a coherent overview of the current situation in the technological competition and its spillovers to other sectors. Moreover, each case study was picked to showcase in practice how interdependence is weaponized through economic statecraft tools.

Secondary-source analysis was prioritized for several reasons. First, such a method enabled access to a broad range of publicly available and official perspectives and statements, allowing for a more holistic synthesis of materials. On the contrary primary methods such as interviewing officials and representatives in the field would be constrained by language barriers, time, logistics, and potential biases, limiting the scope for robust comparative analysis. Second, secondary sources allow the analysis of diverse actors and regions with varying opinions, backgrounds, and languages, mitigating language barriers and facilitating more up-to-date research. However, this method also comes with certain trade-offs. For example, an interview with an expert might have provided more insights and nuances of the industry. Moreover, potential biases still can find their way into the research, as it could be hard to find original sources or alternative opinions. Finally, without direct access to primary sources, verifying the accuracy of the data can be challenging. This thesis seeks to provide a comprehensive understanding of how global technological competition is reshaping power dynamics, alliances, and security within the international system through examining these problems and using a systematic analytical approach.

However, this research has certain limitations, primarily due to its reliance on secondary sources, which stems from the limited availability of Chinese-language materials and language barriers. Additionally, the existing literature on semiconductors and the U.S.–China tech rivalry has been largely shaped by Western-centric perspectives, where key definitions, concepts, and actors within the field are predominantly established and analyzed.

The thesis is structured as follows. The Literature Review and Theoretical Framework chapter outlines core strands of literature and proposes an integrated framework, combining concepts of weaponized interdependence, economic statecraft, and national security. The first chapter provides an overview of the semiconductor industry, its history, the impact of COVID-19, and current trends shaping the sector (1.). The second chapter maps out key stakeholders, such as Taiwan, Japan, South Korea, the Netherlands, EU, China, and the US, and analyzes their policies (2.). The third chapter applies a theoretical framework to examine the tensions and relationships among these main stakeholders (3.). The fourth chapter introduces the importance of semiconductor technology to AI development and their interconnectedness (4.). Finally, the conclusion synthesizes the findings and reflects on the broader implications for the industry, the future of global security, and shifting power dynamics.

1. Literature review and theoretical framework

In the literature on the U.S.–China rivalry authors generally agree on the growing importance of semiconductors as a "strategic tool" for achieving technological, economical, and geopolitical objectives. Moreover, many scholars argue that what was once primarily an economic rivalry has now evolved into a full-fledged tech war between the two great powers. In the literature, there are three main strands through which the authors analyze the role of semiconductors in the U.S.–China tech war.

The first strand of literature focuses on trade policies, economic statecraft, market interdependence, and supply chains through the lens of Political Economy (Aggarwal and Reddie 2021; Mark and Roberts 2022; Chang and Yang 2020; Zhang and He 2014; Helleiner 2021). The second strand draws on realism and techno-nationalism theories, focusing on the geopolitics of semiconductors, great power competition, the geography of the semiconductor supply chain, and the struggle for dominance over the strategic region of Taiwan (Bradford 2023; Miller 2022; Hamdani and Belfencha 2024; Park 2023). The last strand stems from technology and security studies and emphasizes the importance of emerging technologies and innovation, focusing on military application of semiconductor and AI, defense strategy, and national security concerns of great powers (Horowitz 2018; Allen 2023; Shivakumar and Wessner 2022; Hah and Bing 2024; Kennedy 2020). This review will present the main arguments, approaches, and concepts of the three strands, discussing their strengths and limitations, and will ultimately argue for an approach that integrates the insights of all three approaches. Following Michael Mastanduno's argument that the line between political economy and security studies have disappeared, this thesis also employs an interdisciplinary approach in order to create a fuller picture of U.S.–China rivalry and semiconductor's role in it (Mastanduno 1999).

In the first strand, many authors explore the concept of economic statecraft, where states employ economic tools, such as sanctions, to advance their security and geopolitical objectives (Farrell and Newman 2019, 47–48; Aggarwal and Reddie 2021, 139). China employs state-led capitalism and strategically maneuvers within WTO regulations to safeguard and cultivate its domestic sectors. It implements industrial policies, such as "Made in China 2025" strategy, to close the gap with the U.S. through state investment, protectionist measures, strategic partnerships, and targeted trade initiatives. Moreover, Beijing used economic coercion to further its strategic objectives, provoking protectionist responses and altering global trade dynamics (Aggarwal and Reddie 2021, 144). While China has made significant investments throughout the semiconductor supply chain, it still faces barriers such as high entry costs, intellectual property barriers, talent shortages, and geopolitical tensions with the U.S. (Verwey 2019). On the other hand, the U.S. is constantly restricting China's access to latest semiconductor tech through tariffs and sanctions (Majerowicz and Medeiros 2018, 16-17).

Economic nationalism, in a modern understanding of the concept, refers to "the use of national policies to promote exports while creating barriers to imports and is a 21st century version of 17th century mercantilism" (Chow 2020). The strategies discussed above, pursued by both the U.S. and China, are characterized in the literature as a turn toward economic nationalism (Helleiner 2021). Due to the digitalization of the world, the popularity and importance of semiconductors are growing rapidly, which in turn compels the adoption of new policies, particularly protectionist measures (Bolle and Zettelmeyer 2019, 3). With Donald

Trump back in office, it is obvious, as the administration turned to economic nationalism through massive tariffs, trade war with China, and "America first" policies (Chow 2020, 4–8).

Henry Farrell and Abraham L. Newman conceptualize "weaponized interdependence" and contrast it with conventional theories of economic interdependence, which emphasize mutual reliance, arguing that the structure of global networks create power imbalances, enabling great power states, such as the U.S. and China, to exercise unilateral authority and control through weaponized interdependence (Farrell and Newman 2019). States adopt economic nationalism as a strategy to counteract weaponized interdependence. For example, a country heavily reliant on foreign technology or materials currently seek to develop domestic industries in these sectors in order to reduce dependence on potentially coercive supply chains. Chia-Chien Chang and Alan H. Yang side with Farrell and Newman and argue that global connectivity fosters new ways for great powers "to coerce, manipulate, and penetrate". And that globalization results in asymmetrical networks, in which some states (like China and the U.S.) are far more connected than others. Authors like Seohee Park, Manal Hamdani and Ismail Belfencha also critique neoliberal and liberal perspectives that economic interdependence inherently promotes peace. They argue that asymmetric interdependence serves as a sort of leverage in geoeconomics, where "the risk of defection underpins the unlikelihood of cooperation between interdependent states" (Park 2023, 4; Hamdani and Belfencha 2024; Chang and Yang 2020, 320).

Lastly, some authors in the political economy literature on semiconductors and the U.S.–China trade war analyze the importance of global value chains (GVC) and semiconductor supply chain for this conflict. As it was mentioned above, semiconductors play a crucial role in both economic and security concerns of the U.S. and China, who in turn strive to gain more control and autonomy over the industry. This shift toward economic nationalism and protectionism raises concerns among other actors, scholars and politicians "about the possible de-coupling of technology development networks between the two countries" which will have major implications on the semiconductor value chain and the industry (Grimes and Du 2022, 2). Authors argue that while China has a critical position in semiconductor supply chain (lower value-added functions of assembly and testing), the United States, Taiwan, South Korea, and some European countries control key IP, R&D, and manufacturing of cutting-edge semiconductors. However, in light of continuous tariffs from the U.S., China has been doing substantial steps towards self-reliance. Miki and Tamanyu also examine the impact of the U.S. tariffs against China on global semiconductor supply chain and the restructurings that followed after. While tariffs on China led to a decline in China's exports to the U.S., exports from bystander countries like Vietnam and Taiwan to the U.S. increased, allowing these counties to gain more importance in the semiconductor supply chain (Miki and Tamanyu 2024, 8). Wei Finally, authors underscore the necessity of resilience tactics of the semiconductor supply chain, including the diversification of production bases, onshoring and addressing challenges such as talent shortages in light of increasing geopolitical tensions (Wei and Wu 2024, 15).

The second strand of literature frames the strategies discussed in the first strand as geopolitical in nature, focusing on how the rivalry over control of semiconductor technology and supply chains is shaping the balance of power and geopolitics among China, the U.S., and other international actors. One of such actors is Taiwan, and its geographical position and semiconductor manufacturing capabilities placed it right in the middle of the U.S.–China tech rivalry (Miller 2022; Chou 2023). Anu Bradford argues that the U.S. is implementing measures to restrict China's access to strategic technologies while simultaneously focusing on state-led capacity-building, citing national security concerns as the primary justification. In response, China, in a strive for self-sufficiency, has implemented its own restrictions on the U.S. tech companies, leading to a subsidy race aimed at bolstering capabilities in key sectors, such as semiconductors. Thus, the two superpowers are entrenched in a tech war, where achieving economic and technological supremacy is a key to securing geopolitical primacy. However, the deep economic interdependence between these two countries also compels both of them to operate within certain certain boundaries and adopt strategies of restraint (Bradford 2023, 187).

One of China's main problems is not only the catching up with chip production but also the fact that China is reliant on foreign technology, a huge part of which is in the hands of China's rivals (Miller 2022). Moreover, both the U.S. and China are feeling the implications and difficulties of the trade war they are leading. What is even more concerning is that these implications also affect technological innovation and supply chains, and have the potential to spark conflicts (Hamdani and Belfencha 2024, 12).

Moreover, as states started prioritizing technological sovereignty and national interests over the openness and multilateral cooperation, the implications of these geopolitical strategies reflect the broader geopolitical pressures to "eat or be eaten" (Zhang 2025, 96). "Techno-Geopolitical Uncertainty" – a concept coined by Yadong Luo and Ari Van Assche – embodies these continuous tensions, generated by strategic realignments, underscoring the rise of techno-nationalism (Luo and Van Assche 2023; Chow 2025). Techno-nationalism is introduced by Seohee Park as a state's strategic use of technology in order to strengthen national security or gain economic benefits. Park argues that states intervene in the value chain through economic and political tools to alter its structure and change power dynamics (Park 2023, 4).

Taiwan's role and strategies in the U.S.-China tech rivalry have been underexplored. However, the concept of the "Silicone Shield" is often used by scholars to describe Taiwan's national security strategy. First coined by Craig Addison in *Silicon Shield: Taiwan's Protection*

Against Chinese Attack, the term has gained renewed attention in recent years. The "Silicon Shield" can be understood in two parts: first, because China relies heavily on Taiwan's chip supply to sustain its economic growth, launching a war for unification would be economically and technologically costly. Second, it implies that the U.S. and its allies are likely to defend Taiwan not solely for ideological reasons, but to safeguard their own strategic interests in the region, given that Taiwan's semiconductor sector – much like oil in the 20th century – sits at the center of the modern global value chain (Chu 2024, 110). Thus, the "Silicon Shield" symbolizes Taiwan's strategic advantage from its dominance in the global semiconductor industry and serves as a deterrent against potential aggression. However, while the U.S. is already reducing its reliance on Taiwan, China continues pressuring and threatening Taiwan, using propaganda on Taiwanese population. Thus, the "Silicon Shield" is not a guarantee of Taiwan's security. Instead, the tech war between the U.S.–China only heightens the geopolitical risks, and not only for Taiwan, but for the supply chains and other actors involved (Chou 2023, 16).

Finally, authors like Peter C. Y. Chow, Zachariah Peterson, and Marina Yue Zhang underpin the strategic and geopolitical importance of the "Chip 4 Alliance" for geopolitics of the U.S.–China rivalry. However, authors differ in their interpretations of why the Biden administration introduced the initiative in 2021. Marina Yue Zhang believes that because no state, including the United States, currently possesses full self-sufficiency across all semiconductor components, the U.S. has actively encouraged collaboration with its geopolitical allies. In contrast, Peter C. Y. Chow, Zachariah Peterson argue that the initiative stemmed from a growing recognition of semiconductors' central role in the modern economy, which prompted the formation of the "Chip 4 Alliance." Regardless of the differing views, the goal of the "Chip 4 Alliance" between the U.S., Japan, Korea, and Taiwan is not only to create a resilient global semiconductor supply chain but also to counter China's rise as a technological competitor (Chow 2025; Peterson 2022; Chu 2024).

The third strand of literature focuses on the intersection of technology and security studies, emphasizing the role of emerging technologies, such as AI, in shaping global power dynamics. Michael C. Horowitz argues that as chips become more efficient, states get more access to AI capabilities. Thus, the state that possesses the most cutting-edge generation of semiconductors will get an advantage in the AI race. Horowitz also highlights the dual nature of AI – military/civilian – and argues that emerging technologies "shape the balance of power through military and economic means" (Horowitz 2018, 42). Gregory C. Allen frames semiconductor technology as a chokepoint in global AI development. He argues that the U.S. control over emerging technologies, such as AI, is strategically leveraged to maintain global technological dominance, with AI leadership positioned as a core national security priority. In contrast, China pursues a military-civil fusion strategy, which means that AI innovations in the private sector directly benefit the People's Liberation Army (PLA). Looking ahead, global competition over emerging technologies is expected to shape the IR landscape, as control over AI and semiconductors becomes central to the national security and military strategies of great power (Allen 2023, 8; Shivakumar and Wessner 2022).

