

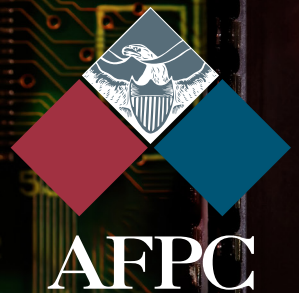
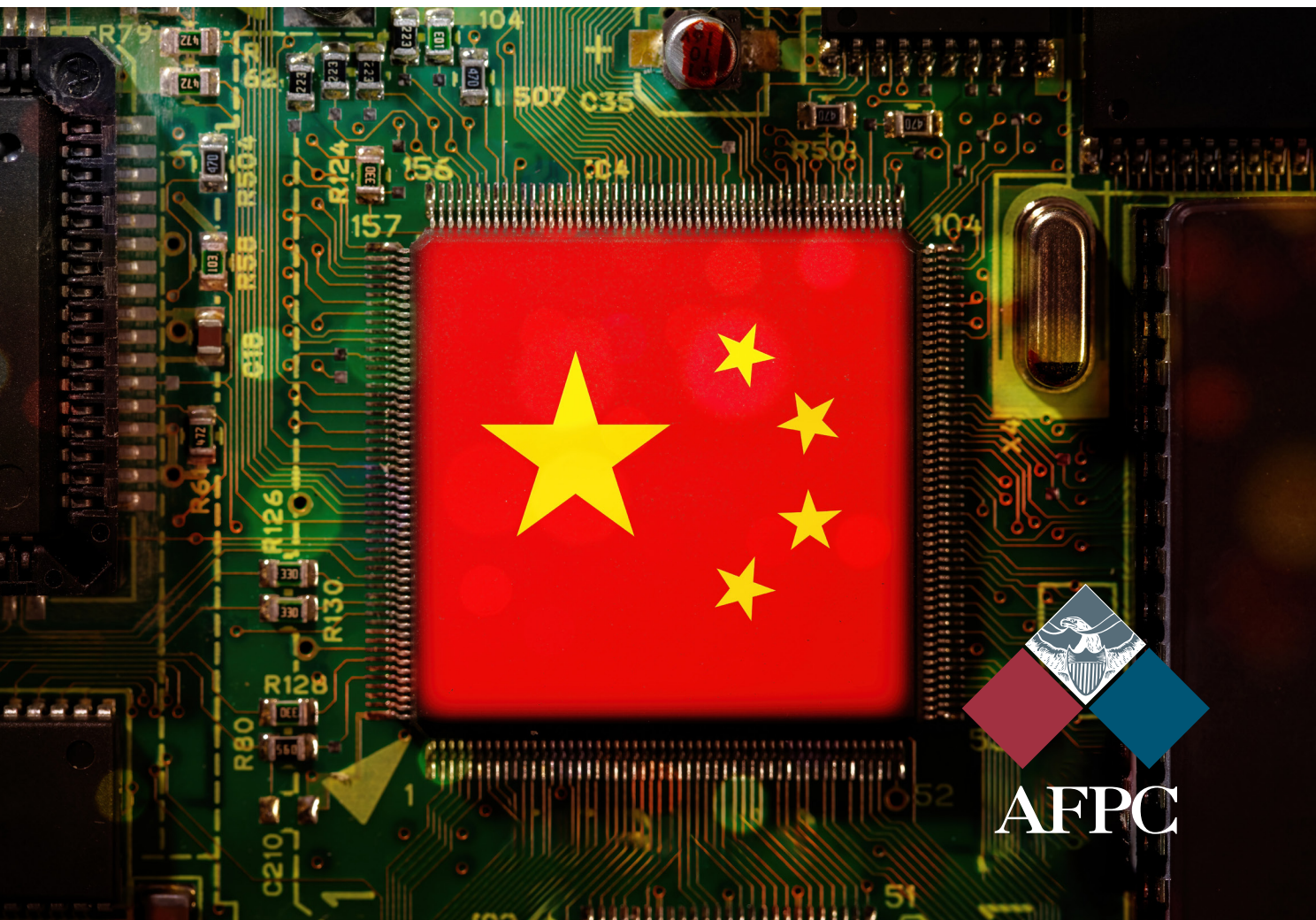
AMERICAN FOREIGN POLICY COUNCIL

SPECIAL REPORT

NOVEMBER 2025

DETERRENCE AND THE INDUSTRIAL BASE: THE U.S. AND CHINA

LARRY WORTZEL



ABOUT AFPC

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EXECUTIVE SUMMARY

Over the past few decades, China has emerged as the main geopolitical, economic, and military rival to the United States. Under its current paramount leader, Xi Jinping, Beijing's assertiveness in all three of these domains has grown steadily.

Core to the Chinese strategy for achieving its aim of matching and eventually surpassing America's global influence is the understanding that industrial and military power are interlinked. By contrast, since the end of the Cold War, the U.S., alongside much of the rest of the West, has stressed global interdependence and a clearer divide between economic and military affairs.

Since the 1990s, while China has pushed for greater self-sufficiency, the U.S. has found itself in a situation where it is now dependent on China—a potential military adversary—for key components and resources vital to its own military. While for the moment China also still requires U.S. resources such as advanced semiconductors and jet engines, the PRC is now ahead of the U.S. in many areas technologically, including in innovative areas such as space. Furthermore, its espionage operations are superior, highly intrusive, and more disruptive than those of the U.S., enabling it to obtain Western technology.

The United States still retains an advantage in many areas, including in terms of military power. But this gap is closing quickly, and in some fields where the U.S. retains a clear numerical advantage, such as nuclear weaponry, the real impact may be less significant than commonly assumed.

The pages that follow offer a detailed consideration of the importance of a strong industrial base for the maintenance of a strong military, and the significance of U.S. dependency on foreign allies (or even adversaries) for key resources needed by its industrial base. China's policies on this subject are also reviewed, with a key focus on how Beijing's state-centric model has enabled it to develop both industrial and military capabilities at rapid speed.

This paper also includes a comparative analysis of the military strength of the U.S. and China. It points out that numbers and statistics can be deceiving. This is partly so because, while U.S. military forces are dispersed around the world, Chinese military resources are concentrated in the West Pacific, meaning that it would have a great advantage in the event of hostilities in that region.

DETERRENCE AND THE INDUSTRIAL BASE: THE U.S. AND CHINA

The challenge to U.S. interests in the Indo-Pacific region posed by China's growing strength and influence is widely acknowledged. However, the scale of this challenge is now growing at an unprecedented rate. Since Xi Jinping took over the Chinese Communist Party, Beijing has stepped up its use of coercion by diplomatic, informational, economic, and military means. This includes the employment of "gray-zone tactics" involving the use of state-controlled fishing fleets to harass foreign vessels.¹

Combined with China's industrial capacity, its military modernization, its assertive actions on maritime and territorial claims, its efforts to control international waters, and the creation of artificial islands in the South China Sea, these developments constitute a matter of urgent concern for the U.S. and its allies.²

As early as his November 2012 speech to the standing committee of the Central Military Commission (CMC), soon after becoming Communist Party General Secretary and CMC Chairman, Xi laid out the linkage between a strong and modern industrial base, a strong military, and a strong Chinese state. This link has remained a consistent theme throughout Xi's decade-plus in power.

In that speech, Xi emphasized both reform of the People's Liberation Army (PLA) and the need for the creation of strong industrial capacity able to take advantage of new technologies. In turn, he argued, reform within industry would also serve as the basis for a strong national military.³

These themes have clearly alarmed U.S. allies in the Pacific. These include Japan, Australia, New Zealand, the Republic of Korea (South Korea), the Republic of the Philippines, and Thailand. The U.S. is bound to some of these nations by mutual security agreements, and to others by exchanges of notes. These are decades-long commitments. There are also other close security partners in the region, such as Singapore, Malaysia, Indonesia, and the ASEAN states. Then there is the close relationship with Taiwan—the one that carries with it the most significant risk of open hostilities between the U.S. and China.⁴ If war were to break out with China in the Indo-Pacific, the U.S. would find itself in a conflict with steep costs. Whether such a conflict arose over Taiwan, the South China Sea, or the East China Sea, tens of thousands of American troops could die in a short period of time. The stakes in any such conflict would be high: territorial sovereignty, the free flow of commerce, respect for international law, the integrity of U.S. treaty commitments, and the preservation of democracies in the Indo-Pacific.

Protecting these interests and deterring China requires a credible military capability and an industrial base capable of sustaining both military operations and the domestic economy. This paper explores the threat from China and the strength and resilience of the U.S. industrial base as compared to that of the People's Republic of China (PRC).

POTENTIAL FLASHPOINTS

The majority of people believe the most likely flashpoint that could lead to a clash between China and the U.S. is Taiwan. However, there are other areas in the region that could easily lead to a conflict.

For instance, China's actions in the East China Sea, where it has territorial claims against Japan, could also lead to open conflict, likely drawing in the United States as well. Under the Treaty of Mutual Cooperation and Security, signed with Japan in the wake of the Second World War, the U.S. is now obligated to come to Japan's aid in the event of hostilities.⁵

China also has territorial claims against South Korea, another U.S. ally in the western Pacific, creating a different potential flash point.⁶ The U.S. also has a mutual defense treaty with the Philippines—one which has been recently reaffirmed by Washington and Manila⁷—and, through an exchange of notes, has security ties with Thailand.⁸ U.S.-Thai security ties were very strong during the U.S. war in Vietnam, and Thai relations with China are good.

Finally, an accident or miscalculation involving the use of military force could lead to conflict between the U.S. and China. Historical examples of such incidents include a 2001 collision between an unarmed U.S. reconnaissance aircraft and a Chinese fighter plane in the South China Sea, and the accidental 1999 bombing of the PRC's embassy in Belgrade by the U.S.⁹

As the PRC has expanded its global economic interests and PLA presence, other areas of competition have naturally developed as well. While less likely to be flashpoints for a conflict, the U.S. and the PRC now have competing interests well beyond China's immediate neighborhood, especially over the China's growing influence and presence in Latin America.

Regarding Taiwan, the Taiwan Relations Act of 1979 obligates the U.S. to "consider any effort to undermine the future of Taiwan by other than peaceful means, including by boycotts or embargoes, a threat to the peace and security of the Western Pacific area and of grave concern to the United States." That may not translate into a firm commitment to go to war in defense of Taiwan under any circumstances, but in diplomatic parlance the use of the term "grave concern" conveys a strong likelihood of some form of U.S. intervention if Taiwan were to be attacked by China.¹⁰

It should be clear, therefore, that the potential for conflict between China and the United States is real, and that both sides are actively seeking means of deterrence.

DETERRENCE IN COMPARATIVE PERSPECTIVE

U.S. thinking about, and approaches to, deterrence have evolved considerably over time. Deterrence theory is largely based on threat assessments as well as perceptions and public opinion. Lawrence Freedman of King's College London points out that deterrence has increasingly become "detached from the practice of war... and the more it was studied in universities and think-tanks, the more it became an area for academic inquiry, although still without an agreed upon definition."¹¹

A summary paper on deterrence from the Council on Foreign Relations further reminds us that deterrence requires credible threats, the will and capability to carry them out, and the willingness to bear or face the consequences of doing so.¹²

There are some common denominators, however, between both American (and Western) and Chinese thought on the topic. Both the Chinese and Western traditions believe that deterrence involves more than just military preparations or capacities. Both approaches consider deterrence to involve a broad range of factors. These can include coercive strategies, accurate assessments of one's own strengths and weaknesses and those of the enemy,¹³ military capacity, economics, propaganda, political will, alliances, and diplomacy.¹⁴

For China, modern deterrence goes beyond the threat of nuclear weapons use. It depends on capabilities in new domains such as space, as well as the information and cyber domains. An article in the *People's Liberation Army Daily* summarized the Chinese view that there is a difference between deterrence and threats:



Source: Pexels

Deterrence [威慑] is making the opponent give up its attacking behavior due to fear of unbearable retaliation, while threat [威胁] is forcing the opponent to yield because of fear of unimaginable consequences. In terms of part of speech, deterrence is a neutral term, while threat is a pejorative term. The relationship between deterrence and threat is that of passivity versus activity; it is a defensive versus offensive relationship; a reactive versus proactive relationship. Deterrence strategy is an active defense strategy, while threat strategy is an offensive strategy. Deterrence = counterattack capability + determination + warning to the enemy; threat = offensive capability + determination + warning to the enemy. In employing a deterrence (threat) strategy, the struggle begins with deterrence (threat) such as warnings and ultimatums; in employing a real combat strategy, the struggle begins with the use of force, such as surprise attacks.¹⁵

A key feature of Chinese deterrence theory, therefore, is that for deterrence to be effective the country or entity to be deterred must sense an offensive threat and the likelihood that the opponent will carry it out. It also is important to understand that China will escalate a situation or enter combat, even if its leaders believe they may not win. This is because they believe demonstrating the will to carry out a threat is key.

