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Defence Acquisition and Military Investment in an Increasingly Competitive World

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DEFENSE ACQUISITION AND MILITARY INVESTMENT IN AN INCREASINGLY COMPETITIVE WORLD

By Major D.A. Lee

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ABSTRACT

Defense acquisition, military investment and budgeting, and access to raw materials are all critical aspects of national security and underpin a country's ability to defend itself and project power overseas. Unfortunately, these important subjects are often overshadowed by studies focused on emerging technology, expeditionary operations, or other aspects of national defense that are more en vogue or more easily understood.

This paper suggests that while seemingly dry, such areas are worthy of further study and attention given the return of great power rivalry between the United States, China, and Russia. Moreover, the effects of the COVID-19 pandemic have readily demonstrated that a nation's dependence on international supply chains can diminish that country's underlying national security. The paper ultimately suggests that the broad renewal of interest in restoring national capacities should be harnessed and focused on key areas such as critical infrastructure to maximize the 'defense dividend' of such investments.

By considering a range of subjects – such as the defense industrial base, rare earth elements, the importance of critical infrastructure, and both fiscal and monetary policy – across its four chapters, this paper seeks to provide readers with an entrée into what may otherwise seem an esoteric area of scholarship, and to provide would-be researchers with a solid base of unclassified sources for further study.

INTRODUCTION

The approximately $700 billion annual budget of the United States Department of Defense makes it the most expensive organization in the world. Given its cost, understanding the functioning of such a large organization and how it employs its budget on behalf of the American people is worthy of ongoing study. However, according to David Sorensen, "scholarly work in the field of defense acquisition has largely dried up."[1]

Despite any recent inattention, the topics of defense acquisition, military investment, and access to raw materials all remain critical aspects of national security and underpin the United States' ability to defend itself and project power overseas. Despite their importance, these vital subjects are often overshadowed by research focused on emerging technology, expeditionary operations, or other aspects of national defense that are more en vogue or more readily understood and consumed by a broader audience.

However, the COVID-19 pandemic provides a ready lens to consider issues related to defense acquisition such as supply chain management. For many, the first sign of problems with globalized supply chains came when COVID-19 vaccine shipments were delayed. Those who have taken the regular functioning of our globalized system for granted were likely taken aback by this development, which would have seemed impossible little more than a year ago.

As parts of the system began to break down, average citizens worldwide took notice. How could governments force businesses to break their contracts with other nations? Who decided which country received its vaccines first? Perhaps most importantly, people wondered why vaccines couldn't be produced in their own country instead of being manufactured halfway

[1] David S. Sorenson, *The Process and Politics of Defense Acquisition* (London: Praeger Security International, 2009), viii.

around the world. Many understandably view the COVID-19 vaccine supply situation as both a national and international crisis. However, it also presents an opportunity for citizens to turn their focus inward and ask difficult questions of themselves and their governments.

Prior to COVID-19's emergence, close observers of recent American politics would have noted the issuance of Executive Orders from both the Trump and Biden administrations addressing critical supply chains and the supply of rare earth metals. The publication of these Executive Orders likely marked the first occasion many Americans considered the vulnerability of American supply arrangements, especially in an age of just-in-time delivery.

As the world's sole superpower, it is worthwhile to consider what kind of national investments and priorities the United States has made in order to maintain its position atop the global power structure. Given the public statements made by some of its leaders it is also worth considering whether or not such investments will be continued, and whether it is either possible or desirable to attempt to fundamentally reshape American society in the wake of a once-in-a-century pandemic.

Structure & methodology

This paper is organized into four standalone chapters that are centered on the contemporary American experience in defense acquisition, military budgeting, and defense investment.

The first chapter examines the meaning and importance of defense acquisition, highlighting its resource- and money-intensive nature. Given the high profile given to concerns about steel and aluminum imports during the Trump administration, Chapter 1 also examines the state of both domestic industries as well as the Trump administration's focus on restoring and

reshoring aspects of the United States' manufacturing capacity. This leads into the chapter's consideration of the current state of the US defense industrial base.

The second chapter looks at the functioning of resource allocation in an increasingly competitive world, using some of China's actions (and American reactions) to frame the importance of access to raw materials and the necessity of trading partners. Starting with a look at China's industrial and economic ascent, the chapter then pivots to consider China's recent Belt and Road Initiative. The subject of rare earth elements gives focus to this chapter, which also includes a discussion of the return to great power rivalry between the United States, China, and Russia.

The third chapter outlines some of the growing challenges facing the American military today, including the limits of just-in-time supply chains and American initiatives aimed at increasing resilience in its supply relationships. A brief selection of near-future military threats is also presented to provide potential signposts for further research. The concept of Black Swan events as popularized by Nassim Nicholas-Taleb is also employed as both a model for considering the impact of unforeseen events and an impetus for building resilience into national systems. Finally, given that money is of paramount importance to national defense capacity, the third chapter examines recent fiscal and monetary policy in the United States and considers how COVID-19 stimulus spending represents both a risk and an opportunity for defense investment.

The paper's fourth and final chapter considers the perspective of international organizations that believe the pandemic represents an opportunity to 'build back better'; the World Economic Forum stands in as a proxy for globalists while the case of COVID-19 'vaccine nationalism' is used to critique the purported benefits of globalization. Finally, the chapter concludes with a consideration of the Biden administration's recent stimulus initiatives.

The paper draws on primary sources generated by governments or global institutions whenever possible throughout its component chapters. In the first three chapters of this paper, many primary sources produced by the American federal government are referred to and provide a basis for further research.

By necessity, the paper's final chapter draws on many accounts from the popular press to capture the contemporary public sentiment toward globalization, vaccination timelines, and governmental performance during the pandemic. While these sources are by no means 'the last word' on COVID-19 or the rollout of related vaccines, they collectively capture a particular moment in time – late 2020 to early 2021, a period marked by the discovery of vaccines and their initial, uneven rollout.

Finally, readers should note that due to length considerations this paper does not contain a standalone theory or literature review. Instead, the dominant literature and contending schools of thought are examined throughout the body of the paper as they relate to specific critical areas of inquiry.

CHAPTER 1 – THE MEANING AND IMPORTANCE OF DEFENSE ACQUISITION

This chapter provides a foundation for the chapters that follow by outlining some of the resources – in terms of raw materials and monetary investments – that the United States military requires to build, operate, and maintain its forces.

To do so, the chapter makes extensive use of primary sources from the US Geological Survey (USGS), the US Department of Defense's comptroller, and the results of an extensive review of the American defense industrial base (DIB) ordered by the Trump administration in 2017. In order to focus its discussion about parts of the American procurement process the example of the Lockheed Martin F-35 Lightning II (also known as the Joint Strike Fighter) has been utilized; the aircraft provides a ready focal point due to its high profile and status as the single-most expensive military procurement in history.

1.1 Contemporary issues for procurement – the case of the F-35

While exhaustive studies have been published detailing the challenges encountered by western military procurement processes, this paper lacks the scope to provide a full examination of all of them. Instead, this chapter will focus on some of the most well-known contemporary issues for the United States' DIB.

The process of fielding any one piece of advanced equipment is expensive and time-intensive – gone are the days of quickly retooling the production lines of Detroit's automakers to meet the urgent needs of the American military. Instead, timelines to design, manufacture, and field an advanced weapon system can span decades.

The F-35 Lightning II fighter jet is emblematic of the rising costs in defense acquisition. According to author Sean McFate, the F-35 is "the most expensive weapon in history. The United States has sunk $1.5 *trillion* into this airplane – more than Russia's GDP."[2] McFate estimates each plane costs approximately $120 million to build, and describes America's ongoing commitment to the aircraft as part of its 'technological utopianism' – a belief that additional advanced technology will solve problems on its own, an ethos that McFate describes as "part of the Western way of war."[3]

In terms of initial acquisition expenses, a 2020 US Government Accountability Office (GAO) report lists a total price of $428 billion dollars for the F-35, which equates to the purchase of 2,470 aircraft by the U.S. by the 2044 fiscal year.[4] The GAO also notes that the US Department of Defense (US DoD) has been developing the F-35 for over 19 years, and that as of 2020 it had yet to be determined whether or not the F-35 would be "operationally effective and suitable."[5] A 2019 GAO report was more succinct, stating upfront that "F-35 aircraft performance is falling short of warfighter requirements – that is, aircraft cannot perform as many missions or fly as often as required."[6]

The spending associated with military procurement can be difficult to curtail once a project has been initiated. This is largely attributable to how modern military production is carried out within the United States; the F-35 once again provides a ready example. A feature of the manufacturing base needed to build and maintain the F-35 is how geographically diverse it is

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[2] Sean McFate, "Rule 2: Technology Will Not Save Us," in *The New Rules of War* (William Morrow, 2019), 44.

[3] Ibid., 46.

[4] US Government Accountability Office (GAO), "F-35 Joint Strike Fighter: Actions Needed to Address Manufacturing and Modernization Risks," 2020, 1, https://www.gao.gov/products/GAO-20-339.

[5] Ibid.

[6] US Government Accountability Office (GAO), "F-35 Aircraft Sustainment: DOD Needs to Address Substantial Supply Chain Challenges," 2019, sec. Highlights, https://www.gao.gov/products/gao-19-321.

– especially within the United States. In 2014 subcontracts had been granted to over 1,300 companies spread across 45 states[7], with every state aside from Hawaii, Alaska, Wyoming, and Nebraska having economic ties to the F-35 project.[8] As of this paper's writing, according to an interactive 'economic impact map' maintained by Lockheed Martin (the manufacturer of the F-35), the only remaining state with zero economic ties to the F-35 is Hawaii.[9] According to the manufacturer, the number of suppliers based in the United States and Puerto Rico has also increased to more than 1,800 companies, which Lockheed Martin claims support over 254,000 jobs in the US.[10]

The dispersed footprint of the F-35's production and supply chains creates a national vested interest in the continuance of the project despite cost overruns.[11] Moreover, the implications of limiting spending related to the project – or canceling it outright – would be felt by business and political leaders across the nation. As one critic puts it, "The F-35 was designed to evade not just enemy fighters, but political accountability as well."[12]

Lastly, the F-35 itself is extremely complex. The aircraft's software uses approximately eight million lines of code, and its tailor-made maintenance and supply software requires a further 24 million lines of computer code. Both sets of software are still plagued by bugs, with government auditors claiming the plane's software "is as complicated as anything on earth."[13]

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[7] Paul Waldman, "How the F-35 Boondoggle Shows That Deficit Hawkery Is a Sham," *Washington Post*, July 25, 2014, https://www.washingtonpost.com/blogs/plum-line/wp/2014/07/25/how-the-f-35-boondoggle-shows-that-deficit-hawkery-is-a-sham/.

[8] Jeremy Bender, Armin Rosen, and Skye Gould, "This Map Shows Why the F-35 Has Turned into a Trillion-Dollar Fiasco," *Business Insider*, August 20, 2014, https://www.businessinsider.com/this-map-explains-the-f-35-fiasco-2014-8.

[9] Lockheed Martin, "F-35 Lightning II - Economic Impact," 2021, https://www.f35.com/f35/about/economic-impact.html.

[10] Lockheed Martin, "F-35 Lightning II Program Status and Fast Facts," 2021, https://www.f35.com/f35/mediakit.html.

[11] Waldman, "How the F-35 Boondoggle Shows That Deficit Hawkery Is a Sham."

[12] Ibid.

[13] McFate, "Rule 2: Technology Will Not Save Us," 45.

More pressingly, such holes in the software could create vulnerabilities for enemy hackers to exploit. Though the debate over the effectiveness and costliness of the F-35 is ongoing and also has Canadian implications, this paper lacks the depth to more fully consider the topic here.

What the example of the F-35 demonstrates, though, is that military procurement has become increasingly complex, costly, and difficult to constrain, while the long developmental timelines associated with such projects means military systems can arrive late-to-need and may be mismatched to the current threat environment.

Underlying America's national capability to design and build systems like the F-35 is its DIB. The GAO defines the DIB as "the combination of people, technology, institutions, technological know-how, and facilities used to design, develop, manufacture, and maintain the weapons needed to meet U.S. national security objectives."[14] Elsewhere, the DIB is conceptually combined with America's manufacturing capacity to form the broader American industrial base, which "supports economic prosperity and global competitiveness, and arms the military with capabilities to defend the nation."[15] A third definition speaks to both the public and private aspects of the DIB, and states that the DIB (along with American manufacturing writ large) is "the end-to-end set of capabilities, both private and public, that design, produce, and maintain the platforms and systems (hardware and software) on which our Warfighter depends."[16]

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[14] US Government Accountability Office (GAO), "Defense Industrial Base - Integrating Existing Supplier Data and Addressing Workforce Challenges Could Improve Risk Analysis" (Washington, D.C., 2018), 5, https://www.gao.gov/assets/gao-18-435.pdf.

[15] United States Department of Defense, "Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States - Report to President Donald J. Trump by the Interagency Task Force in Fulfillment of Executive Order 13806," 2018, 1–2, https://media.defense.gov/2018/Oct/05/2002048904/-1/-1/1/ASSESSING-AND-STRENGTHENING-THE-MANUFACTURING-AND DEFENSE-INDUSTRIAL-BASE-AND-SUPPLY-CHAIN-RESILIENCY.PDF.

[16] Ibid., 15.

The current state of the DIB will be examined in the final section of this chapter. Before doing so, it is worthwhile to consider some of the inputs that such an industrial base requires in terms of raw materials and money.

1.2 Key resource needs of the US military – the case of steel

Ascertaining the precise resource needs of the US military is difficult in an unclassified environment; while military budget estimates and financial details are broadly disseminated as matters of law and public accountability, exact specifications regarding the underlying raw material requirements needed to sustain the American military are difficult to come by.