Tian He and You Ji bridge technological development of AI and semiconductors alongside with their implications on national security and military competition. Semiconductors are integral part of China's military and defense strategy, while AI (that is powered by semiconductors) is key to China's military superiority. Moreover, authors argue that technological restrictions are being used as tools of economic warfare, contending that strategy-setting and implementation form part of a broader whole-of-state endeavor, particularly in China, aimed at mobilizing all high-tech sectors to accelerate and enhance AI development, catch up with the U.S. in high-tech development in order to fully tap national potential in scientific and technological innovation through techno-economic statecraft. Both China and the U.S. are actively integrating AI into defense planning, surveillance systems, and military logistics.

Scott Kennedy argues that “there is no higher priority sector in China than semiconductors”, however, China’s high-tech innovation is uneven, with successes in areas like AI and 5G but struggles in others like semiconductors, as China’s state-led initiatives tend to fail when the technology has high complexity. James A. Lewis Compares China’s technology strategy to Soviet-style central planning, emphasizing authoritarian control over innovation. Author argues that state-driven R&D is inefficient compared to free-market innovation and China’s use of AI-driven surveillance to maintain political stability is a major national security risk for the U.S. (Kennedy 2020, 6).

While the literature on the U.S.–China rivalry and the role of technology is vast, there are still some gaps. As the U.S. and China have taken the spotlight in the literature, it is important to research how the U.S.–China tech war and restructurings of supply chains impacts other actors and their roles in semiconductor supply chain, with a specific focus on Taiwan. Who are the other actors? How are they navigating the tensions, and with whom do they decide to create alliances – and why? Furthermore, authors usually analyze AI and semiconductors separately, rarely touching upon their interconnected nature, even though semiconductors are crucially important for AI development, as they provide the necessary hardware for complex computations. Lastly, the literature and research in this topic would benefit from a more up-to-date analysis of how U.S. and Chinese policies have shaped the competition since then.

Thus, this thesis attempts to partially close some gaps in the rather large body of research on the U.S.–China competitiveness. First, create an up-to-date analysis of the industry and check how U.S. and Chinese policies have shaped the competition since 2022 with their impacts on geopolitics and global security. Second, integrate key stakeholders in the semiconductor competition – Japan, South Korea, the Netherlands, and the EU – with a focus on China, the U.S., and Taiwan, into one study and analyze their respective strategies. Third, provide an overview and analysis of the semiconductor–AI nexus and highlight the importance of semiconductor technology for AI advancement.

Each of the three strands of literature discussed contributes valuable insights to the analysis of the U.S.–China competition over semiconductors and AI; however, each of them has its own limitations. Political economy highlights the globalized character and vulnerabilities of semiconductor supply chains but tends to treat states as unitary actors and often downplays the impact of technology on the economy. Realist and techno-nationalist theories, on the contrary, tend to overemphasize great power competition and national policy imperatives, while underestimating the extent to which states are interconnected due to the fragmented nature of the semiconductor supply chain. These approaches often overlook how such interdependencies and strengths can be strategically weaponized

And while security and technology studies research the materiality and dual-use nature of semiconductors and AI, as well as their security implications, they often underestimate the broader dynamics between states and the role of economic interests and commercial actors as drivers of innovation. Moreover, all these strands overlook the analysis of the dual-use semiconductor–AI nexus, focusing on them separately. Thus, while all of these theoretical frameworks provide distinct lenses through which one can view the tech war between the U.S.

and China, an integrated framework is needed to create a binocular through which the full picture becomes clearer.

Thus, this thesis combines an integrated analysis that draws from each of the three traditions. Specifically, it employs the concepts of weaponized interdependence, economic statecraft, and national security as analytical tools to map how states construct and contest technological and economic superiority. It argues that, driven by national security concerns, states turn to weaponized interdependence through the means of economic statecraft to achieve their techno-economic goals in the semiconductor and AI industries. Moreover, this thesis connects the AI and semiconductor industry by showing that AI technology is now a key driver of semiconductor sector, as constant improvements in AI tech fuel demand for faster and more efficient semiconductors – which, in turn, are the essential hardware that make AI possible.

It is crucial to provide clear definitions of the three concepts. Coined by Henry Farrell and Abraham L. Newman, weaponized interdependence is "leveraging global networks of informational and financial exchange for strategic advantage". Thus, states that control economic chokepoints "can weaponize networks to gather information or choke off economic and information flows, discover and exploit vulnerabilities, compel policy change, and deter unwanted actions" (Drezner and Farrell 2021, 2). Economic statecraft explains how exactly states exercise their leverage and use industrial policy, trade measures, and investment regulation to pursue technological and, in the end, geopolitical superiority, also "examining the implications of economic development in a globalized economy where security, technology, and innovation are highly interdependent" (Aggarwal and Reddie 2021). National security concerns drive the shifts in strategies and make states turn to weaponized interdependence through the means of economic statecraft. This underscores a techno-nationalist turn, with "states viewing technological prowess as integral to national security and economic stability"

(Park 2023). Techno-nationalism also underscores the importance of domestic tech industries to economic development and national security of states. Thus, states call for the corporations to strengthen their positions in the industry, in order to become more self-sufficient and securitize economic activity (Park 2023, 3-4).

The concepts of weaponized interdependence, economic statecraft, and national security are deeply interconnected, as weaponized interdependence provides the structural logic (using chokepoints in an interdependent network to states' own benefit), economic statecraft serves as a tool (tariffs, sanctions, export/import controls), and national security acts as both the motivator and justificator of such actions (protecting critical technology). Together, this integrated conceptual framework directly addresses the "how" and "why" the semiconductor–AI market has become a new battlefield for supremacy.

Chapter 1 – Background

1.1 History of Semiconductors

Semiconductors are small electronic chips that can process, store, and transfer data or signals. Semiconductors are usually made of silicon or germanium and consist of billions of elements. Semiconductors can be divided into different types – from memory and logic to analog and sensor chips – each serving their own purpose. Semiconductors first gained spotlight in the mid-20th century when, in 1947, John Bardeen and Walter built a germanium transistor, beginning a new era in technology (Łukasiak and Jakubowski 2010, 3; Shamaei 2024). Starting from the 1960s, silicone became a preferred material for semiconductors, and the integrated circuit (IC) was developed. The IC made it possible to put several transistors on a single chip, leading to the miniaturization of electronic devices and enabling modern computing, communications, and consumer electronics (Morris 1990; Miller 2022, 18). Since then, the semiconductor industry has made significant progress, with advancements in manufacturing, R&D, and materials. In the 1970 and 1980s, the the semiconductor industry boomed, particularly in the U.S., with leading firms like Intel at the forefront. In the 1990s, the development of the internet and the increasing reliance on computing power and memory chips catalyzed further growth in the semiconductor industry. From the 2000s onward, semiconductors became an integral part of daily life and are now used in everything – from simple clocks and refrigerators to advanced supersonic aircraft and AI systems (Hitachi High-Tech Corporation n.d.; Wright and Zola 2025).

1.2 Industry Overview

The semiconductor industry has undergone significant transformations, especially since the COVID-19 pandemic, when supply chains were disrupted like never before. The semiconductor industry has experienced difficulties in recent years in meeting industry demand for semiconductors. Moreover, the complex structure of the semiconductor supply chain makes it hard to quickly respond to changes in demand due to the geographical fragmentation of the chain and dependencies of states and firms on each other (Kamakura 2022). Such an amount of globalization has left the supply chain of the semiconductor industry vulnerable to any event (geopolitical or health-related) that would interfere in the chain. One such event was the prolonged shutdown triggered by COVID-19, which had a major effect on businesses and fabs around the world and increased consumer demand for more sophisticated processors across a range of industries. For example, businesses had to move to remote work, leading to an exponential rise in demand for consumer electronics and computer components (Ochonogor et al. 2023).

More recently, another event that disrupted the semiconductor industry was the Russia-Ukraine war, which led to deficiencies in energy supply and increased commodity prices. However, such turbulent times have prompted a bulk of academic and policy insights into the resilience and viabilities of the SSC (Semiconductor Supply Chain), urging stakeholders to implement domestically oriented policies and devise strategies aimed at creating a more resilient supply chain (Wei and Wu 2024, 14).

Overall, there are four main risks the semiconductor industry currently faces: firstly, environmental problems, such as natural disasters or severe weather, can disrupt semiconductor supply chain. Secondly, economic fluctuations, such as demand surges or supply excesses, can affect sales, production, and contribute to talent shortages. Thirdly, technological threats, including cyberattacks, can jeopardize manufacturing processes and data security within both the semiconductor industry and states. Lastly, geopolitical tensions, including trade conflicts and restrictions, can limit exports and imports, making the semiconductor supply chain less resilient (Akayama, Chow, and Gupta 2024).

Semiconductors are at the center of geopolitical rivalry between the U.S. and China. These small chips are crucial for cutting-edge technologies such as AI, 5G, autonomous vehicles and, most importantly, to modern military technology (Stone 2024). Trade restrictions and national security concerns of the U.S. and China currently influence the flow of semiconductor materials and technologies. Thus, there has been an even greater shift towards "techno-nationalism," where safeguarding domestic manufacturing capabilities and creating resilient supply chains are national priorities for many stakeholders, not only China and the U.S. Other nations are also competing for their place under the sun in the semiconductor supply chain (Peters 2022; Farrand 2025).

While the U.S. has mobilized its technological dominance, powered by recent policies like the CHIPS Act, to curb China's rapid rise in chip production and its reliance on Taiwan, aiming to maintain its competitive edge (Ryu 2025, 96; Peters 2022, 3), China has been heavily investing in its domestic semiconductor capabilities as part of "Made in China 2025" plan, but has faced constrains in the form of restricted access to critical technologies from the U.S. and its allies.

Furthermore, what complicates the semiconductor industry even more is that it is highly monopolized, unbalanced, and concentrated. As production has became more complex, particularly with the emergence of advanced process nodes, the ability to manufacture these chips became concentrated in a few economies that possess the resources to invest in research and development (R&D) and manufacturing equipment (Akayama, Chow, and Gupta 2024).

For example, China's consumer market has become a major dependency for other Asian economies, or Taiwan's current equipment imports are mostly from the U.S. and the Netherlands. As geopolitical tensions rise, countries, not only China and the US, but Japan, South Korea, Taiwan etc., are looking to increase their strategic autonomy by building up domestic semiconductor production. However, such monopolistic practices and lack of competition, high costs (like Extreme Ultraviolet Lithography (EUVL) machines), exclusive trade agreements, and rapid technological innovations create high barriers for new players and late-developing economies (like India, Vietnam, and Thailand), seeking to enter the market, ultimately stifling innovation (Ren et al. 2023, 1157; Akayama, Chow, and Gupta 2024).

Even with the challenges mentioned above, the industry is projected to continue growing, with global sales expected to exceed $1 trillion by 2030. Semiconductor innovation will remain a key driver of advancements in various fields, including AI, autonomous driving, and quantum computing.

This chapter demonstrates that the semiconductor industry, first solely economic and technological, became highly politicized and securitized by states, and prone to state interventions. These shifts highlight the need for the integrated framework, proposed above, to understand the strategic shifts and interdependencies in such a complex industry. It also sets the stage for further analysis of how key stakeholder’s policies and strategies influenced security, supply chains, and the relation between the AI and semiconductors.

Chapter 2 – Stakeholders

This chapter outlines strategic responses by Taiwan, Japan, South Korea, the Netherlands, and the EU to the policies and strategies implemented by the U.S. and China since 2022, and showcases, in practice, the use of economic statecraft tools by these stakeholders to reach their techno-economic goals, with national security interests as the underlying driver. Semiconductor manufacturing and supply are at the heart of the technological race between the United States and China, in which Taiwan plays a key role. Having forged its way into this competition through its advanced semiconductor manufacturing, headed by Taiwan Semiconductor Manufacturing Co., or TSMC, Taiwan stands right at the center of this rivalry. However, China, the U.S., and Taiwan are not the only actors shaping this competition and its supply chains. South Korea, Japan, the EU, and the Netherlands are all involved in the semiconductor supply chain. Moreover, in light of structural changes in the global political economy in 20th century, the interests and opportunities of global corporations and firms are now not only taken into account by states, but become crucial players in every sector (Strange 1992). In the context of the semiconductor sector, crucially important actors include businesses like Intel, NVIDIA, Qualcomm, Applied Materials (US), SMIC, Huawei (HiSilicon), YMTC (China), TSMC (Taiwan), Samsung (South Korea), ASML (Netherlands). Thus, states now bargain not only with other states but also with firms, and between firms, and in order to understand how supply chain functions and influences the tech rivalry between China and the U.S., it is important to consider all these actors.

Finally, there is a very complex and intertwined global network of states and companies that create, design, and produce semiconductors every day; and the smallest disruption in one geographical location will be spilled over to all others.

2.1 Stakeholders: Taiwan

As the recent developments and above-mentioned tensions between the U.S. and China showcase, Taiwan’s semiconductor industry is now not solely economic, but a geopolitically critical industry. Taiwan is a leader in technologically advanced manufacturing processes, which is a distinguishing feature of its semiconductor supply chain compared to other nations. TSMC is the world's most important manufacturer of advanced semiconductors, applied in everything – from consumer electronics to military technologies (Global Taiwan Institute 2024).

TSMC is responsible for more than half of the world's contract chip manufacturing, making Taiwan a significant player. Both the United States and China have a strategic interest in Taiwan largely because it is the leading player in the semiconductor manufacturing business (Kaur 2021). The strong concentration of production in Taiwan, especially at higher technology tiers, makes the supply chain of the product under study highly susceptible to significant threats. These would include all kinds of disruptions, from geopolitical conflict to natural disasters. For instance, Taiwan is located in a very earthquake-prone area of the world, which increases the vulnerability of the semiconductor supply chain (Magill 2024). This fragility of the supply chain of such a vital component is further highlighted by China's increased militarization of the Taiwan Strait and the growing fears of escalation in the region.