Indeed, Chinese leaders have taken military action in the past in order to deter an enemy from further action.¹⁶ This has been done both as a punitive reaction to decisions taken by an adversary, and as a preemptive warning.¹⁷ This was the case in the Sino-Indian War, in China's decision to go to war in Korea in 1950, and in China's decision to attack Vietnam in 1979. In each case, decisions were shaped by the views of China's most senior leaders. Basically, the prevailing calculus was that taking punitive military action was a useful measure both to punish an adversary and as a means of deterrence (or threat) against other potential opponents.¹⁸ In China's case, although these decisions were debated at the highest levels of the Chinese Communist Party and in its Central Military Commission, they were driven by the beliefs of the paramount leader at that time – in these cases, Mao Zedong in 1950 and Deng Xiaoping in 1979.

Another aspect of Chinese thinking about deterrence that should worry policymakers across the Pacific is the PRC's approach to escalation. PRC military thinkers seem to share the optimistic but risky belief that, if deterrence fails and war is the only resort, a further escalation of hostilities can be controlled.

Escalation of a conflict can be vertical (more intense or different forms of contact) or horizontal (in another theater of war or region) in nature. But in either case, the PLA believes it can be controlled. In terms of horizontal escalation, PLA military thinking is that a conflict can be contained at a local or regional level and not turn into a global conflict.¹⁹

PLA thinkers also believe that there is more to deterrence than military action. Like strategists in the U.S., Beijing's military thinkers believe that while military measures are the main way to manage or deter conflict, they should be supported by political, diplomatic, economic and technological means.²⁰

Ultimately, however, for the CCP's senior leadership, a military that is obedient to Party rules and guidelines is the most important factor. To that end, Xi Jinping continually admonishes PLA political leaders to follow his guidelines on the goal of building a strong army that can win battles and maintain a fighting spirit.²¹ PLA military doctrine, therefore, is not as important to China's leadership as confidence that the military supports the CCP.

The United States, meanwhile, follows a body of formal doctrine that resides in the Department of War (previously the Department of Defense).²² The U.S. view of deterrence is “discouraging or restraining someone—in world politics, usually a nation-state—from taking unwanted actions, such as an armed attack...as opposed to the closely related but distinct concept of ‘compellence,’²³ which is an effort to force an actor to do something.”²⁴

Nobel Prize-winning scholar Thomas C. Schelling described compellence as an action that persuades an opponent to give up a desired objective. On the other hand, deterrence, for Schelling,

entails the use of threats of punishment to discourage an opponent from a particular course of action.²⁵

The Department of War sees deterrence options as designed to “decisively influence the adversary’s decision-making calculus in order to prevent hostile actions against U.S. vital interests.”²⁶ The operational concept for U.S. forces is to influence an adversary’s decision process and attempt to alter their perception of the benefits of a particular course of action, the costs of associated decisions, and to try and convey to that adversary the benefits of restraint and the cost of action.

Formally, in the parlance of American military doctrine, “the U.S. seeks to 1) deny an adversary benefits, 2) impose costs on an adversary, and 3) encourage restraint on the part of an adversary. To achieve this, the U.S. conceives of direct means as force projection, active and passive defenses, global strike [capabilities] including conventional, nuclear, and non-kinetic options, and strategic communication.”²⁷ This is a combination of what Schelling describes as compellence and deterrence, but is not far from the views of the PRC leadership.

A primary way the U.S. seeks to enable its deterrence options is by maintaining a forward presence that entails security cooperation with partners and allies. As such, interoperability with those actors is critical to U.S. deterrence doctrine. In this regard, China has lagged. The PRC has only recently focused on building the capabilities for persistent forward presence. However, it cooperates with partners, and Beijing is now known to be actively working to build confidence and develop operating concepts with them.²⁸

Having the military, political, technological, and economic capacity to influence an adversary’s decisions is clearly related to the capacity to conduct and maintain military action. The U.S. industrial base is critical to that capacity. Another important factor, also related to the strength of the industrial base, is the ability to reconstitute the military, economy, and nation in the event of conflict. That is why a study of the U.S. and Chinese industrial bases is important in understanding deterrence.

DEFINING THE INDUSTRIAL BASE

In general terms, the industrial base involves not only the manufacturing capacity of a nation, but also the supply chain that supports manufacturing. It also includes the infrastructure for production and energy, the capacity to move goods, and the availability and skill of the labor force.²⁹ This means:

- Physical assets: The quality and availability of machinery and equipment;
- Human resources: Skills, experience, and number of operational staff;

- Technological tools: Automation and software that support production;
- Raw materials: Availability and quality of necessary inputs; and
- Operational strategies: Production methodologies like Just-in-Time (JIT) or Lean manufacturing.³⁰

In terms of the capacity of a nation to deter or sustain war, the relevant factors may be different, and the ability to surge or sustain production is critical. As industries did in World War II, the ability to shift forms of production is an important factor in responding to crisis. The 1991 Gulf War, however, was sufficiently short-lived for the existing industrial base to be able to support the deployment of U.S. forces. If the war had become an extended conflict, it is probable that there would have been shortages of spare parts, munitions, and other items. This problem is partly ameliorated by the fact that many elements of production have dual use capabilities, both civilian and military.³¹

The industrial base, therefore, depends on the critical infrastructure of the nation. It is a catch-all term that includes all elements necessary for the production and distribution of supplies and products. Presidential Policy Directive (PPD) 21 of 2013 defines critical infrastructure as including “distributed networks, varied organizational structures and operating models (including multi-national ownership), interdependent functions and systems in both the physical space and cyberspace, and governance constructs that involve multi-level authorities, responsibilities, and regulations.”³²

The defense industrial base is part of the critical infrastructure and the nation’s industrial base. However, it differs in that it is specifically related to the production of weapons and armaments.

THE DEFENSE INDUSTRIAL BASE

There are additional factors involved in the concept of defense industrial base. According to a 2024 Congressional Research Service (CRS) report, “the U.S. defense industrial base (DIB) is the network of organizations, facilities, and resources that provides the U.S. government—particularly the Department of Defense (DOD)—with defense-related materials, products, and services.”

Thus, the defense industrial base includes not only the arsenals and production facilities run by the Department of War, but “a wide variety of entities, including commercial firms operated on a for-profit basis, not-for-profit research centers and university laboratories, and government-owned industrial facilities. It provides everything from large, technologically sophisticated weapon systems and highly specialized operational support to general commercial products and routine services.”³³

A February 2025 briefing on defense in *The Economist* noted that the number of U.S. defense companies had numbered 51 in 1993, but over the years defense production had shrunk to just five major firms.³⁴

Not all 12 of America's main defense contractors produce war materiel. According to one industry ranking, Raytheon is the largest defense company in the U.S., with its 2022 revenue measured at \$67.07 billion. The second and third largest defense companies in the U.S. are Boeing and Lockheed Martin, which made \$66.61 billion and \$65.98 billion in revenue respectively.³⁵

However, as the practice and technology of war shift, the spectrum of companies winning contracts from the Department of War shifts with it. Between January and August 2025, contracts awarded to GE Aerospace, General Dynamics, shipbuilder Huntington Ingalls Industries, and Northrop Grumman Corporation caused their stock values to surge.³⁶ The General Services Administration lists the top 100 defense contractors by their global vendor name annually.³⁷

It is also important to keep in mind that not all defense contractors manufacture weapons. For instance, according to Forecast International, in 2022 the fifth largest defense contractor in the U.S. was Pfizer, Inc., and the seventh largest was Humana, both of which are in the health care sector.³⁸

In 2025, there was a shift back toward military equipment-focused companies. The top five defense contractors were companies that are among the traditional defense equipment manufacturers: Lockheed Martin, Northrop Grumman, Raytheon, General Dynamics, and Boeing. However, the sixth and seventh largest contractors – Anduril and Palantir – are companies in the emerging field of Artificial Intelligence (AI).³⁹

What is more alarming is that in some areas, the U.S. is becoming dependent on distant allied countries for critical capabilities that would be threatened if a conflict broke out with China. South Korea provides a good example. Its shipbuilding capacity now dwarfs that of the United States. For example, in June 2024, Hanwha Ocean Co., a major South Korean conglomerate that manufactures cargo and combat ships, “acquired the Philly Shipyard [in Philadelphia, PA] for \$100 million and has already secured a contract with the United States Navy to repair a navy vessel—Korea's first such agreement.”⁴⁰ While this may be a wholly justifiable investment, one must question how parts and subsystems are sourced. If they are sourced from an area that could be situated in a war zone, critical parts may not be available in the event of conflict in Northeast Asia.



Source: Shutterstock

INDUSTRIAL REVOLUTIONS AND THE DEFENSE INDUSTRIAL BASE

For decades, U.S. policy analysts have expressed concerns that the U.S. industrial base and economy are in decline. To quote one 1992 article in the *Harvard Business Review*:

Real wages are falling. Productivity growth is down. Companies aren't competitive in global markets. White-collar jobs are no longer secure. The nation's infrastructure is collapsing. The federal deficit is soaring. The health system is deteriorating. The cities are unsafe. Schools are failing. The gap between rich and poor is widening.⁴¹

More than thirty years later, many people seem to have the same concerns. But the strength of the industrial base shifts with changes in technology, and involves a number of elements. These include infrastructure, innovation, mastery over domains like space and cyberspace, and how self-sufficient the nation is.⁴²

The industrial revolution in the 18th and 19th centuries took advantage of new inventions such as the steam engine and the cotton gin that fed and allowed huge increases in productivity. Men and women became more productive in new workplaces. For centuries people had labored to produce goods at about the same pace. Then harnessing water, steam, and energy created mills and

factories. The use of machines led to the growth of urban areas and increased human production exponentially. Shoes, clothing, and other material goods were produced at high levels like never before and people migrated from rural to urban areas. One invention led to another, changing economic makeup of the United States as well as other countries.⁴³ Inventions like textile mills, steam engines, sewing machines, and the railroad allowed whole sectors of the country to be more productive and put more people to work in better organized ways.⁴⁴

In terms of the defense industrial base, the evolution of machinery and steelmaking produced the first automatic machine gun, the Maxim Gun,⁴⁵ rifled artillery with increased ranges and improved accuracy,⁴⁶ and other dual-use technologies that revolutionized warfare. Among these were the railroad, which arguably gave the North tremendous logistical advantages over the South in the U.S. Civil War, and the telegraph, which produced a revolution in command, control, and intelligence sharing.⁴⁷

The second industrial revolution took place roughly between the 1870s and the start of the First World War in 1914.⁴⁸ Mass production techniques led to economies of scale that fed the second industrial revolution.⁴⁹ These processes led to falls in the cost of constructing containers and cylinders, which accelerated the manufacturing of engines and storage.⁵⁰ This permitted the design of engines of different sizes and the development of containers used to refine and store petroleum products. Companies took advantage of mass production and the availability of interchangeable parts. Eventually, according to Joel Mokyr, this led to the “rise of giant corporations such as Carnegie Steel, Dupont, Ford Motors, and General Electric in the U.S. and their equivalents in Europe.”⁵¹

In terms of the defense industrial base, among the weapons that were mass-produced during the second industrial revolution were machine guns that could fire hundreds of rounds a minute, bolt-action designed rifles that improved the firepower of infantry soldiers, and semi-automatic, self-loading pistols like the U.S. M1911, which the U.S. Army used from 1911 through 1985.⁵² Other weapons that were mass-produced during that period were armored vehicles, aircraft, flame-throwers, and chemical weapons that were later banned in warfare.⁵³ Aircraft were used by both sides in the war for reconnaissance, bombing, and strafing. The mass production of all these vehicles, aircraft, weapons, and ammunition fed a global war that lasted from 1914 to 1918.⁵⁴

The third industrial revolution, dating from the 1950s, introduced computers and automation.⁵⁵ The third industrial revolution also involved nuclear energy and nuclear weapons development. Interstate highways improved infrastructure, the transportation of goods, and significantly improved the capability to assemble and move large numbers of military personnel. The new technologies – including nuclear weapons and the ballistic missiles used to carry them – contributed to deterrence and U.S. military capacity. This industrial revolution displaced workers changed capital distribution, communication, forms of banking, and economies across the world.