While a 2018 notice from the Department of the Interior provided a list of 35 minerals deemed critical to American national and economic security[17], the underlying draft report by the USGS does not include forecasts on usage or demand of the critical minerals.[18] However, the agency's Mineral Commodity Summaries reports help to fill this informational gap with raw data. For example, the USGS estimates that $300 million of cobalt (one of the 35 critical minerals, and used in jet engines and rechargeable batteries) was consumed in 2020, but that 76% of this amount was imported; American mines produced 600 metric tons of cobalt and another 2,100 metric tons were recovered via scrap, but 8,700 metric tons were needed to support American industry.[19] Rare earths make up much of the 35-mineral list drafted by the USGS and will be examined in greater depth in the paper's second chapter.[20]

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[17] US Department of the Interior, "Final List of Critical Minerals 2018," *Federal Register* 83, no. 97 (2018): 23295–96, https://www.federalregister.gov/d/2018-10667.

[18] Steven M. Fortier et al., "Draft Critical Mineral List - Summary of Methodology and Background Information" (Reston, VA, 2018), https://doi.org/10.3133/ofr20181021.

[19] US Geological Survey, "Cobalt," *Mineral Commodity Summaries* (Reston, VA, 2021), https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-cobalt.pdf.

[20] US Geological Survey, "Rare Earths," *Mineral Commodity Summaries* (Reston, VA, 2021), https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-rare-earths.pdf.

Though USGS data is available regarding these minerals and other products like iron and steel, the USGS does not provide estimates on military usage despite the critical linkage to national security made by the Department of the Interior. This phenomenon extends to the private sector as well. For example, in 2013 the Alliance for American Manufacturing (AAM) produced a 357-page report entitled *Remaking American Security: Supply Chain Vulnerabilities & National Security Risks Across the U.S. Defense Industrial Base.* While the report provides details on American manufacturing and production capabilities for key sectors such as steel armor plate, no definitive list of resource quantities is included.[21] Thus, in an effort to demonstrate how the raw resource requirements earmarked for military usage are largely approximated, the remainder of this section focuses on what the Trump administration considered a vital national security interest – American steel production.

The U.S. Department of Commerce's Bureau of Industry and Security (BIS) periodically produces reports that consider particular resource types. Dubbed 'Section 232' reports due to their authorization under that section of the Trade Expansion Act of 1962, the documents provide detail on key sectors. A 2018 report entitled *The Effect of Imports of Steel on the National Security* represents the most recent report published by the BIS. Though its main aim can be discerned from its title, it also includes an analysis of "domestic production needed for projected national defense requirements; the capacity of domestic industries to meet such requirements… and the capacity of the United States to meet national security requirements."[22]

[21] Alliance for American Manufacturing, "Remaking American Security: Supply Chain Vulnerabilities & National Security Risks Across the U.S. Defense Industrial Base," 2013, https://www.americanmanufacturing.org/wp-content/uploads/2021/02/Remaking-American-Security.pdf.

[22] US Department of Commerce, "The Effect of Imports of Steel on the National Security," 2018, 1, https://www.commerce.gov/section-232-investigation-effect-imports-steel-us-national-security.

The report has much in common with a 2001 BIS report entitled *The Effect of Imports of Iron Ore and Semi-finished Steel on the National Security*.[23] Comparing the 2018 report to the 2001 publication reveals some obvious differences; while the latter version is not a perfect analogue of the 2001 report, BIS lists these reports adjacent to each other on its Section 232 website.[24] Though 17 years passed between the publication of the two reports, it is noteworthy that no other Section 232 reports were published in the interim.

The 2001 report lists three broad findings in its table of contents:

> 1) Iron ore and semi-finished steel are important to U.S. national security,
> 2) U.S. national security is not dependent on imports of iron ore or semi-finished steel, and
> 3) Imports of iron ore and semi-finished steel do not fundamentally threaten to impair the capability of the U.S. iron ore and semi-finished steel industries to satisfy national security requirements.[25]

Though modeled on the 2001 iteration, the 2018 report on steel is markedly different in its tone after a similar first finding:

> 1) Steel is important to U.S. national security,
> 2) Imports in such quantities as are presently found adversely impact the economic welfare of the U.S. steel industry,
> 3) Displacement of domestic steel by excessive quantities of imports has the serious effect of weakening our internal economy, and
> 4) Global excess steel capacity is a circumstance that contributes to the weakening of the domestic economy.[26]

Though declarative, such statements are light on specifics – as is indeed the case with much of the 2018 report. As an example, the report states that the US DoD has "a large and ongoing need

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[23] US Department of Commerce, "The Effect of Imports of Iron Ore and Semi-Finished Steel on the National Security," 2001, https://www.bis.doc.gov/index.php/documents/section-232-investigations/81-iron-ore-and-semi-finished-steel-2001/file.

[24] Bureau of Industry and Security, "Section 232 Investigations: The Effect of Imports on the National Security," 2020, https://www.bis.doc.gov/index.php/other-areas/office-of-technology-evaluation-ote/section-232-investigations.

[25] US Department of Commerce, "The Effect of Imports of Iron Ore and Semi-Finished Steel on the National Security," i–ii.

[26] US Department of Commerce, "The Effect of Imports of Steel on the National Security," sec. Table of Contents.

for a range of steel products" needed as an input to make weapons systems. Close reading of the report reveals that annual DoD requirements are pegged at approximately 3% of domestic steel production[27], a figure that is mirrored by the private sector in the 2013 AAM report.[28] Such a low level hardly screams 'national security crisis', and as Hasik notes, imported steel hasn't been a threat to American national security in the past, it does not constitute such a threat today, nor is it likely that it will become one in the future.[29]

Nevertheless, the Department of Commerce's outlook on steel imports changed drastically between 2001 and 2018. While this may not be a surprise given that nearly two decades had passed between the reports' publication, it is worth noting the political climate that shaped the more recent report. Indeed, the 2018 report's genesis during 2017 was politically charged, with U.S. Secretary of Commerce Wilbur Ross receiving direction from President Trump to investigate the effect of steel imports.[30] It is also noteworthy that the finished 2018 report recommended the American government impose steel tariffs on nations that exported steel to the United States[31], which had been the intent of the Trump administration since the outset.[32] Seemingly anticipating pushback on the political front, the report cites the precedent of six previous administrations that employed quotas or tariffs to curb steel imports.[33]

The section above demonstrates that the military's reliance on American steel production is minimal and does not constitute a critical situation for national security. However, it may also

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[27] Ibid., 23.

[28] Alliance for American Manufacturing, "Remaking American Security: Supply Chain Vulnerabilities & National Security Risks Across the U.S. Defense Industrial Base," 22.

[29] James Hasik, "Is Imported Steel a Threat to American National Security?," *The Atlantic Council*, 2017, https://www.atlanticcouncil.org/content-series/defense-industrialist/is-imported-steel-a-threat-to-american-national-security/.

[30] US Department of Commerce, "The Effect of Imports of Steel on the National Security," 18.

[31] Ibid., 7–8.

[32] Bob Woodward, *Fear: Trump in the White House* (New York: Simon & Schuster, 2018), chap. 17.

[33] US Department of Commerce, "The Effect of Imports of Steel on the National Security," 6.

imply that the military's overall reliance on American manufacturing is less than popularly imagined. This theme will be explored in this chapter's final section. Having touched on the nature of raw material inputs for the DIB, the intervening section now considers the importance of money.

1.3 Considering the expense of acquisition, operations, and maintenance

Former Secretary of Defense James Mattis has been quoted as stating that "No nation in history has maintained its military power if it failed to keep its fiscal house in order."[34] While this concept will be more fully explored in the third chapter of this paper, Mattis' credo is indicative of the close relationship between military strength and national financial capability.

Though the example of the F-35 presented in this chapter's opening section demonstrates the cost of the single-most expensive military project in American history, a brief discussion regarding the ongoing costs of acquisition, operation, and maintenance of American military forces is necessary here to situate the regular costs of defense in peacetime.

The sheer size of the American military apparatus can be difficult to comprehend – the overall organization is massive. At the end of fiscal 2020 the American Army was operating nearly 18,000 tanks and an equal amount of combat vehicles, the Navy and Marine Corps totaled 235 ships in inventory with an additional 71 submarines (as well as over 4,000 aircraft), and the Air Force was responsible for over 6,300 aircraft and nearly 400 intercontinental ballistic missiles (ICBMs).[35] The DoD is also one of the nation's largest employers, with roughly 1.3 million personnel in the Active Component (the American equivalent of the CAF's Regular

[34] McFate, "Rule 2: Technology Will Not Save Us," 46.

[35] United States Department of Defense, "Agency Financial Report Fiscal Year 2020," 2020, 6–8, https://comptroller.defense.gov/odcfo/afr2020.aspx.

Force), approximately 800,000 National Guard and Reserve members, and over 775,000 civilian employees.[36] The DoD is responsible for approximately 4,800 real estate holdings spanning 26.9 million acres around the world, with properties in 45 foreign countries, all 50 states, and 8 American territories.[37] Not surprisingly, the American DoD is the most expensive organization in the world.[38] Thus, as suggested by David Sorensen in his handbook on defense acquisition, "in the name of good citizenship alone, it is highly useful to understand at least something about the defense acquisition system."[39]

Funding the United States military on an annual basis is extremely expensive for the American taxpayer. Outlays for discretionary spending on national defense totaled $676 billion dollars in 2019, or roughly half of all discretionary spending.[40] Within this figure, operations and maintenance accounted for $271 billion dollars of spending, with the next largest expense being military personnel at $148 billion.

DoD's fiscal year 2021 'green book' report – the common name for the department's National Defense Budget Estimates – lists total departmental discretionary spending for FY19 at $687.8 billion.[41] Figures released by NATO in October 2020 closely mirror those produced by American federal agencies, listing total US defense spending in 2019 as $730 billion and accounting for 3.51% of national GDP.[42]

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[36] Ibid., 14.

[37] US Department of Defense, "Base Structure Report, Fiscal Year 2018 Baseline" (Washington, D.C., 2018), 7, https://www.acq.osd.mil/eie/BSI/BEI_Library.html.

[38] Sorenson, *The Process and Politics of Defense Acquisition*, vii.

[39] Ibid.

[40] Congressional Budget Office, "The Federal Budget in 2019," 2019, https://www.cbo.gov/publication/56326.

[41] United States Department of Defence, "National Defense Budget Estimates for FY 2021," 2020, 1, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2021/FY21_Green_Book.pdf.

[42] North Atlantic Treaty Organization, "Defence Expenditures of NATO Countries (2013-2020)" (Brussels, 2020), 6–8, https://www.nato.int/cps/en/natohq/news_178975.htm.

This range of figures – $676 billion, $687.8 billion, and $730 billion – illustrates that exact figures on defense spending can be difficult to find, and variations persist across different national estimates and reports. This may be partly due to the many accounting irregularities pointed out within DoD's Agency Financial Report; the report for the 2020 fiscal year outlined 26 'material weaknesses' and four 'significant deficiencies' that "could adversely affect DoD financial operations."[43] These oversights include accounting adjustments made without supporting evidence, poor inventory controls, and errors in account reconciliation that led to disparities of $4.5 billion between military accounts.[44] Nevertheless, a 'ballpark' figure of $700 billion per year provides a rough gauge of current annual American military spending.

A 2020 report by the Congressional Budget Office (CBO) notes that the Trump administration requested a military budget of $706 billion for fiscal 2021, which marked a 4% decrease from 2020's appropriation.[45] $637 billion of that amount is earmarked for the 'base' portion of the budget, "which is intended to fund normal, peacetime activities, such as day-to-day military and civilian operations and the development and procurement of weapon systems."[46] The $69 billion in remaining funds is allocated for overseas contingency operations (OCO) and emergency requirements.

Looking at the next few years, the CBO suggests that American defense spending is forecast to remain stable through 2025 at approximately $707 billion per year in 2021 dollars.[47] However, in the 10 years beyond 2025, CBO estimates that inflation-adjusted defense spending will increase by roughly 10% each year between 2025 and 2035, thus totaling approximately

[43] United States Department of Defense, "Agency Financial Report Fiscal Year 2020," 83.
[44] Ibid., 83–96.
[45] Congressional Budget Office, "Long-Term Implications of the 2021 Future Years Defense Program" (Washington, D.C., 2021), 1, https://www.cbo.gov/publication/56526.
[46] Ibid.
[47] Ibid., sec. At a Glance.

$781 billion by 2035.[48] Still, DoD's own budget overview notes that as a percentage of the national economy, the FY 2021 budget is "near a record post-World War II low."[49]

While this section is not meant to be exhaustive, paired with the example of the F-35's acquisition and cost overruns it should provide readers with an idea of the scope of the American military's expense. It should also be clear that the defense enterprise in the United States requires ongoing, significant investment to continue its operations.

Having established that defense acquisition requires both raw material inputs and an influx of money, this chapter's final section touches on the current state of the DIB in the United States.

1.4 The current state of the US defense industrial base

While two Executive Orders from the Trump administration addressing rare earth elements (REE) will be addressed in greater depth in the second chapter of this paper, a separate Executive Order (EO 13806) from 2017 entitled *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States*[50] looms large in the current discussion about the American DIB.

Published on 21 July 2017, EO 13806 begins by stating that "A healthy manufacturing and defense industrial base and resilient supply chains are essential to the economic strength and

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[48] Ibid.

[49] United States Department of Defense, "Defense Budget Overview - Irreversible Implementation of the National Defense Strategy," 2021, 1–13, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2021/fy2021_Budget_Request_Overview_Book.pdf.