Another challenge Taiwan faces is growing pressure from the government in order to maintain technological superiority. Recently, the Taiwanese minister stated that TSMC's most advanced technologies, including the forthcoming N2 (the first generation of nanosheet transistor technology) manufacturing process, are mandated by law to remain in Taiwan (Upton 2025). In the meantime, TSMC is constructing three plants in Arizona. Although only the older N4 technology is currently operational, N2 is expected to be introduced in the United States by 2030. Considering the timing of these events, TSMC is now facing pressure from the U.S. to speed up the transfer of semiconductor tech to America, which is another example of weaponized interdependence in action (The Economist 2024). Such interdependence between Taiwan and the U.S. promotes collaboration between states, but also creates vulnerabilities in areas crucial to national security (Grimes and Du 2022, 11).

Currently, the U.S. is one of Taiwan's main allies and security providers, since China is continuously threatening to "unify" Taiwan. And Taiwan's semiconductor sector serves as a pinpoint of this relationship, as the U.S. is still deeply dependent on Taiwan for its manufacturing. As Assistant Secretary of Defense Ely Ratner noted, "Taiwan is located at a critical node within the first island chain, anchoring a network of U.S. allies and partners – stretching from the Japanese archipelago down to the Philippines and into the South China Sea – that is critical to the region's security and critical to the defense of vital U.S. interests in the Indo-Pacific" (Sacks 2023).

Taiwan's relationship with China can be described as constant interplay of economic interdependence and geopolitical interests. While one of Taiwan main goals is to maintain its autonomy, it also heavily relies on trade with China for its economic stability. To put it into numbers, 54.2 percent, or $90.4 billion, of Taiwan's chip exports went to China in 2023 (Chou 2023, 23). In response, the Ministry of Labor of Taiwan has issued a directive to personnel agencies, instructing them to stop listing job openings of China (Fallert 2021).

Finally, the position of Taiwan and its ability to maintain its strategic value will depend, first of all, on its adaptability, including foreign policy changes, and geopolitical situation in the world. Taiwan now needs to reassess its partnerships, their diversification, enhance its capabilities for the stabilization of the situation around it, and invest in development and innovation that would make it more stable and resilient to the influence of other players.

2.2 Stakeholders: South Korea, Japan, the EU and the Netherlands

The EU, South Korea, Japan and the Netherlands are also mobilizing state support to assist the semiconductor industry, transforming the competition for critical technologies into a global trend and following China and the U.S. towards a state-driven "techno-nationalism" (Bradford 2023). For example, the EU's call for action to strengthen European technological leadership resulted in creation of the "European Chips Act" in 2023. Through this act the EU wants to resolve the issue of semiconductor shortage, reducing dependency on other states and becoming technologically self-sufficient, with a main goal to reach 20% of global market share in semiconductors by 2030 (European Council 2025). However, this dependency is not one-sided, as just as the EU relies on front- and back-end manufacturing in Asia, Asian manufacturers rely on chemicals and manufacturing equipment from European suppliers. Policy analysts, like Jan-Peter Kleinhans, nonetheless argue that "European Chips Act" is just a short-term strategy and urge the EU to mobilize its power and create long-term policy objectives, investing in its own domestic sectors and talent pool, and understanding its position in the semiconductor supply chain to be more effective in its governance (Kleinhans 2024).

One of the EU member states that stands out is the Netherlands, together with ASML (Advanced Semiconductor Materials Lithography). In particular, ASML is the main global supplier of Extreme Ultraviolet (EUV) lithography machines, which are essential for manufacturing cutting-edge chips. ASML, also referred to as a “Crown Jewel”, is also caught up in geopolitical tensions between China and the U.S., as its EUV machines are crucial for advanced chip production used in the AI, defense systems, and advanced computing (Pattheeuws et al. 2024, 5). Thus, citing national security concerns, the U.S. has been pressuring the Netherlands to restrict the export of ASML’s machines to China since 2023 (van der Veere 2024, 4). These controls align with the U.S. "small yard, high fence" approach – targeting a narrow set of critical technologies with tight restrictions (Siripurapu and Berman 2023).

In a broader EU strategy context, there has been some conflict of interest, as the EU Chips Act was implemented to reduce reliance on Asia and reshore certain semiconductor production. In turn, the Netherlands seek to focus on specific sectors of the industry, like the chip-making equipment, and reshoring would mean direct competition with South Korea, with which the Netherlands hope to maintain a strategic cooperation (van der Veere 2024, 6;Pattheeuws et al. 2024).

South Korea is another major actor in the semiconductor supply chain, being a part of Chip 4 Alliance”, together with the U.S., Japan and Taiwan, and home to two of the world’s largest memory chip (DRAM and NAND flash) producers: Samsung Electronics and SK Hynix. In 2021, semiconductors accounted for nearly 20% of South Korea's total exports, highlighting the industry's major role in the national economy (Kumar 2023, 6). However, about 60% of South Korea semiconductor export in 2021 was to China. Additionally, China is now South Korea's top export market for semiconductor equipment. This shows that South Korean semiconductor sector, which is crucial for county’s economy, has become extremely reliant on the Chinese market. Similarly to the Netherlands, South Korea also faces pressure from the U.S. to align with its tech-containment strategy against China (Kumar 2023, 8). Moreover, Washington has pressured South Korean corporations to stop their tech exports to China – another example of weaponized interdependence in action. Both companies are now making significant investments in new fabs (fabrication facilities) in the U.S. to meet American demands (Van der Veere 2024, 5).

To reduce its reliance on China, diversify markets, and strengthen its position in the global market, South Korea has been implementing several policies. First, two slogans, such as "Next China" and "Export Diversification", have recently emerged in South Korea. Under these policy slogans, Korea is increasing exports to Southeast Asia, Vietnam, and other ASEAN countries to shift its market away from China (Kumar 2023, 9). Second, in 2021, South Korea unveiled “K-Semiconductor Strategy" with chip makers, including Samsung Electronics and SK Hynix, committed to investments in the semiconductor sector exceeding 510 trillion won by 2030.

The government has also pledged to support the industry through tax incentives and infrastructural initiatives (KBS News 2021). Another significant development was the "K-Chip Belt," which aimed at linking several regions, into a "belt" to advance the chip industry across several phases, including design, manufacturing, equipment, and raw materials, within a single area (KBS News 2021).

Lastly, facing talent shortage in the sector, South Korea plans to attract 300,000 foreign students by 2027, many of whom will be directed into technical and semiconductor-related fields (ICEF Monitor 2023). In 2024, South Korea revealed its intention to establish a "semiconductor mega cluster" in southern Seoul by 2047, with an investment of 472 billion dollars (Yoon-seung 2024).

In the 1980s, Japan was a global leader in semiconductor sector, with over 50% of market share. However, as the Japanese economy stalled in the beginning of the 1990s, the U.S. regained its position as the leader in semiconductor market. In the coming years, Japan's share has fallen to around 10% due to growing competition from South Korea, Taiwan, and the U.S. (Kamakura 2022). Moreover, recent tensions and health crisis revived global interest in reshoring and national and economic security, but Japan faces structural (legacy infrastructure, limited domestic demand, and weak industrial policy support) and demographic constraints (such as, rapidly declining birth rate and ageing population).

Despite the decline in manufacturing dominance, Japan remains vital in semiconductor materials, such as silicon wafers, photoresists, and manufacturing equipment, where firms like Shin-Etsu, SUMCO, and Tokyo hold significant global market shares (Kamakura 2022, 267). In terms of semiconductor manufacturing equipment (SME), Japan currently holds the second place after the U.S. and occupies 29% of global SME market share, leading in assembly and test equipment. China is the predominant market for SMEs in the Indo-Pacific. For example, 29 percent all Japanese SME sales go to customers in China (Thadani and Allen 2023). One of the most significant indicators of Japan's comeback is the establishment of a TSMC factory in Japan in 2024. The fab is intended to manufacture advanced logic chips, as well as thousands of wafers per month – products that Japan has previously been unable to produce (TSMC 2024).

Two key components of Japan's semiconductor strategy are enhancing local manufacturing capacity and focusing on R&D for next-generation semiconductors. Moreover, Japanese government has set aside over ¥1 trillion (~$7B) to subsidize domestic semiconductor manufacturing (Tomoshige 2023, 1-2). Japan is also strengthening R&D partnerships and investing in next-generation chip technology. For example, Rapidus Corporation received 2.3 billion dollars of financial support from the Japanese government in 2022 and 2023, and has a goal to mass-produce 2nm chips by 2027 (Tomoshige 2023, 1-2). Another entity is the Leading-edge Semiconductor Technology Center (LSTC), which aims to achieve autonomous growth and sustainable development of Japan's semiconductor industry through advancement of research and development in cutting-edge semiconductor technology (Tomoshige 2023, 1-2; Sekitani and Chen 2024, 9243; LSTC 2025). However, full reshoring is unlikely, as Japanese companies are increasingly moving R&D and production closer to customers in Asia, reflecting a regionalization trend rather than a national turn.

2.3 Stakeholders: China and the United States

While the United States and Taiwan are the current leaders in semiconductor sector, China is quickly developing and readjusting to the U.S. export controls, that intended to curb China’s advances in semiconductor technology (Khrestin 2024). Furthermore, interdependence in the U.S.–China semiconductor supply chain linkages further complicates their rivalry, as it is heavily weaponized by both states, through the means of economic statecraft, which includes sanctions, tariffs, policies, and shifts in economic alliances. This trails back to the main research question of how the U.S. and Chinese semiconductor policies have reshaped the semiconductor and AI industries since 2022, and what impact it had on great power competition and geopolitics?

The CHIPS and Science Act is the backbone of the U.S. industrial strategy in semiconductors. It was first implemented in August 2022, during Biden administration, allocating $52.7 billion in direct subsidies, tax incentives, and R&D funding to boost domestic semiconductor production and innovation in the United States and its allies (Japan, South Korea, and Taiwan) (Hufbauer and Hogan 2025, 34). One of the main goals is to manufacture 20% of the world's logic chips by 2030. Moreover, the CHIPS Program Office introduced a "Vision for Success," where it outlines that investing in fabs may help revive the U.S. semiconductor industry while also advancing the U.S. economic and national security objectives.

To reduce dependency on foreign suppliers and geographic chokepoints, the U.S. is incentivizing global firms to build fabs in the U.S., creating resilient "fab clusters". Fab clusters are "geographically compact areas with multiple commercial-scale fabs owned and operated by one or more companies; a large, diverse and skilled workforce; nearby suppliers; R&D facilities; utilities; and specialized infrastructure" (Shivakumar, Wessner, and Howell 2023).

Currently, the U.S. is a leader in chip design with companies like NVIDIA, Intel and Qualcomm, EDA tools, where Cadence and Synopsys hold near-duopoly control and spend 30% or more of their revenues on R&D each year; and in semiconductor manufacturing equipment with American firms like Applied Materials and Lam Research as global leaders. However, ASML is consistently catching up with Applied Materials and, in 2023, even surpassed the American company, reporting a revenue of $29.83 billion compared to Applied Materials' $26.52 billion (Shilov 2024).

The semiconductor sector is a central to the U.S.–China tech and trade rivalry. Thus, in recent years the U.S. policy is focused on strategic decoupling, restricting Chinese access to advanced chips and tools and equipment, as was mentioned above, while reshoring critical technologies, through CHIPS Act (Bateman 2022). Since the Trump administration (1st term), both states have escalated tariffs against each other. Under the Biden administration, the U.S. policy towards China has broadened and now includes national security questions. Moreover, the U.S. is weaponizing the semiconductor supply chain and creating barriers for China. For example, the U.S. has put Chinese businesses, like Huawei and SMIC, on the Entity List, restricting access to U.S. technologies (Fuller 2021, 3-5).

A problem for the U.S. is that it still depends on Taiwan for sophisticated semiconductors imports but aims to minimize this reliance through initiatives like the CHIPS Act. In particular, in April 2024, the U.S. government announced spending 6.6 billion U.S. dollars in direct subsidies for TSMC (Shepardson 2024). And more than 8.5 billion U.S. dollars for Intel (U.S. Department of Commerce 2024) with Gina Raimondo saying: "It didn't happen overnight. We had to convince TSMC that they wanted to expand" (Shepardson 2024).

In an effort to counter China's influence and enhance supply chain resilience, the U.S. is coordinating with allies, through the Quad (the U.S.–Japan-–India–Australia Quadrilateral Security Dialogue), "Chip 4 Alliance", and the TTC (U.S.–EU Trade and Technology Council) (Benson, Quitzon, and Reinsch 2023). This thesis strategically selected these alliances as case studies, as they have been used by the U.S. as tools of economic statecraft to pressure its closest against China. As the U.S. allies are caught in asymmetric interdependence with Washington, they become obliged to comply. Additionally, the U.S. is also promoting "friend-shoring" and encouraging allies, especially in the Indo-Pacific region, to build fabs and shift supply chains out of China (CSIS's Asia Program 2023).