Now, the third industrial revolution is experiencing its sunset, with energy production changing and fossil fuels in decline, even if policymakers attempt to deny or reverse the changes.⁵⁶ In 2016, Klaus Schwab (founder of the World Economic Forum and a German mechanical engineer) summed it up this way:

The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production.... a Fourth [industrial revolution] is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these changes herald the transformation of entire systems of production, management, and governance.⁵⁷

In a *Foreign Affairs* article, Schwab described the Fourth Industrial Revolution as building on the Third and characterized by a fusion of technologies that blur the lines “between the physical, digital, and biological spheres”.⁵⁸

In a 2020 statement before the U.S. Senate Committee on Commerce, Science, and Transportation, Subcommittee on Security, Rush Doshi, then of the Brookings Institution, built on Schwab’s predictions, focusing on U.S.-China competition in technology and the industrial base. He laid out that:

China is pursuing a robust, state-backed effort to displace the United States from global technology leadership. This effort is not driven entirely by commercial considerations but geopolitical ones as well. Beijing believes that the competition over technology is about more than whose companies will dominate particular markets. It is also about which country will be best positioned to lead the world. China’s leaders have often seen technology and economic exchange through a political lens, particularly as a way to create or avoid dependency, [and] strengthen China’s ‘comprehensive power.’⁵⁹

China is increasingly outcompeting the U.S. in many areas. Even more challenging is the fact that it is precisely China’s centrally planned model of state control—and its investments in state-led industrial policy—that has created pockets of excellence which sometimes surpass those of the United States.

For instance, China is an equal—if not ahead of—the U.S. in some areas such as the use of outer space and satellites.⁶⁰ China is producing satellites for asteroid mining and harnessing energy in deep space. It is engaged in active espionage to advance its space capacity, and it uses the same industrial infrastructure for the manufacture of both satellites and military equipment such as missile launchers. China also has a wide range of anti-satellite programs and is leveraging its Belt and Road Initiative to build tracking and satellite command and control centers around the globe.⁶¹

GRASPING THE CHALLENGE

The top-down, state-controlled industrial policy exercised by Xi's China provides the advantage of ensuring that policy is rapidly translated into action. In the U.S. and countries that follow a liberal democratic model, differing views by political parties and constituents may slow the policy process.

To further complicate the problem for the U.S. and like-minded democracies, during the late 1970s and 1980s, many Western policymakers gambled that engagement with China and a strong trading relationship with Beijing would lead to political and economic liberalization in that nation. This proved to be a major mistake. While many U.S. policymakers in the legislative and executive branches thought they could bring about economic liberalization and democratic change in China through trade and engagement, they ended up strengthening the grip of the Chinese Communist Party over the country's people and industry.⁶²

In times of conflict, the capacity of American industry to innovate, surge production, and meet the needs of America's armed forces has been a critical factor in national security. In both world wars, the strength of the U.S. industrial base facilitated allied victories. World War II saw an increase in the defense-related component of Gross National Product grow from two percent in 1939 to 44 percent in 1944.⁶³

By the beginning of the 21st Century, many Americans, this author included, expressed concern that the trend toward the globalization of production and the shift of American industrial capabilities overseas would leave the United States unable to respond to future security challenges.⁶⁴ It became clear that a failure to pay attention to the U.S. industrial base could render the U.S. unable to manifest a sufficiently large surge in the production of new weapons, intelligence, and materiel, in the event of a major conflict breaking out.

Despite the warnings, critical industries have shifted to China and, as a result, should an ally or partner be unable or unwilling to join the U.S. in a major conflict, America could find itself unable to support its own military efforts. Although national security cannot be an excuse for protectionism, today it is clear that more attention to the capacity of U.S. industry is required.

Additionally, the U.S. needs to focus on dual-use critical technologies, industries and skills where we still lead. Policies should encourage investment in research and development to support a robust domestic defense industrial base. The United States does not need the capacity to do everything, but even close allies might not always be able to transport critical materials or equipment by air or sea.

Notably, during the Biden administration, there was an attempt to move some military industrial production overseas. The Secretary of the Navy at the time, Carlos Del Toro, admired how

shipbuilding efforts were completed on time in South Korea and Japan. South Korea and Japan are the world's second and third largest nations in shipbuilding (behind China).⁶⁵ At a forum at the Stimson Center, Del Toro expressed an openness to assembling parts of U.S. warships at foreign shipyards to help increase U.S. Navy ship production.⁶⁶

This is a misguided policy, however. While South Korean and/or Japanese investment in the U.S. for military or civil shipbuilding may be a good idea, creating a dependence on shipyards that are in close missile, air, or naval attack range to China, Russia, or North Korea is a dangerous approach. In the event of a conflict, U.S. forces, bases, and such shipyards would be among the first targets for an adversary.

Navy Secretary Del Toro seemed to realize this and was aware of how Congress might react to shifting production to foreign countries. In 2024, he told shipbuilding company leaders from Japan and South Korea:

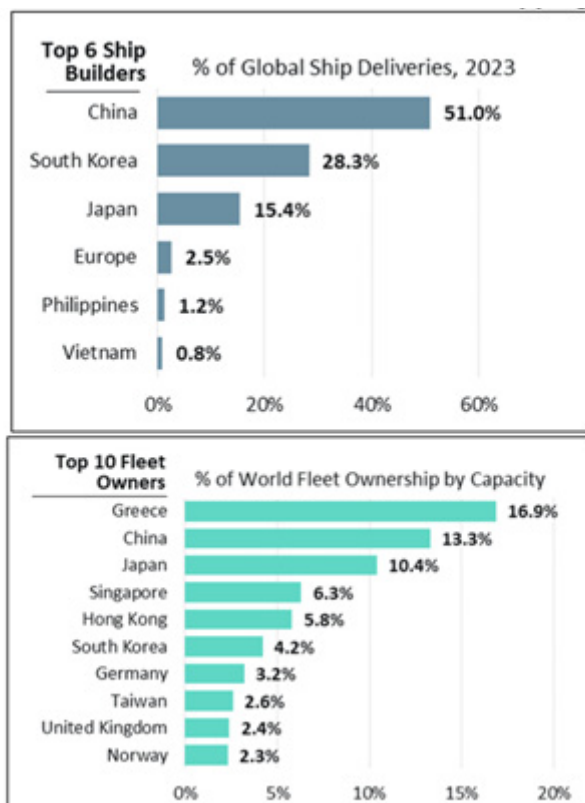
There are numerous former shipyard sites around the [U.S.] which are largely intact and dormant. These are ripe for redevelopment as dual-use construction facilities for both warships, like Aegis destroyers, as well as high-value chain commercial vessels, such as the ammonia gas carriers that will enable the global transition from fossil fuels to green energy sources like hydrogen. Investment in dual-use shipyards in the United States will create good-paying, blue-collar and new-collar American jobs building the advanced ships that will protect and power the economy of tomorrow.⁶⁷

However, it seems that members of Congress have not yet fully grasped the dangers of depending on shipbuilding or ship repair facilities in potential combat zones. Senators Tammy Duckworth and Andy Kim, Democrats from Illinois and New Jersey respectively, traveled to South Korea and Japan in August 2025 to examine U.S. shipbuilding options there.⁶⁸

To be sure, there are benefits from learning from the industrial policies and shipbuilding expertise of Korea and Japan and attracting companies from those nations to join joint ventures in the U.S. is an attractive option. Still, if U.S. supply chains become dependent on parts shipped from Korea or Japan, those supply chains would be threatened in the event of a conflict with China, Russia, or North Korea, and repairing U.S. vessels so close to potential combat zones would risk ships under repair becoming immediate targets in a conflict.

This means that the best options for the U.S. are to partner with other allies in the region, including South Korea and Japan, but to diversify supply lines and repair locations. Ultimately, rebuilding the U.S. shipbuilding industry will not be a simple, short-term task that can be accomplished quickly.

Figure 1. China's Global Market Share in Shipping

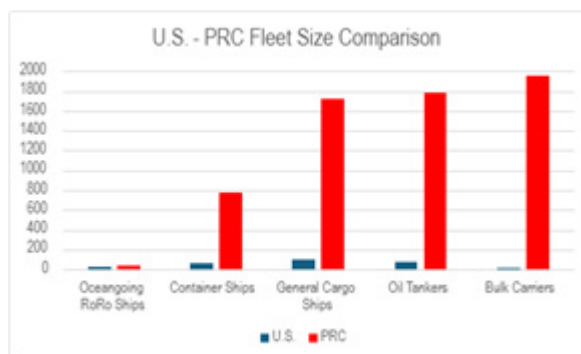


Source: Karen M. Sutter, "Section 301 and China: Shipping and Shipbuilding Issues," Congressional Research Service, In Focus IF12666, March 13, 2025, https://www.congress.gov/crs_external_products/IF/PDF/IF12666/IF12666.6.pdf

To demonstrate China's superiority in shipbuilding, consider that in August 2025, the PRC sent seven Roll-on, Roll-off (Ro-Ro) cargo ships into the Taiwan Strait.⁶⁹ This demonstrates the capacity to use these ships for amphibious warfare in the event China acts against Taiwan (or other nations in the region). It also demonstrates the utility of Xi Jinping's policy of "military-civil fusion" (军民融合).⁷⁰ A full description of the program can be found later in this study, but in brief, the policy allows the PLA and China's defense programs to tap into the civilian economy in the event of crisis or war.

In terms of the size of the available commercial shipping fleets, China also has a substantial lead on the United States. In every category of major shipping—oceangoing roll-on-roll-off (Ro-Ro) ships, container ships, general cargo ships, oil tankers, and bulk fuel carriers—the PRC fleet dwarfs that of the U.S. Although the U.S. has substantial power to mobilize and control shipping in time of war, one can only mobilize what is available.⁷¹ If there is minimal availability of ships to

Figure 2. U.S.-PRC Fleet Size Comparison



Sources for this chart available in Appendix 1.

press into service, wartime powers may not be sufficient. Hence the pressure to increase U.S. ship building.⁷²

The PRC, on the other hand, can literally mobilize any ship in its commercial fleet at short notice.⁷³

The search for overseas shipbuilding capacity has come alongside similar efforts to shift the production of vital equipment such as combat aircraft, ground weapons, and armaments overseas. This is a strong indicator that the U.S. has lost much of its industrial base capacity.

