Testimony

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The Challenges of China's Supply Chain Dominance

Posturing the Defense Industrial Base

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The Challenges of China's Supply Chain Dominance: Posturing the Defense Industrial Base

Testimony of Bradley Martin[1]
RAND[2]

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China's preeminence in manufacturing and across many key elements of the supply chain is well documented.[3] China has the largest manufacturing sector of any national economy and dominates international trade,[4] which means that it is connected to supply chains around the world.[5]

Finding all the places where China directly and indirectly affects critical supply chains is nearly impossible because commodities pass in and out of China at various stages of the production process. We do know, however, that China is preeminent in several basic industries without which other economies would have difficulty functioning. These include the processing of critical minerals;[6] chemical production for industrial, pharmaceutical, and even military use;[7]

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[3] Felix Richter, "China Is the World's Manufacturing Superpower," Statista, April 16, 2025.

[4] China Power Team, "Measuring China's Manufacturing Might," China Power, Center for Strategic and International Studies, December 18, 2024.

[5] Bonnie S. Glaser and David J. Bulman, "China's Dominance in Global Supply Chains," German Marshall Fund, September 20, 2022.

[6] Nedal T. Nassar, Elisa Alonso, and Jamie L. Brainard, National Minerals Information Center, *Investigation of U.S. Foreign Reliance on Critical Minerals—U.S. Geological Survey Technical Input Document in Response to Executive Order No. 13953 Signed September 30, 2020*, version 1.1, U.S. Geological Survey, U.S. Department of the Interior, Open-File Report 2020-1127, December 7, 2020.

[7] C. Textor, "Chemical Industry in China: Statistics & Facts," Statista, January 3, 2024.

some kinds of microelectronics;[8] and batteries.[9] These commodities are not always at the cutting edge of technology, but they are nevertheless essential.

The U.S. government and, in particular, the Department of Defense (DoD), has responded to this preeminence by attempting to counter it in multiple ways. With respect to the defense industrial base (DIB), however, we should consider that many of the shortfalls arise from issues in the broader economy. There may be no way to fix the DIB without fixing broader economic issues.

This testimony responds to a set of questions provided by the commission staff and attempts to answer them in logical sequence.[10] The questions are interrelated and allow me to develop a narrative. I will state the questions as posed and then answer them, connecting them with related questions as I go. These answers are framed from the perspective of the United States and focus less on China's intentions than on its capabilities to exert leverage over U.S. supply chains, particularly as they relate to the U.S. DIB.

Question 1

What defense supply chain challenges from U.S. dependence on—and exposure to—China has the U.S. government focused on solving to date, and how has it gone about trying to address them?

Answer

DoD has been proactive in trying to identify areas of supply chain vulnerability, both in high tech developmental areas (such as quantum computing) and in more routine areas (such as chemical production). The first step in this effort has been to identify exposure and vulnerability, such as determining where problems might lie and thus focus additional effort. Within DoD, the Defense Advanced Research Projects Agency (DARPA) has initiated programs to identify vulnerabilities across sectors.[11]

This focused effort has included the stockpiling of strategic materials, carried out in large part by the Defense Logistics Agency (DLA).[12] This approach assumes that we know which materials are likely to be most critical, have some idea of what wartime or other emergency demand would look like, and requires storage of the material in a way that ensures its readiness for use. Such stockpiling can be effective in reducing vulnerability, but it is limited by our ability to forecast exact demand.

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[8] "The Story Behind China's Upcoming Mass Production of Photonic Chips," iMedia, May 24, 2025.

[9] Ellis Gibson, "China's Dominance in Lithium-Ion Battery Production: Battery Production, Global Impact and Future Outlook," PoweringAutos, April 21, 2025.

[10] All questions are presented verbatim as they were submitted to the author.

[11] Branson Brooks, "DARPA Picks 2 Companies to Aid Supply Chain R&D Program," ExecutiveGov, July 17, 2024.

[12] Defense Logistics Agency, "DLA Strategic Materials," webpage, undated, https://www.dla.mil/Strategic-Materials/.