One ongoing struggle for the U.S., shared by other states is talent shortage. The demand for industry-ready talent will only grow in the years ahead, as the demand for semiconductors continues to grow now. The United States is currently experiencing a substantial shortage of technicians, computer scientists, and engineers, as stated in the 2023 study conducted by the Boston Consulting Group and SIA (SIA 2024). To bridge projected labor gaps, U.S. programs aim to support R&D collaborations, IP protections, and STEM workforce development. Other current challenges include long construction timelines for new fabs, around 3-5 years, and cost competitiveness, as East Asian fabs still enjoy lower labor and operational costs (Varadarajan et al. 2024, 25-27).

Even as the United States seeks to move manufacturing domestically, China is beginning to catch up – and in some areas, even dominate – global technology. Given the country's growing appetite for electronics, and the recent shock from DeepSeek, a new low-cost, open-source model that, despite skepticism from some analysts, could threaten hundreds of billions invested in AI and chip infrastructure, the potential for China to take over the semiconductor market is significant (IO+ 2025). With Donald Trump returning to the Oval Office, tensions the competition over who will take the reins of technological leadership are likely to fire up.

The Made in China 2025 initiative envisions China's desire to turn its industry from a workshop of low-tech and cheap goods into a technology giant creating the most technologically advanced and high-quality goods (Institute for Security & Development Policy 2018). This includes semiconductors and aims to stop it from being a factory of low-tech and inexpensive goods. China is also intensifying its efforts in the global semiconductor competition with a new phase of National Integrated Circuit Industry Investment Fund (the Big

Fund). The third phase began in 2024, with a $47.5 billion investment aimed at increasing China’s contribution to global semiconductor manufacturing (Lee 2024).

China is the winner in terms of semiconductor equipment purchases. In 2023 and 2024, it spent $41 billion on equipment and was the main growth driver for the WFE market. However, these numbers are projected to decrease in 2025 due to export controls and restrictions. For example, China constituted 47% of ASML’s revenue in 2024, but this number is projected to decrease to 20% in 2025 (Yang and Li 2025). Still, overall, in 2025, it is projected that China will take up the biggest part of revenue in the semiconductor industry. China is also one of the leaders in the lower segment of semiconductor manufacturing, which is assembly, test, and packaging (ATP). Out of 484 facilities in 2021, 134 were situated in China (Khan, Peterson, and Mann 2021); and in 2025, China's market share in ATP will only continue to rise (IDC 2024).

Recently, the Korea Institute of S&T Evaluation and Planning (KISTEP) has published a report demonstrating a dramatic shift in the global semiconductor industry, showing that China has overtaken South Korea in memory chip technologies, where South Korea dominated for a generation. China is also gaining more power in foundational semiconductors, also referred to as legacy chips or mature chips, which are “semiconductors produced at manufacturing nodes 22 nanometers (nm) and larger” (Schumacher 2024). TrendForce predicts that China’s global mature process capacity, 28nm and above, will rise from 22% in 2021 to 49% by 2030, and may even surpass 50%, with both SMIC and Hua Hong Semiconductor expanding their 28nm and 14nm production (TrendForce 2025). To put it into numbers, China is home to about half of the world’s 12-inch wafer fabrication facilities. This gives it an advantage in the manufacturing mature-process chips due to its complete industrial chain, strong production capacity, and low-cost benefits (Chao 2025). Moreover, Huawei made a significant breakthrough and fabricated a 7nm chip, defying U.S. sanctions and demonstrating that China can produce advanced chips despite restrictions (Zafar 2025).

As was mentioned above, the United States has spent substantial resources to restricting China’s access to advanced semiconductor technologies. As Vyra Wu writes, China's semiconductor market faces triple threats: oversupply, sanctions, and structural shifts (Wu 2024). However, despite U.S. prohibitions, China's heavily subsidized EDA industry is booming, and Chinese enterprises are offering their services below market rates to close the R&D and technology deficit.

Still, Chinese manufacturers are facing significant problems trying to catch up with Taiwan (Sacks 2023). However, despite sanctions and tariffs from the U.S., China's semiconductor sector has demonstrated relative resilience and growth in the past years. Policy support, technological advancements and demand in the market have contributed to this trend (Global Times 2025). In response to nations implementing restrictions on selling the semiconductor technologies to China, the latter has enhanced its export control measures. This includes the introduction of new licensing requirements (implemented in 2023, December 2024 and early 2025) for materials and technologies, which are essential for semiconductor manufacturing (TDI 2025). In the latest restrictions round, Trump ordered 54% tariffs on all Chinese imports into the U.S. in April 2025, and a few days later, China imposed 34% reciprocal tariffs on imports of U.S. goods (Liu and Gan 2025).

Finally, both nations are weaponizing their strategic resource superiority, and such tit-for-tat export restrictions between the U.S. and China on semiconductors, vital minerals, and rare earth elements, which indicates a growing geopolitical and economic competition with far-reaching implications for supply chains and, overall, international relations. Furthermore, from this section it is clear, that semiconductor sector is not limited to China and the U.S., and that other governments have launched their own initiatives and policies, formed alliances at the national and international level, reinforcing, restructuring, and creating in a more resilient semiconductor supply chain, to serve their national security and geopolitical aims (Thadani and Allen 2023).

This chapter underscores how national security and techno-economic goals drive not only industrial strategies but also shift in alliances. This finding ties back to the conceptual framework, which shows that economic statecraft tools are employed to maintain national security and achieve technological, economic, and geopolitical objectives.

Chapter 3 – National Security, Weaponized Interdependence and Economic Statecraft

From the analysis in previous chapters, it is clear that semiconductor industry has emerged as a critical arena for geopolitical competition, and semiconductors are viewed as "a symbol of national power" (Park 2023, 1), where economic and national security goals intertwine. Thus, developing cutting-edge semiconductor technology and onshoring of production has become a top national security priority, leading to high-stakes competition among states for dominance in this sector. This chapter analyzes the dynamics between then main stakeholders (China, the United States, Taiwan, the Netherlands, Japan, South Korea, and the EU), the strategies and policies they are implementing, and the motivations behind them, through the lenses of Weaponized Interdependence, Economic Statecraft, and National Security. This chapter argues that, in the semiconductor rivalry, states driven by national security concerns states turn to weaponized interdependence through the tools of economic statecraft.

Henry Farrell and Abraham L. Newman refer to "leveraging global networks of informational and financial exchange for strategic advantage" as weaponized interdependence. Modern semiconductor geopolitics can be understood through the concept of weaponized interdependence, as in a highly concentrated semiconductor supply chain, a state that controls a critical "hub" or chokepoint (a unique technology or market) can block or hamper other actors' access to that network. In practice, technologically advanced states like the U.S. and its close allies have tended to hold these pivotal nodes in the semiconductor value chain, from R&D to manufacturing equipment. Control over these chokepoints allows powerful states to impose export controls, tariffs, or sanctions that limit rivals – such as China – from accessing critical inputs, which constitutes a classic form of economic coercion (Farrell and Newman 2019, 54-58).

Economic statecraft, in turn, explains how exactly states exercise their leverage and use industrial policy, trade measures, and investment regulation to pursue technological and, in the end, geopolitical superiority. For example, the U.S. export controls targeting advanced semiconductor equipment destined for China serve as a tool of economic statecraft (Aggarwal and Reddie 2021, 1-2; S. Lee 2024, 409). Such policies are a part a broader shift toward techno-nationalism, a concept first coined by Robert Reich in 1987. Techno-nationalism refers to states seeing leadership in tech industries, like semiconductors, as essential to their sovereignty and security, in turn giving them a reason to aggressively intervene in markets to secure those advantages (Park 2023, 2). Due to quickly changing international dynamics, such an understanding of techno-nationalism has evolved, transitioning from an emphasis on "catch-up" to more proactive "first-mover" strategies (Kim et al., 1-2).

National security imperatives now dominate semiconductor policy, and what once was a primarily commercial and economic global supply chain is now becoming increasingly securitized: more and more governments frame semiconductor self-sufficiency and control over the supply chain as crucial to their national defense and economic resilience. This securitization of technology and the sector is also used by states to justify state interventions in economy (Park 2023, 4).

The U.S. has been one of the leaders in semiconductor industry for quite some time now, and, in recent years, it has deliberately leveraged this position as a strategic weapon. Washington’s approach to relations with China has been “weaponizing” their interdependence, turning China's reliance on U.S.-linked technology into a pressure point. For example, as the U.S. controls several chokepoints in the SSC, such as EDA, cutting-edge manufacturing equipment, and advanced R&D, it aims to slow Beijing's acquisition of high technology items that could support the People's Liberation Army under China's "Military-Civil Fusion" strategy (Ford 2024).

The export controls imposed by the U.S., targeting more than 140 Chinese companies, along with the current tariff rate (145%) against Beijing, are justified under U.S. law on the grounds of national security – this is economic statecraft in action (Mangan et al. 2025). Just days later, Trump clarified that the industry would be subject to a "semiconductor tariff" instead (Halpert 2025). Nonetheless, such uncertainty and back-and-forth decision-making show that the U.S. government is trying to balance the "weaponization" of economic tool, so that it inflicts greater harm on its adversaries than on itself.

However, China is not the only state under pressure from the U.S., both the Netherlands and Japan have had to agree to U.S.-led restrictions, even on less advanced lithography equipment, since 2023.

Moreover, in 2018, Dutch authorities initially granted ASML a license to export an EUV tool to China, but under heavy U.S. lobbying that license was revoked on security grounds (Lugt 2024). Thus, the U.S. coerces its allies into sacrificing short-term economic gains for a shared strategic goal of preventing China's rise, highlighting how asymmetric dependencies can be exploited, even among "friends." Domestically U.S. strategies include reshoring production and industrial subsidy to reduce dependence on Asia, primarily Taiwan. All these measures, such as export bans, domestic investment, pressuring both allies and rivals through weaponized interdependence, and tariffs reveal Washington's efforts to wield economic statecraft for strategic gains in semiconductor industry. Nonetheless, U.S. economic statecraft faces constraints and pushback. American businesses, deeply intertwined with the Chinese market, have "been willing to walk right up to the edge" of restrictions to maintain their access to China's costumers (Farrell 2025). Both scholars and analysts warn that overreach or incoherence in these coercive policies could erode U.S. technological leadership in the long run. Nonetheless, the U.S. keeps prioritizing its national security over the previous free-market approach in a shift from interdependence to targeted decoupling in critical tech (Farrell 2025; Bateman 2022).

China's position in the semiconductor interdependence web is largely one of asymmetric dependences which the U.S. exploits. Despite China's status as the world's largest consumer and assembler of chips, it remains reliant on foreign (U.S., Taiwanese, European, Japanese) technology for the most advanced components and equipment. This dependence has become a strategic liability for Beijing, especially when Chinese tech giants were cut off from critical inputs. As a response, China has also taken a techno-nationalist turn and has been investing billions of dollars in the sector, treating it as a top strategic priority (Reuters 2024). China's "Big Fund" reflects the renewed urgency to be the first in the semiconductor industry, following the U.S. export control measures tightening the noose on China's tech imports. Ultimately, U.S. economic statecraft has provoked a powerful counter-response from China aimed at achieving self-sufficiency.

Beijing's strategy can be understood through defensive economic statecraft, where the government is mobilizing all possible economic and regulatory means to fortify its tech sector against external pressure. As Chinese leaders are cautious in using weaponized interdependence offensively, recognizing the risk of backfiring and Beijing aims to "maximize impact on target states while minimizing economic losses" to itself. China has been actively "securitizing" technology and framing the race for semiconductor dominance as a matter of national security, emphasizing the need to "reduce their vulnerability" in a world where the U.S. can threaten critical supplies (S. Lee 2024, 399). As China's Foreign Ministry Spokesperson Lin Jian's recently stated: "The U.S. hegemonic move in the name of "reciprocity" is a typical move of unilateralism, protectionism and economic bullying. The U.S. tariffs with differentiated rates violate the WTO principle of non-discrimination, severely disrupt the international trade order and the security and stability of the global industrial and supply chains…" (Ministry of Foreign Affairs 2025). Finally, China's model of "dual circulation", introduced in 2020, encapsulates China's strategy: boosting the domestic tech cycle (internal circulation) to be less reliant on international (external) trade for the sake of national security (Zuo 2024).

Taiwan has pivotal position in the SSC, and this kind of dominance in chip fabrication makes Taiwan irreplaceable, at least for now. In other words, Taiwan's interdependence is also its security leverage, as the microchips it manufactures are so crucial that the U.S. and other powers have a vested interest in Taiwan's stability. However, the "Silicon Shield" is a double edge sword, as "chip manufacturing prowess may increase the danger to Taiwan" (Jieh-min 2024). The U.S. has been urging Taiwan (and TSMC) to diversify chip production to U.S. soil – Taipei worries this could weaken its Silicon Shield by lessening the world's immediate dependence on chips made in Taiwan and, thus, having less security guarantees from the U.S. Taiwan's government and industry are fully aware of the leverage they hold in the industry, and exercise their own form of techno-economic statecraft. Taiwan strategically uses its position in the supply chain to strengthen international support while carefully managing its relations to avoid unnecessarily provoking China.

Simultaneously, to strengthen supply chain security, Taiwan, for example, is participating in dialogues like the "Chip 4" alliance, signaling that it is an active shaper, not merely a pawn, in the chip war.