This is a decades-long problem. A recent U.S. Government Accountability Office (GAO) report notes: “The Navy plans for a larger, more capable fleet of ships to counter evolving threats. But the Navy has struggled to increase the size of the fleet for the past 2 decades. Its performance in shipbuilding and ship repair is critical to achieving the desired future fleet.”⁷⁴ The Director of Defense Capabilities and Management at GAO, likewise told Congress: “The United States’ military superiority depends on its ability to project strength across all warfighting domains. GAO’s body of work has shown that U.S. military readiness has been degraded over the last two decades due to a variety of challenges, including maintaining existing systems while acquiring new ones that can overcome rapidly evolving threats.”⁷⁵

China’s dominance in shipping and shipbuilding straddles the boundary between civilian and military. There is virtually no distinction between civilian shipyards in China and military shipyards, and Xi Jinping’s “military-civil fusion” (军民融合) program, which can harness the entire industrial base to support military construction, means that the options for shipbuilding and repair in China far outstrip the capacity in the U.S.

The United States has only just begun responding to these developments. On April 25, 2025, President Trump published an Executive Order (EO) designed to revitalize the U.S. shipbuilding industry and announced a Maritime Action Plan to put the EO into effect.⁷⁶ The White House Fact Sheet on the Maritime Action Plan notes that:

- “0.2% of the world’s ships are built by the United States, compared to 74% built by China.
- 0% of the containers used to move commodities around the world are built by the United States, compared to 96% built by China.
- 0% of the ship-to-shore cranes in the United States are built domestically, compared to 80% built by China.
- Chinese state-owned software is being installed in port operations across the United States, with limited to no alternatives.”⁷⁷

Meanwhile, in Congress, the Shipbuilding and Harbor Infrastructure for Prosperity and Security, or “(SHIPS) for America Act,” was reintroduced by Republican Senator Todd Young and Democratic Senator Mark Kelly.⁷⁸ The “Ships for America Act” was originally introduced in December 2024 at the end of the previous Congress. In a syndicated opinion piece, Wilson Beaver, a policy analyst at The Heritage Foundation, said that the efforts are designed “as a cornerstone of the effort to resurrect U.S. commercial shipping, expand and modernize the U.S. navy, and reindustrialize the United States.”⁷⁹

Despite the Administration’s effort, however, major shipping companies appear to continue to order new ships made in China and to use them at U.S. ports. A Mediterranean Shipping company executive explained to a journalist at the South China Morning Post that “major shipping companies, including Mediterranean Shipping Company...(MSC)—the world’s largest—are opting to continue working with Chinese shipyards, saying their competitiveness cannot be easily matched in the short term.”⁸⁰

But the decline of the U.S. industrial base affects more than space and the shipbuilding and maritime industries. As the next section of this paper points out, a number of other areas of the U.S. critical infrastructure need to be revitalized.

THE STATE OF AMERICA’S INDUSTRIAL BASE

By the end of World War II, the United States had built what may have been the world’s most robust and diversified industrial base. That dominance persisted during the decades of the Cold War, when the U.S. was one of two superpowers and certainly the most powerful nation in terms

of global reach and economic dominance. However, after winning the Cold War, America seemed to focus on its global economic interests, or let U.S. corporations do so, often at the expense of its security interests.

The consequences of this shift are potentially severe. If left untended, the principles that inform strategy, like the military acronym DIME (Diplomatic, Military, Informational, and Economic interests) can get out of balance, leading to a degradation of other major strategic needs.⁸¹ That has been the case in the past quarter-century. While free market concepts like comparative advantage have helped deliver cheaper prices to American consumers, they have also weakened America's capacity to build and produce military capability quickly.

Statesmen and scholars have argued that “international commerce can strongly shape security relations.”⁸² And in the post-Cold War period, the dominant view was that an increase in commerce and shared economic interests—in other words, globalization—would reduce conflict. Further, while most countries have sought or decided to be self-sufficient in arms and weapons production, Richard Bitzinger points out that, beginning in about the 1980s, and increasingly in the post-Cold war period, even defense production has globalized.⁸³ Pointing to the effect of the decline of the Soviet Union and the effect on the globalization of production, Stephen Brooks and Williams Wohlforth point out that the limits of the Soviet Union's capacity to challenge the U.S. was related to the relative decline of the Soviet economy in comparison to that of the U.S.⁸⁴

China, however, is not the Soviet Union, and, unlike the Soviet Union, its industrial capacity and economy are growing.

In a 2020 *Forbes Magazine* article, Kenneth Rapoza pointed out that “China was being groomed to become a low-cost producer for U.S. multinationals since the time of Republican President Richard Nixon. That got the ball rolling. The idea was not to turn it into a manufacturing hub at the expense of the U.S., but an open China would become a more middle-class country, and a middle-class China would overthrow the Communist Party elite. So the experts believed.”⁸⁵

Instead, as Rapoza noted, Huawei is producing more 5G equipment than Cisco, America cannot tear itself away from TikTok, and the *Made in China 2025* plan—which focuses on expansion in innovative industries such as blockchain technology, artificial intelligence, robotics, and biotech—has been wildly successful.⁸⁶ While some may derive false reassurance from the fact that “only” roughly 15 percent of U.S. imports come from China, or that alternate sources exist for some products, in a number of areas (such as rare earth minerals, micro-circuitry, information technology devices, and magnets for weapons) the U.S. is not self-sufficient.⁸⁷ Indeed, the effort to reduce reliance on China for critical military or dual-use technologies is a continuing struggle for the Department of Defense.⁸⁸

A study of the U.S. critical infrastructure by the Foundation for Defense of Democracies (FDD) illustrates the close, symbiotic linkage between the industrial base and the defense industrial base. According to the 2025 FDD study:

Over the past year, the intelligence community has revealed how deeply Chinese hackers known as Volt Typhoon penetrated U.S. transportation, energy, and water systems. Volt Typhoon demonstrated China's capability to gain and maintain persistent access to closed systems and pre-position malicious payloads to cause disruption and destruction. Meanwhile, other Chinese Communist Party (CCP) malicious cyber operations, including Flax Typhoon, hijacked cameras and routers, and Salt Typhoon burrowed deep into U.S. telecommunications networks. In addition to enabling potential disruption, compromising critical infrastructure allows Beijing to amass information about the movement of goods, surreptitiously watching as the United States moves its military equipment across the country. Given these threats, the U.S. military has a vested interest in the security of the nation's critical transportation infrastructure.⁸⁹

The FDD report highlights how interference with the national industrial base can disrupt defense mobilization and deployment. The authors explain how interference with parts of the U.S. critical infrastructure like ports and the rail system can be damaging. Indeed, these are crucial elements needed for the coordinated function of military deployments, the movement of material, and the deployment of personnel and equipment.⁹⁰

Other studies have echoed the same warning. An April 2025 Heritage Foundation study laid out the problems of the present defense industrial base.⁹¹ It concludes that “between 1942 and 1945, the U.S. defense industrial base produced 17 aircraft carriers, 300,000 planes, and roughly 50,000 Sherman tanks. But today the U.S. lacks the capacity to produce just what Ukraine needs to fend off Russia.”⁹² The report further noted that the U.S. was overly dependent on foreign suppliers for microelectronics and semiconductor chips and lacked domestic foundries for these items. This state of affairs represents a critical shortfall, because, as the journal *American Affairs* has outlined, a stronger defense industrial base requires a stronger national industrial base.⁹³

PORTS AND THE U.S. INDUSTRIAL BASE

There are vulnerabilities in the U.S. industrial base posed by a heavy dependence on China for cranes and other infrastructure technology at ports. According to a report from PAMIR, a risk management firm focused on China, “the primary risk from maintaining a Chinese crane presence in U.S. ports is China's exploitation of data acquired through the monitoring of commercial inputs for a trade advantage.”⁹⁴

During normal times, China benefits from trade flows through U.S. ports and probably would not attempt to interfere with port operations. However, in a crisis, there are ways that the PRC could impede or shut down port operations, which would affect military deployments and the U.S. economy.

One PRC data management system, the PRC-supported National Public Information Platform for Transportation and Logistics, or LOGINK, tracks logistics information from PRC and foreign ports and can track data from global logistics databases.⁹⁵ LOGINK provides information on global logistics activities, potentially giving China's government and intelligence services an opportunity to influence the global transport system, and that of America. According to a study by the U.S.-China Economic & Security Review Commission (USCC), LOGINK could give "PRC logistics firms... a key competitive advantage in a third-party logistics market that could be worth as much as \$1 trillion a year."⁹⁶

One conclusion of the USCC report is that:

China's subsidization and promotion of a nominally public good in a private market could undermine the dynamism of comparable U.S. services. The United States lacks tools to address market distortions from Chinese digital services. While antidumping and countervailing duties enable the United States to respond to subsidized goods, the U.S. government does not have comparable tools to respond to digital services offered when the price is below market value.⁹⁷

The U.S. government has attempted action in response to this vulnerability. The potential threat from China's data acquisition was deemed serious enough that in 2023, the House introduced H.R. 1724, the Securing Maritime Data from Communist China Act.⁹⁸ The bill, among other suggested remedies, would "urge governments to cooperate with the United States to counter attempts by the People's Republic of China at international standards-setting bodies to spread LOGINK."⁹⁹ However, the bill was never enacted into law—and the vulnerability remains.

The resulting situation is deeply suboptimal. As the Center for Maritime Strategy (CMS) has noted, "lessons learned from Europe's heavy dependency on Russian hydrocarbons should serve as a cautionary tale" of the risks of allowing a single country to manipulate or dominate maritime trade.¹⁰⁰ The CMS report concluded that: "Ultimately, the debate about LOGINK cannot be separated from Chinese investments in ports across the globe, the provision of cranes, and broader Chinese efforts to become a logistics and transport superpower in the coming decades."¹⁰¹

THE DECLINE OF THE U.S. STEEL INDUSTRY

America's steel industry grew at a fast pace after the Civil War, eventually turning the United States into the world's largest steel producer.

According to a history by the National Material Company, an independent steel service company, "between 1880 and the turn of the century, American steel production increased from 1.25 million tons to more than 10 million tons. By 1910, America was producing more than 24 million tons, by far the greatest of any country."¹⁰² In the northern part of the United States, major steelmakers were situated in Pennsylvania and Ohio,¹⁰³ while in the south, Birmingham, Alabama dominated the steel industry.¹⁰⁴

Things changed after the Second World War. According to the International Monetary Fund (IMF) in 1964, the operating costs of U.S. steel mills averaged about 15 percent higher than those of steel producers in Japan.¹⁰⁵ This put U.S. steel producers at a competitive disadvantage. Moreover, the fact that Japan was a U.S. ally meant that there was no geopolitical obstacle to sourcing steel from Tokyo at a lower cost. The results were pronounced. By 1972, "U.S. unit operating costs were about 40 percent higher than those of Japanese producers," a differential accounted for by Japanese labor productivity and declines in the cost of iron ore to Japanese producers.¹⁰⁶

Long-term investment decisions by U.S. steel producers were also a factor. According to the IMF, American "producers have generally opted to replace existing capacity rather than build totally new facilities." These decisions made the efficiencies in new foreign mills less costly.¹⁰⁷

Simultaneously, globalization made it cheaper to import steel than to produce it in the U.S. and pay the higher wages required by American workers.¹⁰⁸ Meanwhile, the availability of alternative materials like plastics and aluminum made steel less practical financially. Environmental regulations, which were looser in Japan and much looser in China, also made steel production more expensive in the U.S.¹⁰⁹ And countries like China do not have labor disputes, independent unions or strikes. The unions that do exist are tightly controlled by the Chinese Communist Party.¹¹⁰

In the short term, President Trump's new 2025 tariffs on steel may not significantly increase U.S. steel production. Even the president of the United Steelworkers Union seems to argue for production with "trusted allies" like Canada.¹¹¹ Meanwhile, the merger between U.S. Steel and Japan's Nippon Steel is expected to serve as a shot in the arm for U.S. steel production, but will not solve the overall decades-long decline in the sector.¹¹²



Source: Shutterstock

CRITICAL MINERALS AND U.S. MILITARY SYSTEMS

Rare earth elements, also often called critical minerals, are essential parts of technologies such as electric vehicle motors, batteries, and wind turbines. In the military realm, rare earths are the critical minerals used in the manufacture of missile and aircraft guidance and control systems, advanced optics technologies, radar, sophisticated smart or guided weapons and systems, and telecommunications.¹¹³ Although they are present in many places around the world, in 2022, according to Canadian government estimates, China produced 70 percent of the global supply of these critical minerals, the U.S. produced 14 percent, Australia 6 percent, and a few other countries produced the remaining 10 percent.¹¹⁴ The Canadian study notes: “the United States was the world’s largest supplier of REEs [rare earth elements] until the emergence of China in the mid-1990s. China was virtually the world’s sole REE supplier until 2012, when the now-bankrupt American producer Molycorp Inc. and the Australian company Lynas Rare Earths Ltd. started commercial production.”¹¹⁵

Although the U.S. was previously aware of its dependence on China for rare earth elements, it was not thought to be a major problem until the U.S. began to push back on China’s aggressive actions in the South China Sea and East China Sea and on China’s trade practices. Now, according to the *South China Morning Post*, “China dominates the global supply of rare earths, including more

than 90 percent of the world's processing and refining. It also has an edge in most other critical minerals, such as refined gallium, of which it controls 98.8 percent of the output."¹¹⁶

This has created a strategic problem for the United States. Even though, in 2020, President Donald Trump issued an Executive Order identifying 35 minerals essential to the economy and national security of the U.S.,¹¹⁷ not much progress has been made in addressing the vulnerability. A subsequent Executive Order by President Biden continued many of the Trump Administration's actions in this area,¹¹⁸ but this was mostly limited to an administrative review of measures that could be taken. Few concrete steps have been taken; only a handful of processing plants have been opened in the U.S., and the country is still heavily dependent on China for such critical minerals.

