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Answering the China Chip Challenge

Recommendations for U.S. Semiconductor Industrial Policy in 2021

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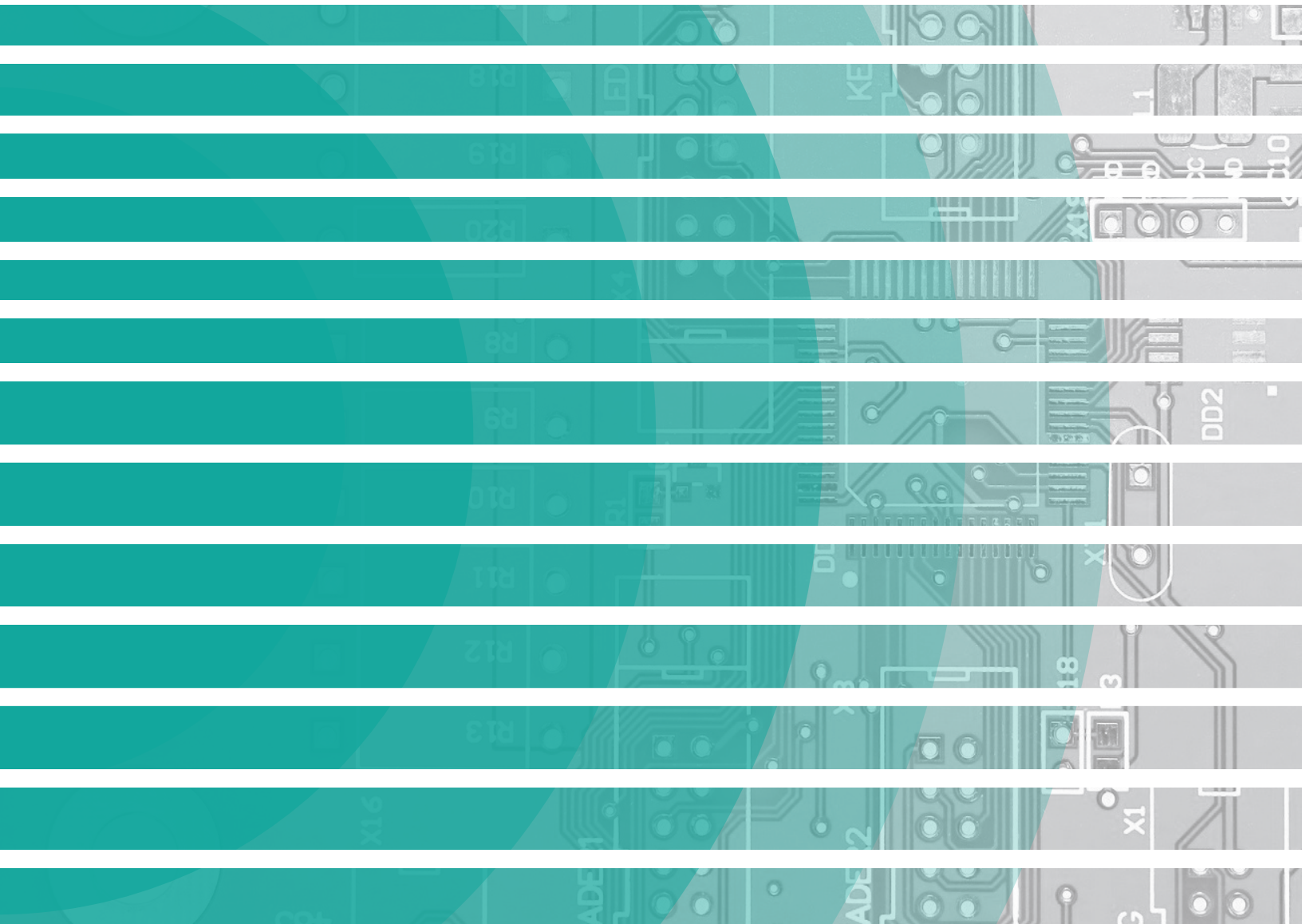

EXECUTIVE SUMMARY

Five years ago, the People's Republic of China (PRC) announced a decade-long campaign dubbed "Made in 2025," designed to secure for itself global dominance in ten key economic and national security sectors, including the crucial semiconductor industry,[1] where an investment of more than $150 billion is underway.[2]

The Chinese semiconductor industry remains behind its global competitors, despite a focused policy to gain competitive advantage.[3] Given its current strategic standing, the United States must, while it has time, reinvigorate national policy support for its domestic semiconductor industry.[4] The looming challenge posed by the PRC has, helpfully, been recognized by both Obama[5] and Trump administrations and potential responses have bipartisan support from members of Congress.[6]

At the moment, the U.S. employs a range of policy options, including research and development (R&D) subsidies and trade restrictions to protect and strengthen the American semiconductor industry.[7] Specifically, Congress supports manufacturers through the R&D tax credit, and is now considering a refundable tax credit to encourage investment in the industry. On the protection front, this past September the U.S. government restricted the export of technology to Semiconductor Manufacturing International Corporation, a leading Chinese computer chip manufacturer, to address suspected technology theft by the Chinese government.[8] The Commerce Department

1 U.S.-China Economic and Security Review Commission (USCC), *2019 Report to Congress* (2019), https://www.uscc.gov/sites/default/files/2019-11/2019%20Annual%20Report%20to%20Congress.pdf.

2 President's Council of Advisors on Science and Technology (PCAST), *Report to the President Ensuring Long-Term U.S. Leadership in Semiconductors* (2017), p. 8. https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_ensuring_long-term_us_leadership_in_semiconductors.pdf.

3 USCC, *2019 Report to Congress*, op. cit., p. 48.

4 Congressional Research Service (CRS), *U.S. Semiconductor Manufacturing: Industry Trends, Global Competition, Federal Policy* (2016), https://www.everycrsreport.com/files/20160627_R44544_77fdee097eaaac05bcf7bd6041d5bdf44b24c7b9.pdf

5 PCAST, *Report to the President*, op. cit.

6 Stephen Nellis, "U.S. lawmakers propose $22.8 billion in aid to semiconductor industry," *Reuters*, June 10, 2020, https://www.reuters.com/article/us-usa-semiconductors/u-s-lawmakers-propose-22-8-billion-in-aid-to-semiconductor-industry-idUSKBN23H39M.

7 Alan K. Ota, "New Tax Credit For Chipmakers Gains Steam In Virus Bill Talks," *Law360*, July 7, 2020, https://www.law360.com/articles/1289944/new-tax-credit-for-chipmakers-gains-steam-in-virus-bill-talks.

8 Ana Swanson and Raymond Zhong, "U.S. Places Restrictions on China's Leading Chip Maker," *New York Times*, October 5, 2020, https://www.nytimes.com/2020/09/26/technology/trump-china-smic-blacklist.html.

is reportedly considering expanding that measure to include additional Chinese firms. The Trump administration also increased federal law enforcement initiatives to counter and prevent economic and industrial espionage by, and on behalf of, the PRC.