Turning to reducing demand, DoD has also tried to develop weapons and other capabilities that do not depend on extensive and complicated supply chains. Besides DARPA, the Defense Innovation Unit has funded projects characterized by relatively simple supply chains that can be readily scaled from commercial sources.[13]

I will discuss the implications of such approaches in more detail in response to subsequent questions, but there is inherent tension between quickly developed technology and an effective supply chain to go with it. If capability development follows largely along the lines of what can be readily stockpiled, new and effective technology may be overlooked or discouraged. If, however, new capability is developed with no supply chain to accompany it, even relatively simple technology may be useful for only a limited period. DoD has only lately begun trying to find a balance.

Question 2

How effectively has the Department of Defense (DoD) coordinated with the defense industrial base on addressing supply chain vulnerabilities, particularly on sub-tier supply chain vulnerabilities?

Answer

DoD initiated an action plan in 2022 to address vulnerabilities as directed by Executive Order 14017.[14] The plan includes steps to better understand vulnerabilities, better establish demand and requirements, better screen material for foreign sourcing, and generally provide for more-secure and effective supply chains. Achieving these objectives has been made difficult by the complexity of supply chains; it is extremely likely that some component of any industrial product will have passed through China at some point.[15]

DLA, program offices, service acquisition programs, and local purchasing activities have all emphasized the importance of curating parts, but businesses attempting to provide commodities needed by the U.S. government still face the challenge that a significant concentration of material, some of it a precursor to the finished product, resides in China.[16] Even if agencies could coordinate with every sub-tier supplier, most suppliers could not identify the origin of all the parts in the systems provided. For example, China has a 30–40 percent market share of the world's legacy semiconductors, which makes it likely that any equipment using a semiconductor—including machinery control systems or pumps or even lighting circuits—is likely to have some Chinese parts. The issue is not that some operational security element might be disclosed as the result of these parts being in the equipment but that suppliers might not be able to find substitutes that are not readily available Chinese products. The situation is even more

[13] Defense Innovation Unit, homepage, undated, https://www.diu.mil/solutions.

[14] Department of Defense, *Securing Defense-Critical Supply Chains*, February 2022.

[15] Michael Mariani, "What China's New Export Controls Mean for the U.S. Defense Industry—and How the Impact Could Escalate," Z2Data, January 23, 2025.

[16] Govini, "2024 National Security Scorecard," 2024.

tenuous when the product requires rare earth or refined minerals. These will almost certainly have a Chinese connection for the reasons listed below.

Question 3

How has the DoD coordinated on addressing defense-related supply chain risks with other agencies, such as in areas like pharmaceuticals?

Answer

Every cabinet-level agency in the U.S. government has some kind of supply chain center that is focused on issues of concern to that agency. This is an understandable reaction to a set of complicated threats, but the proliferation of organizations has not resulted in—indeed, it may have hampered—a coherent approach across the government and private sector.[17] DoD is, appropriately, focused on national defense, largely in an external setting. It values ready availability of material at a scale necessary to support military operations. These goals are broadly congruent with the interests of the Department of Homeland Security, the Department of Health and Human Services, or the Department of Commerce, but their needs are different enough that efforts by each organization may sometimes be at cross-purposes.

There had been an effort to create capacity within the National Security Council (NSC) staff to manage supply chain issues among various executive departments, but with the reorganization of the NSC currently being undertaken,[18] it is unclear that this is a likely path forward. DoD has historically taken the lead in responding to industrial base or national resource issues, but this approach might not be effective as it becomes clear that the vulnerabilities reside in the broader economy. The lack of interagency coordination remains a problem.

Question 4

How effectively can the DoD analyze defense supply chains and identify vulnerabilities and reliance on Chinese suppliers? What notable differences in these capabilities, if any, exist based on Service, platform, procurement processes (e.g., cost plus, firm-fixed price, sole source contracts, etc.), and other dimensions? What role do defense prime contractors play in ensuring their supply chains are secure and resilient? What level of information on their supplier relationships do they share with the DoD, and is it sufficient?

Answer

DoD relies very heavily on reports from vendors for tracking possible supply chain issues. It does not have significant organic capability for tracking economic trends that might be affecting material availability more broadly. The intelligence community has been working to find better

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[17] Bradley Martin, *Supply Chain Uncertainty: Building Resilience in the Face of Impending Threats*, RAND Corporation, RR-A2558-1, 2024, https://www.rand.org/pubs/research_reports/RRA2558-1.html.

