

Are Chips the Testbed for Increased Transatlantic Cooperation?

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EXECUTIVE SUMMARY

The EU and US have proposed plans to restore resilience and balance for one of the world's most foundational technologies and essential industries. While pursuing complete self-sufficiency as a goal would be unrealistic, the proposals are designed to provide public funding for each region's critical semiconductor needs. Both plans provide public support to help increase private investment in semiconductor R&D and manufacturing, but the plans have distinct implementation strategies and requirements.

Our comparison of the two plans aims to help policymakers identify both common ground and unique best practices from each one. Specifically,

- To receive support for a "first-of-a-kind" manufacturing facility in Europe, the EU Chips Act's regulation also requires investments in "next-gen" chips. The US CHIPS Act does not have a similar requirement, but Intel advocates using an applicant's commitments to domestic R&D as a factor in the decision making for public funding.
- The US CHIPS Act has progressed at a slower rate than its European counterpart. And unlike its EU homologue, it lacks a clause to expedite the permitting process for new facilities. A delay in permitting in our dynamic industry means that proposed investments that would otherwise happen in the US if there were CHIPS funding may occur elsewhere.

- A strong digital talent pipeline is crucial to a successful semiconductor ecosystem. The US CHIPS Act wisely requires grant applicants to invest in workforce training to help support the expected increase in new semiconductor facilities. The EU Chips Act will also support education, training, skilling and reskilling initiatives, but it is not a requirement.

As the US and the EU implement their chips initiatives, they should learn from each other and their R&D institutions should find ways to jointly collaborate on "breakthrough challenges". The common semiconductor challenges and shared ambitions of the EU and US should help usher in a new era of effective transatlantic cooperation.

A Tale of Two Strategies

Two different regions, but similar semiconductor supply challenges and technological ambitions requiring significant government action. The initiatives chosen by the EU and US to address those challenges and ambitions? Separate proposals to level the playing field, increase R&D, and rebalance the semiconductor supply chain. To help

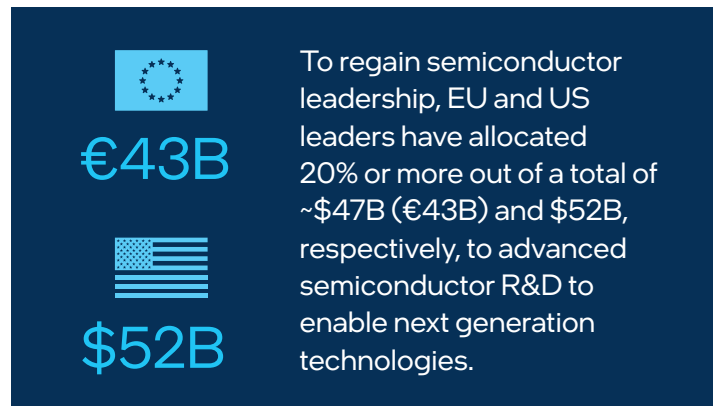
policymakers on both sides of the Atlantic understand the potential impacts of their respective initiatives, we analyze key similarities and differences between the [Creating Helpful Incentives to Produce Semiconductors \(CHIPS\) for America Act](#) and the [EU Chips Act](#) (a package of initiatives).¹

Common Transatlantic Semiconductor Objectives

Both initiatives aim to reinvigorate semiconductor R&D to increase technology leadership, and increase domestic chipmaking manufacturing capacity to enhance supply chain resilience. We compare below how the US and EU initiatives meet these common objectives.