The *South China Morning Post* sums up the resulting situation this way: "U.S. defence systems are deeply reliant on critical minerals, and China's tightening grip on exports, tech, and production could accelerate their supply chain disruption. Without fast-tracked domestic capacity and cooperation with allies in critical mineral production, the U.S. could potentially face challenges in strategic preparedness in the Indo-Pacific region."¹¹⁹

That has a bearing on contemporary policy. President Trump's efforts to negotiate with Xi Jinping do not, as of this writing, seem to have led to any durable agreement on critical minerals. President Trump has complained that Xi Jinping is "extremely hard to deal with" and Xi has apparently made agreements and then reneged.¹²⁰ Commentators at CNBC point out that "rare earths are China's bargaining chip in the trade war — the U.S. is trying to fix that... [with] a \$400 million investment in MP Materials, an American rare earth miner and producer. MP Materials owns the only operational rare earth mine in the U.S. at Mountain Pass, California. Goldman Sachs and JPMorgan also backed the company with a \$1 billion loan to fund the expansion of MP Materials magnet-making operations" as well as other projects.¹²¹

Beijing approves a certain number of export permits for rare earth materials, but these seem to be for components or chips the PRC needs for its own production. Observers continue to doubt that all of U.S. needs will be supplied and there are lingering doubts about the durability of any trade deal.¹²² The upshot, as the author of this paper sees it, is that Beijing can continue to squeeze the U.S. at will.

Meanwhile, Beijing's export control system on these elements is getting tighter. China has responded to the U.S. placing export controls on the computer chips that Chinese industries need by strengthening its own controls on rare earth elements.

Moreover, a trade agreement between Washington and Beijing—something the Trump administration is seeking—would not resolve the problem for the U.S.¹²³ Even if China sends enough rare earth elements to the U.S. to allow American foundries to make the chips that China and U.S. automakers need, the U.S. defense industry remains dependent on a potential military

adversary.¹²⁴ And one can be sure that China's military and political leadership will not sacrifice its own military advantages by providing much-needed rare earth elements to the U.S. military.

Over time, that dependence could change. Some positive developments suggest that the U.S. is getting back into the business of mining rare earth elements. According to the *Wall Street Journal*, one U.S.-based firm is seeking to solve supply chain problems in magnet production, which depend on rare earth elements, by working with European companies to establish a factory in Texas.¹²⁵ To help ensure its own access to the rare earth elements needed by the military, the Department of War is investing in a miner of rare earth minerals, MP Materials.¹²⁶ The Pentagon has agreed to buy \$400 million of MP Materials preferred stock in the only operational rare earth mine in the U.S. at Mountain Pass, California.¹²⁷

Opening mines in the U.S. is good news for the supply chains of these critical minerals, but it does not completely solve the shortages, and even though it appears that Beijing and Washington may come to some agreement on the export of Chinese rare earth minerals to the U.S., this does not mean the U.S. will get everything it needs.¹²⁸

While mining capacity is a problem, a key U.S. vulnerability is the lack of domestic refining and magnet-making. Nearly all midstream processing still occurs in China, giving Beijing control over the most strategically important stage of the supply chain.

The U.S. permitting regime is equally limiting. New mines and refineries routinely face decade-long approval cycles that deter private investment and prevent rapid expansion. Without faster permitting, predictable timelines, and targeted incentives, the United States will remain dependent on Chinese processing capacity regardless of domestic mining efforts.

In the event of increased tensions or conflict, it is almost guaranteed that the PRC will use its control of these exports as an economic weapon to exert pressure on the United States. Moreover, even in times when there is no crisis, Beijing is not going to ship enough to strengthen the military of the country it views as its greatest rival.

Another approach the U.S. could take is to examine opportunities to recycle basic rare earth metals from old components, but ultimately, it is of vital importance for the U.S. to urgently boost mining from domestic sources or, at least, diversify imports away from dependency on its chief geopolitical rival.

SPACE AND AEROSPACE

In June 2025, the commander of the U.S. Space Command, General Stephen Whiting, told *Defense News* that “China has moved breathtakingly fast in space, and that’s in probably three ways that I



Source: Pexels

would highlight.... China has built a targeting system based in space to find, fix, track and target U.S. and allied forces in the Indo-Pacific area of responsibility, and then they use that system to feed over-the-horizon fires to try to hold at risk these capabilities...and they have leveraged all the advantages of space to make their army, the People's Liberation Army, the People's Liberation Navy and the People's Liberation Air Force, more lethal, more precise and more far-ranging, using space-enabled services."¹²⁹

And it is not only in space, but also in missiles that China appears to lead the United States. As Beijing prepared to celebrate the 80th anniversary of the victory over Japan in World War Two, it conducted rehearsals for a massive parade. The PRC celebrates its victory on September 3 each year, one day after the Japanese Instrument of Surrender was signed on September 2, 1945.

At the parade rehearsal, the PLA prepared to show its advances in hypersonic missiles, new fifth-generation stealth fighters, fighter aircraft, and a new generation of strategic intercontinental ballistic missiles (ICBMs).¹³⁰ An upgraded series of missiles, including the YJ-15, YJ-17, YJ-19, and YJ-20, was on display.¹³¹ The YJ-15 is a ramjet-powered supersonic missile, the YJ-17 has a warhead that is a hypersonic glide vehicle, the YJ-19 is an airbreathing ramjet powered missile, and the YJ-20 is a hypersonic anti-ship missile.¹³² All of these systems can probably be launched from land, air, or sea. They are designed to degrade or destroy enemy systems. The idea is likely that they

will be able to intercept enemy vessels as they cross into the Western Pacific through the so-called second island chain stretching from Japan to New Guinea via the Mariana Islands. This means that such missiles could be devastatingly effective against the U.S. or Japanese Navy.

Notably, the new fighters are powered by Chinese-made WS-10C jet engines. For decades, China had problems developing indigenous military jet engines. Now it has its own industrial base for fighter-jet engines. It no longer depends on Russia for its supply chain in this critical area.¹³³

Although the United States has worked to develop hypersonic strike capabilities for about two decades, China and Russia lead in this area.¹³⁴ U.S. efforts in this area have been constrained by funding from Congress, but also by an inability to decide on missions for the weapons systems.

If developed, however, U.S. defense officials agree that hypersonic weapons are a serious threat and that “both terrestrial- and current space-based sensor architectures are insufficient to detect and track hypersonic weapons.”¹³⁵ Thus, while China and Russia each have a defense industrial base to support these 21st century weapons, the U.S. defense industrial base is still trying to catch up to them.

Another major area of competition is commercial aircraft sales and development. The United States has the advantage here, though China has worked for decades to develop its own commercial aircraft to compete with Boeing and Airbus. One goal is to make the PRC less dependent on these two global aircraft giants, while another PRC objective is to get its own planes certified for international sales. China’s commercial aircraft manufacturer, Commercial Aircraft Manufacturer of China (COMAC), already has regional jets for its own use and for the international market.¹³⁶

This is an area that has been seriously affected by the trade war between the U.S. and China. In response to export bans imposed by the PRC on rare earth minerals, the Trump administration banned the sale of GE engines to China, critical for the development of COMAC’s regional jet, the C919, but as trade talks progressed, the U.S. approved the sale of engines from a GE joint venture (the LEAP-1C engine from GE–Safran Aircraft Engines) to China.¹³⁷

When it comes to wide-body commercial jets, however, the market is dominated by Boeing and Airbus. Yes, Boeing has had its manufacturing problems with the 737, the 777, and the 787, but it is still one of the two global powerhouses in wide-body aircraft.¹³⁸ There were crashes, loose bolts on planes, and other flaws, but the view of many in the aircraft manufacturing industry is that the company must focus on a culture of safety and quality control. Meanwhile, China’s attempt at the C919 depends on U.S. parts and engines. The PRC is a very long way away from getting the aircraft certified for international use, let alone begin manufacturing wide-bodied aircraft.¹³⁹ What the PRC is doing is putting pressure on U.S. manufacturers and trade negotiators by alternating its purchases between Airbus and Boeing, while both companies want to sell parts as well as aircraft to China.¹⁴⁰

A NOTE ABOUT CHINESE QUALITY CONTROL

To many of us who have worked or lived in China for long periods of time, we call it the land of “chabuduo” 差不多. That translates roughly to “just about” or “nearly.” When China began to manufacture knock-off, reverse-engineered models of the Jeep Wagoneer in the late 1980s and 1990s, one could look at a Chinese made “Jeep,” and see doors hung crooked, or a muffler falling off. Ask a Chinese car dealer about the flaw, and the answer was invariably “chabuduo” 差不多 (just about). Jim Mann catalogued these issues in his book *Beijing Jeep*.¹⁴¹

The problem, though, is not limited to the 1980s or 1990s, or to the automotive industry. In late 1990s, the U.S. Defense Attache Office in Beijing brought in a U.S. military medical team to visit Chinese hospitals to see if their standards were up to treating American military personnel. This author accompanied an operating room (OR) team to what was touted as the top PLA hospital in China. When asked if the autoclave gauge was calibrated on a regular basis, the Chinese nurse responded “chabuduo” 差不多: The gauge goes up when we put the autoclave on and the gauge goes down when we shut it off.” The decision of the U.S. medical team was that all U.S. personnel would be treated at a U.S. military hospital in Japan or South Korea.

Between 2000 and 2017, this author visited tool manufacturing facilities in south-central China, a Budweiser Beer Brewery in Wuhan, and a major manufacturer of wind turbines in Northeast China. U.S. and European corporate engineers sent in to oversee quality control all complained that if they attempted to correct workers on quality control procedures, the Communist Party secretary interfered. Quality control at the Budweiser beer factory was so bad at that time that all instruments monitoring the brewing process were hooked into the company’s main plant by fiber-optic cable.

This is not to say that China is incapable of good quality control. The satellite and space industry is excellent in this regard, but in other areas such as engines and quality metallurgy in general, the PRC has continuous quality control problems.

