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Rebuild

Toolkit for a New American Industrial Policy

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About this Report

This report is published as part of the U.S. National Industrial Policy Strategy project at CNAS. The project is developing an intellectual framework for industrial policy in the American context, in an era of strategic competition with technology at its center. The goal of the project is to pave the way for enhanced and sustained American economic competitiveness and technological leadership. This report builds on analysis and insights from prior CNAS publications, including:

"Reboot: Framework for a New American Industrial Policy," by Megan Lamberth, Martijn Rasser, Hannah Kelley, and Ryan Johnson (May 2022)

"Regenerate: Biotechnology and U.S. Industrial Policy," by Ryan Fedasiuk (July 2022)

"Reimagine: Clean Energy Technology and U.S. Industrial Policy," by Jonas Nahm (September 2022)

"Rewire: Semiconductors and U.S. Industrial Policy," by Chris Miller (Forthcoming)

Additional reports from this series are available on the CNAS website.

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Executive Summary

As economic security comes to the forefront of U.S. foreign policy, the U.S. strategy has been largely reactive and focused on playing defense rather than offense. Actions have centered on slowing down competitors—namely China—rather than defining an affirmative vision for growing American strength in the economic domain. A uniquely American industrial policy is the missing piece of the U.S. economic security strategy.

Pursuit of industrial policy must recognize the immense benefits of free markets while also grappling with their limitations. Policymakers must promote the efficiency and productivity gains of a competitive open market while also seeking resilient and secure supply chains, fair and reciprocal trading relations, and uninterrupted access to those goods and services critical to the national defense, critical infrastructure, and smooth functioning of the society writ large.

Industrial policy advocates must also get comfortable with a new way of thinking about global competition. They must be clear-eyed about the fact that the security of the United States and its allies may be threatened by China's technological and economic advances. Simply leveling the playing field with China is no longer enough. The United States needs to play to win.

The first report in this Center for a New American Security (CNAS) project outlined the intellectual framework for a uniquely American industrial policy, one that can "secure the United States' standing as the world's premier technology power, so that it can empower its citizens, compete economically, and secure its geostrategic interests without compromising its values or sovereignty."[1] This second report gets specific. It lays out the tools available to the U.S. government for implementing industrial policy effectively, categorizing three separate types of industrial policy interventions:

1. **Defensive** industrial policies that address economic or security harms caused by external economic actors.
2. **Proactive** industrial policies that support cutting-edge technological development and the competitiveness of specific sectors.
3. **Emergency response** industrial policies that bolster America's crisis response capability.

The toolkit analysis notes the difficult tradeoffs that policymakers must face when assessing the practicality or effectiveness of deploying any particular tool or set of tools.

The report concludes with a series of pragmatic actions that the U.S. government should take to implement an American industrial policy, one that advances U.S. prosperity and growth, leverages U.S. comparative advantages and values, and positions the United States and its allies to prevail in a strategic competition with China.

Key Actions for Activating the Industrial Policy Toolkit

Build the government's capacity to implement industrial policy.

- Expand and strengthen the Department of Commerce's Office of Industry and Analysis.
- Establish the position of industrial policy coordinator within Commerce.
- Mandate publication of sectoral strategies.
- Strengthen industrial policy quantitative analysis.
- Establish oversight mechanisms.
- Access private-sector industry expertise.

Deepen federal-state-local cooperation.

- Cultivate state and local catalysts.
- Create national-level demand signals.
- Condition national-level incentives on local support.

Innovate financing for industrial policy.

- Authorize the Industrial Finance Corporation of the United States.
- Establish Defense Production Act-like authorities for nondefense sectors.
- Establish best practices for subsidies.

Build the workforce for industrial policy.

- Map industrial policy workforce needs.
- Integrate workforce needs into sectoral strategies.

Build economic alliances.

- Develop joint approaches to nonmarket economies.
- Disarm on the subsidies race with allies.
- Develop new frameworks for strategic competition, including a new regime for investment and export controls.
- Spark joint innovation.
- Grant emergency regulation exemptions.

Introduction

A common refrain in Washington is that "economic security is national security." Yet, ask a dozen policymakers what they mean by this, and one is likely to receive at least a dozen different answers. In the most limited interpretation, this phrase reflects the obvious reality that a nation's ability to field a powerful military is a function of its ability to fund such a military, which requires a strong economy and tax base. Simply put, tanks and missiles are expensive, and the government must have sufficient economic resources to buy enough of them to prevail in any future conflict. To extend this idea further, economic security might also encompass the need for a robust defense industrial base that can develop and produce defense-related goods and services in times of both peace and war. This military-focused interpretation, however, is incomplete, as it misses the strategic advantages that may accrue from the projection of power on economic terms alone. To understand this, one must look at how economics and national security increasingly intersect in a global, digitized world and—to the point of this report—how an affirmative American industrial policy can play a critical role in strengthening U.S. economic security.

For decades, U.S. international economic policy was driven by the ideal that open markets and a rules-based economic system would lead to gains in domestic prosperity and global stability. The United States was a leader in setting global norms and rules and benefited tremendously from the post–World War II global economic framework. Today, however, the rise of authoritarian, state-dominated economies present a systemic challenge to this ideal, as these economies—namely China—do not have a strategic interest in following economic rules set by the United States and its allies. These state actors seek to exploit the open nature of the U.S. economy to advance their own strategic objectives, most notably in the critical realm of technology competition. As Secretary of State Antony Blinken recently noted, "China is the only country with both the intent to reshape the international order and, increasingly, the economic, diplomatic, military, and technological power to do it. Beijing's vision would move us away from the universal values that have sustained so much of the world's progress over the past 75 years."[2] At the same time, the U.S. economy is inextricably linked to China's economy, marking the first time in modern history that the country's most formidable strategic adversary is also one of its largest trading partners.[3] Simply leveling the playing field with China is no longer enough. The United States needs to play to win.

The U.S. response to these challenging dynamics has led to an increasing number of restrictions in the country's open economic system. Old tools designed to prevent national security harms arising from specific commercial transactions, such as export controls and investment screening, have been updated and expanded. New tools, such as regulation of the import of information and communication technologies and the export of capital, are under development. Tariffs remain at the center of the current debate regarding U.S. policy toward China. Heavy sanction regimes are in place across the globe, most notably against Russia. Each of these instruments has a different policy goal, but the common theme is a growing comfort among U.S. policymakers with imposing economic restrictions if restrictions are in the U.S. national interest. In other words, geoeconomics—the pursuit of geopolitical aims by leveraging a nation's economic power—has become a core part of U.S. foreign policy.[4] Consequently, the strength of the U.S. economy is a necessary element of projecting U.S. power abroad. Economic security is national security.

Simply leveling the playing field with China is no longer enough. The United States needs to play to win.

U.S. economic security policy to date has been largely defensive, but policymakers are increasingly waking up to the fact that the United States needs to start playing offense. Economic restrictions are a necessary response to the actions of adversary states, but they cannot in and of themselves secure the country's economic future. At the end of the day, businesses need a reason to invest in the United States, Americans need decent work, and the economy must keep advancing the technology frontier. America needs an affirmative industrial policy that is based on what the economy needs to thrive, not just what it needs to protect itself from external harms. Industrial policy is the missing piece to America's economic security strategy.

In the first report of this series on industrial policy, the authors defined industrial policy as "any measure of government engagement in the free market to produce economic outcomes in the national interest that markets would not take on their own. Practically speaking, this means actions by U.S. leaders to

develop, grow, or reorient parts of all of the economy to achieve a specific objective."[5] Industrial policy by definition means a stronger government hand in private-sector activities to shape decisions made by firms and support the success of firms operating in critical sectors. While concerns with China are driving much of the discussion on industrial policy today, the industrial policy interventions discussed in this paper also have relevance to U.S. economic security policy with respect to other nations, particularly those engaging in market-distorting behaviors that present strategic challenges for U.S. leadership in critical sectors.

The pursuit of industrial policy recognizes that free markets alone are insufficient to secure national interests in all cases. Policymakers must promote the efficiency and productivity gains of a competitive open market while also seeking resilient and secure supply chains, fair and reciprocal trading relations, and uninterrupted access to those goods and services essential to the national defense, critical infrastructure, and smooth functioning of the society writ large. A laissez-faire U.S. policy has contributed to a range of negative outcomes that the United States is now scrambling to address, including those with serious national security implications. The production of advanced, cutting-edge chips is uncomfortably and extremely concentrated in Taiwan. The United States lacks a major producer of the batteries necessary to power electric vehicles and the clean energy transition. The country relies on foreign producers for critical telecommunications equipment, key pharmaceutical inputs, and raw materials for a range of advanced technology products.[6] The United States has even come up short on the production of basic goods, such as surgical masks.

While the United States need not be a leader in every single sector, it must do a better job in securing a reliable supply of the key products necessary to enable the functioning of a modern economy and military—including through a disciplined industrial policy that creates smart incentives for U.S. firms to make these goods in the United States.[7] This is a goal that both sides of the political spectrum should support, and in fact increasingly do. The CHIPS and Science Act, the nation's most significant foray into industrial policy in recent years, passed with bipartisan support.[8] While Republicans and Democrats may disagree on the specific aims of industrial policy—for example, should it be used to counter China or to fight climate change?—there is growing consensus that the government should act.

To point out the flaws in the old hands-off approach, however, is not to suggest that the government should swing wildly in the other direction toward aggressive state intervention in the economy. An American-style industrial policy must lean into U.S. advantages, which include an open-market economic system, a culture of innovation and risk-taking, free flows of talent and ideas, and strong alliances with other major economies. Industrial policy in the American context should support, rather than supplant, these advantages. Industrial policy must also be supported by broader efforts to enhance the competitiveness of the economy as a whole. An ambitious trade agenda designed to promote U.S. workers and businesses, smart approaches to regulation, and broad-based improvements in U.S. talent pipelines are critically needed across industries. Industrial policy's role is to accelerate these types of competitiveness initiatives within those traded sectors that are most critical for the economic security needs of the country.[9]

An American-style industrial policy must lean into U.S. advantages, which include an open-market economic system, a culture of innovation and risk-taking, free flows of talent and ideas, and strong alliances with other major economies.

