Strategic Synergy: Advancing U.S.-Japan Semiconductor Industries through Collaborative Economic Statecraft

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ABSTRACT

This paper examines how the United States and Japan use export controls to counter China's growing influence and how their approaches have reshaped their domestic semiconductor industries. China's rapid technological advancements and growing influence in the global semiconductor industry have become a significant concern for both the United States and Japan, prompting a need for coordinated strategies that counterbalance this rise. However, the United States' unilateral approach to export controls, intended to limit China's access to advanced technologies, has had unintended consequences. These measures have impacted the semiconductor industries of U.S. allies, including Japan, and have strained relations by imposing economic burdens and disrupting established supply chains. The recent change in approach has weakened collective trust in American leadership and weakened crucial alliances, ultimately undermining the collective effort needed to effectively address the challenge posed by China.

POLICY RECCOMMENDATIONS

- U.S. policymakers should prioritize gathering comprehensive data on the long-term impact of U.S. export controls both domestically and globally to assess their effectiveness.
- U.S. policymakers should re-evaluate the need for decoupling from China and reconsider the pressure placed on allies to do the same, ensuring that strategic decisions align with the economic realities and security concerns of allied nations while maintaining global competitiveness.
- U.S. policymakers should recognize Japan's potential to become the new hub for semiconductor production in East Asia, similar to Taiwan, and work collaboratively to strengthen this role by fostering trust, investing more in Japan's semiconductor industry, and pursuing policies that support Japan's economic and security interests.

Growing global demand for semiconductors and the need to secure supply chains against geopolitical risks, especially in the Indo-Pacific region, is reshaping the U.S.-Japan semiconductor relationship. Historically, both nations have been leaders in the industry, with Japan pioneering manufacturing technologies and the United States driving innovation and design. In recent years, this partnership has strengthened in ways due to mutual concerns about the growing dominance of Chinese semiconductor capabilities and the strategic importance of semiconductors for national security and economic stability. The partnership has also faced doubt and reduced trust from Japan's side due to the U.S.'s global conduct and its handling of conflicts around the globe.[53]

The United States aims to be a leader in the global semiconductor industry but faces incredible challenges in achieving that objective due to vulnerable supply chains, defensive trade policies that have unintended consequences, and lack of feasibility of achieving complete self-sufficiency due to high costs and complexity. Instead, focusing on supply chain resilience and strategic joint initiatives with countries like Japan that have similar ambitions, concerns, and is a longstanding U.S. ally in the region, can help propel the U.S. semiconductor industry.

One of the main factors that work against the U.S.'s attempts to lead the global semiconductor market is its recent approach to export controls. The race for technological hegemony is mainly between the U.S. and China and nearby countries are pulled into this new age Cold War and has caused a sense of alienation among Indo-Pacific allies. As semiconductors become increasingly tied to national security and economic security, the United States would benefit from friend shoring, using established relations with key allies to address China's rapid technological developments. Although Japan faces its own set of challenges, the two countries are poised to act as a dam, using bilateral export controls to protect free trade and a rules-based order in the region.

Another factor that works against U.S. interests in the Indo-Pacific is the lack of consideration for the economic ties countries are forced to have with China due to their geographical proximity.[55] This is one of the biggest challenges Japan faces. Although both the United States and Japan are economically tied with China, Japan has much more to risk by agitating them, especially with export controls. China is

Japan's largest trading partner, accounting for a significant portion of its imports and exports. This close economic relationship leaves Japan exceptionally vulnerable to any disruptions or retaliatory measures from China. So, while the United States is invaluable ally of Japan, Japan cannot easily be onboard with the Cold War between the United States and China.

The paper will begin with a background on the history of U.S.-Japan relations regarding semiconductors and analyze the political situation in the United States leading up to the 2022 export controls. Next, it will analyze U.S. export controls and Japan's export controls and give a case study on semiconductor policies from both countries. Then, it will analyze the efficiency of these controls and analyze any available data as well as the extent of U.S./Japan collaboration. It will then analyze challenges faced by Japanese firms due to U.S. export controls and how the U.S. and Japan are working with TSMC. It will conclude with an analysis on how Japan is handling the U.S./China trade war, the implication that has for U.S./Japan relations, and discussing its policy implications for U.S. policymakers.

This research project aims to answer: 1) What strategies can the United States and Japan implement through their semiconductor policies and economic statecraft to deepen their strategic partnership and fortify their semiconductor supply chain to ensure technological dominance in the Indo-Pacific, while adeptly countering China's expanding influence in the region? 2) How do U.S. export controls impact both the U.S. and Japan's semiconductor industries and hinder their progress? 3) What are the areas of alignment and divergence between the U.S. and Japan regarding trade policies, economic priorities, and technological standards?

Background of U.S.-Japan Semiconductor Partnership

The Japanese semiconductor industry emerged as a competitive producer in the late 1970s and achieved most of its success in DRAMs. By the 1980s, the U.S. market share of semiconductor production went down from 70% in 1978 to 20% in 1986 while the Japanese share increased from around 30% to roughly 75% 20. Japan proved to be a formidable foreign rival and triggered U.S. firms to action. The Semiconductor Industry Association (SIA) had two complaints, (1) that Japanese firms were dumping into U.S. markets and (2) that market barriers existed in Japan, restricting foreign access. The petitions and complaints of the SIA coincided with a political situation that worked in their favor 20. The Reagan administration was facing pressure domestically to open foreign markets and address perceived trade imbalances with Japan specifically. Setting up a trade agreement was politically advantageous for the Reagan administration, allowing them to address trade concerns while upkeeping the president's image of adhering to free-market principles.[29]

Additionally, Japan was facing growing international scrutiny and potential economic sanctions due to the U.S. accusing them of dumping semiconductors in third-world markets, posing a threat to local industries and driving U.S. competitors out of business.[52] Combined with the threat of the U.S. cutting off Japan's access to their market, Japan agreed to negotiate and eventually sign a trade agreement in 1986 Semiconductor Trade Agreement. The agreement had three main provisions: antidumping both in U.S. markets and third markets, raising foreign market access to 20%, and maintaining a fair market value by increasing the price of domestic semiconductor products.[20]

Japan's Ministry of International Trade and Industry (MITI) then took on a new approach to its semiconductor industry. They began pursuing the idea of imposing a voluntary export restraint (VER), which is a self-imposed restriction that limits the number of goods exported to raise prices.[20] Although MITI had no statutory authority to force Japanese firms to comply, they still instructed them to reduce exports while simultaneously instructing them to purchase more foreign semiconductors, essentially stockpiling them.

