

# Transatlantic Cooperation on Semiconductors: A US Perspective

by Julia Tréhu



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## ABSTRACT

Semiconductors are essential for the global economy, but recent supply chain disruptions and geopolitical tensions have highlighted new risks, leading to new policy approaches. US semiconductor strategy centres around three objectives. First, the funding provided through the CHIPS and Science Act is part of a larger push to strengthen domestic industry and manufacturing. Second, the US seeks to deny strategic adversaries of key technology through export controls. And third, it aims to secure the supply chains for critical technologies. The European and American semiconductor sectors are already tightly intertwined, and further coordination has occurred through forums like the Trade and Technology Council. But challenges remain, including the risk of a subsidy race. Further transatlantic cooperation on key aspects of these new industrial policies can ensure the realisation of shared objectives for a more resilient semiconductor sector.

*USA | European Union | Transatlantic relations | Industrial policy | Semiconductors*

**keywords**

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by Julia Tréhu\*

## Introduction

The global economy is increasingly reliant on semiconductors (chips), which are essential for everyday consumer electronics, artificial intelligence, clean tech, and across industrial sectors from automotive to defence. The semiconductor industry remains highly cyclical.<sup>1</sup> High demand, for example the surge in orders for personal computing devices at the beginning of pandemic-induced telework in spring 2020, can lead to supply shortages and higher prices. But inventory buildup then leads to falling prices and short-term slowdowns or negative growth. Yet overall demand for chips (across analogue, logic, micro and memory) is expected to show sustained growth over coming years, with a projected 1 trillion US dollars in sales by 2030.<sup>2</sup> As US Secretary of Commerce Gina Raimondo stated, "Semiconductors are like the water of the new economy, you can't do anything without them."<sup>3</sup>

The importance of chips for the modern economy poses several challenges. The complex value chain is both highly concentrated and fragmented, with a handful of companies and countries leading in specific segments and production stages. A high degree of private industry concentration, specialisation in the production chain and the highly capital-intensive nature of the industry represent a

<sup>1</sup> World Semiconductor Trade Statistics (WSTS), *WSTS Semiconductor Market Forecast Fall 2023*, 28 November 2023, <https://www.wsts.org/76/Recent-News-Release>.

<sup>2</sup> Ondrej Burkacky, Jula Dragon and Nikolaus Lehmann, "The Semiconductor Decade: A Trillion-Dollar Industry", in *McKinsey Articles*, 1 April 2022, <https://www.mckinsey.com/industries/semiconductors/our-insights/the-semiconductor-decade-a-trillion-dollar-industry>.

<sup>3</sup> Steven Overly, "Raimondo: Commerce 'War Room' Seeing Improvements on Supply Chain Woes", in *Politico*, 22 November 2021, <https://www.politico.com/news/2021/11/22/raimondo-commerce-war-room-supply-chain-woes-523207>.

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This paper is part of the project "Building a transatlantic technology bridge: challenges and opportunities", managed by the Istituto Affari Internazionali (IAI), in partnership with the German Marshall Fund of the United States and Centrum für Europäische Politik, and supported by Fondazione Compagnia di San Paolo. An EU perspective on the topic of semiconductors is also available as part of the project (see IAI Papers 24|06).

competitive barrier that encourages market concentration.

The geostrategic importance of semiconductors has prompted the United States to adopt subsidy and investment plans with a three-pronged approach: strengthen domestic industry and manufacturing, combat China and de-risk supply chains. While the EU broadly shares these goals, transatlantic cooperation on semiconductors remains challenging. The EU and US have coordinated, largely through the Trade and Technology Council (TTC), on semiconductor-related policies, including early-warning mechanisms and information-sharing on export controls, subsidy policies and supply chain disruptions. But the introduction of stringent unilateral restrictions and possible market-distorting policies by the US has not been well-received in Europe, whose industry is more exposed to China. Despite shared objectives to increase transparency and coordination, metrics for success and implementation remain vague.

This paper first defines and explores US strategic interests in chips and analyses current US industrial policy related to semiconductors, including the challenges faced in realising these ambitions. It then assesses current EU-US coordination and finally proposes areas where cooperation could overcome key challenges and unlock opportunities.

## 1. Semiconductor policy in the United States

### 1.1 US strategic interests

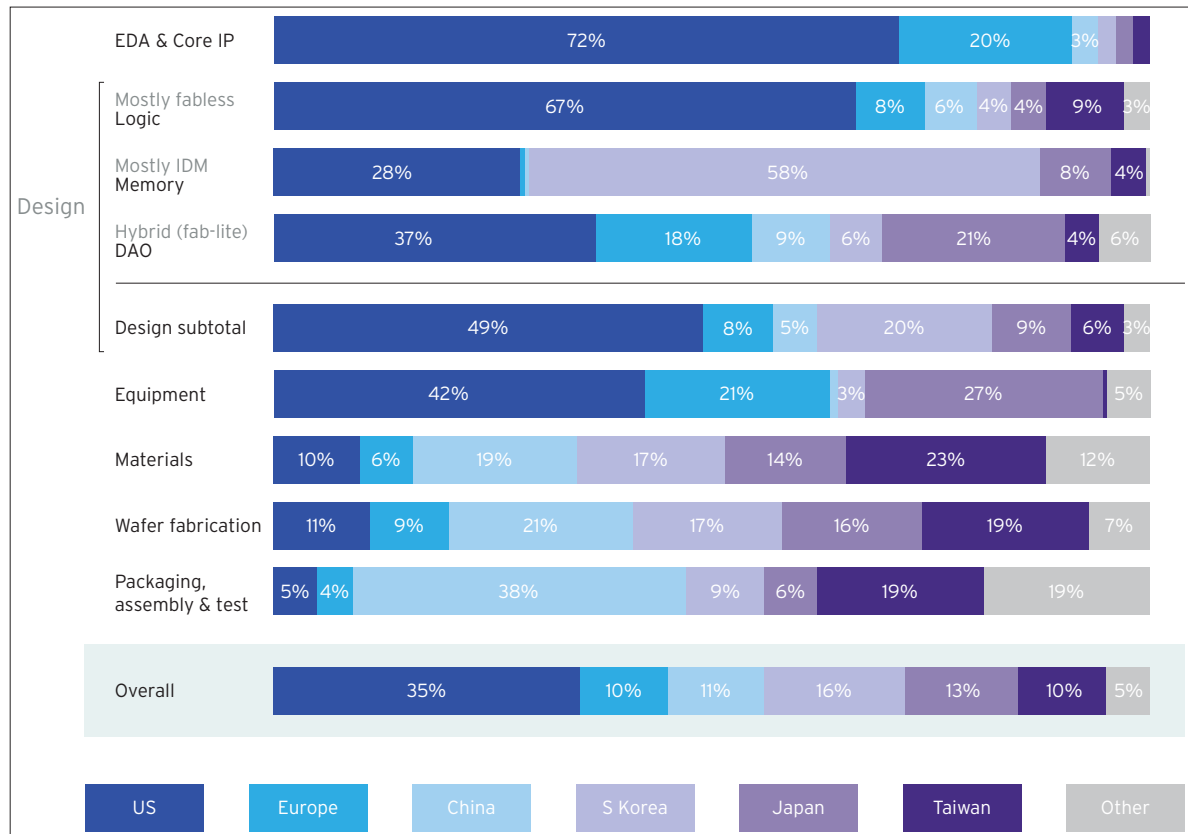
The semiconductor industry has its origins in post-war northern California, what would one day become Silicon Valley, and while the industry is now truly global, the US remains a central player.<sup>4</sup> US firms lead in global market share, with 48 per cent of global sales in 2022, followed by South Korea at 19 per cent.<sup>5</sup> Of the ten largest semiconductor firms, six are American (Intel, Micron, Qualcomm, Broadcom, Nvidia, and Texas Instruments).<sup>6</sup> The US also holds a dominant position in key segments of the industry, particularly design and software, while Europe remains a leader in optics, manufacturing tools and chemicals.

