

Avoiding Black Swans in Future Wars: How National Economics Could Dictate the Outcome of a Future Sino-American War

A Monograph

by

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Abstract

Avoiding Black Swans in Future Wars: How National Economics Could Dictate the Outcome of a Future Sino-American War, by MAJ Sidney H. McMath, 77 pages.

The economic implications of a protracted war between the United States and China promise a future fraught with uncertainties about the prospects of either military's abilities to win and preserve their state's strategic standing. The likelihood is high that a war between the United States and China would be long and costly, where the key to victory lies not in the ability to break any battlefield stalemate but rather in a contest between each state's economic endurance. Both China and the United States bring particular economic advantages and disadvantages that shape their pursuit of victory. Through the lens of each state's national economies, this research seeks to understand the strategic and operational implications of a future Sino-American war scenario set in the Indo-Pacific in 2036.

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Abbreviations

A2/AD	Anti-Access/Area Denial
AI	Artificial Intelligence
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
CCP	Chinese Communist Party
DoD	Department of Defense
EU	European Union
GDP	Gross Domestic Product
IW	Information Warfare
PLA	Peoples Liberation Army
PLAA	People's Liberation Army-Army
PLAAF	People's Liberation Army-Air Force
PLAN	People's Liberation Army-Navy
SLOC	Sea Lines of Communication
UK	United Kingdom
US	United States
WWII	World War II

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Introduction

The economic implications of a protracted war between the United States and China promise a future fraught with uncertainties about the prospects of either military's abilities to win and preserve their state's strategic standing. The likelihood is high that a war between the United States and China would be long and costly, where the key to victory lies not in the ability to break any battlefield stalemate but rather in a contest between each state's economic endurance. Both China and the United States bring particular economic advantages and disadvantages that shape their pursuit of victory. Through the lens of each state's national economies, this research seeks to understand the strategic and operational implications of a future Sino-American war scenario set in the Indo-Pacific in 2036.

Importance of this Research

In the US Defense Department's transition to great power competition, the military professional must avoid the hypnotic effects of conflicts such as the Gulf War that carry false promises of swift victories through decisive battles. US military planners and strategists must remember that wars between great powers are seldom short and cheap. This research seeks to understand, first, how the US and China's economies will determine each nation's ability to sustain such long-term operations and generate further discussion about how well prepared the US is for this challenge. Second, this research focuses on a scenario that falls outside of the US military's desire for the decisive battle, forcing readers to explore undesirable but more probable possibilities. Only by confronting these inconvenient truths can US planners soberly account for the US national security implications of China's expanding capabilities and strategic aims.

Literature Review

How We got Here

China's Point of View

China sees itself as a revanchist power, seeking to retrieve its great power position lost during the “century of humiliation” when Western colonial powers and eventually Japan and the US stripped its regional influence, wealth, and sovereignty.¹ China's attempts to regain this regional hegemony pose a significant risk to world governance as its path to power would result in a multi-polar world defined by spheres of influence that would effectively end the US-led world order.² Graham Allison's “Thucydides Trap” speaks to these risks, pointing out that in only four of the sixteen cases “when a rising power rivaled a ruling power” did the rivalry not end in bloodshed.³ G. John Ikenberry also argues that the most sweeping transitions between major powers tend to come after great wars, or what he terms “dramatic moments of upheaval,” when the destruction of the old order allows a newly victorious power to revise the new ordering system.⁴

¹ Dean Cheng and Brad Carson, “JAW-JAW: China is a Funny Sort of Revisionist Power—A Conversation with Dean Cheng,” *War on the Rocks, Podcast JAW JAW*, 13 November 2018, accessed 25 February 2020, https://warontherocks.com/2018/11/jaw-jaw-china-is-a-funny-sort-of-revisionist-power-a-conversation-with-dean-cheng/?utm_source=WOTR+Newsletter&utm_campaign=8618c7f901-EMAIL_CAMPAIGN_10_30_2018_11_23_COPY_01&utm_medium=email&utm_term=0_8375be81e9-8618c7f901-83055177; Elizabeth C. Economy, *The Third Revolution: Xi Jinping and the New Chinese State* (New York: Oxford University Press, 2018), 189; Drew Jones, “Q&A with Dr. Toshi Yoshihara, Chinese Aircraft Carrier Development and Strategy: Implications for the United States and its Allies,” Project 2049 Institute, 1 October 2018, accessed 23 January 2020, <https://project2049.net/2018/10/01/chinese-aircraft-carrier-development-and-strategy-implications-for-the-united-states-and-its-allies/>; David C. Kang, *East Asia: Before the West* (New York: Columbia University Press, 2010).

² Oriana Skylar Mastro, “The Stealth Superpower: How China Hid Its Global Ambitions,” *Foreign Affairs* 98, no. 1 (January-February 2019): 31.

³ Graham Allison, “The Thucydides Trap: Are the U.S. and China Headed for War?,” *The Atlantic*, 24 September 2015, accessed 12 May 2020, <https://www.theatlantic.com/international/archive/2015/09/united-states-china-war-thucydides-trap/406756/>.

⁴ G. John Ikenberry, *After Victory: Institutions, Strategic Restraint, and the Rebuilding of Order after Major Wars* (Princeton: Princeton University Press, 2006), 3, 7.

Fearing that the United States would attempt to protect its interests by leveraging its military alliance network and ability to project military power globally, China historically pursued a less threatening economically-focused path to power.⁵ Toward these ends, every Chinese administration since Mao deliberately placed military modernization last in priority for national resources to avoid perceptions of China as a rising military threat to the United States.⁶ Though President Xi tells the truth when he often states that China's rise is peaceful, what he does not say is that China's rise seeks to rewrite world order while avoiding one of Ikenberry's "dramatic moments of upheaval" with the United States and its allies.

As China's economic power grows, so too do its concerns for its vulnerabilities. China's economic-based strategy requires access to global markets, and with 80 percent of world trade conducted on the oceans, maritime access is vital.⁷ However, China does not enjoy unfettered access to the open ocean owing to a series of constricting islands known as the first and second island chains (figure 1). China fears that a strong naval power like the United States can cut off its access to world markets and critical overseas energy and raw material supplies, suffocating it into submission with little fight.⁸ To mitigate these risks, China is diversifying its economic access

⁵ Mastro, "The Stealth Superpower," 31; China's former president, Deng Xiaoping, described this strategy as "hide your strength, bide your time." Mastro, "The Stealth Superpower," 34; China's current president, Xi Jinping, later echoed this sentiment when quoting former President Hu Jintao's call for China's peaceful rise to power. Mastro, "The Stealth Superpower," 31; Henry Kissinger, *On China* (New York: Penguin Press, 2012), 500; Toshi Yoshihara and James R. Holmes, *Red Star over the Pacific: Chinas Rise and the Challenge to U.S. Maritime Strategy* (Annapolis, MD: Naval Institute Press, 2018), 164.

⁶ Paul H. B. Godwin, "China's Defense Establishment: The Hard Lessons of Incomplete Modernization," in *The Lessons of History: The Chinese People's Liberation Army at 75*, ed. Laurie Burkitt, Andrew Scobell, and Larry M. Wortzel (Carlisle, PA: Strategic Studies Institute, 2003), 20-21, 25, 45; Mastro, "The Stealth Superpower," 34; Jonathan D. Pollack, "China's Military Modernization, Policy, and Strategy," *Asian Perspective* 5, no. 2 (Fall-Winter 1981): 158, 164-165; Thomas W. Robinson, "Chinese Military Modernization in the 1980s," *The China Quarterly* 90 (June 1982): 239, doi:10.1017/s0305741000000321.

⁷ Michael O'Hanlon (Interviewer) and Adm. John Richardson (Interviewee), "A Conversation with the Chief of Naval Operations," Brookings, accessed 12 May 2020, <https://www.brookings.edu/events/a-conversation-with-the-chief-of-naval-operations/>.

⁸ Yoshihara and Holmes, *Red Star Over the Pacific*, 10-11.

through the Belt and Road Initiative⁹ (figure 2) and a more robust regional military solution than traditionally pursued.

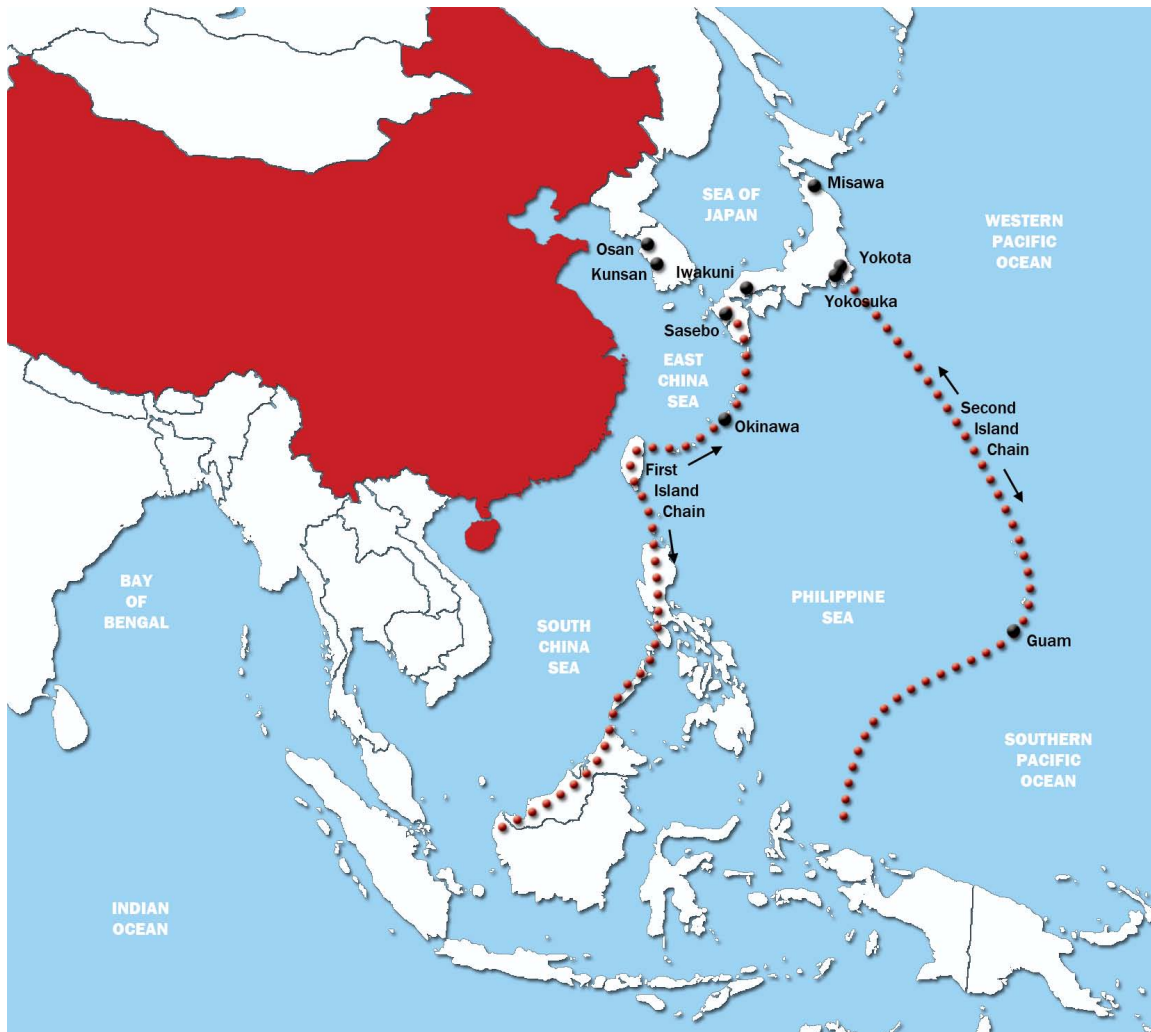


Figure 1. First and Second Island Chains. DrE, “China’s ADIZ is a Strategic Move to Control First Island Chain,” Consortium of Defense Analysts, 26 December 2013, accessed 16 February 2021, <https://cofda.wordpress.com/2013/12/25/chinas-adiz-is-a-strategic-move-to-control-first-island-chain/>.

⁹ Yan Xuetong, “The Age of Uneasy Peace: Chinese Power in a Divided World,” *Foreign Affairs* 98, no. 1 (January-February 2019): 42.

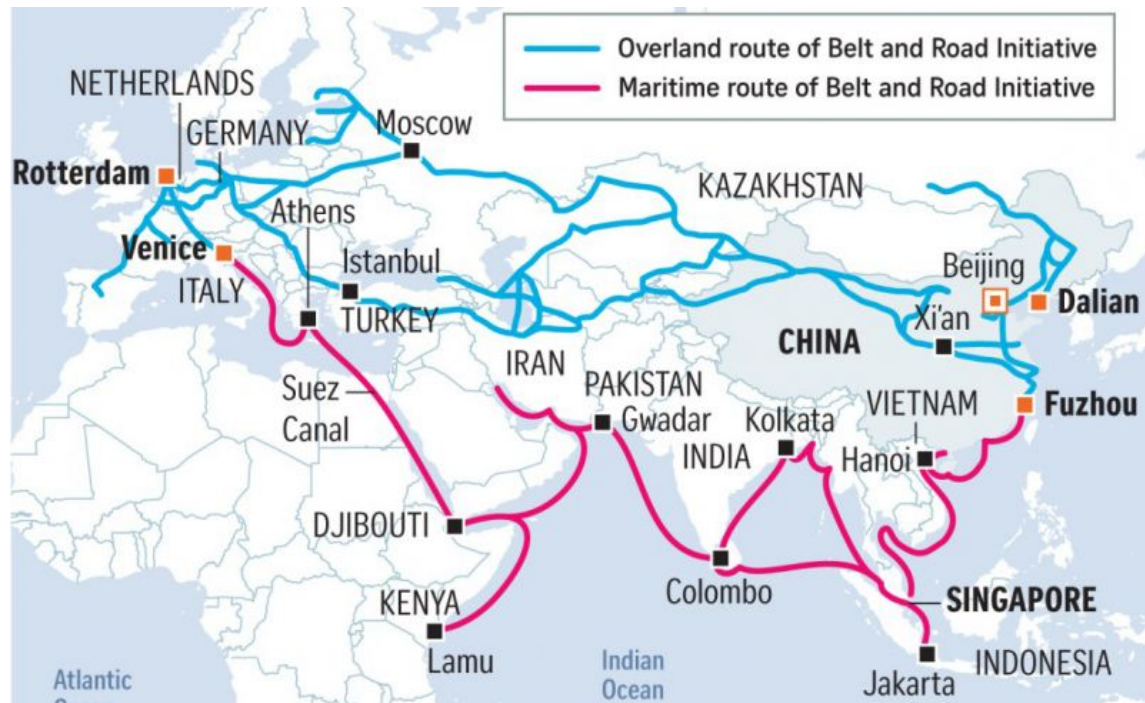
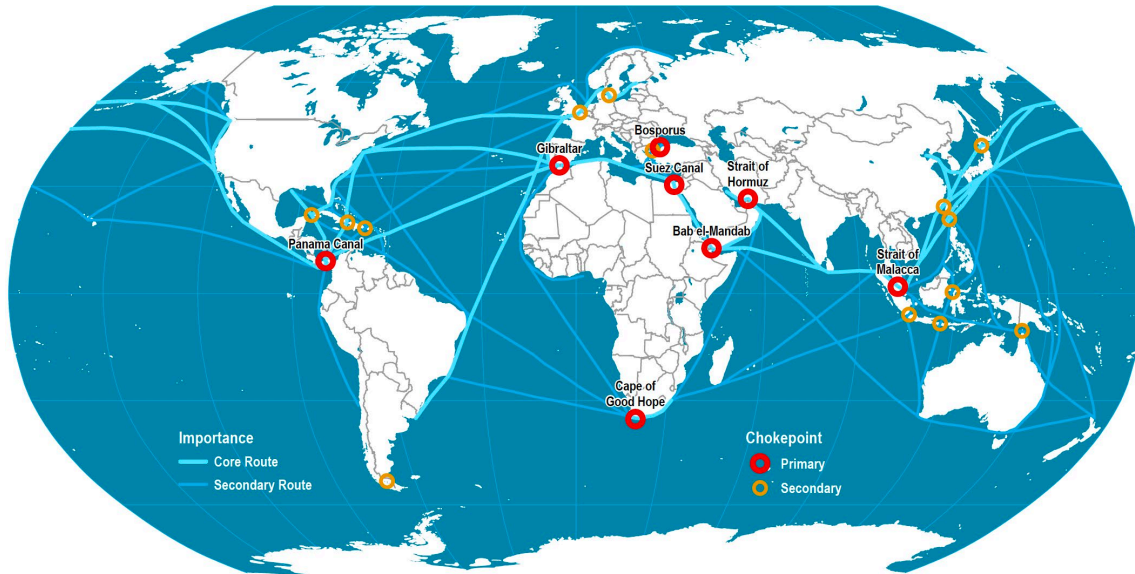


Figure 2. Belt and Road Initiative. Asia Green Real Estate, “The Belt-and-Road Initiative and the Rising Importance of China’s Western Cities,” Asia Green Real Estate, accessed 16 February 2021, <https://www.asiagreen.com/zh/news-insights-cn/the-belt-and-road-initiative-and-the-rising-importance-of-china-s-western-cities>.