Japanese firms did not immediately comply with the terms of the trade agreement as Japan did not directly control the industry, an aspect overlooked during negotiations. MITI, struggling to enforce the trade agreement, was perceived as fickle and this prompted both the SIA and the Reagan administration to action in fear of having a failed trade agreement. In April 1987, President Reagan imposed 100% tariffs on $300 million worth of Japanese imports, citing that Japan allegedly violated their agreement to keep domestic semiconductor product prices high to prevent the practice of dumping.[29]

The anti-dumping provisions in the 1986 agreement turned out to be partly illegal under the World Trade Organization's 1947 General Agreement on Tariffs and Trade (GATT).[19] This forced the United States to remove this provision during the renegotiation of the agreement in 1991. The third-market provision was also removed after the European Economic Community (EEC) filed a complaint and it was ruled by the World Trade Organization (WTO) that it violated Article 11 of the GATT.[1] The U.S. and Japan re-entered the trade agreement in 1991, aiming to achieve the 20% foreign access to Japan's market and the United States achieved its target market share when the agreement

TABLE 1. Timeline of U.S.-Japan Semiconductor Relations from the 1980s to the Present

Year	Event	Details
1970s	Emergence of Japan's Semiconductor Industry	Japan's semiconductor industry rapidly grows, challenging U.S. dominance in global markets.
1980s	U.S.-Japan Semiconductor Trade Disputes Begin	Rising competition from Japan leads to trade tensions. U.S. firms accuse Japan of "dumping" semiconductors in U.S. markets while restricting access to Japan's markets.
1986	U.S.-Japan Semiconductor Agreement	A trade agreement is signed to address concerns about Japanese market access to ensure fair competition.
1991	Renewal of the 1986 Agreement	Agreement is renewed, focusing on increasing foreign market share in Japan.
1996	Conclusion of the 1986 Agreement	Agreement officially ends, with Japan agreeing to maintain open and competitive markets.
2000s	Collaboration on Advanced Technologies	The U.S. and Japan strengthen ties in semiconductor R&D, collaborating on new technologies.
2010s	China's Rise in Semiconductors	China's growing investment in its semiconductor industry leads to increased compeition and global tensions.
2018	U.S.-China Trade War begins	The U.S. imposes tariffs on Chinese goods, including semiconductors, escalating trade tensions.
2019	Revision of Japan's Foreign Exchange and Foreign Trade Act (FEFTA)	Japan revises the FEFTA to tighten controls on foreign investment in sensitive sectors, such as semiconductors, due to national security concerns. Revisions were partly influenced by U.S. semiconductor policies and growing concerns over China's influence.
2020	U.S. Pushes for Decoupling from China	The U.S. pressures allies, including Japan, to reduce reliance on Chinese semiconductors, impacting U.S.-Japan relations.
2022	Japan's Economic Security Promotion Act (ESPA)	Japan passes the ESPA Act, aimed at securing critical supply chains, including semiconductors. The act reflects vulnerabilities exposed during the pandemic and growing concerns over China's technological growth.
2022	The U.S. passes the CHIPS and Science Act	Authorizes roughly $280b billion to boost domestic R&D and semiconductor manufacturing capabilities to counter China and strengthen U.S. supply chain resilience.
2022	The U.S. announces sweeping export controls on semiconductors	The U.S. Department of Commerce imposes broad export controls to limit China's access to advanced semiconductors.
2023	Japan and the Netherlands agree to join the U.S. on passing export controls targetting China	Although Japan and the Netherlands have not stated China as the target of their export controls, both countries proceeded with export controls targeting advanced chip-making equipment.

China's Influence in the Semiconductor Industry and U.S.-China Relations vs. Japan-China Relations

China's influence in the semiconductor industry has grown substantially over the past decade, driven by significant government investments and strategic initiatives aimed at achieving self-sufficiency and global leadership in this critical industry. As part of its "Made in China 2025" plan, China has prioritized the development of advanced semiconductor technologies, seeking to reduce dependency on foreign suppliers and enhance its position in the global value chain.[2] This has led to increased competition with the United States and Japan, both of which are traditional powerhouses in the semiconductor field and have immense national security and economic security concerns regarding China.

As previously stated, Japan is in a unique predicament when it comes to China. Japan and China have a long and tumultuous history that makes their relationship difficult. This historical context exacerbates any tensions between the two such as tensions that rose due to territorial disputes over the Senkaku/Diaoyu Islands as well as the overall tensions in the region and the threat of that spilling over into Japan or China.[6] There are also economic security concerns from both sides. China has proven to be a bad actor, often using economic retaliation and exploiting Japan's interdependence. This has caused Japan to prioritize economic security in recent years, focusing on friendshor- diversifying to reduce dependence on China. Japan's close ties with the United States as well as its recent export controls on semiconductors worries China and further heightens tensions between the two countries.