Reinvigorate chipmaking R&D to increase technology leadership

While the EU chipmaking ecosystem has innovation giants like IMEC, too few companies in the EU and US can sustain the level of R&D required to solve breakthrough problems that will be required to keep innovating at the pace demanded by Moore's Law. To regain semiconductor leadership, EU and US leaders have allocated 20% or more out of a total of ~\$47B (€43B) and \$52B, respectively, to advanced semiconductor R&D to enable next generation technologies. Both the US CHIPS Act and EU Chips Act have provisions designed to connect new and existing semiconductor R&D initiatives together to fill gaps in a chip technology's innovation journey from lab to fab—i.e., from pre-competitive research to prototyping, pilot lines and high-volume manufacturing. The US CHIPS Act's broad R&D program is the National Semiconductor Technology Center (NSTC), which will be coordinated with other narrower programs such as the National Advanced Packaging Manufacturing Program and a new Manufacturing USA institute. The EU Chips Act creates the Chips for Europe Initiative as its innovation lead, building on existing programs like Horizon Europe and Digital Europe.



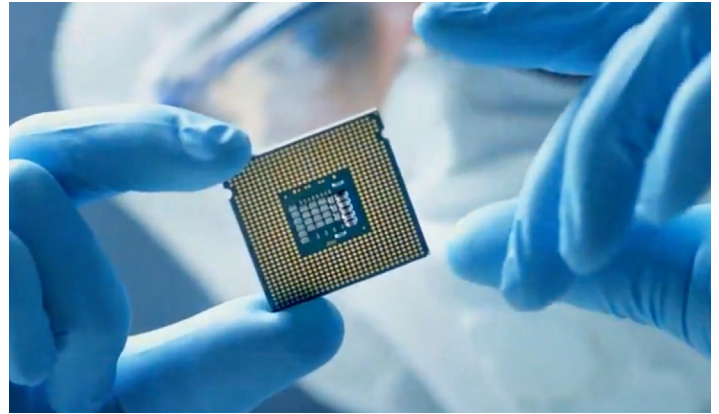
Given the magnitude of the challenge, Intel strongly supports EU-US cooperation on pre-competitive semiconductor R&D. We benefit from our bilateral R&D programs with CEA-Leti (France), IMEC (Belgium), and Fraunhofer (Germany) on photoresist and advanced packaging projects. On an industry level, IMEC could be a valuable contributor working with the NSTC and US industry in exploring breakthrough challenges and prototyping new technologies. Those challenges could include, as examples, patterning technologies beyond today's Extreme Ultra-Violet lithography; transistor stacking process flows for improved density; and finding new interconnect materials for improved density, performance, and reliability.

¹ **EU Chips Act Package:** Proposal for a Regulation establishing a framework of measures for strengthening Europe's semiconductor ecosystem (Chips Act) [hereinafter "Proposed Regulation"]; Communication from the Commission: A Chips Act for Europe; Proposal for a Council Regulation amending Regulation (EU) 2021/2085 establishing the Joint Undertakings under Horizon Europe, as regards the Chips Joint Undertaking; Commission Recommendation on a common Union toolbox to address semiconductor shortages and an EU mechanism for monitoring the semiconductor ecosystem; available at <https://digital-strategy.ec.europa.eu/en/library/european-chips-act-communication-regulation-joint-undertaking-and-recommendation>. **US CHIPS Act:** Pub. Law. No 116–283 (January 1, 2021), William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021; TITLE XCIX – Creating Helpful Incentives to Produce Semiconductors for America Act; available at <https://www.congress.gov/116/plaws/publ283/PLAW-116publ283.pdf>.

Increase domestic chipmaking manufacturing capacity to enhance supply chain resilience

Both the US and EU have seen huge declines in their share of chipmaking manufacturing capacity and now face excessive dependency on East Asia, especially for leading edge chips. Many defense and supply chain analysts have highlighted this condition as a significant vulnerability.² Conflict in the Ukraine and the COVID pandemic, along with soaring semiconductor demand, are painful reminders of the fragility of the semiconductor industry's supply chain. Accordingly, the US CHIPS Act and EU Chips Act provide a mechanism to stimulate the massive private investment required to restore domestic capacity.