The first report in the CNAS national industrial policy strategy project laid out the intellectual framework for a uniquely American industrial policy.[10] This report builds on that foundation by examining the industrial policy toolkit and making a series of concrete, actionable recommendations for policymakers. Among the various reports now being produced on industrial policy across the broader policy community, the contribution of the CNAS project is to define the strategic interests that America has in developing its own brand of industrial policy and how doing so will advance U.S. national security.[11]

America's Industrial Policy Toolkit

As part of a broader economic security strategy, an American industrial policy must seek "to ensure long-term competitiveness in critical technology sectors, establish secure and resilient supply chains, and safeguard the day-to-day functioning of society in times of crisis."[12] With these overarching objectives in mind, this section examines the existing industrial policy toolkit, identifying successes and challenges in the use of existing tools and outlining considerations for policymakers seeking to strengthen the use of these industrial policy tools. The analysis categorizes three separate types of industrial policy interventions:

1. **Defensive** industrial policies that address economic or security harms caused by external economic actors.
2. **Proactive** industrial policies that support cutting-edge technological development and the competitiveness of specific sectors.
3. **Emergency response** industrial policies that bolster America's crisis response capability.

These objectives may not be mutually exclusive, as some stakeholders and desired economic end states might overlap. For example, the use of subsidies may be a proactive industrial policy, but it can also support defensive objectives in some instances by offsetting the effect of other countries' industrial policies. Moreover, the use of various types of industrial policies inevitably involves tradeoffs. For example, the expanded use of export controls may hamper problematic technology transfer practices of other countries, but it also deprives U.S. firms of the revenue necessary to reinvest in research and development (R&D), creating a tension between defensive and proactive industrial policy strategies. For ease of reading, measures will be grouped according to their primary objective, though policymakers will need to account for these complex tradeoffs when developing specific strategies for industrial policy implementation.

Defensive Industrial Policies

Of the three categories of industrial policy, the United States has the most robust set of existing authorities in defensive industrial policy. These tools have been used extensively to level the playing field with foreign competitors, reflecting the bias toward defensive tools in recent U.S. industrial policy practice.

There are two types of defensive policies:

- **Economic defensive tools** that address economic harms caused by the trade and economic policy of a foreign country, including trade remedy and related authorities and litigation at the World Trade Organization (WTO).
- **National security defensive tools** that address national security risks arising from discrete commercial transactions, including export controls, inbound investment screening, and outbound investment controls.

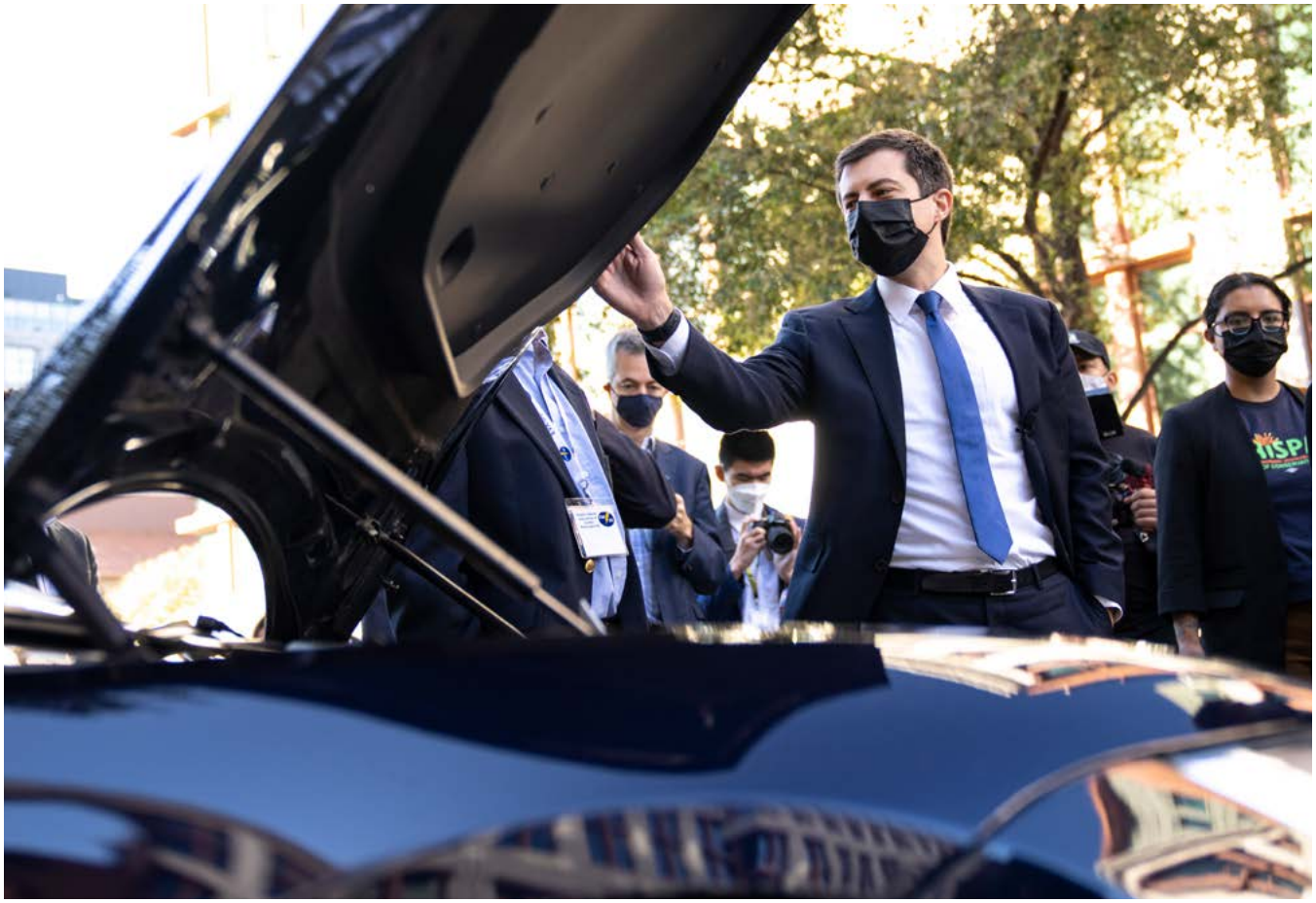
ECONOMIC DEFENSIVE TOOLS

Economic defensive tools consist of a suite of trade remedy and related tools, as well as WTO litigation. Adversarial trade practices negatively affect American firms and workers—a dynamic that can lead to economic security harm depending on which sectors are impacted. China's distortive state-directed economic policies, including mass use of subsidies and trade and investment barriers that favor its own domestic economic actors, are the leading example of why the United States must sharpen its defensive economic policies, though the United States has historically used trade remedy tools to address concerns stemming from a much broader range of trading partners.[13]

Trade Remedy and Related Tools

The trade remedy and related authorities toolkit consists of a variety of domestic authorities to impose tariffs or other restrictive measures to protect domestic industry from the negative effect of foreign trade practices. While certain trade remedy tools may be initiated by industry, the U.S. government has also attempted to use these tools to protect favored industries, justifying their inclusion in the industrial policy toolkit as a conceptual matter. The trade remedy and related tools include:

- **Anti-dumping and countervailing duty orders (AD/CVD orders).** AD/CVD authorities allow the United States to respond to underpriced or subsidized imports into the United States, if such imports cause material injury to U.S. producers.[14] Opponents of AD/CVD measures argue that the measures can distort trade themselves and that the orders are most often pursued by self-interested industry stakeholders seeking protection from foreign competition.[15] A 2020 study on the economic effect of temporary trade barriers, including AD/CVDs, found that these measures had significant, long-term effects on downstream industry competitiveness in terms of both pricing and employment, potentially outweighing the benefits for the protected industry.[16] Proponents of AD/CVDs, however, note the political utility of the orders, calling them a "pressure release valve" for the economic tensions that come from foreign competition.[17]



An affirmative industrial policy should include both defensive policies that protect American interests internationally and proactive policies that foster growth in critical sectors. For example, industrial policy should protect and promote electric vehicle manufacturers to sustain the increasing demand for electric vehicles in the United States. U.S. Secretary of Transportation Pete Buttigieg looks at a Tesla Model S at at the department's headquarters in October 2021. (Drew Angerer/Getty Images)

- **Section 201 safeguard authorities.** Authorized in section 201 of the Trade Act of 1974, section 201 safeguards are temporary trade measures that protect against a surge of imports of goods that cause serious injury to a country's domestic industry.[18] Remedies can include tariffs, quotas, tariff-rate quotas, or other negotiated agreements. Section 201 came back to the public consciousness in 2017 following the initiation of two separate safeguard investigations requested by U.S. manufacturers of solar cells and large residential washers. The solar cell investigation highlighted the tension that can arise between industry subsectors, as solar cell panel producers sought protection, while installers—which employ significantly more U.S. workers—were hurt by the higher prices associated with tariffs.[19]
- **Section 232 national security authorities.** Authorized in section 232 of the Trade Expansion Act of 1962, section 232 authorities authorize the president to investigate the import of items to determine if such imports threaten to impair the national security of the United States.[20] The president is authorized to act to "adjust imports," which may include the imposition of tariffs. The Trump administration reinvigorated the use of section 232 authorities, mostly notably for the steel and aluminum industries.[21] Under the Biden administration, the Department of Commerce initiated a section 232 investigation on rare earth magnet imports, which is the current administration's first under its ongoing supply chain reviews.[22] While the section 232 tariffs on steel and aluminum were successful in their limited goal of increasing utilization at steel and aluminum production plants, they may have also led to higher costs for consumers and end users.[23] Additionally, application of section 232 tariffs to a range of close allies exacerbated trade tensions with those countries, since section 232 tariffs are based on

a national security threat finding. U.S. trade negotiators have spent significant political capital negotiating agreements to lower these tariffs as part of a broader effort to restore U.S. alliances.[24]