Beyond the primary U.S.–China–Taiwan triangle, Japan has aligned closely with Washington's strategic objectives, viewing China's tech rise with concern. Japan has also shown that it is willing to weaponize interdependence on its own when national interests are at stake. For example, Japan's decision to implement export restrictions on South Korea, cutting off critical chemical materials needed for South Korean chip production in 2019 (S. Lee 2024, 401). In response, Korea cut off as much of its commercial ties with Japan as possible. This could be regarded as "decoupling' from Japan. Therefore, current trade tensions between two countries, is a dynamic interplay between Korea's "decoupling" and Japan's "weaponized interdependence" (Kim 2021, 21). While South Korea holds a valuable position in the supply chain, Seoul is walking a tight trope between the U.S. and China. South Korea faces challenges in maintaining its strategic autonomy and economic prosperity, with an asymmetric economic interdependence with China and continuous pressure from Washington's for decoupling from Beijing (Sohn and Lee 2023, 100-101). South Korea, similar to Taiwan, practices a two-pronged strategy: cooperate with U.S. tech initiatives without alienating China (S. Lee 2024, 401). Such cautious diplomacy highlights the challenge for middle powers caught in a techno-security dilemma.

The EU has shifted to a "new economic statecraft" (Balfour et al. 2024, 103) that is more considerate of geopolitical issues. European Chips Act, one of the countermeasures to weaponized interdependence, invests billions to develop EU's domestic semiconductor production capabilities in order to reduce dependency on imports from geopolitically vulnerable regions, like Taiwan. In this context, security-related concerns have gained increasing traction in shaping Europe's economic statecraft, particularly since the onset of the Russia–Ukraine war. The Dutch government's decisions on ASML exports are a mirror for the broader EU stance on the semiconductor tech war. Initially reluctant to politicize high-tech trade, the Netherlands, under U.S. pressure, made the decision to deny China the means for 5nm-and-below fabrication as a prudent security step (Lugt 2024). The Netherlands' compliance with export curbs, despite some internal EU frictions about sovereignty, indicates a recognition that asymmetric dependencies can be dangerous. Having ASML as a gatekeeper of advanced lithography makes Europe both a potential chokepoint wielder and a potential target of coercion.

The analysis of this chapter, thus, directly confirms that semiconductor geopolitics can be defined by weaponized interdependence, where states are leveraging their position in SSC, with the help of economic statecraft, to pursue strategic and national security objectives. It also underscores the increasing use of techno-economic statecraft as a policy tool by major stakeholders to achieve not only economic, but technological dominance or resilience against external coercion. The integration of national security concerns, economic statecraft, and weaponized interdependence across industries, combined with growing protectionism and strategic competition, makes the semiconductor industry multi-dimensional – where economic and geopolitical forces are deeply entangled and exert influence far beyond the industry itself.

Chapter 4 – Semiconductor–AI Nexus

The central puzzle of this thesis – why ostensibly market-driven semiconductor industries have become overt tools of statecraft – has been sharpened by the emergence of AI technologies in recent years and its rapid advancement. The dual-use nature of AI, which means it can be applied to both civil and military sectors, magnifies the stakes of chip control, as semiconductors form foundation of high-tech manufacturing and AI systems. Without cutting-edge chips, states will not have a competitive advantage in AI-driven industries, economic growth, or military power. Thus, it was a surprising observation that such an interconnected relationship has been underexplored and underrepresented in the literature. AI is a very complex system that requires semiconductors for training its algorithms, storing and moving data, and testing AI models in real time. Thus, semiconductors and AI are deeply interconnected; AI technology is now a key driver of semiconductor industry, as constant improvements in AI tech are fueling demand for faster and more efficient semiconductors (PWC 2024).

The fight for supremacy in the AI is another level of tech war between China and the U.S. Just recently, OpenAI started collaborating with Oracle and other foreign companies and investors to create a $500 billion worth of AI infrastructure in the United States, since Donald Trump announced a new company – the Stargate Project, calling it "the largest AI infrastructure project by far in history" and promising to keep "the future of technology" in the United States (da Silva, Sherman, and Rahman-Jones 2025). On the other side of the world, DeepSeek's AI breakthrough in December 2024 has triggered an "avalanche" of interest in Chinese tech firms over recent months, causing U.S. tech companies like Nvidia to plunge as DeepSeek sparked concerns over America's leadership in the sector. Moreover, China is establishing a government-backed fund worth 138 billion dollar to support high-tech industries, like semiconductors and AI (Swayne 2025).

In recent years, China has been paying a lot of its attention to this nexus, as many times the government stressed that AI and military affairs walk hand in hand. One of the central concepts in China's tech strategy is military-civil fusion, which means that advances in commercial sectors like AI and semiconductors can and should directly support military modernization and security goals. To support this, over the past decade, China has invested billions to create a self-sufficient semiconductor ecosystem. For example, through its military-civil fusion strategy, Chinese government aims to achieve its security and geopolitical goals. Thus, whoever will hold leadership in AI will have military superiority (State Department 2025).

What is more concerning for the U.S. is that DeepSeek is a free, open-source large language model reportedly developed in under two month and for about $6 million, which is a fraction of what the U.S.'s OpenAI charges on its large language models, and it has also outperformed OpenAI's latest model in many third-party tests. This also means that DeepSeek successfully navigated through severe semiconductor restrictions imposed by the U.S. government on China, which prevented it from accessing the most powerful chips, such as Nvidia's H100. The most recent developments indicate that DeepSeek either found its way around the tariffs, or did not have the effect Washington had envisioned (J. Wu and Bosa 2025; Global Times 2025b). Meanwhile, major American tech firms reportedly went into "panic mode," urgently trying to "copy anything and everything" they could from DeepSeek (Global Times 2025b). Many industry experts, however, remain cautious about DeepSeek's bold claims. Given the extraordinary efficiency of it, some wonder if DeepSeek had benefited from espionage or exploiting loopholes in export controls. Indeed, officials at OpenAI raised suspicions that DeepSeek may have cloned or appropriated elements of their models. Thus, investigations were reportedly opened into whether any protected intellectual property or algorithms had been illicitly leveraged in DeepSeek's development processes (Garcia 2025). The DeepSeek's team has denied these claims, citing their open-source release as proof of their honesty. This case shows how closely access to semiconductor technology is linked to progress in AI. If a state like China can achieve such success in AI with limited semiconductor resources, it challenges the assumption about how much of an advantage access to the best chips truly provides.

A defining aspect of the semiconductor–AI relationship is its significance as high-tech infrastructure and the complexity of the manufacturing process behind it. Manufacturing modern semiconductors is one of the most technologically demanding processes, requiring nanometer precision, billion-dollar facilities, and geographically fragmented supply chains for materials and tools. This high-tech manufacturing foundation underpins national competitiveness in AI, as AI processors rely on features like extreme ultraviolet lithography and multi-billion transistor integration that only a few firms worldwide are practicing.

The future of semiconductors for AI seems very promising and transformative, as innovation in semiconductor technology reshapes the way AI functions, however, it goes along with its challenges. Firstly, advanced AI algorithms require huge amounts of computational power and energy efficiency, and developing such processors without consummation of excessive power remains a key challenge. Secondly, the manufacturing of semiconductors, especially 3nm or 2nm nodes, requires billions of dollars; such high costs create barriers for smaller businesses and states seeking to have their stake in the industry. Moreover, geopolitical tensions between the U.S. and China further fire up these tensions and challenges. Thirdly, ethical and sustainability challenges arise, as AI capabilities advance. More attention is being brought to how AI is being used and for what purposes, especially when it comes to surveillance, face recognition, and lethal autonomous weapon systems. There have been calls for tighter regulation and ethical standards because of concerns about privacy, bias, and accountability. Environmental impact of semiconductor manufacturing and AI implementation is a growing issue, as semiconductor manufacturing requires a lot of energy and water, while training and running huge AI models requires a lot of electricity. Thus, renewable energy, energy-efficient architecture, and sustainable manufacturing are among main priorities of fabrication facilities (Microchip USA 2025). Finally, chip makers will also face problems if the trend continues. Such challenges include larger tech companies developing their own manufacturing capabilities and onshoring production of chips, which means they will import less from dedicated chip manufacturers. The second challenge arises from this, as tech giants aiming to design and manufacture their own chips will require a skilled workforce, and given the major talent shortages in both the semiconductor and AI industries, this will become increasingly difficult.

In conclusion, the nexus between semiconductors and AI is shaping current geopolitical and technological landscapes. While semiconductors are what makes contemporary AI possible, AI quick development and constant improvements drive the next chapter of semiconductor innovation.This industry has become deeply strategic for states, and countries all over the globe are heavily investing, enacting policies to protect or acquire chip capabilities, and integrating AI-semiconductor goals with broader national strategies. The themes of military-civil fusion, high-tech manufacturing, and the quest for speed and efficiency intersect in this story. Moreover, according to the report by McKinsey & Company, AI accelerator chips (designed for the efficient processing of AI workloads like neural networks) will grow at a rate of approximately 18 percent annually, which is “five times more than for semiconductors used in non-AI applications" (Batra et al. 2018, 4; Synopsys 2025). This chapter directly addressed how semiconductors enable and shape the advancement of artificial intelligence, and vice versa, showcasing how this technological interdependence intensifies the U.S.–China rivalry, influences state strategies, and impacts the global security architecture. It also contributed to the discussion on why and how semiconductors have transcended their traditional economic and technological roles to become a weapon of geopolitics.

What is already clear is that the semiconductor–AI nexus will remain a pinpoint of innovation, investment, and competition, with outcomes that could reshape economic and security alliances in the 21st century.

Conclusion

Semiconductors are a pinpoint of the U.S.–China tech war and are crucial for high-tech manufacturing and for enabling AI. The semiconductor industry is a complex global network where interdependence in the U.S.–China semiconductor supply chain further complicates their rivalry. While China is strategically reliant on the U.S. and Taiwan for imports for advanced semiconductors, the U.S.'s limited domestic production of semiconductors makes the U.S. vulnerable to supply chain disruptions. Moreover, U.S. faces high costs trying to rebuild its domestic semiconductor manufacturing capacity. This thesis finds that more aggressive and nationalist policies by both powers and other main stakeholders have intensified the semiconductor rivalry and are influencing and reordering global partnerships and alliances.

In response to rising geopolitical tensions and an increasingly fragmented global semiconductor supply chain, states – including, but not limited to, the U.S. and China – have adapted their strategies to this new reality. Specifically, driven by national security concerns, they are increasingly leveraging weaponized interdependence through tools of economic statecraft. The United States has been creating and strengthening new alliances and onshoring investment to secure semiconductor supply chain. Meanwhile, China, has been focusing on self-reliance and investing hundreds of millions into domestic semiconductor production and pursuing indigenous innovation to counterbalance its exclusion from Western technology and R&D. These policies have fueled a technology arms race and also put pressure on alliances; as Washington has been pressuring allies, like Japan and the Netherlands, to impose parallel export controls on China, while Beijing's isolation prompted it to seek alternative supply channels become more self-reliant.

Taiwan and South Korea have also taken action and reinforced their crucial places in the semiconductor supply chain. Still, they face pressure to take sides and maintaining their position. The European Union has also launched its own Chips Act to build capacity and reduce reliance on foreign suppliers. Meanwhile, TSMC, Samsung, Intel, and ASML have become de facto strategic assets to their home states.

Techno-nationalism has taken central stage as technological dominance and national security go hand in hand, breaking from the globalization trend of previous decades. Semiconductor supply chains are being reconfigured via “friend-shoring” among allies and selective decoupling from rivals, as states prioritize autonomy and self-reliance to build resilience against vulnerabilities. The results are an emerging landscape of tighter blocs and weaponized interdependencies; a more fragmented yet security-centric world economy where access to this critical infrastructure (semiconductor tech) is a key strategic determinant and a leverage, and changing and unstable power dynamics.

An important finding is the intertwined role of semiconductors in driving cutting-edge AI advancements, creating the semiconductor–AI nexus, where advancements in AI create demand for more advanced semiconductors, which, in turn, enable new AI capabilities. As semiconductors became a backbone of modern AI systems, leadership in AI is impossible without mastering semiconductor manufacturing and design. Such findings reaffirm an argument by Chris Miller that “today, military, economic, and geopolitical power are built on a foundation of computer chips,” but also add on, as technological supremacy is also based on prowess in semiconductor tech. The thesis’s core argument is thus confirmed: semiconductors have become the defining element of modern geopolitics and global security, similar to how oil underpinned global power in the last century.

Overall, there is a visible shift toward economic nationalism. As countries choose state-led strategies to reduce reliance on foreign technology, the questions raise about the long-term effects this shift could have on supply chain resilience and geopolitical dynamics. Thus, semiconductor industry faces several risks, like labor and talent shortages, environmental risks, and geopolitical tensions with "uncertainty" being a buzz word of year 2025.

As South Korea, the Netherlands, Japan, Taiwan, China and the U.S. have been all facing similar challenges, the governments should take action and make reform to advance innovation and maintain their state's competitiveness. This includes ensuring that the policies and strategies are considering both short and long-term implications and benefits, implementing strict energy and environmental regulations, facilitating access to new and growing markets, and diversifying the fabrication base to reduce reliance on single regions.

Thus, further research could focus on developing models for evaluating and controlling emerging geopolitical risks, especially in areas, like semiconductor and AI industries. Future research could also look at the roles of late-developing economies (for example, India or Southeast Asian nations) or nuclear states, such as Russia, might have in this industry, and evaluate the long-term effectiveness of emerging partnerships, like the Chip 4 Alliance.

References

Adamson, D. W. J., and L. Creemers. n.d. "A Coalition of the Unwilling? Chinese and Russian Perspectives on Cyberspace Broeders." R. J. E. H.