In 2021, President-elect Joe Biden and his administration will take responsibility for setting U.S. policy for the semiconductor industry and confronting the Chinese challenge.

With the new year and new administration in mind, this paper reviews the history of American semiconductor policy, the federal government's analysis of Chinese industrial policy within the same sphere, and lays out the implications for American economic and national security. The paper concludes by presenting semiconductor policy recommendations for the Biden administration and 117th Congress:

- Maintain increased federal investment in the semiconductor industry to retain our strategic advantage, to drive technological innovation (as is included in the pending National Defense Authorization Act), and to compensate for potential economic costs of new controls aimed to prevent technology transfer.
- Protect the American semiconductor industry from potential technology transfer through the strategic application of export controls to restrict technology sales to key Chinese semiconductor firms and by applying CFIUS to restrict foreign direct investment or acquisition of semiconductor firms and technology.
- Strengthen American counterintelligence and improve the security of American academic institutions and research centers to prevent the transfer of sensitive information critical for technological innovation, including semiconductor manufacturing.

While government subsidies and trade restrictions will introduce economic efficiencies, the value for U.S. national security for encouraging the development of additional domestic semiconductor manufacturing capacity and protecting existing technological advantage from potential transfer or theft by the PRC justifies the intervention.

The history of U.S. semiconductor industrial policy demonstrates that federal investment in research and development has promoted both American economic and national security, partic-

ularly during periods of great power competition. Early and ongoing government investments in the semiconductor manufacturing industry following World War II enabled innovation in information technology that contributed to American prosperity over the past 75 years. In addition, the sobering public warnings from the U.S. national security community about the threat posed by the PRC to American economic and security interests provide compelling reasons to support a national strategy aimed at countering Beijing's goals of achieving technological superiority, particularly given China's bent toward authoritarianism and posture toward liberty around the world.

Today, a bipartisan consensus among national policymakers has embraced a new national semiconductor industrial policy aimed to counter the Chinese challenge. Moving forward, the Biden administration and the 117th Congress should continue and extend the current strategy for U.S. semiconductor industrial policy to address the China challenge while promoting American economic and security interests.

AMERICAN SEMICONDUCTOR MANUFACTURING: A SHORT HISTORY

National policymakers have long recognized the importance of semiconductors for U.S. economic and national security. Developed after World War II and supported by federal research and development, semiconductors are appropriately described as "the enabling technology of the information age"[9] and the "brains of modern electronics."[10] Semiconductors, in the most general sense, are the basic components of electronic devices and so essential to modern computing technology. Put another way, to lose a competitive edge when it comes to semiconductors, is to leave exposed, in the most devastating ways, a country's economic and national security. America has understood this since the early 20th century.

9 Michaela D. Platzer and John F. Sargent Jr., Congressional Research Service (CRS), *U.S. Semiconductor Manufacturing: Industry Trends, Global Competition, Federal Policy* (2016), https://fas.org/sgp/crs/misc/R46581.pdf.

10 Semiconductor Industry Association, *Building America's Innovation Economy Fact Sheet* (2020), p. 1. https://www.semiconductors.org/wp-content/uploads/2020/03/2020_SIA_Industry-Facts_5-14-2020.pdf.

And so, early federal sponsorship of the semiconductor industry in the 1940s and 1950s continued in the following decades, with the National Academies of Sciences, Engineering, and Medicine reporting that "between the late 1950s and early 1970s, the federal government directly or indirectly funded up to 40 percent to 45 percent of industrial R&D in the semiconductor industry."[11]

Historically, the U.S has acted to protect its semiconductor industry from international competition that would jeopardize its strategic advantage. In the 1970s, for instance, Japan initiated an industrial policy aimed to compete with the U.S., which resulted in a contracting of American exports and raised questions about the sector's viability without federal intervention.[12] As a consequence, the Reagan administration and Congress took several actions to support the industry, including the establishment of a bilateral agreement with Japan,[13] raising tariffs to enforce compliance with that agreement,[14] and the establishment of a new federal-industry Semiconductor Manufacturing Technology (SEMATECH) consortium with the Department of Defense (DOD), in addition to funding authorized to support research and development (R&D).[15] SEMATECH was supported by the government until the mid-1990s, when federal funding was phased out, although this important partnership continued with industry funding for another 20 years.[16]

By all appearances, the 1980s reforms were followed by a rebound of the American semiconductor manufacturing. In 2004, RAND Corporation analysts reported:

> *The year 1991 also marked the beginning of a sustained five-year industry boom that saw total sales revenue grow to nearly three times the 1990 level. The boom, along with greater R&D and product development associated with it, led the U.S. industry to recapture the worldwide market leadership position in 1993 for the first time since 1985. Since then, U.S. industry has maintained that position, and foreign market share in the Japanese mar-*

11 National Research Council (NRC), *Government-Industry Partnerships for the Development of New Technologies* (2003), https://doi.org/10.17226/10584.

12 National Research Council, *Government-Industry Partnerships for the Development of New Technologies*, op. cit., p.59-65.

13 Frank C. Conahan, U.S. Government Accountability Office, *International Trade Observations on the U.S.-Japan Semiconductor Arrangement* (1987), https://www.gao.gov/assets/80/76429.pdf.

14 President Ronald Reagan, *Memorandum On Tariff Increases on Japanese Semiconductor Products* (1987), https://www.reaganlibrary.gov/archives/speech/memorandum-tariff-increases-japanese-semiconductor-products.

15 J. Dexter Peach, U.S. General Accounting Office, *Federal Research: Lessons Learned from SEMATECH* (1992), https://www.gao.gov/assets/220/216960.pdf.

16 CRS, *U.S. Semiconductor Manufacturing*, op. cit., p. 49.

ket has approached 30 percent…[17]

While the RAND analysts note that other factors affected the semiconductor industry and the market rebound, the national policies aimed to address unfair Japanese trade tactics and government intervention to support the sector appear to have accomplished their objectives.

It should be noted, however, government intervention into the semiconductor industry was not universally supported. During the 1990s, government funding for semiconductor R&D was criticized as corporate welfare.[18] T.J. Rogers, President and CEO of Cypress Semiconductors, was an outspoken critic of federal subsidies, and led an effort among Silicon Valley CEOs to 'declare independence' from corporate welfare. Consequently, from the late 1990s to the early 2000s, a decline in federal funding for semiconductor R&D occurred. For example, annual funding from the Defense Advanced Research Projects Agency (DARPA) for microelectronic R&D, a principal source of federal investment, declined from more than $250 million in FY1999 to approximately $180 million in FY2002.[19]

Beyond direct investment and federal research partnerships, U.S. tax law has been another policy mechanism used to bolster the semiconductor manufacturing industry. Congress and the Reagan administration established a research tax credit in 1981, invaluable to an industry that relies on R&D to drive innovation consistent with Moore's Law and the pressure to continue to increase chips' efficiency. This temporary tax credit, which was periodically extended, was finally made permanent in 2015.[20]

The semiconductor industry association has recently called attention to the fact that federal R&D investment has been flat since the 1990s, arguing that U.S. market share of global semiconductor manufacturing capacity as a result has declined from 37 percent to 12 percent.[21] In response, just this year members of Congress introduced bipartisan legislation to increase federal R&D for the semiconductor industry (discussed in greater detail below). For its part, the Trump administration updated national semiconductor policy to counter the PRC's semiconductor strategy, using

17 Charles Kelley, Mark Wang, Gordon Bitko, et. al., "High-technology Manufacturing And U.S. Competitiveness," RAND Corporation (2004), https://www.rand.org/content/dam/rand/pubs/technical_reports/2004/RAND_TR136.pdf.