[18] Robbie Gramer, Felicia Schwartz, Ali Bianco, and Daniel Lippman, "Trump Administration to Shrink the National Security Council," Politico, May 23, 2025.

tools and processes for identifying system-level vulnerabilities, but these are nascent and not well integrated into DoD processes.[19] DoD tracks some materials very carefully, such as components for classified systems and nuclear propulsion systems, but such careful protocols are not practical across the whole range of systems DoD procures.

Sourcing from only U.S. suppliers will increase costs and could, in fact, affect delivery and operational schedules. The desire to avoid China-based supplies in daily operations and purchasing could impose significant inefficiency. In procurement, if firm-fixed price contracts are used, suppliers have every incentive to look for the lowest-priced components for the end product, which might spur noncompliant behavior or, at least, reduce the incentive to look very hard at sourcing. If a vendor is a sole source and is given protection against cost increases resulting from preference for U.S. suppliers, the ability and incentive to carefully track sources exists, but the continuing incentive of every business will be to reduce cost, which generally does not encourage isolation from China.

Prime contractors have visibility over the main inputs into major defense acquisition programs and are indeed incentivized to assure the government that major end items are sourced securely. But, the prime contractors rely on smaller contractors for many components, and in some cases, prime contractors may own but have little managerial relationship with the companies making the actual materials.[20] Those companies will be dealing with the market reality that some kinds of materials come only from China. The issue overall is not that the primes do not report to DoD that supply chain vulnerabilities exist, but that the smaller companies that make key materials are looking only to deliver a product and might not be attentive to the inputs. The vulnerability is not a matter of a lack of DoD oversight but of industries assuming that the objective is to deliver the product—an objective that is often best accomplished with Chinese sourcing, at least in the short term.

Question 5

How well can the U.S. defense industrial base deal with adverse supply shocks? How prepared is it to deal with surge requirements?

Answer

The U.S. DIB is generally not well positioned to deal with supply chain shocks, except in some relatively narrow aspects of major defense acquisition, where the demands are well specified and funding is for regulatory reasons assured.[21] Some examples of relatively secure supply chains are those for Navy nuclear power, nuclear weapon development, and some advanced sensors.

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[19] Office of the Director of National Intelligence, "Supply Chain Risk Management for Industry & Academia," webpage, undated, https://www.dni.gov/index.php/safeguarding-science/supply-chain-risk-management.

[20] Luke A. Nicastro, *The U.S. Defense Industrial Base: Background and Issues for Congress*, Congressional Research Service, R47751, September 23, 2024.

[21] Martin, 2024.

However, in most cases, the DIB lacks the capacity to respond to surge demand.[22] It responds to steady-state demand and, indeed, possesses the capacity to respond to well-specified short-term market fluctuations. Moreover, the DIB does not have incentives to prepare for shocks. Clearly, everyone in the United States could be adversely affected by a shock, but specifically preparing for such a shock requires incentives. Telling industries in the DIB to stockpile or maintain excess production capacity on the basis of good citizenship is unlikely to be effective.

These shortfalls are not primarily due to China's attempts to influence the DIB. China has offered low-cost and efficient industrial supplies across the U.S. economy, but we have not seen evidence that it has specifically undercut the DIB. What has generally happened is that private actors must seek the least-expensive inputs into a product they are contracted to deliver. In a normal market, suppliers adjust to meet demands, and when surges occur, markets ultimately adjust to meet the surge requirements. DoD has attempted to apply efficient market principles to ordering and delivering spare parts through the use of working capital fund mechanisms. This works relatively well in steady-state operations. However, it does not work particularly well when the demand exceeds the normal peacetime pattern, as it would certainly do in the event of a war.

The United States has historically been able to overcome supply chain shocks by absorbing any initial damage and then turning to its civilian industrial base to make up capacity. This approach relied on a large and growing industrial economy with significant excess capacity that could be readily converted to defense production.[23] This favorable situation probably will not be true for future contingencies and ought to be dropped as a likely eventuality.

