Choking the Silicon Dragon: The Geopolitical Effects of U.S. Restrictions on China's Chip Industry

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Introduction

In December 2024, the United States unveiled its most confining semiconductor export restrictions in the last three years. These target 140 Chinese companies as part of a strategy to be the economic and technological leader in the market.[1] The main goal is to lower Beijing's technological aspirations and get control over the semiconductor industry. The US restricted access to areas such as AI, high-performance computing, and critical techs, which are crucial in China's progress.

This article examines the implications of these restrictions and why the US implemented them in the first place. The text presents their geopolitical, economic, and strategic consequences while assessing their threat to worsen U.S.-China relations.

The Mechanics of the Restrictions

According to the U.S. Department of Commerce, the recent implementation of import controls was mainly for tech equipment, and tools for etching, deposition, and lithography.[2] The issue is that those restrictions do not only affect Chinese companies but also American and other global firms. For instance, companies such as Lam Research, Applied Materials, and ASM International.[3] The restrictions are also against advanced chips and high-bandwidth memory (HBM), which are essential for AI development. Due to this, companies like Samsung and SK Hynix will suffer as well, and as a result, so will the global economy.
These controls are part of the U.S. "small yard, high fence" approach.[4] It's a strategy that restricts critical technologies (small yard) with strict rules (high fence) to protect security with risking global economic spillovers. The focus is on critical chokepoints in the global semiconductor supply chain where American firms dominate (lithography and AI chips). The main goal is to prevent China from using civilian technologies and prevent the implementation of those technologies in its military capabilities, which is under China's "Military-Civil Fusion" strategy.
The restrictions have caused immediate problems in China's semiconductor industry. But there are still loopholes and potential workarounds for China.

The Economic Fallout for China and the Global Supply Chain

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[1] "US targets China's chip industry with new restrictions." 2024. Reuters. https://www.reuters.com/technology/us-targets-chinas-chip-industry-with-new-restrictions-2024-12-02/
[2] Breaking the Circuit: US-China Semiconductor Controls. 2024. Foreign Policy Research Institute. https://www.fpri.org/article/2024/09/breaking-the-circuit-us-china-semiconductor-controls/
[3] Jung, Hyok, Jonghyuk Oh, and Hyuk Hu Kwon. 2024. "Investigating the Effect of the U.S. Semiconductor Export Controls on China." Korea Institute for International Economic Policy (KIEP). https://kiep.go.kr
[4] Breaking the Circuit: US-China Semiconductor Controls. 2024. Foreign Policy Research Institute. https://www.fpri.org/article/2024/09/breaking-the-circuit-us-china-semiconductor-controls/

Chinese companies like Wingtech Technology and Naura Technology Group are going to suffer now because chips and manufacturing equipment will be limited. Since the first U.S. restrictions in 2022, China's imports of semiconductor manufacturing equipment have decreased by more than 32.5%.[5] Additionally, regions in China such as the Guangdong Province, Shanghai Municipality, and Jiangsu Province have seen a big drop in the amount of equipment they can import, with imports falling by 43.7%.[6] Automotive and electronics have high delays, and prices are increasing because of fewer cheap availability.[7] As a result, big suppliers from South Korea, Taiwan, and Japan are reevaluating their operations to comply with US controls. These challenges are also present in Europe. It faces increasing manufacturing costs and supply chain delays. The firms that specialize in the automotive and electronics sectors have higher costs and delays in the supply chain as well. The consequent volatility shows the dangers of any changes in supply chains.

Implications for U.S.-China Relations

The primary reason for the existence of these restrictions, as mentioned previously, is to prevent China from accumulating civilian and military might. Beijing responded by accelerating local semiconductor knowledge investments supported by state-owned companies and municipal governments.[8] These investments led to higher-node legacy chips being created, starting research on new lithography technologies, and applying open-source architectures like RISC-V. All of this results in Chinese companies becoming more independent and less reliant on imports.

China's responses also affected the trade sector when they restricted licenses in July 2023 for elements such as gallium, germanium, and other rare earth metals. China is also preventing American companies such as Micron, which makes computer memory and data storage, from selling their goods in their country. This is a clear signal that indicates a strong willingness to change toward technological self-sufficiency and decreasing their reliance on Western imports.

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[5] Jung, Hyok, Jonghyuk Oh, and Hyuk Hu Kwon. 2024. "Investigating the Effect of the U.S. Semiconductor Export Controls on China." Korea Institute for International Economic Policy (KIEP). https://kiep.go.kr

[6] Jung, Hyok, Jonghyuk Oh, and Hyuk Hu Kwon. 2024. "Investigating the Effect of the U.S. Semiconductor Export Controls on China." Korea Institute for International Economic Policy (KIEP). https://kiep.go.kr

[7] Gupta, Kirti, Chris Borges, and Andrea Leonard Palazzi. 2024. Collateral Damage: The Domestic Impact of U.S. Semiconductor Export Controls. CSIS. https://www.csis.org/analysis/collateral-damage-domestic-impact-us-semiconductor-export-controls

[8] Shivakumar, Sujai, Charles Wessner, and Thomas Howell. 2024. Balancing the Ledger: Export Controls on U.S. Chip Technology to China. CSIS. https://www.csis.org/analysis/balancing-ledger-export-controls-us-chip-technology-china.