China’s military solution focuses on what China sees are its core regional interests: control of and access beyond the first and second island chains, control of the disputed waters that make up the South and East China Seas, and the reunification of Taiwan under the mainland rule of the Chinese Communist Party (CCP).¹⁰ Controlling these interests provide China greater security to its sea lines of communication (SLOC) (figure 3), access for its navy to reach beyond the first island chain, naval bases to sustain that access, and access to vital oil reserves and fisheries on which China can draw in times of need.¹¹

¹⁰ Economy, *The Third Revolution*, 201; Yoshihara and Holmes, *Red Star over the Pacific*, 7, 11, 20-21.

¹¹ Economy, *The Third Revolution*, 200.



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Figure 3. Major Maritime Shipping Lanes and Chokepoints. The Geography of Transport Systems, “Main Maritime Shipping Routes,” Maps, accessed 16 February 2021, <https://transportgeography.org/media/maps/>.

United States’ Point of View

The United States seeks to maintain the current US-led world order established in the wake of World War II (WWII).¹² In an attempt to provide governance between states that would ensure a longer-lasting peace, the United States sought to rewrite the world order in its image.¹³ All states would serve as legally equal members in international institutions that used international laws and norms as the basis to settle future disputes diplomatically.

¹² Schweller argues that a state’s first concern is “maintain[ing] their position in the system,” particularly those that receive the greatest benefit from the current system. Randall L. Schweller, “Bandwagoning for Profit: Bringing the Revisionist State Back In,” *International Security* 19, no. 1 (Summer 1994): 86, 100-101, doi:10.2307/2539149.

¹³ Ikenberry, *After Victory*, 164-165, 170; Charles A. Kupchan, “The Normative Foundations of Hegemony and The Coming Challenge to Pax Americana,” *Security Studies* 23, no. 2 (May 2014): 219, 223, doi:10.1080/09636412.2014.874205.

in turn, ensures the continued legitimacy and enforcement of the new order.¹⁴ The second strength was the network of US-led military alliances established to counter the expansions of the Soviet's alternative world order.¹⁵ In the wake of the Soviet Union's collapse, US military power expanded to match its global order's now worldwide reach,¹⁶ but without the purpose and direction it once held.¹⁷ China's recent rise and advancement of an alternative world order has renewed the alliance's purpose to protect the US-defined world order.¹⁸

The US strategic ends can tolerate a rising China as long as China's policy aims allow the global scope of the US-led world order. The United States will otherwise resist any Chinese aims that disrupt this order, including the forceful annexation of Taiwan, sea control and denial operations that cut the United States off from its regional allies, or limiting the world's access to critical maritime trade routes. The United States takes these policies seriously, as evidenced by the determination that "60 percent of US air and naval forces would be based in the Pacific by 2020."¹⁹ In the event of war with China, one can expect these policy aims to define the US military objectives and end state.

¹⁴ Ikenberry, *After Victory*, 164-166; Counterintuitively, the US hobbling its power became a source of further power for the US. Weaker states find advantages in participating in the US-led ordering system that gives all states equal legal standing, regardless of their military, economic, or political power. This equality offsets weaker states' power imbalance relative to stronger states, making weaker states strong advocates for the US ordering system over that of the hierarchical, authoritarian Soviet system. Ikenberry, *After Victory*, 164.

¹⁵ Ikenberry, *After Victory*, 163, 166, 170-172.

¹⁶ *Ibid.*, 216-217.

¹⁷ John J. Mearsheimer and Stephen M. Walt, "The Case for Offshore Balancing: A Superior U.S. Grand Strategy," *Foreign Affairs* 95, no. 4 (July-August 2016): 70, accessed 14 February 2021, <http://www.jstor.org/stable/43946934>.

¹⁸ Michael R. Gordon and James Marson, "NATO Should Expand Its Focus to Include China, Report Says," *The Wall Street Journal*, 1 December 2020, accessed 1 December 2020, <https://www.wsj.com/articles/nato-should-expand-its-focus-to-include-china-report-says-11606820403?st=5fyrq11fdeogy47>.

¹⁹ The First Gulf War, though not perfectly analogous, provides the best example of how long force-flow timelines can be, under largely uncontested circumstances, before enough forces are in theater to commence combat operations. Five and a half months passed between the first unit's arrival in theater until the first offensive air sorties were flown. An additional five weeks passed until the ground campaign began. Operation Desert Shield (C-Day) began 7 August 1990. Air Force's lead element, 1st Tactical Fighter Wing, arrived in Theater: 8 August 1990. Operation Desert Storm (D-Day) began 17 January 1991. The

Methodology

Predicting Black Swan events is a futile act as they are, by definition, unpredictable. However, not all unforeseen events are Black Swans, but rather failures to explore plausible future events when the needed information was readily available. One can more easily mitigate these self-inflicted Black Swans by imagining numerous plausible future scenarios that force one to confront otherwise unimagined eventualities. Using scenario planning tools, such as the Schwartz model, provides a systematic approach to achieving greater clarity to an otherwise foggy future. “Scenarios are not about predicting the future, but rather they are about perceiving futures in the present.”²⁰ Once constructed, scenarios provide planners and decision-makers common reference points that reduce biases and allow them to confront a range of potential futures as time unfolds. This research hopes to shed light on some of these futures and reduce the impact of their strategic surprise.

To develop scenarios that are not just possible but also plausible and informative, planners explore the “critical uncertainties”²¹ underlying the major “driving forces”²² behind any possible future events.²³ For example, oil prices for an oil company are a driving force for its future decisions. The uncertainty is what might cause future oil prices to be higher or lower. By

ground invasion (G-Day) began 24 February 1991. Robert H. Scales, *Certain Victory: The US Army in the Gulf War* (Fort Leavenworth, KS: US Army Command and General Staff College Press, 1994), 391-393; Robert Work, Deputy Secretary of Defense, statement to the Council of Foreign Relations, 20 January 2015, as cited by David C. Gompert, Astrid Stuth Cevallos, and Cristina L. Garafola, *Exploring the Course and Consequences of a Sino-U.S. War* (Santa Monica, CA: RAND Corporation, 2016), 35, accessed 1 December 2020, https://www.rand.org/pubs/research_reports/RR1140.html.

²⁰ Peter Schwartz, *The Art of the Long View: Paths to Strategic Insight for Yourself and Your Company* (Toronto: Doubleday, 1996), 36.

²¹ Critical uncertainties are found by “questioning your assumptions about predetermined elements.” Schwartz, *The Art of the Long View*, 115.

²² “Driving forces are the elements that move the plot of a scenario, that determine the story’s outcome.” Schwartz, *The Art of the Long View*, 101-102.

²³ Schwartz, *The Art of the Long View*, 6.

developing scenarios where the oil prices are high in one and low in another, planners can develop ways to address either possibility.

This paper's methodology deviates slightly from the typical use of the Schwartz model. Whereas it tends to build scenarios of numerous driving forces from a single entity's perspective, this research seeks to explore a single driving force from two entities' perspectives. Specifically, this research uses the United States and China's national economies as the major driving forces to explore how both might conduct and sustain warfare during a potential Sino-American war. The axes on the figure 4 show the critical uncertainties represented as whether each economy can sustain a protracted, large-scale conflict. The result below are four plausible, potential scenarios from which one can explore how large-scale combat scenarios might unfold between China and the United States.

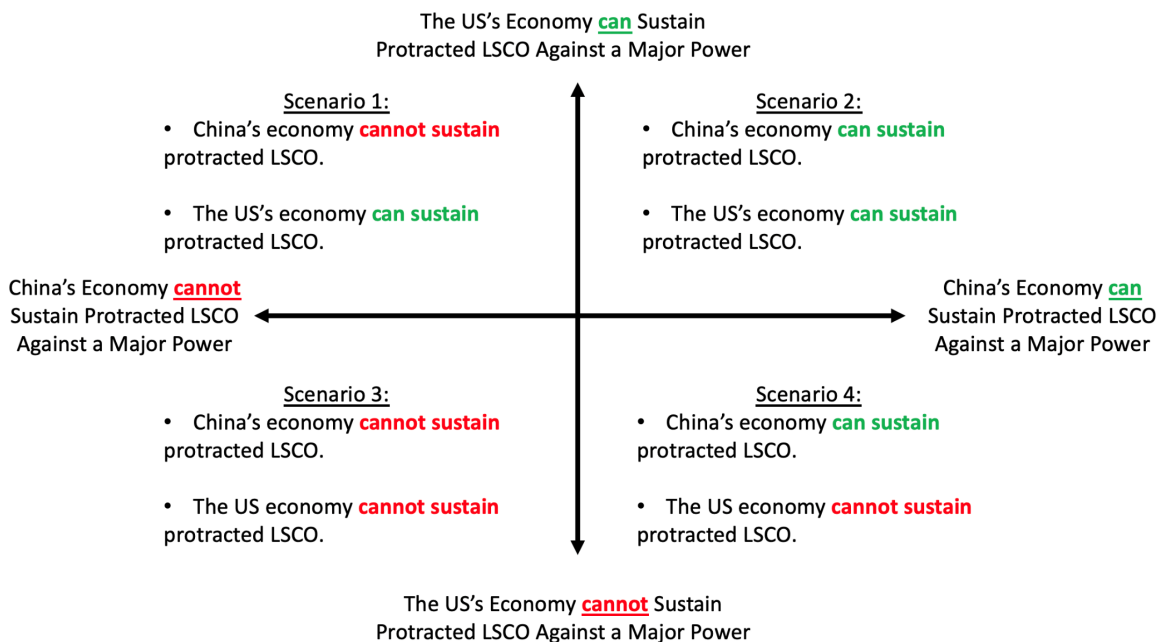


Figure 4. Schwartz Future Scenarios Quad Chart. Peter Schwartz, *The Art of the Long View: Paths to Strategic Insight for Yourself and Your Company* (Toronto: Doubleday, 1996).

military planners confront possibilities that are often acknowledged but receive little attention when pursuing the ever-elusive decisive battle.

Analysis

Three sections make up this chapter: an analysis of US and China's military doctrine, a comparison of US and China's national economies, and the future war scenario. The first two sections provide the conceptual-level building blocks that inform the outcome of the third. Military theory and doctrine inform how militaries want to fight, while the availability of national resources constrains those desires. Simply put, the scenario in the third section explores where each state's military theory meets its economic reality.

Section I: Doctrine

China's Doctrine

Historically, China's concerns for its territorial defense barely extended beyond its borders. Its military doctrine focused on its army and relied heavily on its vast territory and immense population size for defense. China's strategic ambitions have since grown further beyond its borders, requiring its military doctrine to grow in support of its regional desires. These extended aims require the Peoples Liberation Army (PLA) to achieve greater military power projection capabilities in war domains long neglected by the PLA, particularly the air, maritime, and international information domains.²⁴

As a historically land-based power with a limited outward focus, China has almost no history on which its naval or air forces can draw.²⁵ Consequently, the PLA is seemingly adapting

²⁴ "Superiority in three main domains—information, air, and maritime—with the information domain as first and foremost in importance." Edmund Burke, Kristen Gunness, Cortez Cooper, and Mark Cozad, *People's Liberation Army Operational Concepts* (Arlington, VA: RAND Corporation, 2020), 6-7.

²⁵ China has a deep historical well of land warfare theory through the likes of Sun Tzu and others, but it absent the same in the maritime domain. The last serious Chinese fleet in its history dates back 600 years to Admiral Zheng He's diplomatic and commercial voyages. Consequently, China looks to the US naval theorist, Admiral Alfred T. Mahan, to inform its understanding of naval power's strategic role and

a blend of its land-based doctrine to meet the nation's new requirements, specifically Mao's 1964 "lure the enemy in deep" strategy with China's modern understanding of "informatized" warfare. Together, these look to mitigate China's relatively weak naval and air forces while maximizing its geographic advantages. Mao's "lure the enemy in deep" strategy sought to allow an invading enemy to penetrate far enough into China's vast territory to overextend its lines of communication. The Chinese would then rely on the PLA, militia's, and regular citizens turned combatants to "engage an enemy in a protracted war of attrition."²⁶ Eventually, the enemy's efforts would culminate, providing Chinese forces opportunities to expel the remaining enemy forces.

However, the waters of the East and South China Seas are not land and cannot be occupied and used in the same way. Guided by the PLA's belief in technology's integral role in modern warfare, known in China as the "informatization" of warfare, China increasingly looks to technological means to overcome these limitations.²⁷ The most obvious solution is more robust naval and air forces that provide continuous power projection across the air and sea domains. China supplements these forces with a complex yet cheaper anti-access/area denial (A2/AD) network consisting of land and sea-based missiles.²⁸ The extended range and continuous presence

importance. This still leaves China to figure out its naval doctrine to put that strategic role into practice. Yoshihara and Holmes, *Red Star over the Pacific*, 14-18, 158-162.

²⁶ Taylor M. Fravel, *Active Defense: China's Military Strategy since 1949* (Princeton, NJ: Princeton University Press, 2019), 113, 127.

²⁷ Following the 1991 Gulf War, China realized it was far behind its peers in a new, technologically-driven way of war that China described as the "informatization" of warfare. China immediately took steps to catch up by incorporating these ideas into doctrine. Since then, China has made minor updates to these concepts, but they largely hold to the core idea of technology's critical role in warfare. Notable evolutions include Chinese doctrine calling for "integrated joint operations" through C4ISR to ensure the "application of information technology to all aspects of military" and, later, the need to develop long-range, precision weapons and further integrate cyber and space operations. Fravel, *Active Defense*, 187, 219, 231.

²⁸ US Defense Intelligence Agency, *China Military Power: Modernizing a Force to Fight and Win* (Washington, DC: Defense Intelligence Agency, 2019), 65, accessed 11 February 2021, http://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/China_Military_Power_FINAL_5MB_20190103.pdf; US Department of Defense, *Military and Security Developments Involving the People's Republic of China* (Washington, DC: Government Publishing Office, 2020), ix, 72, 74-75, accessed 26

of China's air, naval, and missile forces recreate its vast territory out to the first and second island chains while protecting its SLOCs. These same forces simulate China's large numbers of combatants when coordinated through command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) capabilities and enhanced by artificial intelligence (AI) algorithms.²⁹

It is important to note that China's understanding of "informationalized" warfare has evolved far beyond that born out of the Gulf War and now recognizes information warfare's (IW) extension into the "cognitive space." Known as the "Three Warfares," China's objective "is to control public opinion, organize psychological offense and defense, engage in legal struggle, and fight for popular will and public opinion."³⁰ Chinese theorists see achieving success in the cognitive space through "prior peacetime preparation . . . particularly in the realms of diplomacy and public opinion" to ensure favorable conditions in war or ideally prevent it altogether.³¹

October 2020, <https://media.defense.gov/2020/Sep/01/2002488689/-1/-1/1/2020-DOD-CHINA-MILITARY-POWER-REPORT-FINAL.PDF>; Yoshihara and Holmes, *Red Star over the Pacific*, 89.

²⁹ "Chinese military strategists also assess that AI applications will provide the basis for advanced cruise missiles; autonomous air, ground, surface and sub-surface drone systems; anti-artillery, air, and missile defense systems; and a range of C2 and other systems" (Burke et al., *People's Liberation Army Operational Concepts*, 22). "The side with the algorithm advantage dominates war with human-computer hybrid operations and neural network decision-making, 'cloud brain,' and 'virtual warehousing' technologies and capabilities" (Burke et al., *People's Liberation Army Operational Concepts*, 21).

³⁰ Burke et al., *People's Liberation Army Operational Concepts*, 15.

³¹ Stefan J. Banach, "Virtual War and Weapons of Mass Deception," Modern War Institute, 19 April 2018, accessed 21 January, 2020, <https://mwi.usma.edu/virtual-war-weapons-mass-deception/>; Burke et al., *People's Liberation Army Operational Concepts*, 15. Critical to success in this warfare is the global and inescapable connectivity of humanity through digital networks. The ability to practically and effectively carry out the "Three Warfares" was impossible before the modern pervasive reach of the internet. These networks now give states almost limitless and unfiltered access to open Western societies, enabling China or other actors to achieve what is called "social control" through "virtual war." Stefan J. Banach, "Virtual War: A Revolution in Human Affairs," *Small Wars Journal*, 2 February 2018, accessed 21 January, 2020, <https://smallwarsjournal.com/jrnl/art/virtual-war-revolution-human-affairs>.