18 T.J. Rodgers, "Silicon Valley versus Corporate Welfare," Cato Institute (April 1998), https://www.cato.org/publications/briefing-paper/silicon-valley-versus-corporate-welfare.

19 National Research Council, *Government-Industry Partnerships for the Development of New Technologies* (2003), https://doi.org/10.17226/10584, p. 70.

20 CRS, *U.S. Semiconductor Manufacturing*, op. cit., p. 8.

21 Semiconductor Industry Association, *Building America's Innovation Economy Fact Sheet*, op. cit., p. 1.

export controls aimed to prevent technology transfer.

Before examining these recent policy developments, however, it is necessary to review the unique challenge China poses.

THE CURRENT CHINA CHALLENGE

China's efforts to grow its semiconductor manufacturing capacity has, over the past few years, become one of its key new focuses. As early as January of 2017, the President's Council of Advisors on Science and Technology (PCAST) submitted a report to then-President Obama on the importance of ensuring long-term American dominance in the global semiconductor market.[22] Noting the existing challenges facing the industry, including global competition and fundamental technological limits, the Council warned:

> *Now a concerted push by China to reshape the market in its favor, using industrial policies backed by over one hundred billion dollars in government-directed funds, threatens the competitiveness of U.S. industry and the national and global benefits it brings.*[23]

The Council described China's strategy of large subsidies and 'zero-sum' tactics to chip away at the strategic advantages currently enjoyed by the American semiconductor industry, concluding "We strongly recommend a coordinated Federal effort to influence and respond to Chinese industrial policy, strengthen the U.S. business environment for semiconductor investment, and lead partnerships with industry and academia to advance the boundaries of semiconductor innovation."[24]

Below is a discussion of recent developments in these areas since January 2017.

22 PCAST, *Report to the President*, op. cit.

23 PCAST, *Report to the President*, op. cit., p. 2.

24 PCAST, *Report to the President*, op. cit., p. 25.

CHINESE SUBSIDIES

In 2017, the Council wrote that, "[t]he Chinese government, motivated by economic and national-security goals, has publicly asserted its desire to build a semiconductor industry that is far more advanced than today and less reliant on the rest of the world."[25] At the time, Chinese semiconductor manufacturing capabilities were behind current practices in the U.S. But only two years prior, the PRC had announced plans to spend more than $160 billion over a 10-year period to modernize its semiconductor manufacturing sector and become increasingly self-reliant on chips.[26] The PRC's goal was to "increase its self-sufficiency rate for integrated circuits to 40 percent by 2020 and to 70 percent by 2025."[27] The latest initiative is an extension, or acceleration, of Chinese semiconductor industrial policy that began in the 1950s.[28]

President Xi Jinping himself provided insight into the reasoning behind the PRC's focus on developing its semiconductor manufacturing. In a 2016 speech, he noted that, "core technology is our biggest lifeline and the fact that core technology is controlled by others is our greatest hidden danger."[29] Beyond the direct subsidies discussed above, the PRC has implemented policy changes to encourage private and global investment in its semiconductor sector (including the industry in its "encouraged investment areas"[30]). The state has also used regulatory power to encourage investment in the sector, including from private companies. The U.S.-China Economic and Security Commission wrote to Congress in 2019, warning: "Baidu, Alibaba, and Tencent each responded to Beijing's call for self-reliance by taking steps to support the development of the semiconductor industry in China," adding that "China's technology sector has faced stepped-up government scrutiny and increased pressure to align with Party edicts after years of thriving under light regulation."[31]

In 2019, the PRC established five-year tax reductions for the industry and created a new $29

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25 PCAST, *Report to the President*, op. cit., p. 8.

26 Ian King, "China Has Big Plans for Homegrown Chips," *Bloomberg Businessweek*, June 25, 2015, https://www.bloomberg.com/news/articles/2015-06-25/china-has-big-plans-for-homegrown-chips.

27 Christopher Thomas, "A new world under construction: China and semiconductors," *McKinsey & Company*, November 1, 2015, https://www.mckinsey.com/featured-insights/asia-pacific/a-new-world-under-construction-china-and-semiconductors.

28 John VerWey, "Chinese Semiconductor Industrial Policy: Prospects for Future Success," Journal of International Commerce and Economics, United States International Trade Commission, August 2019, https://www.usitc.gov/publications/332/journals/chinese_semiconductor_industrial_policy_prospects_for_success_jice_aug_2019.pdf.

29 USCC, *2019 Report to Congress*, op. cit., p. 134.

30 USCC, *2019 Report to Congress*, op. cit., p. 63.

31 Loc. cit.

billion fund for semiconductor investments, according to the Council on Foreign Relations.[32] In 2020, Xi announced a $1.4 trillion investment in the technology sector, including support for the semiconductor industry, in response to recent U.S. actions,[33] discussed in detail below. As recently as September 2020, Beijing was reportedly considering additional investments in the sector in its latest five-year plan.[34] Beyond the direct investment or subsidies, the Chinese semiconductor market is supported by broad domestic demand, for both domestic use and exports.[35]

CHINESE ZERO-SUM TACTICS

The Obama administration's Council of Science and Technology Advisors described the PRC's other pillar of industrial policy as zero-sum tactics. The Council notes these tactics "can create defense-related national-security risks by accelerating the spread of sensitive technologies."[36] According to Obama administration advisors, common ways that Beijing seeks to advance its semiconductor sector include forcing or encouraging domestic customers to only buy from domestic firms, requiring technology transfers from global companies to access the Chinese market, espionage and intellectual property theft, and collusion.[37]

Since 2017, the PRC has continued and, in some cases, ramped up these tactics through the following:

Requiring Chinese Companies Purchase From Domestic Firms: For example, the PRC has reportedly developed its own equivalent to the American entity list, presumably in response to recent U.S. actions, including establishing its own export control measures.[38] The U.S. China Economic and Security review reported in 2020 that:

32 Adam Segal, "Year in Review 2019: The U.S.-China Tech Cold War Deepens and Expands," *Council on Foreign Relations*, December 18, 2019, https://www.cfr.org/blog/year-review-2019-us-china-tech-cold-war-deepens-and-expands.