Aggarwal, Vinod K., and Andrew W. Reddie. 2021. "Economic Statecraft in the 21st Century: Implications for the Future of the Global Trade Regime." World Trade Review 20 (2): 137–51. https://doi.org/10.1017/s147474562000049x.

Akayama, Shinichi, Daniel Chow, and Subrat Gupta. 2024. "Localizing the Global Semiconductor Value Chain." Adlittle.com. 2024. https://www.adlittle.com/jp-en/insights/report/localizing-global-semiconductor-value-chain.

Allen, Gregory C. 2023. "China's Pursuit of Defense Technologies: Implications for US and Multilateral Export Control and Investment Screening Regimes." https://www.csis.org/analysis/chinas-pursuit-defense-technologies-implications-us-and-multilateral-export-control-and.

Allen, Gregory C., and Isaac Goldston. 2025. "Understanding U.S. Allies' Current Legal Authority to Implement AI and Semiconductor Export Controls." Csis.org. 2025. https://www.csis.org/analysis/understanding-us-allies-current-legal-authority-implement-ai-and-semiconductor-export#:~:text=Executive%20Summary,bandwidth%20memory%2C%20among%20other%20measures.

ARC Group. 2024. "Japan's Semiconductor Resurgence: Strategic Partnerships and Domestic Production." ARC Group - Global Financial Services with Deep Roots in Asia (blog). ARC Group. September 23, 2024. https://arc-group.com/japan-semiconductor-resurgence/.

ASML. 2024. "ASML | The World's Supplier to the Semiconductor Industry." ASML. 2024. https://www.asml.com/en/company/about-asml.

Balfour, Rosa, Sinan Ülgen, Eugenia Baroncelli, Lizza Bornassi, Raluca Csernatoni, Andreas Goldthau, and Giovanni Grevi. 2024. Geopolitics and Economic Statecraft in the European Union. Carnegie Endowment for International Peace.

Bareis, Jascha, and Christian Katzenbach. 2022. "Talking AI into Being: The Narratives and Imaginaries of National AI Strategies and Their Performative Politics." Science, Technology & Human Values 47 (5): 855–81. https://doi.org/10.1177/01622439211030007.

Bateman, Jon. 2022. "U.S.-China Technological 'Decoupling': A Strategy and Policy Framework." Carnegie Endowment for International Peace. 2022. https://carnegieendowment.org/research/2022/04/us-china-technological-decoupling-a-strategy-and-policy-framework?lang=en.

Batra, Gaurav, Zach Jacobson, Siddarth Madhav, Andrea Queirolo, and Nick Santhanam. 2018. "Artificial Intelligence Is Opening the Best Opportunities for Semiconductor

Companies in Decades. How Can They Capture This Value?” Mckinsey.com. 2018. https://www.mckinsey.com/~/media/McKinsey/Industries/Semiconductors/Our%20Insights/Artificial%20intelligence%20hardware%20New%20opportunities%20for%20semiconductor%20companies/Artificial-intelligence-hardware.ashx.

———. n.d. “Artificial Intelligence Is Opening the Best Opportunities for Semiconductor Companies in Decades. How Can They Capture This Value?” Mckinsey.com. Accessed April 14, 2025. https://www.mckinsey.com/~/media/McKinsey/Industries/Semiconductors/Our%20Insights/Artificial%20intelligence%20hardware%20New%20opportunities%20for%20semiconductor%20companies/Artificial-intelligence-hardware.ashx.

Benson, Emily, Japhet Quitzon, and Alan William Reinsch. 2023. “Securing Semiconductor Supply Chains in the Indo-Pacific Economic Framework for Prosperity.” Csis.org. 2023. https://www.csis.org/analysis/securing-semiconductor-supply-chains-indo-pacific-economic-framework-prosperity.

Bhandari, Konark. n.d. “The Geopolitics of the Semiconductor Industry and India’s Place in It.” Carnegie Endowment for International Peace. Accessed October 21, 2024. https://carnegieendowment.org/research/2023/06/the-geopolitics-of-the-semiconductor-industry-and-indias-place-in-it?lang=en.

Blackwill, Robert D., and Jennifer M. Harris. 2016. War by Other Means: Geoeconomics and Statecraft.

Bolle, De, and Jeromin Zettelmeyer. 2019. “Measuring the Rise of Economic Nationalism.” Peterson Institute for International Economics Working Paper, 19–34.

Bown, Chad P. 2020. “How the United States Marched the Semiconductor Industry into Its Trade War with China.” East Asian Economic Review 24 (4): 349–88. https://doi.org/10.11644/kiep.eaer.2020.24.4.384.

———. 2022. “Four Years into the Trade War, Are the US and China Decoupling?” PIIE Realtime Economics.

Bradford, Anu. 2023. “The Battle for Technological Supremacy: The US-China Tech War.” In Digital Empires, 183–220. Oxford University PressNew York.

Broeders, Dennis, Liisi Adamson, and Rogier Creemers. 2019. “Coalition of the Unwilling? Chinese and Russian Perspectives on Cyberspace.” In Chinese and Russian Perspectives on Cyberspace, edited by D. Broeders, L. Adamson, and R. Creemers.

Broeders, Dennis, and Bibi Van Den Berg, eds. 2020. Governing Cyberspace: Behavior, Power and Diplomacy. Rowman & Littlefield.

Bush, Richard C. 2021. Difficult Choices: Taiwan’s Quest for Security and the Good Life. Brookings Institution Press.

Center for Strategic and International Studies (CSIS): Reports on U.S.-China Tech Rivalry. n.d.

Chang, Chia-Chien, and Alan H. Yang. 2020. “Weaponized Interdependence: China’s Economic Statecraft and Social Penetration against Taiwan.” Orbis 64 (2): 312–33. https://doi.org/10.1016/j.orbis.2020.02.002.

Chao, Zhou. 2025. “5-7 Nm Possibly The Long-Term Technological Ceiling For China’s Semiconductor Industry – Analysis.” Eurasiareview.com. 2025. https://www.eurasiareview.com/09012025-5-7-nm-possibly-the-long-term-technological-ceiling-for-chinas-semiconductor-industry-analysis/#:~:text=In%20terms%20of%20advanced%20processes,%2Dproduced%20high%2Dend%20chips.

Chen, Lung-Chu. 2016. The US-Taiwan-China Relationship in International Law and Policy. Oxford University Press.

Chip War: China Claims Breakthrough in Silicon Photonics That Could Clear Technical Hurdle. n.d.

Chou, K. 2023. A Discussion on Geopolitical Risk of Taiwan Semiconductor Industry.

Chow, Daniel. 2020. “Economic Nationalism: US and Chinese Style.” Ohio St. Bus. LJ 14.

Chow, Peter C. Y. 2025. “Alliance for a Resilient Global Semiconductor Industry.” In . Peter C. Y. Chow.

Chu, Ming-Chin Monique. 2024. “Taiwan’s Strategic Imperatives in Safeguarding National Security through Semiconductor Significance amid Sino-US Rivalry.” In Palgrave Studies in Global Security, 309–38. Cham: Springer Nature Switzerland.

———. 2025. “Strategic Imperatives in Safeguarding National Security Through Semiconductor Significance Amid Sino-US Rivalry Ming.” In .

Creemers, Rogier, Straton Papagianneas, and Adam Knight, eds. 2023. The Emergence of China’s Smart State. Lanham, MD: Rowman & Littlefield.

CSIS. 2024. “A Strategy for The United States to Regain Its Position in Semiconductor Manufacturing.” Csis.org. 2024. https://www.csis.org/analysis/strategy-united-states-regain-its-position-semiconductor-manufacturing#:~:text=Rebuilding%20the%20U.S.%20Semiconductor%20Industry&text=Lots%20of%20money%2C%20for%20sure,cost%20between%20%2420%2D30%20billion.

CSIS’s Asia Program. 2023. “Promoting Semiconductor ‘Friend-Shoring’: The Role of Indo-Pacific Allies and Partners in Supply Chain Resilience.” Csis.org. 2023. https://www.csis.org/programs/asia-program/promoting-semiconductor-friend-shoring-role-indo-pacific-allies-and-partners.

Denamiel, Thibault, Evan Brown, and David Korn. 2025. “Sourcing Requirements and U.S. Technological Competitiveness: Evaluating the Impact of National Security Guardrails in the CHIPS Act.” Csis.org. 2025. https://www.csis.org/analysis/sourcing-requirements-and-us-technological-competitiveness.

Diplomacy Broeders, D. W. J., and B. Berg. n.d. Governing Cyberspace: Behavior, Power, And.

Drezner, Daniel W., and Henry Farrell. 2021. The Uses and Abuses of Weaponized Interdependence. Edited by Abraham L. Newman. Brookings Institution Press.

European Commission. 2025. "Competition Policy." Competition Policy. 2025. https://competition-policy.ec.europa.eu/index_en.

European Council. 2025. "The EU Chips Industry." Europa.Eu. 2025. https://www.consilium.europa.eu/en/policies/eu-chips-industry/.

Ezell, Stephen. 2024. "How Innovative Is China in Semiconductors?" https://itif.org/publications/2024/08/19/how-innovative-is-china-in-semiconductors/.

Fallert, Nicole. 2021. "Taiwan Bans Companies from Hiring Employees in China as Tensions Rise." Newsweek. April 29, 2021. https://www.newsweek.com/taiwan-bans-companies-hiring-employees-china-tensions-rise-1587549.

Farrand, Benjamin. 2025. "The Economy-Security Nexus: Risk, Strategic Autonomy and the Regulation of the Semiconductor Supply Chain." European Journal of Risk Regulation 16 (1): 279–93.

Farrell, Henry. 2025. "The Rise and Fall of Economic Statecraft: Overreach and Incoherence Hobble America's Most Powerful Weapon." Foreign Affairs 104 (1): 168–74.

Farrell, Henry, and Abraham Newman. 2019a. "Japan and South Korea Are Being Pulled into a Low Level Economic War." Washingtonpost.com. 2019. https://www.washingtonpost.com/politics/2019/08/01/japan-has-weaponized-its-trade-relationship-with-south-korea/.

Farrell, Henry, and Abraham L. Newman. 2019b. "Weaponized Interdependence: How Global Economic Networks Shape State Coercion." International Security 44 (1): 42–79. https://doi.org/10.1162/isec_a_00351.

Ford, Christopher. 2024. "Weaponized Interdependence, U.S. Economic Statecraft, and Chinese Grand Strategy." Newparadigmsforum.com. 2024. https://www.newparadigmsforum.com/weaponized-interdependence-u-s-economic-statecraft-and-chinese-grand-strategy.

FTC. 2025. "Federal Trade Commission (FTC)." Usa.gov. 2025. https://www.usa.gov/agencies/federal-trade-commission.

Fuller, Douglas B. 2021. "China's Counter-Strategy to American Export Controls in Integrated Circuits Douglas."

Garcia, Nate. 2025. "Developments in the AI Arms Race—Does the Emergence of DeepSeek Mean That OpenAI Is in Deep Water?" Vanderbilt University. February 13, 2025. https://www.vanderbilt.edu/jetlaw/2025/02/13/developments-in-the-ai-arms-race/.

Gilli, Andrea, and Mauro Gilli. 2019. “Why China Has Not Caught up yet: Military-Technological Superiority and the Limits of Imitation, Reverse Engineering, and Cyber Espionage.” International Security 43 (3): 141–89. https://doi.org/10.1162/isec_a_00337.

Global Taiwan Institute. 2024. “Taiwan Stands on the Frontline of the Global Tech Competitiveness and Semiconductor Standoff.” Global Taiwan Institute. August 21, 2024. https://globaltaiwan.org/2024/08/taiwan-stands-frontline-global-tech-competitiveness-semiconductor-standoff/.

Global Times. 2025a. “China’s Chip Sector Remains Resilient Regardless of How US Changes Policy.” Globaltimes.Cn. 2025. https://www.globaltimes.cn/page/202504/1331348.shtml.

———. 2025b. “Chinese Tech Start-up DeepSeek Unnerves US with Low-Costs AI Model on Par with OpenAI’s O1.” Globaltimes.Cn. 2025. https://www.globaltimes.cn/page/202501/1327542.shtml.

———. 2025c. “Chinese Tech Start-up DeepSeek Unnerves US with Low-Costs AI Model on Par with OpenAI’s O1.” Globaltimes.Cn. 2025. https://www.globaltimes.cn/page/202501/1327542.shtml.

Grimes, Seamus, and Debin Du. 2022. “China’s Emerging Role in the Global Semiconductor Value Chain.” Telecommunications Policy 46 (2): 101959. https://doi.org/10.1016/j.telpol.2020.101959.

Hah, Kelvin, and Xian Bing. 2024. “SECURITY AND SUPREMACY: AN EXAMINATION OF THE US-CHINA TECHNOLOGICAL RIVALRY IN THE SEMICONDUCTOR INDUSTRY.” MJIR| Malaysian Journal of International Relations 12 (1): 140–60.

Halpert, Madeline. 2025. “Trump Threatens New Tariffs on Smartphones Days after Exempting Them.” BBC, April 13, 2025. https://www.bbc.com/news/articles/c62z54gwd22o.

Hamdani, Manal, and Ismail Belfencha. 2024. “Strategic Implications of the US-China Semiconductor Rivalry.” Discover Global Society 2 (1). https://doi.org/10.1007/s44282-024-00081-5.