<sup>4</sup> See Chris Miller, *Chip War. The Fight for the World's Most Critical Technology*, New York, Simon and Schuster, 2022; Christophe Lécuyer and David C. Brock, *Makers of the Microchip. A Documentary History of Fairchild Semiconductor*, Cambridge, MIT Press, 2010.

<sup>5</sup> Semiconductor Industry Association, *2023 State of the U.S. Semiconductor Industry*, 2023, p. 20, <https://www.semiconductors.org/2023-state-of-the-u-s-semiconductor-industry>.

<sup>6</sup> Santosh Das, "Top 10 Largest Semiconductor Companies in the World", in *Electronics and You*, 10 August 2023, <https://www.electronicsandyou.com/blog/?p=8885>.

**Figure 1** | Semiconductor industry value added by activity and region 2021 (%)



Source: Semiconductor Industry Association, *2022 State of the U.S. Semiconductor Industry*, November 2022, p. 21, <https://www.semiconductors.org/state-of-the-u-s-semiconductor-industry>.

The US's share of chip production has nevertheless declined over the past several decades. Globalisation led to offshoring of manufacturing outside the US in the context of wider de-industrialisation. Semiconductor companies adopted a foundry (or fabless) model, separating design from manufacturing.<sup>7</sup> At the same time, East Asian manufacturing powerhouses like Taiwan and South Korea were rising.<sup>8</sup> As a consequence, the US share of global semiconductor manufacturing capacity fell from 37 per cent in 1990 to 12 per cent today.<sup>9</sup> While there is disagreement over how to calculate these figures,<sup>10</sup> they caught the attention of policymakers in the

<sup>7</sup> Daniel Nenni and Paul McLellan, *Fabless: The Transformation of the Semiconductor Industry*, Revised ed., SemiWiki.com LLC, 2019, <https://semiwiki.com/books/Fabless%202019%20Version%20PDF.pdf>.

<sup>8</sup> Karen M. Sutter, John F. Sargent Jr. and Manpreet Singh, "Semiconductors and the CHIPS Act: The Global Context", in *CRS Reports*, No. R47558 (28 September 2023), <https://crsreports.congress.gov/product/details?prodcode=R47558>.

<sup>9</sup> Antonio Varas et al., *Government Incentives and US Competitiveness in Semiconductor Manufacturing*, Boston Consulting Group, September 2020, <https://www.bcg.com/publications/2020/incentives-and-competitiveness-in-semiconductor-manufacturing>.

<sup>10</sup> Jan-Peter Kleinhans, "Europe Didn't Have 44% of Global Chip Production Capacity in the 90s."

US and EU and were widely cited by industry and government representatives in the context of new chip policies.<sup>11</sup>

Snarled supply chains during the Covid-19 pandemic combined with soaring demand for computers and consumer appliances also increased awareness of the economic disruption that could result when the supply of chips was no longer seamless. In some ways, the unique disruptions of 2020–21 were not in fact illustrative of broader weaknesses in the semiconductor supply chain.<sup>12</sup> Global production of semiconductors increased by 8 per cent from 2020–21.<sup>13</sup> Automakers, however, had reduced their chip orders due to a projected pandemic-induced decline in demand. Chip production then shifted to the most in-demand sectors, such as computers and devices needed for teleworking. This just-in-time model made auto manufacturers vulnerable to shortages when demand for cars picked up again.

National security and the growing geopolitical rivalry with China also explain US strategic interest in chips, an outlook not always shared by European allies. Ninety-two per cent of advanced (under 10nm) logic chips are manufactured in Taiwan, mainly by Taiwan Semiconductor Manufacturing Company (TSMC).<sup>14</sup> These chips are notably the most important for advanced artificial intelligence (AI) systems. According to the final report of the National Security Commission on Artificial Intelligence, "If a potential adversary bests the United States in semiconductors over the long term or suddenly cuts off U.S. access to cutting-edge chips entirely, it could gain the upper hand in every domain of warfare."<sup>15</sup> The US military's exact reliance on Taiwan for a larger range of chips is unknown, although TSMC is known to manufacture chips for F-35 fighters and other military-grade devices.<sup>16</sup> The concern about conflict with Taiwan is generally focused on the medium term. This means that a primary interest in chips is about directly providing for and securing the American defence industrial base in order to be prepared and self-sufficient when and if the need arises to mount a defence of the island. Some politicians have called for extreme measures, such as blowing up TSMC's facilities in the

Sorry", in *LinkedIn*, 11 December 2021, <https://www.linkedin.com/pulse/europe-didnt-have-44-global-chip-production-capacity-90s-kleinhans>.

<sup>11</sup> Pat Gelsinger, "The EU Must Play a Long Game for Semiconductor Success", in *Financial Times*, 28 April 2021, <https://www.ft.com/content/34b07427-6bca-431d-8406-62762fc46941>.

<sup>12</sup> Chris Miller, "The EU's Confused Role in the 'Chip War'", in *Internationale Politik Quarterly*, 29 September 2022, <https://ip-quarterly.com/en/node/37756>.

<sup>13</sup> IC Insights, "Total IC Unit Shipments Forecast to Climb 9% this Year", in *Research Bulletins*, 13 April 2022, <https://www.icinsights.com/data/articles/documents/1445.pdf>.

<sup>14</sup> Katharina Buchholz, "Advanced Microchip Production Relies on Taiwan", in *Forbes*, 13 January 2023, <https://www.forbes.com/sites/katharinabuchholz/2023/01/13/advanced-microchip-production-relies-on-taiwan>.

<sup>15</sup> US National Security Commission on Artificial Intelligence, *Final Report*, April 2021, p. 214, <https://reports.nscai.gov/final-report>.

<sup>16</sup> SuJal Shivakumar and Charles Wessner, "Semiconductors and National Defense: What Are the Stakes?", in *CSIS Commentaries*, 8 June 2022, <https://www.csis.org/node/65689>.

case of a Chinese invasion.<sup>17</sup> Other experts have argued that even in a scenario where China took full control of the island, it would lack the specialised expertise necessary to run the complex fabs.<sup>18</sup> But either way, this concentration in Taiwan has unsettled policymakers concerned about possible conflict and goes a long way towards explaining a desire to onshore chip manufacturing.

Reinforcing chip supply chains and meeting defence-related needs does not, however, mean onshoring all chip production to the US, and coordination with the EU remains important regarding the chips-defence nexus. While there is a focus on both mature (20nm or greater) and leading-edge (7nm or smaller) chips, policymakers also want to ensure that supplies of legacy chips which are important for various military uses are not entirely dependent on geopolitical hotspots.<sup>19</sup> While EU countries are less concerned about direct conflict, these perspectives are changing following the Russian invasion of Ukraine.