An example of Japan's plans to reduce dependence on China is their rare earth minerals supply chain. In 2010, a Chinese fishing boat collided with Japanese Coast Guards. China's response to that crisis was to stop exporting rare earth materials, accelerating Japan's plan to de-risk and diversify from China.[25] In 2010, Japan imported roughly 90% of its rare earth minerals from China and by 2019, they reduced their imports to 58% with a stated goal of importing less than 50% by 2025.[15] The Japanese government also created a financial package with five main objectives: (1) to support the investment in equipment to reduce the use of rare earth minerals, (2) to develop technology to use alternative materials, (3) to promote the recycling of rare earth minerals by investing in recycling facilities, (4) to develop mines and acquire interests in rare earth mines around the world, and lastly, (5) to stockpile on rare earth minerals as well as create a policy framework to ensure reserves of critical minerals.[27]

In 2020, Japan announced that it will increase the stockpile of rare earth minerals from 60 days to 180 days of domestic consumption. In 2022, Japan passed the Economic Security Promotion Act (ESPA) with the aim of creating resilient supply chains and expanded fiscal support to Japanese firms to incentivize them to reshore and diversify from China, especially in critical industries such as the semicon-

-ductor industry. In 2023, after a mutual agreement between the United States, Japan, and the Netherlands, Japan expanded its export restriction on 23 types of cutting-edge semiconductor manufacturing technologies. Although China is not stated as the intended target, this move came after the U.S. passed sweeping export controls in 2022, cutting China's access to advanced manufacturing technologies. According to a 2024 report from Bloomberg, Japan is now also planning to expand its export restriction on four more technologies related to semiconductors and/or quantum computing.[58]

Like Japan, the United States also has a complex history with China. Despite ideological differences, the United States and China became more economically intertwined throughout the years. The United States, unlike Japan, does not have as many risks associated with being economically connected with China. The U.S. is less dependent on Chinese trade relative to the size of its overall economy and has a more diversified range of trade partners. Combined with its military might, leadership on the global stage, and well-established foreign relations, the United States is much harder to retaliate against, though it is not impossible.

The trade conflict between the United States and China began in 2018 with the Trump administration adopting a unilateral, protectionist, and "America First" attitude to the relationship.[43] President Trump advocated for trade protectionism, arguing that the U.S. trade deficit was extremely high due to unfair trade practices from China such as intellectual property theft and China restricting market access to U.S. firms. As part of his "America First" policy, President Trump shifted the course of U.S. trade policies from multilateral free trade agreements (FTA) to bilateral trade deals. The trade war officially began after the Trump administration increased tariffs on Chinese imported goods.[56]

This period was marked by a significant blow to the U.S. economy as well as reduced trust in U.S. trade policies around the globe. Multiple countries, including allies, passed retaliatory tariffs that eventually forced the Trump administration to use an economic program from the Great Depression called the Commodity Credit Corporation (CCC) to support American farmers who lost revenue due to the imposed tariffs.[42] Trump's public remarks that were aimed at allies and adversaries alike also caused a collective re-evaluation of American leadership on the global stage and dealt a damaging blow to the United States' reputation as well as its foreign relations.

Trump's views align with Reagan-era trade policies in the 1980s, especially with the 1986 Semiconductor Trade Agreement, in which he argued then that foreign countries such as Japan and China are economically exploiting the United States through unfair trade practices.[45] He believed that tariffs would promote domestic manufacturing capabilities and revive U.S. domestic industries.[13] His imposed tariffs, however, failed to meet his stated goal of reducing the trade deficit. Economists argue that while the tariffs reduced U.S. imports from China, they increased imports from other countries making the United States' overall trade deficit unchanged and less efficient as they were sourcing from third-world countries.[32]

The trade war was further escalated under the Biden administration when the U.S. Department of Commerce announced unilateral export controls on advanced semiconductor technologies and equipment aimed at restricting China's access to these critical technologies. These export controls were a continuation of the Trump-era tariffs and were developed as part of a broader strategy to limit China's ability to develop advanced semiconductors domestically, especially considering their civilian-military fusion doctrine.[11] The export controls targeted not only specific technologies but also key components and machinery necessary to produce high-end semiconductors.[50] In 2023, the U.S. Department of Commerce updated its semiconductor export controls to close exploited loopholes that were impacting the efficiency of the 2022 export controls.[51]

This move stunned U.S. allies, especially Japan, as they did not receive any warnings and were not brought onboard to pass complimentary controls. In the following months, foreign companies exported record amounts of chipmaking equipment to China while U.S. companies were banned from doing so due to the export controls.[57] The U.S. government then began to hastily pressure and negotiate with allies such as the Netherlands and Japan to pass similar export controls, banning China from accessing chipmaking equipment. The unilateral approach to export controls further impacted global trust in American leadership and strained relations with allies as U.S. policymaking was seen as erratic and unpredictable.

Analysis of American vs. Japanese Export Control and Semiconductor Policies

In 2022, the Biden administration decided to maintain the tariffs they inherited from the previous administration and couple it with federal investments to revamp the United States' domestic semiconductor industry. By bolstering domestic semiconductor manufacturing capabilities, the U.S. government aims to reduce dependency on foreign manufacturers, mitigate the risks associated with supply chain disruptions by relying on domestic production, and address the economic concerns previously mentioned such

as the high trade deficit, unfair trade practices, and theft of intellectual property and market barriers.

The most prominent of the federal investments is the CHIPS and Science Act of 2022, which allocated roughly $280 billion for domestic semiconductor manufacturing and research. The act aims to revitalize the domestic semiconductor industry, seeking to separate from China on important technological industries by reducing dependency. More importantly, the act emphasizes the importance of partnerships with allied nations to foster an integrated and resilient semiconductor ecosystem.