Satellites and Communications

Telecommunications is a technology area where in some areas the PRC may be on par with—or even ahead of—the U.S. The PRC has 245 military satellites in orbit, including communications satellites and its BeiDou Navigation Satellite System 北斗卫星导航系, which provides positioning, navigation, and timing (PNT), but also some communications features that U.S. Global Positioning System (GPS) PNT systems do not have.¹⁴² Of 4,852 satellites in orbit in January 2022, 10.3 percent (499) were owned or operated by Chinese entities, but not all were military.¹⁴³

China’s military use satellites include systems used for PNT, communications, meteorology, oceanography, electronic intelligence, signals intelligence, early warning of threats, as well as

rendezvous and proximity operations.¹⁴⁴ The latter term refers to satellites that may have a dual use. They can rendezvous with other spacecraft or remove debris from orbit,¹⁴⁵ but they can also be used to shadow foreign satellites and to jam or collide with them.¹⁴⁶

BeiDou, the PRC rival to the U.S. GPS system, has the capability to connect to smartphones and allows users to send messages, a feature GPS does not have, and China's BeiDou constellation is larger than the GPS constellation of the United States.¹⁴⁷ This makes the system very attractive in third world, developing countries, where PRC-made smartphones are also popular. BeiDou is also a dual-use system, providing civilian PNT and supporting the PLA. This makes China's system an economic challenge for the U.S. and means that the PRC gets to set communications standards which may become the international norm.¹⁴⁸

The PRC also is competing with the U.S. in establishing a foothold on the Moon, eventually seeking a manned lunar base.¹⁴⁹ China's plan is to undertake a manned lunar landing in 2030, and perhaps establish a joint base on the Moon with Russia. The U.S., working with international partners, is seeking roughly the same goal over the same timeline. China's lunar lander, Chang'e-7, is scheduled to survey the Moon's south pole in 2026.¹⁵⁰ The U.S. moon lander, Artemis, has experienced heat shield problems that NASA continues to try to address.¹⁵¹ Both the far side of the Moon and the south pole of the Moon offer the possibility of new minerals and geophysical exploration.

China also presents a more direct threat to U.S. interests and reconnaissance programs in space. The PRC has an advanced anti-satellite program with "space-capable weapons systems including anti-satellite and ballistic missiles, co-orbital satellites, and directed energy, cyber and electronic warfare capabilities."¹⁵²

The capabilities outlined above all depend on China's developing and maturing industrial base, which coupled with Xi Jinping's "military-civil fusion programs"¹⁵³ contribute to the PRC's impressive defense industrial base.

China's Industrial Base

Central planning, the use of subsidies, and strong internal competition were major factors in the development of China's strong industrial base. China focuses on developing its economy and on investing in state-owned enterprises (SOEs). Although they are often inefficient, these SOEs are almost always run or overseen by Chinese Communist Party officials and are responsive to the CCP's dictates.

In a report for the U.S.-China Economic and Security Review Commission, several experienced analysts point out that, while "China is a late entrant" into the "global race for economic,

technological, and innovation leadership,” top-down state planning and “a voracious appetite for foreign technology” have made China a global power in emerging technologies.¹⁵⁴

For China, state planning and SOEs have the advantage of ensuring that “defense, civilian, and dual-use” plans support the development of the economy and are responsive to global changes in technology and needs.¹⁵⁵ For Xi Jinping, state planning is a key pillar of ‘military-civil fusion’ (军民融合),¹⁵⁶ which has “quickly become a guiding force behind not only local government economic planning but also the strategies of Chinese corporations.”¹⁵⁷ Xi’s concept has become a national strategy “that has quickly become a guiding force behind not only local government economic planning, but also the strategies of Chinese corporations. MCF is influencing investment decisions, talent recruitment, and research and development (R&D) across multiple fields of dual-use technology sectors, to include artificial intelligence, advanced materials, and aviation.”¹⁵⁸ Still, it is a concept that has some inherent problems and can lead to shortages or failures in enterprises if production is shifted to support the military or mobilization.

THE *MADE IN CHINA 2025* PROGRAM

The *Made in China 2025* program is another way that China has used its state planning system to strengthen its industrial base and create self-sufficiency.

Professor Barry Naughton of the University of California San Diego, describes three distinct phases in the evolution of the program: (1) identifying focus sectors between 2006-15; (2) the adaptation and use of new technologies since 2016; and (3) building self-sufficiency with indigenous production and support beginning since about 2020.¹⁵⁹

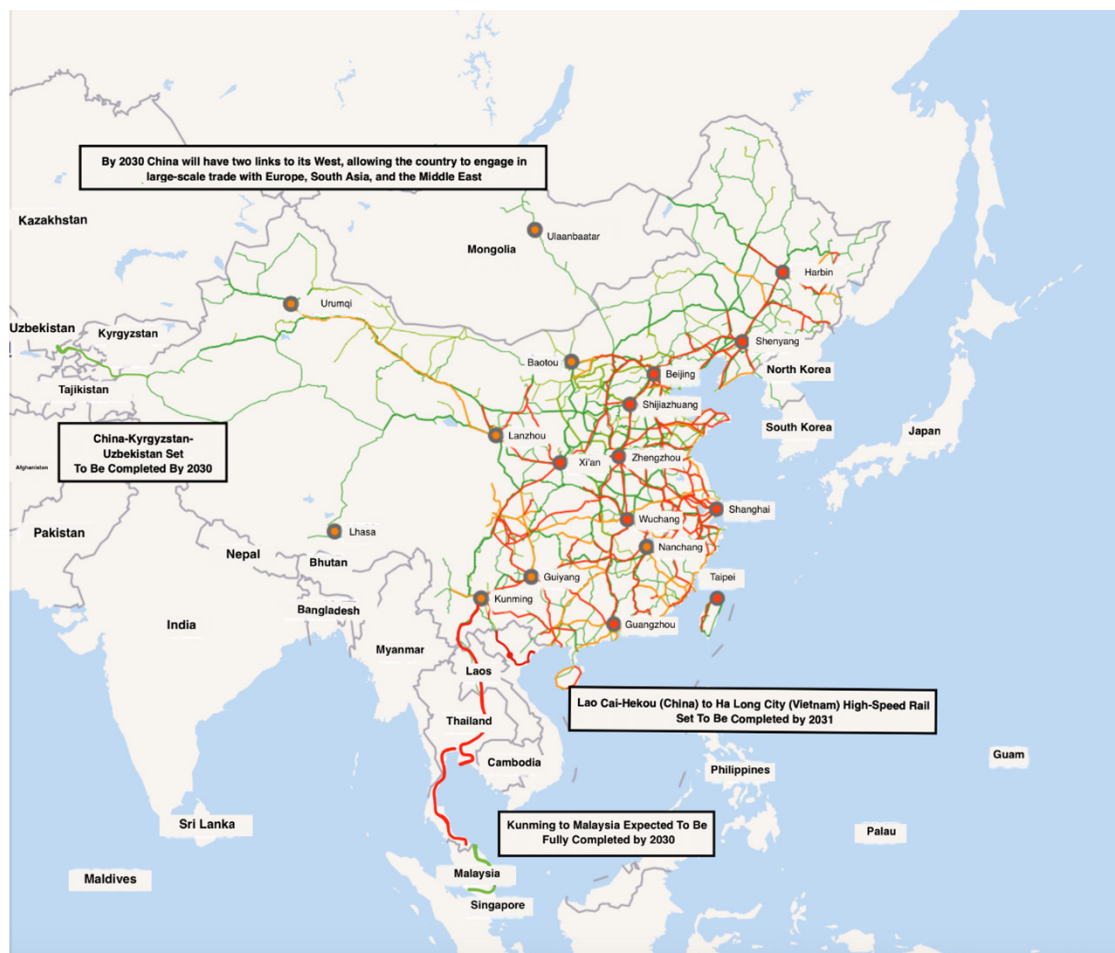
As the Congressional Research Service (CRS) describes it, the *Made in China 2025* policy “calls for technological breakthroughs in 10 sectors” as well as state support for sector-specific plans.¹⁶⁰

Karen Sutter, CRS Specialist in Asian Trade and Finance, writes that: “These plans aim to make China the leader in all parts of the global value chain, and to increase the share of inputs and finished goods produced in China and worldwide by PRC firms.... [*Made in China 2025*] is focused on advanced manufacturing and on transforming China’s economy from one that assembles goods to one that invents the products it makes.”

The ten sectors that are the focus of *Made in China 2025* and are where China intends to dominate global markets are:

1. New generation information technology,
2. High-end computerized machines and robots,

Figure 3. China Railway Distribution



Sources may be found in Appendix 2. Map prepared by Mathew T. Williams.

3. Aerospace,
4. Maritime equipment and high-tech ships,
5. Advanced railway transportation equipment,
6. New energy and energy saving vehicles,
7. Energy equipment,
8. Agricultural machines,

Figure 4. U.S. Railway Distribution



Source: OpenRailwayMap. Accessed June 30, 2025. <https://openrailwaymap.org/>.

9. New materials, and

10. Biopharma and high-tech medical devices.¹⁶¹

Addressing railways, China already has a well-developed rail system in its central and eastern areas, but to the west and southwest, there are considerable gaps. This means that in terms of its ability to address threats and resupply, China is well positioned in the event of conflict with the U.S., Japan, or in its littoral seas. However, it is vulnerable with respect to Russia and India.

CHINA'S USE OF ESPIONAGE

Espionage and technology theft are a major factor in the development of China's industrial base. China's defense industries have used reverse engineering to improve indigenous systems, using both official technology transfers from other countries and espionage.¹⁶² While cyberespionage (e.g. hacking) is often used by the PRC, more traditional methods of espionage are also used. These include directly requesting technical information from manufacturers or researchers, appearing to seek market services from companies, targeting U.S. travelers in China, and gleaning manufacturing ideas from open source professional journals.¹⁶³

Figure 5. Distribution of U.S. Strategic Highways



Source: Federal Highway Administration, <https://hepgis-usdot.hub.arcgis.com/maps/usdot::national-highway-system-map/explore?location=35.829594%2C-96.354108%2C3.78>

The use of espionage speeds up the development of new technology and saves years of research, work, and time in the development process. There are clear linkages between China's use of traditional espionage and the targets of PRC cyberespionage, both of which target the same information sets.¹⁶⁴ One PRC cyberespionage attack, codenamed NIGHT DRAGON by the U.S., concentrated on the energy sector. U.S. officials involved in talks with the PRC were targeted by a cyber-attack codenamed POISON IVY that gave hackers control over the victims' computers. Other PRC cyber intrusion sets have been codenamed AVOCADO, GHOSTNET, BYZANTINE CANDOR, and TITAN RAIN.¹⁶⁵

The cyber espionage programs running out of China are not restricted to only the United States. The SALT TYPHOON hacking campaign, as it was called by U.S. partners and allies, has been attributed to China's Ministry of State Security and the PLA.¹⁶⁶ Twenty allied and partner signals intelligence agencies across the Pacific and the globe cooperated to uncover the breadth of the penetrations and breaches of industries, governments, port logistics, and infrastructure and address the vulnerabilities.¹⁶⁷

In the SALT TYPHOON hacking campaign by China, the scope of the effort was so extensive that British and American officials described the attack as "unrestrained and indiscriminate."¹⁶⁸ Canada, Finland, Germany, Italy, Japan and Spain were partners in a statement directed at the

Chinese government. One former FBI cyber security official said: “I can’t imagine any American was spared given the breadth of the campaign.”¹⁶⁹

According to a recent *Wall Street Journal* article, China has hacked into U.S. court-authorized intrusions by American agencies into the systems of U.S. citizens targeting specific people that PRC intelligence agencies identify as people of intelligence interest.¹⁷⁰ Chinese cyber-attacks are so widespread that “the Federal Bureau of Investigation has notified roughly 600 companies that the espionage activity indicated some interest in them for reasons including their commercial relationships and network vulnerabilities.”¹⁷¹

Overall, it is clear to the author of this paper that espionage, and especially cyber-espionage, is an area in which the PRC leads the United States. The U.S. will always be on the defensive against these cyber and human espionage attacks. Given its large population, the PRC can simply put more manpower into various forms of espionage than the U.S. can.¹⁷²

The U.S. must continue to conduct defensive cyber-security programs and to educate the public about the dangers of cyber intrusions. The key is to continue the type of security education programs that various agencies of the U.S. government already run. It is also critical to raise awareness among companies, educational institutions, and citizens, and the U.S. must be in a position to retaliate with devastating results in the event of a major cyber-attack by China or any other country.¹⁷³ Thus, as in space and other domains, deterrence is critical to U.S. interests.