- **Section 301 remedies.** Section 301 of the Trade Act of 1974 authorizes the Office of the U.S. Trade Representative (USTR) to enforce U.S. rights under trade agreements or—more controversially—to respond to any foreign trade practice that is unjustifiable and burdens or restricts U.S. commerce. This is one of the broadest economic policy tools to deploy as part of the defensive policy toolkit.[25] Most notably, the Trump administration's section 301 investigation into China's forced technology transfer practices was the basis for the significant new tariffs imposed on Chinese imports.[26] The Economic and Trade Agreement between the United States and the People's Republic of China (informally known as the Phase One Agreement) was negotiated to resolve the issues identified in the section 301 investigation, though that agreement ultimately covered a broader range of issues beyond just those limited to forced technology transfer.[27] The Trump administration also launched section 301 investigations into a range of other trade practices of allies, sparking controversy over the expansive use of these domestic authorities.[28]

The Biden administration has largely extended the Trump-era section 301 practices, maintaining tariffs on China and contemplating a new section 301 investigation into Chinese subsidies.[29] Whether used to create leverage in hypothetical future negotiations with China or to adjust structural imbalances in the U.S.-China bilateral relationship, tariffs have become an integral part of the U.S. trade policy on China.[30] The tariffs on China are not without controversy, however. The current section 301 measures cost an estimated $51 billion to consumers, when not accounting for exclusions.[31] These costs cannot be easily transferred to China, as the tariffs are structurally an increase in the price of goods imported into the United States and paid for by U.S. consumers.[32] Secretary of Treasury Janet Yellen has commented publicly that section 301 tariffs are adding to inflationary pressures.[33] In addition to the economic impacts, the use of section 301 authorities to impose new tariffs has raised concerns about whether the United States is abiding by its WTO commitments, including from close allies such as the European Union (EU).[34]

WTO Litigation

The United States may pursue litigation at the WTO to remedy unfair trade practices. However, the utility of bringing cases may be limited. Even when successful, cases take years to resolve. Currently, the appeals process is not available, after the United States blocked the appointment of appellate judges in protest over the performance of the appellate body. Ambassador Katherine Tai, herself a seasoned WTO litigator before becoming the U.S. Trade Representative, noted the challenges with litigating against China. The United States has won every case with China that has been decided, but these victories have failed to translate into broader structural reforms to move China toward a free market economy.[35] Finally, in order to litigate, there must be a WTO rule that disciplines the problematic practice that the litigating party seeks to address, which is not a given considering the difficulty in negotiating new, high-standard rules in this consensus-based body.

The CHIPS and Science Act of 2022, which President Joe Biden signed into law at the White House on August 9, 2022, will provide a crucial boost to U.S. semiconductor chip manufacturing and continued scientific research in a range of critical fields of science and technology. (Chip Somodevilla/Getty Images)

NATIONAL SECURITY DEFENSIVE TOOLS

National security defensive tools are authorities used to impose economic restrictions on specific transactions that may present national security risks. These include export controls, inbound investment screening, and outbound investment controls.

U.S. policymakers have increasingly relied on national security–based tools to manage strategic competition with China, in part because of the inability of existing trade tools to level the playing field with China. As Secretary of Commerce Gina Raimondo emphasized in June 2022, "U.S. restrictions on exports are at the red-hot center of how we best protect our democracies."[36] While further expansion of these tools may be necessary to ensure U.S. technological leadership, the U.S. government must also reflect on the limitations of these tools. When national security tools work well, this success is due to predictability in the policy process, a well-defined and bounded concept of what constitutes a national security risk, and buy-in from the private sector, which is ultimately responsible for the first line of compliance.[37]

Export Controls

U.S. authorities for export controls on dual-use technology were codified in the Export Control Reform Act of 2018. Use of export controls for a range of foreign policy purposes has increased significantly, including novel uses of these authorities to target specific Chinese companies (e.g., Huawei) or activities (e.g., human rights abuses) of concern. The appropriate use of export controls has been hotly debated in recent years, prompting discussion over whether new frameworks are needed to address gaps in existing authorities. Experts and policymakers have increasingly called for a new multilateral export control regime to facilitate more expansive use of export controls for dual-use technology. The current framework is grounded in the voluntary Wassenaar Arrangement, which is designed to prevent destabilizing accumulations of conventional weapons and does so on a country-agnostic basis. Wassenaar's current mandate may not allow it to address the full range of issues with China specifically and it suffers from the additional ailment of having Russia as a member.[38] Advocates argue that a new regime would facilitate cooperation with close allies to set controls based on shared democratic values and to more ably consider controls on technologies important for strategic competition with China, including emerging technologies.[39]

Inbound Investment Screening

U.S. authorities for screening foreign investment for national security purposes are implemented by the Committee on Foreign Investment in the United States (CFIUS). The Foreign Investment Risk Review Modernization Act of 2018 overhauled CFIUS rules to more effectively ensure that next-generation technologies are not acquired by adversarial actors, among other reforms.[40] From 2018 to 2021, the number of transactions CFIUS reviewed annually increased from 249 to 436 and CFIUS became much more aggressive in seeking out transactions that are not voluntarily notified.[41] CFIUS assesses national security risks related to factors relevant to industrial policy objectives, including whether an investment may provide a foreign investor with access to advanced technology or impact U.S. supply of critical goods. However, CFIUS reviews are conducted on a case-by-case basis, with risk assessments limited to the effect of the particular transaction under review, potentially limiting the utility of the CFIUS process to pursue industrial policy goals more broadly.

Outbound Investment Controls

While the United States does not have existing authorities to screen or control outbound investments made by U.S. investors overseas, policymakers have increasingly expressed concerns about the national security risks that may arise from certain U.S. investments in China. Senators Bob Casey and John Cornyn have been vocal advocates of establishing broad authorities to screen outbound investments involving critical supply chains, while National Security Advisor Jake Sullivan has noted the possibility that certain outbound investments may circumvent the spirit of export controls.[42] The CHIPS and Science Act includes a limited outbound investment control that prohibits the recipients of subsidies under the act from expanding certain operations in China, but more ambitious proposals related to outbound investment screening were dropped from the enacted version of the legislation. This debate, however, is not over, and outbound investment controls remain a distinct possibility whether enacted through future legislative action or through an executive order.

An outbound investment screening mechanism can fill an important gap in existing authorities by allowing the U.S. government to regulate the flow of capital that supports the development of critical technologies in China. This is particularly needed in cases when such development is not necessarily dependent upon the transfer of technology from the United States and thus

cannot be addressed through export controls. For example, China has indigenously developed advanced artificial intelligence (AI) capabilities that are not reliant on U.S. technologies, but the United States does not have a strategic interest in allowing U.S. capital to support the further expansion of China's AI market.

POLICY CONSIDERATIONS FOR USE OF DEFENSIVE INDUSTRIAL POLICIES

Use of defensive tools is a necessary part of a holistic industrial policy strategy, but policymakers must heed lessons learned from prior use of these tools. Economic defensive tools involve significant tradeoffs between competing sectors, run the risk of protectionism, and are limited by the structural constraints of these tools. National security defensive tools need to remain tethered to a clear concept of "national security." Policymakers should also consider how these policies would work in tandem with an affirmative industrial policy, so that proactive and defensive policies reinforce each other.

- **Limits of traditional trade remedy processes.** Trade remedies, while important to reinforce international rules and to provide economic relief, are not speedy processes. Remedies may take years to achieve, and markets may move on in the meantime.[43] Remedies also tend to be highly specific, limiting their utility in addressing broader structural issues with large nonmarket economies.[44]
- **Tariff tradeoffs.** While tariffs may have some effectiveness in addressing specific economic harms by shifting consumption and production choices away from unfairly traded goods, they are not costless. In fact, economic studies have shown that costs are largely passed onto consumers, though some disagree and observe that producers also shoulder a significant portion of the cost.[45] Moreover, tariffs could reduce real income, so revenue generated from tariffs could be offset by lowered tax revenue elsewhere from real income. Tax Foundation research finds that tariffs tend to be regressive: The foundation estimates that all tariffs in place currently would reduce long-run GDP by 0.23 percent ($5.1 billion), reduce wages by 0.15 percent, and eliminate 176,800 jobs.[46] The current debate over the inflationary impact of the current tariffs reflects these difficult dynamics.[47] Additionally, the use of multiple trade remedy tools can cause unintended, negative effects. For example, section 232 tariffs of steel and aluminum may have undercut the effectiveness of section 201 safeguards for washers by making a key input for washers more expensive.[48]

The People's Republic of China has a strong grasp over its industrial policymaking. The Chongqing Iron and Steel Co., Ltd. Plant, pictured here, was relocated from the city's central to the outskirts as per government directive, demonstrating a top-down style of industrial policymaking. (China Photos/Getty Images)

- **Risks of protectionism.** Trade remedies run a high risk of resulting in protectionist or politically motivated behavior that favors one sector over others.[49] Even from the perspective of industrial policy, which inherently involves efforts to prioritize certain sectors, purely protectionist actions are undesirable, as the end economic result is unlikely to lead to long-term competitiveness of protected sectors. Defensive economic tools are best used in response to specific harms caused by unfair trade practices. They cannot in and of

themselves make firms globally competitive. Overuse of defensive tools for protectionist purposes can ultimately erode the incentives inherent in free market competition that drive firms to innovate and advance the technological frontier.

- **Unintended consequences of unilateral measures.** Unilateral measures may not be most effective at addressing other nations' market-distorting practices, as globalized trade provides flexibility for transshipment and substitution via third markets. For example, restrictions on imports of semiconductors and television sets from Japan may have encouraged growth in the same goods from South Korea and Taiwan.[50] The United States rarely enjoys monolithic power over the demand or supply of specific goods, necessitating a strategy of working with other countries to ensure that defensive policies have real teeth.