[50] United States of America, "Executive Order 13806 of July 21, 2017 - Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States," *Federal Register - Presidential Documents* 82, no. 142 (2017): 34597, https://www.federalregister.gov/documents/2017/07/26/2017-15860/assessing-and-strengthening-the-manufacturing-and-defense-industrial-base-and-supply-chain.

national security of the United States."[51] Leading from this contention, EO 13806 also states that "A comprehensive evaluation of the defense industrial base and supply chains… will provide a necessary assessment of our current strengths and weaknesses."[52] Finally, the Executive Order directed that an unclassified report be provided to President Trump within 270 days of EO 13806's publication.[53]

The direction of Trump's EO 13806 led to the production of a similarly-entitled report called *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States*; the report's cover notes that it was prepared 'In Fulfillment of Executive Order 13806"[54] While its publication in September 2018 was beyond the initial deadline directed by President Trump, the 146-page report is nevertheless an excellent starting point to consider the state of America's DIB. Readers should note that the unclassified version of the report is cited in this paper; any classified annexes have not been widely disseminated and are not considered here.

The EO 13806 report is useful since it represents a whole-of-government effort. While the publication's creation was led by DoD's Office of Industrial Policy, coordination occurred with "the Departments of Commerce, Labor, Energy, and Homeland Security"[55], and a variety of other stakeholders – such as the Director of National Intelligence (DNI), the Director of the Office of Management and Budget (OMB), and the Department of the Interior – were consulted.[56] For those interested in further study of this subject, the report also includes a lengthy

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[51] Ibid.
[52] Ibid.
[53] Ibid., 34597–98.
[54] United States Department of Defense, "Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States - Report to President Donald J. Trump by the Interagency Task Force in Fulfillment of Executive Order 13806."
[55] Ibid., 1.
[56] Ibid.

Appendix that provides a list of the many US government sources that were used in the report's construction.

Stated upfront in the report's executive summary, some of the major findings speak to current deficiencies in the American DIB. For example, the report notes that "A surprising level of foreign dependence on competitor nations exists" and that "Many sectors continue to move critical capabilities offshore in pursuit of competitive pricing and access to foreign markets."[57]

One of the key takeaways from the EO 13806 report is the creation of five 'macro forces' that are seen as risks for the American DIB, which "collectively represent the root causes of… ten risk archetypes and associated impacts on America's manufacturing and [DIB]."[58] These five factors are uncertainty regarding government spending, a decline of the country's manufacturing base capabilities and output capacity, negative business and procurement practices from the federal government, the industrial policies of competitor nations like China, and an overall decline in trade and STEM skills in the American populace.[59]

To exemplify the knock-on effects of uneven government spending from year to year, the EO 13806 report points to the case of aluminum:

> Wrought aluminum plate, and specifically cold-rolled plate, is essential for armoring U.S. ground combat vehicles, constructing Navy ships, and building military aircraft. Unlike other more common forms of rolled aluminum materials, thick cold-rolled aluminum production capabilities and capacities are unique. DoD relies on domestic producers as well as capabilities available from ally countries in Europe. Due to U.S. Government budget uncertainties, unpredictable DoD demand, and other commercial market factors, the defense industrial base can face challenges when trying to balance diverse demands for cold-rolled plate production capacity while also informing long-term internal capital investment decisions. [60]

[57] Ibid., 3.
[58] Ibid., 19.
[59] Ibid., 19–20.
[60] Ibid., 21.

Though governmental spending may indeed vary, it is worth pausing here to briefly consider the average annual aluminum demand from DoD. As part of the same series of BIS Section 232 reports referenced above, a 2018 report on aluminum imports was prepared to determine aluminum's importance to national security.[61] Unlike the report on steel the aluminum report has redactions throughout, with the section describing aluminum requirements for national defense standing as the most heavily redacted. While the exact quantity and its related footnote are blacked out, the report states that DoD "and its contractors use a small percentage of U.S. aluminum production."[62] No rationale is provided for these redactions, though the intent seems clear – a low DoD reliance on the American aluminum sector undercuts the report's very raison d'être.

While a deep examination of federal procurement practices, Chinese industrial policies, or the declining skill level of the American populace are beyond the scope of this paper, the example of aluminum suggests that the state of the American DIB may not be as grave as EO 13806 would otherwise imply. The remainder of the chapter examines a selection of other concerns regarding the DIB's capabilities.

Perhaps unsurprisingly, many elements of the American DIB reside outside the United States in a highly globalized world. While the US has close relationships with allies like Canada – as embodied by the National Technology and Industrial Base (NTIB) shared between Canada and the US[63] – the EO 13806 report notes that "Through the ongoing globalization of industrial

[61] US Department of Commerce, "The Effect Of Imports Of Aluminum On The National Security," 2018, https://www.bis.doc.gov/index.php/documents/aluminum/2223-the-effect-of-imports-of-aluminum-on-the-national-security-with-redactions-20180117/file.

[62] Ibid., 24–25.

[63] United States Department of Defense, "Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States - Report to President Donald J. Trump by the Interagency Task Force in Fulfillment of Executive Order 13806," 16.

supply chains and commodities markets, a number of countries without formal supply agreements support the manufacturing and defense industrial base…"[64] The countries included as examples are three relatively small nations – Jamaica, Kazakhstan, and Singapore – as well as 'strategic competitor' China.[65] The lack of a formal agreement is used to suggest the decreased reliability of ongoing supply from such countries.

Within America's borders, the 2020 iteration of the *Industrial Capabilities Report to Congress* published by DoD's Office of Industrial Policy points to the overall robustness of the "Big Six" defense contractors (BAE Systems, Boeing, General Dynamics, Lockheed Martin, Northrop Grumman, and Raytheon) as a sign of the overall health of the defense sector.[66] These suppliers made up 32% of DoD's 'prime obligations' in 2019, and globally they are the biggest companies in terms of defense revenue – "The Big Six are financially healthy, continue to expand in market share, and have seen a general increase in revenue with a… Growth Rate of 5.6 percent from 2014-2019."[67]

While perhaps not a perfect analogue for the overall health of the DIB, the robustness of firms like the Big Six is important for the American military since the defense firms operate in what can be termed a monopsony – a market with one purchaser only.[68] Unlike other US-based manufacturers, defense companies face multiple export restrictions on their products and have to abide by rules such as the International Trafficking in Arms Regulation (ITAR). Thus, defense contractors are highly dependent on the American government and military, and vice versa.

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[64] Ibid., 17.

[65] Ibid.

[66] United States Department of Defense, "Fiscal Year 2020 Industrial Capabilities Report to Congress," 2021, 40–41, https://media.defense.gov/2021/Jan/14/2002565311/-1/-1/0/FY20-INDUSTRIAL-CAPABILITIES-REPORT.PDF.

[67] Ibid.

[68] Henry Walter, "The Defense Industrial Base: How Idiosyncratic and Historical Influences Dictate Its Future," *International Social Science Review* 95, no. 1 (2019): 2.

However, the EO 13806 report criticizes the strategic direction of such companies, pointing out that "many firms shifted focus from designing and *building* products to designing and *selling* products."[69] (emphasis added) This is in keeping with the report's message of reinvesting in American manufacturing capacity and reshoring capabilities where possible, and aligns with Walter's suggestion that "Defense drawdowns after the Cold War caused a wave of change in this sector, which ultimately harmed its long-term effectiveness."[70]

The EO 13806 report points to efforts to establish a national strategy for advanced manufacturing as part of current efforts to ameliorate the fragility of America's DIB and regain said effectiveness.[71] The report also includes many recommendations for future consideration, such as "Diversifying away from complete dependency on sources of supply in politically unstable countries who may cut off U.S. access."[72] Again, supply arrangements are a primary focus of the report, and will be examined in more depth throughout the remainder of the paper.

Similarly, 2020's *Industrial Capabilities Report* recommends the creation of a 'defense industrial strategy' with four objectives – 1) to reshore the DIB and its related supply chains, 2) to modernize manufacturing, engineering, and R&D, 3) to modernize acquisition / procurement processes, and 4) to increase innovation in public-private partnerships.[73]

Ultimately, the creation of such a strategy may be necessary to position the United States to respond to the return of great power rivalry. As Walter writes, "Given the need for new capabilities to fulfill new objectives against new potential adversaries (a revisionist China and

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[69] United States Department of Defense, "Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States - Report to President Donald J. Trump by the Interagency Task Force in Fulfillment of Executive Order 13806," 28.

[70] Walter, "The Defense Industrial Base: How Idiosyncratic and Historical Influences Dictate Its Future," 1.

[71] United States Department of Defense, "Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States - Report to President Donald J. Trump by the Interagency Task Force in Fulfillment of Executive Order 13806," 4.

[72] Ibid., 5.

[73] United States Department of Defense, "Fiscal Year 2020 Industrial Capabilities Report to Congress," 8–9.

resurgent Russia), the DIB will be called upon in a way it has not been since the 1986 Reagan buildup."[74] An examination of recent Chinese developments is the subject of the paper's second chapter.

[74] Walter, "The Defense Industrial Base: How Idiosyncratic and Historical Influences Dictate Its Future," 1.

CHAPTER 2 – RESOURCE ALLOCATION IN AN INCREASINGLY COMPETITIVE WORLD

Having considered the importance of defense acquisition, the defense industrial base, and some of the underlying financial needs of the American military in the previous chapter, the paper's second chapter looks at the issue of global resource allocation. This examination begins with a brief discussion on what has been popularly referred to as 'the rise of China', but instead of focusing solely on China's increasing industrialization, the classification of China as a great power rival of the United States is also examined. Such a consideration ties into the examination of China's Belt & Road Initiative (BRI) as a 'mailed fist' – that is, a display of both political ruthlessness and an implied threat of force.

Next, by highlighting China's resource ambitions through the specific lens of rare earth elements (REE), the paper shows that China's actions have produced near-monopolies of vital resources that could ultimately threaten the national security of competitor nations – especially the United States. After examining current American measures to reduce national vulnerability to REE supply chains, the chapter concludes with a reflection on how such efforts may be too little, too late.

2.1 The industrial rise of China

Before proceeding, it is worth briefly explaining why this chapter focuses on the perceived threat to America from China and excludes examination of other nations. Part of the rationale is scope; this paper lacks the breadth to fully account for the range of adversaries that the United States and its allies may face around the globe. More pointedly, this decision was made in recognition of American policy documents like the 2017 National Security Strategy

(NSS), which flatly states that "China and Russia challenge American power, influence, and interests, attempting to erode American security and prosperity."[75] Elsewhere in the document, China is listed as a competitor accused of stealing "hundreds of billions of dollars" of American intellectual property every year[76], a revisionist power that wants to "shape a world antithetical to U.S. values and interests" and dislodge American influence in the Indo-Pacific[77], and a country that uses "economic inducements and penalties, influence operations, and implied military threats to persuade other states to heed its political and security agenda."[78]

Similarly, the 2018 National Defense Strategy (NDS) issued by the US DoD plainly states that "China is leveraging military modernization, influence operations, and predatory economics to coerce neighboring countries to reorder the Indo-Pacific region to their advantage."[79] Underlining China's importance to the United States, the 'most far-reaching objective' of the NDS is to "set the military relationship between our two countries on a path of transparency and non-aggression."[80] At the same time, the NDS also accuses China (and Russia) of "undermining the international order from within the system by exploiting its benefits while simultaneously undercutting its principles…"[81]

Taken together the 2017 NSS and 2018 NDS are indicative of a "major shift" for the American defense establishment's post-9/11 focus, moving it from counter-terrorism operations to the return to great power competition.[82] Highlighting such a shift is important since these two

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[75] United States of America, "National Security Strategy of the United States of America," 2017, 2, doi:10.1002/9781119289142.ch9.

[76] Ibid., 21.

[77] Ibid., 25.

[78] Ibid., 46.

[79] United States Department of Defense, "Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge," 2018, 2.

[80] Ibid.

[81] Ibid.

[82] Walter, "The Defense Industrial Base: How Idiosyncratic and Historical Influences Dictate Its Future," 1.

documents largely set the agenda for many other federal departments and agencies, and thus shape many of the primary government sources cited by this paper – the NSS and the NDS are the collective bedrock on which much of contemporary American defense policy is built.

While this paper lacks the scope to fully document and describe China's ascent into an industrial and economic powerhouse, a few considerations merit inclusion here. The first is that Chinese GDP has grown considerably vis-à-vis the west over the last forty-plus years. Since 'opening up' to foreign investment and establishing Sino-US diplomatic relations in 1979,[83] China has been one of the world's fastest growing economies.[84] According to World Bank data, China's average annual GDP growth in the 40-year period between 1979 and 2019 was 9.39%; this compares to 2.65% for the United States and 2.42% for Canada.[85] In practical terms, such growth also meant that the size of the Chinese economy doubled roughly every eight years during that period.[86]

A second important factor in China's ascent is the increasing urbanization of its population. Per the same World Bank dataset, in 1979 18.6% of China's population lived in urban areas (as defined by China's own national statistics). At the dawn of the 21st century this percentage had grown to 35.87%, and by 2019 stood at 60.31%. For comparison's sake once again, over the same 40-year period the American urban population increased from 73.69% to 82.46%, while Canada moved from 75.62% to 81.48%. Much of this process followed on the heels of foreign investment in China, which created greater opportunities in its urban centers.

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[83] Jianyong Yue, *China's Rise in the Age of Globalization: Myth or Reality?* (London: Palgrave Macmillan, 2018), ix.

[84] Congressional Research Service, "China's Economic Rise: History, Trends, Challenges, and Implications for the United States" (Washington, D.C., 2019), https://crsreports.congress.gov/product/pdf/RL/RL33534.

[85] The World Bank, "The World Bank - Data - GDP Growth (Annual %)," 2021, https://api.worldbank.org/v2/en/indicator/NY.GDP.MKTP.KD.ZG?downloadformat=excel.

[86] Congressional Research Service, "China's Economic Rise: History, Trends, Challenges, and Implications for the United States," 5.

Though a larger segment of China's population lives in rural areas today compared to Canada or the United States, the overall move of millions of Chinese into cities has provided the industries located there with a ready workforce.