### *1.2 US semiconductor-related industrial policy*

The Biden Administration's chip policies should be situated within a broader focus on renewing domestic industry and reversing the deleterious social and economic trends of recent decades. If America is to seize the opportunities provided by new technologies, the argument goes, it needs to reinvest in and revitalise domestic production. Winning the 21st-century economic and geopolitical competition means increasing domestic capabilities over key building blocks, in this case semiconductors. "Industrial policy" was an anathema term in Washington for decades, but many high-profile economists have been critically revisiting this approach.<sup>20</sup> The Biden Administration in turn has emphasised an economic thinking distinct from post-Cold War neoliberalism and globalisation through its major policies including the Inflation Reduction Act, Chips and Science Act, and Infrastructure Bill, an approach it has dubbed "Bidenomics".

The CHIPS and Science Act appropriates 52.7 billion US dollars towards the semiconductor sector, including manufacturing facilities and research and development (R&D) through the National Institute of Standards and Technology.<sup>21</sup> This funding aims at boosting domestic manufacturing to ensure secure supply

<sup>17</sup> Jason Willick, "Blow Up the Microchips? What a Taiwan Spat Says About U.S. Strategy", in *The Washington Post*, 12 May 2023, <https://www.washingtonpost.com/opinions/2023/05/12/microchips-us-taiwan-strategy>.

<sup>18</sup> David Sacks, "Threatening to Destroy TSMC Is Unnecessary and Counterproductive", in *Asia Unbound*, 9 May 2023, <https://www.cfr.org/node/246641>.

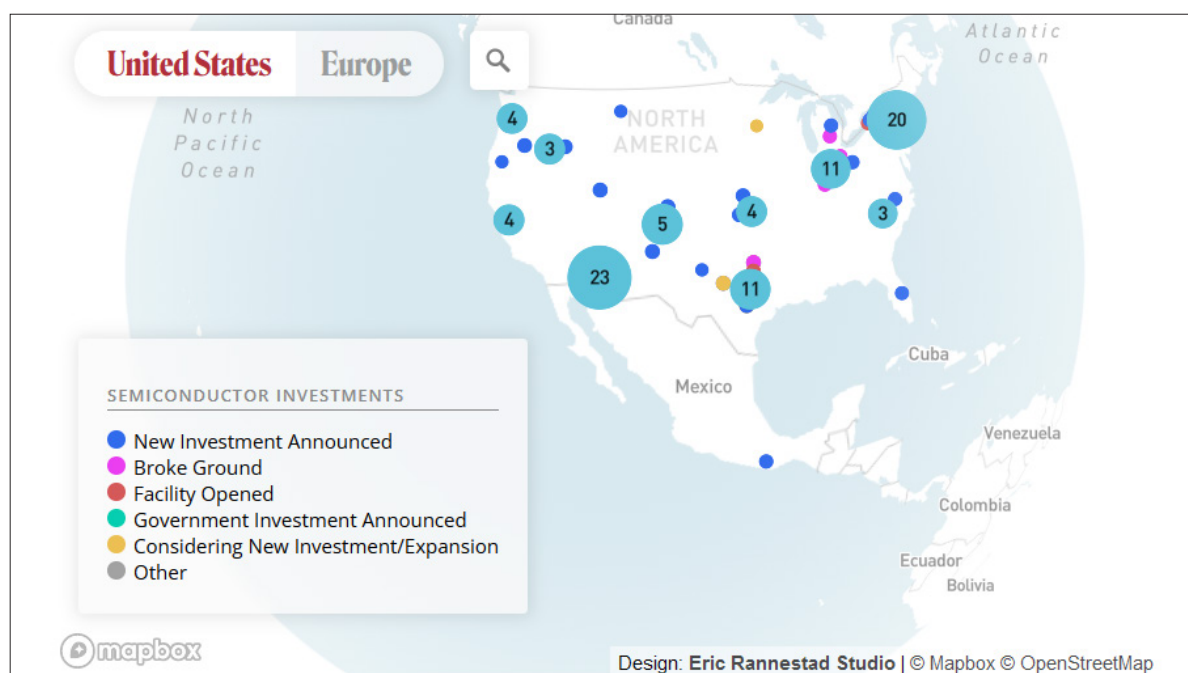
<sup>19</sup> Author interviews with US government officials, 20 November 2023.

<sup>20</sup> See: Réka Juhász, Nathan J. Lane and Dani Rodrik, "The New Economics of Industrial Policy", in *NBER Working Papers*, No. 31538 (August 2023), <https://www.nber.org/papers/w31538>; Dani Rodrik, "A New Paradigm for Economic Policy and the Role of Mainstream Economics", in *Post-Neoliberalism*, 18 November 2023, <https://www.postneoliberalism.org/articles/a-new-paradigm-for-economic-policy-and-the-role-of-mainstream-economics>.

<sup>21</sup> Karen M. Sutter, John F. Sargent Jr. and Manpreet Singh, "Semiconductors and the CHIPS Act", cit.

chains, guard against control by China of geopolitical hotspots or key nodes, and fulfil the Bidenomics pledge of bringing back good manufacturing jobs to America. Funding opportunities were announced progressively over 2023 with different application processes for large commercial fabs, smaller supply chain projects and commercial R&D. A major focus is on creating clusters, and thirty-one regional innovation hubs were announced in fall 2023.<sup>22</sup> The potential for future funding led to a surge of semiconductor-related investments from 2020 onwards, with particular hubs in Arizona and upstate New York.

**Figure 2** | Semiconductor investments – United States



Source: GMF, *The GMF Digital Semiconductor Investment Tracker* (interactive map), <https://www.gmfus.org/gmf-digital-semiconductor-investment-tracker>.

The first funding through the CHIPS Act was announced in December 2023, focusing on military-use chips.<sup>23</sup> A second award of 162 million US dollars was announced in January 2024 for Microchip Technologies to increase production of chips across a range of sectors.<sup>24</sup> The semiconductor industry is notoriously

<sup>22</sup> White House, *Fact Sheet: Biden-Harris Administration Announces 31 Regional Tech Hubs to Spur American Innovation, Strengthen Manufacturing, and Create Good-Paying Jobs in Every Region of the Country*, 23 October 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/23/fact-sheet-biden-harris-administration-announces-31-regional-tech-hubs-to-spur-american-innovation-strengthen-manufacturing-and-create-good-paying-jobs-in-every-region-of-the-country>.

<sup>23</sup> Josh Boak, "Biden Administration Says New Hampshire Computer Chip Plant the First to Get Funding from CHIPS Law", in *AP News*, 11 December 2023, <https://apnews.com/article/b7d2c6b1be718cfef3cb9dad3df2fd6>.

<sup>24</sup> Ana Swanson, "U.S. Awards Chip Supplier \$162 Million to Bolster Critical Industries", in *The New*

capital-intensive and requires enormous quantities of investment and R&D, and the CHIPS Act investment figures are in fact quite small compared to both other countries' investments (such as in East Asia) or capital expenditures by firms.<sup>25</sup> Figures should therefore be contextualised within an extremely expensive and volatile industry, which calls into question whether available resources will be enough to meet ambitions.