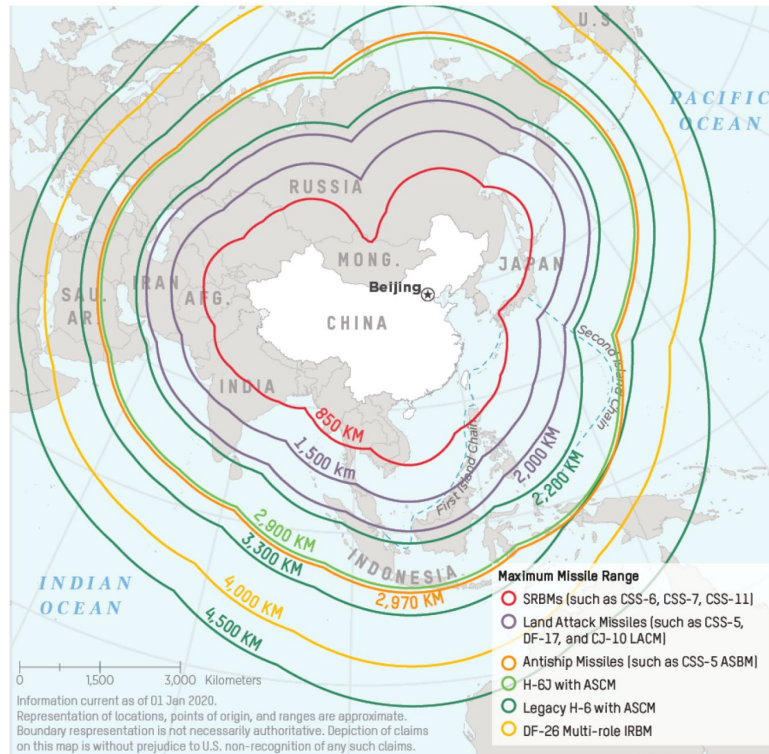


Figure 5. China's Conventional Strike Capabilities. US Department of Defense, *Military and Security Developments Involving the People's Republic of China* (Washington, DC: Government Publishing Office, 2020), 57, accessed 26 October 2020, <https://media.defense.gov/2020/Sep/01/2002488689/-1/-1/1/2020-DOD-CHINA-MILITARY-POWER-REPORT-FINAL.PDF>.

In concert, China's air, sea, and information domain capabilities reduce China's need to achieve parity with other major powers by raising the potential cost to aggressor states to unacceptable levels. If these measures fail and conflict occurs, then warfare in the cognitive space sets the strategic conditions to undermine the legitimacy of any adversary's actions, sow confusion in its society and amongst its allies, and reduce its international support. On the battlefield, cheap missiles do most of the heavy lifting by destroying enemy capabilities while giving weaker Chinese forces a fighting chance and conserving them for later consolidation of gains.³²

There exists one potentially fatal difference from the "lure the enemy in deep" strategy. Allied basing allows US forces to begin any conflict within China's recreated "territory" with

³² Earl H. Ellis, *FMFRP 12-46: Advanced Base Operations in Micronesia* (Washington, DC: Department of the Navy, Headquarters United States Marine Corps, August 1991), 89.

fully established lines of communication. China must ensure the rapid destruction of these capabilities to prevent any coalition counteroffensive.

United States' Doctrine

Initially stunned by the US swift and complete victory over Iraqi force in the 1991 Gulf War, the US adversaries quickly came to understand this new way of war.³³ The most obvious weakness is the US need to conduct a major force buildup before conducting full combat operations.³⁴ Russian and Chinese A2/AD networks, as the name suggests, seek to exploit this weakness through their own network-centric warfare concept³⁵ designed to pose too great of a risk to any US force buildup.³⁶ If successful, such measures may even deter US action altogether or, failing that, keep US buildup efforts disjointed and vulnerable to destruction in detail.

³³ Inherently defensive, the 1986 “AirLand Battle” doctrine was designed to defeat an invasion of Western Europe by the numerically superior Warsaw Pact through “synchronizing” the force’s “combined arms” to conduct “deep attacks” into the enemy’s rear echelons while buying time for the arrival of additional support from the US. Walter E. Kretchik, *U.S. Army Doctrine: From the American Revolution to the War on Terror* (Lawrence: University Press of Kansas, 2011), 196-197, 216-217. It was also a tech-heavy doctrine, incorporating intelligence, surveillance, and reconnaissance (ISR) technology with precision munitions to deliver the degrees of effective firepower necessary to win, a concept later giving rise to the idea of “system-of-systems” warfare and now called “network-centric warfare.” William A. Owens, “The Emerging U.S. System-of-Systems,” Institute of National Security Studies, Strategic Forum 63, February 1996, accessed 11 February 2021, https://web.archive.org/web/20100105160638/http://www.ndu.edu/inss/strforum/SF_63/forum63.html; Yoshihara and Holmes, *Red Star over the Pacific*, 39.

³⁴ The US extensive global alliance network and military reach meant that it held no significant presence in any one place while it was continuously deployed everywhere. Consequently, if the US went to war, it needed to gather its globally deployed forces through a major force buildup before beginning offensive operations, as seen in the Gulf War.

³⁵ Network-centric warfare is “an information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization. In essence, NCW translates information superiority into combat power by effectively linking knowledgeable entities in the battlespace.” David S. Alberts, John J. Garstka, and Frederick P. Stein, *Network-Centric Warfare: Developing and Leveraging Information Superiority*, 2nd ed. (Washington, DC: DoD C4ISR Cooperative Research Program, February 2000), accessed 12 February 2021, http://www.dodccrp.org/files/Alberts_NCW.pdf.

³⁶ Yoshihara and Holmes, *Red Star Over the Pacific*, 6; US Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028* (Fort Eustis, VA: TRADOC, November 2018), 15, 24.

Several notable US doctrinal proposals address these evolving challenges, all to varying degrees drawing on the Gulf War's network-centric legacy. The US Navy is exploring doctrine complimentary to the emerging "Joint All Domain Operations" concept.³⁷ This concept argues for the elevation of information and space domains to the existing list of land, sea, and air, and "converging" their effects on an enemy through "cross domain synergy."³⁸ The US Navy wants to leverage similar capabilities to "control or deny the seas by destroying an adversary's fleet, containing it in areas that prevent meaningful operations, prohibiting it from leaving port, or by controlling [SLOCs]."³⁹ The Navy would also work with allies to "[control] critical choke points, enabling us to safeguard joint forces flowing into theater and to impose military and economic costs on our adversaries."⁴⁰ Mosaic warfare, another concept, argues that intelligence, surveillance, and reconnaissance capabilities, such as orbiting satellites, will be pervasive and continuous on any modern battlefield between great powers, making concealment and surprise more difficult.⁴¹ With a purpose to defeat an all-knowing enemy, Mosaic Warfare leverages more flexibly and rapidly configured networked forces⁴² enhanced by AI to target the enemy's ability

³⁷ Kimberly Underwood, "The Army Shapes Joint All-Domain Operations," *SIGNAL*, 1 August 2020, accessed 14 February 2021, <https://www.afcea.org/content/army-shapes-joint-all-domain-operations>; US Army, TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028*, 20; US Department of the Navy, *Advantage at Sea: Prevailing with Integrated All-Domain Naval Power* (Washington, DC: Government Publishing Office, December 2020), 13, accessed 24 February 2021, <https://media.defense.gov/2020/Dec/17/2002553481/-1/-1/0/TRISERVICESTRATEGY.PDF> /TRISERVICESTRATEGY.PDF.

³⁸ Underwood, "The Army Shapes Joint All-Domain Operations"; US Army, TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028*, 20.

³⁹ US Navy, *Advantage at Sea*, 13.

⁴⁰ Ibid.

⁴¹ Benjamin Jensen and John Paschkewitz, "Mosaic Warfare: Small and Scalable are Beautiful," *War on the Rocks*, 23 December 2019, accessed 2 February 2021, <https://warontherocks.com/2019/12/mosaic-warfare-small-and-scalable-are-beautiful/>; US Department of Defense, *Military and Security Developments Involving the People's Republic of China*, 74.

⁴² Previous networked systems are comprised of predetermined unit structures that fit together like the pieces of "jigsaw puzzle." Mosaic warfare, in contrast, seeks to go away from these predetermined unit structures and instead "connect small unmanned systems with existing capabilities in creative and continually evolving combinations that take advantage of changing battlefield conditions and emergent vulnerabilities." Jensen and Paschkewitz, "Mosaic Warfare."

to make decisions “rather than trying to achieve objectives primarily through attrition.”⁴³ A third concept advanced by the Marine Corps is Expeditionary Advanced Base Operations.⁴⁴ This doctrine acknowledges the Marine Corps’ naval heritage and unique suitability to address the largely maritime-based threats in the Indo-Pacific.⁴⁵ Marines will split up “into small, self-contained units . . . intended to make them harder to find and target” by Chinese forces. In support of a larger naval campaign, they can then seize key maritime terrain and establish a persistent presence controlling the SLOCs so vital to China’s economic survival.⁴⁶ Altogether, these concepts give an idea of the myriad ways that US forces may confront an adversary like China.

Section II: National Economies

National Debt Structure

United States

Except for the Korean War, US history demonstrates that wars tend to drive high national debt levels.⁴⁷ as the government relies largely on increased borrowing to finance growing wartime

⁴³ Bryan Clark, Dan Patt, and Harrison Schramm, *Mosaic Warfare: Exploiting AI and Autonomous Systems to Implement Decision-Centric Operations* (Washington, DC: Center for Strategic and Budgetary Assessments, 2020), 17, 24; Jensen and Paschkewitz, “Mosaic Warfare.”

⁴⁴ US Navy, *Advantage at Sea*, 13.

⁴⁵ Alastair Gale and Shiho Fukada, “Marines Prepare for Rising Challenge from China’s Military with Island Training,” *Wall Street Journal*, 3 January 2021, accessed 23 January 2021, https://www.wsj.com/articles/marines-prepare-for-rising-challenge-from-chinas-military-with-island-training-11609689085?st=37353vpwtu4cea&reflink=article_imessage_share; Jim Lacey, “The ‘Dumbest Concept Ever’ Just Might Win Wars,” *War on the Rocks*, 29 July 2019, accessed 26 January 2021, <https://warontherocks.com/2019/07/the-dumbest-concept-ever-just-might-win-wars/>; US Marine Corps, “Expeditionary Advanced Base Operations (EABO),” Concepts and Programs, accessed 26 January 2021, <https://www.candp.marines.mil/Concepts/Subordinate-Operating-Concepts/Expeditionary-Advanced-Base-Operations/>.

⁴⁶ Gale and Fukada, “Marines Prepare for Rising Challenge from China’s Military with Island Training”; Lacey, “The ‘Dumbest Concept Ever’ Just Might Win Wars”; US Marine Corps, “Expeditionary Advanced Base Operations (EABO).”

⁴⁷ The national debt is the total accumulation of the federal government’s annual budget deficits. A deficit exists when a government spends more than it brings in and must sell bonds to make up the difference. It is important to note that, just as with a household, maintaining debt is not necessarily a bad thing. Whereas debt resulting from paying daily living expenses like groceries or vacations is not advisable,

economic demands.⁴⁸ The US debt to gross domestic product (GDP) ratio reached its historical peak towards the end of WWII when it surged for a short time to almost 113 percent.⁴⁹ Except for the 1980s and early 1990s, the federal government largely paid down much of that debt until the Great Recession struck in 2008, necessitating greater levels of expenditures.⁵⁰

Table 1. War Financing in the United States

	Estimated percentage of expenditures financed by:	
	Direct taxes	Debt and seignorage
Revolutionary War	13.1	86.9
War of 1812	21.0	79.0
Mexican War	41.8	58.2
Civil War Union	9.3	90.7
Civil War Confederacy	13.0	87.0
Spanish-American War	66.0	34.0
World War I	24.0	76.0
World War II	41.0	59.0
Korean War	100.0	0.0

Lee E. Ohanian, “The Macroeconomic Effects of War Finance in the United States: World War II and the Korean War,” *The American Economic Review* 87, no. 1 (March 1997): 25, accessed 3 October 2020, <http://www.jstor.org/stable/2950852>.

Unfortunately, the United States now finds itself approaching debt levels equal to its GDP for the first time since WWII.⁵¹ A combination of increasing expenditures, such as the

debt used to acquire “long-lived capital goods” can provide a net benefit. For governments, assets such as roads, bridges, and ports fall in the latter category since constituents use them for years to come, enabling their access and contribution to the greater economy. Glenn R. Hubbard and Anthony Patrick O’Brien, *Economics*, 5th ed. (Boston: Pearson, 2015).

⁴⁸ Matt Phillips, “The Long Story of U.S. Debt, From 1790 to 2011, in 1 Little Chart,” *The Atlantic*, 14 November 2012, accessed 4 September 2020, <https://www.theatlantic.com/business/archive/2012/11/the-long-story-of-us-debt-from-1790-to-2011-in-1-little-chart/265185/>; Lee E. Ohanian, “The Macroeconomic Effects of War Finance in the United States: World War II and the Korean War,” *The American Economic Review* 87, no. 1 (March 1997): 23-40, accessed 3 October 2020, <http://www.jstor.org/stable/2950852>.

⁴⁹ Viewing the debt in relation to a state’s GDP demonstrates how much total debt the nation is taking on relative to its ability to pay it off and is also the easiest way to view its impact over time. Phillips, “The Long Story of U.S. Debt.”

⁵⁰ Phillips, “The Long Story of U.S. Debt.”

⁵¹ Kate Davidson, “U.S. Debt Is Set to Exceed Size of the Economy Next Year, a First Since World War II,” *Wall Street Journal*, 2 September 2020, accessed 4 September 2020,

Global War on Terror, recovery from the Great Recession, and now managing the economic damage wrought by the global pandemic, conspire with major federal tax cuts to ensure a skyrocketing national debt to GDP ratio. Given that the federal government primarily relied on Americans to finance previous major wars by purchasing war bonds,⁵² perhaps such levels are a short-term concern. Living through the Great Recession and now the global pandemic, the current generation of Americans demonstrates tendencies to save in troubled times, with the US personal savings rate peaking at a record 33.5 percent in reaction to the global pandemic, up from 7.5 percent.⁵³ This provides some promise that the United States maintains a strategic reserve of capital from which it could draw by once again selling government war bonds.

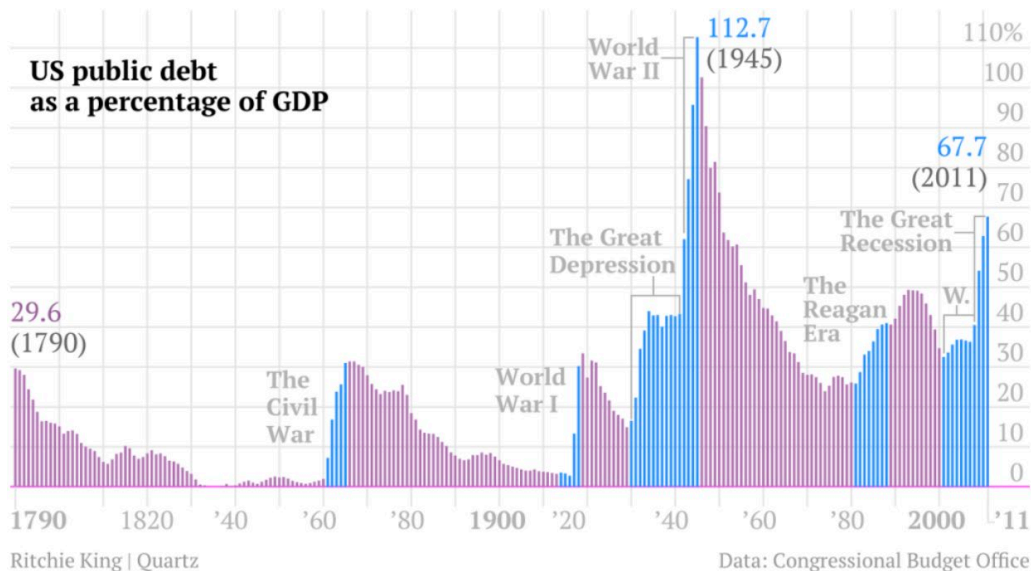


Figure 6. US Debt to GDP Ratio 1790 to 2011. Matt Phillips, “The Long Story of U.S. Debt, from 1790 to 2011, in 1 Little Chart,” *The Atlantic*, 14 November 2012, accessed 4 September 2020, <https://www.theatlantic.com/business/archive/2012/11/the-long-story-of-us-debt-from-1790-to-2011-in-1-little-chart/265185/>.

<https://www.wsj.com/articles/u-s-debt-is-set-to-exceed-size-of-the-economy-for-year-a-first-since-world-war-ii-11599051137?st=jr1eel6ovsd08uu>.

⁵² Encyclopedia.com, “Financing, World War II,” Encyclopedia.com, 3 October 2020, accessed 4 October 2020, <https://www.encyclopedia.com/defense/energy-government-and-defense-magazines/financing-world-war-ii>.

⁵³ Paul Davidson, “Americans Are Sitting on Record Cash Savings amid Pandemic and Uncertain Economy,” *USA Today*, 10 August 2020, accessed 4 October 2020, <https://www.usatoday.com/story/money/2020/08/10/saving-and-spending-americans-spend-their-record-savings-crisis/3319970001/>.

However, both the US and the world's financial systems have changed since WWII, leaving many old methods in doubt and new methods untested.⁵⁴ Greater access to the global market means finances are more fluid than in times past. On the one hand, a future financial system may provide additional access to financing from investors worldwide. If during wartime, on the other hand, investment opportunities outside of the United States prove stronger, the government may be unable to rely on its citizens for financing, a problem China will undoubtedly also face.⁵⁵ This combination of circumstances leaves the US ability to finance future wars uncertain. What is certain is that the United States will adapt to changing circumstances with methods and institutions different from those of the past. Regardless, high levels of debt to GDP are not ideal and only serve as an additional obstacle for the United States.

China

In contrast, China potentially suffers from over-lending, having provided vast loans through foreign government bond purchases or often dubious direct loans to states the world over, particularly the developing world.⁵⁶ China is currently the world's largest official creditor, "surpassing traditional, official lenders such as the World Bank, the IMF, or all OECD creditor governments combined."⁵⁷ Recent research finds that as of 2017, over 150 countries owe China more than \$5 trillion in loans, approximately 6 percent of the world's total economic output and

⁵⁴ Brendan Greeley, "How the US Actually Financed the Second World War," *Financial Times Alphaville*, 13 February 2019, accessed 4 October 2020, <https://ftalphaville.ft.com/2019/02/13/1550057130000/How-the-US-actually-financed-the-second-world-war/>.