The third and final factor considered here is the increasing industrialization of China following the introduction of 1979's economic reforms. Per a 2016 report from the St. Louis Federal Reserve, China produces nearly half of the global supply of major industrial goods such as coal, cement, crude steel, and vehicles, and its rate of industrial patent applications outpaces the United States by roughly 50%.[87] In the wake of 1979's reforms, China's manufacturing capacity rose beyond that of the world's other industrial powers, "overtaking the U.S. in 2010 to become the No. 1 industrial powerhouse."[88] Building off his Federal Reserve report, Wen notes that

> China is also the world's largest producer of ships, speed trains, robots, tunnels, bridges, highways, electricity, chemical fiber, machine tools, cell phones, computers, bicycles, motorcycles, air conditioners, refrigerators, wash machines, furniture, textiles, clothing, footwear, toys, fertilizers, agricultural crops, pork, fish, eggs, cotton, copper, aluminum, books, magazines, television shows, as well as college students. In short, China produces one third of world agricultural products and supplies nearly 50 percent of global industrial goods.[89]

Having established China's economic bona fides and the United States' consideration of the country as a great power rival, this chapter now turns its gaze to China's need for resources and its Belt and Road Initiative.

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[87] Yi Wen, "China's Rapid Rise From Backward Agrarian Society to Industrial Powerhouse in Just 35 Years," *The Regional Economics*, no. April (2016): 9, https://www.stlouisfed.org/~/media/Publications/Regional-Economist/2016/April/lead.pdf.

[88] Ibid.

[89] Yi Wen, "The Making of an Economic Superpower: Unlocking China's Secret of Rapid Industrialization," *Federal Reserve Bank of St. Louis Working Paper Series*, 2015, 4, doi:10.1142/9885.

2.2 Differing perceptions of China's Belt and Road Initiative

The extent of China's recent ambitions in securing access to resources, trading partners, and new markets is perhaps best embodied by its Belt & Road Initiative (BRI), which is also referred to as the 'One Belt, One Road' (OBOR) plan. BRI has received much attention in both the academic and popular press since its announcement in 2013, and its portrayals range from a peaceful reincarnation of the Silk Road to an overt attempt to facilitate eventual Chinese dominance of Europe and Africa. As with the previous section about China's industrial ascent, this paper lacks the scope to fully detail the particulars of the BRI and its myriad infrastructure projects. Instead, this section details some of the key dilemmas for US foreign policy.

As a starting point, the 2020 book *Critical Reflections on China's Belt & Road Initiative* provides a concise summary of BRI's intent:

> … projects under the BRI aim to build a powerful network of transport and communications infrastructure, creating favorable conditions to connect the inner provinces of China with the outside world, and help to narrow the development gap between the coastal regions and western China's remote interior. At the same time, the maritime transport system facilitates China's transportation of imported raw materials and petrol from the Middle East and Africa, while also making it easier for China to transport its exports. Moreover, the overseas infrastructure projects help open investment markets for China's US$3 trillion worth of idle capital, which accounted for 30 percent of the world's foreign reserves in February 2017, while bringing about other benefits in the diplomatic, security, and military fields for China.[90]

The English-language version of the official BRI website produced by the People's Republic of China also provides a novel view of the strategy behind the BRI. Using open and neutral language throughout, the website claims the BRI aims to embrace "the trend toward a multipolar world, economic globalization, [and] cultural diversity…" and that the BRI "is designed to

[90] Nguyen Thi Thanh Thuy, "US Attitudes and Reactions Towards China's 'Belt and Road' Initiative," in *Critical Reflections on China's Belt & Road Initiative*, 2020, 205, doi:10.1007/978-981-13-2098-9.

uphold the global free trade regime and the open world economy in the spirit of open regional cooperation."[91]

Such a description is noteworthy due to its many implications. First, acknowledging the return of a multipolar world itself indicates the end of what has been described as the 'unipolar moment' whereby American dominance atop the global order was assured.[92] The BRI website also suggests that the move toward a global, interconnected economy will continue and that the BRI itself is emblematic of a global free trade system without physical or economic barriers. The word 'open' and its related term of 'opening-up' are peppered throughout the website, and are paired with utopian statements suggesting the BRI will "enable [continental partners in Europe and Africa] to understand, trust and respect each other and live in harmony, peace and prosperity."[93]

Noting that China's national economy is deeply tied to the global economy, the government website adds that "China will stay committed to the basic policy of opening-up, build a new pattern of all-around opening-up, and integrate itself deeper into the world economic system." Aspirations of an ascendant China willing to act as a global leader are also apparent on the government BRI website, as the site points out that "China is committed to shouldering more responsibilities and obligations within its capabilities, and making greater contributions to the peace and development of mankind."[94] If one were to consider these statements in an apolitical vacuum he would likely view the creation of the BRI as greatly beneficial to all, with no reason for strategic pause.

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[91] The People's Republic of China, "Full Text: Action Plan on the Belt and Road Initiative," *The Belt and Road Initiative*, 2015, http://english.www.gov.cn/archive/publications/2015/03/30/content_281475080249035.htm.

[92] Barry Buzan and Ole Waever, "Levels : Distinguishing the Regional from the Global The How and Why of Distinguishing the Regional," *Regions and Powers: The Structure of International Security*, 2018, 31–32.

[93] The People's Republic of China, "Full Text: Action Plan on the Belt and Road Initiative."

[94] Ibid.

Instead, according to Robert Spalding, a retired USAF Brigadier General and author of *Stealth War: How China Took Over While America's Elite Slept*, the use of the 'belt' and 'road' analogies were specifically made for two reasons: to invoke the historical example of the Silk Road – a network of trade routes that connected modern-day China to Central Asia, Africa, and Europe – and "to project China's return to dominance."[95]

Eschewing utopian visions and favouring Spalding's pragmatism, Clarke suggests that three main interpretations of the BRI are prevalent today. The first is based on geopolitics and suggests that Beijing seeks to slow the rise of India as a regional competitor and stop possible American 'encirclement' in the Indo-Pacific. The second is focused on Chinese domestic production, and views the BRI as an attempt to rebalance regional differences between the country's coastal economic hubs and its interior territory. Finally, the third view suggests the BRI is a national tool of soft power that China can use both to boost its claim of being an alternative to American global leadership and also to expand its own strategic and economic reach.[96] Clarke suggests that supporters of the second and third view contend that "geopolitical gains that may come from the success of BRI are welcome but of secondary importance."[97]

In their book chapter examining the political economy of the BRI, Yeung and Lui endorse Clarke's second interpretation. Expanding on his thoughts, the duo suggest that following the global financial crisis of 2008-2009, China's domestic economy had become uneven due to decades of growth built on foreign investment and increasing consumer demand in

[95] Robert Spalding, *Stealth War: How China Took Over While America's Elite Slept*, OverDrive (Penguin, 2019), chap. 9.

[96] Michael Clarke, "The Belt and Road Initiative: China's New Grand Strategy?," *Asia Policy* 24, no. 1 (2017): 71–72, doi:10.1353/asp.2017.0023.

[97] Ibid.

the west.[98] Such an imbalance favoured the eastern and coastal regions of China while western China was left behind, resulting in "vast disparities in income and productivity…"[99]

However, the duo also touch on something not explicitly addressed by Clarke – the fact that "China also needs to secure its raw materials and energy supply and ensure that trade routes are secure and unimpeded."[100] While such an aim may seem self-evident in the rationale behind the BRI megaproject, open acknowledgement of this aspect of BRI is vital for western governments – at its core the BRI serves Chinese national interests in securing trading partners, entry to deep-water ports to trade from, and access to the various raw materials that China needs to continue developing both its economy and national military.

Clarke ultimately suggests the BRI blends multiple aspects of each of the three viewpoints: "BRI constitutes a grand strategy that integrates [domestic, economic, and geopolitical] factors in pursuit of Beijing's decades-long goal of returning to great-power status without provoking overt counterreactions from its neighbors and the United States."[101] The final contention by Clarke is important in acknowledging that the strategic aims of the BRI were designed to avoid reaction from global rivals. This is particularly significant in the American context, where both support and opposition for American involvement in the BRI could be found in Trump-era federal officials. Such views led to divided political opinion in the US both in terms of potential American participation in the BRI and regarding Sino-American relations more broadly.[102] Beyond government circles, Thuy notes the American business community is

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[98] David W K Yeung and Aloysius W C Lui, "China's Belt-Road Initiative: The Political Economy of Coordinated Coalitional Cooperation," *Contemporary Issues in International Political Economy*, 2019, 198–99, doi:10.1007/978-981-13-6462-4.

[99] Ibid.

[100] Ibid., 199.

[101] Clarke, "The Belt and Road Initiative: China's New Grand Strategy?," 72.

[102] Thuy, "US Attitudes and Reactions Towards China's 'Belt and Road' Initiative," 210–11.

supportive overall of the BRI, given related opportunities for investment and potential equipment sales to BRI-associated projects.[103]

Finally, the attitudes of American thought leaders and academics toward BRI are worth considering. According to Thuy, these opinions are universally negative toward BRI and question China's underlying economic, political, and security-related rationale; Thuy suggests that since "they are specialists in their field of research and possess profound knowledge of China and Sino-American relations, their opinions and warnings should be heeded."[104]

Concluding his examination of American attitudes toward BRI, Thuy notes that

> [D]espite support from some quarters, the US government is firm about its position to avoid participating in the BRI. Overtly, Washington argues that the BRI does not meet international financial standards and transparency. However, the main reason for staying outside the BRI is strategic. This is because the BRI is perceived as a tool for China to implement the so-called Chinese Dream of restoring China's global stature. In this sense, China could potentially unseat America as the most powerful nation in the world and challenge the US-led world order. Hence, participating in the BRI means that Washington would be indirectly helping China pursue its ambitions at the expense of the United States.[105]

In summary, the BRI will assist China in its efforts to obtain resources, access trading partners, and influence both the international rules-based order and the global economy.[106] Such efforts may have been facilitated by the United States' pursuit of an 'America First' agenda under the Trump administration, which created a void in global leadership and left a 'political and economic vacuum'[107] for China to fill. Within such a gap, the BRI "is one of China's methods to expand its strategic and political influence throughout the globe at America's expense."[108]

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[103] Ibid., 213.
[104] Ibid., 216.
[105] Ibid.
[106] Wenjuan Nie, "Xi Jinping's Foreign Policy Dilemma: One Belt, One Road or the South China Sea?," *Contemporary Southeast Asia* 38, no. 3 (2016): 423, doi:10.1355/cs38-3c.
[107] Thuy, "US Attitudes and Reactions Towards China's 'Belt and Road' Initiative," 217.
[108] Ibid.

Given that initiatives such as the BRI will provide China with expanded access to global resources and markets, a related concern could be how China will exploit this newly extended reach. The case of Chinese dominance in the rare earth element market provides some insight in this regard.

2.3 China's dominance in rare earth elements

The case of rare earth elements (REE) – alternatively referred to as rare earth metals or rare earth minerals – is illustrative of the type of ongoing access to resources that China has prioritized to the detriment of western governments.

As Klinger observes, "Rare earths are not rare. Because they were unknown at the time of their discovery – as most things are – they were presumed to be rare."[109] The USGS considers the 15 elements ranging in atomic number from 57 to 71 as part of the REE group; these 15 elements are commonly referred to as lanthanides. Two additional elements (yttrium and scandium) are often included due to their similarities, bringing the total to 17 rare earth elements.[110] REEs are vital for modern life since they are "so thoroughly integrated into our everyday lives that just about everything would grind to a halt without them."[111]

China's push toward domestic innovation in REE began in the 1980s as China worked to 'gain a foothold in the world arena' and take advantage of the massive REE reserves in the country.[112] Since then, the country has assumed a dominant position in global REE supply;

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[109] Julie Michelle Klinger, *Rare Earth Frontiers*, 2017, 1, doi:10.7591/9781501714610.

[110] Bradley S. Van Gosen et al., "The Rare-Earth Elements - Vital to Modern Technologies and Lifestyles," *U.S. Geological Survey Fact Sheet 2014-3078*, 2014, https://pubs.usgs.gov/fs/2014/3078/.

[111] Klinger, *Rare Earth Frontiers*, 1.

[112] Cindy Hurst, "China's Rare Earth Elements Industry: What Can the West Learn?," *Institute for the Analysis of Global Security (IAGS)* (Washington, D.C., 2010), 6.

various estimates claim China controlled 97% of the world's REE market by 2010, with the US Congressional Research Service (CRS) citing a 90-95% figure in 2013.[113]

China has not been shy in using its dominant control of REE to advance its national interests. Contributing to *The Political Economy of Rare Earth Elements*, Dobransky noted that "China, in the last several years, has made threatening moves that could deny REE to other countries and, in effect, collapse their economies or pressure their domestic businesses to relocate to China for a stable REE supply."[114]

A well-known example of such behaviour involved China blocking REE exports to Japan in 2010 following the Japanese detention of a Chinese fishing boat captain.[115] The dispute both highlighted the potential for China to disrupt the world's supply of REE and to "use its control of rare earth as leverage to obtain its political and economic goals."[116]

A 2013 CRS report includes estimates about REE usage in key American defense platforms. For example, each modern Virginia-class nuclear submarine requires approximately 9,200 pounds of REE, each Aegis destroyer requires approximately 5,200 pounds of the same, while the F-35 Lightning II detailed in Chapter 1 requires 920 pounds of REE for each airframe produced.[117]

Two broader takeaways from the report were that "the world is almost wholly dependent on a single national supplier – China – for rare earths" and that "the rare earths supply chain

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[113] Congressional Research Service, "Rare Earth Elements in National Defense: Background, Oversight Issues, and Options for Congress," 2013, sec. Summary, https://fas.org/sgp/crs/natsec/R41744.pdf.

[114] Steve Dobransky, "The Curious Disjunction of Rare Earth Elements and US Politics: Analyzing the Inability to Develop a Secure REE Supply Chain," in *The Political Economy of Rare Earth Elements*, ed. Ryan David Kiggins (London: Palgrave Macmillan, 2015), 85.