The Biden administration also implemented a range of export controls and investment screening mechanisms to complement its federal investments and protect U.S. semiconductor technology from being accessed by potential adversaries, particularly China. The U.S. Department of Commerce's Bureau of Industry and Security (BIS) administers the Export Administration Regulations (EAR) which restricts the export of dual-use, military and civilian, technologies. Semiconductors fall under this category due to their potential use in advanced military systems. BIS has also implemented specific controls on semiconductor manufacturing equipment and technology, requiring exporters to obtain licenses before shipping these items to certain countries, notably China.

BIS also maintains an Entity List, which includes foreign organizations, businesses, and individuals that are subject to specific export restrictions. Companies on the list, such as Huawei and Semiconductor Manufacturing International Corporation (SMIC), face strict requirements that limit their access to U.S-origin technology and components.[11] These restrictions are designed to prevent the transfer of advanced semiconductor technologies to entities that pose a national security risk or are involved in activities contrary to U.S. foreign policy interests.

As for investment screening mechanisms, the Committee on Foreign Investment in the United States (CFIUS) is an interagency committee authorized to review transactions involving foreign investment in U.S. businesses to determine their impact on national security, including semiconductor companies.[9] Recent reforms under the Foreign Investment Risk Review Modernization Act (FIRRMA) have expanded CFIUS's authority to scrutinize a broader range of transactions, including non-controlling investment and real estate transactions near sensitive military installations.[47] The Export Control Reform Act (ECRA) also grants the Department of Commerce permanent statutory authority to implement export controls, including emerging and foundational technologies that are deemed as essential to national security, such as advanced semiconductors.[48]

In 2022, Japan implemented the Economic Security Promotion Act (ESPA) to enhance the nation's resilience and economic security amid escalating geopolitical tensions, both between the U.S. and China and Japan and China. The primary motivation behind the ESPA was to safeguard critical technology sector, such as semiconductors, from the risks associated with supply chain disruptions and to protect Japan from economic coercion from other countries due to economic dependency.

Japan, like the United States, has also implemented a range of export controls and investment screening mechanisms to protect its semiconductor industry and national security interests. Japan's export control system is governed primarily by the Foreign Exchange and Foreign Trade Act (FEFTA) which was designed to regulate the export of goods and technologies that have national security implications. Under FEFTA, the Ministry of Economy, Trade, and Industry (METI) administers export controls, requiring exporters to obtain licenses for semiconductor manufacturing equipment and materials. METI regularly updates the list of controlled items, aligning it with international frameworks such as the Wassenaar Arrangement, an international agreement established in 1996 by 42 participating countries in which its primary purpose is to promote transparency and responsibility in the transfer of conventional arms and dual-use goods and technologies.[50]

Japan also employs catch-all controls that allow METI to restrict exports that are not listed explicitly in the control lists but could be used for the development of weapons of mass destruction (WMDs) or contribute to military end-use in countries of concern, which provides Japan the flexibility to respond to emerging threats. Exporters are also required to verify the end-users and end-uses of their products to ensure that they are not diverted to unintended military applications. METI conducts rigorous checks and demands comprehensive documentation from exporters to ensure the information provided is accurate.

For investment screening mechanisms, amendments to FEFTA have strengthened Japan's ability to screen foreign investments in sensitive fields such as the semiconductor field. The threshold for prior notification of foreign investments was lowered from 10% to 1% of voting rights.[51] This change enables the government to review and potentially block investments that might pose a threat to Japan's national security, particularly from countries that have strategic rivalries with Japan such as China. Japan has also identified certain sector critical to their national security and has placed additional restrictions on foreign investments in

-ments in these areas.

Case study of the Chips & Science Act vs. the ESPA Act:

The CHIPS and Science Act aims to strengthen domestic semiconductor manufacturing and reduce reliance on foreign suppliers by providing substantial funding to support the development and expansion of semiconductor manufacturing facilities within the U.S. It includes provisions for subsidies, grants, and tax incentives to encourage investment in chip production and research. A key objective of the act is to revitalize the U.S. semiconductor industry by supporting the construction of new fabs, advancing R&D, and fostering workforce development. The legislation also emphasizes enhancing the resilience of the semiconductor supply chain and promoting collaboration between the three sectors of government, private industry, and academia.

The act has had a transformative impact on the U.S. semiconductor industry and its funding and incentives have spurred significant investments in domestic semiconductor manufacturing, leading to the construction of new fabs and expansion of existing facilities. This influx of capital is expected to boost production capacities and help mitigate supply chain vulnerabilities exposed by recent global disruptions. The act has also accelerated advancements in semiconductor research and development, fostering innovation and supporting the development of next-generation technologies. By providing financial support and strategic guidance, the CHIPS and Science Act has strengthened the competitive position of U.S. semiconductor firms and enhanced their ability to meet both domestic and international demand.

Japan's Economic Security Promotion Act (ESPA) represents a strategic pivot in the nation's industrial policy, focusing on strengthening economic security and revitalizing its semiconductor industry. The ESPA consolidates several laws aimed at enhancing Japan's resilience against geopolitical and economic uncertainties. One of its key objectives is to reduce dependency on foreign technology and bolster domestic production capabilities in critical sectors such as semiconductors. By encouraging companies to consider economic security in their strategic decisions, the ESPA seeks to foster a more robust and self-reliant industrial base. The act supports initiatives that promote innovation, safeguard critical technologies, and ensure the secure supply of essential components. It also prioritizes two-way dialogue and collaboration between the government and the private industry to advance semiconductor technology and maintain competitive advantages in a rapidly evolving global market.[27]

Implementation involves promoting investment in semiconductor R&D, supporting the formation of strategic partnerships with international firms, and ensuring that critical technologies are developed and produced within Japan. The ESPA also includes measures to secure supply chains, protect intellectual property, and encourage innovation through public-private collaborations. By aligning policy goals with practical support mechanisms, the ESPA act seeks to address vulnerabilities in Japan's semiconductor sector and position the country as a key player in the global technology landscape.