⁵⁵ Davidson, "Americans Are Sitting on Record Cash Savings amid Pandemic and Uncertain Economy."

⁵⁶ Sebastian Horn, Carmen Reinhart, and Christoph Trebesch, "China's Overseas Lending" (Kiel Working Paper No. 2132, Kiel Institute for the World Economy, June 2019), 5, accessed 2 September 2020, https://www.ifw-kiel.de/fileadmin/Dateiverwaltung/IfW-Publications/Christoph_Trebesch/KWP_2132.pdf; Sebastian Horn, Carmen Reinhart, and Christoph Trebesch, "How Much Money Does the World Owe China?," 26 February 2020, accessed 2 September 2020, <https://hbr.org/2020/02/how-much-money-does-the-world-owe-china>.

⁵⁷ Horn, Reinhart, and Trebesch, "How Much Money Does the World Owe China?"

far exceeding previously believed figures.⁵⁸ Additionally, much of China's various financial outflows go unreported to the various international organizations tracking these numbers.⁵⁹ Consequently, the world's total debt to China is likely higher.

In the event of war, the loss of debt held by enemy states, such as China's \$1.1 trillion in US treasury bonds and potentially its \$850 billion in Eurobonds, would be the least of China's worries.⁶⁰ What makes these loans dangerous for China, and the globe for that matter, is the amount of wealth owed to China by some of the world's most vulnerable states. As of 2017, the top 50 states owing the greatest debt to China hold an average of 40 percent of their total external debt to China, representing an average of 15 percent of their GDP.⁶¹ In 2018, the then acting US Assistant Secretary of State for African Affairs, Ambassador Donald Y. Yamamoto, stated that some developing states in Africa owe as much as "50%, 100%, and in one case 200% of GDP debt."⁶² Under the conditions of China's oft-cited "debt-trap diplomacy," most of these states already find it difficult to repay these loans under conditions of global peace. Further compounding these states' concerns is that China is often their largest trading partner by large margins. A war that might sever China's SLOCs presents potentially devastating short and medium-term economic implications to those states and the developing world.

In the event of a major war, China is likely to recall some of that debt to pay for its war effort, forcing developing states already struggling with current payments to default. The 1982

⁵⁸ Sebastian Horn, Carmen Reinhart, and Christoph Trebesch, "China's International Lending Is Much Higher than Previously Known," 1 July 2019, accessed 5 September 2020, <https://www.ifw-kiel.de/publications/media-information/2019/chinas-international-lending-is-much-higher-than-previously-known/>.

⁵⁹ Horn, Reinhart, and Trebesch, "China's Overseas Lending," 5.

⁶⁰ Investopedia, "How Much U.S. Debt Does China Own?," Investopedia, 28 August 2020, accessed 15 September 2020, <https://www.investopedia.com/articles/investing/080615/china-owns-us-debt-how-much.asp>; Horn, Reinhart, and Trebesch, "China's Overseas Lending," 34.

⁶¹ Horn, Reinhart, and Trebesch, "China's Overseas Lending," 7.

⁶² Matina Stevis-Gridneff, "More of Africa Finds Itself in China's Debt," *The Wall Street Journal*, 25 July 2018, accessed 15 September 2020, <https://www.wsj.com/articles/more-of-africa-finds-itself-in-chinas-debt-1532549741>.

global debt crisis provides some insight into the cascading events that might result from widespread defaults.⁶³ The amount of debt owed to China places at risk China's ability to wage a long-term conflict and the world economy's health.

Trade Structures

United States

Table 2. United States' Top Ten Trading Partners, 2018

Top Ten Export Trading Partner (2018)	Exports	Percentage of Total Exports Share	Top Ten Import Trading Partner (2018)	Imports	Percentage of Total Import Share
Canada	\$299.7 billion	18%	China	\$563.2 billion	21.6%
Mexico	\$265.4 billion	15.9%	Mexico	\$349.2 billion	13.4%
China	\$120.1 billion	7.2%	Canada	\$325.7 billion	12.5%
Japan	\$75.2 billion	4.5%	Japan	\$145.9 billion	5.6%
UK	\$66.3 billion	3.9%	Germany	\$128.3 billion	4.9%
Germany	\$57.3 billion	3.4%	South Korea	\$76.2 billion	2.9%
South Korea	\$56.5 billion	3.4%	UK	\$61.7 billion	2.4%
Netherlands	\$48.6 billion	2.9%	Ireland	\$57.7 billion	2.2%
Brazil	\$39.5 billion	2.4%	India	\$56.4 billion	2.2%
France	\$37.6 billion	2.3%	Italy	\$56.2 billion	2.2%

World Bank, "United States Exports, Imports and Trade Balance by Country 2018," World Integrated Trade Solutions, accessed 16 September 2020, <https://wits.worldbank.org/CountryProfile/en/Country/CHN/Year/2018/TradeFlow/EXPIMP/Partner/by-country>.

The United States finds itself in unique circumstances relative to China. Canada and Mexico, two of the US largest trading partners, share a border with the United States. The United States also enjoys unimpeded access to most of its other major trading partners through the Atlantic Ocean, such as the United Kingdom (UK), Ireland, European Union (EU) states, and Brazil. All totaled, these states represent 48.8 percent of US exports and 37.6 percent of imports.

⁶³ In the 1960s, newly independent developing states took on heavy debt from foreign sources in efforts to finance domestic growth. When a global recession struck in the 1980s, the inability of the developing world to repay on its debt conspired with "a decline in real net capital inflows," due to tighter monetary policy in the United States, to starve developing states' economies, ensuring a global debt crisis that lasted years. Chukwuka Onyekwena and Mma Amara Ekeruche, "Is a Debt Crisis Looming in Africa?," Brookings, 11 April 2019, accessed 4 October 2020, <https://www.brookings.edu/blog/africa-in-focus/2019/04/10/is-a-debt-crisis-looming-in-africa/>; Claire Brunel, "Lecture 9 Financial Crises" (Class lecture, American University, Washington, DC, 6 August 2018).

The only trade relations at risk are those with South Korea and, to a lesser extent, Japan and India. Together these states only make up 9.9 percent and 10.7 percent of US export and imports, respectively. Of course, China is one of the US top trading partners, accounting for almost as much as the US imports from Mexico and Canada combined, and 7.2 percent of US exports. The loss of Chinese markets, coupled with major trade disruptions with South Korea, Japan, and India, would represent a relatively painful loss in minor revenue streams and production in the short to medium-term while domestic markets adjusted.

China

Table 3. China's Top Ten Trading Partners 2018

Top Ten Export Trading Partner (2018)	Exports	Percentage of Total Exports Share	Top Ten Import Trading Partner (2018)	Imports	Percentage of Total Import Share
United States	\$479.7 billion	19.2%	South Korea	\$204.6 billion	9.6%
Hong Kong	\$302.9 billion	12.2%	Japan	\$180.4	8.5%
Japan	\$147.2 billion	5.9%	Other Asian States (NES)	\$177.3 billion	8.3%
South Korea	\$109 billion	4.3%	United States	\$156 billion	7.3%
Vietnam	\$84 billion	3.8%	Germany	\$106.2 billion	5%
Germany	\$77.9 billion	3.1%	Australia	\$105 billion	4.9%
India	\$76.9 billion	3.1%	Brazil	\$77.1 billion	3.6%
Netherlands	\$73.1 billion	2.9%	Vietnam	\$64 Billion	3%
UK	\$56.9 billion	2.3%	Malaysia	\$63.3 Billion	3%
Singapore	\$49.8 billion	2%	Russia	\$58.8 Billion	2.8%

World Bank, "China Exports, Imports and Trade Balance by Country 2018," World Integrated Trade Solutions, accessed 16 September 2020, <https://wits.worldbank.org/CountryProfile/en/Country/CHN/Year/2018/TradeFlow/EXPIMP/Partner/by-country>.

China currently enjoys several top ten trading partners as neighbors, such as Singapore, Japan, South Korea, and Malaysia, with others like Vietnam, India, and Russia even share a border. However, China's growing power and presence in the global market may not be enough to offset its geographic disadvantages. Relative to the United States, China's ability to easily access trade with places in other world regions, like Australia, Brazil, the EU, and the UK, is limited. In the event of war, China only enjoys secure access to Vietnam, India, and Russia, altogether only 8.5 percent of China's total exports and 6.7 percent of imports.

China's political isolation further compounds its troubled access to global trade. Many of China's top trading partners participate in alliances with collective defense agreements with the United States, such as South Korea,⁶⁴ Japan,⁶⁵ the EU states and the UK through NATO, Brazil,⁶⁶ and Australia,⁶⁷ most of whom also enjoy some of the US closest relations. Even recent events already trouble China's access to foreign capital through Hong Kong as Beijing's increasingly authoritarian rule over Hong Kong erases any distinction between them in the world's eyes.⁶⁸

Regarding China's top ten trading partners sharing a border, Russia, a major regional power in its own right, could and probably would increase its trade with China during a Sino-American conflict. President Putin would exploit any opportunity for Russia to profit economically and politically by ensuring a long-lasting war between the world's two most powerful states, thereby increasing Russia's relative power.

India's role in such a war is still unpredictable. Though China represents 14.6 percent of India's total imports,⁶⁹ China's rise is also a source of increasing alarm for the Indian

⁶⁴ US Department of State, "U.S. Relations with the Republic of Korea," Department of State, 5 May 2019, accessed 17 September 2020, <https://www.state.gov/u-s-relations-with-the-republic-of-korea/>.

⁶⁵ US Department of State, "U.S. Relations with Japan," Department of State, 22 January 2020, accessed 17 September 2020, <https://www.state.gov/u-s-relations-with-japan/>.

⁶⁶ United Nations, "Inter-American Treaty of Reciprocal Assistance-UNTC," United Nations, accessed 17 September 2020, <https://treaties.un.org/pages/showDetails.aspx?objid=0800000280163387>.

⁶⁷ US Department of State, "U.S. Relations with Australia," Department of State, 14 May 2020, accessed 17 September 2020, <https://www.state.gov/u-s-relations-with-australia/>.

⁶⁸ Emily Feng, "China Enacts Security Law, Asserting Control Over Hong Kong," *NPR*, 30 June 30, 2020, accessed 20 December 2020, <https://www.npr.org/2020/06/30/885127007/china-enacts-security-law-asserting-control-over-hong-kong>; Noah Sin, "Explainer: How Important Is Hong Kong to the Rest of China?," *Reuters*, 5 September 5, 2019, accessed 17 September 2020, https://www.reuters.com/article/us-hongkong-protests-markets-explainer/explainer-how-important-is-hong-kong-to-the-rest-of-china-idUSKCN1VP35H?utm_source=feedburner.

⁶⁹ World Bank, "India Exports, Imports and Trade Balance by Country 2018," World Integrated Trade Solutions, accessed 17 September 2020, <https://wits.worldbank.org/CountryProfile/en/Country/IND/Year/2018/TradeFlow/EXPIMP/Partner/by-country>.

government. India and China have long-standing disputes regarding their shared border.⁷⁰ and China's increasing naval encroachment into the Indian Ocean.⁷¹ For these reasons, the United States and India began conducting joint naval exercises to signal resolve against Chinese expansion.⁷² India's active involvement in any war between the United States and China may hinge on the Indian economy's ability to find alternative suppliers and a chance to settle its long-standing disputes with China in the event of a US victory. Economically, though, India is relatively unimportant to China's wartime economy as it only represents a little over 3 percent of China's total exports.

The final trading partner addressed, Vietnam, holds little historical affection for China as the two states share an animosity dating back centuries.⁷³ Although they have settled some minor border disputes, China's encroachment into what Vietnam claims as their territorial waters in the South China Sea leaves little promise for friendly relations.⁷⁴ As are many states in the Indo-Pacific Region, Vietnam is skeptical of China's motives and tends to welcome US efforts to balance against China's expansionary aims.⁷⁵ This is not to say that Vietnam will openly join the United States in any major war. Vietnam's healthy distrust of major powers and the fact that its

⁷⁰ Alyssa Ayres, "The China-India Border Dispute: What to Know," Council on Foreign Relations, 18 June 2020, accessed 17 September 2020, <https://www.cfr.org/in-brief/china-india-border-dispute-what-know>.

⁷¹ James R. Holmes, "Who Will Win the Great China-India Naval War of 2020?," *Foreign Policy*, 7 August 2017, accessed 17 September 2020, <https://foreignpolicy.com/2017/08/07/who-will-win-the-sino-indian-naval-war-of-2020/>; T. V. Paul, "How India Will React to the Rise of China: The Soft-Balancing Strategy Reconsidered," *War on the Rocks*, 17 September 2018, accessed 17 September 2020, <https://warontherocks.com/2018/09/india-and-the-rise-of-china-soft-balancing-strategy-reconsidered/>; Christopher Woody, "India's Deadly Showdown with China Could Lead to Rising Tensions at Sea," *Task and Purpose*, 12 July 2020, accessed 17 September 2020, <https://taskandpurpose.com/analysis/china-india-naval-warfare>.

⁷² Rajat Pandit, "In Signal to China, US & India Conduct Joint Naval Exercise," *The Times of India*, 21 July 2020, accessed 17 September 2020, <https://timesofindia.indiatimes.com/india/in-signal-to-china-us-india-conduct-joint-naval-exercise/articleshow/77059404.cms>.

⁷³ Robert D. Kaplan, *Asia's Cauldron: The South China Sea and the End of a Stable Pacific* (New York: Random House, 2015), 56.

⁷⁴ *Ibid.*, 59-61.

⁷⁵ *Ibid.*, 12, 62.

economy could not exist without Chinese trade⁷⁶ means that one should expect trade relations at a minimum to continue between Vietnam and China during any Sino-American conflict. For China, however, Vietnam only represents 3.8 percent of its exports and 3 percent of its imports, posing little help or hindrance to China's wartime economy.

Critical Resource Availability

United States

Any discussion of how long a state's economy can sustain large-scale combat must speak to its strategic material stockpiles. States stockpile numerous resources deemed critical to national security. The most well-known stockpiling effort in the United States is probably the petroleum reserve designed to provide around a 90-day supply of oil in the event of major oil import disruptions.⁷⁷ The US Strategic National Stockpile, seen in recent Coronavirus-related headlines,⁷⁸ is designed to stockpile critical medical products "to supplement state and local supplies during public health emergencies."⁷⁹ The United States also stockpiles, through the Defense Logistics Agency's Strategic Materials department, thirty-one different materials, such as titanium, chromium, manganese, beryllium, and others.⁸⁰ Each material is chosen based on various factors, including how vital and accessible it is to the United States. In short, stockpiling

⁷⁶ Ibid., 63-64.

⁷⁷ US Department of Energy, "Strategic Petroleum Reserve," Department of Energy, accessed 17 September 2020, <https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve>; Chris Baraniuk, "Why the US Hides 700 Million Barrels of Oil Underground," *BBC Future*, 21 September 2015, accessed 17 September 2020, <https://www.bbc.com/future/article/20150921-why-the-us-hides-700-million-barrels-of-oil-underground>; Cherise Threewitt, "How Long Will the U.S. Oil Reserves Last?," *HowStuffWorks Science*, 30 June 2020, accessed 17 September 2020, <https://science.howstuffworks.com/environmental/energy/us-oil-reserves-last.htm>.

⁷⁸ Anshu Siripurapu, "The State of U.S. Strategic Stockpiles," Council on Foreign Relations, 15 June 2020, accessed 17 September 2020, <https://www.cfr.org/background/state-us-strategic-stockpiles>.

⁷⁹ US Department of Health and Human Services, "Strategic National Stockpile," Department of Health and Human Services, 1 September 2020, accessed 17 September 2020, <https://www.phe.gov/about/sns/Pages/default.aspx>.

⁸⁰ US Defense Logistics Agency, "Strategic Materials, What Strategic Materials Offers," Defense Logistics Agency, accessed 15 September 2020, <https://www.dla.mil/HQ/Acquisition/StrategicMaterials/Offers/>.

greatly mitigates adverse impacts to national economics and defense to ensure continued wartime production.

China

China's secretive nature makes it difficult to ascertain through open-source research any meaningful detail about their stockpiling efforts or how long they could last in a crisis. For this text's purpose, however, it is reasonable to believe that China has taken similar steps to the United States to ensure adequate stockpiles ready for a time of war. Consequently, this scenario assumes that both states have similarly long-lasting stockpiles.

For China, two resources deserve special attention: fuel and food. China's geographic location, coupled with the fact that it is a major fuel importer with low ratios of arable land to population, presents China with potentially serious wartime vulnerabilities. China is the world's largest and second-largest consumer of coal and oil, respectively, both representing the majority of China's energy use.⁸¹ However, most of these resources come from overseas. Despite maintaining the world's third-largest coal reserve, in 2009, China became a net importer of coal to keep up with its growing energy needs, getting most of its coal imports from overseas locations like Australia and Indonesia.⁸² Fifty-five percent of China's oil also comes from overseas routes, mainly the Middle East⁸³ and another 15 percent from Russia.⁸⁴

⁸¹ China Power Team, "How Is China's Energy Footprint Changing?," China Power Project, 26 August 2020, accessed 18 September 2020, <https://chinapower.csis.org/energy-footprint/>.