A key piece of US policy on semiconductors concerns not only manufacturing and industrial policy, but the denial of this key technology to strategic adversaries. Export controls on dual-use technology including semiconductors are managed by the Commerce Department's Bureau of Industry and Security (BIS) and the State Department's Directorate of Defense Trade Controls in coordination with the Department of Defense's Defense Technology Security Administration. A variety of export controls related to China's access to semiconductors date back to the Cold War, and initial controls were put in place under the Trump Administration. But BIS made waves with a significant new ruling in October 2022 targeting exports of advanced chips used in supercomputing and AI, with new licensing requirements for some manufacturing equipment, and restrictions on US persons working in the Chinese chip industry.<sup>26</sup> National Security Advisor Jake Sullivan has described the policy as one of "small yard, high fence".<sup>27</sup>

Additional export controls announced in October 2023 tighten these restrictions, including a 0 per cent *de minimis* rule for some lithography equipment.<sup>28</sup> The *de minimis* rules in BIS's Export Administration Regulations (EAR) are based on the percentage by value of controlled content of US origin in an item manufactured outside the US. If an item incorporating controlled US-origin content exceeds the *de minimis* percentage, it is subject to the EAR.<sup>29</sup> As a report from the Rhodium Group explains:

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York Times, 4 January 2024, <https://www.nytimes.com/2024/01/04/business/economy/microchip-technology-biden-funding.html>.

<sup>25</sup> Song Jung-a, "Samsung Profits Fall 69% as Demand for Semiconductors Slumps", in *Financial Times*, 6 January 2023, <https://www.ft.com/content/7790591e-8105-4a57-92f3-6b672b5b88bf>.

<sup>26</sup> US Bureau of Industry and Security, *Commerce Implements New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)*, 7 October 2022, <https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/3158-2022-10-07-bis-press-release-advanced-computing-and-semiconductor-manufacturing-controls-final/file>.

<sup>27</sup> White House, *Remarks by National Security Advisor Jake Sullivan on the Biden-Harris Administration's National Security Strategy*, 13 October 2022, <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/10/13/remarks-by-national-security-advisor-jake-sullivan-on-the-biden-harris-administrations-national-security-strategy>.

<sup>28</sup> US Bureau of Industry and Security, *Export Controls on Semiconductor Manufacturing Items*, 25 October 2023, <https://www.federalregister.gov/documents/2023/10/25/2023-23049/export-controls-on-semiconductor-manufacturing-items>.

<sup>29</sup> See Sharron Cook and Nancy Kook, *De minimis & Direct Product Rules*, presentation at the US Bureau of Industry and Security webinar, 17 December 2015, [https://www.bis.doc.gov/index.php/component/docman/?task=doc\\_download&gid=1408&Itemid=182](https://www.bis.doc.gov/index.php/component/docman/?task=doc_download&gid=1408&Itemid=182).



Applying a 0% de minimis rule captures any shred of US technology or software linked to ASML [the leading producer of lithography equipment], including those Cymer-made lasers, and even cases where no US product, service, technology, or person is involved. [...] This rule effectively asserts that even if no obvious US linkage exists via a person, technology, product, or service, the US nonetheless 'retains jurisdiction over such foreign-made equipment to protect US national security and foreign policy interests'.<sup>30</sup>

Negotiations are ongoing with strategic partners, especially the Netherlands, home to ASML, Germany, where key suppliers like Trumpf and Zeiss operate, as well as South Korea, on aligning export controls. But much of the focus on revitalising the US semiconductor industry, as illustrated by the recommendations in the September 2022 report from the Council of Advisors on Science and Technology, focuses on domestic measures rather than opportunities for international cooperation.<sup>31</sup>

## 2. Challenges and opportunities

The US seeks to overcome several key challenges in attempting to meet the three-part objectives of combatting China, securing supply chains and boosting American manufacturing.

Workforce training and preparedness is a central issue. There is currently a shortage of trained personnel in the US semiconductor industry.<sup>32</sup> A recent progress report on workforce from the National Institute of Standards and Technology (NIST) illustrates some key overlapping concerns: constructing new fabs will require construction workers and tradesmen; manning the fabs will require skilled engineers; workers need to be able to acquire the skills needed for careers in the chip industry; and salaries need to be attractive to maintain the best workers.<sup>33</sup> Taiwan has succeeded in making careers in semiconductors highly desirable and prestigious. Boosting the semiconductor sector in the US will require the same, including partnering with universities to ensure the appropriate training programmes and talent pipelines are in place. The role of immigration reform in meeting these needs will be central. The inequality that results from lack

<sup>30</sup> Reva Goujon and Jan-Peter Kleinhans, "All In: US Places a Big Bet with October 17 Controls", in *Rhodium Group Reports*, 6 November 2023, p. 5 and 11, <https://rhg.com/research/all-in>.

<sup>31</sup> US President's Council of Advisors on Science and Technology (PCAST), *Report to the President: Revitalizing the U.S. Semiconductor Ecosystem*, September 2022, [https://www.whitehouse.gov/wp-content/uploads/2022/09/PCAST\\_Semiconductors-Report\\_Sep2022.pdf](https://www.whitehouse.gov/wp-content/uploads/2022/09/PCAST_Semiconductors-Report_Sep2022.pdf).

<sup>32</sup> Madeleine Ngo, "America's Semiconductor Boom Faces a Challenge: Not Enough Workers", in *The New York Times*, 19 May 2023, <https://www.nytimes.com/2023/05/19/us/politics/semiconductor-worker-shortage.html>.

<sup>33</sup> Chips for America, *Building the U.S. Semiconductor Workforce. Progress Report*, 3 November 2023, <https://www.nist.gov/system/files/documents/2023/11/03/Building-the-US-Semiconductor-Workforce.pdf>.

of good jobs was a key catalyst for new industrial policies, and ensuring that new jobs connected to semiconductors result in stable careers with a path to upward mobility is crucial to meeting these goals. Guidance around CHIPS Act subsidies, such as requirements that firms meet childcare requirements in order to help more women secure manufacturing jobs, illustrates the larger social vision pursued via new industrial policies.<sup>34</sup>

The semiconductor industry is divided between design, manufacturing, and assembly, testing and packaging (ATP), with many firms and regions specialising in one piece of the value chain. Current US policies prioritise manufacturing over other parts of the chip production process. The US particularly lags in advanced packaging.<sup>35</sup> It was reported, for example, that semiconductors manufactured at TSMC's new Arizona location would need to be shipped back to Taiwan for packaging.<sup>36</sup> ATP facilities remain highly concentrated, with 81 per cent in Southeast Asia.<sup>37</sup> A successful semiconductor-focused industrial policy and the build-up of an entire ecosystem will need to ensure balance across the value chain.

The chip industry is also highly complex and dependent on second-order suppliers, increasing the difficulty of accurately mapping supply chains and the risk of supply chain shocks. Intel, for example, relies on over 16,000 individual suppliers.<sup>38</sup> Supply of critical minerals and mining is a piece of this challenge. Poor planning, for example by the automotive industry at the beginning of the pandemic, can exacerbate shocks. Mapping the entire supply chain is an enormously complex undertaking, but efforts are underway, including EU and US government surveys of their respective industries' supply chains and the roles of their domestic industries,<sup>39</sup> as well as valuable studies by the Organisation for Economic Cooperation and Development on semiconductor value chains and from think tanks including the Center for Strategic and International Studies.<sup>40</sup> To

<sup>34</sup> Jim Tankersley, "To Tap Federal Funds, Chip Makers Will Need to Provide Child Care", in *The New York Times*, 27 February 2022, <https://www.nytimes.com/2023/02/27/us/politics/child-care-chip-makers-biden.html>.