33 "China has new US$1.4 trillion plan to seize the world's tech crown from the US," *South China Morning Post*, May 21, 2020, https://www.scmp.com/tech/policy/article/3085362/china-has-new-us14-trillion-plan-seize-worlds-tech-crown-us.

34 Sharon Chen, Yuan Gao, and Steven Yang, "China to Plan Sweeping Support for Chip Sector to Counter Trump," *Bloomberg Technology*, September 3, 2020, https://www.bloomberg.com/news/articles/2020-09-03/china-is-said-to-plan-broad-chip-sector-support-to-counter-trump.

35 Jeffrey Craig, "China's Semiconductor Industry: 60% of the global semiconductor consumption," *DaxueConsulting*, October 25, 2020, https://daxueconsulting.com/chinas-semiconductor-industry/.

36 PCAST, *Report to the President*, op. cit., p. 9.

37 PCAST, *Report to the President*, op. cit., pp. 9-10.

38 U.S.-China Economic and Security Review Commission (USCC), *2020 Report to Congress* (2020), https://www.uscc.gov/sites/default/files/2020-12/2020_Annual_Report_to_Congress.pdf.

In late 2019, China's Ministry of Commerce reported it was developing an "Unreliable Entity List" targeting foreign companies, groups, and individuals who harm the interests of Chinese companies. To that end, Chinese government officials have reportedly studied Chinese companies' reliance on U.S. suppliers. Though few details are available, the Chinese government raised the specter of the list several times as 2020 unfolded. In September 2020, the Chinese government finally released the details of how the list will be implemented, allowing the blacklisting of any foreign entity found to be "endangering national sovereignty, security or development interests of China."[39]

The United States should expect this trend of China focusing on reducing its dependence on foreign suppliers to continue. In a Spring 2020 speech, Xi announced, "We must strive to have at least one alternative source for key products and supply channels, to create a necessary industrial backup system."[40]

Forcing Technology Transfers: In 2020, the U.S. Trade Representative (USTR) reiterated its placement of China on the "Priority Watch List," required by federal law to counter foreign intellectual property theft. In its annual Section 301 report, USTR wrote: "China's system of pressuring and coercing technology transfer, and the continued need for fundamental structural changes to strengthen IP protection and enforcement, including as to trade secret theft, obstacles to protecting trademarks, online piracy and counterfeiting, the high-volume manufacturing and export of counterfeit goods, and impediments to pharmaceutical innovation."[41]

For example, Chinese licensing requirements involve significant disclosure, putting intellectual property at risk. The U.S. China Economic and Security Review Commission notes, "The Chinese government utilizes an extensive and complex licensing system that discriminates against foreign investors, resulting in significant delays and added costs for foreign companies while also leading to the transfer of valuable IP and technology to Chinese competitors." Licensing is required for engaging in most economic activities, including manufacturing or selling products. A 2020 Chamber of Commerce survey of American businesses in China found that 41 percent cited the regulatory environment and licensing as a challenge and 54 percent cited "lack of IP protection and

39 USCC, *2020 Report to Congress*, op. cit., p. 217.

40 Ibid.

41 Robert E. Lighthizer, Office of the United States Trade Representative, *2020 Special 301 Report*, https://ustr.gov/sites/default/files/2020_Special_301_Report.pdf.

enforcement" as a top concern.[42]

These market access challenges apply to the semiconductor sector. According to the U.S. International Trade Commission (USITC), the Commerce Department's "Bureau of Industry and Security, which conducted a survey of the [integrated circuit] design and manufacturing industry in the United States in 2017, found that 25 companies in the U.S. industry indicated they would have to form joint ventures with Chinese entities and/or transfer IP in order to maintain market access."[43] USITC added that "the responding companies were not minor players in the industry, but rather generated $25 billion in total sales and manufactured 26 percent of all ICs made and sold in the United States."[44]

Other tactics include foreign direct investment or venture capital investments, which involve either acquiring a firm and its intellectual property or establishing an ownership position which may open the door to technology transfer. The U.S. China Economic and Security Review Commission found that the Chinese government and state owned enterprises invested more than $14 billion in acquiring U.S. information and communications technology firms between 2011 and 2018.[45] In a 2018 report, Michael Brown and Pavneet Singh with the Defense Innovation Unit (DIU) examined the risk of Chinese investments in emerging technology, citing data showing increased Chinese investment in venture-backed startups between 2015 and 2017.[46] More worrisome is Brown and Singh's warning about what's coming: "China is investing in the critical future technologies that will be foundational for future innovations both for commercial and military applications: artificial intelligence, robotics, autonomous vehicles, augmented and virtual reality, financial technology and gene editing."[47] The DIU report cited Chinese investors involvement in the purchase of a Dutch semiconductor firm and an attempted purchase of U.S firm Lattice Semiconductors through a "special purpose vehicle."[48]

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42 "AmCham Shanghai Releases 2020 China Business Report," AmCham, September 9, 2020, https://www.amcham-shanghai.org/en/article/amcham-shanghai-releases-2020-china-business-report.

43 John VerWey, "Chinese Semiconductor Industrial Policy: Past and Present," Journal of International Commerce and Economics, United States International Trade Commission, July 2019, p. 19, https://www.usitc.gov/publications/332/journals/chinese_semiconductor_industrial_policy_past_and_present_jice_july_2019.pdf.

44 Ibid.

45 Sean O'Connor, U.S.-China Economic and Security Review Commission, *How Chinese Companies Facilitate Technology Transfer from the United States* (2019), https://www.uscc.gov/sites/default/files/Research/How%20Chinese%20Companies%20Facilitate%20Tech%20Transfer%20from%20the%20US.pdf.

46 Michael Brown and Pavneet Singh, "China's Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable A Strategic Competitor to Access the Crown Jewels of U.S. Innovation," Defense Innovation Unit Experimental (DIUx), (January 2018), https://admin.govexec.com/media/diux_chinatechnologytransferstudy_jan_2018_(1).pdf.

47 Brown and Singh, "China's Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable A Strategic Competitor to Access the Crown Jewels of U.S. Innovation,"op. cit., p. 3.

48 Brown and Singh, "China's Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable A Strategic Competitor to Access the Crown Jewels of U.S. Innovation," op. cit., p. 10.

Cyber Espionage, Traditional Espionage, and Talent Acquisition: The Obama PCAST warned that "China steals intellectual property both covertly and overtly."[49] China's use of cyber espionage to commit economic or industrial espionage against the U.S. has been described as "the greatest wealth transfer in human history,"[50] by former and current senior intelligence community officials.[51] According to a 2018 estimate by the Center for Strategic and International Studies, "the United States probably [loses] between $20 billion and $30 billion annually from Chinese cyber espionage."[52] In 2013, the Commission on the Theft of American Intellectual Property estimated that Chinese espionage caused hundreds of billions of losses per year (on the level of U.S. exports to Asia or $300 billion) and millions of lost jobs.[53]

In 2020, FBI Director Christopher Wray said that almost half of the Bureau's counterintelligence cases were related to China. He warned: "The greatest long-term threat to our nation's information and intellectual property, and to our economic vitality, is the counterintelligence and economic espionage threat from China. It's a threat to our economic security—and by extension, to our national security."[54]

The Department of Defense's (DOD) annual China Military Power report cited cybersecurity researchers who found that Chinese hackers "repeatedly targeted tech groups developing machine learning, autonomous vehicles, medical imaging, semiconductors, processors, and enterprise cloud computing software."[55] The report cited a 2018 example of a Chinese state-owned-enterprise that "was implicated in a conspiracy to commit economic espionage through the theft, conveyance, and possession of stolen trade secrets from a U.S. semiconductor company," that "specializes in dynamic random-access memory," which the PRC has identified "a national priority."[56]

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49 PCAST, *Report to the President Ensuring Long-Term U.S. Leadership in Semiconductors*, op. cit., p. 9.