⁸² Ibid.

⁸³ US Energy Information Administration, "Independent Statistics and Analysis - China's Crude Oil Imports Surpassed 10 Million Barrels per Day in 2019," Energy Information Administration, 23 March 2020, accessed 18 September 2020, <https://www.eia.gov/todayinenergy/detail.php?id=43216>.

⁸⁴ US Energy Information Administration, "Independent Statistics and Analysis - China's Crude Oil Imports Surpassed 10 Million Barrels per Day in 2019"; China also consumed an average of 13.57 million barrels a day in 2019, but produced only 4.89 million barrels a day. US Energy Information Administration, "What Countries are the Top Producers and Consumers of Oil? - Frequently Asked Questions (FAQs)," 1 April 2020, accessed 18 September 2020, <https://www.eia.gov/tools/faqs/faq.php?id=709>.

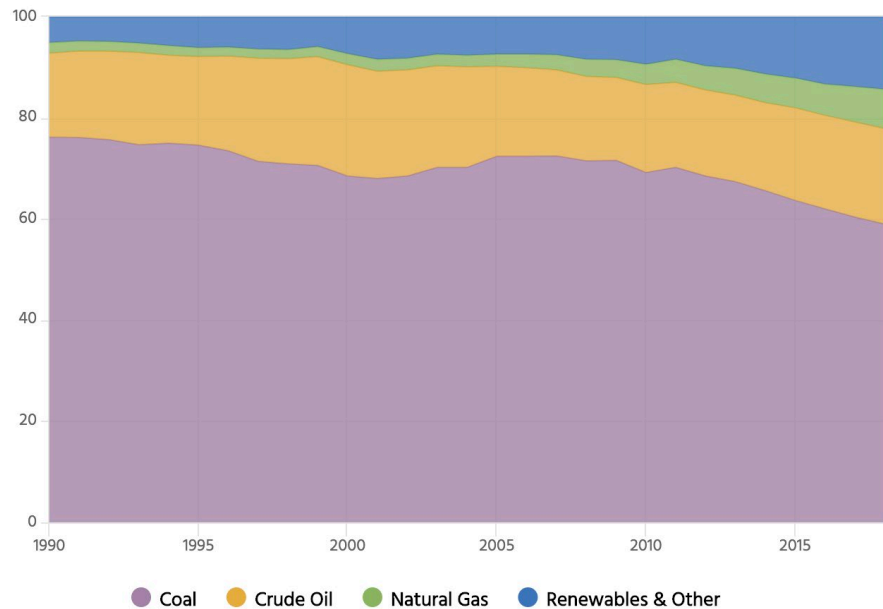


Figure 7. Breakdown of China's Energy Consumption by Percentage. China Power Team, "How Is China's Energy Footprint Changing?," China Power Project, 26 August 2020, accessed 18 September 2020, <https://chinapower.csis.org/energy-footprint/>.

China could implement measures to limit the impact of being cut off from these foreign fuel sources, such as rationing, greater use of renewable energy, and drawing increasingly from more-easily accessible overland sources like Russia.⁸⁵ In the short-term, China can also draw from its petroleum stockpile, which is similar to the US stockpile.⁸⁶ However, these efforts still do not offset the losses expected if China's SLOCs are cut. Russia recently built an overland pipeline to China, with additional capacity expected, that promises to provide a full 10 percent of China's total oil needs by 2025.⁸⁷ Though overland sources are more secure, by themselves, these

⁸⁵ Artyom Lukin, "How a Huge New Gas Pipeline Boosts Russia's Strategic Entente with China," *World Politics Review*, 17 December 2019, accessed 19 September 2020, <https://www.worldpoliticsreview.com/articles/28416/the-geopolitics-of-the-new-russia-china-pipeline>; Geoffrey Smith, "Russia and China Have Built a New Gas Pipeline That Has Everything-Except Profit," *Fortune*, 7 December 2019, accessed 19 September 2020, <https://fortune.com/2019/12/07/russia-china-gas-pipeline/>.

⁸⁶ Wood Mackenzie, "China's Crude Reserves to Reach 1.15 Billion Barrels in 2020," Wood Mackenzie, 23 March 2020, accessed 17 September 2020, <https://www.woodmac.com/press-releases/chinas-crude-reserves-to-reach-1.15-billion-barrels-in-2020/>; Associated Press, "China Stockpiles Crude as Prices Collapse," *MarketWatch*, 23 April 2020, accessed 16 September 2020, <https://www.marketwatch.com/story/china-stockpiles-crude-as-prices-collapse-2020-04-22>.

⁸⁷ Lukin, "How a Huge New Gas Pipeline Boosts Russia's Strategic Entente with China."

percentages do not solve China's problem but only buy it time. Additionally, though China is one of the leading states developing renewable energy sources, China expects renewables will only account for 20 percent of its energy needs by 2030.⁸⁸ In short, the need for overseas energy imports is one of China's greatest long-term strategic vulnerabilities.

China's expansionary aims in the South China Sea and the Indian Ocean region and the development of its A2/AD network acknowledge this vulnerability. Despite many skeptics, China believes that the South China Sea may contain the world's second-largest oil reserves, and securing these waters may alleviate some, but not all, of China's demand.⁸⁹ It is important to note, however, that oil rigs are not immune to attack. Additionally, the Indian Ocean region controls access to those critical maritime chokepoints between China and its Middle Eastern oil. China's efforts to control the Indian Ocean dubbed the "string of pearls strategy,"⁹⁰ is an otherwise fragile wartime strategy designed to use increased port access to expand the People's Liberation Army-Navy's (PLAN) operational reach and is not currently supported by China's A2/AD network which fails to project power beyond the first island chain.⁹¹ Consequently, this scenario views China's reliance on imported oil as a critical vulnerability. The only hitch is that many regional US allies also rely on the same source of oil, potentially frustrating US efforts to blockade maritime-based oil shipments through the region.

⁸⁸ China Power Team, "How Is China's Energy Footprint Changing?"

⁸⁹ An estimated 130 billion barrels. Kaplan, *Asia's Cauldron*, 10.

⁹⁰ Maria Abi-habib, "How China Got Sri Lanka to Cough Up a Port," *The New York Times*, 25 June 2018, accessed 17 September 2020, <https://www.nytimes.com/2018/06/25/world/asia/china-sri-lanka-port.html>; Editors, "China's Debt-Trap Diplomacy," *National Review*, 3 July 2018, accessed 17 March 2020, <https://www.nationalreview.com/2018/07/china-belt-and-road-initiative-debt-trap-diplomacy/>; Patrick Mendis, "The Colombo-Centric New Silk Road," *Economic and Political Weekly* 47, no. 49 (December 2012): 70, accessed 17 September 2020, <http://www.jstor.org.proxyau.wrlc.org/stable/41720443>; James Kynge, Chris Campbell, Amy Kazmin, and Farhan Bokhari, "How China Rules the Waves," *Financial Times*, 12 January 2017, accessed 17 September 2020, <https://ig.ft.com/sites/china-ports/>; Yoshihara and Holmes, *Red Star over the Pacific*, 150.

⁹¹ Mastro, "The Stealth Superpower," 33; US Defense Intelligence Agency, *China Military Power*, 65-66, 103; Yoshihara and Holmes, *Red Star over the Pacific*, 89.

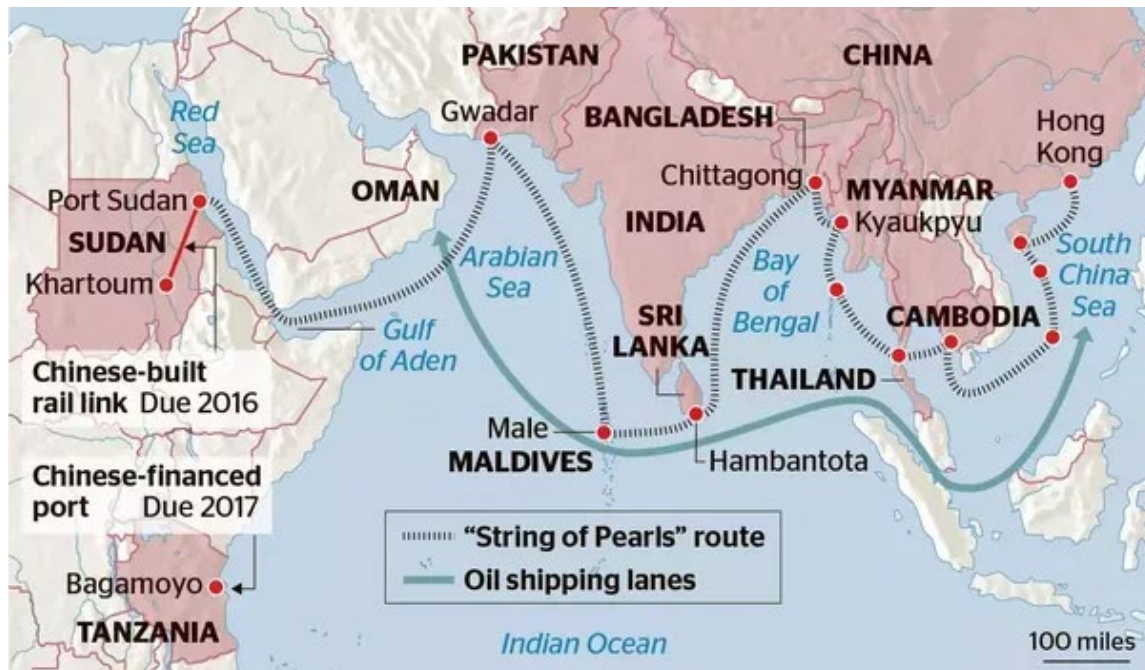


Figure 8. China's "String of Pearls" and Middle East Oil Shipping Lanes. Quora, "Why is 'String of Pearls' Strategy of China a Threat to India's Economy and Security?," Quora.com, accessed 14 February 2021, <https://www.quora.com/Why-is-String-of-Pearls-strategy-of-China-a-threat-to-Indias-economy-and-security>.

China's low ratio of arable land to population potentially troubles its ability to feed its population, forcing China to rely on imports even in peacetime. For instance, whereas the United States maintains 1.16 acres of arable land per person, China has only 0.21 acres per person, leaving China "heavily reliant on food imports from other countries."⁹² Poor food and safety regulations also plague China, such as the outbreak of African swine fever in 2018 that devastated its pork supply and pollution, leaving large portions of China's water supplies unusable.⁹³

China is exploring numerous solutions, though few address the challenges inherent with a naval blockade. First, China often turns to imports to make up the differences to unforeseen shortfalls.⁹⁴ Additionally, Chinese firms buy large acreages of arable land worldwide to grow and

⁹² China Power Team, "How Is China Feeding Its Population of 1.4 Billion?," China Power Project, 26 August 2020, accessed 18 September 2020, <https://chinapower.csis.org/china-food-security/>.

⁹³ China Power Team, "How Is China Feeding Its Population of 1.4 Billion?"

⁹⁴ Ibid.

import crops.⁹⁵ Though stunted by domestic pushback, Chinese officials are also exploring genetically modified crops to increase domestic production in key crops.⁹⁶ One can also link China's pursuit of food security to China's desire to control the South China Sea, which is "one of the top five most productive fishing zones in the world," supplying "12 percent of the global fish catch."⁹⁷ These final two are the only potential solutions safe from enemy disruption, with genetic modification potentially requiring much implementation time.

Though China would experience short-term food security challenges in a major war, this is not to say China would starve. Others argue that the Chinese can feed themselves if only they "will choose to do so."⁹⁸ Changing environmental conditions and evolving food security policies provide the necessary solutions.⁹⁹ In a war, Beijing could overcome domestic resistance to unpopular policies to manage food shortage challenges. However, having grown accustomed to a better variety of imported foodstuffs, China's middle classes may serve as a target for China's enemies wishing to undercut further the CCP's mandate to rule.¹⁰⁰

Military Industrial Complex

United States

In the years following the Soviet Union's fall in 1991, the US defense budget fell precipitously.¹⁰¹ A 1993 review by the Department of Defense (DoD) of the nation's defense

⁹⁵ Chinese firms as the world's fourth-largest purchasers of land in the world. China Power Team, "How Is China Feeding Its Population of 1.4 Billion?"

⁹⁶ China Power Team, "How Is China Feeding Its Population of 1.4 Billion?"

⁹⁷ Angaindrankumar Gnanasagaran, "Fishy Business in the South China Sea," *The ASEAN Post*, 22 July 2018, accessed 4 October 2020, <https://theaseanpost.com/article/fishy-business-south-china-sea>; China Power Team, "How Is China Feeding Its Population of 1.4 Billion?"; Economy, *The Third Revolution*, 200.

⁹⁸ Peng Gong, "China Needs No Foreign Help to Feed Itself," *Nature News*, 1 June 2011, accessed 18 September 2020, <https://www.nature.com/articles/474007a>.

⁹⁹ Ibid.

¹⁰⁰ Kissinger, *On China*, 6-7, 16.

¹⁰¹ John Deutch, "Consolidation of the U.S. Defense Industrial Base," *Acquisition Review Quarterly* (Fall 2001): 137-138, accessed 24 October 2020, <https://www.dau.edu/library/arj>

posture concluded that the “more than forty percent drop in . . . DoD investment expenditures” required a consolidation of defense-based assets in private and public sectors.¹⁰² Base Reduction and Consolidation efforts closed “bases and government-owned shipyards, depots, and laboratories.”¹⁰³ The so-called “Last Supper,” a dinner held by the Pentagon for the heads of the major defense firms, marked the beginning of accelerated consolidation for the private sector defense firms. At this dinner, then Secretary of Defense Les Aspin encouraged increased private sector consolidation.¹⁰⁴ The industry underwent a consolidation that reduced the number of defense-related firms from fifty-one in the 1980s to five until the DoD ended the process in 1998 due to concerns about the industry’s competitiveness.¹⁰⁵

The decision sought balance, “encourage[ing] consolidation in order to gain efficiencies” while “maintain[ing] competition in all critical sectors.”¹⁰⁶ The consolidation also gave rise to concerns about the defense industry’s inability to “surge” production during wartime. Others argued that not only did economic forces leave few alternatives, but a changing operational environment made the need to expand military production irrelevant.¹⁰⁷ Wars would no longer take on the long-term, attrition-style wars of the past.¹⁰⁸ The defense industry would only need to surge more expendable items like repair parts and munitions, but not tanks and aircraft.¹⁰⁹ Instead, better “battlefield awareness” through proper information distribution combined with

/ARJ/arq2001/Deutch.pdf; John A. Tirpak, “The Distillation of the Defense Industry,” *Air Force Magazine*, 1 July 1998, accessed 24 October 2020, <https://www.airforcemag.com/article/0798industry/>.

¹⁰² Deutch, “Consolidation of the U.S. Defense Industrial Base,” 137-138.

¹⁰³ *Ibid.*, 139.

¹⁰⁴ Tirpak, “The Distillation of the Defense Industry.”

¹⁰⁵ Deutch, “Consolidation of the U.S. Defense Industrial Base,” 141; Tirpak, “The Distillation of the Defense Industry.”

¹⁰⁶ Former Deputy Secretary of Defense Jacques S. Gansler as cited by Tirpak, “The Distillation of the Defense Industry.”

¹⁰⁷ Tirpak, “The Distillation of the Defense Industry.”

¹⁰⁸ *Ibid.*

¹⁰⁹ Former Deputy Secretary of Defense Jacques S. Gansler as cited by Tirpak, “The Distillation of the Defense Industry.”

more accurate munitions would be the new way of war and dominate the defense industry's future focus..¹¹⁰

This belief requires a special mention of the limited US semiconductor production capacity since semiconductors are integral to this type of networked warfare. Semiconductors, and other technologies from what one might call the digital industrial complex, are critical for all computers to operate and process data, be they in a laptop, an automobile, or an F-35 Joint Strike Fighter..¹¹¹ In warfare, these technologies are also critical for networking assets to achieve asymmetric advantages across the levels of war that exceed the sum of their parts. For example, incorporating AI and quantum computing to dominate everything from the strategic-level narrative to more rapidly processing targeting data to achieve faster battlefield effects requires these technologies..¹¹² Though most US semiconductor design, research, and development are still domestic, the vast majority of the fabrication, testing, and packaging moved to Asia, particularly Taiwan, placing this critical industry's wartime fate in China's grasp..¹¹³

Predictions that the US will never need to ramp up production are questionable when considering the DoD is preparing for great power competition in light of China's rise and Russian aggression..¹¹⁴ The Pentagon now acknowledges these shortcomings in major US industries such

¹¹⁰ Deutch, "Consolidation of the U.S. Defense Industrial Base," 142-143.

¹¹¹ Brad Slingerlend and Jon Bathgate, "Opinion: Shortage in Chips Puts US National Security at Risk," Market Watch, 3 February 2021, accessed 5 February 2021, <https://www.marketwatch.com/story/shortage-in-chips-puts-u-s-national-security-at-risk-11612373012>.

¹¹² Slingerlend and Bathgate, "Opinion"; Semiconductor Industry Association, "2020 State of the U.S. Semiconductor Industry," Semiconductor Industry Association, accessed 5 February 2021, <https://www.semiconductors.org/2020-state-of-the-u-s-semiconductor-industry/>.