  The Trump-era use of trade remedies tools, such as the section 232 and section 301 authorities, against close allies such as Canada, Japan, and the EU unnecessarily provoked tensions with those countries at a time when the United States needed their cooperation to take stronger action against China. Trade irritants are a part of every major trading relationship, but cooperative approaches to negotiating mutually beneficial outcomes can more responsibly address these irritants while building stronger economic alliances.

- **Structural issues at the WTO.** China's rise as the WTO's largest trader—while simultaneously maintaining strong state control over its economy—presents an existential challenge to the WTO.[51] Existing WTO rules do not fully address the range of Chinese trade and investment practices that disadvantage U.S. and allied economies. The WTO's consensus-based decision process limits the ability of the WTO to negotiate new rules to address China's trade practices specifically, as well as to negotiate high-standard rules more generally. The current dysfunction in the WTO appellate body also limits the overall utility of the WTO, as rules must be enforced to meaningfully constrain state behavior.[52] While the United States still has a strong interest in the future success of the WTO, particularly when setting a minimum standard of economic behavior from other trading partners, it cannot rely on the WTO alone to address more ingrained systemic challenges with China.

- **Bounding a larger concept of national security.** The emerging concept of economic security has blurred the lines between economic and national security concerns. Policymakers must still recognize the outer bounds of what national security tools can achieve. Such tools are generally designed to address discrete security risks arising from ordinary business transactions and cannot solve all commercial issues. National security tools can be used to regulate what technology, for example, can be transferred to China, but they cannot be used to dictate the commercial terms on which permitted technology transfer occurs.[53] The latter—setting of commercial terms—is at the heart of many U.S. concerns over China's trade practices, and policymakers will need to develop other tools to address these issues.

Proactive Industrial Policies

Proactive industrial policies are an essential complement to defensive actions. While defensive tools seek to remedy harms, proactive tools seek to affirmatively craft an upward trajectory for critical industries, including those where U.S. technological leadership is critical for economic security objectives. To take the inverse of the prior section's focus, proactive tools are about getting ahead, not getting even. These types of policies have been used sporadically in recent years, though they have gained new traction with the passage of the CHIPS and Science Act. Policies in this category include financial incentives provided at the federal and nonfederal levels, investment in human capital, trade policy, and export promotion.

FINANCIAL INCENTIVES

These forward-looking investments are made to spur the growth of key sectors. This may include funding at all points along the life cycle of a particular technology or sector, though to date the United States has more heavily emphasized investments in early stage R&D investments. "Incentives" and "subsidies" are used interchangeably in this analysis and can include a variety of financial instruments, including grants, loans, guarantees, and tax credits.

Defense Technology Funding Programs

The U.S. government has a well-established track record in implementing funding programs to mobilize resources around development of a particular technology area relevant to defense needs.[54] The most obvious example of this is the Defense Advanced Research Projects Agency (DARPA), a Department of Defense (DoD) agency mandated to develop cutting-edge technology for America's military leadership. From its Sputnik moment–inspired founding days,

DARPA has served as a government incubator for experimental technology, and the agency has become crucial to U.S. economic competitiveness. Global Positioning System (GPS) technology and the internet are the most well-known examples of DARPA-launched technologies, but DARPA also supported innovations in microelectronics, unmanned aerial vehicles (UAVs), AI, machine intelligence, and semi-autonomous systems.[55] DARPA has had an outsize impact relative to its small size.

Proactive industrial policies are an essential complement to defensive actions.

The success of DARPA has inspired similar initiatives in the United States and abroad. ARPA-E (ARPA-Energy) in the Department of Energy has funded $2 billion in support of more than 950 energy technology projects since its founding in 2009.[56] The Biden administration has proposed multiple advanced research agencies, such as ARPA-H (ARPA-Health) for the National Institutes of Health with $6.5 million in funding sustained over three years. Another, ARPA-C (ARPA-Climate), has $500 million in funding to combat climate change.[57] Internationally, Japan, Germany, the United Kingdom, and NATO recently have created DARPA-inspired programs, though the success of these organizations is still too early to see.[58]

In-Q-Tel and the Defense Innovation Unit have similar missions to DARPA: Both seek to leverage the development of commercial technologies that may have national security relevance.[59] In-Q-Tel is a government-funded venture capital firm designed to foster the national security community's access to emerging technologies. The Defense Innovation Unit is designed to accelerate the glacial defense procurement process and provide the military with faster access to commercial technologies. Both units have a strong focus on later stages in the development cycle, with the goal of accelerating the adoption of commercial or dual-use technologies by national security programs.[60] These programs are focused on ensuring that the national security community has access to cutting-edge technologies that are ready for adoption into government programs, as well as ensuring that private industry is incentivized to develop technologies that may be of interest to the national security community. While these programs may not address all industrial policy goals, they serve a crucial role for meeting particular national security needs within the government.

Ad Hoc Incentives for Strategically Important Industries

Policymakers have shown increasing interest in the ad hoc use of subsidies or incentive programs to respond to emerging national security needs. While some needs may be met through Defense Production Act (DPA) Title III authorities (discussed in further detail later in this report), others are of large enough scale to warrant a separate appropriation, which is typically done on an ad hoc basis. Most prominent among these is the CHIPS and Science Act, which provides $52 billion in funding for chips sector subsidies.

Almost all countries implement some form of subsidies, and subsidies for chips are prominent in major producer nations. The South Korean government and semiconductor industry have plans to spend $451 billion over the next 10 years.[61] The EU has plans to spend $47 billion in public and private money until 2030.[62] Japan has pledged $6.8 billion toward similar efforts.[63] However, some subsidies are more distortive than others, particularly when combined with other measures to advantage local firms.[64] Chinese subsidies, such as the financing of projects at below-market rates through policy banks, greatly distort the playing field for American firms.[65] Chinese government support for its indigenous semiconductor industry is supported by the immense $170-billion Integrated Circuit Fund dedicated to this purpose, along with regional and provincial funds.[66] In the 2021 USTR Report to Congress on China's WTO compliance, it was noted that China's political economy remains marred by "trade-distorting subsidization."[67]

The prevalent use of subsidies by other countries has been part of the rationale for U.S. action on chips subsidies. Before passage of the CHIPS and Science Act, the Biden administration was vocal in expressing concerns that the slow pace of congressional action would lead to the United States losing out to other countries in the chips race. For example, the Commerce secretary warned in May 2022 that delay in passing the CHIPS Act would put America at a disadvantage. On a separate occasion, the secretary said that the United States should "move to making chips in America, not friend-shoring."[68] The chips subsidies, therefore, have a mix of defensive and proactive aims, as fears over losing out to firms from other countries where subsidies are already in heavy use appear to be part of the political impetus for the incentives.

It is too early to tell if the CHIPS and Science Act subsidies will provide a successful template for future incentives in other sectors. The ad hoc nature of the process to fund the subsidies meant that it was subject to significant delays and political negotiation. The Department of Commerce will face immense pressure to administer the subsidies program responsibly while struggling with the fact that it has little institutional expertise in executing subsidies at this scale. Congressional negotiators included novel types of guardrail provisions to ensure that the incentives are responsibly used to boost U.S. domestic capacity and bend supply chains away from China, but these guardrails will need to be closely monitored. Finally, the United States has no clear policy for how its subsidies should align with those of other countries. When China grants subsidies, policymakers may want to restrict the ability of U.S. firms to receive both Chinese and U.S. subsidies. Double-dipping in the subsidies pot fundamentally undermines the ability of the United States to use its own subsidies as a counter to China's unfair trade practices. When allied economies grant subsidies, the United States should work with these partners to ensure that subsidies are not duplicative or leading to a subsidies race.

Almost all countries implement some form of subsidies, and subsidies for chips are prominent in major producer nations.

State-Level Incentives

In addition to federal incentive programs, state and local governments are active in providing incentives, usually through tax credits. These incentive programs are motivated by different objectives than those at the federal level; state and local governments typically seek to boost jobs and local economic development in their area. Competition between states and local governments may not lead to any positive net benefit for a national industrial policy effort if the incentives impact only the location of particular facilities and not the overall productive capacity of the country. However, state and local institutions can play a critical matchmaking role to ensure that industry investments are paired with local talent pools and supporting institutions, such as local universities. For example, the state of Ohio benefits from organizations such as JobsOhio, the Ohio Manufacturers' Association, and Parallax Research, which are state-level organizations that tap into and deepen the linkages between academia, industry, and the Ohio state government.[69]

Government Contracting Authorities and Preference Programs

Government contracting and procurement authorities are unique in their ability to guarantee demand for critical goods and services and thereby shape the desired outcomes in the market. Asset acquisition, purchase guarantees, and advance market commitments by the government are all useful measures for shaping market outcomes. For example, under the Emergency Use Authorization authority under section 564 of the Federal Food, Drug, and Cosmetic Act, the Health and Human Services (HHS) secretary pledged advanced market commitments (under DPA authorization) of hundreds of millions of doses of COVID-19 vaccines developed by pharmaceutical companies.[70] Domestic preference policy measures, compared to contracting and procurement authorities, have broader remits. The January 2021 Buy American executive order mandates support for and investment in American production.[71] Overall, procurement and contracting authorities more surgically target industries and actors, and they may incur less unintended consequences compared to measures such as tariffs.[72] Broader measures such as domestic preference executive orders are useful in political signaling.

FOUNDATIONAL R&D SUPPORT

The private sector dwarves the federal government in R&D investments, as private businesses injected $485.8 billion into R&D from 2000 to 2019 compared to the federal government's $63.1 billion over the same period.[73] The robust $280 billion of funding included in the CHIPS and Science Act represents a historic investment in U.S. science and technology programs and the largest five-year investment in public R&D in the nation's history.[74] Apart from the $52.7 billion earmarked for subsidies for the semiconductor sector, the remainder of funding will be infused into the American economy and workforce. The bill includes the authorization of $81 billion over five years for the National Science Foundation, of which $20 billion is earmarked for the newly established Directorate for Technology, Innovation, and Partnerships to accelerate "domestic development of national and economic-security critical technologies such as artificial intelligence, quantum computing, advanced manufacturing, 6G communications, energy, and material science."[75] Other major science agencies, including the Department of Energy,

the National Aeronautics and Space Administration, the National Institute of Standards and Technology, and the National Oceanic and Atmospheric Administration, also received strong boosts in funding. Much of this funding, however, is only authorized and not yet appropriated and available to agencies.