However, neither EU nor US policymakers aim for complete self-sufficiency; rather, both want to mobilize enough funding to help build a threshold level of chipmaking capability to serve their most critical needs—especially given the very expensive nature of semiconductor facilities (e.g., more than \$10 billion for just one leading edge fab!) In Europe, public support can now be obtained for manufacturing, front- or back-end, if done in “first-of-a-kind” facilities (i.e., beyond state-of-the-art in the EU). In the US, the funding is broader and aimed at facilities that are “*in the interest of the United States*”; the Department of Commerce also can consider whether the applicant is “*responsive to [US] national security needs or requirements...*”³ The significant economic growth, budgetary benefits, as well as employment and talent creation generated by new investments in semiconductor capacity have been well documented by analysts. These analysts also stress that investment in more advanced semiconductor research and leading-edge manufacturing investments in the US and EU will produce the greatest benefits.⁴



In Europe, investors that need public support for “first-of-a-kind” facilities also must commit to invest in “next-gen chips.” No such requirement explicitly exists under the US CHIPS Act, although Intel has suggested to the Department of Commerce that it consider a grant applicant’s contribution to R&D in the US when evaluating whether to support a qualified manufacturing project.⁵

Unlike the EU Chips Act, the US CHIPS Act requires an applicant to invest in workforce training programs as a condition of receiving public support for a new semiconductor facility and allows the applicant to use part of that support to help develop the needed workforce. A strong digital talent pipeline is essential to long term support for an expanding semiconductor ecosystem, which the EU Chips Act acknowledges by seeking to attract new talent to address the skills shortage and by supporting education, training, skilling and reskilling programs as part of its Chips for Europe Initiative. Talent availability is more critical than in the past because manufacturing sites like the new ones Intel is developing in Ohio and Magdeburg typically will be much bigger than they used to be.

² E.g., *Securing Defense-Critical Supply Chains: An Action Plan developed in response to President Biden's Executive Order 14017*, Department of Defense, at 33-34 & Figure 5 (February 2022); available at <https://media.defense.gov/2022/Feb/24/2002944158/-1/-1/1/DOD-EO-14017-REPORT-SECURING-DEFENSE-CRITICAL-SUPPLY-CHAINS.PDF>.

³ US CHIPS Act, *supra* note 1, Section 9902(a)(2)(C)(i)(II) & 9902(a)(2)(C)(ii)(III).

⁴ See “Europe’s urgent need to invest in a leading-edge semiconductor ecosystem,” Kearney, available at <https://www.kenarney.com/documents/20152/272966470/Europes+urgent+need+to+invest+in+a+leading-edge+semiconductor+ecosystem.pdf/f3ec1e30-b8ff-b367-417c-62cf476342ea?t=1636582354000>; “Government Incentives and US Competitiveness in Semiconductor Manufacturing,” BCG and SIA (September 2020), available at <https://web-assets.bcg.com/27/cf/9fa28eeb43649ef8674fe764726d/bcg-government-incentives-and-us-competitiveness-in-semiconductor-manufacturing-sep-2020.pdf>.

⁵ See generally Intel Corporation Comments on “Incentives, Infrastructure, And Research and Development Needs to Support a Strong Domestic Semiconductor Industry,” Department of Commerce, Part 2, at pp. 6-8 (Federal Register Notice of January 24, 2022, DOC-2021-0010), available at <https://www.regulations.gov/comment/DOC-2021-0010-0196>.

A Shared Sense of Urgency

A crucial takeaway is that policymakers on both continents have accurately identified the global imbalance in chipmaking as a major and immediate risk to their respective economies, national security, and technological leadership. The US, however, has moved much slower than the EU in finalizing its incentive initiative despite a sense of urgency among many in the US government.