The ESPA has had a notable impact on the Japanese semiconductor industry, much like the CHIPS & Science Act. The act has facilitated increased investment in domestic semiconductor production and R&D, leading to the establishment of new research centers and manufacturing facilities. Initiatives like the Leading-Edge Semiconductor Technology Center (LSTC) and collaborations with international partners such as IBM through the Rapidus consortium are direct outcomes of the act's strategic goals. These efforts aim to close the technological gap between Japan and global leaders like TSMC and Samsung. Additionally, the act has provided financial support and incentives for both domestic and foreign companies to expand their semiconductor operations in Japan, which has helped to enhance the country's technological capabilities and reduce supply chain risks.[27]

The CHIPS and Science Act and the ESPA Act both address the need to strengthen domestic semiconductor industries, but they differ in focus and approach. The CHIPS Act centers on revitalizing U.S. semiconductor manufacturing through substantial federal funding, tax incentives, and subsidies for new fabs and R&D. Its approach is heavily focused on boosting domestic production capacity and reducing dependency on foreign sources by directly supporting U.S. companies and infrastructure and setting the U.S. industry for potentially becoming self-sufficient.

In contrast, the ESPA act emphasizes economic security and strategic self-sufficiency within Japan's broader industrial policy framework. Its approach includes fostering international collaborations and partnerships, such as those with IBM and IMEC, alongside strengthening domestic capabilities. While both policies share objectives of enhancing semiconductor production and innovation, the CHIPS Act is more internally focused on U.S. infrastructure and technology leadership, whereas the ESPA integrates international cooperation as a central strategy to revive Japan's semiconductor industry, recognizing the need to compen-

sale for areas Japan is not strong in within the semiconductor industry.

Analyzing the Efficiency of U.S.-Japan Controls

The efficiency of U.S. export controls has been subjected to intense criticism from both domestic and foreign companies as the decision to base export controls on geography rather than affiliation has been because of the failure of the BIS to determine whether AI hardware is being used for civilian use or military use.[40]

This new approach was mainly a response to China's revamped doctrine of infusing military and civilian sectors, preventing countries like the U.S. from determining the end-users of semiconductor chips produced. Although the intention was to limit China's technological access, the export controls potentially harmed the U.S. domestic industry and the industries of allied countries.[35]

U.S. firms experienced revenue losses due to restriction on sales to certain Chinese companies without government licenses. Although there isn't data on the long-term effects of the controls, The Federal Reserve Bank of New York released a report in 2024 revealing that affected U.S. firms are struggling to find new buyers, resulting in a notable decline in revenue, profitability, bank credit, and employment. Additionally, concerns about future restrictions are deterring the formation of new commercial relationships, not only with Chinese firms but also with firms in other countries, as third-party firms seek more reliable sources of supply that are not affected by export controls.[39]

The competitiveness of any semiconductor industry depends on economies of scale and extensive capital investments. With China being the largest semiconductor market, accounting for 31.4% of global purchases in 2022, any reduction in sales significantly undermines U.S. firms. To deny key Chinese firms access to U.S. technologies means export controls impose immediate revenue losses on the affected U.S. suppliers. Specifically, U.S. suppliers, because of export controls, experienced a notable decline in stock prices for at least 20 days, with a 2.5% abnormal drop representing an average market capitalization loss of $857 million per supplier and total losses of $130 billion. There has also been a decline in bank lending to these suppliers, further affecting their competitive edge.[39]

The strategic response of China to U.S. export controls was also unaccounted for and is exemplified by the Dutch lithography company ASML, which saw increased purchases of its machinery by China despite U.S. restrictions, supporting the argument that the U.S. passed these controls unilaterally and without informing key allies. Only after significant pressure from the U.S. did the Dutch government limit ASML's exports to China. By then, China had stockpiled enough in anticipation of U.S. export controls going into effect.[14] Although China managed to stockpile chipmaking equipment, the controls will freeze China at the chip manufacturing level while the rest of the world continues to advance.

Affected suppliers are also less likely to form new relationships with Chinese customers with analysis showing a 50%-75% increase in terminations and a 60%-80% decline in new relationships, indicating a significant and broad decoupling from China. The study also finds that suppliers are unable to offset the reduction by finding new customers

TABLE 7. Real Effects of Export Controls

The New York Federal Reserve Bank, Geopolitical Risk and Decoupling: Evidence from U.S. Export Controls,

Dependent variables:	Cash Flow		Revenues		EBIT		CAPEX		Employees	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Panel A: Full Sample					
Affected · Post	-0.021**	-0.017**	-0.108**	-0.083**	-0.019**	-0.016*	0.006*	0.005	-0.087**	-0.069**
	(0.007)	(0.007)	(0.036)	(0.032)	(0.007)	(0.008)	(0.003)	(0.003)	(0.036)	(0.031)
Observations	32,108	32,108	32,328	32,328	32,110	32,110	32,065	32,065	31,899	31,899
					Panel B: Restrictive Sample					
Affected · Post	-0.021**	-0.017**	-0.109**	-0.085**	-0.020**	-0.016*	0.006*	0.004	-0.09**	-0.072**
	(0.007)	(0.007)	(0.037)	(0.032)	(0.008)	(0.008)	(0.003)	(0.003)	(0.036)	(0.031)
Observations	26,771	26,771	26,965	26,965	26,773	26,773	26,737	26,737	26,601	26,601
Fixed Effects:										
Cohort-Firm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cohort-SIC-Year	✓		✓		✓		✓		✓	
Cohort-SIC-Size-Year		✓		✓		✓		✓		✓

domestically or internationally. This inability to reconfigure supply chains results in a greater reliance on domestic costumers but the total numbers of customers still decline. There is no evidence of reshoring or friend-shoring, as suppliers do not significantly increase their customer base in politically friendly regions in Asia or Europe.[39]