Hartley, John. 2023. “Strategic Stories: Weaponized or Worldmaking?” Global Media and China 8 (1): 72–92. https://doi.org/10.1177/20594364231153200.

He, Tian, and You Ji. 2023. “China’s Techno-Economic Statecraft Amid US-China Strategic Rivalry: AI and the ‘New Whole-State System.’” Orbis 67 (4): 605–25.

Helleiner, Eric. 2021. “The Diversity of Economic Nationalism.” New Political Economy 26 (2): 229–38. https://doi.org/10.1080/13563467.2020.1841137.

Hitachi High-Tech Corporation. n.d. “4. History of Semiconductors.” Hitachi High-Tech Corporation. Accessed April 4, 2025. https://www.hitachi-hightech.com/global/en/knowledge/semiconductor/room/about/history.html.

Horowitz, Michael C. 2018. Artificial Intelligence, International Competition, and the Balance of Power.

Huda, Mirza Sadaqat. 2021. "An Ecological Response to Ethno-Nationalistic Populism: Grassroots Environmental Peacebuilding in South Asia." International Affairs 97 (1): 119–38. https://doi.org/10.1093/ia/iiaa176.

Hufbauer, Clyde Gary, and Megan Hogan. 2025. Industrial Policy through the CHIPS and Science Act: A Preliminary Report. PIIE Briefings.

IDC. 2024. "IDC: Global Semiconductor Market to Grow by 15% in 2025, Driven by AI." IDC: The Premier Global Market Intelligence Company. 2024. https://www.idc.com/getdoc.jsp?containerId=prAP52837624.

Institute for Security & Development Policy. 2018. "Made in China 2025." Isdp.Eu. 2018. https://www.isdp.eu/wp-content/uploads/2018/06/Made-in-China-Backgrounder.pdf.

IO+. 2025. "DeepSeek's Affordable AI Shocks the Global Chip Market." IO+. January 27, 2025. https://ioplus.nl/en/posts/deepseeks-affordable-ai-shocks-the-global-chip-market.

IRDS. 2023. "Semiconductors and Artificial Intelligence." Ieee.org. 2023. https://irds.ieee.org/topics/semiconductors-and-artificial-intelligence.

Jerry Yang, Taipei, and Digitimes Asia Levi Li. 2025. "China's Semiconductor Equipment Purchases to Decline in 2025, Report Finds." DIGITIMES Inc. February 13, 2025. https://www.digitimes.com/news/a20250212PD223/equipment-2025-overcapacity-growth-2024.html.

Jieh-min, Wu. 2024. "Silicon Shield 2.0: A Taiwan Perspective." The Diplomat, September 14, 2024. https://thediplomat.com/2024/09/silicon-shield-2-0-a-taiwan-perspective/.

Kamakura, Natsuki. 2022. "From Globalising to Regionalising to Reshoring Value Chains? The Case of Japan's Semiconductor Industry." Cambridge Journal of Regions Economy and Society 15 (2): 261–77. https://doi.org/10.1093/cjres/rsac010.

Kaur, Dashveenjit. 2021. "TSMC Dominance as the World's Largest Chipmaker Explained." TechWire Asia. Tech Wire Asia. February 4, 2021. https://techwireasia.com/2021/02/the-dominance-of-the-worlds-largest-chipmaker-tsmc/.

———. 2025. "Global Chip Race: China Semiconductor Sector Surpasses South Korea." TechWire Asia. Tech Wire Asia. March 12, 2025. https://techwireasia.com/2025/03/global-chip-race-china-semiconductor-sector-surpasses-south-korea/.

KBS News. 2021. "'K-Semiconductor Belt Strategy' to Establish the World's Largest Supply Network by 2030." Kbs.Co.Kr. 2021. https://world.kbs.co.kr/service/contents_view.htm?board_seq=403357.

Kennedy, Scott. 2020. "China's Uneven High-Tech Drive." In Center for Strategic and International Studies (CSIS).

Khan, Saif M., Dahlia Peterson, and Alexander Mann. 2021. "The Semiconductor Supply Chain." Center for Security and Emerging Technology 8.

Khrestin, Igor. 2024. “China Is Catching up to Us.” The Dallas Morning News, October 2, 2024. https://www.dallasnews.com/opinion/2024/10/02/china-is-catching-up-to-us/.

Kim, Mi-Jin, Heejin Lee, and Jooyoung Kwak. 2020. “The Changing Patterns of China’s International Standardization in ICT under Techno-Nationalism: A Reflection through 5G Standardization.” International Journal of Information Management 54 (102145): 102145. https://doi.org/10.1016/j.ijinfomgt.2020.102145.

Kim, Yang-Hee. 2021. “Interactions between Japan’s ‘Weaponized Interdependence’ and Korea’s Responses:‘Decoupling from Japan’ vs.“decoupling from Japanese Firms.” Politics and Development 5 (1): 19–31.

Kleinhans, Jan-Peter. 2024. “The Missing Strategy in Europe’s Chip Ambitions.” Interface-eu.org. 2024. https://www.interface-eu.org/publications/europe-semiconductor-strategy.

Klingler-Vidra, Robyn. 2019. “AI Super-Powers: China, Silicon Valley and the New World Order.” International Affairs 95 (2): 485–86. https://doi.org/10.1093/ia/iiz011.

Kratz, Agatha, and Juliana Bouchaud. n.d. “China and the Future of Global Supply Chains.” Rhg.com. Accessed April 2, 2025. https://rhg.com/research/china-and-the-future-of-global-supply-chains/.

Krige, John. 2024. “Debate: Building a US Regulatory Empire in the Chip War with China.” Technology and Culture 65 (4): 1081–1108.

Kumar, Rajiv. 2015. “Korea’s Changing Relations with the United States and China: Implications for Korea-India Economic Relations.” Journal of Asiatic Studies 58 (4): 104–33.

———. 2023. “The US-China Chip War and Prospects for South Korea-India Semiconductor Cooperation.” The Journal of Indian and Asian Studies. https://doi.org/10.1142/s2717541323400041.

Lee, Lizzi C. 2024. “China’s Big Fund 3.0: Xi’s Boldest Gamble yet for Chip Supremacy.” The Diplomat, June 6, 2024. https://thediplomat.com/2024/06/chinas-big-fund-3-0-xis-boldest-gamble-yet-for-chip-supremacy/.

Lee, Seungjoo. 2024. “US-China Technology Competition and the Emergence of Techno-Economic Statecraft in East Asia: High Technology and Economic-Security Nexus.” Journal of Chinese Political Science 29 (3): 397–416.

Lewis, James Andrew. 2019. “Learning the Superior Techniques of the Barbarians China’s Pursuit of Semiconductor Independence.” https://www.csis.org/analysis/chinas-pursuit-semiconductor-independence.

Lindsay, Jon R. 2015. “The Impact of China on Cybersecurity: Fiction and Friction.” International Security 39 (3): 7–47. https://doi.org/10.1162/isec_a_00189.

Lindsay, Jon R., and Tai Ming. n.d. China and Cybersecurity: Espionage, Strategy, and Politics in the Digital Domain. Edited by Derek S. Cheung.

Liu, John, and Simone McCarthy. 2025. “China Vows to Counter Trump’s ‘Bullying’ Tariffs as Global Trade War Escalates.” CNN, April 3, 2025. https://www.cnn.com/2025/04/02/business/china-trump-tariffs-intl-hnk/index.html.

Liu, Juliana, and Nectar Gan. 2025. “China Imposes 34% Reciprocal Tariffs on Imports of US Goods in Retaliation for Trump’s Trade War.” CNN, April 4, 2025. https://www.cnn.com/2025/04/04/business/china-us-tariffs-retaliation-hnk-intl/index.html.

LSTC. 2025. “Leading-Edge Semiconductor Technology Center.” Leading-Edge Semiconductor Technology Center. 2025. https://www.lstc.jp/english/.

Lugt, Sanne van der. 2024. “Why ASML Is the EU’s Most Important Bargaining Chip.” Unibocconi.Eu. 2024. https://iep.unibocconi.eu/why-asml-eus-most-important-bargaining-chip.

Lugt, van der Sanne. 2024. “Why ASML Is the EU’s Most Important Bargaining Chip.” Unibocconi.Eu. 2024. https://iep.unibocconi.eu/why-asml-eus-most-important-bargaining-chip.

Łukasiak, Lidia, and Andrzej Jakubowski. 2010. “History of Semiconductors.” Journal of Telecommunications and Information Technology, no. 1: 3–9. https://doi.org/10.26636/jtit.2010.1.1015.

Luo, Yadong, and Ari Van Assche. 2023. “The Rise of Techno-Geopolitical Uncertainty: Implications of the United States CHIPS and Science Act.” Journal of International Business Studies, 1–18. https://doi.org/10.1057/s41267-023-00620-3.

Magill, Kate. 2024. “Taiwan Earthquake’s Impact on Chip Industry Likely to Be ‘Moderate,’ Experts Say.” Supply Chain Dive. April 5, 2024. https://www.supplychaindive.com/news/taiwan-earthquake-impact-semiconductor-supply-chain-tsmc-micron/712388/.

Mahbubani, Kishore. 2020. Has China Won?: The Chinese Challenge to American Primacy. Hachette UK.

Majerowicz, Esther, and Carlos Aguiar de Medeiros. 2018. “Chinese Industrial Policy in the Geopolitics of the Information Age: The Case of Semiconductors.” Revista de Economia Contemporânea 22 (1). https://doi.org/10.1590/198055272216.

Mangan, Dan, Kevin Breuninger, Christina Wilkie, Megan Cassella, Jesse Pound, and Ruxandra Iordache. 2025. “Trump Tariffs on China Now Total 145%, White House Clarifies: Live Updates.” CNBC. April 10, 2025. https://www.cnbc.com/2025/04/10/china-trump-tariffs-live-updates.html.

Mark, Jeremy, and Dexter Tiff Roberts. 2022. “United States-China Semiconductor Standoff: A Supply Chain Under Stress.” Atlantic Council Issue Brief.

Mastanduno, Michael. 1999. “Economic Statecraft, Interdependence, and National Security: Agendas for Research.” Security Studies 9 (1–2): 288–316. https://doi.org/10.1080/09636419908429402.

Maurer, Tim. 2018. Cyber Mercenaries: The State, Hackers, and Power. Cambridge, England: Cambridge University Press.

Microchip, U. S. A. 2025. “The Intersection of AI and Semiconductors.” Microchip USA - TRANSPARENCY INNOVATION EFFICIENCY. 2025. https://www.microchipusa.com/industry-news/semiconductor-industry/the-intersection-of-ai-and-semiconductors-advancements-implications-and-future-opportunities.

Miki, S., and Y. Tamanyu. 2024. “On the Restructuring of Global Semiconductor Supply Chains.” In Bank of Japan Working Paper Series.

Miller, Chris. 2022. Chip War: The Fight for the World’s Most Critical Technology. Simon and Schuster.

Ministry of Foreign Affairs. 2025. “Foreign Ministry Spokesperson Lin Jian’s Regular Press Conference on April 7, 2025.” Gov.Cn. April 7, 2025. https://www.fmprc.gov.cn/mfa_eng/xw/fyrbt/202504/t20250407_11589637.html.

Monitor, Icef. 2023. “South Korea Aims to Attract 300,000 International Students by 2027.” ICEF Monitor - Market Intelligence for International Student Recruitment. ICEF. August 23, 2023. https://monitor.icef.com/2023/08/south-korea-aims-to-attract-300000-international-students-by-2027/.

Morris, P. R., ed. 1990. A History of the World Semiconductor Industry.

Newman, A. L., and H. Farrell. 2020. “Weaponized Interdependence in the Global Economy.” International Studies Review 22 (4): 786–94.

Ochonogor, Kenechukwu, G. Solomon Nwuka, Cyril O. Osho, and Oluwagbemiga Anoka. 2023. “The COVID-19 Pandemic and Supply Chain Disruption: An Analysis of the Semiconductor Industry’s Resilience.” Int. J. Tech. Sci. Res. Eng 6 (1): 7–18.

Ong, Kenneth. n.d. “China’s Defiant Chip Strategy.” Fpri.org. Accessed October 21, 2024. https://www.fpri.org/article/2024/06/chinas-defiant-chip-strategy/#:~:text=The%20PRC's%20pursuit%20of%20semiconductor,tensions%20in%20the%20Taiwan%20Strait.

Pan, Che. 2024. “Chip War: China Is 5 Years behind Global Leading-Edge Production, Report Says.” South China Morning Post. August 20, 2024. https://www.scmp.com/tech/tech-war/article/3275187/chip-war-china-five-years-behind-global-leading-edge-production-report-says.

Park, Seohee. 2023. “Semiconductors at the Intersection of Geoeconomics, Technonationalism, and Global Value Chains.” Social Sciences (Basel, Switzerland) 12 (8): 466. https://doi.org/10.3390/socsci12080466.

Pattheeuws, Steven, Joost Eyck, Francisco Aguiar, Thomas Boot, and Pieter van Hoeve. 2024. “Semicon in NL.” https://www.pwc.nl/nl/actueel-publicaties/assets/pdfs/pwc-semicon-in-nl.pdf.

Peters, Michael A. 2022. “Semiconductors, Geopolitics and Technological Rivalry: The US CHIPS & Science Act, 2022.” Educational Philosophy and Theory, 1–5. https://doi.org/10.1080/00131857.2022.2124914.