<sup>35</sup> Mark LaPedus, "Expanding Advanced Packaging Production in the U.S.", in *Semiconductor Engineering*, 5 January 2022, <https://wp.me/p9HsLC-1DxaP>.

<sup>36</sup> Ashley Belanger, "Biden Called Arizona Fab a 'Game-Changer.' Analyst Calls It a 'Paperweight'", in *Ars Technica*, 13 September 2023, <https://arstechnica.com/?p=1968149>.

<sup>37</sup> Antonio Varas et al., *Strengthening the Global Semiconductor Supply Chain in an Uncertain Era*, Boston Consulting Group, April 2021, [https://www.semiconductors.org/wp-content/uploads/2021/05/BCG-x-SIA-Strengthening-the-Global-Semiconductor-Value-Chain-April-2021\\_1.pdf](https://www.semiconductors.org/wp-content/uploads/2021/05/BCG-x-SIA-Strengthening-the-Global-Semiconductor-Value-Chain-April-2021_1.pdf).

<sup>38</sup> Intel website: *Intel Manufacturing*, <https://www.intel.com/content/www/us/en/architecture-and-technology/global-manufacturing.html>.

<sup>39</sup> See US Government Accountability Office, "Semiconductor Supply Chain: Policy Considerations from Selected Experts for Reducing Risks and Mitigating Shortages", in *GAO Reports*, No. GAO-22-105923 (26 July 2022), <https://www.gao.gov/products/gao-22-105923>; Nicoletta Rosati et al., *The EC Consultation on the Semiconductors' Value Chain*, Luxembourg, Publications Office of the European Union, 2023, <https://doi.org/10.2760/609020>.

<sup>40</sup> OECD, "Measuring Distortions in International Markets: The Semiconductor Value Chain", in *OECD Trade Policy Papers*, No. 234 (12 December 2019), <https://doi.org/10.1787/8fe4491d-en>; Akhll

mitigate supply chain risks, the CHIPS Act encourages purchase commitments. Adding redundancy is a key part of ensuring resiliency and de-risking.<sup>41</sup> Although fully mapping suppliers may be impossible, further cooperation is needed to identify bottlenecks and chokepoints.

Finally, a major challenge is that of defining metrics for success. What does success look like in five, ten, or 15 years? What kinds of chips should the US be producing, in what quantities and for which sectors? As Moore's Law slows, the industry focus is shifting towards more targeted designs tailored to specific industry and consumer demands.<sup>42</sup> Excess supply will also affect prices in an incredibly cyclical industry.<sup>43</sup> Industrial policies need to stay abreast of these changes, a challenging process with many competing opinions. Getting groups to agree on a lexicon of terms is an important first step for defining success.<sup>44</sup>

The need to define metrics also applies to the foreign policy and trade elements central to the Biden Administration's strategy, including export controls. Denying China access to certain chip-making materials might merely accelerate its domestic industry and the removal of American inputs from China's supply chains. Maintaining leverage could be a better approach. China's ecosystem is closely interconnected with US companies, suppliers and funding. The CHIPS Act requirements that ban companies receiving funding from investing in chips under the 28nm node in China for ten years may end up accelerating and reorienting production of these legacy chips and therefore dependency on China for these chips, which are used in growing sectors like 5G or IoT devices.<sup>45</sup> As the largest chip market, and with over 100 billion US dollars spent to boost its chip industry, China still represents a key part of US companies' business and strategies.<sup>46</sup> The US is concerned, however, about the threat China poses to market-based actors, and that its export subsidies and export capacity will lead to a similar situation for current and mature chips as occurred with solar panels, namely a flood of cheaper imports that rapidly undercuts domestic industry. While the World Trade Organization (WTO) requires transparency on subsidies, China's opaqueness makes this difficult.<sup>47</sup> Furthermore, recent advances by Huawei in chipmaking suggest a

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Thadani and Gregory C. Allen, "Mapping the Semiconductor Supply Chain: The Critical Role of the Indo-Pacific Region", in *CSIS Briefs*, May 2023, <https://www.csis.org/node/105653>.

<sup>41</sup> Author interviews with US Government officials, November 2023.

<sup>42</sup> Ian Cutress, "Interview with GlobalFoundries CEO Dr. Thomas Caulfield", in *More Than Moore*, 8 November 2023, <https://morethanmoore.substack.com/p/interview-with-globalfoundries-ceo>.

<sup>43</sup> "Biden's Microchip Man Says Goodbye", in *Politico Tech*, 2 August 2023, <https://politico-tech.simplecast.com/episodes/bidens-microchip-man-says-goodbye-ronnie-chatterji>.

<sup>44</sup> Author interviews with US Government officials, November 2023.

<sup>45</sup> Karen M. Sutter, John F. Sargent Jr. and Manpreet Singh, "Semiconductors and the CHIPS Act", cit.

<sup>46</sup> Julie Zhu, "Exclusive: China Readying \$143 Billion Package for Its Chips Firms in Face of US Curbs", in *Reuters*, 14 December 2022, <https://www.reuters.com/technology/china-plans-over-143-bln-push-boost-domestic-chips-compete-with-us-sources-2022-12-13>.

<sup>47</sup> US Trade Representative, *2022 Report to Congress on China's WTO Compliance*, February 2023, <https://ustr.gov/sites/default/files/2023-02/2022%20USTR%20Report%20to%20Congress%20on%20China's%20WTO%20Compliance%20-%20Final.pdf>.

perhaps unexpected ability to work around sanctions.<sup>48</sup> This represents a possible area of convergence with the EU, which shares these concerns, and information-sharing on Chinese capacity could be an important area of cooperation.

### 3. EU-US cooperation

#### 3.1 Current EU-US cooperation on semiconductors

The American and European semiconductor industries are already tightly intertwined and interdependent, including through investment, research and supply chains, although each region has its specific strengths.<sup>49</sup> EU and US companies engaged in this sector have significant operations on both sides of the ocean. Cooperation and coordination between the governments mainly occurs through activities now placed in the context of the Trade and Technology Council. The TTC's Working Group 3 focuses partly on semiconductor supply chains, although the approach shifted following the Russian invasion of Ukraine.<sup>50</sup> The TTC also has a working group on supply chains for critical minerals. Successive summit outcomes illustrate a sustained and growing focus on chips. The May 2022 TTC statement refers to a desire to increase transparency and coordination on semiconductor policies.<sup>51</sup> An early warning mechanism was announced at the December 2022 TTC.<sup>52</sup> The May 2023 press release contained the most in-depth description of cooperation with the EU on semiconductors, including a joint early-warning mechanism, transparency mechanism and goal to avoid a subsidy race.<sup>53</sup> Disagreement remains, however, over the extent to which the focus of semiconductor policies should be on combatting China. National security also remains an EU member state competency, which means the decision to tighten export control measures in response to US demands is largely carried out by national governments, and then reflected in EU regulation. There is still significant uncertainty over what kind of cooperative chip ecosystem the EU and US are trying to create, and what role there will be for a diverse set of partners and stakeholders.

<sup>48</sup> "Mate 60 Pro Mobile RF Architecture Proves Huawei Can Compete with Top-Tier Smartphone OEMs", in *Tech Insights Blog*, 8 December 2023, <https://www.techinsights.com/node/54374>.

<sup>49</sup> Shayerah I. Akhtar et al., "U.S.-EU Trade Relations", in *CRS Reports*, No. R47095 (3 June 2022), <https://crsreports.congress.gov/product/details?prodcode=R47095>.