INDUSTRIAL POLICY WORKFORCE DEVELOPMENT

Prior research, including research conducted by CNAS, has amply demonstrated that the United States faces a worrisome skills gap in advanced technology sectors.[76] The United States faces serious shortages in workers with advanced degrees, industry experience, and non-degree-based technical skills.[77] TSMC founder Morris Chang identified talent shortages in the United States as one of the major challenges to establishing chip manufacturing facilities in the United States.[78] The technical skills gap in the United States is not a new problem, and despite efforts to establish a range of science, technology, engineering, and mathematics (STEM) educational programs, the United States remains stubbornly behind other countries. After the Sputnik moment, the U.S. government established the National Defense Education Act (1958) to expand and improve educational programs to meet national needs. Sixty years later, there has not been systematic evaluation of the effectiveness of the program, and American prowess in STEM education has been declining.[79] Americans themselves rate the U.S. K–12 STEM education to be subpar, with only 29 percent of the country's adults rating it as competitive.[80] Promisingly, the CHIPS and Science Act includes National Science Foundation initiatives to broaden workforce participation in microelectronic sectors and authorizes $13 billion for STEM education development.[81]

Challenges exist in matching skilled workers to private sector needs, though the U.S. government is taking steps to address these. For example, the Economic Development Administration's Build Back Better Regional Challenge program will support regional industry clusters through grants for infrastructure improvements and workforce development.[82] Implementing these types of initiatives is resource-intensive and requires a cadre of well-connected program managers at all levels of government with in-depth knowledge of federal priorities and funding opportunities, as well as local talent pools and skills initiatives.[83]

Additionally, access to foreign talent is a core part of the U.S. innovation ecosystem. Some estimates show that immigrants account for more than half of the country's STEM workers with PhDs.[84] As one example of an effort to remedy constraints that the U.S. immigration system places on access to foreign talent, the America COMPETES Act included immigration provisions to exempt advanced STEM degree holders from green card caps.[85] However, the conference process that resulted in the CHIPS and Science Act ultimately dropped these provisions.[86]

TRADE POLICY AND EXPORT PROMOTION

Proactive industrial policy's main objective is to enable U.S. firms to succeed in global competition. This inherently means that firms must have access to—and be competitive in—global markets. Government efforts to shift supply chains or promote particular sectors are highly unlikely to succeed if they fail to account for this fundamental fact.[87] As a general matter, a robust trade agenda to address barriers in foreign markets is a critical part of the broader U.S. competition strategy. As an industrial policy tool specifically, trade policy can be used to identify barriers that negatively impact critical industry sectors and prioritize the resolution of these barriers in engagements with foreign government partners. The earlier discussion on trade remedies focused on enforcement of trade obligations of foreign trading partners. As a proactive industrial policy tool, the focus is instead on negotiation of new market access commitments for key industry needs.

Proactive industrial policy's main objective is to enable U.S. firms to succeed in global competition. This inherently means that firms must have access to—and be competitive in—global markets.

Ideally, negotiation of issues related to industrial policy goals would occur as part of a broader trade agreement negotiation so that it may be balanced appropriately and holistically with other U.S. priorities, including raising the environmental and labor standards of trading partners. The Biden administration has sworn off new trade agreements, preferring to engage in loosely defined forums such as the Indo-Pacific Economic Framework for Prosperity and the U.S.-EU Trade and Technology Council (TTC).[88] While these efforts may produce interesting results on discrete priority issues, critics have noted that they are unlikely to produce substantial changes in trading relationships, as the United States has explicitly taken market access negotiation off the table.[89]

In addition to trade negotiations, trade promotion programs can support industrial policy objectives by ensuring that U.S. firms can take full advantage of market opportunities. Organizations such as the U.S. Commercial Service are designed to support U.S. exporters in foreign markets, including through market research, match-making services, regulatory guidance, and advice on addressing trade barriers.[90] Newer initiatives have been stood up to help U.S. exporters compete directly with Chinese firms in third-party markets, such as EXIM's China and Transformational Exports Program, which provides supportive financing for U.S. exporters in key technology areas of strategic competition with China.[91] Intensifying these types of trade promotion programs for critical sectors can be an important part of a broader industrial policy strategy. Particular focus on small businesses, which account for a majority of U.S. exporters, and an emphasis on markets where U.S. exporters can achieve significant growth—not just where they are useful to push back against inroads by Chinese firms—are critical parts of a competitive export promotion agenda.[92]

POLICY CONSIDERATIONS FOR PROACTIVE INDUSTRIAL POLICIES

Stepped-up use of proactive industrial policies can play a key role in ensuring that critical industries succeed in global markets. However, such incentives also run the risk of undermining the very commercial pressures that cause industry to innovate and compete, factors that will ultimately determine their success in global markets. Policymakers must consider these risks and design proactive industrial policy interventions accordingly.

- **Sector prioritization.** Policymakers need to have a strong sense of what kind of technologies are needed to sustain the U.S. innovation base and what gaps in productive capacity threaten U.S. economic security. This requires strong analytical capacity to assess technology development, industrial capacity, and the global competition landscape. This type of analytic muscle can inform how the United States invests in and develops its human capital stock, proactively incentivizes strategic industries, and allocates resources from its R&D agencies.
- **Tolerance for risks.** Successful industrial policy requires risk-taking. Some funded projects should fail if investments are truly pushing the technology frontier forward, particularly in industrial policy efforts focused on incubating emerging technologies. With notable exceptions, such as DARPA, failure is not institutionally rewarded within the government bureaucracy, instead inviting political criticism and backlash. A cultural shift must occur for industrial policy to succeed.
- **Negative effects of incentives.** While some risks are required for innovation, government administrators should be wary of other types of risk, such as firms becoming commercially sluggish if they are overly reliant on government funds. The role of subsidies is to provide a short-term critical boost, not a long-term crutch that shields an industry from market pressures entirely. Firms must still have strong commercial incentives to innovate and adapt to global market conditions.
- **Conditionality.** Financial incentives should come with strings attached. Policymakers may want to consider a range of restricted activities for firms receiving subsidies, including executive compensation, shareholder benefits, and overseas investments in adversary countries (e.g., CHIPS and Science Act guardrails). Conditionality requirements should balance the need for responsible expenditure of taxpayer firms with the need for flexibility in implementation and the desire to induce companies to actually want the proffered incentives. Oversight and clear guidelines on obvious redlines are needed; government micromanagement is not.

Successful industrial policy requires risk-taking.

- **Trade agreement constraints.** The United States has committed to rules in the WTO and in its regional and bilateral trade agreements disciplining the use of subsidies. While certain types of subsidies are permitted, extensive use of subsidies may lead to litigation against the United States if such subsidies are not designed with trade obligations in mind. Stepped-up use of subsidies could become an irritant in trading relations with allies or further undermine the utility of WTO rules if the United States disregards its existing commitments in this space.
- **Risks of politicization.** New sources of federal funding may quickly become new sources of political pork, undercutting the objective assessment of national needs that is required to make industrial policy work.
- **Cradle-to-grave support for industrial capacity.** Industrial policy requires the successful promotion of priority industries across the life cycle, from technology incubation to large-scale production to market growth. For technologies that show promise, the grave is too often in the commercialization phase. Certain government programs have started to address this.

For example, ARPA-E grant recipients are required to develop plans for commercialization from the beginning, in a practice that was then adopted by DARPA.[93] Programs such as EXIM's China and Transformational Exports Program help emerging technology companies grow through expanded exports.

- **Government procurement constraints.** Government procurement processes are notoriously hard to navigate, particularly for smaller businesses. Government demand signals may be sufficient to spur increased domestic production in certain cases but may be less effective in responding to long-term structural shifts in global value chains for advanced technologies, where the government is a tiny player compared to the commercial market.

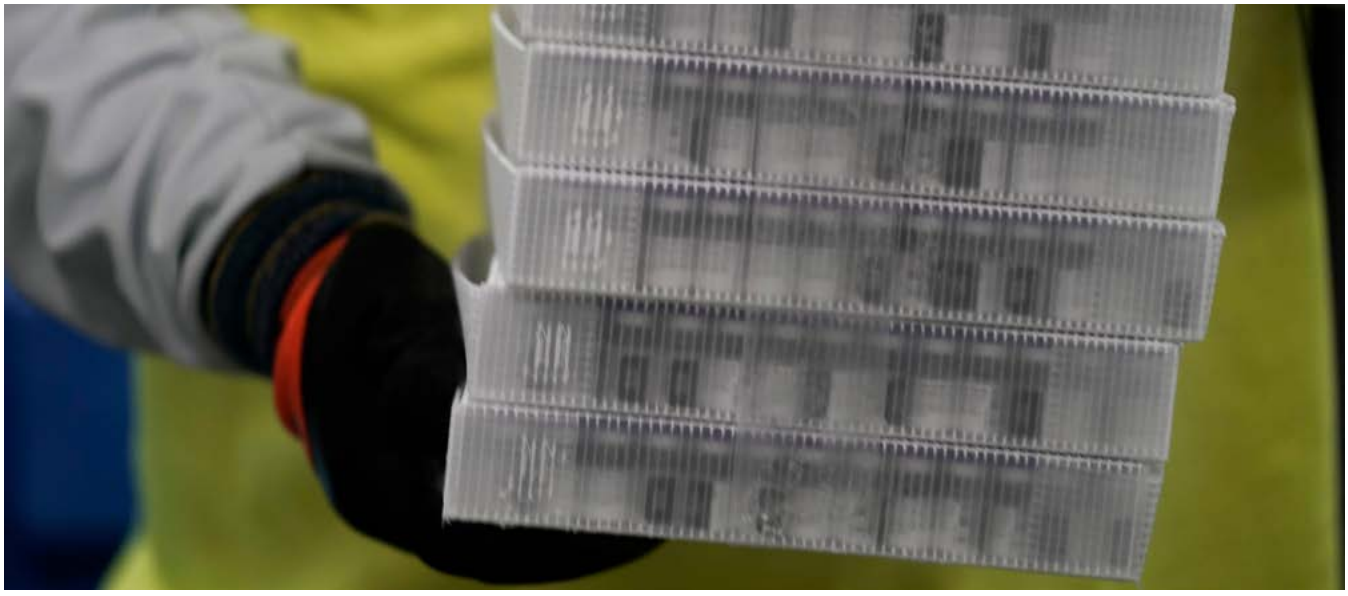
Emergency Response Industrial Policies

Emergency response industrial policies enable the government to surge industrial capacity during times of crisis, including to respond to supply chain disruptions for critical goods. Critical goods can encompass a range of products, running from high-tech goods to items that are basic but nonetheless essential, such as surgical masks. Emergency response tools may be used to *prepare* for crisis, including developing industrial capacity and stockpiles in advance, or to *respond* to crisis. Effective emergency response industrial policy will have both of these "prepare" and "surge" components.