50 Josh Rogin, "NSA Chief: Cybercrime constitutes the 'greatest transfer of wealth in history,' *Foreign Policy*, July, 9, 2012, https://foreignpolicy.com/2012/07/09/nsa-chief-cybercrime-constitutes-the-greatest-transfer-of-wealth-in-history/.

51 Russell Flannery, "China Theft Of U.S. Information, IP One Of Largest Wealth Transfers In History: FBI Chief," *Forbes*, July 7, 2020, https://www.forbes.com/sites/russellflannery/2020/07/07/china-theft-of-us-information-ip-one-of-largest-wealth-transfers-in-history-fbi-chief/.

52 James Andrew Lewis, "How Much Have the Chinese Actually Taken?," *Center for Strategic & International Studies (CSIS)*, March 22, 2018, https://www.csis.org/analysis/how-much-have-chinese-actually-taken.

53 The Commission on the Theft of American Intellectual Property, *The IP Commission Report* (2013), https://www.nbr.org/wp-content/uploads/pdfs/publications/IP_Commission_Report.pdf.

54 Christopher Wray, "The Threat Posed by the Chinese Government and the Chinese Communist Party to the Economic and National Security of the United States," Remarks to the Hudson Institute, July 7 2020.

55 Office of the Secretary of Defense, *Military and Security Developments Involving the People's Republic of China* (2020), https://media.defense.gov/2020/Sep/01/2002488689/-1/-1/1/2020-DOD-CHINA-MILITARY-POWER-REPORT-FINAL.PDF.

56 Ibid.

The PRC also uses overt talent acquisition as a means to acquire intellectual property and develop its technology sectors. A 2019 bipartisan investigation by the Senate Permanent Subcommittee on Investigations (PSI), led by Sens. Rob Portman and Tom Carper, examined the Chinese 'Thousand Talents' initiative, which "incentivizes individuals engaged in research and development in the United States to transmit the knowledge and research they gain here to China in exchange for salaries, research funding, lab space, and other incentives."[57] PSI's report highlighted examples of Chinese nationals with links to Chinese National Defense Universities or the Chinese Academy of Sciences attempting to work in U.S. semiconductor firms.[58]

THE STATE OF THE CHINESE SEMICONDUCTOR INDUSTRY IN 2020

Despite the PRC's concerted efforts and industrial policies dating back to the 1950s, the Chinese semiconductor industry remains behind global competitors today, according to government and industry analyses.[59]

According to the Semiconductor Industry Association (SIA), China accounts for just 5 percent of global semiconductor market sales, behind the U.S. (47 percent), Korea (19 percent), Japan (10 percent), Europe (10 percent), and Taiwan (6 percent).[60] China's capital investments on semiconductors accounts for 10 percent of global semiconductors, while Korea (31 percent), the U.S. (28 percent) and Taiwan (17 percent) are the global leaders.[61] Nevertheless, SIA also predicts that China's share of global semiconductor manufacturing capacity will grow to 24 percent by 2030 while the United States' share will decline to 10 percent.[62] Moreover, according to the Congres-

57 United States Senate Permanent Subcommittee on Investigations, Committee on Homeland Security and Governmental Affairs, *Threats to the U.S. Research Enterprise: China's Talent Recruitment Plans* (2019), https://www.hsgac.senate.gov/imo/media/doc/2019-11-18%20PSI%20Staff%20Report%20-%20China's%20Talent%20Recruitment%20Plans.pdf.

58 Ibid.

59 VerWey, "Chinese Semiconductor Industrial Policy," op. cit., p. 1.

60 Semiconductor Industry Association, *2020 State of the U.S. Semiconductor Industry* (2020), https://www.semiconductors.org/wp-content/uploads/2020/06/2020-SIA-State-of-the-Industry-Report.pdf.

61 VerWey, "Chinese Semiconductor Industrial Policy," op. cit.

62 Semiconductor Industry Association, *U.S. Semiconductor Leadership A Policy Platform* (2020), https://www.semiconductors.org/wp-content/uploads/2020/10/SIA_PolicyPlatform_Final.pdf.

sional Research Service (CRS), China has overtaken North America in its semiconductor fabrication capacity, which is a key step in the manufacturing process.[63]

Again, for the moment, the Chinese semiconductor industry remains behind the U.S. In 2019, the U.S. China Economic and Security Review Commission found that: "China's semiconductor industry is still heavily reliant on foundational technology dominated by U.S. firms at critical points in the supply chain, from the basic architecture in chip design to advanced manufacturing equipment used in semiconductor foundries."[64] The Commission added that: "despite this enormous financial and policy support, Chinese semiconductor firms remain one to two generations behind international competitors and highly reliant on foreign semiconductor technology... ."[65]

A USITC published on the Chinese semiconductor industry in 2019 examined the past failure of Chinese industrial policy for the semiconductor industry and its prospects for future success. USITC official John VerWey argued that China's failure to achieve parity with international competitors in the semiconductor industry despite industrial policies dating back to the 1950s highlight structural challenges that the PRC must overcome with its new initiative. VerWey summarized:

> *Poorly crafted and executed strategic plans, a lack of human capital, and other countries' export controls have all hampered the development of China's industry in the past. While ongoing challenges remain, China currently has the strategic planning, motivation, and funding available to ensure that its domestic industry eventually catches up with the worldwide leaders. This is cause for Chinese optimism, but several cautionary notes must be considered, including the timing of the industry's development relative to international competitors, new investment restrictions and export controls, and the quantity and quality of the human capital on which China's semiconductor industry relies.*[66]

As VerWey later mentions, adding to the PRC's industrial policy challenges are recent U.S. policy actions aimed to counter the China semiconductor strategy.

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63 Platzer, et al., CRS, *Semiconductors: U.S. Industry, Global Competition, and Federal Policy* op. cit.

64 USCC, *2019 Report to Congress*, op. cit.

65 USCC, *2019 Report to Congress*, op. cit.

66 VerWey, "Chinese Semiconductor Industrial Policy," op. cit.

KEY RECENT U.S. POLICY ACTIONS

Countering the PRC strategy to achieve independence and superiority in key technologies, including the semiconductor industry, has been a priority of the Trump administration. Review of recent U.S. policy actions and proposed legislative reforms shows growing national focus and bipartisan support for a national industrial policy to promote the U.S. semiconductor industry and counter Chinese industrial policy tactics.