¹¹³ Slingerlend and Bathgate, "Opinion"; Semiconductor Industry Association, "2020 State of the U.S. Semiconductor Industry." The Biden administration ordered a review of these shortages to begin developing plans to address these national security concerns. Josh Boak and Tom Krisher, "Biden Order a Review of US Supply Chains for Vital Goods," Associated Press, 24 February 2021, accessed 24 February 2021, <https://apnews.com/article/joe-biden-business-global-trade-health-coronavirus-pandemic-b08eb8f76932cc71049732ddd60a035d>.

¹¹⁴ Army University Press, "Impact of Large-Scale Combat Operations," Army University Press, September 2018, accessed 5 February 2021, <https://www.armyupress.army.mil/Special-Topics/Hot-Topics/LSCO/>.

as shipbuilding and semiconductor production, primarily caused by the economic forces of China's rise pulling these industries to Asia.¹¹⁵ In short, the economic underpinnings that made the United States a global power following WWII no longer exist. It is no longer the "arsenal of democracy" that provides allies an abundance of supplies necessary to fight and win wars.

China

Informed by the legacy of its communist command economy, China views its defense industry in more expansive terms than the United States that includes the entire economy. Known in China as "military-civil fusion," Beijing is pursuing greater integration between the government and Chinese firms, particularly those that are state-owned, to achieve state aims.¹¹⁶ The result is that China's economy remains on an almost perpetual wartime footing, allowing China to more quickly harness its full economic power at any time.¹¹⁷ Additionally, by ensuring

¹¹⁵ Loren Thompson, "Pentagon Report Paints Grim Picture of American's Industrial Decline," *Forbes*, 13 January 2021, accessed 27 January 2021, https://www.forbes.com/sites/lorenthompson/2021/01/13/pentagon-report-paints-grim-picture-of-americas-industrial-decline/?fbclid=IwAR2dgdwLOq_ak_JQmBA1NZJ4Xspk774JoezrZY9p8JpwMNG6PQsR_v5P7HXQ&sh=523147e07abf. The pursuit of greater technological advancements and the rise of near-peer competitors have increased the US military's relationship with Western firms in industries not traditionally seen as defense related. Sean Kimmons, "Army Futures Command Aims to Tap into Innovative Culture in Austin and Beyond," *Army News Service*, 16 August 2018, accessed 25 October 2020, https://www.army.mil/article/209932/army_futures_command_aims_to_tap_into_innovative_culture_in_austin_and_beyond; Daniel Wirls, "Eisenhower Called It the 'Military-Industrial Complex.' It's Vastly Bigger Now," *The Washington Post*, 25 June 2019, accessed 25 October 2020, <https://www.washingtonpost.com/politics/2019/06/26/eisenhower-called-it-military-industrial-complex-its-vastly-bigger-now/>.

¹¹⁶ Leo Lin, "China's Answer to the US Military-Industrial Complex," *The Diplomat*, 19 April 2017, accessed 26 October 2020, <https://thediplomat.com/2017/04/chinas-answer-to-the-us-military-industrial-complex/>; US Department of Defense, *Military and Security Developments Involving the People's Republic of China*, 18.

¹¹⁷ Qiao Liang, Al Santoli, and Xiangsui Wang, *Unrestricted Warfare* (Brattleboro, VT: Echo Point Books and Media, 2015), 163; US Department of Defense, *Military and Security Developments Involving the People's Republic of China*, 18; "[W]arfare is no longer an activity confined only to the military sphere." Liang, Santoli, and Wang, *Unrestricted Warfare*, 163; For context, the United States during WWII, arguably the time representing its greatest industrial capability, took approximately forty-two months to reach its peak wartime economic output. The US also had a roughly eighteen-month head start before the Japanese attack on Pearl Harbor, spurred by the defeat of French and British forces at the hands of the Germans in 1940. Even with this head start, US economic mobilization did not reach its peak until the end of 1943. One could consider these conditions to be the most optimal for the US who held the title at the time as the world's largest economy and brought lessons from the mobilization from WWI to better inform mobilization for WWII. B. Elberton Smith, *United States Army in World War II, The War Department: The Army and Economic Mobilization* (1958; repr., Washington, DC: Center of Military History, 1991), 4-5, 705, 717.

that loyal communist party members fill the leadership roles in both the civil and military sides, the CCP guarantees a strong relationship between the government and major corporations along with greater degrees of innovation than typically acknowledged by Western countries.¹¹⁸ By controlling the leadership on both sides, the CCP can simultaneously maintain top-down political control while allowing for a more hands-off economic approach to Chinese firms to encourage more organic levels of innovation not typically found in a command economy.¹¹⁹

Some argue that despite these developments, China still trails the United States in innovation and will for some years to come.¹²⁰ Though China's manufacturing output is the world's largest,¹²¹ its strength lies in being the second-mover that reproduces or adapts others' innovations but does not create its own.¹²² Whereas China can more cheaply and rapidly produce larger numbers of traditional weapons platforms like tanks, fighter aircraft, and destroyers,¹²³ it is doubtful that China will lead in the innovations necessary to dominate the information space, much less incorporate those technologies into their weapons platforms.¹²⁴ A Sino-American war would seem to contrast quality versus quantity.

¹¹⁸ Arthur R. Kroeber, *China's Economy: What Everyone Needs to Know* (Oxford: Oxford University Press, 2020), 3-4.

¹¹⁹ Kroeber, *China's Economy*, 4, 8; Richard McGregor, *The Party: The Secret World of China's Communist Rulers* (New York: Harper Perennial, 2010), xxi.

¹²⁰ China Power Team, "Is China Leading in Global Innovation?," China Power Project, 25 August 2020, accessed 25 October 2020, <http://chinapower.csis.org/china-innovation-global-leader/>.

¹²¹ China's \$4 trillion compared to the US \$2.3 trillion. Irena Martinčević, "Mapped: China's Manufacturing Superpower vs. the World," HowMuch.Net, 9 April 2020, accessed 25 October 2020, <https://howmuch.net/articles/map-worlds-manufacturing-output>.

¹²² China Power Team, "Is China Leading in Global Innovation?"; Kroeber, *China's Economy: What Everyone Needs to Know*, 43, 58, 64; Erik Roth, Jeongmin Seong, and Jonathan Woetzel, "Gauging the Strength of Chinese Innovation," McKinsey and Company, 9 February 2018, accessed 25 October 2020, <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/gauging-the-strength-of-chinese-innovation>.

¹²³ This is evident by China's ability to produce 96 percent of the world's maritime-based shipping. Jude Blanchette, Jonathan E. Hillman, and Maesea McCalpin, "Hidden Harbors: China's State-Backed Shipping Industry," Center for Strategic and International Studies, 14 October 2020, accessed 25 October 2020, <https://www.csis.org/analysis/hidden-harbors-chinas-state-backed-shipping-industry>.

¹²⁴ China Power Team, "Is China Leading in Global Innovation?"

Scenario

The US President's press conference was scheduled for 9:00 a.m. in Washington, DC, 10:00 p.m. Beijing's time. Despite both sides' unexpectedly poor performance in the war's first week, Beijing hoped the conference might contain some hint of the US willingness to negotiate peace and prevent further escalations. Instead, the US President echoed the American peoples' sentiments. Fueled by anger, Americans wanted to double down on a war that, to a largely internationally isolated public, seemed unprovoked. Confident in their anger, they believed that the full commitment of the world's most powerful military would ensure a quick victory. No one foresaw at the time that anger as the war's driving force would give way to desperation in the face of sunk costs, fueling the 2036 Sino-American War for another two and one-half years.

Phase I: Week One: The Battle of the Algorithms

The initial kinetic blows between US and Chinese forces are a relatively short-lived yet violent exchange of ballistic and cruise missiles targeting the other's missile systems, long-range integrated enemy air defense systems,¹²⁵ C4ISR systems,¹²⁶ air and naval platforms, ports, and airfields around the region critical to military operations. The increased reach and accuracy of these missiles coordinated by AI-enhanced battle networks¹²⁷ ensure high attrition on both sides in the initial attack, with the second-mover taking greater losses.¹²⁸ Defensive systems that spoof, jam, and deceive targeting otherwise prevent heavier attrition.¹²⁹ Nonetheless, hypersonic

¹²⁵ US Army, TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028*, 33.

¹²⁶ Burke et al., *People's Liberation Army Operational Concepts*, 12.

¹²⁷ “[C]omponents of the weapon system may be distributed across multiple physical platforms. For example, a maritime patrol aircraft might detect an enemy ship and pass the location data to a nearby friendly ship, which launches a missile. Defense strategists refer to this as a *battle network*.” Paul Sharre, *An Army of None: Autonomous Weapons and the Future of War* (New York: W. W. Norton, 2018), 43.

¹²⁸ Burke et al., *People's Liberation Army Operational Concepts*, 6, 21-22; Jeffrey Engstrom, *Systems Confrontation and Systems Destruction Warfare: How the Chinese Peoples' Liberation Army Seeks to Wage Modern Warfare* (Arlington, VA: RAND Corporation, 2018), iii; Sharre, *Army of None*, 5-6, 43.

¹²⁹ Sharre, *An Army of None*, 55-56.

weapons.¹³⁰ and weapons swarms.¹³¹ ensure the immediate destruction of targets ranging from high payoff targets like aircraft carriers to regional military basing.¹³² By week's end, this unprecedented form of algorithm-driven combat comes to an end with the precision munition stockpiles' exhaustion on both sides. This does not, however, spell the end of the war as the number of targets far exceeds the number of missiles needed to ensure their destruction.¹³³ The war has only begun as each side prepares to fight with the remaining, less sophisticated assets.

Lurking behind the headlines of large front-line casualty counts is a silent and unseen war raging in the information and space domains with far-reaching destructive and disruptive consequences for both societies and their militaries. The first strategic line of effort from both states is a war in the "cognitive space" advancing narratives designed to convince the world of their cause's legitimacy. Winning this war is critical to garnering global support and shaping the world after the war.¹³⁴ These efforts extend to the opposing state's domestic audience. Taking the

¹³⁰ Congressional Research Service, *Hypersonic Weapons: Background and Issues for Congress* (Washington, DC: Congressional Research Service, 2020).

¹³¹ Jensen and Paschkewitz, "Mosaic Warfare"; Sharre, *Army of None*, 11-13.

¹³² The United States maintains basing throughout the Indo-Pacific region. Unfortunately, with exceptions such as those in Australia, Guam, and Diego Garcia, the vast majority of US basing and forces in the region reside well within range of China's missiles. Furthermore, the US military's decades-long focus on North Korea has "coagulated" these bases around Korea. This limited dispersion exposes US forces to Chinese threats while limiting US forces' available options to threaten China's forces or maritime access, particularly through the South China Sea. Robert Haddick, *Fire on the Water: China, America, and the Future of the Pacific* (Annapolis, MD: Naval Institute Press, 2014), 52-59.

¹³³ David B. Larter, "As China Expands Navy, US Begins Stockpiling Ship-Killing Missiles," *Defense News*, 11 February 2020, accessed 5 December 2020, <https://www.defensenews.com/naval/2020/02/11/as-china-continues-rapid-naval-expansion-the-us-navy-begins-stockpiling-ship-killing-missiles/>. The DoD learned how scarce their precision munition stocks were when the US Tomahawk cruise missiles' stock ran out during the low-intensity Kosovo campaign between 1998-1999. Lawrence J. Korb, "Not Enough Cruise Missiles to Go Around?," *New York Times*, 6 April 1999, accessed 3 December 2020, <https://www.nytimes.com/1999/04/06/opinion/not-enough-cruise-missiles-to-go-around.html>; Jonathan Bergner, "Why the US Should Stock up on Tomahawk Cruise Missiles," *Defense News*, 29 May 2018, accessed 3 December 2020, <https://www.defensenews.com/opinion/commentary/2018/05/29/why-the-us-should-stock-up-on-tomahawks/>.

¹³⁴ Burke et al., 7, 13, 15; Engstrom, *Systems Confrontation and Systems Destruction Warfare*, 12. "Engaging the cognitive space requires employment of what the Chinese call the 'Three Warfares': public opinion warfare, psychological warfare, and legal warfare. The objective of the Three Warfares is to control public opinion, organize psychological offense and defense, engage in legal struggle, and fight for popular will and public opinion." Burke et al., 15.

place of airdropped leaflets in wars past, hackers deliver carefully tailored propaganda designed to undercut domestic support for the war through digital media platforms and cellphone applications. To achieve even momentary advantages, each state also executes a wide range of cyber-attacks to exploit carefully cultivated vulnerabilities in the other's digital networks years in the making.¹³⁵ These attacks range from covert espionage, emplacing false information and disruptive algorithms, and even more kinetic attacks like overheating and burning down servers.

Government targets include institutions such as the intelligence and defense communities and state economic institutions. Hacks against critical financial institutions, universities, and major firms ensure that the private sector is not spared. Further revealing the vulnerabilities of an increasingly digitally connected society, hackers strike everything from society-wide GPS capabilities to personal vehicles, causing widespread economic disruption. Though initially limited, non-governmental actors take advantage of the chaos to hack anything from personal social media and bank accounts to nuclear power plants. The home front, so easily reached by distant digital enemies, soon becomes a battlefield of its own as everyday life, so inextricably linked to the digital world, falls under attack.

This unseen virtual war.¹³⁶ extends to the front lines. Targeting each military's C4ISR capabilities holds exceptionally high priority to disrupt essential communication, the rapid and accurate processing of targeting data, intelligence sharing with allies, and coordinating joint and coalition operations.¹³⁷ The US and China's heavy military reliance on space-based capabilities leads both sides to consider destroying the other's satellites if only to achieve short-term

¹³⁵ Banach, "Virtual War: A Revolution in Human Affairs"; Banach, "Virtual War and Weapons of Mass Deception"; US Department of Defense, *Military and Security Developments Involving the People's Republic of China*, 74.

¹³⁶ Banach, "Virtual War: A Revolution in Human Affairs"; Banach, "Virtual War and Weapons of Mass Deception."

¹³⁷ Burke et al., 12.

disruption..¹³⁸ However, fears of too much space debris causing a cascading event that destroys all satellites finds cooler heads..¹³⁹ Such a result would ensure what might be called “Mutually Assured Space Denial” for all nations who rely on space and potentially send humanity back into the Dark Ages. Instead, most attacks on space capabilities come from disrupting, destroying, or commandeering satellites through cyberattacks, lasers, and even other satellites equipped with robotic arms..¹⁴⁰

Economic Impacts

As reports from the front lines begin rolling in back home, policymakers in Beijing and Washington debate the necessary degree of military and economic mobilization. Balancing the peoples’ emotions, basic needs, and the conflict’s non-existential nature, the United States decides on full, not total, mobilization..¹⁴¹ All available active and reserve forces, as well as those that can be spared from other global security obligations, are deployed to the region, adding to or replacing combat power. Congress also releases a deluge of funding to get the nation’s military industry on a war footing as there is no time to waste. The US WWII history demonstrates that US economic mobilization took roughly forty-two months from start to peak production..¹⁴² Though full is less extensive than total mobilization, the complexity of US technology combined

¹³⁸ Engstrom, *Systems Confrontation and Systems Destruction Warfare*, 58-60.

¹³⁹ Charles Powell, “Saving Space from ‘Star Wars’-Style Misperceptions,” *War on the Rocks*, 14 July 2020, accessed 26 January 2021, <https://warontherocks.com/2020/07/saving-space-from-star-wars-style-misperceptions/>.

¹⁴⁰ Niall Firth, “How to Fight a War in Space (and Get Away with It),” *MIT Technology Review*, 26 June 2019, accessed 26 January 2021, <https://www.technologyreview.com/2019/06/26/725/satellite-space-wars/>; Todd Harrison, Kaitlyn Johnson, Thomas G. Roberts, Tyler Way, and Makena Young, “Space Threat Assessment” (Report of the CSIS Aerospace Security Project, Center for Strategic and International Studies, Washington, DC, March 2020), 8-18, accessed 26 January 2021, https://aerospace.csis.org/wp-content/uploads/2020/03/Harrison_SpaceThreatAssessment20_WEB_FINAL-min.pdf.

¹⁴¹ US Department of Defense, Joint Staff, Joint Publication (JP) 4-05, *Joint Mobilization Planning* (Washington, DC: Government Publishing Office, 2018), I-3, I-8.

¹⁴² Smith, *The Army and Economic Mobilization*, 4-5, 717.

with limited production facilities and the expertise needed to produce these assets may cancel out time otherwise saved.

China views the war as an opportunity to either eject the United States from the region or prevent a second century of humiliation.¹⁴³ Combined with the CCP's fears that losing the war means losing its mandate to rule,¹⁴⁴ the CCP sees the conflict as an existential threat and prepares for total mobilization.¹⁴⁵ China's military-civil fusion already has the economy on a war footing, leaving funding and production increases and greater centralized control of scarce resources as the only necessary changes. Consequently, China's economy replaces combat losses more rapidly from the outset of the war. With already more naval and air platforms than the United States, albeit less capable,¹⁴⁶ China's ability to produce more presents a grave threat to US forces if they fail to achieve a quick victory.

The United States immediately calls on its regional allies and partner nations to join in a coalition against China, restrict trade and investment with Chinese firms, recall any outstanding debts, and cancel all financial obligations. Simultaneously, China leverages its deep global economic entrenchment to compel states to do the same to the United States. Governments worldwide shut down stock exchanges to prevent fearful investors from causing a global depression. The United States and China, however, allow major firms to adjust investments to meet new wartime restrictions against investments that may even indirectly benefit the enemy.