Peterson, Zachariah. 2022. “An Overview of the Chip 4 Alliance and Its Rami- Fications.” Globalspec.com. 2022. https://electronics360.globalspec.com/article/.

PWC. 2024. “State of the Semiconductor Industry.” Pwc.com. 2024. https://www.pwc.com/gx/en/industries/technology/state-of-the-semiconductor-industry-report.pdf.

Reitetschläger, Julian. 2024. Weaponized Interdependence in Global Semiconductor Governance: A Constructivist Study on the Governance Architectures of China, the European Union and the United States.

Ren, Yawen, Yu Yang, Yun Wang, and Yi Liu. 2023. “Dynamics of the Global Semiconductor Trade and Its Dependencies.” Journal of Geographical Sciences 33 (6): 1141–60. https://doi.org/10.1007/s11442-023-2123-9.

Reuters. 2024. “China Sets up Third Fund with $47.5 Bln to Boost Semiconductor Sector,” May 27, 2024. https://www.reuters.com/technology/china-sets-up-475-bln-state-fund-boost-semiconductor-industry-2024-05-27/.

Ryu, Yongwook. 2025. “Chips on the Deck: US-China Rivalry and Reorganizing the Supply Chains of Semiconductors.” In The South China Sea: The Geo-Political Epicenter of the Indo-Pacific?, 93–101. Singapore: Springer Nature Singapore.

Sacks, David. 2023. “Will China’s Reliance on Taiwanese Chips Prevent a War?” Council on Foreign Relations. July 6, 2023. https://www.cfr.org/blog/will-chinas-reliance-taiwanese-chips-prevent-war.

Schmitt, Lewin. 2022. “Mapping Global AI Governance: A Nascent Regime in a Fragmented Landscape.” AI and Ethics 2 (2): 303–14. https://doi.org/10.1007/s43681-021-00083-y.

Schumacher, Andreas. 2024. “China’s Mature Semiconductor Overcapacity: Does It Exist and Does It Matter?” Csis.org. 2024. https://www.csis.org/analysis/chinas-mature-semiconductor-overcapacity-does-it-exist-and-does-it-matter.

Segal, Adam. 2016. “The Hacked World Order: How Nations Fight, Trade, Maneuver, and Manipulate in the Digital Age.” Hachette UK.

Sekitani, Tsuyoshi, and Xiaodong Chen. 2024. “Revitalization of Japanese Industry Using Nanotechnology.” ACS Nano 18 (13): 9243–44. https://doi.org/10.1021/acsnano.4c03035.

“Semiconductor Industry Future: Size, Jobs, and Monopoly Insights.” 2023. Pragna Solutions. Pragna Technologies. July 31, 2023. https://pragna.net/semiconductor-industry-how-big-it-is-future-jobs-creation-and-monopoly/.

Semiconductor Supply Chains, AI and Economic Statecraft A Framework for UK-Korea Strategic Cooperation Ardi Janjeva, Seungjoo Lee, Harish Bhaskaran, Seoin Baek and Hyunjin Lee. n.d.

Seok-min, Oh. 2023. "S. Korea Seeks to Cut Key Minerals Dependence on China to 50 Pct by 2030." Yonhap News Agency. February 27, 2023. https://en.yna.co.kr/view/AEN20230227003351320.

Shamaei, Ali. 2024. "Role of Semiconductors in AI, Analytics and Edge Computing." Medium. February 15, 2024. https://ashamaei.medium.com/role-of-semiconductors-in-ai-analytics-and-edge-computing-f1b81282abfe.

Shen, Xinmei. 2024. "Chip War: China Claims Breakthrough in Silicon Photonics That Could Clear Technical Hurdle." South China Morning Post. October 6, 2024. https://www.scmp.com/tech/tech-war/article/3281156/chip-war-china-claims-breakthrough-silicon-photonics-could-clear-technical-hurdle.

Shepardson, David. 2014. "US Finalizes $6.6 Billion Chips Award for TSMC Ahead of Trump Return." Reuters. 2014. https://www.reuters.com/technology/us-finalizes-66-billion-chips-award-tsmc-ahead-trump-return-2024-11-15/.

Shih, Willy. 2020. "Is It Time to Rethink Globalized Supply Chains?" MIT Sloan Management Review 61 (4): 1–3.

Shilov, Anton. 2024. "ASML Dethrones Applied Materials, Becomes World's Largest Fab Tool Maker: Analyst." Tom's Hardware. February 16, 2024. https://www.tomshardware.com/tech-industry/manufacturing/asml-dethrones-applied-materials-becomes-worlds-largest-fab-tool-maker-analyst.

Shivakumar, Sujai, and Charles Wessner. 2022. "Semiconductors and National Defense: What Are the Stakes?" Csis.org. 2022. https://www.csis.org/analysis/semiconductors-and-national-defense-what-are-stakes.

Shivakumar, Sujai, Charles Wessner, and Thomas Howell. 2023. "The Role of Industrial Clusters in Reshoring Semiconductor Manufacturing." Csis.org. 2023. https://www.csis.org/analysis/role-industrial-clusters-reshoring-semiconductor-manufacturing.

SIA. 2024. "2024 State of the U.S. Semiconductor Industry." Semiconductor Industry Association. September 11, 2024. https://www.semiconductors.org/2024-state-of-the-u-s-semiconductor-industry/.

SIA/BCG Report. 2021. "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era." Semiconductor Industry Association. April 1, 2021. https://www.semiconductors.org/strengthening-the-global-semiconductor-supply-chain-in-an-uncertain-era/.

Silva, João da, Natalie Sherman, and Imran Rahman-Jones. 2025. "Stargate: Tech Giants Announce AI Plan Worth up to $500bn." BBC, January 22, 2025. https://www.bbc.com/news/articles/cy4m84d2xz2o.

Siripurapu, Anshu, and Noah Berman. 2024. "The Contentious U.S.-China Trade Relationship." Council on Foreign Relations. May 14, 2024. https://www.cfr.org/backgrounder/contentious-us-china-trade-relationship.

Sohn, Yul, and Hyo-Young Lee. 2023. "South Korea's Economic Statecraft: Between Interdependence and National Security." In Strategic Asia: Reshaping Economic Interdependence in the Indo-Pacific, edited by Ashley J. Tellis, Alison Szalwinski, and Michael Wills.

State Department. 2025. "Military-Civil Fusion and the People's Republic of China." State.gov. 2025. https://www.state.gov/wp-content/uploads/2020/05/What-is-MCF-One-Pager.pdf.

Stone, Mark. 2024. "An Overview of Military Semiconductor Applications." City Labs. January 11, 2024. https://citylabs.net/military-semiconductor-applications/.

Sujai, and Charles Wessner. 2022. Semiconductors and National Defense.

Sukumar, Arun, Dennis Broeders, and Monica Kello. 2024. "The Pervasive Informality of the International Cybersecurity Regime: Geopolitics, Non-State Actors and Diplomacy." Contemporary Security Policy 45 (1): 7–44. https://doi.org/10.1080/13523260.2023.2296739.

Swayne, Matt. 2025. "China Launches $138 Billion Government-Backed Venture Fund, Includes Quantum Startups." The Quantum Insider. March 7, 2025. https://thequantuminsider.com/2025/03/07/china-launches-138-billion-government-backed-venture-fund-includes-quantum-startups/.

Synopsys. 2025. "What Is an AI Accelerator?" Synopsys.com. 2025. https://www.synopsys.com/glossary/what-is-an-ai-accelerator.html.

TDi. 2025. "Trade Laws and Restrictions." Tdi-sustainability.com. 2025. https://www.tdi-sustainability.com/trade-laws-and-restrictions-timeline-and-implications/.

Thadani, Akhil, and Gregory C. Allen. 2023. "Mapping the Semiconductor Supply Chain." Center for Strategic and International Studies.

"The Digital Silk Road: Expanding China's Digital Footprint PREPARED BY EURASIA GROUP 8 APRIL." 2020. Digital Footprint PREPARED BY EURASIA GROUP 8.

The Economist. 2024a. "The Semiconductor Choke-Point." Economist (London, England: 1843), June 13, 2024. https://www.economist.com/asia/2024/06/13/the-semiconductor-choke-point.

———. 2024b. "TSMC Walks a Geopolitical Tightrope." Economist (London, England: 1843), November 14, 2024. https://www.economist.com/business/2024/11/14/tsmc-walks-a-geopolitical-tightrope.

Tomoshige, Hideki. 2023. "Japan's Semiconductor Industry and Supply Chain Strategy." In East Asia Forum Quarterly 15 (3): 11–12.

TrendForce. 2025. "China's Nexchip Reportedly to Overtake Taiwan's VIS and PSMC in 2025 amid Mature Process Expansion." China's Nexchip Reportedly to Overtake Taiwan's VIS and PSMC in 2025 Amid Mature Process Expansion | TrendForce News. 2025.

https://www.trendforce.com/news/2025/03/24/news-chinese-foundry-nexchip-reportedly-to-overtake-taiwans-vis-and-psmc-in-2025-amid-mature-process-expansion/.

TSMC. 2024. “TSMC Celebrates the Opening of JASM in Kumamoto, Japan.” Tsmc.com. 2024. https://pr.tsmc.com/english/news/3113.

Upton, Brian. 2025. “New Taiwan Law Blocks TSMC From Giving Advanced Chip Tech To U.S.” 9meters.com. 2025. https://9meters.com/technology/new-taiwan-law-blocks-tsmc-from-giving-advanced-chip-tech-to-u-s.

Varadarajan, Raj, Chris Richard Iacob Koch-Weser, Joseph Fitzgerald, Jaskaran Singh, Mary Thornton, Robert Casanova, and David Isaacs. 2024. “Emerging Resilience in the Semiconductor Supply Chain.” Boston Consulting Group and Semiconductor Industry Association.

Varas, Antonio, and Raj Varadarajan. 2020. “How Restrictions to Trade with China Could End US Leadership in Semiconductors.” BCG Report 9.

Veere, Anoma P. van der. 2024. The Netherlands and South Korea: From Semiconductors to Universities.

Verwey, J. 2019. “Chinese Semiconductor Industrial Policy: Past and Present.” Journal of International Commerce and Economics.

Wang, Jiann-Chyuan. 2023. “The U.s.-China Technology War and Taiwan’s Semiconductor Role in Geopolitics.” HCSS. The Hague center for Strategic Studies. November 20, 2023. https://hcss.nl/report/the-u-s-china-technology-war-and-taiwans-semiconductor-role-in-geopolitics/.

Wei, David D., and Jeff H. Y. Wu. 2024. “Semiconductor Supply Chain Resilience and Disruption: Insights, Mitigation, and Future Directions.” International Journal of Production Research, 1–24.

Wright, Gavin, and Andrew Zola. 2025. “What Is a Semiconductor and What Is It Used For?” WhatIs. TechTarget. March 27, 2025. https://www.techtarget.com/whatis/definition/semiconductor.

Wu, Jasmine, and Deirdre Bosa. 2025. “How China’s New AI Model DeepSeek Is Threatening U.S. Dominance.” CNBC. January 24, 2025. https://www.cnbc.com/2025/01/24/how-chinas-new-ai-model-deepseek-is-threatening-us-dominance.html.

Wu, Vyra. 2024. “China’s Chip Equipment Market Faces Triple Threats: Oversupply, Sanctions, and Structural Shifts.” DIGITIMES Inc. December 20, 2024. https://www.digitimes.com/news/a20241218PD212/equipment-oversupply-2025-wafer-market.html.

Yang, Jay, and Duck Soon Chang. 2022. “Korea enacts special act to protect and foster national high-tech strategic industry.” Kimchang.com. 2022. https://www.kimchang.com/en/insights/detail.kc?sch_section=4&idx=24744.

Yang, Zi. 2021. “China’s Military-Civil Fusion Strategy: Development, Procurement, and Secrecy (Introduction).” Jstor.org. 2021. https://www.jstor.org/stable/27023951.

Yoon-seung, Kang. 2024. “S. Korea Unveils Plan to Build ‘semiconductor Mega Cluster’ by 2047.” Yonhap News Agency. January 15, 2024. https://en.yna.co.kr/view/AEN20240115001800320.

Zafar, Ramish. 2025. “China’s Huawei Can Make ~750,000 Advanced AI Chips despite US Sanctions, Says Report.” Wccftech. March 8, 2025. https://wccftech.com/chinas-huawei-can-make-750000-advanced-ai-chips-despite-us-sanctions-says-report/.

Zenglein, Max J., and Claudia Holzmann. n.d. China’s Pursuit of Semiconductor Independence: Implications for Global Security.

Zhang, Jianhong, and Xinming He. 2014. “Economic Nationalism and Foreign Acquisition Completion: The Case of China.” International Business Review (Oxford, England) 23 (1): 212–27. https://doi.org/10.1016/j.ibusrev.2013.04.002.

Zhang, Marina. 2025. “From Dependence to Decoupling: China’s Semiconductor Self-Sufficiency amid Geopolitical Pressures.” In .

Zuo, Mandy. 2024. “How China’s ‘Dual Circulation’ Drive Is Shaping up – and What’s next on the Agenda.” South China Morning Post. June 26, 2024. https://www.scmp.com/economy/china-economy/article/3267963/how-chinas-dual-circulation-drive-shaping-and-whats-next-agenda?module=perpetual_scroll_0&pgtype=article.

Zysman, J., and A. L. Newman. 2006. How Revolutionary Was the Digital Revolution. Stanford University Press.