Using Controls to Prevent Technology Transfer: In the final years of the Obama administration, increasing scrutiny was applied to potential Chinese investment and foreign licensing agreements involving the semiconductor industry.[67] Under federal law, the Committee on Foreign Investment in the United States (CFIUS), which includes an interagency committee of executive branch officials, is charged with reviewing foreign investment transactions to assess potential national security risks to the United States.[68]

In 2018, Congress passed, and President Trump signed, the *Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA)*, which reformed the CFIUS process, and strengthened the president's authority to block foreign investments and transactions (with appropriate evidence).[69] FIRRMA also authorized CFIUS to flag countries of "special concern," defined as, "a country that has a demonstrated or declared strategic goal of acquiring a type of critical technology or critical infrastructure that would affect United States leadership in areas related to national security."[70]

Since 2015, U.S. government scrutiny has resulted in at least four transactions being abandoned and two outright blocked.[71] *Bloomberg Law* reports that three of the six transactions blocked by President Trump at CFIUS's recommendation involved semiconductor companies.[72]

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67 CRS, *Semiconductors: U.S. Industry, Global Competition, and Federal Policy* op.cit.

68 U.S. Department of the Treasury, The Committee on Foreign Investment in the United States (CFIUS), https://home.treasury.gov/policy-issues/international/the-committee-on-foreign-investment-in-the-united-states-cfius.

69 James K. Jackson, CRS, *The Committee on Foreign Investment in the United States (CFIUS)* (2020), https://fas.org/sgp/crs/natsec/RL33388.pdf.

70 Ibid.

71 Platzer, et al., CRS, *Semiconductors: U.S. Industry, Global Competition, and Federal Policy*, op. cit.

72 Grace Maral Burnett, "Semiconductors Made CFIUS," *Bloomberg Law*, June 12, 2020, https://news.bloomberglaw.com/bloomberg-law-analysis/analysis-semiconductors-made-cfius.

The Trump administration, with support from Congress, also used its authority under federal law to prevent technology transfer by imposing export controls. Congress passed the Export Controls Reform Act (ECRA) of 2018, which "provides broad, detailed legislative authority for the President to implement dual-use export controls."[73] Under the ECRA, the Commerce Department must establish and maintain the "Entity List" of persons or organizations "involved, or with the potential to be involved, in activities contrary to U.S. national security or foreign policy interests,"[74] and allows Commerce to block export licenses to these entities. According to the law firm Akin Gump, "One of the primary policy motivations behind [ECRA and FIRRMA] was the need to enhance U.S. export and investment controls to address concerns regarding the release of critical technologies to end users and destinations of concern, primarily China."[75]

In 2019, the Commerce Department added the Chinese technology giant Huawei (and many of its non-American affiliates) to the Entity List, creating a licensing requirement for any potential technology transfer.[76] A focus of this control was to prevent Huawei from accessing U.S. semiconductors. Later, in August 2020, the Commerce Department added additional affiliates and extended the control to restrict Huawei "from obtaining foreign made chips developed or produced from U.S. software or technology to the same degree as comparable U.S. chips."[77]

In recent months, the Trump administration applied new controls specifically on Chinese semiconductor manufacturing. In September, the Commerce Department initiated new controls on suppliers selling to Semiconductor Manufacturing International Corporation (SMIC), a leading Chinese semiconductor manufacturer, after determining that potential sales to the company "may pose an unacceptable risk of diversion to a military end use in the People's Republic of China."[78] In December, the DOD listed SMIC as a Chinese military firm,[79] preventing American

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73 Congressional Research Service, *U.S. Export Control Reforms and China: Issues for Congress* (2020), https://fas.org/sgp/crs/natsec/IF11627.pdf.

74 Ibid.

75 Akin Gump Strauss Hauer & Feld, LLP, "The Export Control Reform Act and Possible New Controls on Emerging and Foundational Technologies," September 12, 2018, https://www.akingump.com/en/news-insights/the-export-control-reform-act-of-2018-and-possible-new-controls.html.

76 Bureau of Industry and Security, *Huawei Entity List Frequently Asked Questions*, December 3, 2020, https://www.bis.doc.gov/index.php/documents/pdfs/2447-huawei-entity-listing-faqs/file.

77 U.S. Department of Commerce, "Commerce Department Further Restricts Huawei Access to U.S. Technology and Adds Another 38 Affiliates to the Entity List," August 17, 2020, https://www.commerce.gov/news/press-releases/2020/08/commerce-department-further-restricts-huawei-access-us-technology-and.

78 Reuters Staff, "U.S. tightens exports to China's chipmaker SMIC, citing risk of military use," *Reuters*, September 26, 2020, https://www.reuters.com/article/uk-usa-china-smic-idUKKBN26H0LQ. Ana Swanson and Raymond Zhong, "U.S. Places Restrictions on China's Leading Chip Maker" *The New York Times*, October 5, 2020, https://www.nytimes.com/2020/09/26/technology/trump-china-smic-blacklist.html.

79 Alexandra Alper, Humeyra Pamuk, "United States adds China's SMIC and CNOOC to Defense blacklist," *Reuters*, December 3, 2020, https://www.reuters.com/article/us-usa-china-military-companies/united-states-adds-chinas-smic-and-cnooc-to-defense-blacklist-idUSKBN28D3CR.

investment in the company under a November 2020 Trump administration executive order.[80]

The new controls applied to SMIC have led to domestic and global speculation that similar controls may be imposed on other Chinese semiconductor manufacturing firms, such as Yangtze Memory Technologies (YMTC) and ChangXin Memory Technologies (CXMT).[81] Writing in *Fortune Magazine*, retired Generals James Marks and Robert S. Walsh recommended that the Commerce Department add these companies to the Entity List, since they have "known ties to China's military."[82]

Increasing Federal Investment and Using Tax Policy to Support Semiconductor R&D and Manufacturing Capacity: Congress and the Trump administration have also continued to support the semiconductor industry by passing tax reform legislation favored by the industry and also by advancing new bipartisan measures to increase federal R&D for the sector.

The 2017 *Tax Cuts and Jobs Act* lowered corporate tax rates and maintained the R&D tax credit, which "significantly improve[d] the competitiveness of U.S. semiconductor research, design, and manufacturing," according to the SIA.[83] The federal government also has several initiatives aimed at advancing technology R&D, such as the National Strategic Computing Initiative which was launched in 2015 by President Obama and extended during the Trump administration.

During the 116th Congress, multiple bipartisan bills were introduced to dramatically increase federal R&D support for the semiconductor industry, which led to language and key provisions included in the *National Defense Authorization Act*, expected to become law before the end of the Congress.