Another side effect of the U.S.'s controls is that the export restrictions have led Beijing to view the U.S. as an unreliable economic partner. On greater global issues such as public health and climate change, this could lead to a reduction of collaboration between the two countries. For U.S. allies, juggling economic links to China versus alignment with American strategic objectives is also a difficult task. Countries like Japan and the Netherlands have imposed similar limits on semiconductor equipment, but they might suffer economic consequences as a result. One could say that the pressure on governments is quite high, and they have to carefully weigh every decision they make.[9] Additionally, western nations might begin to prioritize trade with China over the US. Ultimately, such policies polarize the worldwide economic and technological ecosystems even more.

Additionally, China depends on Russia to help lessen U.S. semiconductor export restrictions. The Russian invasion of Ukraine causes similar technological penalties for Moscow. Therefore, collaboration in R&D and resource sharing could potentially improve China's industrial strengths.[10] In that way, this cooperation would help both countries to establish semiconductor manufacturing ecosystems without American involvement.

On top of everything else, China leverages its leadership position in BRICS to encourage technological cooperation. The BRICS governments give cooperation, finance, and research top priority to lessen reliance on Western countries' tech supply chains.[11] Geopolitical issues have historically caused China and India to have minimal cooperation, yet worries about over-reliance on Western technologies could spur cooperation in open-source software systems like RISC-V. Despite their less developed chipmaking capabilities, Brazil and South Africa have the potential to test outdated semiconductor technologies and aid in their market introduction.

Policy Solutions and Recommendations

The US should reinforce its cooperation with countries like Japan, South Korea, and the Netherlands to reduce economic damage and prevent allies from changing sides in trade. These countries are

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[9] Jung, Hyok, Jonghyuk Oh, and Hyuk Hu Kwon. 2024. "Investigating the Effect of the U.S. Semiconductor Export Controls on China." Korea Institute for International Economic Policy (KIEP). https://kiep.go.kr

[10] Allen, Gregory C. 2024. The True Impact of Allied Export Controls on the U.S. and Chinese Semiconductor Manufacturing Equipment Industries. Wadhwani AI Center. https://americanaffairsjournal.org/2024/02/a-new-era-for-the-chinese-semiconductor-industry-beijing-responds-to-export-controls/.

[11] Allen, Gregory C. 2024. The True Impact of Allied Export Controls on the U.S. and Chinese Semiconductor Manufacturing Equipment Industries. Wadhwani AI Center. https://americanaffairsjournal.org/2024/02/a-new-era-for-the-chinese-semiconductor-industry-beijing-responds-to-export-controls/.

very important for semiconductor manufacturing and can aid the U.S. in maintaining control with coordinated export restrictions, technology sharing, and increased cooperation in joint R&D projects. In that way, innovation would be increased and reliance on China for critical technologies would be decreased. It would ensure collective resilience in the semiconductor sector.

Additionally, the US should increase its investments in incentives and packaging capabilities to boost U.S. manufacturing of sophisticated semiconductors. So increasing the financing for programs like the CHIPS Act would grow manufacturing in microchips. The development of public-private partnerships would help to boost modern manufacturing plants and speed up innovation. By doing so, the US can keep up its competitiveness to improve the home labor force and the supply chain for important technology.

Furthermore, the US should reduce reliance on specific regions—especially China—by diversifying semiconductor supply chains through creating worldwide partnerships. Creating such partnerships would help to create strategic stocks of important minerals and components. This would offset interruptions, therefore stabilizing sectors like electronics and automobiles, which are dependent on semiconductors.

Despite its competitive ability, the U.S. should consider diplomatic communication with China to reduce tensions and reduce the possible outcome of response actions. A major first step would be lowering the controls; however, it is unlikely to happen because the United States prioritises China's underdevelopment and strives to be technologically ahead of it. There is a possibility for small cooperation in non-sensitive sectors, such as environmental technologies or basic research, which would build trust and allow for closer bilateral relations.

At last, the United States has to monitor and counteract possible illegal responses. China might have illegitimate technology transfers or deepen ties to US competitors. So America should set global standards for safe semiconductor use and ethical artificial intelligence.

Conclusion

China's technical objectives have been limited by U.S. semiconductor limitations, which also disrupt world supply chains and worsen international trade relations. These controls negatively affect everyone, no matter if they are American, Chinese, or any other part of the world. As a response, China is increasing its own semiconductor capacity and established alliances with nations like Russia and BRICS allies to reduce its dependency on Western technologies. Although these limitations are supposed to protect U.S. national security, they create the danger of dividing global technological advances and economic

systems. The U.S. has to find a balance between keeping restrictions and encouraging cooperation with its allies.

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