Both states begin courting shared trading partners, particularly those militarily and economically important. For example, the benefits to South Korea's geographic and economic

¹⁴³ Kissinger, *On China*, 58.

¹⁴⁴ Ibid., 6-7, 16.

¹⁴⁵ McGregor, *The Party*.

¹⁴⁶ Jon Harper, "Eagle vs Dragon: How the U.S. and Chinese Navies Stack Up," *National Defense Magazine*, 9 March 2020, accessed 27 January 2021, <https://www.nationaldefensemagazine.org/articles/2020/3/9/eagle-vs-dragon-how-the-us-and-chinese-navies-stack-up>; Ian Livingston and Michael E. O'Hanlon, "Why China Isn't Ahead of the US Navy, Even with More Ships," Brookings, 10 September 2018, accessed 27 January 2021, <https://www.brookings.edu/blog/order-from-chaos/2018/09/10/why-china-isnt-ahead-of-the-us-navy-even-with-more-ships/>.

proximity to a still rising China compete with the US decades-long commitment to South Korean security. South Korean leaders must juggle the impossible task of remaining on the fence between the two combatants demanding greater alignment. Chinese policymakers take a carrot and stick approach to court Seoul while limiting the war's expansion. They simultaneously deploy additional Chinese ground forces in striking distance of Korea while limiting strikes against US forces on the peninsula to the information domain, with kinetic strikes reserved for those deemed active participants in the war. The purpose of this latter aim is that as long as China respects the UN mandate of US Forces-Korea,¹⁴⁷ this simultaneously shows China's respect for international law and prevents the US from using these troops in the war. Beijing's carrot quietly promises that it will help South Korea reunify the peninsula in the event of a Chinese victory if South Korea ensures US forces remain within their UN role.

Conversely, the United States reaffirms its defense commitments to South Korea with the presence of US forces and their historical ties serving as compelling counter-narratives. The United States also promises additional naval and air forces to secure South Korea's SLOCs from Chinese disruption. Such an example demonstrates the difficulty for states who find themselves playing the rope's role in a tug-o-war between two major powers.¹⁴⁸

Phase II: 10 Days to 18 Months-The Race Against Stalemate

After the shock of the first week's combat losses, the public begins settling into the realities of the new era of war defined by a home front increasingly riddled by widespread cyber-attacks. Both public and private entities continue instituting cyber-defense reforms that curtail the

¹⁴⁷ Republic of Korea, "ROK-UN Relations," Ministry of Foreign Affairs, September 2020, accessed 27 January 2021, <https://www.usfk.mil/About/Combined-Forces-Command/>.

¹⁴⁸ Japan is critical to any US-led coalition. Without Japan, such a coalition would fail before it could form. China knows this and will look to cash in on years of diplomatic and economic courtship with Japan to ensure its failure.

scope and scale of subsequent attacks. As months pass, the people back home revert to ways of living more familiar to their parents and grandparents. They use road maps for travel, watch cable news to avoid digitally-pushed foreign propaganda, and keep bank-certified paper records resembling old checkbooks as a means of insuring against the loss of digital bank records.

Meanwhile, back on the war front, US policymakers recognize that fatally crippling the PLAN and People's Liberation Army-Air Force (PLAAF) in a series of decisive blows is no longer possible and are forced to consider longer-term approaches. The US military strategy transitions to a blockade controlling the maritime chokepoints vital to China's economy. Military commanders immediately transition from an enemy-focused attrition approach to a geographically-focused approach requiring more traditional, close-in combat methods to seize key terrain throughout the region.

Critically, forward-deployed US forces remained and fought within China's A2/AD bubble during the first week's missile barrages to retain the US vital and growing international coalition and the basing provided. These positions of advantage allow allied air, naval, and marine forces to rapidly disperse at the operational-level while remaining tactically concentrated to achieve three vital military objectives without having to wait for reinforcing expeditionary forces.¹⁴⁹ The first two objectives control the maritime chokepoints; the first is to China's South through the Malacca and Sunda Straits, and the second is to the China's North and East through the Tsushima and Soya Straits leading to the Arctic Sea routes now open due to years of climate change.¹⁵⁰ The third objective is to provide a force near Taiwan to deter any Chinese attempt to seize the island by force and prevent Chinese merchant vessels from taking routes around the first

¹⁴⁹ Gale, and Fukada, "Marines Prepare for Rising Challenge from China's Military with Island Training"; Lacey, "The 'Dumbest Concept Ever' Just Might Win Wars"; US Army, TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028*, 34, 37; US Marine Corps, "Expeditionary Advanced Base Operations (EABO)"; US Navy, *Advantage at Sea*, 13-14.

¹⁵⁰ Nicolas LePan, "The Final Frontier: How Arctic Ice Melting Is Opening up Trade Opportunities," World Economic Forum, 13 February 2020, accessed 7 January 2021, <https://www.weforum.org/agenda/2020/02/ice-melting-arctic-transport-route-industry/>.

two objectives. This force must also keep shipping lanes to Taiwan open long enough to ship as many of those vital semiconductors as possible that the US computer-reliant weapons systems require. All three objectives hold the secondary purpose of restricting the PLAN and PLAAF's freedom to maneuver beyond the first island chain..¹⁵¹

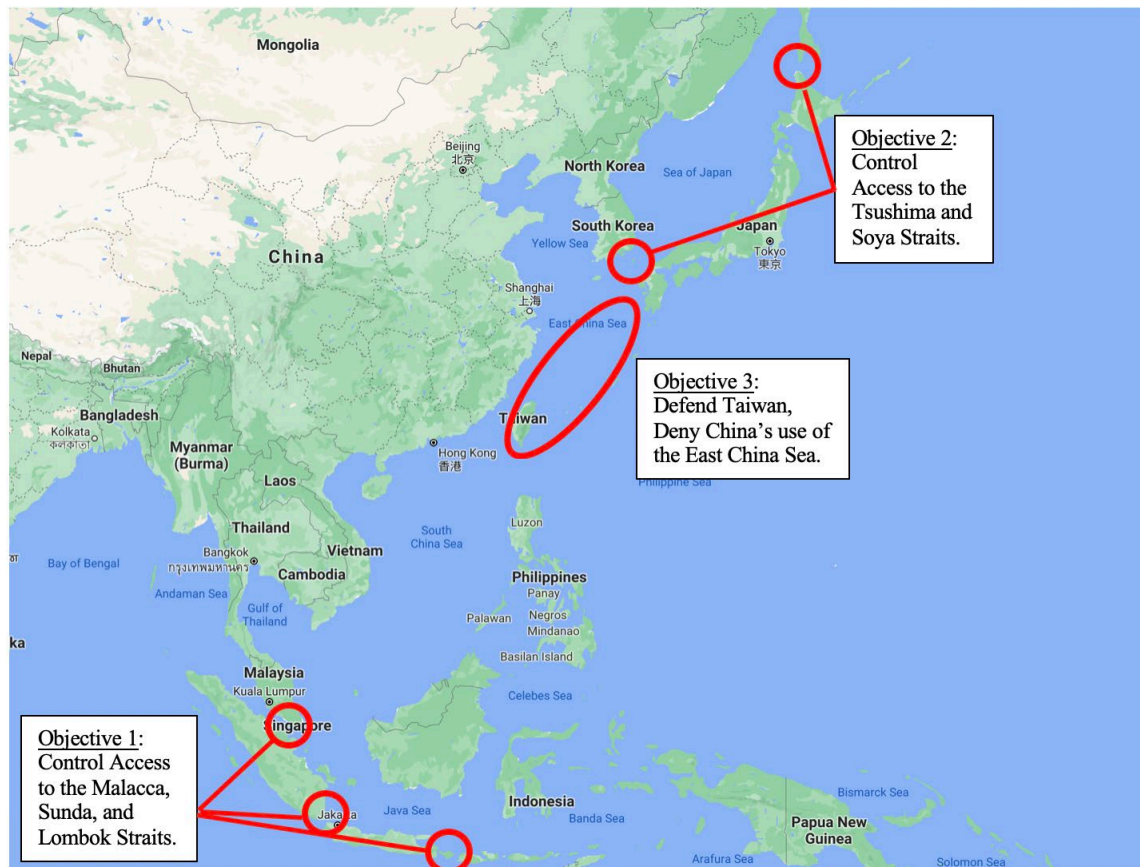


Figure 9. US-led Coalition's Military Objectives. Google, "Taiwan," Google Maps, accessed 23 February 2021, <https://www.google.com/maps/place/Taiwan/@19.1689083,115.5204499,4.21z/data=!4m5!3m4!1s0x346ef3065c07572f:0xe711f004bf9c5469!8m2!3d23.69781!4d120.960515>, overlay created by author.

The allies' strategy is no secret to the Chinese, who have spent years deterring it. Beijing still sees a chance for a quick victory if Chinese forces can break any blockade before it forms and destroy enough allied forces to ensure the PLAN's reach through to the Indian Ocean. A race begins to seize the most commanding locations near these chokepoints to establish air and sea control while the PLAN prepares to strike a devastating blow against allied forces.

¹⁵¹ US Navy, *Advantage at Sea*, 13-14.

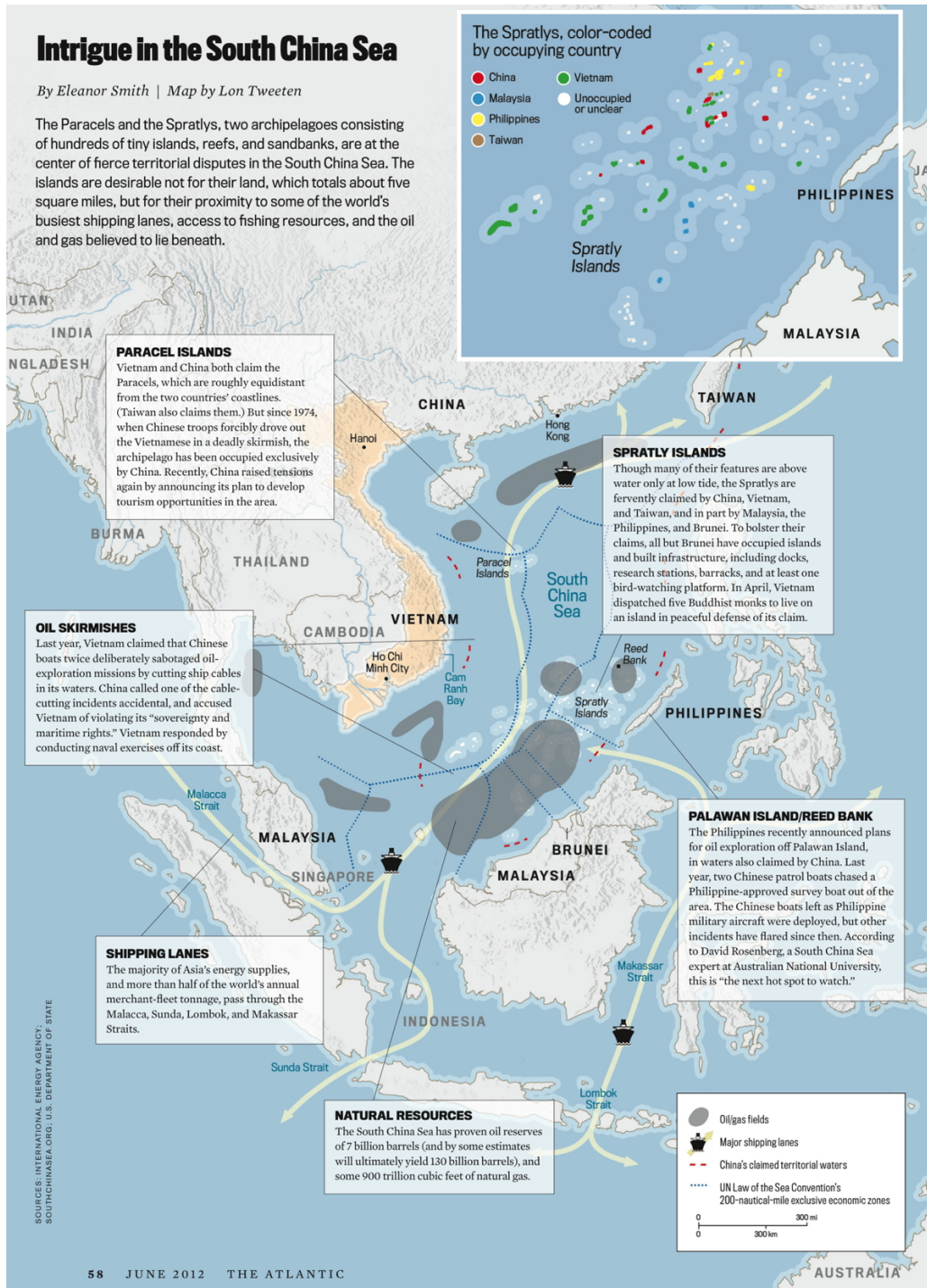


Figure 10. The Islands of the South China Sea and Their Importance. Eleanor Smith, Map by Lon Tweeten, "Intrigue in the South China Sea," *The Atlantic*, June 2012, accessed 16 February 2021, <https://www.theatlantic.com/magazine/archive/2012/06/intrigue-in-the-south-china-sea/308995/>.

For months to come, countless battles rage throughout the region between platoon to battalion-sized ground formations capable of independent operations, all wrestling for control of

countless tiny, often unnamed, and yet operationally significant islands.¹⁵² Naval and air forces struggle to both support ground forces and fight for local sea denial and air superiority. On each island seized, both sides establish anti-air and anti-ship missile systems, long-range precision artillery, and electronic warfare systems, and more. Each island serves as an additional digitally-connected node in a complex network of redundant and overlapping capabilities. When integrated with C4ISR capabilities and AI¹⁵³ to quickly process large amounts of targeting data, this network promises to rapidly find and destroy targets, placing the enemy's operations in a tangled web of dilemmas.¹⁵⁴

Determined not to let the allied blockade go unanswered, Chinese submarines target merchant shipping to disrupt the newly formed trade routes now circumventing these contested chokepoints. The allies can spare few patrols for escort duties as they remain focused on their military objectives. Merchant shipping instead takes longer routes that mitigate danger but raises costs. Diverting shipping bound for the Philippines and Japan via the Indian Ocean is relatively easy. Japan, along with South Korea, also benefit from increased traffic through the Arctic Sea route. However, Taiwan and South Korea's proximity to China leaves them particularly exposed to Chinese efforts to sink or commandeer shipping, further draining allied resources for anti-submarine warfare.

Despite the fierce nature of combat, both sides consider limitations to avoid uncontrollable escalation. A tacit agreement begins to form between the two belligerents where kinetic warfare, with some exceptions, remains mostly in Indo-Pacific waters. The allies focus on

¹⁵² US Army, TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028*, 19.

¹⁵³ Burke et al., 21-22.

¹⁵⁴ US Army, TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028*, 39-40. "Target-centric warfare, or TCW, is "described as a system rather than simply a concept—a 'complex, self-adapting system made up of multiple mutually affecting subsystems' that operate in an organizational structure guided by overarching objectives, missions and tasks (Dong, 2015, 8–9)." "TCW places a premium on information-sharing, delegated decision-making, and adaptable units capable of working in new environments." Burke et al., 17.

Chinese mainland targets such as ports, airfields, factories, oil refineries, and cyber-centers while avoiding targets that might add to the public's war fervor or seem to threaten the CCP's existence and unintentionally escalate the allies' otherwise limited aims. Towards this second aim, the allies exploit more covert means with less attribution, such as cyber, spies, and special operations forces, to cultivate homegrown threats and further drain China's security resources. Except for destroying the US missile and radar capabilities clearly acting outside of their UN-sanctioned role, the Chinese continue to limit their actions against US forces in Korea since simply containing these forces proves cheaper. China also deploys its few nuclear-powered submarines to the US West Coast with limited surveillance missions, preferring the less escalatory, non-kinetic IW strikes on US-based targets.¹⁵⁵ Besides initial attacks on military facilities in places like Guam, China's few kinetic strikes on US soil remain retaliatory to attacks on China's mainland and focus on military facilities, ports, airfields, and corporations integral to the US digital industrial complex.

After several months of combat, it becomes clear to Chinese commanders that they cannot win the race for air and sea control. Instead, they turn to an offensive, months in planning for such an eventuality, designed to break the stalemate. The PLA concentrates its offensive on the more vital southern SLOCs while using interior lines of communication and economy of force efforts to mitigate risk to its eastern and northern flanks. But Chinese commanders seek a unique approach as the more traditional, kinetic-based operations failed to prevent the stalemate. This time, forces operating in the information domain will serve as the main effort, with air and naval forces acting as the exploitation force.

The Chinese have long viewed the US reliance on C4ISR to plan, coordinate, and conduct operations as one of its greatest strengths and weaknesses and that "system warfare" was

¹⁵⁵ Burke et al., 13; US Department of Defense, *Military and Security Developments Involving the People's Republic of China*, ix, 72.