[115] Keith Bradsher, "Amid Tension, China Blocks Vital Exports to Japan," *New York Times*, September 22, 2010, http://www.nytimes.com/2010/09/23/business/global/23rare.html.

[116] Congressional Research Service, "Rare Earth Elements in National Defense: Background, Oversight Issues, and Options for Congress," 19.

[117] Ibid., 4.

vulnerability question may adversely affect the ability of the United States to plan strategically for its national security needs."[118] American concerns of Chinese REE dominance are understandable given the critical requirement to use these materials in key military capabilities, and have increased given China's open consideration of applying targeted REE export restrictions against the United States.

The most recent example of China considering the limitation of exports to America arose in February 2021, with several news outlets reporting that China was once again mulling methods to disrupt U.S. defense contractors. According to Bloomberg News, "The specter of export curbs [previously] arose in 2019 amid a deepening trade war"[119] which itself had provided the impetus for two Executive Orders issued during the Trump administration. Those Executive Orders and other American actions will be examined next in the penultimate section of this chapter.

2.4 Current US concerns regarding Chinese REE dominance

As alluded to in this paper's introduction, under the Trump administration the American government worked to secure ongoing access to REEs and to mitigate the vulnerability created by heavy dependence on a potentially unreliable supplier. Recognizing that "The United States is heavily reliant on imports of certain mineral commodities that are vital to the Nation's security and economic prosperity,"[120] the Trump administration issued Executive Order (EO) 13817 on

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[118] Ibid., 1.

[119] Bloomberg News, "China Eyes Rare Earth Export Curbs for U.S. Defense, FT Says," *Bloomberg News*, February 15, 2021, https://www.bloomberg.com/news/articles/2021-02-16/china-eyes-rare-earth-export-curbs-for-u-s-defense-sector-ft-kl7l9uxb.

[120] United States of America, "US Department of the Interior - Office of the Secretary: Final List of Critical Minerals 2018," *Federal Register* 83, no. 97 (2018): 23295–96, https://www.govinfo.gov/content/pkg/FR-2018-05-18/pdf/2018-10667.pdf.

20 December 2017. This three-page Order recognized that the "dependency of the United States on foreign sources creates a strategic vulnerability for both its economy and military to adverse foreign government action, natural disaster, and other events that can disrupt supply…"[121] It is worth pointing out this statement was made years before the supply chain disruptions caused by COVID-19 occurred, the impact of which will be examined in greater depth across the final two chapters of this paper.

EO 13817 also asserted that while there are 'significant deposits' of certain REE within the United States, American production capacity has been hamstrung by a combination of data shortfalls, the bureaucracy surrounding the granting of permits, and the sometimes litigious nature of the American mining sector.[122] As a result, President Trump also called for the creation of a national strategy to reduce the United States' reliance on critical minerals.

From a national security perspective, EO 13817 describes America's military as "among the Nation's most significant consumers of critical minerals" and aims to improve both its "technological superiority" and overall readiness.[123] Given the requirements for REE inputs as noted above, and recognizing that the United States has become more dependent on Chinese imports since the 1990s[124], it should be clear that uninterrupted access to REE is a vital interest for the Pentagon.

Despite EO 13817's release in late 2017, little observable progress occurred within the next three years to reduce American vulnerability to REE disruption. As a result, a follow-on

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[121] United States of America, "Executive Order 13817 of December 20, 2017: A Federal Strategy To Ensure Secure and Reliable Supplies of Critical Minerals," *Federal Register - Presidential Documents* 82, no. 246 (2012): 60835–37, https://www.federalregister.gov/documents/2017/12/26/2017-27899/a-federal-strategy-to-ensure-secure-and-reliable-supplies-of-critical-minerals.

[122] Ibid., 60835.

[123] Ibid.

[124] Congressional Research Service, "China's Mineral Industry and U.S. Access to Strategic and Critical Minerals: Issues for Congress," 2015, sec. Summary, https://crsreports.congress.gov/product/pdf/R/R43864/.

Executive Order (13953) was released in October 2020 during the Trump administration's final months. EO 13953 was more direct in its language, with Trump introducing the Order by stating that "a strong America cannot be dependent on imports from foreign adversaries for the critical minerals that are increasingly necessary to maintain our economic and military strength in the 21st century."[125] The 2020 EO further noted that the United States' "undue reliance on critical minerals, in processed or unprocessed form, from foreign adversaries constitutes an unusual and extraordinary threat…"[126] Perhaps most pointedly, EO 13953 included Trump's statement that "I hereby declare a national emergency to deal with that threat."[127]

Taken together, Executive Orders 13817 and 13953 can be readily understood as the Trump administration's outlook on the importance of secure, reliable access to REE. It is worth noting that no similar Executive Order was issued by either George W. Bush or Barack Obama during their respective tenures. In effect, Trump's two Executive Orders constitute the bulk of presidential commentary on the issue over the last two decades. Indeed, prior to the release of Trump's two Executive Orders, Dobransky noted in 2015 that "The United States government has been noticeably silent on REE, especially the White House (regardless of political affiliation)."[128]

While it could be tempting to dismiss these two Executive Orders as emblematic of the saber-rattling that the Trump administration exhibited toward China, the Biden administration

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[125] United States of America, "Executive Order 13953 of September 30, 2020: Addressing the Threat to the Domestic Supply Chain From Reliance on Critical Minerals From Foreign Adversaries and Supporting the Domestic Mining and Processing Industries," *Federal Register - Presidential Documents* 85, no. 193 (2020): 62539, https://www.federalregister.gov/documents/2020/10/05/2020-22064/addressing-the-threat-to-the-domestic-supply-chain-from-reliance-on-critical-minerals-from-foreign.

[126] US Geological Survey, "Rare Earths."

[127] United States of America, "Executive Order 13953 of September 30, 2020: Addressing the Threat to the Domestic Supply Chain From Reliance on Critical Minerals From Foreign Adversaries and Supporting the Domestic Mining and Processing Industries," 62540.

[128] Dobransky, "The Curious Disjunction of Rare Earth Elements and US Politics: Analyzing the Inability to Develop a Secure REE Supply Chain," 86.

has continued to press China on the use of such potential trade restrictions. Per a February 2021 readout of Biden's first conversation with Chinese leader Xi Jinping, Biden raised concerns about Beijing's "coercive and unfair economic practices… and increasingly assertive actions in the [Indo-Pacific]."[129]

Perhaps more importantly, two weeks after his telephone conversation with President Xi, Biden issued an Executive Order (14017) that addresses American supply chains and builds on EO 13953 as issued by Trump in 2020.[130] Biden's EO 14017 begins by stating that "The United States needs resilient, diverse, and secure supply chains to ensure our economic prosperity and national security,"[131] and by its second page, EO 14017 details more specific supply chain concerns – semiconductors, high-capacity and electric vehicle (EV) batteries, pharmaceuticals, and REEs.[132] EO 14017 also provides further direction for the Secretary of Defense (who acts as the 'National Defense Stockpile Manager' for REEs), stating that the Secretary "shall submit a report identifying risks in the supply chain for critical minerals and other identified strategic materials, including rare earth elements… and policy recommendations to address these risks."[133]

While critics could argue that Executive Orders are not as forceful as legislation, they are an important tool that allows a President to act unilaterally and quickly, whether it be "to establish policy, reorganize executive branch agencies, alter administrative and regulatory processes, [or] affect how legislation is interpreted and implemented…"[134] Though some critics

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[129] The White House, "Readout of President Joseph R. Biden, Jr. Call with President Xi Jinping of China," *The White House*, 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/02/10/readout-of-president-joseph-r-biden-jr-call-with-president-xi-jinping-of-china/.

[130] United States of America, "Executive Order 14017 of February 24, 2021 America's Supply Chains," *Federal Register - Presidential Documents* 86, no. 38 (2021): 11849–54, https://www.federalregister.gov/documents/2021/03/01/2021-04280/americas-supply-chains.

[131] Ibid., 11849.

[132] Ibid., 11849–50.

[133] Ibid., 11850.

[134] Kenneth R. Mayer, "Executive Orders and Presidential Power," *The Journal of Politics* 61, no. 2 (1999): 445.

argued that Executive Orders were used excessively during the Trump administration, data from the University of California Santa Barbara reveals that the 220 Executive Orders published by Trump was not excessive by modern standards; indeed, the Carter administration issued 320 Executive Orders during its four-year tenure.[135]

Despite the rhetoric employed at the highest levels of the United States government, there is some reason for cautious optimism in the American REE sector. According to the Mineral Commodity Summaries report issued by the USGS in January 2021, the global mining output of REE for 2020 totaled 240,000 tons.[136] Of this total, the United States produced 38,000 tons while China had a production of 140,000 tons, demonstrating the disparity that concerns American leadership. However, 'measured and indicated' reserves total 2.7 million tons in the United States and over 15 million tons in Canada[137]; these reserves, if developed and exploited, could greatly reduce America's reliance on imports from China.

2.5 Too little, too late?

While actions by both the Trump and Biden administrations to address the REE imbalance are admirable they are perhaps too little, too late.

Having acquired a dominant position in the REE sector, China has repeatedly shown its willingness to use it. Though threats targeting the United States arose in both 2019 and early 2021, the ability of China to continue to use such leverage should give the United States and its allies pause, especially in the midst of an ongoing trade war between the United States and China. China's ability to severely restrict or cut off the supply of REE has strategic implications

[135] The American Presidency Project, "Executive Orders," 2021, https://www.presidency.ucsb.edu/statistics/data/executive-orders#eotable.

[136] US Geological Survey, "Rare Earths."

[137] Ibid.

for the United States and Canada, since as the USGS points out, materials used in lieu of REEs are generally less effective.[138]

Nevertheless, after addressing Beijing's unfair trade practices with Xi Jinping as noted above, President Biden ended his call with the Chinese leader by committing himself to "pursuing practical, results-oriented engagements" with his counterpart.[139] Such a willingness to continue to have an ongoing, meaningful dialogue could forestall drastic action by the Chinese.

Part of the difficulty for current US leadership is that despite a stated desire to reverse the economic entanglement between the United States and China, the two nations have actually increased their financial linkages since the start of the COVID-19 pandemic. Per a New York Times report, in November 2020 China had a trade surplus of $75.4 billion with the United States, spurred by a 21% increase in year-over-year exports.[140] This stood in contrast to the desires of American politicians, who initially viewed the pandemic as an opportunity to reduce their country's trade imbalance with China, and was unexpected given the roughly $360 billion in trade tariffs placed on Chinese imports during the Trump administration.[141]

Though it is a topic worthy of its own in-depth analysis, experts have questioned the extent to which it is possible for the United States and China to 'de-link' their respective national economies. The U.S. Chamber of Commerce, "the world's largest business federation representing the interests of more than 3 million [American] businesses", produced a report in February 2021 entitled *Understanding U.S.-China Decoupling: Macro Trends and Industry Impacts*. The report notes that "The U.S. and Chinese economies have become deeply

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[138] Ibid.

[139] The White House, "Readout of President Joseph R. Biden, Jr. Call with President Xi Jinping of China."

[140] Ana Swanson, "With Americans Stuck at Home, Trade With China Roars Back," *New York Times*, December 14, 2020, https://www.nytimes.com/2020/12/14/business/economy/us-china-trade-covid.html.

[141] Ibid.

intertwined in the last two decades" with a trading relationship estimated at "$737.1 billion in 2018, before the start of the trade war."[142]

The significant economic interchange between the two countries has led to concerns, setting off 'alarm bells' in both capitols due to the increased competition between the two nations, especially in matters of geopolitical strategy and high technology.[143] The basic calculus regarding strategy and economic intent has changed, thus leading to the seeming dissolution of the 'implicit bargain' surrounding trade between both nations.[144]

Given that the U.S. Chamber of Commerce represents the interests of American merchants, it is unsurprising that the report is emblematic of the group's desire to "be a vocal proponent of open markets and free trade that is mutually beneficial, safe, and secure…"[145] Still, regardless of the American government's intent the flow of goods from China into the United States has continued unabated during the COVID-19 pandemic, especially as American consumers with stimulus checks in hand shop online to buy inexpensive goods from China.

For now, the power of the American consumer has triumphed over any potential decoupling actions between the Chinese and American economies, despite tensions between both countries following the outbreak of COVID-19. As the Chamber's report notes, such anxieties have led to "a broader debate about supply chains, reshoring, and resilience."[146] These areas are a focal point within the paper's next chapter.

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[142] U.S. Chamber of Commerce, "Understanding U.S.-China Decoupling: Macro Trends and Industry Impacts," 2021, 5, https://www.uschamber.com/report/understanding-us-china-decoupling-macro-trends-and-industry-impacts.

[143] Ibid., 2.

[144] Ibid., 5.

[145] Ibid., 2.

[146] Ibid., 3.

CHAPTER 3 – GROWING CHALLENGES TO AMERICAN NATIONAL SECURITY

While China's actions regarding its own resource and defense acquisition endeavours present a threat to the United States, the country is by no means the only factor the west will have to contend with. Thus, the paper's third chapter serves to call attention to some of the additional challenges facing America and its allies today.

The chapter begins by describing what Nassim Nicholas Taleb termed 'Black Swan' events in his 2007 book of the same name. By examining how 'just in time' supply chains were affected by the COVID-19 pandemic – a potential Black (or Grey) Swan itself – the need for increased redundancy is also discussed. Next, this chapter examines the growing national debts that have resulted from COVID-19 and details some of the downsides of these 'debt mountains.'

The third portion of this chapter points to some of the growing global military challenges that will face the United States in the near future, and also draws on recent failures of American critical infrastructure to show that investment is required inside the country's borders as well as externally. Finally, building on its initial examination of Taleb's 2007 book, the chapter concludes by considering the possibility of monetary collapse – the ultimate Black Swan.