Question 6

What leverage does China continue to hold within U.S. defense supply chains, and how is this distinct from China's broader leverage over U.S. commercial supply chains?

Answer

China does not possess the same kind of leverage over the DIB that it does over the rest of the U.S. economy, largely because the DIB is small enough and has sufficient bespoke interests that ultimately the United States can at least give its forces sufficient capability and capacity to fight a war that would be extremely destructive to China. Although predicting the exact course of events is impossible, my assessment is that the United States might find continuing the war for an extended period difficult, but both sides would likely find such a war to be damaging to the point of generally trying to avoid it. China might ultimately "win," but in depriving the DIB of critical material, it is likely also depriving itself of trade and income as it applies restrictions across sectors.

China possesses leverage in the sense of being able to deny materials for which the United States often does not have a ready substitute. It has further leverage because it can disrupt the flow of precursors and can indeed threaten countries that might be alternative suppliers.

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[22] Martin, 2024.

[23] Alan S Milward, *War, Economy and Society, 1939–1945*, University of California Press, 1980.

However, China could not completely prevent the U.S. DIB from functioning and could not block an effort to carve out niche supply chains within the DIB that do not depend in a major way on the commercial market.

Question 7

What tools does the DoD have, including procurement and investment mechanisms, to bolster the health, security, and resilience of the defense industrial base? How sufficient and readily available are these tools? Please briefly describe how different agencies like the Defense Logistics Agency and Defense Innovation Unit contribute, as well as any gaps you perceive with respect to managing challenges from exposure to and dependence on China.

Answer

DoD is generally very well-funded, and its leadership is open to innovation. Its cultural and organizational problems are largely associated with a previous emphasis on achieving efficiency in peacetime. Consideration of the potential for war has driven a reassessment of priorities, and there appears to be broad understanding that what might make sense for a business in steady state might not make sense when facing wartime demand.

However, some actions are clearly necessary to get the DIB into a better posture for war, even if the United States is not able to reorient its economy to enable more-secure supply chains. These start with the recognition that there is likely to be inherent inefficiency in keeping material or capacity just in case. DLA's working capital fund model may simply be inappropriate for a situation where what might be needed in war cannot be predicted from peacetime ordering patterns. The Defense Innovation Unit and organizations like it can have an impact on the demand side by encouraging the development of capabilities specifically designed to have a small logistics footprint. Ukraine, without benefit of a large industrial base and large numbers of supplies, has very successfully produced drones that have bedeviled the Russian military.

The tools available and likely to be useful are those that incentivize innovation but begin with the conception that innovation is oriented primarily toward military effectiveness, which may in turn be closely related to mass and volume, implying an ability to produce in large amounts. There may be concerns about the degree of security implicit in such systems, but part of the paradigm would be to accept that some number of systems may be corrupted and unusable.

An advantage of depending on large numbers of developed, inexpensive systems is that large numbers may very well promote enough demand that domestic suppliers may become more readily available, not just for systems but also for components. However, for some systems, there may simply be no alternative than for DoD to accept that the only means of having a stable supply is to pay some manufacturer a large amount simply to stay open for business with DoD.

Question 8

What limits does the DoD face in using demand-side signals to foster domestic production of defense articles? Please describe any challenges that may arise from an incentive mismatch

between meeting agency mission demands versus insuring the resilience of defense supply chains against contemporary risks.

Answer

As long as the U.S. government tries to make efficiency a virtue above every other, it is signaling to industry that its primary interest is in delivering the currently required amount of a product at the minimum cost. Actors in the DIB will then be incentivized to find the least-expensive and most-convenient suppliers, which will very often be in China. The government can impose restrictions on sourcing, but the energy it would take to check every commodity, given the complexity of the supply chains, is likely to result in the continued migration of supply chain sources to the most-efficient provider.

Moreover, if there is no signal that demand could increase significantly, there is little incentive for producers to add capacity. Absent those incentives, the ability to respond to either disruption or surge is likely to remain limited.

DoD does not have an unlimited budget, and the need to avoid pointless overcapacity is well understood. However, the main function of DoD is to prepare for war, and the lack of attention to capacity for wartime use has helped to create the supply chain challenges we have repeatedly discussed.