A COMPARATIVE ANALYSIS OF COMMUNICATION INFRASTRUCTURE

Here, the U.S. has some distinct advantages. Rail and road systems are well developed in eastern, northern, and central China. But in the west—where mountainous or remote areas predominate—the PRC has far more limited infrastructure. Moreover, in some minority areas – most notably Xinjiang and Tibet—the PRC has resorted to repression and attempts to suppress indigenous languages or religious beliefs.¹⁷⁴ This has in some cases led to hostile populations.¹⁷⁵ (See Figure 3.)

The U.S. has a clear advantage over the PRC with a better distribution of major railways and strategic highways. (See Figure 4.)

Timelines in PRC development planning

China’s overall development plan has a timeline. For example, the *Made in China 2025* plan includes the following targets:

- By 2025: Boost manufacturing quality, innovation, and labor productivity; obtain an advanced level of technology integration; reduce energy and resource consumption; and develop globally competitive firms and industrial centers.
- By 2035: Reach a level of development that is on par with global industry at an intermediate level; improve innovation; make major technology breakthroughs; lead innovation in specific industries; and set global standards.
- By 2049: Lead global manufacturing and innovation with a competitive position in advanced technology and industrial systems. (This date coincides with the 100th anniversary of the founding of the PRC.)¹⁷⁶

Military-Civil Fusion and the Nationwide Industrial Effort

In implementing *Made in China 2025* and incorporating all sectors of China's economy as a national effort and goal, CCP General Secretary Xi Jinping has invoked and used the Mao Zedong era concept of "People's War."¹⁷⁷ He is using this concept to support his own theories on how industrial production in China should be a "military-civil fusion" (军民融合).¹⁷⁸ This concept dates to the early days of the formation of the CCP and the PLA. It harnesses collective efforts by the military, state owned enterprises (SOEs), government organizations, and private enterprise. In other words, it encompasses virtually all economic and military institutions, as well as those engaged in the fields of science and technology. The effect of Xi's policies is to harness all the institutions and the industrial base in China to support the PLA.

Although the implementation of the military-civil fusion program has its own inherent problems, it has supported the "collective efforts by the PLA's militia, reserves, state-owned enterprises (SOEs), government organizations, and private enterprises to mobilize in support of defense goals and advancing science and industry by virtually all economic and military institutions," as well as academia.¹⁷⁹

The *Financial Times* analyzed the successful effects of the combination of state planning and manufacturing policies on China's industrial base this way:

Using a unique combination of industrial policy, subsidies and other state support coupled with private sector entrepreneurialism and ferocious competition in China's vast market, the country was able to sharply increase the share of Chinese producers domestically and internationally in many of the sectors, in some cases matching or exceeding foreign competitors' technology.¹⁸⁰

This is part of a series of industrial policies in China designed to increase the PRC's own self-reliance and strengthen its domestic industrial chains while reducing dependence on foreign sources.

Over time, the policy also aims to increase foreign dependence on China. This is part of what Chinese economists have called a “dual circulation policy”. That is to say, both reduce dependence on foreign trade, but also improve the quality of PRC goods and thereby reduce foreign political and economic leverage on China.¹⁸¹

An assessment by the Rhodium Group, a financial analysis company, reported that “systemic distortions in China’s economy also generate some of the same effects as subsidies and other ‘conventional’ state support tools.”¹⁸²

Among Rhodium’s findings were:

- Many Chinese firms operate with the assumption of implicit guarantees from the government. This has led to an expansive and politicized financial sector that allocates credit to strategic sectors without the same regard for economic fundamentals as in more market-driven economies. The politically driven deployment of these vast financial resources gives Chinese and, to a lesser extent, some foreign companies, easy access to finance and soft budget constraints, creating effects akin to more conventional subsidies.
- Local governments also build production infrastructure and real estate in industrial parks, which are then provided at discounted prices to companies. This has some of the same effects as a subsidy—enhancing corporate profitability and competitive advantage—but without direct financial handouts.
- Regulation and market access is selectively enforced to the benefit of politically favored companies, often local firms, but also foreign firms that align with Beijing’s strategic interests. This helps them scale rapidly and become globally competitive when they otherwise might not have been.¹⁸³

To use the concept introduced by political scientist Harold Lasswell back in 1941, China is a classic “garrison state.” That is, it is a country “dominated by the military-industrial complex... that became a force in itself.”¹⁸⁴ Lasswell introduced the construct as a critique of the United States readying itself for war, but he also suggested that the description fit Japan, Germany, and Russia.¹⁸⁵ Given the emphasis on military domination and confrontation by Xi Jinping, the construct fits China today.

In contrast with China, Aaron Friedberg of Princeton University argues that today, the U.S. has ceased being a garrison state since the end of the Cold War.¹⁸⁶ For Friedberg, since then, issues like medical care and social support programs overtook the emphasis on a military-industrial complex.

Figure 6. First and Second Island Chains



Source: Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2011* (Washington, DC: Department of Defense, 2011), 23. <https://nsarchive.gwu.edu/document/16585-united-states-department-defense-military-and>

THE BRI AND CHINA'S INDUSTRIAL BASE

Xi Jinping's vision is global in scope. It envisions a world in which Beijing can set standards for technology and telecommunications, provide equipment and aid to poorer countries, and become a model for national development that competes with the West.¹⁸⁷

Nadege Rolland of the National Bureau of Asian Research describes the Belt and Road Initiative (BRI) as a comprehensive vision for regional, political, economic and financial integration under Beijing's helm—in a region that comprises two-thirds of the world's population and half of the world's current GDP.

Rolland also explains the scope and ambition of the BRI:

BRI is the Chinese leadership's answer to China's most pressing economic and strategic challenges. It's not just about economic development. It's also about social stability. It's about securing China's continental periphery. It's about energy security as well as broader political influence and strategic expansion. So it's got many different layers...regarding its progress to date, it's just beginning to take shape really. There is no official list of projects or countries involved.¹⁸⁸

There does not seem to be a broad, mapped out plan for the BRI. Individual BRI programs draw on central funding, while also incorporating development and loan programs for state owned enterprises, private companies and joint ventures.

Despite the lack of overall coherent planning, enthusiasm for China's BRI projects has spread around Asia, Central Asia, the Middle East, Africa, Europe, and the western hemisphere.¹⁸⁹

THE MILITARY BALANCE BETWEEN THE U.S. AND CHINA

The United States remains the world's foremost military force. It is a global fighting force that is deployed continually, deterring potential conflict, and maintaining alliance relationships.

At one time, "U.S. industrial might as a whole underwrote U.S. military strength and success. Manufacturing underpinned the national economy...producing nearly 300,000 aircraft and 86,000 tanks in World War II."¹⁹⁰ Today, as this paper explores, the U.S. armed forces depend on a global supply chain and the U.S. industrial base depends on far flung supply chains and potentially hostile states, a situation that must be remedied.

In 2025 the U.S. military was composed of "approximately 1,279,799 active-duty personnel distributed among the following branches: Army, 450,000 personnel; Navy, 332,000 personnel; Air Force, 316,000 personnel; Marine Corps, 173,000 personnel; Space Force, 9,450 personnel; and Coast Guard, 40,600 personnel. The total number of reserves and national guard members is 738,000. In addition, the Department of Defense employs approximately 754,000 civilians."¹⁹¹

In aggregate numbers of systems and weapons, The United States leads China in many areas. However, the numbers can be misleading, as the deployment patterns and functions of U.S. forces differ considerably from those of the Chinese military. Furthermore, one of the areas in which the U.S. has a major lead is nuclear systems which warrants a separate analytical discussion.

First of all, U.S. forces are continually deployed around the world in large numbers, and in cases like Japan, South Korea, and Europe, the deployments have been continuous for decades. China, in contrast, has very few forces deployed and those that are deployed are sent abroad in small numbers.

Looking at the U.S. Navy, at any given time, the U.S. generally has an aircraft carrier strike group (CSG) in the Mediterranean Sea, the Pacific Ocean, and the Atlantic Ocean, as well as one in either the Arabian Sea or Indian Ocean. A CSG usually includes one aircraft carrier with its on-board air wing, at least one cruiser, two or three destroyers, and one or two nuclear-powered attack submarines. In addition, between the Navy's amphibious warfare ships and the U.S. Marine

Figure 7. Major Weapons Balance

Major Weapons Type	U.S.	China
Submarines		
Nuclear Attack	52	6
SSBNS	14	6
Diesel/Electric	0	46
ICBMS	400	140
Strategic Bombers		
B-52H	46	0
B-2A	20	0
Aircraft Carriers	11	2 (3 by 2026)
Cruisers	13	8
Destroyers	73	42
Frigates	23	49
Patrol/Coastal	85	142+
Major Amphibious	31	11
Combat Capable Fighters	3,303	2,919
Number of Countries Where Forces Are Deployed	56	9

Source: The Military Balance 2024 (London: International Institute of Strategic Studies, 2024), 36-53, 253-264.

Corps, the U.S. generally has Marine Expeditionary Units (MEU) on board Amphibious Ready Groups (ARG) deployed and operating continuously in various parts of the world.¹⁹² Generally one ARG with its MEU is deployed in the Atlantic, Mediterranean, or near Africa, and another ARG and MEU are in the Indo-Pacific. The U.S. maintains an Air Force and Army presence in South Korea, Japan, Hawaii, Guam, Europe, the Middle East, and Africa. U.S. Marines are now also on almost permanent deployment in Australia.

It is useful to look at comparative Navy and Air Force requirements for defensive protection of coastlines. The U.S. has 95,471 miles (153,652 kilometers) of coastline to patrol and defend. China has only 9010 miles (14,500 kilometers) of coastline. That means that PRC naval and air forces are able to concentrate their power in the Western Pacific while the U.S. has only a small portion of its forces in the Pacific region, with the bulk of these on the west coast or in Hawaii.

China, in comparison, operates only a logistics base in Djibouti and a paramilitary outpost in Tajikistan, but a report by the Rand Corporation identifies other target countries where analysts believe the PRC would like bases, such as: Cambodia, Pakistan, Equatorial Guinea, Namibia,

the Solomon Islands, the UAE, and Vanuatu.¹⁹³ There are also small contingents of PLA soldiers deployed as part of U.S. peacekeeping missions from time to time.

The Chinese People's Liberation Army, or PLA, was born in 1927 as the Chinese Communist Party's armed resistance against the then Chinese Nationalist government. It started as a ground force.¹⁹⁴ Today the PLA is a blanket term that covers the ground forces or PLA Army (PLAA), the PLA Navy (PLAN), the Marine Corps, the PLA Air Force (PLAAF), the PLA Rocket Forces (PLARF), and supporting forces. The PLA functions under the CCP's Central Military Commission (CMC), the chairman of which is CCP General Secretary and PRC President Xi Jinping.¹⁹⁵

Xi has set medium and long-term goals for China, and these goals depend on the PLA becoming a “world class” military that can support China's global status as a great power. China is also pursuing a dominant position in space. This does not come from an intrinsic attachment to the adventurous spirit of space exploration, but part of an effort to increase what the Chinese Communist Party (CCP) sees as Comprehensive National Power 综合国力 (CNP).¹⁹⁶ This represents, among other things, an effort to build economic, military, and diplomatic power and prestige. Xi has a vision for China that depends on a PLA that is modern, dominant, and able to stand up to major powers like the U.S.¹⁹⁷ That means not only harnessing the industrial base to support the military and society, but also developing weapons and strategies to make China the kind of dominant power it was in past centuries.¹⁹⁸ This is part of what the PRC calls the PLA's “historic missions.”¹⁹⁹

In terms of its strategic position vis-à-vis the U.S., PLA strategists believe China would have an advantage in any confrontation in the Western Pacific because the PLA would be operating on interior lines of communication, close to the mainland, and supported by all of Chinese society and the PRC's industrial base. United States forces, in comparison, would be forced to operate through exterior lines of communication. The U.S. would need to move forces and supplies very long distances, dependent on communications systems and resources based thousands of miles away. Chinese strategists think the PRC would have an advantage inside what is generally called the first and second island chains in the Western Pacific (see Figure 6).

