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Chairman Bilirakis, Ranking Member Schakowsky, and members of the Subcommittee, thank you for holding this important hearing and inviting me to appear before you today.

I. Introduction

My name is Asad Ramzanali, and I'm the Director of Artificial Intelligence and Technology Policy at the Vanderbilt Policy Accelerator (VPA), a center at Vanderbilt University. I have experience working in the technology industry and in technology policy, including previously serving as the chief of staff and deputy director for strategy at the White House Office of Science and Technology Policy (OSTP), and as a staffer to a former member of this Committee. I started my career on the business side of Silicon Valley – first on the corporate strategy team at Intuit, then managing a startup accelerator backed by JPMorgan. My testimony reflects my personal views and does not represent the views of Vanderbilt University or VPA.

Semiconductors are among the most technically complex things humans have ever built. That technological complexity was built slowly over time and made possible by decades of research and development (R&D) and actions of thousands of companies. From the earliest days of the technology, the American government has funded semiconductor R&D, invested in industrial capacity, and established rules for fair markets that enabled American leadership in semiconductors. I thank you for continuing to focus attention on the policy choices that can enable a market that is critical for our economic and national security.

In this testimony, I will discuss specific key issues in three parts of the semiconductor and computing ecosystem where a lack of competition requires policy focus. First, I'll discuss implementation of the CHIPS Act, which includes funding for manufacturing chips in the U.S. and R&D funds. The manufacturing incentives show early signs of success, while the R&D portion is stalled. Then, I'll turn to how the AI boom is driving semiconductor economics, with Nvidia controlling 90% of the AI chip market. In particular, I highlight the role that circular financing (i.e., a vendor investing in unprofitable customers) is playing in increasing risks for the whole economy. Finally, I turn to where semiconductors are used – data centers operated by hyperscalers. This is a concentrated market where Congress can take actions to improve competition, increase national security, and protect constituents from rising electricity costs.

II. Implementation of the CHIPS Act

On August 9, 2022, President Joe Biden signed the CHIPS and Science Act, which appropriated \$39 billion for semiconductor manufacturing incentives and \$11 billion for semiconductor research and development (R&D).¹ That law, along with prior legislation authorizing CHIPS programs,² enjoyed bipartisan support in Congress. The manufacturing incentives were designed to reduce the risk posed by manufacturing capacity being concentrated abroad and to reestablish American leadership in chip manufacturing. The R&D incentives were meant to be an investment in long-term leadership continued semiconductor innovation, in ways that go beyond what any one company has an incentive to do on its own.

A. *CHIPS Manufacturing Incentives*

On the manufacturing side, progress is visible. Before the CHIPS Act, the U.S. produced 0% of advanced-node logic chips – which include graphics processing units (GPUs) commonly used to train AI models – with nearly 90% of capacity concentrated in TSMC facilities in Taiwan.³ By the end of the Biden administration, the U.S. was on track to have 28% of advanced-node capacity by 2032⁴ and had “crowded-in” over \$500 billion in private semiconductor investment.⁵ TSMC’s Arizona facility showed higher production yields than its Taiwan facilities.⁶ We are now on track to be the only country in the world to have domestic chip manufacturing by each of the big five companies: TSMC, Intel, Samsung, Micron, and SK Hynix.

These early signs of success require continued government leadership, and the Trump administration’s handling of the manufacturing incentive program raises some concerns. First, DOGE-related personnel cuts reportedly reduced staffing in the CHIPS Program Office by two-fifths.⁷ Second, multiple CHIPS deals have raised specific conflicts of interest concerns.⁸ Third,

¹ CHIPS and Science Act, Pub. L. No. 117-167, div. A (“CHIPS Act of 2022”), (codified at 15 U.S.C. § 4651 et seq.).

² William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, Pub. L. No. 116-283, div. H tit. XCIX (codified at 15 U.S.C. § 4651 et seq.) (hereinafter “NDAA for FY2021”).