The collateral damage of export controls on U.S. suppliers is statistically and economically significant. Export controls lead to a decline in cash flow by 20% of its average value for treated firms, revenues for treated firms declined by 8.6%, and EBIT declined by 25% of its average value in 2022. Affected suppliers adjusted to the negative consequences of export controls by reducing employment but not investment. The effect on investment is marginally significant and becomes insignificant once fixed effects are interacted with size quartiles. There is no robust evidence that investment is affected by export controls. However, the effect on employment is significant, representing a 7.1% decline in the total number of employees. The asymmetric effect on investment and employment suggests that export controls do not significantly change the long-term investment opportunities of affected firms but may require short-term adjustments to the labor force.[39]

Targeted Chinese firms may also increase purchases from non-U.S. firms with whom they have pre-existing relations. Non-U.S. firms are generally exempt from U.S. export controls unless they are using U.S. designed hardware or software, in which case they can be included under the Foreign Direct Product Rule. Table 11 shows that non-U.S. firms supplying goods to Chinese targets experience higher revenues and profitability as short-term phenomenon following the inclusion of Chinese targets in the U.S. export control lists. The results are stronger for non-U.S. firms headquartered in U.S.-allied countries, likely because they produce high-tech products comparable to those made by U.S. firms. China's strategic response was made evident by Chinese firms buying from ASML before the Dutch government could get on board with U.S. export controls, exploiting that time delay.[39]

Japan's export control system is largely based on the Wassenaar Arrangement, which focuses on export controls for conventional arms and dual-use goods and technologies. Japan frames its export controls as aligning with the guidelines of the agreement to emphasize its commitment to multilateral agreements and international norms. This positioning helps Japan portray its measures as part of a broader effort to promote global security and prevent the proliferation of sensitive technologies rather than as actions specifically targeting China.

TABLE 11. Supply Chain Circumvention

The New York Federal Reserve Bank, Geopolitical Risk and Decoupling: Evidence from U.S. Export Controls,

Panel A: Treated firms in allied regions

Dependent variables:	Revenues		EBIT	
	(1)	(2)	(3)	(4)
Affected · Post	0.159***	0.131**	0.006	0.004
	(0.048)	(0.050)	(0.007)	(0.008)
Fixed Effects:				
Cohort-Firm	✓	✓	✓	✓
Cohort-SIC-Year	✓		✓	
Cohort-SIC-Size-Year		✓		✓
Observations	97,697	97,697	98,192	98,192

Panel B: Treated firms in all regions

Dependent variables:	Revenues		EBIT	
	(1)	(2)	(3)	(4)
Affected · Post	0.045*	0.034	0.001	0.002
	(0.025)	(0.023)	(0.003)	(0.003)
Fixed Effects:				
Cohort-Firm	✓	✓	✓	✓
Cohort-SIC-Year	✓		✓	
Cohort-SIC-Size-Year		✓		✓
Observations	359,052	359,052	360,701	360,701

Japan frames its export controls as aligning with the guidelines of the agreement to emphasize its commitment to multilateral agreements and international norms. This positioning helps Japan portray its measures as part of a broader effort to promote global security and prevent the proliferation of sensitive technologies rather than as actions specifically targeting China. By doing so, Japan seeks to avoid openly antagonizing China while pursuing its strategic objectives of reducing dependency, limiting China's access to advanced semiconductors, and aligning with U.S. export controls.

China and Japan have enjoyed a mutually beneficial economic and trade relationship for over 50 years. Bilateral trade has increased more than 300 times, and Japanese Foreign Direct Investment (FDI) in China exceeds $120 billion 49. Japan relies heavily on the Chinese market for its semiconductor industry, exporting 50% of its semiconductor manufacturing equipment to China for a third straight quart in the January-March 2024 period.[49] Japan's planned export controls will require case-by-case government approval for exporting certain semiconductor equipment to countries including China. This move goes against market rules and could disrupt the semiconductor industry's development in both nations. Japan's legislative measures for highlights Japan's position between the United States and China. The decision to make export controls a case-by-case situation is a middle ground between the two countries seeking Japan's full cooperation.[12] Japan is also considering China's past recorded behavior as a bad actor to think about and take measures to protect its long-term economic security.

Japan's export controls, though seemingly aligned with U.S. export controls, are not as strict and extensive and aims to reduce the effects of shifting export controls on its domestic industry by maintaining a balance of collaboration and autonomy. The aim is to make Japan an indispensable part of the global semiconductor supply chain and pull back from over-relying on foreign countries while also recognizing its own limitation and working with allied countries in areas where Japan's domestic industry doesn't excel at.[41]

METI is also shifting its focus to strengthening its catch-all controls, emphasizing the need for prior consultation for technology transfers with potential military applications. Although not mandatory yet, this consultation is expected to become a requirement by fall 2024. METI plans to create a new list of regulated technologies, focusing on high-risk transactions where Japan holds global indispensability or superiority. The goal is to prevent the inadvertent enhancement of manufacturing capabilities for unauthorized recipients, as technology transfer is harder to control once it occurs, sticking to the principles of the Wassenaar Agreement.[3]

Both the United States and Japan face struggles balancing national security concerns, economic security concerns, and the demands of the private sector. From the perspective of national security, the U.S. has achieved its goal of slowing down China's rapid growth in the semiconductor industry. However, it faces pressure from the private sector and the domestic industry who face supply chain issues and potential revenue losses due to the strict export controls. The United States also faces pressure globally as the export controls are perceived as unilateral and came without warning while allies were still grappling with the strained relations from the Trump administration.