- The *Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Act* (S. 3933 and H.R. 7178), is bipartisan, bicameral legislation that, according to CRS, would:

80 Executive Order on Addressing the Threat from Securities Investments that Finance Communist Chinese Military Companies, Exec. Order No. 13959, 85 FR 73185 (2020), https://www.whitehouse.gov/presidential-actions/executive-order-addressing-threat-securities-investments-finance-communist-chinese-military-companies/.

81 Josh Horowitz, "Proposed U.S. curbs on Chinese chipmaker SMIC could rattle supply chains," *Reuters*, September 15, 2020, https://www.reuters.com/article/china-smic-supply-chain-idUSL-4N2G5148; Roslyn Layton, "SMIC Is One of Many Semiconductor Fabs With Military Ties to China's Military," *Forbes*, October 2, 2020, https://www.forbes.com/sites/roslynlayton/2020/10/02/smic-is-one-of-many-semiconductor-fabs-with-ties-to-chinas-military/.
Doh Hyun-woo, "Semiconductor Industry: US Likely to Expand Trade Sanctions against China," *Business Korea*, October 5, 2020, http://www.businesskorea.co.kr/news/articleView.html.

82 James Marks and Robert S. Walsh, "How Biden can avoid China getting its hands on sensitive military technology," *Fortune*, December 13, 2020.

83 "Make the U.S. Tax System Globally Competitive," Semiconductor Industry Association, accessed November 1, 2020, https://www.semiconductors.org/policies/tax/.

"establish an investment tax credit for U.S.-based semiconductor manufacturing equipment and manufacturing facilities; authorize more than $15 billion for semiconductor R&D, workforce training, and related activities; authorize matching funds for state and local semiconductor programs; authorize funding to bolster DOD assured access efforts; and direct the Department of Commerce to assess the capabilities of the U.S. industrial base to support semiconductor design and manufacturing, and U.S. interdependencies with such capabilities in other countries."[84]

- The *American Foundries Act of 2020* (S. 4130), sponsored by Senator Tom Cotton (R-AR) and Senator Chuck Schumer (D-NY) and eight co-sponsors, would, according to CRS "authorize at least $25 billion for semiconductor-related R&D, construction of facilities, and acquisition of equipment and intellectual property; authorize incentives for the creation, expansion, or modernization of microelectronics manufacturing or advanced R&D facilities to meet the needs of the DOD and intelligence agencies for assured and secure microelectronics; and require the development of a plan to coordinate with foreign government partners on establishing common microelectronics export control and foreign direct investment screening measures to align with national and multilateral security priorities."[85]

As of December 15th, legislative language drawn from these bills was included in the *National Defense Authorization Act for Fiscal Year 2021*, which passed Congress on December 11, 2020 with veto-proof majorities and is currently pending President Trump's signature.[86]

These semiconductor-focused legislative packages are exemplary of renewed Congressional interest in increasing federal spending on R&D. For example, the bipartisan *Endless Frontiers Act* would authorize $100 billion for new R&D spending for the National Science Foundation (NSF) focused on technology. The legislation would also rename NSF the National Science and Technology Foundation. The sponsors of the bipartisan legislation announced the bill's introduction by citing the need to answer Chinese competition.[87]

84 Platzer, et al., CRS, *Semiconductors: U.S. Industry, Global Competition, and Federal Policy* op. Cit., p. 43.

85 Ibid.

86 National Defense Authorization Act for Fiscal Year 2021, H.R. 6395, 116th Congress (2020), https://www.congress.gov/bill/116th-congress/house-bill/6395/actions.

87 Endless Frontier Act, S.3832 (2020), 116th Congress, https://www.congress.gov/bill/116th-congress/senate-bill/3832.

Increasing Counterintelligence Practices to Prevent Research and Intellectual Property Theft: The Trump administration has stepped up efforts to address the Chinese 'Thousand Talents' initiative and other counterintelligence threats that have resulted in sensitive technology transfer. These reforms, in part, have answered the bipartisan recommendations of the Senate's Permanent Subcommittee on Investigations, which urged greater actions to protect American research institutions. In May, President Trump noted "Protecting the innovations, creations, and inventions that power our country are vital to our economic prosperity and national security," and further described how his administration was "suspending and limiting the entry into the United States of high-risk students and researchers from China."[88]

DISCUSSION OF CURRENT POLICY OPTIONS

As the 116th Congress and Trump administration near their ends, the future of American semiconductor industrial policy will soon be shaped by a new White House and Congress. While the Trump administration significantly increased efforts to challenge China's initiative to attain independence and superiority in semiconductor manufacturing, these policies answer the warnings of former President Obama's top science and technology advisors from January 2017. Moreover, bipartisan legislation strengthening CFIUS and U.S. export control law passed Congress with strong support, indicating that both political parties recognize and support efforts to curb potential technology transfer to the PRC. In addition, recent bipartisan bills that would increase federal support for semiconductor manufacturing R&D, including provisions in the *National Defense Authorization Act*, shows a commitment to federal intervention to support the sector.

In 2021, the Biden administration and Members of Congress will need to assess whether to change course from the Trump administration's policies and current law.

Some observers argue that concerns about the Chinese semiconductor sector are unfounded given the PRC's inability to successfully challenge the U.S. for dominance, and that any government intervention is unnecessary, wasteful, and counterproductive. For example, Scott Lincicome, a senior fellow in economic studies at the libertarian Cato Institute, reasons that the U.S. semicon-

88 President Donald J. Trump Is Protecting America from China's Efforts to Steal Technology and Intellectual Property, Briefing Statement, (2020), https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-protecting-america-chinas-efforts-steal-technology-intellectual-property/.

ductor industry remains strong and globally competitive, while pointing to evidence of Chinese ongoing struggles with top-down industrial policy.[89] Lincicome cites evidence, including the 2019 USITC analysis, which shows that Chinese semiconductor firms remain years behind their global competitors,[90] as well as recent media reports from China describing a Wuhan-based semiconductor firm's struggles to complete a factory construction project due to planning and fundraising challenges.[91] He concludes his criticism of the current trend of U.S. industrial policy for the semiconductor industry by noting:

> *…the House and Senate just fast-tracked billions in direct government subsidies (not just R&D support) to U.S. semiconductor manufacturers that are, by their own account, "on solid footing," in order to counter a threat that, by the U.S. government's own account, doesn't actually exist – billions that, if history is any guide, won't produce clear benefits and could actually harm the industry.*

However, the USITC analysis Lincicome cites as evidence of the lagging Chinese semiconductor industry concludes that China's initiative will ultimately succeed, noting: "While ongoing challenges remain, China currently has the strategic planning, motivation, and funding available to ensure that its domestic industry eventually catches up with the worldwide leaders."[92]

While government subsidies and trade restrictions will introduce economic efficiencies, the value to U.S. national security for encouraging the development of additional domestic semiconductor manufacturing capacity and protecting our existing technological advantage from potential transfer or theft justifies the intervention. Critically, limiting or controlling certain semiconductor exports for the purpose of preventing technology transfer will impose economic challenges for the industry, which could be compensated by additional federal subsidies or tax credits.