³ Int’l Trade Admin., *Taiwan - Semiconductors Including Chip Design for AI*, (Dec. 1, 2025), <https://www.trade.gov/country-commercial-guides/taiwan-semiconductors-including-chip-design-ai>; Raj Varadarajan et al., *Emerging Resilience in the Semiconductor Supply Chain*, BOS. CONSULTING GRP. & SEMICONDUCTOR INDUS. ASS’N (2024), <http://www.semiconductors.org/emerging-resilience-in-the-semiconductor-supply-chain/>.

⁴ Raj Varadarajan et al., *supra* note 3 at 14.

⁵ Chris Borges, Yutong Deng & Julie Heng, *Innovation Lightbulb: Tracking CHIPS Act Incentives*, CTR. FOR STRATEGIC & INT’L STUD. (2025), <https://www.csis.org/analysis/innovation-lightbulb-tracking-chips-act-incentives>.

⁶ Mackenzie Hawkins, *TSMC’s Arizona Chip Production Yields Surpass Taiwan’s in Win for US Push*, BLOOMBERG, Oct. 24, 2024, <https://www.bloomberg.com/news/articles/2024-10-24/tsmc-s-arizona-chip-production-yields-surpass-taiwan-s-a-win-for-us-push>.

⁷ Sunny Grimm, *Trump Purge Hits Chips Act Office, Two-Fifths of Staff to Be Terminated: Report*, TOM’S HARDWARE, Mar. 3, 2025, <https://www.tomshardware.com/tech-industry/trump-purge-hits-chips-act-office-two-fifths-of-staff-to-be-terminated-report>.

⁸ See, e.g., Spencer Kimball, *Trump Administration Equity Stakes Pose Risks to U.S. Companies and Markets*, CNBC, Feb. 7, 2026, <https://www.cnbc.com/2026/02/07/trump-equity-stakes-pose-these-risks-to-us-companies-and-markets.html> (USA Rare Earths was required to raise private funding as a condition on its government investment, and retained the Commerce Secretary’s former firm to lead that financing); see, also, Eric Lipton et al., *Family*

certain deals are proceeding without clear legal authority. When the administration converted Intel’s CHIPS grant to an equity stake, it did so “without any legal authority,” while also removing the company’s legal obligations and taxpayer safeguards.⁹ And it did so without providing a convincing argument for how the investment advances the CHIPS Act’s goals.¹⁰ Equity investments can play an important role in advancing American industrial policy, but those deals need to be pursued with appropriate legal authority and with appropriate safeguards and benefits for the public, as my colleague Joel Dodge has detailed recently.¹¹

As the remainder of CHIPS manufacturing funds are committed and distributed, Congress’s role is to ensure that taxpayer funds are being used for the purpose they were appropriated under the CHIPS and Science Act and that they are being used in the public interest and without conflicting private benefits. That means requiring the Commerce Department to retain sufficient staffing for managing agreements, and it means Congress holding regular oversight hearings with the Commerce Secretary and relevant CHIPS leaders. It also means scrutinizing deals that may present conflicts of interest. And if equity deals proceed without transparency and without commensurate public benefit, Congress should step in to publicize all CHIPS-related investment and governance agreements and documents and to require CEOs of companies in which the government retains ownership rights to appear for oversight hearings.

B. CHIPS R&D Program

On the R&D side, the story is quite different. The goal of the \$11 billion for the National Semiconductor Technology Center (NSTC) was to fund R&D that advances the competitiveness of the whole U.S. semiconductor ecosystem, especially with activities that no one entity has an incentive to undertake (e.g., shared research facilities as other countries have; pre-competitive, long-time horizon, and high-risk research; workforce development).¹² The Biden administration was slow to launch the NSTC and related chips R&D efforts, though that was largely caused by taking the time to determine the right organizational structure to best achieve the goals of the CHIPS R&D programs and to ensure that the independent nonprofit established for that purpose, Natcast, was legally permissible.¹³

The Trump administration has dismantled those efforts. In August 2025, the Commerce Secretary cut funding to Natcast and programs at three flagship R&D facilities.¹⁴ Related statutorily required programs and structures – including National Advanced Packaging Manufacturing

Affair: Commerce Secretary’s Sons Cash In on A.I. Frenzy, N.Y. TIMES, Nov. 20, 2025, <https://www.nytimes.com/2025/11/20/us/politics/howard-lutnick-family-ai.html>.