Japan namely faces struggles with economic security as decoupling from China is impossible. Unlike the United States' renewed interest in decoupling, Japan has been pursuing de-risking from China for at least ten years. There is a disconnect between the government's desire to secure the country's economy while also maintaining or even furthering its economic ties with China. From a different perspective, Japan's economic policies can be interpreted as incoherent. While there is a definite push for de-risking, Japan has become increasingly economically intertwined with China, advocating for initiatives such as the Regional Comprehensive Economic Partnership (RCEP) and pursuing free trade agreements with China.[54]

Unlike Japan, which is pursuing de-risking instead of decoupling, the conversation of decoupling is frequently brought up in the United States. There is a political push to pursue even more strict export control measures that set the stage for decoupling from China. This push, however, would have detrimental effects both on the U.S. economy and supply chains as well as global supply chains. According to the Boston Consulting Group (BCG), if the United States government pursued decoupling, U.S. firms stand to lose about 18% of their global market share value and roughly 37% of their global revenue 2. This move would also cost the U.S. economy roughly 15,000-40,000 domestic jobs. Although slightly less dramatic, if the United States maintains the current restrictions that are in place, U.S. firms lose about 8% of their global market share and roughly 16% of their global revenue.[2]

The concept of decoupling would also have an impact on foreign relations and economic interdependence globally.

For the U.S. to successfully achieve broad decoupling from China, the global semiconductor value chain would have to reconfigured and reshored. According to a report from the SIA and BCG, the United States would need a minimum of $1 trillion in upfront investment to create and maintain a sufficient domestic supply chain, would incur costs ranging from $45-$125 billion in recurring annual operational costs, and would increase chip prices 35%-65% globally 2. Beyond the economic costs, decoupling between the United States and China would stifle future advancements in the semiconductor industry globally. This will most likely impact the current system of international order and would bring about two distinct systems, increasing prices globally and impacting semiconductor end-users.

U.S.-Japan Collaboration

In May 2022, Japan and the U.S. formalized their semiconductor collaboration through the Japan-U.S. Commercial and Industrial Partnership (JUCIP) and launched a joint task force to develop next-generation semiconductors. This initiative includes establishing the Leading-Edge Semiconductor Technology Center (LSTC) in Japan, modeled after the U.S. National Semiconductor Technology Center (NSTC), and focusing on advanced chip technologies. Both countries are also addressing semiconductor vulnerabilities heightened by the COVID-19 pandemic and increasing competition from China, with Japan enacting the Economic Security Promotion Act (ESPA) to prioritize economic security in decision-making.[36]

Japan's strategy involves several key elements: forming partnerships with the U.S., such as the Rapidus consortium, to develop 2 nm chips; creating the LSTC for advanced R&D; establishing new chip manufacturing bases, including a joint venture with Taiwan's TSMC; and providing subsidies for domestic and foreign semiconductor production. This shift marks a departure from Japan's previous aim of self-sufficiency and aligns with broader efforts by both Japan and the U.S. to address semiconductor supply chain issues and strategic risks.

The Rapidus initiative, launched in August 2022, aims to leapfrog several technology nodes to start producing 2 nm chips by 2027 17. This ambitious plan involves collaboration with IBM and IMEC, and substantial Japanese government support, including significant funding for R&D and infrastructure. Despite this, Rapidus faces challenges, such as a lack of experience in advanced chip manufacturing and the complexities of skipping multiple technology nodes.[16]

Japan remains competitive in certain semiconductor areas and is leveraging its expertise in semiconductor materials and equipment. The Japanese government is also supporting U.S. firms like Micron Technology and Western Digital with substantial financial incentives to enhance semiconductor manufacturing capabilities in Japan. Overall, Japan's new semiconductor strategy represents a critical effort to reclaim its position in the global semiconductor market through strategic partnerships, significant investments, and innovative technological advancements.

Japan's national security strategy also reflects a nuanced approach to integrating itself into the global semiconductor supply chain while maintaining a degree of autonomy from both China and the United States. This strategy seeks to navigate the complex geopolitical landscape of the semiconductor industry without becoming entangled in the ongoing trade conflicts between these two major powers.[6]

Challenges Faced by Japanese Semiconductor Firms Due to U.S. Export Controls

Japanese semiconductor firms have encountered challenges due to U.S. export controls, which have been intensified as part of broader geopolitical tensions. The U.S. has imposed restrictions on the export of advanced semiconductor technologies and equipment to China, impacting Japanese companies that rely on American technology and components. These controls disrupt global supply chains and create uncertainty for Japanese firms engaged in semiconductor manufacturing and R&D. The restrictions have particularly affected Japanese companies involved in joint ventures or collaborations with U.S. firms, limiting their access to cutting-edge technologies and market opportunities. Additionally, the constraints on exporting semiconductor equipment and materials have forced Japanese firms to seek alternative suppliers and adapt their strategies, often resulting in increased costs and operational complexities 34. The overall impact is a more challenging business environment, with potential delays in product development and increased difficulty in maintaining competitiveness in the global semiconductor market.

As previously mentioned, there seems to be a gap between the Japanese government and the private sector. Japan's push for de-risking from China, as well as the U.S./China trade war, have put Japanese companies in a difficult position due to their deep economic ties with China. Many Japanese firms rely heavily on the Chinese market for a substantial portion of their sales and the restrictions from both the U.S. and Japan have led to disruption in their operations such as revenue losses and strained relations with Chinese customers, like the American counterparts. While there is dialogue between the two countries on how to reduce the

impact of export controls on businesses from both sides, Japanese companies are still facing increased compliance costs as they navigate the complex regulatory environment imposed by U.S. controls.[4]

TSMC in Japan and U.S. Involvement

The U.S. involvement in the TSMC and Japan Semiconductor Venture project primarily stems from its strategic interest in bolstering semiconductor supply chains and enhancing its own technological edge in the industry 44. Although TSMC is a Taiwanese company, the U.S. plays a significant role in the project through several channels. The U.S. provides crucial technological support and expertise through American firms supplying advanced semiconductor equipment and technology that are integral to TSMC's manufacturing processes. By participating in the venture, the U.S. helps elevate the project's capabilities to achieve its goal of diversifying.