The DPA is the lonely workhorse of emergency response industrial policy today, but it can be a powerful tool for both emergency response and proactive industrial policy if used more strategically. The DPA provides the president with expansive authority to ensure that the domestic industrial base is prepared to serve national security needs, with the concept of "national security" needs expanding over time to now also include homeland security, energy security, and emergency preparedness.[94] The president may invoke the DPA to boost the government's response to particular emergencies, and agencies may also use certain DPA authorities in the ordinary course of business without a formal declaration of a national emergency by the president.

The key portions of the DPA include:

- **Title I** (*Priorities and Allocations*) establishes a system of priorities and allocations for materials, services, and facilities. The priorities authorities allow the president to give designated government contracts priority in private-sector facilities, essentially requiring these contracts to cut in line before all other contracts. The allocations authorities, which are less frequently used, allow the president to control the general distribution of materials, services, and facilities.[95] Priority order ratings flow down through contracts and subcontracts to enable the recipients of priority orders to have the necessary inputs to meet the requirements of the priority contract.



In December 2020, boxes of Pfizer-BioNTech COVID-19 vaccine were prepared at the Pfizer Global Supply Kalamazoo manufacturing plant in Portage, Michigan. This unprecedented advancement in vaccine development was made possible by Operation Warp Speed, which directed concentrated government support toward biotechnological breakthroughs to combat COVID-19. (Morry Gash/Pool/Getty Images)

- **Title III** (*Expansion of Production Capacity and Supply*) authorizes and specifies conditions for financial assistance to expand productive capacity and supply, including the ability to provide loans, loan guarantees, direct purchases, purchase commitments, and equipment installation.[96]
- **Title VII** (*General Provisions*) authorizes the president to consult and coordinate the support of industry representatives in developing plans of actions in providing for national defense.[97]

Multiple agencies are involved in DPA implementation, including the Departments of Agriculture, Commerce, Defense, Energy, Homeland Security, and Transportation.[98] The Department of Homeland Security has lead responsibility for DPA coordination, along with the National Security Council and Council of Economic Advisors. Commerce is tasked with conducting industrial base assessments and has delegated authority for implementation of priority and allocation orders.[99] While multiple agencies have delegated authorities to implement Title III funding, only the DoD has an active and funded Title III program.

The DPA has been invoked to respond to a wide range of crises in recent years, including the COVID-19 pandemic, clean energy transition, rare earth mineral production, and baby formula shortages.[100]

Both the Trump and Biden administrations invoked the DPA multiple times to address shortfalls in COVID-19 vaccination and testing supplies, medical equipment, and personal protective equipment.[101] The DPA was the underlying authority for Operation Warp Speed, a partnership between multiple government agencies and ultimately the private sector to address the United States' vaccine demands starting in early 2020. This partnership initially used Title I priority-rated contracts to mobilize vaccine sponsors and pharmaceutical manufacturers.[102] Agencies then used advanced purchase agreements under Title III to expand production capacity and facilitate public-private partnerships.[103] As a result of the efficacy of these actions, millions of vaccines were produced by April 2021, though U.S. vaccine supply lagged other countries' supplies over the rest of 2021. Notably, an economic analysis of the impact of Operation Warp Speed observes that the price constraints in DPA contracts may have worsened these shortages.[104]

More recently, President Joe Biden invoked the DPA for supply chain concerns. In March 2022, the president invoked Title III to increase domestic production for large-capacity batteries.[105] In May 2022, the president invoked Title I in response to infant formula shortages. He also delegated to the HHS secretary authorities to ramp up production under Title III and to establish a volunteer body of industry executives under Title VII.[106] In June 2022, the president invoked Title III to accelerate domestic production of five clean energy technologies.[107] While the frequent invocations in recent years may seem notable, DoD has been placing 300,000 "rated orders" annually.[108]

All titles of the DPA work together to meet industrial mobilization needs. Title III creates the productive capacity, and Title I allows the U.S. government to tap into that capacity. To fund the expansion of industrial capacity, the DPA established the DPA Fund, appropriations of which can be used to carry out Title III provisions.[109] Every fiscal year, Congress appropriates a multimillion amount to the DPA Fund. In FY 2020, Congress appropriated $64.4 million. Between FY 2010 to FY 2020, annual appropriations ranged from $34.3 million to $150.7 million, for an average $92.4 million in appropriations each year. The year-end balance of the DPA Fund cannot exceed $750 million.[110]

POLICY CONSIDERATIONS FOR EMERGENCY RESPONSE INDUSTRIAL POLICIES

Expanding the use of DPA authorities to address a wide range of crises may present challenges in government capacity to execute on the original intent of the DPA. However, policymakers are likely to continue to lean heavily on the DPA if other tools are not available to address economic disruptions.

- **Difficulty in reconciling comparative advantages and national need.** Certain production has moved offshore because comparative advantages have pushed firms to make such decisions. Therefore, any long-term-oriented resilience-building policy would face the tension between an efficiency mentality (prioritizing economic specialization and cost reduction) and a preparedness mentality (ensuring safety stock of crucial goods).
- **Surge capacity cliffs.** If the president invokes the DPA and gives short-term contracts to companies, there is little predictability for companies that are expected to produce for the government for two to three years but then suddenly not anymore. This dynamic makes it hard for companies to adjust their capacity and to plan over the long-term business cycle.
- **Distinguishing crises from disruptions.** Current supply chain crises have impacted nearly every aspect of daily life, yet not all these disruptions

warrant government intervention. Even fewer can justify government intervention on national defense grounds. While policymakers must use every available authority in genuine emergency situations, continued overuse of the DPA may erode the efficiency and effectiveness of its programs.

- **International competition for critical supplies.** In crisis situations when multiple countries are competing for similar materials or supplies, a focus on increased domestic production is sensible, as international substitutes may not be readily available. However, given the likelihood that critical inputs may come from foreign sources and that the DPA does not apply to firms outside of U.S. jurisdiction, the DPA may hit limits in quickly expanding capacity. Coordination with supplier nations may be required.
- **Resources mismatch.** The DPA Fund, which funds Title III investments, is appropriated funds at a scale significantly lower than what is required during a crisis scenario. For example, while the DPA Fund can hold no more than $750 million at year-end, the DoD alone executed over $3 billion in COVID response investments through the DPA and other actions.[111] Other appropriations for COVID response added billions more to this figure. While contingency appropriations are often unavoidable during an emergency, stronger investments in preparedness may alleviate supply shortages of critical goods and services prior to the emergency of a crisis.
- **Lack of capacity in all implementing agencies.** While multiple agencies have authorities under the DPA, not all agencies regularly use these authorities or have the sufficient expertise to surge on DPA implementation during times of crises.[112]

A family waits to receive baby formula in a Walmart Supercenter in July 2022. The use of the Defense Production Act to address baby formula shortage is highly expansive. The Biden administration is requiring suppliers to direct needed resources to baby formula manufacturers before any other customer. (Brandon Bell/Getty Images)

Recommendations: Activating the Toolkit

As a continuation to the recommendations included in the first report of this series, the following recommendations describe the pragmatic steps that the U.S. government must take to implement an American industrial policy. These recommendations cut across the defensive, proactive, and emergency response industrial policy toolkits.

Build the government's capacity to implement industrial policy

Industrial policy at scale is a new endeavor for the United States, and it must build its institutional capacity accordingly. Ad hoc efforts will not suffice. Expanded resources, enhanced analytic capabilities, new cadres of skilled bureaucrats, and high-level political accountability are necessary to ensure the success of a new American industrial policy. Robust oversight will be particularly important to build public confidence that taxpayer dollars are being spent responsibly.

The administration, with appropriate authorizations and required resources from Congress, should:

Expand and strengthen Commerce's Office of Industry and Analysis. The Office of Industry and Analysis, within the Department of Commerce's International Trade Administration, is charged with "maintain[ing] the leading competitive edge of American industry throughout the world."[113] While the Office of Industry and Analysis has historically focused on promoting U.S. exports, it is well-situated to take a leading role in implementing industrial policy, given its expertise in critical industry sectors, established relations with industry, and capacity to conduct sophisticated trade data analysis and modeling. The Office of Industry and Analysis' institutional location within the Department of Commerce is also advantageous, given the importance of coordinating industrial policy efforts with other authorities implemented by Commerce, including export controls, trade remedies, statistical capacity, and economic development.

Empowering the Office of Industry and Analysis to effectively execute on a new industrial policy mandate will require changes to its current practices, along with increased budgetary support appropriated by Congress.