⁹ Joel Dodge, *Trump’s Industrial Policy: What’s Right and Wrong*, WASH. MONTHLY (Sept. 3, 2025), <https://washingtonmonthly.com/2025/09/03/trump-industrial-policy/>.

¹⁰ Mike Schmidt & Todd Fisher, *Uncle Sam Shouldn’t Own Intel Stock*, WALL ST. J., Aug. 24, 2025, <https://www.wsj.com/opinion/uncle-sam-shouldnt-own-intel-stock-ccd6986d>.

¹¹ Joel Dodge, *The Cases for Government Equity Stakes*, VANDERBILT POL’Y ACCELERATOR (Nov. 12, 2025), <https://vanderbiltpolicyaccelerator.substack.com/p/the-cases-for-government-equity-stakes>.

¹² NDAA for FY2021, see supra note 2, § 9906(c), 15 U.S.C. § 4656(c); Donna Dubinsky, *Enabling the CHIPS R&D Agenda*, FACTORY SETTINGS (Nov. 10, 2025), <https://www.factorysettings.org/p/enabling-the-chips-r-and-d-agenda>.

¹³ *Id.*

¹⁴ Clare Zhang, *Trump Administration Overhauls CHIPS R&D Plans*, AIP, Nov. 26, 2025, <https://www.aip.org/fyi/trump-administration-overhauls-chips-r-d-plans>.

Program, the SMART USA Institute (a Manufacturing USA Institute), the Industrial Advisory Committee, and the Consortium Steering Committee – have been disbanded.¹⁵ The Commerce Department announced it will take a “venture-capital approach” to NSTC through a broad funding solicitation that many worry will not achieve the program’s goals.¹⁶ However, that approach is not what is needed for public investments in CHIPS R&D. Companies already invest vast sums in semiconductor R&D, and this new approach could end up subsidizing what companies would do anyway. Rather, the goal of these funds should continue to be supporting R&D efforts that no one company has an incentive to do alone. More to the point, disinvesting in CHIPS R&D risks a long-term unraveling of the benefits that the CHIPS manufacturing incentives are creating because continual investments in R&D are how we maintain global leadership.

Congress needs to focus on getting CHIPS R&D back on track. Congress can update the specific mechanisms of funding or specific programs, but the original goals should be maintained.

III. Concentration in the AI Chip Market

Today’s AI boom is driving the semiconductor market. While AI chips represented a small portion of the 1.05 trillion chips sold in 2025, they account for approximately 50% of industry revenues and are driving investment.¹⁷ In many ways, the scale of AI investment is hard to fully capture. JPMorgan estimates that between 2026 and 2030, companies will invest \$5 trillion on AI infrastructure – data centers and chips – though those investments are based on just tens of billions in revenue.¹⁸ In this section, I discuss the role of AI chip companies in this bubble, and in the next I turn to the role of cloud computing companies, which operate in data centers.

Core to the economic risk that overinvestment in AI poses is the structure of how companies up and down the AI stack are investing in, lending to, and buying from one another. The following illustration published by *Bloomberg* depicts a sample of these interlocking relationships.¹⁹