The Center for Strategic and International Studies' James Lewis discussed a broad strategy justifying a more active U.S. industrial and security policy for the semiconductor industry in 2019:

89 Scott Lincicome, "Does the U.S. Semiconductor Industry Really Need Urgent Taxpayer Support to Stop China," Cato Institute, July 23, 2020, https://www.cato.org/blog/does-us-semiconductor-industry-need-urgent-federal-support-stop-china.

90 Ibid.

91 Scott Lincicome, "Conservative Industrial Policy and the 'China Threat'," Cato Institute, August 28, 2020, https://www.cato.org/blog/conservative-industrial-policy-china-threat.

92 Chinese Semiconductor Industrial Policy: Prospects for Future Success, op. cit. p.24.

> *Semiconductors are the backbone of the digital economy. The U.S. semiconductor industry and national security are closely linked. The United States will need to engage China to change its mercantilist behavior while simultaneously taking steps to strengthen the U.S. semiconductor industry. Changing Chinese behavior will be difficult but not impossible if the United States and its allies take a consistent approach. In the near term, policy should focus on blunting Chinese investments in production and design technology regulations and increased counterespionage programs. U.S. technological strength can be reinforced by investing more in basic science and government research and taking a more assertive approach to contesting foreign regulations used to gain unfair advantage.*[93]

Later, in a 2020 article, Lewis recommended using strategic controls, such as limiting sales of semiconductor manufacturing equipment to Chinese firms, while allowing this equipment to be sold to non-Chinese firms operating in China to balance security and economic concerns.[94]

The Information Technology Innovation Foundation (ITIF), a think tank focused on innovation, has written strongly in favor of increasing federal R&D spending and incentives for the semiconductor industry. ITIF also cautions that stringent export controls of emerging technologies would cause economic harm for American firms to the tune of $14 billion to $56 billion over five years.[95] ITIF advocates best practices for promoting innovation and a robust semiconductor industry by recommending the protection of intellectual property rights while discouraging barriers to trade or controls of foreign investment.[96] Given the government's findings discussed above, avoiding export controls or preventing foreign investment while protecting intellectual property and preventing technology transfer are difficult goals to balance.

These perspectives, which are broadly representative of libertarian, security-minded, and technology innovation thought-leaders, highlight the tension facing American policymakers in 2021 and beyond. Setting a course for future U.S. industrial policy for the semiconductor industry will require candid discussion of policymakers' values and objectives, understanding that tradeoffs are likely unavoidable.

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93 James A. Lewis, "Learning the Superior Techniques of the Barbarians: China's Pursuit of Semiconductor Independence," *Center for Strategic & International Studies*, January 2019, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/190115_Lewis_Semiconductor_v6.pdf.

94 James A. Lewis, "Managing Semiconductor Exports to China," Center for Strategic & International Studies, May 5, 2020, https://www.csis.org/analysis/managing-semiconductor-exports-china.

95 Stephen Ezell and Caleb Foote, "How Stringent Export Controls on Emerging Technologies Would Harm the U.S. Economy," Information Technology & Innovation Foundation, May 2019, http://www2.itif.org/2019-export-controls.pdf.

96 Steven Ezell, "Government Best Practices to Support Semiconductor Innovation," Information Technology and Innovation Foundation, October 31, 2017, http://www2.itif.org/2017-support-semiconductor-sector-innovation.pdf.

The case for continuing and extending the current direction of U.S. semiconductor industrial policy and countering China's drive for semiconductor independence rests on two key arguments. First, the history of U.S. industrial policy shows that federal investment in R&D in the semiconductor manufacturing industry has led to innovation that has advanced American economic and national security, discussed in detail above. Second, the PRC's drive to achieve technological independence and superiority poses a historic threat to global liberty, given its totalitarianism and plans to export their brand of digital authoritarianism.

The Democratic staff of the Senate Foreign Relations Committee released a report in July 2020 examining China and digital authoritarianism, which includes using technology to track citizens, limiting access to information and stifling dissent, and strengthening the Chinese Communist Party's power. "People's Republic of China is successfully developing and implementing its malign governance model internally and, increasingly, making inroads with other countries to also embrace its new digital doctrine," wrote Senator Robert Menendez, the Committee's ranking member. "It further illustrates how the expansion of digital authoritarianism in China and abroad has drastic consequences for U.S. and allied security interests, the promotion of human rights, and the future stability of cyberspace."[97]

Despite the economic costs, an aggressive U.S. industrial policy will maintain a key strategic, technology advantage for the United States and curb the PRC's aims, including restraining its ability to export digital authoritarianism.

RECOMMENDATIONS

Based on this understanding of the current challenges and objectives for U.S. economic and security policy, the Biden administration and the 117th Congress should do the following:

97 Democratic Staff Report of the Senate Foreign Relations Committee, *The New Big Brother: China and Digital Authoritarianism* (2020), https://www.foreign.senate.gov/imo/media/doc/2020%20SFRC%20Minority%20Staff%20Report%20-%20The%20New%20Big%20Brother%20-%20China%20and%20Digital%20Authoritarianism.pdf.

- Maintain federal investment in the semiconductor industry to maintain a strategic advantage and to drive technological innovation and to compensate for potential economic costs of new controls aimed to prevent technology transfer.
- Protect the American semiconductor industry from potential technology transfer through the strategic and careful application of export controls to prevent direct sales and technology transfer to key Chinese semiconductor firms with ties to the Chinese military and by applying CFIUS scrutiny to restrict future foreign direct investment or acquisition of semiconductor firms and technology that would allow the PRC to achieve its goals for attaining an independent semiconductor industry.
- Strengthen American counterintelligence measures and improve the security of American academic institutions and research centers to prevent the transfer of sensitive information critical for technological innovation, including semiconductor manufacturing.

While government subsidies and trade restrictions will introduce economic efficiencies, the value to U.S. national security for encouraging the development of additional domestic semiconductor manufacturing capacity and protecting existing technological advantage from potential transfer or theft by the PRC justifies the intervention.

The history of U.S. semiconductor industrial policy shows that federal investment in research and development has promoted both American economic and national security, particularly during periods of great power competition. Early and ongoing government investments in the semiconductor manufacturing industry following World War II has enabled innovation in information technology that has contributed to American prosperity over the past 75 years. In addition, the sobering public warnings from the U.S. national security community about the threat posed by the People's Republic of China to American economic and security interests provide compelling reasons to support a national strategy aimed at countering Beijing's goals of achieving technological superiority, particularly given Beijing's digital authoritarianism and its general threat to liberty around the world.

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Before working on Capitol Hill, Lips served as an analyst with the Federal Bureau of Investigation, focusing on cybersecurity and intelligence. From 2000 to 2010, he worked for federal and state think tanks, concentrating primarily on education policy, including serving as a senior policy analyst with the Heritage Foundation. He earned a bachelor's in politics from Princeton University, and a master's degree in Statecraft and National Security Affairs from the Institute of World Politics.