The project represents a strategic partnership that aligns with both U.S. and Japan's geopolitical and economic interests. The U.S. is keen on reducing its reliance on Taiwan for semiconductor supply and diversifying sources to mitigate risks associated with geopolitical tensions. By collaborating with Japan and leveraging TSMC's expertise, the U.S. aims to strengthen its position in the global semiconductor market. While Taiwan, where TSMC is headquartered, remains a crucial player in the global semiconductor industry, the U.S. is actively looking to diversify its sources to other allies in the region and reduce over-reliance on any single country due to economic and national security concerns.

Taiwan's geopolitical vulnerability—given its proximity to China and the ongoing tensions between China and Taiwan—presents risks to supply chains globally. To address this, the U.S. is strengthening its strategic partnership with Japan, leveraging Japan's advanced technological capabilities and relatively stable geopolitical position compared to Taiwan. Japan, with its own semiconductor manufacturing expertise and growing investment in the sector, offers a more secure and stable alternative. The partnership also allows the U.S. to tap into Japan's expertise in certain semiconductor technologies and manufacturing processes, complementing TSMC's strengths. By collaborating with Japan, the U.S. aims to achieve a more resilient semiconductor supply chain that is less susceptible to disruptions from geopolitical conflicts, simultaneously achieving its goal and Japan's goal of de-risking from China.[46]

How Japan is Navigating the U.S.-China Trade War and its Impact on U.S.-Japan Relations

To avoid being drawn into the trade disputes between the United States and China, Japan's strategy includes several key elements:

1. **Balanced Engagement with Major Powers**: Japan seeks to engage with both the U.S. and China in a manner that allows it to benefit from their technological advancements and market opportunities without being overly reliant on either. For instance, Japan is collaborating with U.S. firms like IBM and participating in U.S.-led initiatives such as the Fab 4 semiconductor alliance, while also maintaining its trade relations with China.

2. **Strategic Diversification:** Japan is diversifying its semiconductor industry investments and partnerships to avoid becoming overly dependent on any single country. By establishing new manufacturing bases and pursuing joint ventures with various international partners, including Taiwan's TSMC, Japan is spreading its risk and ensuring that its semiconductor supply chain is resilient and not subject to the fluctuations of any one geopolitical conflict.[30] Japan is also weary of heavily meshing with the United States as that presents its own set of issues.

3. **Economic Security Legislation:** Japan's enactment of the Economic Security Promotion Act (ESPA) reflects its commitment to integrating economic security considerations into its industrial policies. This legislation encourages Japanese companies to assess economic security in their decision-making, thereby enabling Japan to safeguard its interests without getting ensnared in the broader trade wars.

4. **Domestic Capability Building**: Japan is also investing heavily in domestic semiconductor capabilities, such as the Rapidus initiative, to develop cutting-edge 2 nm technology. By building its own advanced manufacturing infrastructure, Japan aims to reduce its vulnerability to external pressures and maintain greater control over its semiconductor supply chain.[16]

Japan's approach to its semiconductor strategy reflects a cautious stance regarding its trust in U.S. foreign policies. It reveals Japan's reduced confidence in the stability and predictability of U.S. policies, particularly considering recent geopolitical tensions and trade disputes.

Implication for U.S.-Japan Partnership

The differing approaches of the CHIPS Act and the ESPA act have significant implications for the U.S.-Japan semiconductor partnership. On one hand, both countries are working toward common goals of enhancing semiconductor resilience and technological advancement, leading to increased collaboration on projects like Rapidus and joint R&D initiatives. The shared focus on strengthening supply chains and reducing reliance on single sources, such as China, underscores a mutual interest in securing semiconductor supply chains.

On the other hand, the emphasis on domestic priorities and competition in both policies can create tensions. Japan's push for international partnerships under the ESPA act, coupled with the U.S. focus on bolstering its own semiconductor sector through the CHIPS Act, might lead to competing interests and divergent priorities. The U.S. may view Japan's collaborations with other international players as both a complement to and a potential challenge to its own strategic goals. Thus, while the policies encourage cooperation and joint ventures, they also highlight the complexities and competitive dynamics inherent in the global semiconductor landscape. The success of the U.S.-Japan partnership will depend on balancing these interests and navigating the evolving geopolitical and economic environment.

Conclusion and Discussion

Japan, with its advanced technologic capabilities and strategic position overall, represents a critical partner that the U.S. has not fully leveraged. The push for Japan to decouple from China overlooks the complexities of Japan's economic dependencies and pressures Japan to a path that could severely harm its economy. The U.S. would benefit from further developing its relationship with Japan and recognizing the potential Japan has for playing a role akin to Taiwan's in the global semiconductor supply chain. By supporting Japan's semiconductor development, the U.S. could foster a more resilient and mutually beneficial alliance that also ensures a stable and secure semiconductor supply chain in the face of rising geopolitical challenges.

The United States' unilateral export controls have shown to have their pros and cons. While achieving its goal of curbing China's technological advancements, there have been concerns about their long-term efficacy and impact. The absence of comprehensive data on the long-term effect of these controls makes it difficult to fully assess their consequences on the global and domestic semiconductor industry. The U.S. would benefit from gathering data to understand the real-world implications on both domestic and international front. One important conclusion can be made on the impact of the export controls, the U.S. needs to repair its reputation among its allies by acknowledging their strategic realities. The U.S.'s recent unilateral approach undermines the collective strength needed in the region to counterbalance China's influence and power.

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