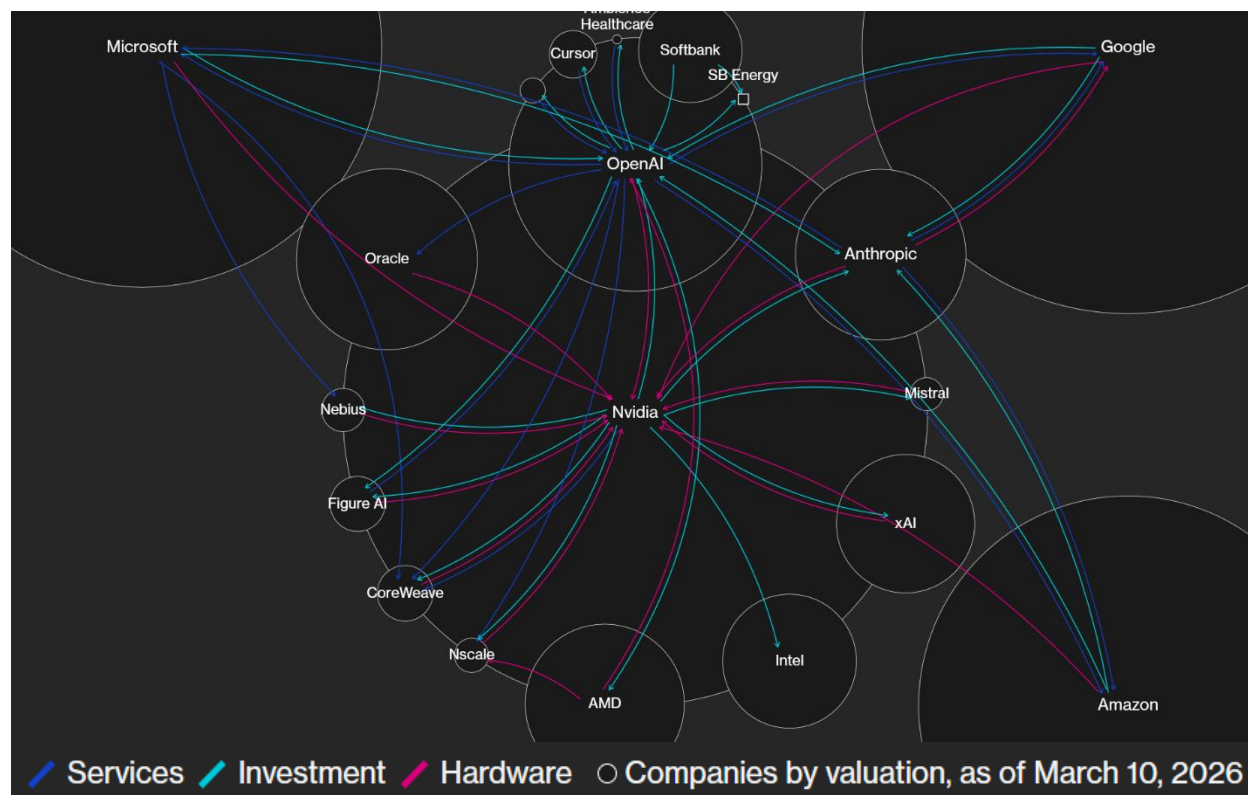
¹⁵ Dubinsky, *supra* note 12.

¹⁶ Zhang, *supra* note 14.

¹⁷ Jeroen Kusters et al., *2026 Global Semiconductor Industry Outlook*, DELOITTE (2026), <https://www.deloitte.com/us/en/insights/industry/technology/technology-media-telecom-outlooks/semiconductor-industry-outlook.html>.

¹⁸ Tarek Hamid et al., *AI Capex - Financing The Investment Cycle*, J.P.MORGAN N. AM. FUNDAMENTAL RSCH. (2025).

¹⁹ Cedric Sam et al., *A Guide to the Circular Deals Underpinning the AI Boom*, BLOOMBERG, Mar. 10, 2026, <https://www.bloomberg.com/graphics/2026-ai-circular-deals/>.



As this illustration shows, one semiconductor company is at the center of this web: Nvidia. The company is a fabless chip company because it, and some of its peers like AMD, outsource chip fabrication to companies like TSMC. Nvidia is the largest fabless chip company – and the largest company in the world by market capitalization. Even as others increase their presence in the AI fabless chip market, Nvidia monopolizes the market, accounting for more than 90% of AI chip revenues today.²⁰

Nvidia’s AI investments are best seen as an “AI empire” as one press outlet described it.²¹ Here’s a sampling of companies that Nvidia has invested in that are direct or indirect customers of Nvidia:

- almost every neocloud company (e.g., CoreWeave, Nebius, Nscale, Lambda);
- every major independent AI model company and startup (e.g., OpenAI, Anthropic, xAI, Mistral AI, Cohere, Thinking Machines Lab, World Labs, Eleven Labs); and
- dozens of AI application companies that build atop models offered by companies like OpenAI and Anthropic (e.g., Cursor, Hippocratic AI, Perplexity, Uniphore).²²

The problem with this investing is that it’s circular; the companies described above, most of which are not profitable, receive investment funds from Nvidia in exchange for shares in their

²⁰ Kalley Huang & Tripp Mickle, *Nvidia Built the A.I. Era. Now It Has to Defend It.*, N.Y. TIMES, Mar. 16, 2026, <https://www.nytimes.com/2026/03/16/technology/nvidia-gtc-ai-chips-huang.html>.

²¹ Marina Temkin, *Nvidia’s AI Empire: A Look at Its Top Startup Investments*, TECHCRUNCH, Jan. 2, 2026, <https://techcrunch.com/2026/01/02/nvidias-ai-empire-a-look-at-its-top-startup-investments/>.

²² *Id.*; NVIDIA Corporation, *NVIDIA Venture Capital: NVentures*, NVIDIA, <https://www.nventures.ai> (last visited Apr. 14, 2026); Sam et al., *supra* note 19.

company, then those companies buy from Nvidia directly (in the case of neocloud companies) and indirectly (in case of AI model and AI application companies).

Notably, it's not just Nvidia. Hyperscalers are also investing in the AI model providers that are among their largest customers – Google invested in Anthropic, Microsoft is a major investor in OpenAI, and Amazon has invested in both. These investments have raised red flags for competition regulators.²³

Circular financing is problematic because when vendors invest in unprofitable customers, they use their own profits to self-finance demand, making a business appear more successful than it is. This hinders market discipline by potentially inflating revenues, increasing prices and reducing supply for other customers, and cementing economic dominance by limiting competitors. The interlocking relationships also enable a problem in one company to cascade across the ecosystem. As I describe elsewhere, because seven tech companies represent a third of the stock market, a financial problem that cascades through the AI industry could cause a 2008-style economic crash that is worth preparing for now.²⁴

Congress should consider banning circular equity investments (vendor investing in its customers) of this sort, ownership caps or maximum thresholds, or an even stronger Glass-Steagall-like structural separation that prohibits companies supplying semiconductors or computing infrastructure from operating the software and AI businesses that require computing. At minimum, this Committee should investigate the practice, as this Committee did in 2002 with “capacity swaps,” a different form of circular financial engineering that worsened and accelerated the dot-com bubble.²⁵

IV. Cloud Computing, Hyperscalers, and Data Centers

As described earlier, developments in AI are driving the semiconductor market. The market that sits between these is cloud computing: AI model companies purchase computing capacity from hyperscalers (i.e., cloud computing providers) that operate data centers full of chips. In this section, I describe market failures in the cloud market.

The Federal Trade Commission and the House Judiciary Committee in the U.S., along with agencies in the U.K., Spain, France, the Netherlands, South Korea, and Japan, have investigated the market and found many market failures. First, the cloud market is highly concentrated. Three

²³ *Partnerships Between Cloud Service Providers and AI Developers*, FED. TRADE COMM'N (2025), https://www.ftc.gov/system/files/ftc_gov/pdf/p246201_aipartnerships6breport_redacted_0.pdf.

²⁴ Asad Ramzanali, *After the AI Crash*, VANDERBILT POL'Y ACCELERATOR (2026), <https://cdn.vanderbilt.edu/vu-URL/wp-content/uploads/sites/412/2026/03/23144242/After-the-AI-Crash.pdf>.