3.1 Black Swan events and the need for redundancy

The concept of the 'Black Swan' grounds the remaining discussion within this chapter. Author Nassim Nicholas Taleb, who popularized the term in his 2007 book *The Black Swan – The Impact of the Highly Improbable*, suggests that such events share three attributes:

> First, it is an *outlier*, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility. Second, it carries an extreme impact… Third, in spite of its outlier status, human nature makes us concoct explanation

> for its occurrence *after* the fact, making it explainable and predictable.[147] (original emphasis)

The central thesis of Taleb's book is that "a small number of Black Swans explain almost everything in our world, from the success of ideas and religions, to the dynamics of historical events, to elements of our own personal lives."[148] This includes events such as the outbreak of wars, financial market crashes, terrorist attacks, or the emergence of key technologies.

As a corollary, the random and unpredictable nature of our world implies that accurately forecasting the future is exceedingly difficult. Thus, Taleb notes that "Black Swan logic makes *what you don't know* far more relevant than what you do know."[149] (emphasis added) He uses the example of the terrorist attacks of September 11, 2001 to show the risk of unknown dangers – "If such a possibility were deemed worthy of attention, fighter planes would have circled the sky above the twin towers, airplanes would have had locked bulletproof doors, and the attack would not have taken place…"[150] Taleb draws a similar lesson from the December 2004 tsunami in the Indian Ocean – if the tsunami had been expected the affected areas would have been evacuated beforehand, thus greatly diminishing its impact.[151]

Of course, once a Black Swan event has taken place, nations and businesses often adjust their plans or behaviour in case of possible reoccurrence. It is a well-worn adage that military planners tend to prepare for the last war instead of trying to determine what the 'next war' might look like; France's construction of the Maginot Line at the end of World War I is often used as

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[147] Nassim Nicholas Taleb, *The Black Swan - The Impact of the Highly Improbable*, OverDrive (New York: Random House, 2007), sec. Prologue.

[148] Ibid.

[149] Ibid.

[150] Ibid.

[151] Ibid.

an example of this tendency. However, Taleb suggests that such preparations are the exact opposite of what rational actors should do.

In the ninth chapter of his book, Taleb writes that western militaries are more adept than most organizations at understanding Black Swans since the concept is closely tied to the military's adoption of the phrase 'unknown unknowns'.[152] This tautology was especially en vogue following its invocation by then-Secretary of Defense Donald Rumsfeld during American operations in Iraq in 2003, but the importance of attempting to account for unforeseen consequences remains a hallmark of military planning.

Given the outsized impact of Black Swan events, and also given that they are by their very nature impossible to predict, a prudent course of action for western nations is to attempt to increase their resilience at a national level. The global impact of the COVID-19 pandemic has demonstrated that resilience is particularly desirable when it comes to a nation's supply chains.

America's 2017 National Security Strategy (NSS) speaks to the importance of supply chains: "The ability of the military to surge in response to an emergency depends on our Nation's ability to produce needed parts and systems, healthy and secure supply chains, and a skilled U.S. workforce."[153] This passage seems prescient given the supply chain difficulties that the United States encountered in procuring ventilators and personal protective equipment (PPE) for health care workers in 2020 as America responded to COVID-19. The NSS goes on to state that "Support for a vibrant domestic manufacturing sector, a solid defense industrial base, and resilient supply chains is a national priority."[154]

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[152] Ibid., chap. 9.
[153] United States of America, "National Security Strategy of the United States of America," 29.
[154] Ibid., 30.

Recognizing the role of improbable events in shaping our lives and our societies, one of the key takeaways from Taleb's book is that there is a greater need for resilience and redundancy in our critical systems. The NSS also states its support for such a position, noting that "We must build a culture of preparedness and resilience across our governmental functions, critical infrastructure, and economic and political systems."[155] Indeed, resilience is a major theme of the NSS, and the terms 'resilient' or 'resilience' appear 18 times throughout the 68-page strategy, most notably in a section entitled 'Promote American Resilience'.[156] While this paper does not examine resilience or redundancy in depth, the prominence of such concepts in American national strategy is deserving of further research.

3.2 The limits of just-in-time supply chains

Perhaps one of the most well-known phenomena associated with globalization is the emergence of 'just-in-time' systems. Popularized by automobile manufacturers like Ford and Toyota via just-in-time manufacturing, just-in-time supply and delivery has become a dominant way of doing business for many companies linked to global supply chains. As noted in the Royal Canadian Navy's *Leadmark 2050* strategic policy, the extensive use of the world's oceans by global shipping networks has meant that for a company such as Canadian Tire, up to one third of its entire inventory is at sea at any given time.[157]

Just-in-time delivery has also meant that retailers can greatly reduce their warehousing and storage costs. However, this has meant that supply chains have become increasingly fragile. Just-in time supply chains are often reliant on the steady flow of goods at all points of the chain –

[155] Ibid., 7.
[156] United States of America, "National Security Strategy of the United States of America."
[157] Royal Canadian Navy, "Leadmark 2050 - Canada in a New Maritime World," 2016, iii.

from the resource extractor to a processor, from a processor to a manufacturer, and from a manufacturer to a retailer. Disruptions in one part of the chain can affect the entire enterprise.

This phenomenon was well summarized by a report from the World Economic Forum (WEF), an entity that will be examined in greater depth in Chapter 4 of this paper. Published in 2019, the WEF *Outbreak Readiness and Business Impact* white paper suggested that

> infectious disease outbreaks could significantly disrupt complex international supply chains. The rise of just-in-time manufacturing has revolutionized how businesses operate, as companies can emphasize small on-site inventories and low defect rates. Yet, the resulting low inventories and high turnover makes producers highly reliant on inputs arriving quickly from suppliers, thus leaving firms potentially vulnerable to even modest disruptions in supply chains.[158]

Issues with the global supply of COVID-19 vaccines represents a particularly grave example of global interdependency falling short. Though by December 2020 Canada had secured more doses per capita than any other country[159] – and enough to vaccinate each Canadian roughly five times over[160] – the actual delivery of vaccines to the country was drastically slowed in the opening months of 2021. Though the Canadian government pointed to manufacturing shortfalls as well as export controls put in place by other governments, Canada was nevertheless negatively affected by supply chain disruptions. While the example of the United States' difficulty in obtaining PPE and ventilators is examined below, vaccine supply chains will be more fully considered in Chapter 4.

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[158] World Economic Forum, "Outbreak Readiness and Business Impact Protecting Lives and Livelihoods across the Global Economy," no. January (2019): 11, http://www3.weforum.org/docs/WEF HGHI_Outbreak_Readiness_Business_Impact.pdf%0Ahttps://www.weforum.org/whitepapers/outbreak-readiness-and-business-impact-protecting-lives-and-livelihoods-across-the-global-economy.

[159] Sandrine Rastello and Kait Bolongaro, "Canada Has Reserved More Vaccine Doses Per Person Than Anywhere," *Bloomberg News*, 2020, https://www.bloomberg.com/news/articles/2020-12-07/canada-has-reserved-more-vaccine-doses-per-person-than-anywhere.

[160] Thin Lei Win, "Canada the Biggest Hoarder of COVID-19 Vaccine Pre-Orders in First World, NGOs Say," *National Post*, December 9, 2020, https://nationalpost.com/news/world/canada-the-biggest-hoarder-of-covid-19-vaccine-pre-orders-in-first-world-ngos-say.

Sadly, the American government should have been fully aware it would encounter difficulties in procuring ample supplies of protective equipment once COVID-19 arrived in the US. In August 2019, the Department of Health and Human Services conducted a functional exercise named 'Crimson Contagion' which was meant to practice America's response mechanisms to a widespread outbreak of an avian flu virus.[161] The exercise involved 19 federal departments and agencies spread across 12 states, as well as dozens of local health departments and hospitals.[162]

One of the key findings in the exercise's after-action report addressed both the domestic manufacturing base in the United States and potential import limits:

> The United States lacks sufficient domestic manufacturing capacity and/or raw materials for almost all pandemic influenza medical countermeasures, including vaccines, therapeutics, PPE, needles and syringes, and N95 masks. Further, in the event of a pandemic, global manufacturing capacity will not be sufficient to meet demand, resulting in an inability to import adequate quantities of medical countermeasures.[163]

Reading the block quotation above in the midst of the COVID-19 pandemic is chilling. While the report's publication in January 2020 may not have provided ample lead time for the federal government to respond to its findings, government leaders nevertheless were aware of the United States' collective limitations in responding to a pandemic. In the months following the report's publication, state governments were left to bid against each other for critical equipment like ventilators and mask shipments, driving prices higher. While the American federal government activated the Defense Production Act in April 2020 to compel domestic manufacturers to craft

[161] U.S. Department of Health and Human Services, "Crimson Contagion 2019 Functional Exercise After-Action Report" (Washington, D.C., 2020), iii.

[162] Ibid.

[163] Ibid., iv.

items such as ventilators[164], the initial frenzy showed that even the distribution of stockpiled equipment could be difficult, to say nothing of producing or purchasing more.

Having considered some of the supply chain limitations that shaped America's initial reaction to the COVID-19 pandemic in early 2020, this chapter now considers some of the economic stimulus measures that government leaders have enacted in hopes of leading their nations to an eventual recovery.

3.3 COVID-19 and the growth of international debt

According to the WEF's *Chief Economist's Outlook 2021* report, more than $10 trillion in fiscal stimulus and emergency funding has been earmarked by G20 governments in response to the COVID-19 pandemic.[165] In the United States, Congress approved emergency funding of $900 billion in December 2020, with a further $1.9 trillion proposed and approved in early 2021 following the transition to the Biden administration.[166]

In the American context, the combination of increased fiscal stimulus and the rollout of COVID-19 vaccines could contribute to inflationary pressures.[167] To combat rising inflation, a central bank would typically employ interest rate hikes to attempt to slow consumer spending

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[164] Maegan Vazquez, "Trump Invokes Defense Production Act for Ventilator Equipment and N95 Masks," *CNN*, April 2, 2020, https://www.cnn.com/2020/04/02/politics/defense-production-act-ventilator-supplies/index.html.

[165] World Economic Forum, "Chief Economists Outlook 2021," 2021, 10, https://www.weforum.org/reports/chief-economists-outlook-2021.

[166] Adam Taylor, "How the $1.9 Trillion U.S. Stimulus Package Compares with Other Countries' Coronavirus Spending," *Washington Post*, March 10, 2021, https://www.washingtonpost.com/world/2021/03/10/coronavirus-stimulus-international-comparison/.

[167] J.P. Morgan Asset Management, "The Investment Outlook for 2021" (New York, 2021), 6, https://am.jpmorgan.com/content/dam/jpm-am-aem/global/en/insights/market-insights/investment-outlook-2021-us.pdf.

and cool inflation. For the US Federal Reserve, such a move would be in keeping with its 'dual mandate' to "[secure] the value of the nation's currency as well as [promote] employment."[168]

However, the broad accumulation of debt by national governments during the COVID-19 pandemic has created a possible tension between monetary policy and fiscal policy – central banks may be limited in their ability to raise interest rates as a tool of monetary policy, since doing so could be at odds with the intent of stimulus spending embodied by governmental fiscal policy.

The sheer amount of stimulus and debt accumulation by governments is unprecedented since the end of World War II. Royal Bank of Canada (RBC)'s 2021 global outlook report observes that "The pandemic has marked the start of a new economic era – one where old rules are swept away", further remarking that "World governments are racking up massive borrowing [and] money is being printed to buy government debt at an unprecedented pace…"[169]

The RBC report also notes the bank's assessment that "high debt levels do not necessarily represent a systemic risk in the near term and that debt servicing costs will remain manageable even in the medium term."[170] However, both of those sentiments are predicated on interest rates remaining low. If interest rates rise, the interest costs owed on outstanding debt – the debt servicing cost referred to above – will also increase, just as they would for an individual borrower. However, as noted above central banks have traditionally used interest rates as one of their main tools to combat inflation and stimulate borrowing. With interest rates at historic lows and with seemingly nowhere to go but up, relying on them to remain low for the medium term

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[168] Aaron Steelman, "The Federal Reserve's 'Dual Mandate': The Evolution of an Idea," *The Federal Reserve Bank of Richmond Economic Brief* 11, no. 12 (2011): 5, https://www.richmondfed.org/publications/research/economic_brief/2011/eb_11-12.

[169] RBC Wealth Management, "Global Insight 2021 Outlook," 2021, 2, https://www.rbcinsight.com/WM/Share/ResearchViewer/?SSS_97F9D4A98CD894640768C76B590E08D2.

[170] Ibid.

may be foolhardy. Also, an associated risk of low interest rates is that individual and institutional investors may be pushed into riskier asset classes as they seek a greater return on their investments, thereby increasing investment risk throughout a financial market.

A 2020 report entitled *"Low for Long" and Risk-Taking* from the International Monetary Fund (IMF) also points to increased systemic risks. Addressing the reduction of interest rates by central banks worldwide in response to COVID-19, the IMF suggests "the policies implemented are efficient *because* they encourage increased risk-taking, and they may have, if unintentionally, increased medium- and long-term macro-financial vulnerabilities."[171] (original emphasis)

However, the United States finds itself in an enviable position unavailable to other countries; since the U.S. dollar functions as the world's reserve currency, demand from other national governments and institutional investors should remain. Compared to other countries, America is less likely to stop printing money, to pay down its debt, or to attempt to slow its rate of debt accumulation.[172]

As a result, the near-term reality for the United States is that "The path of least resistance seems to be pointing toward increasing fiscal spending, not restraint."[173] Essentially, given the low borrowing costs that result from low interest rates, fiscal policymakers – for example, ministers of finance or secretaries of the treasury – do not have an incentive to rein in spending as the overall cost to service national debts remains low.[174] In fact, as of this paper's writing America's federal debt costs are in decline despite the rise of the overall amount of outstanding

[171] Tobias Adrian, "'Low for Long' and Risk-Taking" (Washington, D.C.: International Monetary Fund, 2020), v, https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2020/11/23/Low-for-Long-and-Risk-Taking-49733.