Question 9

What role, if any, do U.S. allies and partners play in supporting DoD efforts to establish secure defense supply chain?

Answer

Comparative advantages among trading partners apply in the DIB as they do in other sectors of the economy. In some cases, allies and partners have resources that the United States simply lacks—such as some kinds of critical minerals—and, in other cases, it will simply be more efficient for one nation to produce some commodities while others produce related commodities.

Allies and partners also serve as a means of gaining mutually beneficial investment in cases where pooled investments might have a better chance of generating both required capital and potential markets. Allies and partners are not an infallible source of support in the DIB, but they can be a valuable resource and should be considered as we explore DIB solutions.

Question 10

What might a worst-case scenario look like in terms of American reliance on Chinese supply chains in the defense sector, particularly if there is no proactive policy response from Congress or the administration to address current vulnerabilities?

Answer

My assessment is that the time when the United States could fail to have an adequate DIB and could still count on the broader economy to rapidly generate required capability has passed.

China has greater manufacturing capacity than the United States, and wars remain contests where materiel remains a deciding factor. The United States might be superior in many different aspects of national power but could still find itself on the losing side of a war in which well-sustained weapons and platforms are key. Even if war does not occur, the perception that the United States lacks the ability to sustain a conflict could seriously diminish deterrence, perhaps emboldening China toward more aggressive action to gain its objectives.

The issue is not necessarily that China will gain access to U.S. systems or even exercise its leverage in a direct way. Rather, the concern is that the United States will find itself in a position where it cannot count on spares and critical equipment, both because it might not have access to the materials and because it has not tried to keep a sufficient base to meet surge demands, even if supplies were perfectly secured. This would not necessarily be the result of China doing something to disrupt the U.S. supply chain but rather the United States failing to take necessary actions.

Question 11

What other trends should the Commission be tracking on this topic?

Answer

Labor is a major constraint within the DIB and elsewhere in the U.S. economy.[24] Efforts to develop a workforce for modern advanced manufacturing are essential. Another trend to monitor is the success in improving the shipbuilding industry in the United States. At the moment, the industry exists almost entirely within the DIB, and it is unclear whether the Trump administration's efforts to bring commercial shipbuilding back to this country will succeed or whether success is even possible. It is worth noting that in 2022, China made more than 1,700 commercial ships, while the United States made only five.[25] Many of the challenges within the DIB and the broader economy are reflected in the shipbuilding sector.

Question 12

The Commission is mandated to make policy recommendations to Congress based on its hearings and other research. What recommendations for legislative action would you make based on the topic of your testimony?

Answer

China is certainly the pacing threat, but remediation is less a matter of countering China than of addressing challenges the United States has created for itself. Several things might improve the approach toward the execution of supply chain security, in the DIB and elsewhere.

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[24] Joe Gould and Stephen Losey, "Amid Hiring Boom, Defense Firms Say Labor Shortage Is Dragging Them Down," *Defense News*, August 5, 2022.

[25] John Frittelli, *U.S. Commercial Shipbuilding in a Global Context*, Congressional Research Service, IF12534, November 15, 2023.

First, despite multiple efforts to describe supply chains and assess vulnerability, there is still little consensus on which supply chains are critical, which are vulnerable, and the degree to which chains affect specific national defense or broader national economic security issues. Agreement on terms and a common approach to study might be essential.

Second, although the desire for agencies to stake a claim in supply chain policy is understandable, the policy structure as it exists is incoherent and works at cross-purposes. Since we are dealing with closely related commodities and issues, failing to have an organization to coordinate policies seems likely to diminish effectiveness.

Third, response to surge is largely a matter of increasing physical capacity in the expectation of needing it in an emergency. This is not likely to come as the result of market forces and, thus, requires an approach that concedes that companies will likely require an incentive that goes beyond what the market could provide. The U.S. government is often in the business of providing collective goods, and this may be a case where the best way to think about surge is as a collective good, subsidized of necessity.

Finally, although China did in many ways help create the U.S. position of vulnerability, it has many reasons to avoid disruptions that would hurt both sides. The best approach to the current vulnerability is not to punish China but to find ways to remedy a situation the United States has, in fact, largely created.