²⁵ *Capacity Swaps by Global Crossing and Qwest: Sham Transactions Designed To Boost Revenues?*, H. Hrg. 107-129 before the Comm. on Energy & Com., 107th Cong. (2002), <https://www.govinfo.gov/content/pkg/CHRG-107hhrg81961/pdf/CHRG-107hhrg81961.pdf>. Years later, the Securities and Exchange Commission settled enforcement charges against companies engaged in fraudulent capacity swaps. Press Release, Sec. & Exch. Comm'n, Lucent Settles SEC Enforcement Action Charging the Company with \$1.1 Billion Accounting Fraud (May 17, 2004), <https://www.sec.gov/news/press/2004-67.htm>; Press Release, Sec. & Exch. Comm'n, Nortel Networks Corporation and Nortel Networks Limited (Oct. 15, 2007), <https://www.sec.gov/enforcement-litigation/litigation-releases/lr-20333>.

companies represent almost two-thirds of the market: Amazon (28%), Microsoft (21%), and Google (14%).²⁶ Second, hyperscalers' parent companies are conglomerates across many adjacent and related markets, enabling practices like anticompetitive bundling and copying of customers' businesses. Third, hyperscalers employ various opaque and differential pricing techniques that hinder customers from comparing the true cost of competitors and from switching to other providers. Finally, the high degree of dependence companies, government agencies, and critical infrastructure providers have on cloud providers creates national security risks.

As I've written elsewhere, Congress should use tried-and-tested competition and national security policy tools to regulate the market. These tools include policies like instituting a neutrality principle, requiring interoperability and portability, designating the cloud as a critical infrastructure sector, and restricting foreign ownership.²⁷

The physical data centers that enable cloud computing have increasingly faced negative public reactions from communities across the country because of the externalities that data centers impose on their surrounding communities. Beyond competition and national security regulation, scholars and policymakers have proposed ways for Congress to address rising energy costs caused by data centers,²⁸ limit carbon emissions from data center energy use,²⁹ and limit state-level tax breaks for data center construction.³⁰ Enacting all of these policies in their strongest form would not reduce the country's capacity to maintain a stable, reliable, and robust cloud ecosystem. Rather, cloud companies would internalize the costs of these externalities.

V. Conclusion

American leadership in semiconductors was never inevitable – it was built through sustained public investment, smart regulation, and competitive markets. Each of the issues I've described today threatens that leadership: Stalled R&D funding may limit our ability to sustain progress from manufacturing incentives. Circular financing in the AI chip market risks a broader economic crash. And concentrated cloud infrastructure creates a whole host of public policy issues the American public is experiencing. I urge this Subcommittee to address them with the seriousness they demand. Thank you for inviting me to testify, and I look forward to your questions.

²⁶ Synergy Rsch. Grp., *GenAI Helps Drive Quarterly Cloud Revenues to \$119 Billion as Growth Rate Jumped Yet Again in Q4*, (Feb. 5, 2026), <https://www.srgresearch.com/articles/genai-helps-drive-quarterly-cloud-revenues-to-119-billion-as-growth-rate-jumped-yet-again-in-q4>.

²⁷ For a more detailed examination of this market, see, Asad Ramzanali, *Why the Cloud Needs Competition*, 42 ISSUES IN SCI. & TECH. 84 (2026); Asad Ramzanali, *How to Regulate the Cloud: A Blueprint to Address the Market Failures and National Security Risks of Cloud Computing*, VANDERBILT POL'Y ACCELERATOR (2025), <https://cdn.vanderbilt.edu/vu-URL/wp-content/uploads/sites/412/2025/09/18140135/How-to-Regulate-the-Cloud.pdf>.

²⁸ See, e.g., Matthew McHale & Hannah Wiseman, *Nine Ways to Address the Energy Impacts of AI Data Centers*, VANDERBILT POL'Y ACCELERATOR (2026), <https://cdn.vanderbilt.edu/vu-URL/wp-content/uploads/sites/412/2026/01/12211201/Nine-Ways-to-Address-the-Energy-Impacts-of-AI-Data-Centers.pdf>.

²⁹ See, e.g., Clean Cloud Act of 2025, H.R. 5179 / S. 1475 (119th Cong.).

³⁰ Ganesh Sitaraman & Asad Ramzanali, *No Handouts for Data Centers*, COMMONPLACE (Aug. 28, 2025), <https://www.commonplace.org/p/no-handouts-for-data-centers>.