<sup>50</sup> Daniel Michaels and Yuka Hayashi, "Russian Invasion Intensifies Role of New U.S.-EU Tech Council", in *The Wall Street Journal*, 15 May 2022, <https://www.wsj.com/articles/russian-invasion-intensifies-role-of-new-u-s-eu-tech-council-11652607001>.

<sup>51</sup> EU-US Trade and Technology Council, *EU-U.S. Joint Statement*, 16 May 2022, <https://www.consilium.europa.eu/media/56726/eu-u-s-joint-statement-of-the-trade-and-technology-council.pdf>.

<sup>52</sup> EU-US Trade and Technology Council, *EU-US Joint Statement*, 5 December 2022, [https://ec.europa.eu/commission/presscorner/detail/en/statement\\_22\\_7516](https://ec.europa.eu/commission/presscorner/detail/en/statement_22_7516).

<sup>53</sup> EU-US Trade and Technology Council, *Joint Statement EU-US Trade and Technology Council of 31 May 2023 in Lulea, Sweden*, [https://ec.europa.eu/commission/presscorner/detail/en/statement\\_23\\_2992](https://ec.europa.eu/commission/presscorner/detail/en/statement_23_2992).

### 3.2 Possible areas of cooperation and opportunity

For EU-US cooperation to be effective, policymakers should be clear-eyed about where objectives overlap and where disagreements remain entrenched. The following recommendations identify areas of possible increased cooperation with mutual benefits.

First, the EU and US should further coordination on critical minerals and the pursuit of joint initiatives (including with third countries) to ensure supply of minerals critical for semiconductor manufacturing. Such coordination should occur alongside efforts to combine existing supply chain mapping initiatives, whether through the TTC or bodies like the OECD. This will help identify chokepoints and build capacity to target them, including through facilitating information-sharing with industry. Agreement on standards and methods will help ensure analysis of change over time in supply chain monitoring. Joint initiatives with third countries should take the form of partnerships rather than recreating past exploitative natural-resource-based relationships.

Second, the focus should remain on comparative advantage and relative strengths. The success of new semiconductor policies does not mean autarkic attempts to recreate these sectors in each region, but rather ensuring efforts are not needlessly duplicative or redundant. "Mutual dependence" is a more effective response to concerns about China and geopolitical tension than trying to build up a self-sufficient domestic industry, which is much easier said than done. This should include coordination on measurable targets or benchmarks for success that go beyond the terms "revitalising industry" or "reshoring supply". Such targets could include, for example, coordinating to ensure funding is distributed between manufacturing and ATP, and meets the needs of local chip-dependent industries.

Third, the EU and US should collaborate further on security standards to protect against supply chain attacks. The US National Institute of Standards and Technology (NIST) recently released a paper on setting measurements and standards, including metrology to ensure provenance of components across the supply chain.<sup>54</sup> These types of initiatives should be shared between partners. Crisis simulations could also be conducted with transatlantic and other key partners, including Japan, Korea and Taiwan.

Fourth, the EU and US should enhance cooperation on workforce-related concerns, including information-sharing and expanding the networks of universities and other training and research programmes, government, and industry that exist within local or regional-level hubs. Broadening these initiatives could help in developing shared workforce initiatives, including coordinating on training programmes, visas and information-sharing on industry needs.

<sup>54</sup> National Institute of Standards and Technology (NIST), *Strategic Opportunities for U.S. Semiconductor Manufacturing*, August 2022, <https://doi.org/10.6028/NIST.CHIPS.1000>.

Finally, both the EU and US have an interest in ensuring government funding is used to achieve stated goals. One way to do so is by enforcing stricter rules on stock buybacks. According to one report, buybacks of the nineteen industry signatories of a public letter to the Biden Administration requesting financial support totalled 540 billion US dollars from 2001 to 2020.<sup>55</sup> EU and US policymakers should tighten requirements around funding allocation and coordinate to ensure government funds are used appropriately.

### 4. Challenges

Despite possible unrealised areas of collaboration, several barriers and political constraints could prevent further EU-US cooperation.

The EU and US both emphasise the importance of avoiding a subsidy race, but the risk remains. One concern is that firms could emphasise concerns about supply chain disruptions to attract ultimately excessive subsidies. In conversations with officials, they argued that this concern is overblown, as a US fab will look different from one in the EU, each responding to different factors like customers and energy usage, lowering the possibility of a subsidy race. Furthermore, with demand expected to rise, the process is not zero-sum. While allies have accused the US of a protectionist turn or of blocking multilateral cooperation through the WTO, US officials insist that the new economic policies are and must be in cooperation with allies. But bodies like the WTO that could adjudicate such disputes are under strain, and every effort should be made to avoid a needless race to the bottom in subsidies. Boosting information-sharing and enhancing policymaker understanding of this complex industry is an important step.

As noted, identifying risks across the highly complex semiconductor supply chain is a difficult task, as each of the inputs emerges from its own intricate and diffuse supply chain. ASML's extreme ultraviolet lithography machines, for example, rely on almost eight hundred suppliers globally.<sup>56</sup> Firms are reluctant to share confidential or proprietary data.<sup>57</sup> The semiconductor industry relies on the development of deep local ecosystems, bridging education, manufacturing, suppliers and the attendant ripple effects on the local economy and governance. EU-US cooperation is therefore not just a question of government-to-government contacts, but coordinating with local municipalities and decision-makers essential

<sup>55</sup> William Lazonick and Matt Hopkins, "How Intel Financialized and Lost Leadership in Semiconductor Fabrication", in *Ineteconomics Articles*, 7 July 2021, <https://www.ineteconomics.org/perspectives/blog/how-intel-financialized-and-lost-leadership-in-semiconductor-fabrication>.

<sup>56</sup> Katie Tarasov, "ASML Is the Only Company Making the \$200 Million Machines Needed to Print Every Advanced Microchip. Here's an Inside Look", in *CNBC*, 23 March 2022, <https://www.cnbc.com/2022/03/23/inside-asml-the-company-advanced-chipmakers-use-for-euv-lithography.html>.

<sup>57</sup> Alan Ifould, "Data Sharing Across the Fab and the Cost of Inaction", in *Semiconductor Digest*, 10 December 2022, <https://www.semiconductor-digest.com/?p=12174>.

to the establishment of successful policies. Without this level of contact, key pieces of information will be missed. Semiconductor cooperation also comes within the context of other friction points in the transatlantic relationship, for example the issue of data flows and privacy. The European Court of Justice has twice invalidated US-EU data flow agreements over US law enforcement access to data held by private companies, and could do so again if and when it reviews the new US-EU Data Privacy Framework agreement. Such tensions could spill over and hinder data-sharing on semiconductors.

Chip export controls will also continue to be a source of tension. It remains to be seen what long-term effect they will have on China's domestic industry, and allies' assessments of the risks will evolve accordingly. There is also the risk that the policies fail to sufficiently differentiate between different types of chips and risks, with knock-on economic effects, for example by increasing Chinese dominance of 28nm chips.

Climate shocks could also pose major risks. Semiconductor manufacturing requires large quantities of water.<sup>58</sup> Local initiatives in the US are already straining resources.<sup>59</sup> Droughts in Taiwan, the development of a chip ecosystem in the dry Arizona desert, changing weather patterns and energy disruptions all pose a risk as climate change accelerates. EU-US coordination and efforts to foster mutual dependence must account for such scenarios.