¹⁵⁵ Burke et al., 74.

the answer to victory..¹⁵⁶ However, debates about the information domain's proper place in China's systems warfare concept sidelined many of those advocating for its predominance. Its supporters have long argued that, like the global trend moving beyond the Industrial Age and into the Information Age, the key to victory is also transitioning beyond predominantly industrial militaries to those that harness IW..¹⁵⁷ A seemingly subtle distinction, this concept goes beyond simple hacking in cyber warfare and instead understands that these networks now connect all domains of war, enabling any wartime action from advancing a state's global narrative to placing effects on targets in the physical domains. These networks are the most destructive weapons system on the battlefield, and information is its munition. Whoever holds key terrain in these networks controls information. Whoever controls information wins in all domains. The inability to achieve victory in the physical domains alone now provides an opportunity for China's PLA Strategic Support Force..¹⁵⁸ to take the leading role in breaking the stalemate without resorting to more escalatory means in the physical domains. If the Chinese can cripple the allies in the information domain, victory may be at hand.

Like the first major tank offensive in history at the Battle of Cambrai during World War I, China's experimental offensive achieved the surprise needed to attain initial successes. Unfortunately, like so many concepts first applied in war, poor coordination led to a failure to properly exploit and consolidate their battlefield gains..¹⁵⁹ However, this offensive marks the 2036 Sino-American War as the first war to apply a virtually-centered operational approach and highlights the rising importance of a state's digital industrial base in victory. Nonetheless, this milestone is transparent for those on the front lines fighting battles that, to them, still resemble

¹⁵⁶ Burke et al., 12.

¹⁵⁷ Ibid., 13.

¹⁵⁸ Ibid., 13-14.

¹⁵⁹ History.com Editors, "Battle of Cambrai," Histroy.com, 21 August 2018, accessed 28 February 2021, <https://www.history.com/topics/world-war-i/battle-of-cambrai>.

Industrial Era combat. They otherwise become accustomed to daily cyber-attacks and limit their radio and digital communications to prevent detection and ensure survival. The need to defeat these sophisticated technologies only drives battlefield innovations such as mosaic warfare's use of wireless ad hoc networks.¹⁶⁰ or reversions to generations-old doctrines that enable fighting in what is increasingly an almost digitally silent battlefield. These countermeasures help blunt the initially impressive gains and serve as a means for an effective counter-offensive, returning the war to stalemate.

Economic Impacts

Though steadily rising, US replacement rates still fail to keep up with combat losses even as Congressional funding helps increase production. The United States must rely on greater allied contributions for fighting and materiel needs to offset the imbalance. Military commanders also implement greater centralized control to husband scarce munitions and hard to replace weapons platforms. These limitations lead to higher casualty rates as commanders use more ground forces to make up for the technological shortages.

With commanding shipping and aircraft production capabilities,¹⁶¹ China initially replaces losses as rapidly as they occur. China is not so concerned with its industrial capacity, but rather the blockade diminishing its critical resource stockpiles with every passing day. The allies understand this point and continue targeting China's production facilities to slow replacement rates to more manageable levels in the short-term while racing to increase their replacement rates to match China's in the long-term. In contrast, China adopts a short-term, high-volume

¹⁶⁰ "For communications, composable forces would likely rely on decentralized wireless networks, in which each force element or the commander would only need to communicate with one other force element; messages would then be transmitted through the network and routed to the appropriate participant" Wireless ad hoc networks (WANET). Clark, Patt, and Schramm, *Mosaic Warfare* 38-39.

¹⁶¹ Blanchette, Hillman, and McCalpin, "Hidden Harbors"; Virginia Harrison, "Can China's Plane-Maker Take on Boeing and Airbus?," *BBC News*, 28 April 2019, accessed 25 December 2020, <https://www.bbc.com/news/business-47689386>.

production strategy to support their offensive and overwhelm the still weak allies. China's risk is that if their offensive fails, they will have spent large amounts of irreplaceable resources.

The economic impacts of the war are global from the first days. A recession sets in as markets worldwide adjust to new realities. The warring states find opportunities in these perils to seek economic advantage over the other. Except for the US Indo-Pacific allies, most states hedge against losing favor with the potential winner by refusing to align with either.¹⁶² The EU is the only economic block that breaks this trend, though reluctantly.¹⁶³ Historical ties with the United States, fears of China's growing power, and the realities of what markets remain available during the US blockade leads the EU to side with the United States after the first month of combat.

The US Indo-Pacific allies continue measures to mitigate China's attacks on their SLOCs. Despite the rising costs of business, their economies eventually stabilize. Other than the lost trade with China and the initially devastating loss of Taiwan's semiconductor industry, US trade opportunities remain largely uninterrupted and even begin to grow several months into the recession. The EU's alignment with the United States, the blockade of China, and the US largely undisturbed access to Atlantic and Pacific-based trade routes places it firmly at the center of the world economy.

The economic consequences for China grow with each passing month as the blockade limits their trade and threatens the permanent realignment of many foreign markets to other regions. The acceleration of an already existing global market trend towards African states for industrial needs is a particularly grave long-term threat to China's industry.¹⁶⁴ With economic

¹⁶² States often wait to see when a clear victor emerges and then begin aligning with that state to achieve greater placement in the newly emerging international system, and act known as "piling on." Schweller, "Bandwagoning for Profit," 95.

¹⁶³ States often align based on their sense of the inevitability of what is to come, the so-called "wave of the future." Schweller, "Bandwagoning for Profit," 96.

¹⁶⁴ David Dollar, *China's Engagement with Africa From Natural Resources to Human Resources* (Washington, DC: Brookings Institute, 2016), 83, accessed 27 January 2021, <https://www.brookings.edu/research/chinas-engagement-with-africa-from-natural-resources-to-human-resources/>.

isolation setting in, China's overland trade with the Middle East and Russia grows.¹⁶⁵ These remaining trade routes become major lifelines for China as rationing and more centralized economic planning seek to stave off the blockade's effects.

The US increased military spending coupled with already high national debt levels places greater strain on the government's finances as the sale of war bonds sends the debt-to-GDP ratio skyrocketing beyond 100 percent. A US default risk becomes real as the national debt conspires with rapidly rising inflation to weaken the dollar's strength. The global recession's depths mark the greatest fears of an eventual collapse into a worldwide depression. Through six months of global economic fears, capitalist markets realign to new opportunities, and the outlook begins a slow upward trend. The benefits are particularly pronounced for the US, who, as the world's largest, still globally connected economy, takes a commanding share of the world's markets. This growth once again begins the flow of much-needed tax revenue to fund the war.

Congress raised taxes early in the war when public opinion provided strong support. These policies later become a political concern when many viewed them as targeting individual taxpayers and small businesses more than large, multinational corporations and their executives who retain their wealth offshore in the current tax environment.¹⁶⁶ In response, Congress explores more aggressive international finance transparency laws targeting and prosecute these actors.

China experiences different revenue concerns. The CCP has long prevented its wealthiest members from hiding funds abroad, allowing for greater tax revenue streams.¹⁶⁷ Like the United

¹⁶⁵ Russia will do what is within its power to ensure that a war between the US and China is long and draining. Though Russia may profit from China's need for raw materials and oil, it may avoid direct militarily support to China to avoid becoming embroiled. Russia's aim would be to profit as much as possible while promoting China's and the US' exhaustion, thus raising Russia's relative power.

¹⁶⁶ Demonstrating that money has no national loyalty, Thomas Jefferson, speaking of America's merchant class, lamented their lack of patriotism during the War of 1812, stating, "merchants have no country. The mere spot they stand on does not constitute so strong an attachment as that from which they draw their gains." Founders Online, "Thomas Jefferson to Horatio G. Spafford, 17 March 1814," National Archives, accessed 5 January 2021, <https://founders.archives.gov/documents/Jefferson/03-07-02-0167>.

¹⁶⁷ Tom Metcalf, "China's Rich Can Run from the Taxman, But Hiding Is Harder," BloombergQuint, 22 February 2019, accessed 27 December 2020, <https://www.bloombergquint.com/china/china-s-rich-can-run-from-the-taxman-but-hiding-is-ever-harder>; Rupert Neate, "China Overtakes

States, China also sells war bonds to fund the war effort. China's greatest concern is instead the loss of revenue from international trade duties. Additionally, China's high demand and limited access to competing global markets leave it hostage to price hikes, driving further debt. To compensate, China calls in some debt from abroad, but these efforts yield disappointing results. The global recession has left few states able to pay, and insisting on payment only forces states to choose between default or further alignment with the West. Not until months into the world's economic recovery does China receive any payments, but these remain meager as developing states' recovery trails stronger economies.

The US access to resources from abroad grows more advantageous with time. The US-led blockade strips China's economic demand from the global market, causing an oversupply and subsequent drop in prices of critical raw materials that greatly benefit the United States. China's economic troubles also cause its currency to weaken while the dollar strengthens, further enhancing the US purchasing power.¹⁶⁸ Furthermore, some resources, like oil, already exist domestically, with the United States and Canada as two of the world's largest exporters.¹⁶⁹ The United States taps these excess supplies to generate additional revenue and alleviate its coalition's resource shortfalls.

In contrast, China implements nationwide oil rationing, increased coal mining, and scheduled power blackouts as its remaining overland oil imports fail to keep up with national usage. Though still not enough to compensate, China's world-leading efforts in renewable energy

US in Rankings of World's Richest People," *The Guardian*, 21 October 2019, accessed 27 December 2020, <https://www.theguardian.com/business/2019/oct/21/china-overtakes-us-in-rankings-of-worlds-richest-people>.

¹⁶⁸ Under typical conditions, a strong US dollar can hurt developing economies as their purchasing power becomes increasingly limited, making purchases from other countries using the dollar much more expensive. The US would need to monitor the dollar in such a situation and take measures to ensure that the dollar does not hurt the global market.

¹⁶⁹ Alexandra Twin, "World's Top 10 Oil Exporters," Investopedia, 3 September 2020, accessed 6 January 2021, <https://www.investopedia.com/articles/company-insights/082316/worlds-top-10-oil-exporters.asp>.

help reduce China's overall reliance on other energy sources.¹⁷⁰ Despite China remaining a net importer of food in the run-up to the war, several factors help China address food shortages. First, China's population declined over the last couple of decades,¹⁷¹ offsetting its modest arable land-to-population ratio. Rationing and increased food imports from neighboring states also help. Wartime imperatives contribute to China's increased adoption of genetically modified foods, with steps towards nationwide implementation promising greater relief in coming seasons. Finally, more efficient farming techniques further eliminate food concerns within the limits of available technology and expertise.

Phase III: 18 Months and Beyond-Military Stalemate and Resource Exhaustion

Exhausted, both nations continue fighting within the confines of their resource-imposed limitations. The US military industry is no longer the bottleneck preventing timely combat replacements. For the rest of the war, air platforms and munitions production keep up with and eventually surpass loss rates. The replacement of naval platforms remains troubled as the development of capabilities needed for mass production requires years, though a focus on smaller and even remotely operated ships helps shorten the timeline.¹⁷² The new bottleneck is the intensive training necessary to employ these complex platforms as much more time is needed to train personnel to a minimum degree of survivability. Unlike technology, experience cannot roll off an assembly line.

¹⁷⁰ Climate Reality Project, "11 Countries Leading the Charge on Renewable Energy," Climate Council, 17 July 2019, accessed 6 January 2021, <https://www.climatecouncil.org.au/11-countries-leading-the-charge-on-renewable-energy/>; Scott Malcomson, "How China Became the World's Leader in Green Energy," *Foreign Affairs*, 28 February 2020, accessed 6 January 2021, <https://www.foreignaffairs.com/articles/china/2020-02-28/how-china-became-worlds-leader-green-energy>.

¹⁷¹ Steven Lee Myers, Jin Wu, and Claire Fu, "China's Looming Crisis: A Shrinking Population," *The New York Times*, 17 January 2020, accessed 27 January 2021, <https://www.nytimes.com/interactive/2019/01/17/world/asia/china-population-crisis.html>.

¹⁷² Mallory Shelbourne and Sam LaGrone, "SECDEF Esper's 'Battle Force 2045' Plan Still Awaiting White House Approval," *USNI News*, 21 October 2020, accessed 24 February 2021, <https://news.usni.org/2020/10/21/secdef-espers-battle-force-2045-plan-still-awaiting-white-house-approval>.

In a role reversal, Chinese production now fails to keep up with attrition rates. The allied blockade, attacks on Chinese production facilities, and China's failed offensive have conspired to reduce China's resources dramatically. Consequently, China relies increasingly on civilian vessels, its inferior coast guard, and Russian-bought aircraft to offset shortcomings.

Despite China's failed offensive, both sides come away with an appreciation for the IW's ability to achieve success, albeit with different conclusions. Though the allies adapted quickly to China's IW-led offensive on the battlefield, it achieved great strategic-level success with low resource costs. Conversely, the allies focus more on IW's operational-level benefits after China nearly broken their blockade and now look to incorporate those lessons in their own planned offensive.

Encouraged by the role reversal of US and Chinese industrial production rates and China's losses in the last offensive, the allies develop plans to break the PLA's hold in the Indo-Pacific. Mimicking China's last offensive, the allies plan to execute a sweeping IW campaign to cripple China's digitally-integrated battle network while selling the appearance of a southern offensive. In reality, allied forces will exploit gains from the IW campaign with thrusts to China's North and East, where China is weakest.

The Chinese also find opportunity in their recent failures. In a new deception campaign, easily sold by virtue of being true, leaked Chinese communications emphasize its naval and air forces' weakness, further validating allied plans. Meanwhile, the People's Liberation Army-Army (PLAA) remains relatively fresh, having seen little wartime action outside of limited feints against US forces in South Korea. With allied forces in Korea long since lulled into a false sense of security, China believes that a joint PLAA and North Korean invasion will achieve strategic surprise needed to swiftly unite the peninsula and hold the fate of US forces hostage to a favorable negotiated peace. The now weak PLAN and PLAAF forces need only to disrupt allied efforts to relieve the peninsula long enough to ensure victory.

Once launched, the offensive places the allies in an immediate crisis with few remaining resources to support forces on the peninsula after the losses from China's last offensive. In a role reversal, Chinese forces now blockade the allies' desperate attempts to save their forces from destruction. The allies must strike with the resources on hand. However, forces in South Korea have long prepared for such an attack, and relatively strong economic links to the outside world throughout the war ensure that allied forces remain prepared. Allied forces need only delay the invasion long enough to break the fragile Chinese blockade.

Economic impacts

Frontline developments renew prospects of further stalemate while previous economic trends continue. The US military industry finally keeps up production rates with combat losses, with prospects to soon surpass those numbers. Acquisition of less complex weapons requiring minimal training enable faster fielding and begin achieving limited payoff, though tech-heavy assets are still needed to overcome China's large force numbers and the vast distances of the front lines. In contrast, China's large population provides a substantial talent pool from which to draw combat replacements, and the limited complexity of Chinese weapons reduces training time. Additionally, the short distances to the front lines require few technological leaps. However, China is fielding ever-fewer platforms and munitions as its access to needed raw materials diminish.

The US economy's global economic connectivity remains unimpeded, and its market share continues growing, with much of the global market's realignment irreversible. Ties between Africa, South America, the United States, and the EU grow tighter, particularly with industrial-based economies and those with critical wartime resources.

The US blockade continues to distance China from overseas markets, with overland routes excepted. Though these overland trading partners are numerous, they still cannot offset losses to China's overseas resources and trade revenue. The situation is increasingly clear to many debtor states that China's attempts to recall debt is unenforceable, which only compounds

China's revenue concerns. However, some states do choose to pay as they look for good relations with China beyond the war. Altogether, without the funding and access necessary to procure critical resources, China's war efforts will eventually grind to a halt along with its production capabilities.

Conclusion

A long war between the United States and China tests their economies differently, with implications to their strategic and operational approaches. Both states find themselves in their own economic races. For the US, either a short or long war is most advantageous, with the period between these two possibilities fraught with uncertainty. Failing a more desirable short victory, the United States must prepare for a protracted war of attrition for which it maintains few men and materiel to prosecute with certainty. Victory's key then shifts from the military's ability to win to its ability to merely hold on, desperately buying time until the economy can produce war materials fast enough to keep up with losses. Until then, victory is precariously uncertain.

A prolonged war, though much more uncertain, may bring greater strategic rewards in victory. Every passing day of a blockade hurts China's economy and solidifies the US as the global economy's center. If the United States still loses militarily, though potentially catastrophic to the current world order, its enhanced economic position could serve as a springboard for a rapid strategic return. After all, it is often the loser that learns the most precious lessons from war.

The longer China is at war, the more uncertain is its future. The more rapid the victory, the greater the strategic reward, as China would maintain its globally-central economic role while simultaneously defeating the world's most powerful military. China's global power would be at its historic peak. A long war holds uncertain prospects for China. A successful US blockade and an inability to defeat the United States diminishes China's role in the global economy and leaves it vulnerable to enemies at home and abroad. Having already benefited from China's economic desperation, states like Russia might take further advantage of China's strategic vulnerability. The

CCP, ever fearful of losing legitimacy at home, may only exacerbate China's precarious position if the CCP overreacts while attempting to control domestic threats. In short, China's strategic position presents it more paths of uncertainty and risk.

Readers may convincingly argue for different actions and consequences in this scenario. What is important, however, is imagining the long-term economic implications or other driving forces of a potential Sino-American war. Indeed, this research is not finished without the completion and comparative analysis of the other three scenarios proposed earlier. Without a doubt, a protracted Sino-American war would be destructive and undesirable for the world. However, the military professional must explore these possibilities to ensure that the country is prepared. Imagining plausible futures does just that by better preparing US and allied strategists to prevent war and ensure continued advantage in competition.

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