To build a “world class military” under Xi Jinping, the PLA has been reorganized several times and has been plagued by corruption, scandals and purges.²⁰⁰ In April 2024, Xi and the CMC eliminated the PLA Strategic Support Force (SSF 战略支援部队), established by Xi in 2017 to provide space, information, and cyber support to the PLA. Instead of the SSF, several functional supporting organizations were formed: the Information Support Force (ISF 信息支援部队); the Military Aerospace Force (ASF 军事航天部队), and the Cyberspace Force (CSF 网络空间部队). These joined the Joint Logistics Support Force (JLSF 联勤保障部队) as PLA supporting arms (兵种) subordinate to the CMC.²⁰¹

Originally, the PLA was a localized fighting force. Its main mission was domestic, to keep the Chinese Communist Party in power. As the PLA develops a global presence supporting broad Chinese national interests, it increasingly competes with the United States in space, cyber-space, and other areas.²⁰²

As the chart in Figure 7 depicts, in some areas, the PLA has more manpower, combat ships, and aircraft than the U.S., but almost all the PRC's forces are available around China. The U.S., on the other hand, is at a disadvantage in the region. The United States maintains a global military presence and has forces deployed in dozens of countries and regions. This means that, while the PRC can focus almost all its forces in the Western Pacific, the U.S. relies primarily on the assets of the U.S. Indo-Pacific Command.²⁰³ The strategic competition between the U.S. and China, therefore, has become focused on the island chains depicted above. For the PRC, the objective is to impede or stop U.S. forces from deploying near China and intervening in what the PRC sees as its area of influence. For the U.S., the objective is to prevent the PLA from deploying and using forces to impede the U.S. military.²⁰⁴

China maintains 2,035,000 active-duty forces, including its supporting arms and paramilitary forces, while its organized reserve forces number 510,000.

In the U.S., the National Defense Act of 1920 created an Assistant Secretary of War who was to assure "adequate preparation for the mobilization of material and industrial organization essential to wartime needs."²⁰⁶ Before World War II, the U.S. avoided international politics unless national interests were severely threatened, but by the end of World War II, the U.S. took on global responsibilities as one of two world superpowers, seeking to contain its Cold War rival, the Soviet Union.²⁰⁷

THE NUCLEAR WEAPONS OVERMATCH

The U.S. overmatch with China in nuclear weapons deserves separate treatment. According to the Federation of American Scientists:

The United States has embarked on a wide-ranging nuclear modernization program that will ultimately see every nuclear delivery system replaced with newer versions over the coming decades...we estimate that the United States maintains a stockpile of approximately 3,700 warheads—an unchanged estimate from the previous year. Of these, only about 1,770 warheads are deployed, while approximately 1,930 are held in reserve. Additionally, approximately 1,477 retired warheads are awaiting dismantlement, giving a total inventory of approximately 5,177 nuclear warheads. Of the approximately 1,770 warheads that are deployed, 400 are on land-based intercontinental ballistic missiles,

roughly 970 are on submarine-launched ballistic missiles, 300 are at bomber bases in the United States, and approximately 100 tactical bombs are at European bases.²⁰⁸

China's nuclear weapons inventory is considerably smaller. The Federation of American Scientists estimates that "China now possesses roughly 500 nuclear warheads, with more in production to arm future delivery systems. China is now believed to have one of the fastest-growing nuclear arsenals among the nine nuclear-armed states."²⁰⁹ But that does not tell the whole story. According to the Federation of American Scientists:

The 2022 Pentagon report increased the projection even further, claiming that China's stockpile of "operational" nuclear warheads had surpassed 400 and will likely reach about 1,500 warheads by 2035. According to the latest 2023 CMPR, China "had more than 500 operational nuclear warheads" as of May 2023 and is on track to have over 1,000 operational warheads by 2030 as previously reported...The observable operational force structure, however, does not add up to more than 500 operational warheads (this report estimates approximately 440).²¹⁰

There are other factors to consider here. For one thing, although Beijing continually reaffirms its policy of "no first use" of nuclear weapons, Western scholars believe that China seems to have been reassessing this pledge.²¹¹ Nearly two decades ago, Chinese military thinkers debated how to respond to any intelligence warning of an imminent strategic attack, keeping open the question of whether a policy of preemptive nuclear counterattack was a viable option if the CMC believed an adversary was about to attack China.²¹² The idea of a preemptive attack is consistent with PRC doctrine on "active defense 积极防御."²¹³

Secondly, China's nuclear retaliatory plans require that the strategic rocket forces maintain a force sufficient to "threaten the opponent by striking his cities," conduct counterstrikes, and cause "unbearable" damage to the U.S.²¹⁴

Vertical escalation from conventional warfare and conventional weapons to the use of tactical nuclear weapons is a distinct possibility in a conflict, particularly if the U.S. were to strike critical targets in China. Additionally, China has tested low-yield neutron weapons, designed to kill opposing forces without inflicting severe damage to cities, which might make the use of tactical nuclear weapons an attractive option for Beijing,²¹⁵ but the use of nuclear weapons by either side would make further escalation likely.

We know that the results of a strategic nuclear exchange would be catastrophic. A 1986 National Academies of Science study predicted that a 500-kiloton attack on a heavily populated area could kill 23 million people, and that a 1-megaton yield weapon could result in as many as 37 million deaths.²¹⁶ Casualties of this scale mean that even with the overwhelming advantage in strategic

nuclear weapons possessed by the United States, a few nuclear warheads of 1 to 3 megatons might still penetrate U.S. missile defenses, leading to catastrophic results for both sides.

All of this means that deterrence is a very important policy, and maintaining the U.S. industrial base is critical for the success of deterrence.

To summarize, even if the U.S. has an overwhelming overmatch with China on strategic nuclear weapons (warheads and missiles), a nuclear attack on the U.S. would be catastrophic. Also, the overmatch in weapons is misleading. The U.S. must deter Russia, North Korea, and potentially Iran. Not all of the strategic weapons in the U.S. inventory could be used to target China. Finally, China's use of a minimal or limited force as a deterrent is probably sufficient. If a 1 megaton warhead could cause up to 37 million deaths, a few nuclear weapons in China's inventory could be more than enough to deter the U.S. The greater threat is of a localized nuclear conflict that could easily escalate.

BOLSTERING U.S. MANUFACTURING: THE INDUSTRIAL BASE AND DEFENSE

A 2016 report by the National Bureau of Economic Research (NBER) highlights the effect of outsourcing manufacturing and production to China between the late 1990s and 2007. According to the NBER report, non-farm employment in the United States fell precipitously as jobs moved elsewhere, many of them to China.²¹⁷ The shift also meant that the U.S. industrial base had shrunk.

Two of the authors, David Autor and Gordon Hanson, argue in a 2025 opinion piece in the *New York Times*, that between 1999 and 2000, trade with China “helped erase nearly a quarter of all U.S. manufacturing jobs.”²¹⁸ This affected “manufacturing, textiles, sporting goods, toy manufacturing, electronics, plastics and auto parts.”²¹⁹

Autor and Hanson now warn that China will eclipse U.S. capabilities in new fields of production. The list of these fields is long and should be sobering to U.S. policymakers. It includes the manufacture of electric batteries, advanced optical communication, artificial intelligence, magnets and superconductors, machine learning, quantum sensors, integrated circuit design, language processing, high performance computing, and quantum computing.²²⁰

However, it is not only these areas that require attention. The U.S. and individual states must examine tax policies to attract businesses and to attract back parts of the industrial base that have migrated overseas.²²¹ Moreover, as politically charged as the subject may be, many of the traditional industries that were part of the American industrial base moved away because of restrictive environmental policies. This is relevant to mining as well as manufacturing.²²²

Wages and benefits are also factors for industry. The Heritage Foundation, in its report on revitalizing the U.S. industrial base, recommends ending “the Davis–Bacon Act of 1931, “a law that requires contractors on federally funded construction projects pay at least the local ‘prevailing’ wage and benefits so that federal projects do not drag down local compensation.”²²³ This will be popular among conservatives, but industries require workers, and a combination of wages and benefits will be a consideration if workers are to go back to traditional or new industries. Among Heritage’s recommendations are:

- Policies that reward innovation,
- Ensuring secure supply chains,
- Increasing foreign military sales of defense equipment,
- An education policy that supports the industrial base and educates workers with the right skills, and
- Grants for improved output capacity.²²⁴

These are all good measures, but there seems to be no consideration of environmental issues, or the pollution associated with some types of manufacturing and mining. A successful industrial base policy must consider these things. It is as though each think-tank or policy institute is operating in its own policy or political silo, with no comprehensive set of recommendations being made.

The significant pollution problems caused by manufacturing in China should demonstrate to U.S. policymakers that this is a real concern.²²⁵ The health problems associated with different industries and the cost of medical care associated with the attendant environmental problems are not “tree hugger” issues that can be dismissed. Health costs and problems in states with significant mining and manufacturing sectors like Ohio, Indiana, and West Virginia, are examples of why these considerations should be part of industrial base policies.²²⁶

Government policies at the federal and state level can help rebuild the industrial base by providing tax relief for companies or industries that contribute to the defense industrial base. Such action may help attract major industries back to the U.S. if they have relocated overseas because of lower business taxes in other locations. To assist in identifying the industries and technologies that the defense industrial base lacks, Congress can direct the Government Accountability Office or the Congressional Research Service to document the sources and supply chains of critical components in important defense industrial base areas, and in the weapons needed to support a resilient defense posture.

The Department of War should be able to document its supply chains to the third tier, something that the military services cannot presently do for all weapons systems.²²⁷ Congress could direct the Secretary of War to document the supply chains to the third tier²²⁸ and ensure they are not dependent on China; however, the Secretary of War has the authority to direct the Joint Staff and the military services to do this without legislation. Military supply chains should not be dependent on China or Russia.²²⁹

Supply chain visibility is critically important to the industrial base, because in areas such as basic computer chips, microelectronics, pharmaceuticals, and biotechnology, China remains the main supplier of the raw materials or components needed for end-items that are manufactured in the U.S. If the components or raw materials cannot be acquired, the products cannot be produced.²³⁰ In a 2022 hearing on Capitol Hill, the U.S.-China Economic and Security Review Commission explored how U.S. supply chains are dominated by China and ways the U.S. could improve the resilience of supply chains.²³¹

LOOKING AHEAD

The United States retains strengths in its geopolitical and economic competition with China, but the balance is shifting. China's model has enabled it to close gaps at speed.

China's state-driven model of tightly fused industrial and military power has enabled it to build industrial and military capacity at remarkable speed. In areas from shipbuilding to space, Beijing is moving beyond parity to superiority. Meanwhile, U.S. dependence on overseas production and fragile supply chains has rendered it increasingly vulnerable.

Rebuilding elements of the U.S. industrial base, diversifying supply chains, and ensuring that military capacity is properly supported by domestic production are now strategic imperatives. Failure to act risks the further erosion of remaining U.S. advantages over China, perhaps eventually ceding global political, economic, and military leadership to the PRC.

ENDNOTES

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APPENDIX 2

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7. Map data © OpenStreetMap contributors & 贵广十标段. Kejing Peng, © 2021. Map altered by Matthew Williams.
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