Finally, while focus remains on opportunities for transatlantic partnership, it should not be forgotten that these interconnected economies are also competitors.<sup>60</sup> There may be a limit to how much coordination is possible, with pushback from the private sector and within government as domestic trade-offs and interests take priority. The upcoming US elections also pose new uncertainties regarding the longevity of Bidenomics and the turn towards industrial policy. Yet strengthening EU-US cooperation in semiconductors through the low-hanging fruit identified above could have positive implications for realising the US's strategic vision in de-risking supply chains, re-industrialising and competing with China.

*Updated 26 February 2024*

<sup>58</sup> Chris Jones and Edwards Vacuum, "Water Supply Challenges for the Semiconductor Industry", in *Semiconductor Digest*, 24 October 2022, <https://www.semiconductor-digest.com/?p=20849>.

<sup>59</sup> Dionne Searcey, "Indiana's Plan to Pipe in Groundwater for Microchip Making Draws Fire", in *The New York Times*, 2 January 2024, <https://www.nytimes.com/2024/01/02/climate/indiana-leap-groundwater-pipe-microchips.html>.

<sup>60</sup> Shayerah I. Akhtar et al., "U.S.-EU Trade Relations", cit.

## References

Shayerah I. Akhtar et al., "U.S.-EU Trade Relations", in *CRS Reports*, No. R47095 (3 June 2022), <https://crsreports.congress.gov/product/details?prodcode=R47095>

Ashley Belanger, "Biden Called Arizona Fab a 'Game-Changer.' Analyst Calls It a 'Paperweight'", in *Ars Technica*, 13 September 2023, <https://arstechnica.com/?p=1968149>

Josh Boak, "Biden Administration Says New Hampshire Computer Chip Plant the First to Get Funding from CHIPS Law", in *AP News*, 11 December 2023, <https://apnews.com/article/b7d2c6b1be718cfef3cb9dad3df2fd6>

Katharina Buchholz, "Advanced Microchip Production Relies on Taiwan", in *Forbes*, 13 January 2023, <https://www.forbes.com/sites/katharinabuchholz/2023/01/13/advanced-microchip-production-relies-on-taiwan>

Ondrej Burkacky, Jula Dragon and Nikolaus Lehmann, "The Semiconductor Decade: A Trillion-Dollar Industry", in *McKinsey Articles*, 1 April 2022, <https://www.mckinsey.com/industries/semiconductors/our-insights/the-semiconductor-decade-a-trillion-dollar-industry>

Chips for America, *Building the U.S. Semiconductor Workforce. Progress Report*, 3 November 2023, <https://www.nist.gov/system/files/documents/2023/11/03/Building-the-US-Semiconductor-Workforce.pdf>

Sharron Cook and Nancy Kook, *De minimis & Direct Product Rules*, presentation at the US Bureau of Industry and Security webinar, 17 December 2015, [https://www.bis.doc.gov/index.php/component/docman/?task=doc\\_download&gid=1408&Itemid=182](https://www.bis.doc.gov/index.php/component/docman/?task=doc_download&gid=1408&Itemid=182)

Ian Cutress, "Interview with GlobalFoundries CEO Dr. Thomas Caulfield", in *More Than Moore*, 8 November 2023, <https://morethanmoore.substack.com/p/interview-with-globalfoundries-ceo>

Santosh Das, "Top 10 Largest Semiconductor Companies in the World", in *Electronics and You*, 10 August 2023, <https://www.electronicandyou.com/blog/?p=8885>

EU-US Trade and Technology Council, *EU-U.S. Joint Statement*, 16 May 2022, <https://www.consilium.europa.eu/media/56726/eu-u-s-joint-statement-of-the-trade-and-technology-council.pdf>

EU-US Trade and Technology Council, *EU-US Joint Statement*, 5 December 2022, [https://ec.europa.eu/commission/presscorner/detail/en/statement\\_22\\_7516](https://ec.europa.eu/commission/presscorner/detail/en/statement_22_7516)

EU-US Trade and Technology Council, *Joint Statement EU-US Trade and Technology Council of 31 May 2023 in Lulea, Sweden*, <https://ec.europa.eu/>



commission/presscorner/detail/en/statement\_23\_2992

Pat Gelsinger, "The EU Must Play a Long Game for Semiconductor Success", in *Financial Times*, 28 April 2021, <https://www.ft.com/content/34b07427-6bca-431d-8406-62762fc46941>

Reva Goujon and Jan-Peter Kleinhans, "All In: US Places a Big Bet with October 17 Controls", in *Rhodium Group Reports*, 6 November 2023, <https://rhg.com/research/all-in>

IC Insights, "Total IC Unit Shipments Forecast to Climb 9% this Year", in *Research Bulletins*, 13 April 2022, <https://www.icinsights.com/data/articles/documents/1445.pdf>

Alan Ifould, "Data Sharing Across the Fab and the Cost of Inaction", in *Semiconductor Digest*, 10 December 2022, <https://www.semiconductor-digest.com/?p=12174>

Chris Jones and Edwards Vacuum, "Water Supply Challenges for the Semiconductor Industry", in *Semiconductor Digest*, 24 October 2022, <https://www.semiconductor-digest.com/?p=20849>

Réka Juhász, Nathan J. Lane and Dani Rodrik, "The New Economics of Industrial Policy", in *NBER Working Papers*, No. 31538 (August 2023), <https://www.nber.org/papers/w31538>

Song Jung-a, "Samsung Profits Fall 69% as Demand for Semiconductors Slumps", in *Financial Times*, 6 January 2023, <https://www.ft.com/content/7790591e-8105-4a57-92f3-6b672b5b88bf>

Jan-Peter Kleinhans, "Europe Didn't Have 44% of Global Chip Production Capacity in the 90s. Sorry", in *LinkedIn*, 11 December 2021, <https://www.linkedin.com/pulse/europe-didnt-have-44-global-chip-production-capacity-90s-kleinhans>

Mark LaPedus, "Expanding Advanced Packaging Production in the U.S.", in *Semiconductor Engineering*, 5 January 2022, <https://wp.me/p9HsLC-1DxaP>

William Lazonick and Matt Hopkins, "How Intel Financialized and Lost Leadership in Semiconductor Fabrication", in *Ineteconomics Articles*, 7 July 2021, <https://www.ineteconomics.org/perspectives/blog/how-intel-financialized-and-lost-leadership-in-semiconductor-fabrication>

Christophe Lécuyer and David C. Brock, *Makers of the Microchip. A Documentary History of Fairchild Semiconductor*, Cambridge, MIT Press, 2010

Daniel Michaels and Yuka Hayashi, "Russian Invasion Intensifies Role of New U.S.-EU Tech Council", in *The Wall Street Journal*, 15 May 2022, <https://www.wsj.com/articles/russian-invasion-intensifies-role-of-new-u-s-eu-tech-council-11652607001>

Chris Miller, *Chip War. The Fight for the World's Most Critical Technology*, New York, Simon and Schuster, 2022

Chris Miller, "The EU's Confused Role in the 'Chip War'", in *Internationale Politik Quarterly*, 29 September 2022, <https://ip-quarterly.com/en/node/37756>

National Institute of Standards and Technology (NIST), *Strategic Opportunities for U.S. Semiconductor Manufacturing*, August 2022, <https://doi.org/10.6028/NIST.CHIPS.1000>