The Office of Industry and Analysis, with support from Congress and the secretary of Commerce, should:

- Expand its economics staff to enable the robust data analysis and economic modeling required to conduct industrial policy analysis across multiple sectors on a regular basis.
- Develop new research methods to ensure that it is not overly reliant on industry information to formulate policy, including building stronger relationships with the intelligence community and independent academics.
- Build business intelligence and commercial data capabilities comparable to that available in the private sector.[114]

Establish the position of industrial policy coordinator position within Commerce. Commerce should establish a senior-level position of industrial policy coordinator to streamline cooperation between Commerce components with industrial policy responsibilities and to ensure high-level accountability for successful implementation of industrial policy initiatives. This position could be double-hatted with the assistant secretary for industry and analysis or be a new position within the secretary's policy planning staff. This position should also lead Commerce's coordination with other agencies implementing industrial policy initiatives, as well as the National Security Council.

Mandate publication of sectoral strategies. The administration should develop a regularized process to develop and publish its strategy for ensuring U.S. competitiveness in priority sectors. The Biden administration's supply chain reports set a foundation for this type of effort, but these types of reports need to be regularly published and updated. They also should include frank assessment of the success or failure of attempted industrial policy interventions.

The sectoral strategies should:

- Assess threats to U.S. competitiveness from non-market economies, commercial competition from market economies, projected supply of sectoral goods and services domestically and from secure sources overseas, and anticipated U.S. and foreign demand for sectoral goods and services.
- Envision how the U.S. government will use defensive, proactive, and emergency response industrial policy tools to develop a comprehensive and integrated approach to ensuring U.S. competitiveness.

- Establish clear metrics for success, though strategy drafters should be wary of focusing on overly specific or narrow targets that are likely to lead to market distortions if pursued in a single-minded manner. Goals such as U.S. leadership in a particular technology node within a set period of time or sufficient stockpiles of a particular good are examples of metrics that are clear, measurable, and pragmatic.

The process for developing the sectoral strategies should:

- Be led by a deputy national security advisor responsible for industrial policy, a position that was recommended in the first report of this series.[115]
- Engage multiple agencies with relevant expertise, with Commerce leading many of the sector strategies and supported by an enhanced Office of Industry and Analysis. Other agencies should contribute or lead strategy development for sectors where they have specialized expertise (e.g., Department of Energy for batteries, as was done in the Biden administration's supply chain reports).

Strengthen industrial policy quantitative analysis. Effective industrial policy requires a detailed, quantitative understanding of how markets are structured and how goods and services are traded across borders. The Department of Commerce's Bureau of Industry and Security (BIS) has existing authorities under the DPA to conduct industrial base assessments, including the powerful ability to mandate detailed survey responses from individual companies.[116] But this capacity is under-resourced, limited to assessing defense-related sectors, and not operating at the scale or speed necessary to implement an ambitious industrial policy. For example, BIS lists one industrial base assessment conducted in 2022 and only three combined in 2021 and 2020, though Commerce has also been involved in the supply chain reports.[117] While Commerce has requested additional funding for this program noting the increased demand for industrial assessments, Commerce budget documents plan for only two assessments annually.[118]

To remedy this analytic gap, Congress should:

- Expand BIS' capacity to regularly conduct industrial base assessments across a wider range of sectors important to the national interest, including those related to future U.S. technological leadership, critical infrastructure, and emergency preparedness.
- Rapidly increase funding for industrial base assessments so that funding is on par with other major statistical programs in Commerce and resourced sufficiently to conduct detailed assessments on a wide range of industries on a regular basis, rather than the current process of ad hoc assessments that may not be updated for decades.[119]

To effectively use a strengthened industrial base assessment capability, the Department of Commerce should:

- Coordinate industrial base assessment survey development with the data collection needs of the Office of Industry and Analysis, so that Office of Industry and Analysis economists have access to otherwise unavailable private-sector data for economic modeling and projections.
- Develop data collection requirements to directly inform the development of sectoral industrial policy strategies.

Establish oversight mechanisms. To ensure that taxpayer dollars are spent responsibly, Congress should mandate regular reporting on the expenditure of subsidies funding. Congress may want to consider establishing special investigators general to oversee subsidies disbursements.

Access private-sector industry expertise. Strengthened government capacity must include deeper insights into private-sector decision-making, which may be difficult to glean from data analysis alone. Industry advisory groups can provide useful insights, but these insights may be hampered by representatives' duty to advocate for specific company positions.

To create a more enduring base of knowledge about how industry works, the administration should:

- Create short-term opportunities at all levels of seniority for private-sector experts to rotate into the government and for government bureaucrats to rotate into the private sector. These opportunities should be available at all levels of seniority. Models like the U.S. Digital Service, which leverages private-sector tech talent for discrete government tech projects, may be useful programs to examine.
- Use select political appointments to spin in private-sector talent for key industrial policy roles.[120]

Deepen Federal-State-Local Cooperation

State and local economic development entities can play a crucial matchmaking role to ensure that federal-level industrial policy initiatives can succeed in local conditions. However, state and local entities may not be aware of national-level priorities, and national-level authorities may find it difficult to assess the availability of a skilled workforce or other enabling factors across thousands of subnational jurisdictions. For industrial policy to work, particularly proactive incentive programs, this gap must be filled.

The administration should:

Cultivate state and local catalysts. State and local economic development institutions exist across the country, but they vary in levels of expertise, available funding, and networks. New federal funding dedicated to creating more regional hubs, such as the National Science Foundation Directorate for Technology, Innovation, and Partnerships' 10-year, $850-million effort to develop Regional Innovation Engines, are intended to "spur economic growth in regions that have not fully participated in the technology boom of the past few decades."[121] Government officials at all levels should grow similar efforts to cultivate state and local catalysts and provide them with the autonomy to adapt programs according to local needs and conditions.

Create national-level demand signals. In research interviews for this project, state economic development officials noted that the supply chain reports were a helpful signal for which sectors to prioritize in their own workforce development plans. The recommended sector strategies of this report can serve a similar function to align national-level priorities with state and local planning efforts.

Condition national-level incentives on local support. State and local officials must buy in to new investments for these initiatives to succeed. The federal government should require that applicants for federal-level incentives demonstrate state and local buy-in, including through requirements to have state or local incentives match federal incentives and have workforce development plans grounded in local labor conditions.

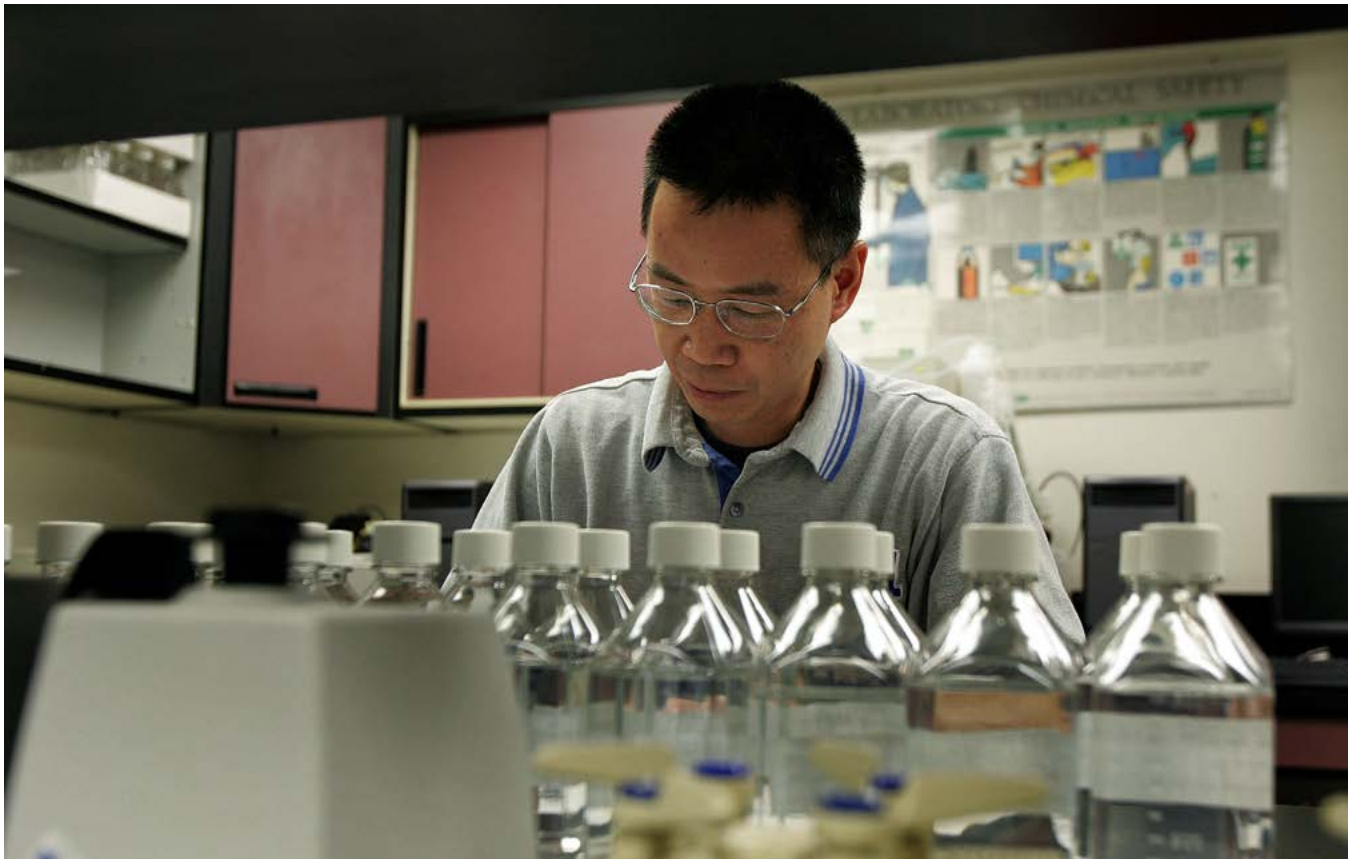
Innovate Financing for Industrial Policy

Proactive industrial policy will require the U.S. government to develop a broader range of financing tools to align commercial incentives with national needs. Existing funding mechanisms such as DARPA have proven effective in spurring technological innovation. However, the current toolkit does not cover the full range of incentives needed to shore up industrial capacity across all stages of a technology's life cycle, and it does a particularly poor job in ensuring capacity for low-tech supplies. Further, while subsidies have a place in an industrial policy strategy, they should be complemented by financing tools that catalyze private-sector investments in critical sectors and return money to the U.S. Treasury.[122] Congress should:

Authorize the Industrial Finance Corporation of the United States (IFCUS). IFCUS is a proposed government-owned corporation that would provide loans, guarantees, and minority equity investments to support domestic manufacturing in critical industrial sectors. The objective of IFCUS is to close a financing gap for technologies that are critical for future U.S. economic and security needs but that private markets will not move to commercialization on their own accord.[123] IFCUS is also a response to policymaker concerns about the offshoring of critical supply chains; it uses a positive incentive structure to make domestic production commercially viable. This contrasts with more intrusive approaches, such as using outbound investment controls to prohibit certain offshoring transactions, that are unlikely to address the root economic causes of offshoring. By providing incentives through debt and equity instruments, IFCUS can return money to the U.S. Treasury as firms repay their loans or IFCUS exits from an equity investment, similar to offsets that the U.S. Development Finance Corporation provides. IFCUS can be more financially sustainable over the long term than grants or subsidies for which the government expects no return.