[172] RBC Wealth Management, "Global Insight 2021 Outlook," 12.

[173] Ibid.

[174] Ibid.

debt; the CBO estimates that the percentage of American GDP needed for debt service will decline from 1.6% of GDP in 2020 to 1.1% by 2024.[175]

As the WEF *Chief Economist's Outlook* report states, "An important open question is the extent to which governments in advanced economies are justified in minimizing concern about borrowing constraints."[176] One long-term drawback of higher national debt levels for such economies will be less flexibility in fiscal budgeting and a reduced ability for central banks to lower corporate and personal tax rates as an economic lever.[177]

This chapter's final section will further examine the issue of systemic financial risks given the extreme levels of national indebtedness that are being reached. Before doing so, and keeping in mind the broad costs of maintaining the American military outlined in Chapter 1, it is now worth considering what kinds of challenges the United States and its allies may face in the near- to mid-term.

3.4 Growing global military challenges

As we have seen with Chapter 1's example of the F-35 Lightning II, defense investment is not cheap nor is it a one-time expense. America's 2018 National Defense Strategy (NDS) is clear in recognizing the requirement for ongoing spending – "The surest way to prevent war is to be prepared to win one. Doing so requires a competitive approach to force development and a *consistent, multiyear investment* to restore warfighting readiness and field a lethal force."[178] (emphasis added)

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[175] Congressional Budget Office, "An Update to the Budget Outlook: 2020 to 2030," 2020, 21–22, https://www.cbo.gov/publication/56517.

[176] World Economic Forum, "Chief Economists Outlook 2021," 10.

[177] RBC Wealth Management, "Global Insight 2021 Outlook," 13.

[178] United States Department of Defense, "Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge," 5.

The NDS describes the current strategic environment in which American forces can be expected to operate as an "increasingly complex global security environment, characterized by overt challenges to the free and international order and the re-emergence of long-term, strategic competition between nations."[179] The NDS further states that the greatest challenge to American security "is the *reemergence of long-term, strategic competition* by what the [NSS] classifies as revisionist powers"[180] (original emphasis) – namely, China and Russia, countries that "want to shape a world consistent with their authoritarian model…"[181]

Though this paper lacks the scope to assess the full spectrum of emerging threats in detail, the remainder of this section touches on a range of challenges facing America in the near future and highlights two particular cases – hypersonic missile systems and the risks to American critical infrastructure.

Per the 2018 NDS, the US DoD plans to "invest broadly in military application of autonomy, artificial intelligence, and machine learning, including rapid application of commercial breakthroughs, to gain competitive military advantages."[182] Such investments could include varied fields such as robotics and semi- and fully-autonomous weapons, a pivot to Multi-Domain Operations (MDO), and developing a national capability to penetrate enemy anti-access / area denial (A2/AD) systems. In the near term, investments are also being made into the developing fields of cyber warfare and hypersonic weapons.

The United States has pursued hypersonic weapons – those traveling faster than five times the speed of sound – since the early 2000s; the extreme speed of these weapons make them

[179] Ibid., 2.
[180] Ibid.
[181] Ibid.
[182] Ibid., 7.

a 'game-changing' technology[183] that the 2018 NDS considers among the 'rapid technological advancements' affecting the contemporary security environment.[184] Per February 2020 testimony by General Terrence O'Shaughnessy (the then-Commander of NORAD) before the Senate Armed Services Committee, both Russia and China are developing hypersonic systems as part of a "range of capabilities to hold the [US] homeland at risk."[185] O'Shaughnessy's testimony represents public acknowledgement of the threat stemming from Chinese and Russian development of hypersonics, as well as an admission that NORAD is not presently capable of credibly defending North America from incoming hypersonics.

A 2020 report from the CRS notes the FY2021 budget request for hypersonics research totaled $3.2 billion dollars, an increase from FY2020's request of $2.6 billion,[186] and that the forecast cost for R&D of hypersonics is projected to reach $5 billion by 2025.[187] Though the CRS report notes that spending on hypersonics has been restrained in the past, both Congress and the Pentagon have grown increasingly interested in the weapons due to advancements made by both Russia and China. Beyond its potential to "upend existing norms of deterrence and renew Cold War-era tensions,"[188] a hypersonics arms race has the potential to become extremely expensive for all participants.

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[183] Steven Simon, "Hypersonic Missiles Are a Game Changer," *The New York Times*, January 2, 2020, https://search.proquest.com/docview/2331729105?accountid=9867.

[184] United States Department of Defense, "Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge," 3.

[185] US Senate Armed Services Committee, "Statement of General Terrence J. O'Shaughnessy, United States Air Force, Commander United States Northern Command and North American Aerospace Defense Command, Before the Senate Armed Services Committee 13 February 2020," 2020, https://www.armed-services.senate.gov/imo/media/doc/OShaughnessy_02-13-20.pdf.

[186] Congressional Research Service, "Hypersonic Weapons: Background and Issues for Congress," 2020, sec. Summary, https://crsreports.congress.gov/product/pdf/R/R45811/16.

[187] R. Jeffrey Smith, "Hypersonic Missiles Are Unstoppable. And They're Starting a New Global Arms Race.," *The New York Times Magazine*, 2019, https://www.nytimes.com/issue/magazine/2019/06/25/the-62319-issue.

[188] Ibid.

Using Schelling and Halperin's thesis from *Strategy and Arms Control* as a baseline, Heather Williams writes that "states often pursue costly new military technologies due to uncertainty and 'a constant fear on either side that the other has developed a dominant position, or will do so, or will fear the first to do so, with the resulting danger of premeditated or pre-emptive attack.'"[189] With almost no dialogue on hypersonic non-proliferation to date,[190] the uncertainty and fearfulness surrounding hypersonics could spur an expensive arms race between the United States and its adversaries and place further demands on a national defense budget already under considerable pressure.

While the costs of hypersonics seem certain to rise sharply in the remainder of this decade, it is also important for the United States to invest in the nation's aging critical infrastructure. Infrastructure like roads, rail lines, bridges, and the power grid are innately tied to America's military capacity and underpin its national security.

Infrastructure such as highways and the electrical power grid are inherently dual use – the systems serve both a civilian purpose and a military purpose. This is similar to the American requirement for ongoing access to REE outlined in Chapter 2, where rare earths are needed as an input for high-tech civilian goods such as smartphones and electric cars as well as military applications.

The Interstate Highway Act enacted by President Eisenhower is an example of such dual use. Having been impressed by Germany's Reichsautobahn, Eisenhower directed the United States to build a network of highways that would become the Interstate Highway System

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[189] Heather Williams, "Asymmetric Arms Control and Strategic Stability: Scenarios for Limiting Hypersonic Glide Vehicles," *Journal of Strategic Studies* 42, no. 6 (2019): 792, doi:10.1080/01402390.2019.1627521.

[190] Richard Speier et al., *Hypersonic Missile Nonproliferation: Hindering the Spread of a New Class of Weapons*, *Hypersonic Missile Nonproliferation: Hindering the Spread of a New Class of Weapons* (Santa Monica, CA: RAND Corporation, 2017), 47–48, doi:10.7249/rr2137.

following World War II's conclusion. The effort led to the construction of 46,000 miles of roads across the United States at a cost of $130 billion dollars; the Interstate became the largest public works project in American history.[191] Beyond providing employment opportunities, facilitating the shipment of goods, and easing public mobility, the road network came with built-in resilience – without a 'single point of failure', a potential attack from America's Cold War enemies would have been hard-pressed to stop the movement of materiel and troops by road across the country.

America's highways remain important today, as the US. Department of Transportation defines the Strategic Highway Network (STRAHNET) – "a 62,791-mile system of roads deemed necessary for emergency mobilization and peacetime movement of heavy armor, fuel, ammunition, repair parts, food, and other commodities to support U.S. military operations" – as critical for DoD's domestic operations.[192] The paper will return to this topic in its final chapter.

More recently, critical failures in the power transmission infrastructure in Texas demonstrated the fragility of America's critical infrastructure when affected by unexpected weather – in this case a winter storm brought on by a polar vortex. The 'domino effect' caused by the interdependency of much critical infrastructure was also displayed; the February 2021 storm temporarily stopped one third of American oil production, rendered drinking water systems as far away as Ohio inoperable, and interfered with COVID-19 vaccination efforts across 20 states as the result of blocked highways.[193]

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[191] Eric Schlosser, *Fast Food Nation: The Dark Side of the All-American Meal* (New York: Houghton Mifflin, 2001), 22.

[192] U.S. Department of Transportation, "Strategic Highway Network (STRAHNET)," 2014, https://www.fhwa.dot.gov/policy/2004cpr/chap18.cfm.

[193] Christopher Flavelle, Brad Plumer, and Hiroko Tabuchi, "Texas Blackouts Point to Coast-to-Coast Crises Waiting to Happen," *New York Times*, 2021, https://www.nytimes.com/2021/02/20/climate/united-states-infrastructure-storms.html.

Sadly, these failures occurred despite clear warnings from federal regulators following a similar cold snap in 2011; the regulators suggested that additional winterization of transmission facilities would increase reliability and help avoid similar outcomes in the future.[194] Their report also noted that the 2011 storm was "not without precedent" and pointed to similar events in "1983, 1989, 2003, 2006, 2008, and 2010."[195] Winter storms affecting the electrical grid in Texas could thus be considered a 'grey swan' – an event that is "rare but expected."[196]

Despite seven similar winter storms between 1983 and 2011, many described the 2021 storm as a 'once in a century' event.[197] From a 'Black Swan' perspective, such a narrative speaks to the human desire to dismiss negative events and underestimate their likelihood in the future. However, eight severe winter storms in less than 40 years suggests that such events have moved from the 'unknown' to the 'known' – these are not Black Swan events, and perhaps not even Gray Swans. However, if Americans are seemingly unable to prepare themselves for known events, what hope is there that they will be collectively ready for a true Black Swan? This chapter's final section deals with one such possibility.

3.5 The ultimate Black Swan of monetary collapse

In *The Black Swan*, Taleb suggests there are two varieties of rare events:

> "a) the narrated Black Swans, those that are present in the current discourse and that you are likely to hear about on television, and

[194] Federal Energy Regulatory Commission, "Report on Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011," 2011, 203, https://www.ferc.gov/sites/default/files/2020-05/ReportontheSouthwestColdWeatherEventfromFebruary2011Report.pdf.

[195] Ibid., 7.

[196] Taleb, *The Black Swan - The Impact of the Highly Improbable*, chap. 3.

[197] Holman W Jenkins, "Texas-Style Blackouts Are the Future," *Wall Street Journal*, 2021, https://www.wsj.com/articles/texas-style-blackouts-are-the-future-11613772034.

> b) those nobody talks about, since they escape models – those that you would feel ashamed discussing in public because they do not seem plausible."[198]

While the examples of 9/11 or COVID-19 raised in this chapter firmly belong to the first type, a possible financial meltdown resulting from the widespread debasement of national currencies would fit into the second category. Such a possibility is rarely taken seriously in the mainstream discourse, owing to what Taleb terms the 'illusion of stability'. This bias "lowers our perception of the risks we incurred in the past, particularly for those of us who were lucky to have survived them. Your life came under a serious threat but, having survived it, you retrospectively underestimate how risky the situation actually was."[199] Operating under such a bias allows us to perceive recovery from past shocks as evidence of invulnerability from similar shocks in the future.

It has been just over a decade since the start of 'the Great Recession' that began in late 2008 due to the meltdown of the US housing market. While the common wisdom is that a monetary collapse is impossible in the United States, recall that the accepted wisdom in the lead-up to the housing market collapse in the United States was that the American housing market was solid and the bedrock of American financial stability.

In its 2021 investment outlook, J.P. Morgan Asset Management admits that predicting the future of the economy or the investment landscape is extremely difficult, writing that "If ever there was a year that reinforced the importance of humility among economic and market prognosticators, 2020 [was] that year."[200] The firm also notes that its 2020 outlook "made no mention of the possibility that a pandemic would plunge the global economy into the deepest recession since World War II and trigger a massive response in terms of fiscal and monetary

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[198] Taleb, *The Black Swan - The Impact of the Highly Improbable*, chap. 6.
[199] Ibid., chap. 8.
[200] J.P. Morgan Asset Management, "The Investment Outlook for 2021," 2.

stimulus."[201] This is a quintessential example of a Black Swan – the arrival of COVID-19 on America's shores represented an 'unknown unknown', an event that no institutional investment bank seemed prepared for.