Daniel Nenni and Paul McLellan, *Fabless: The Transformation of the Semiconductor Industry*, Revised ed., SemiWiki.com LLC, 2019, <https://semiwiki.com/books/Fabless%202019%20Version%20PDF.pdf>

Madeleine Ngo, "America's Semiconductor Boom Faces a Challenge: Not Enough Workers", in *The New York Times*, 19 May 2023, <https://www.nytimes.com/2023/05/19/us/politics/semiconductor-worker-shortage.html>

OECD, "Measuring Distortions in International Markets: The Semiconductor Value Chain", in *OECD Trade Policy Papers*, No. 234 (12 December 2019), <https://doi.org/10.1787/8fe4491d-en>

Steven Overly, "Raimondo: Commerce 'War Room' Seeing Improvements on Supply Chain Woes", in *Politico*, 22 November 2021, <https://www.politico.com/news/2021/11/22/raimondo-commerce-war-room-supply-chain-woes-523207>

Dani Rodrick, "A New Paradigm for Economic Policy and the Role of Mainstream Economics", in *Post-Neoliberalism*, 18 November 2023, <https://www.postneoliberalism.org/articles/a-new-paradigm-for-economic-policy-and-the-role-of-mainstream-economics>

Nicoletta Rosati et al., *The EC Consultation on the Semiconductors' Value Chain*, Luxembourg, Publications Office of the European Union, 2023, <https://doi.org/10.2760/609020>

David Sacks, "Threatening to Destroy TSMC Is Unnecessary and Counterproductive", in *Asia Unbound*, 9 May 2023, <https://www.cfr.org/node/246641>

Dionne Searcey, "Indiana's Plan to Pipe in Groundwater for Microchip Making Draws Fire", in *The New York Times*, 2 January 2024, <https://www.nytimes.com/2024/01/02/climate/indiana-leap-groundwater-pipe-microchips.html>

Semiconductor Industry Association, *2022 State of the U.S. Semiconductor Industry*, November 2022, <https://www.semiconductors.org/state-of-the-u-s-semiconductor-industry>

Semiconductor Industry Association, *2023 State of the U.S. Semiconductor Industry*, 2023, <https://www.semiconductors.org/2023-state-of-the-u-s-semiconductor-industry>

SuJal Shivakumar and Charles Wessner, "Semiconductors and National Defense: What Are the Stakes?", in *CSIS Commentaries*, 8 June 2022, <https://www.csis.org/node/65689>

Karen M. Sutter, John F. Sargent Jr. and Manpreet Singh, "Semiconductors and the CHIPS Act: The Global Context", in *CRS Reports*, No. R47558 (28 September 2023), <https://crsreports.congress.gov/product/details?prodcode=R47558>

Ana Swanson, "U.S. Awards Chip Supplier \$162 Million to Bolster Critical Industries", in *The New York Times*, 4 January 2024, <https://www.nytimes.com/2024/01/04/business/economy/microchip-technology-biden-funding.html>

Jim Tankersley, "To Tap Federal Funds, Chip Makers Will Need to Provide Child Care", in *The New York Times*, 27 February 2022, <https://www.nytimes.com/2023/02/27/us/politics/child-care-chip-makers-biden.html>

Katie Tarasov, "ASML Is the Only Company Making the \$200 Million Machines Needed to Print Every Advanced Microchip. Here's an Inside Look", in *CNBC*, 23 March 2022, <https://www.cnbc.com/2022/03/23/inside-asml-the-company-advanced-chipmakers-use-for-euv-lithography.html>

Akhil Thadani and Gregory C. Allen, "Mapping the Semiconductor Supply Chain: The Critical Role of the Indo-Pacific Region", in *CSIS Briefs*, May 2023, <https://www.csis.org/node/105653>

US Bureau of Industry and Security, *Commerce Implements New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)*, 7 October 2022, <https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/3158-2022-10-07-bis-press-release-advanced-computing-and-semiconductor-manufacturing-controls-final/file>

US Bureau of Industry and Security, *Export Controls on Semiconductor Manufacturing Items*, 25 October 2023, <https://www.federalregister.gov/documents/2023/10/25/2023-23049/export-controls-on-semiconductor-manufacturing-items>

US Government Accountability Office, "Semiconductor Supply Chain: Policy Considerations from Selected Experts for Reducing Risks and Mitigating Shortages", in *GAO Reports*, No. GAO-22-105923 (26 July 2022), <https://www.gao.gov/products/gao-22-105923>

US National Security Commission on Artificial Intelligence, *Final Report*, April 2021, <https://reports.nscai.gov/final-report>

US President's Council of Advisors on Science and Technology (PCAST), *Report to the President: Revitalizing the U.S. Semiconductor Ecosystem*, September 2022, [https://www.whitehouse.gov/wp-content/uploads/2022/09/PCAST\\_Semiconductors-Report\\_Sep2022.pdf](https://www.whitehouse.gov/wp-content/uploads/2022/09/PCAST_Semiconductors-Report_Sep2022.pdf)

US Trade Representative, *2022 Report to Congress on China's WTO Compliance*, February 2023, <https://ustr.gov/sites/default/files/2023-02/2022%20USTR%20Report%20to%20Congress%20on%20China's%20WTO%20Compliance%20-%20Final.pdf>

Antonio Varas et al., *Government Incentives and US Competitiveness in Semiconductor Manufacturing*, Boston Consulting Group, September 2020, <https://www.bcg.com/publications/2020/incentives-and-competitiveness-in-semiconductor-manufacturing>

Antonio Varas et al., *Strengthening the Global Semiconductor Supply Chain in an Uncertain Era*, Boston Consulting Group, April 2021, [https://www.semiconductors.org/wp-content/uploads/2021/05/BCG-x-SIA-Strengthening-the-Global-Semiconductor-Value-Chain-April-2021\\_1.pdf](https://www.semiconductors.org/wp-content/uploads/2021/05/BCG-x-SIA-Strengthening-the-Global-Semiconductor-Value-Chain-April-2021_1.pdf)

White House, *Fact Sheet: Biden-Harris Administration Announces 31 Regional Tech Hubs to Spur American Innovation, Strengthen Manufacturing, and Create Good-Paying Jobs in Every Region of the Country*, 23 October 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/23/fact-sheet-biden-harris-administration-announces-31-regional-tech-hubs-to-spur-american-innovation-strengthen-manufacturing-and-create-good-paying-jobs-in-every-region-of-the-country>

White House, *Remarks by National Security Advisor Jake Sullivan on the Biden-Harris Administration's National Security Strategy*, 13 October 2022, <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/10/13/remarks-by-national-security-advisor-jake-sullivan-on-the-biden-harris-administrations-national-security-strategy>

Jason Willick, "Blow Up the Microchips? What a Taiwan Spat Says About U.S. Strategy", in *The Washington Post*, 12 May 2023, <https://www.washingtonpost.com/opinions/2023/05/12/microchips-us-taiwan-strategy>

World Semiconductor Trade Statistics (WSTS), *WSTS Semiconductor Market Forecast Fall 2023*, 28 November 2023, <https://www.wsts.org/76/Recent-News-Release>

Julie Zhu, "Exclusive: China Readying \$143 Billion Package for Its Chips Firms in Face of US Curbs", in *Reuters*, 14 December 2022, <https://www.reuters.com/technology/china-plans-over-143-bln-push-boost-domestic-chips-compete-with-us-sources-2022-12-13>

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