The US CHIPS Act originated in the Spring of 2020, and the law was enacted on January 1, 2021. Now, 16 months later, that Act is still not funded. US Senate Commerce Committee Chair Maria Cantwell recently lamented,

*"I am pretty sure that if we would have passed the funding a year ago out of the US Senate and it would have been adopted and gone to the President's desk, we would be in a different supply chain issue today . . . if we continue to delay this issue, the investment is going to go somewhere else."*⁶

US Secretary of Commerce Gina Raimondo similarly stated,

*"Each day we delay in getting this [funding] bill to the President's desk, our foreign competitors gain an edge on the United States."*⁷

By way of comparison, the same sense of urgency drove the publication of the EU Chips Act within five months of its birth,⁸ and although the proposed regulation will need European Parliament and Council approval, its guiding principles are applicable now per the European Commission's Communication. Yet we note that the funding for the EU Chips Act programs is fuzzier compared to the proposed funding for the US CHIPS Act, and that private investment will constitute a large portion of the €43B amount.

The EU Chips Act has another implementation advantage over the US CHIPS Act. Due to the overriding public interest in first-of-a-kind facilities in Europe, the EU Chips Act requires Member States to expedite permitting processes for these facilities and even allows "derogations in permit granting procedures, including in certain environmental assessments" if other conditions are met.⁹ Unfortunately, the US CHIPS Act has no such provisions. The problem: Permitting of manufacturing facilities supported by US CHIPS Act money could take several years if the National Environmental Policy Act applies—a delay that would seriously impede the ability of the US semiconductor industry to catch up and compete. In our dynamic and highly competitive industry, a delay of just a few months could mean the death knell for a new project when the investor has another viable location that can meet its timing requirements. The US government should learn from the EU Chips Act's provisions on permitting, especially considering Europe's sustainability goals and commitment to protect the environment (e.g., "European Green Deal").

⁶ 168 Cong. Rec. S2002 (daily ed. Apr. 6, 2022) (statement of Sen. Cantwell); available at <https://www.congress.gov/117/crec/2022/04/06/168/61/CREC-2022-04-06-pt1-PgS2002.pdf>.

⁷ Statement By Commerce Secretary Raimondo on the Senate's Vote to Move the Bipartisan Innovation Act One Step Closer to Conference (March 28, 2022); available at <https://www.commerce.gov/news/press-releases/2022/03/statement-commerce-secretary-raimondo-senates-vote-move-bipartisan>.

⁸ State of the Union speech by President Ursula Von Der Leyen (15 September 2021) available at https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_21_4701, followed by a blogpost by Thierry Breton (same date) available at <https://www.linkedin.com/pulse/how-european-chips-act-put-europe-back-tech-race-thierry-breton/> ("We will present a new European Chips Act. We need to link together our world-class research, design and testing capacities. We need to coordinate EU and national investment along the value chain. The aim is to jointly create a state-of-the-art European chip ecosystem, including production. That ensures our security of supply and will develop new markets for ground-breaking European tech.")

⁹ Proposed Regulation, *supra* note 1, Art. 14.

A Mutually Beneficial Opportunity

Both sides of the Atlantic understand they will benefit from cooperation to resolve their common semiconductor challenges. One example is the supply chain working group that is part of the EU-US Trade and Technology Council (TTC). Another is the US CHIPS Act's Section 9905 multilateral semiconductors security fund to "support the development and adoption of measurably secure semiconductors and ... supply chains" with government partners like the EU that should have similar export licensing, intellectual property, supply chain integrity and other policies. The EU Chips Act similarly calls for more international cooperation on semiconductor policies with like-minded countries that face similar challenges, but it is not specific on that point.

Aligning the US and EU on semiconductor policies and principles is of utmost importance to achieve their common long-term objectives, yet finding shared solutions is key to their practical implementation. We will experience greater success on aligning information-sharing on supply disruptions, priority orders in emergency cases, export controls and product certifications if international standards and market-driven best practices are relied on through a transatlantic harmonized approach. The TTC can be the platform to coordinate these efforts to make semiconductor supply chains more resilient. In fact, semiconductors should be a testbed for renewed transatlantic collaboration that produces real results.



In brief, the EU Chips Act and US CHIPS Act have very similar goals and allocate about the same amount of money to address their common challenges, but the detail and means to implement these initiatives varies significantly.

Hence, each government clearly can benefit by observing the implementation and resulting impacts of the other's semiconductor initiative.