Congress should:

- Authorize IFCUS or a comparable financing instrument for domestic industrial policy needs.
- Establish a clear policy mandate to ensure that funds are geared toward high-impact industrial policy projects and not to benefit particular political constituencies.
- Create an independent board to oversee IFCUS operations and sign off on major deals.



Defense appropriations helped fund synthetic biological technologies such as the synthetic blood substitutes pictured here. Authorizing the Industrial Finance Corporation of the United States would activate a robust industrial policy tool, as the fund could help many innovative small and medium companies that have the potential to make breakthrough discoveries. (Tim Boyle/Getty Images)

Establish DPA-like authorities for nondefense sectors. Recent use of DPA authorities has exposed the pitfalls in an overreliance on a defense-focused tool for all economic, public health, or supply chain crises.[124] For example, invoking the DPA to address the recent shortage of baby formula during a peacetime scenario may inappropriately stretch the original intention of these authorities.[125] Overly expansive use of the DPA undermines its specific defense goals and invites abuse. At the same time, the government clearly needs tools to address these types of shortages, as it would be both immoral and bad policy to, for example, deprive infants of food. While the DoD possesses the necessary contracting expertise to implement DPA authorities, it lacks the sectoral expertise in nondefense sectors necessary to target funding interventions effectively.

Congress should:

- Establish new authorities comparable to DPA Title III to allow for surges in industrial capacity to respond to unanticipated supply chain issues or shortages in a broader range of nondefense sectors.[126]
- Limit these new authorities to use in sectors that are necessary for the functioning of the economy, critical infrastructure, or public health and safety, and require a presidential declaration or similarly high threshold for invoking them to mitigate the risk of abuse.
- Set clear boundaries between how this new authority would work alongside the DPA.
- Provide funding for agencies with sectoral responsibilities to establish new program offices to oversee the use of the authorities.
- Designate the Department of Commerce as the lead agency for coordinating policy and regulations pursuant to the new authorities.

Establish best practices for subsidies. If the government intends to expand the use of subsidies, it must set clear guidelines for their use. This includes:

- Establishing a net strategic benefit test.[127] A net strategic benefit test would assess whether a government investment would enhance the U.S. advantage in a particular sector, considering the availability of supply

domestically and from allied nations, as well as the operational presence of the subsidized firm in adversary countries. A core part of the strategic benefit test should be to evaluate whether, on balance, the applying company is increasing its investments and level of manufacturing technology and capability in the United States versus adversary nations.[128]

- Establishing a necessary offsets test.[129] A necessary offsets test would establish the numerical amount of subsidy required to offset the disadvantage that a firm would face commercially for locating production in the United States. This could consider, for example, subsidies provided in other countries and lower labor or production costs abroad, as well as more intangible, nonmonetary benefits of investing in the United States, such as its strong rule of law.

Build the workforce for industrial policy

U.S. policymakers need to ensure that the United States has the resources to train and retrain its workforce in response to shifts in demands of skills and knowledge crucial to a strong industrial base. There are some existing efforts within the U.S. government, such as the DoD's Industrial Base Analysis and Sustainment program, tasked with closing the defense industrial base workforce skills gap.[130] Moreover, there are government efforts to analyze workforce competency. For example, the National Center for Education Statistics under the Department of Education conducts regular large-scale studies on adult education and employment with a cross-country focus.[131] However, there is a need for analytical capacity on how America's workforce can be used for industrial policy purposes.

The administration should:

Map industrial policy workforce needs. The federal government should take stock of America's competitiveness capacity. The EDA Cluster Mapping Tool released in 2014 should continue to be refined with academic, industry, and government input.[132] The tool continuously integrates relevant information of industry participation, the talent pool, government initiatives, and general economic development across 30 indicators to paint a digestible picture of economic competitiveness of specific regional hubs. U.S. federal and local government agencies should especially leverage the functionality and data from the project to make allocation decisions (e.g., where to set up the next laboratory).

Integrate workforce needs into sectoral strategies. Agencies should integrate workforce needs into sectoral strategies, including identifying projected skills or labor shortfalls and skills in high demand across critical industries. This must go beyond general calls for more STEM education and provide details on the various types of skills and experience necessary to grow critical industries.

Build economic alliances

Industrial policy naturally involves a focus on domestic production. However, smart industrial policy will integrate tools that can ensure access to critical goods and services, whether produced domestically or by allies abroad. Complete onshoring is neither necessary nor desired. In some sectors with highly complex, globalized value chains, onshoring would be nearly impossible and would likely result in serious losses of capacity in and of itself. On the defensive side, economic alliances can create stronger pressure on China to reform or—perhaps more realistically—blunt the effect of any retaliatory actions from China. The Biden administration has recognized this dynamic and included industrial policy issues in its economic dialogues with key partners, including in the Indo-Pacific Economic Framework for Prosperity and the U.S.-EU TTC. Regardless of forum, economic alliances should focus on similar themes.

The administration should engage with allies to:

Develop joint approaches to nonmarket economies. While China is unlikely to respond to U.S. pressure alone, it will face a harder choice if confronted by a broader range of allies. The United States and economic allies should prioritize a core set of concerns related to China's distortive trade practices and agree on a response strategy, using all available trade remedy tools internationally or within their domestic authorities.

Disarm on the subsidies race with allies. The increased interest in deploying incentives runs a high risk of sparking a subsidies race between allies, resulting in wasteful spending and no discernable impact on the joint productivity of economic allies. Economic allies should agree on common standards for the use of subsidies, seek consultation rather than litigation in the event of a dispute, and share information to ensure that subsidies are mutually reinforcing rather than competitive. Notably, the May 2022 U.S.-EU TTC outcomes show that the United States and the EU have the "common goal to limit subsidies to what

is necessary, appropriate, and proportionate to achieve public policy objectives" for their respective semiconductor industry development, which would require information-sharing.[133] In addition, the United States and Japan have agreed to coordinate to jointly ensure innovation and production of semiconductors.[134]

Develop new frameworks for strategic competition, including a new regime for investment and export controls. Existing multilateral export control regimes are ill-suited to manage strategic competition with China, given a traditional focus on conventional weapons and a country-agnostic framework. The United States should pursue a new multilateral or plurilateral export control regime that can squarely address the China challenge. While this regime should center on export controls, it should also be structured to link to regime members' investment screening controls. Technologies of strategic importance must be jointly identified and protected, regardless of whether the underlying commercial transaction is an export or an investment.[135]

Spark joint innovation. The newly minted NATO Innovation Fund, the world's first multi-sovereign venture capital fund, will fund and support development and adaptation of dual-use emerging technologies.[136] The United States, however, only makes up a small percentage of funding that supports NATO's basic science research and may need to increase its funding to demonstrate its commitment to this endeavor. Previous CNAS reports also recommended that the U.S. government create a Technology Partnership Office at the Department of State. Under the leadership of an assistant secretary for technology, this office would be the lead U.S. government entity to manage America's technology partnerships around the world.[137]

Grant emergency regulatory exceptions. Regulatory barriers hamper trade with allies even during calm times. Regulators prohibit the import of goods approved by foreign regulators not because the goods are unsafe but simply because the regulatory process is different. However, emergency approval of foreign-produced baby formula has helped ease current shortages in the United States.[138] Regulators should develop a standing process to enable similar authorizations in the future while continuing to seek resolution of unnecessary regulatory barriers for safe products approved in countries with robust regulatory processes.

Conclusion

Implementing a new American industrial policy will require a fundamental rethink of how the United States engages in global competition. The U.S. government must assert itself more vigorously into the economic future of key industries, largely to address the rising systemic threat presented by China. Policymakers must also remain vigilant to not undermine the core tenets of the U.S. economic system that have driven growth and innovation over the course of U.S. history: freedom to innovate, freedom to chase opportunities, and—perhaps most importantly—freedom to fail. Industrial policy interventions must support rather than supplant the U.S. commitment to open markets, recognizing that government interventions cannot in themselves create globally competitive firms.

> **Industrial policy at scale is a new endeavor for the United States, and it must build its institutional capacity accordingly. Ad hoc efforts will not suffice.**

Just as importantly, the United States should leverage its unique advantages of alliances in pursuing a new industrial policy. Economic competitors that share U.S. democratic values should become economic allies. While allowing companies to compete vigorously, the United States should ensure that it is working closely with its economic allies to create shared opportunities for prosperity. U.S. economic security in a globalized world cannot mean withdrawing behind national borders. The United States must lead in the global technology race, compete hard alongside economic allies, and play to win in the strategic competition with China.

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The mission of the Center for a New American Security (CNAS) is to develop strong, pragmatic and principled national security and defense policies. Building on the expertise and experience of its staff and advisors, CNAS engages policymakers, experts and the public with innovative, fact-based research, ideas and analysis to shape and elevate the national security debate. A key part of our mission is to inform and prepare the national security leaders of today and tomorrow.

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