In the wake of COVID-19, national debt levels have climbed to levels not seen since World War II, with debt-to-GDP ratios up by 15-20% in high income countries.[202] The WEF *Chief Economist's Report* proposes that while consensus exists among economists that "the mistakes of post-crisis austerity must be avoided,"[203] opinions on the potential limits of government spending to spur recovery from COVID-19 are not as homogenous.[204]

Along the same lines as its American counterpart, RBC's own analysis tacitly admits that the world economy is heading in an unpredictable direction: "The more that debt and debt-to-GDP mount over the longer term, the more governments and taxpayers will enter uncharted territory. It's unclear to [RBC] where the tipping point is between manageable and unmanageable debt loads."[205]

As suggested earlier in this chapter, the risk of American inflation above the Federal Reserve's target of 2% annually[206] could compel the central bank to raise interest rates. Doing so would increase the debt service costs incurred by individuals, businesses, and governments alike. Given the historically high level of debts being carried by individuals and governments alike – as well as the fact that the American and global economies are entering 'uncharted territory' – the risk of cascading effects in the global financial system are very real. As the US Federal Reserve

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[201] Ibid.
[202] World Economic Forum, "Chief Economists Outlook 2021," 10.
[203] Ibid.
[204] Ibid.
[205] RBC Wealth Management, "Global Insight 2021 Outlook," 13.
[206] Board of Governors of the Federal Reserve System, "Monetary Policy Report February 19, 2021," 2021, 11, https://www.federalreserve.gov/monetarypolicy/mpr_default.htm.

observed in its February 2021 *Monetary Policy Report*, "Although government programs have supported business and household incomes, some businesses and households have become *more vulnerable to shocks*, as earnings have fallen and borrowing has risen."[207] (emphasis added)

Continuing in this vein, the *Monetary Policy Report* states that

> The outlook for the pandemic and economic activity remains uncertain globally. In response to the economic disruptions caused by the pandemic, many foreign governments have ramped up spending to support households and businesses. Nevertheless, financial systems in some foreign economies are more vulnerable than before the pandemic, and these vulnerabilities may grow in the near term. Risks from widespread and persistent stresses in emerging markets and dollar funding markets could interact with risks associated with the course of COVID-19 for the U.S. financial system. In turn, these risks could be amplified by the vulnerabilities identified in this discussion and produce additional strains for the U.S. financial system and economic activity.[208]

While this paper lacks the breadth and depth to consider the full range of financial vulnerabilities faced by the global economy, recent examples of the collapse of a national currency or hyperinflation exist, such as Russia in 1998[209] or Venezuela in 2016.[210]

Though the direct economic parallels between the United States and either Russia or Venezuela may be minimal, the interconnected nature of the global financial system suggests that disruptions in one nation can cause a ripple effect in other markets – a financial example of the popular phenomenon known as the Butterfly Effect.[211] With increased fragility seemingly baked-in to the fiscal budgets of western governments, the risk of being affected by an economic collapse in another part of the world has likely climbed. Given the extremely high levels of risk

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[207] Ibid., 2.

[208] Ibid., 31.

[209] Padma Desai, "Why Did the Ruble Collapse in August 1998?," *American Economic Review* 90, no. 2 (2000): 48–52, doi:10.1257/aer.90.2.48.

[210] Steve Hanke and Charles Bushnell, "On Measuring Hyperinflation," *World Economics* 18, no. 3 (2018): 1–18.

[211] Taleb, *The Black Swan - The Impact of the Highly Improbable*, chap. 11.

and debt present in the global financial system, the possibility of a monetary collapse may no longer be a Black Swan – such a systemic risk may very well be in Grey Swan territory now.

Knowing that the United States is likely to face risks to both its critical infrastructure and its financial system could provide some level of warning and allow preventive measures and guardrails to be put in place. Nevertheless, Taleb is clear-eyed when it comes to the possibility of proactive anticipation of a crisis: "Everybody knows that you need more prevention than treatment," he writes, "but few reward acts of prevention."[212] Such an attitude squares with the recent examples of the electrical grid's failure in Texas in early 2021, as well as the inability of the American federal government to respond to the lessons learned in its Crimson Contagion exercise.

Perhaps more strikingly, while the sub-optimal responses to both those crises at the state and federal levels are troubling in their own right, they also represent governmental failures while encountering known threats. While the occurrence of 'unknown unknown' Black Swan events may be much harder to predict, their potential impact looms much larger. As a result, observers in early 2021 wondering how well the government would be able to respond to an unknown threat seem justifiably concerned.

The very nature of Black Swan events makes the particulars of such events unknowable in advance of their occurrence; indeed, Taleb himself writes that "I know that history is going to be dominated by an improbable event… I just don't know what that event will be."[213]

[212] Ibid., sec. Prologue.
[213] Ibid., chap. 10.

CHAPTER 4 – THE WORLD ECONOMIC FORUM, BUILDING BACK BETTER, AND VACCINE DIPLOMACY

Having examined some of the growing challenges to the current global economic order, this final chapter of the paper considers what the coming years and the immediate aftermath of the COVID-19 pandemic might look like.

The chapter begins by briefly examining the concept of using COVID-19 as an opportunity for 'a great reset' of society and the idea of 'building back better' by embracing green and sustainable technologies. Using research and statements from the World Economic Forum (WEF) as a proxy for those espousing such views, the chapter then considers some of the justifications for such arguments. Third, the chapter considers the limits of interdependency using COVID-19 'vaccine diplomacy' as a focal point. Finally, the chapter concludes by considering the limits of moving green, examining the delta between President Biden's campaign statements regarding the 'Green New Deal' and his $2-trillion infrastructure plan announced in March 2021.

While this paper's length limits the investigation of these topics somewhat, this chapter nevertheless highlights a variety of subjects worthy of further scrutiny. Additionally, whereas other chapters relied on primary sources from the American government and other recognized bodies, this chapter leans heavily on the writings of WEF founder Klaus Schwab as well as popular press accounts to detail some of the blow-by-blow of vaccine diplomacy.

4.1 The possibility of a 'Great Reset'

Schwab and co-author Thierry Malleret bill their 2020 book *COVID-19: The Great Reset* as a "hybrid between a contemporary essay and an academic snapshot of a crucial moment in

history" and note that it contains "many conjectures and ideas about what the post-pandemic world might, and perhaps should, look like."[214]

The authors contend that "the world as we knew it in the early months of 2020 is no more, dissolved in the context of the pandemic" and point to a "'new normal' radically different from the one we will be progressively leaving behind."[215] Suggesting the possibility for macro, micro, and individual resets, the duo suggests the highest-level changes will highlight the interconnectivity, speed, and complexity inherent in the global system today; indeed, the duo notes that "If just one word had to distil the essence of the 21st century, it would have to be 'interdependence.'"[216]

Though this paper lacks the space to fully relate all of the book's argument, it broadly posits that the 'fault lines' in our modern global society – such as rising inequality, a polarized political environment, ballooning deficits and debt, and environmental damage – have been laid bare by COVID-19.[217] Rather than 'waste a crisis,' the authors suggest that the pandemic instead represents an opportunity to recalibrate society in a more equitable fashion:

> Resetting is an ambitious task, perhaps too ambitious, but we have no choice but to try our utmost to achieve it. It's about making the world less divisive, less polluting, less destructive, more inclusive, more equitable and fairer than we left it in the pre-pandemic era. Doing nothing, or too little, is to sleepwalk towards ever-more social inequality, economic imbalances, injustice and environmental degradation. Failing to act would equate to letting our world become meaner, more divided, more dangerous, more selfish and simply unbearable for large segments of the globe's population. To do nothing is not a viable option.[218]

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[214] K. Schwab and T. Malleret, *COVID-19: The Great Reset*, eBook (Geneva: World Economic Forum, 2020), sec. Preface.

[215] Ibid., sec. Introduction.

[216] Ibid., sec. 1. Macro Reset.

[217] Ibid., sec. Conclusion.

[218] Ibid.

Highlighting the interdependent nature of global society, as well as expressing a desire for a fundamental recalibration of modern life, *COVID-19: The Great Reset* lays the foundation for Schwab's 2021 book *Stakeholder Capitalism* which is discussed below.

Before doing so, it is worth noting that urban studies theorist Richard Florida used the term 'great reset' a decade earlier than Schwab and Malleret to describe the opportunity for societies to recalibrate themselves in times of crisis:

> Great Resets are broad and fundamental transformations of the economic and social order and involve much more than strictly economic or financial events. A true Reset transforms not simply the way we innovate and produce but also ushers in a whole new economic landscape. As it takes shape around new infrastructure and systems of transportation, it gives rise to new housing patterns, realigning where and how we live and work. Eventually, it ushers in a whole new way of life – defined by new wants and needs and new models of consumption that spur the economy, enabling industry to expand and productivity to improve, while creating new and better jobs for workers.[219]

Writing in the wake of the 2008 financial crisis known as 'the Great Recession,' Florida suggests that an "impending '*new normal*' will be less oriented around cars, houses, and suburbs."[220] (emphasis added). It is interesting to note that the same term was applied by Schwab and Malleret in 2020 in the wake of COVID-19.

Likewise, Florida's description of the adjustment to such a new reality could just as easily describe the post-COVID-19 world; he notes that "… we can all sense that our way of life is changing and our economic landscape is too. These changes are emerging – and have been emerging – organically, in fits and starts, for some time now."[221]

The phrase 'great reset' received mainstream media attention in Canada in late 2020, owing to Prime Minister Justin Trudeau's interest in the concept. However, the idea that the

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[219] Richard Florida, *The Great Reset: How New Ways of Living and Working Drive Post-Crash Prosperity*, OverDrive (New York: HarperCollins, 2010), chap. 1.

[220] Ibid.

[221] Ibid.

COVID-19 pandemic presented an opportunity to recalibrate society was coolly received in the Canadian press. Editorials in newspapers like *The Toronto Sun* criticized Trudeau, opining that "Many Canadians were none too pleased to learn that Trudeau considers these hardships to our health and economy as an 'opportunity' for him to foist an agenda upon our nation."[222] The newspaper also suggested that a presentation made by the Deputy Governor of the Bank of Canada entitled "The Great Reset: Supporting the transition to a greener, smarter economy" betrayed an overtly political agenda on the part of Canada's central bank; the *Sun*'s editorial board implored the Bank of Canada to remain neutral instead.[223]

Writing for *Macleans*, columnist Paul Wells observed that "Trudeau and the Liberals have spent too much of 2020 believing a global crisis would somehow make their work easier, or more exciting, or more validating. And on the frequent occasions when they say so out loud, it comes out sounding bad."[224] Wells also highlighted comments made by Trudeau in August 2020 that portrayed the COVID-19 pandemic as both an "unexpected challenge" and "unprecedented opportunity" – a type of comment that the Prime Minister would soon curtail of his own accord.[225] Wells suggested that poor polling related to comments like these demonstrated the Liberals' "sensitivity to being perceived to hijack the moment for a green recovery."[226]

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[222] The Toronto Sun, "Editorial: Bank of Canada Gets in on the Great Reset," *The Toronto Sun*, 2020, https://torontosun.com/opinion/editorials/editorial-bank-of-canada-gets-in-on-the-great-reset.

[223] Ibid.

[224] Paul Wells, "The Great Reset Is Mostly Just Liberals Blowing off Steam. Mostly.," *Maclean's*, 2020, 1–4, https://www.macleans.ca/politics/ottawa/the-great-reset-is-mostly-just-liberals-blowing-off-steam-mostly/.

[225] Ibid.

[226] Ibid.

4.2 Global interdependency and stakeholder capitalism

Though the Great Reset's moment in the Canadian political spotlight was relatively short, Schwab and the WEF have persisted in their efforts for change, pointing to the benefits of such a global approach.

In the preface of his 2018 book *Shaping the Future of the Fourth Industrial Revolution*, Schwab states that "The social and political systems that have lifted millions out of poverty and shaped our national and global politics for half a century are failing us."[227] Schwab suggests that the increasing concentration of wealth in developed nations and its attendant inequality are proof of such a shortcoming, along with factors like damage to the natural environment and "vulnerable populations: the stakeholders least able to absorb the cost of progress."[228]

The result of such failures is that the public's trust in government and business leaders has greatly decreased, reaching a "point where more than half of the world feels the current system is failing them."[229] Schwab believes this is of grave concern since it implies that "social cohesion is fragile at best, and very close to breaking down at worst."[230]

Outlining the necessity for what he terms stakeholder capitalism, Schwab states that "we need a society, economy and international community that is designed to care for all people and the entire planet."[231] While such an approach may seem overly utopian, Schwab points to the examples of countries like Denmark, New Zealand, and Singapore as nations able to incorporate some of the tenets of stakeholder capitalism.

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[227] Klaus Schwab, *Shaping the Future of the Fourth Industrial Revolution*, OverDrive (Geneva: World Economic Forum, 2018), sec. Preface.

[228] Ibid.

[229] Ibid.

[230] Ibid.

[231] Klaus Schwab, *Stakeholder Capitalism: A Global Economy That Works for Progress, People and Planet* (Hoboken, NJ: Wiley, 2021), xv.

Schwab's 2021 book *Stakeholder Capitalism: A Global Economy that Works for Progress, People, and Planet* represents his most recent thoughts on finding the silver lining of COVID-19 and 'building back better':

> The idea that we need to rebuild differently post-COVID is widely shared. The sudden and all-encompassing impact of COVID-19 made us understand, much more than the gradual effects of climate change or increasing inequality, that an economic system driven by selfish and short-term interests is not sustainable. It is unbalanced, fragile, and increases the chance of societal, environmental, and public health disasters. As COVID-19 demonstrates, when disasters strike, they put an unbearable strain on public systems.[232]

While this paper once again lacks the scope to provide a full accounting of Schwab's latest book, it is noteworthy that his advocacy for environmental change is much more prevalent in *Stakeholder Capitalism* vis-à-vis *COVID-19: The Great Reset*. Whereas the latter outlined environmental considerations and presented them in a balanced way[233], the tone of the *Stakeholder Capitalism* chapter focused on the environment ('People and the Planet') seems more urgent. As an example, Schwab provides what he terms a reinterpretation of global economic development over the last 200 years, noting "It is during this period that the greenhouse gases that are now doing irreparable harm to the environment were emitted. And it is during this time that environmental concerns lost out to short-term priorities that now seem less important."[234]

Schwab believe that four 'megatrends' will determine whether or not climate policies will be feasible – urbanization, shifting demographics, technological advancement, and the changing preferences of society.[235] While he is hopeful that the worst effects of climate change can be avoided, Schwab also writes that "the only positive sign from 2020 may have been that [an

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[232] Ibid.

[233] Schwab and Malleret, *COVID-19: The Great Reset*, sec. 1.5.2 Impact of the pandemic on climate change and other environmental policies.

[234] Schwab, *Stakeholder Capitalism: A Global Economy That Works for Progress, People and Planet*, 150.

[235] Ibid., 159–62.

environmental tipping point] was delayed, as emissions came to a near standstill in many places for a few months."[236]

Schwab views stakeholder capitalism as an evolutionary step beyond what Milton Friedman described as shareholder capitalism beginning in the 1970s, whereby the sole social responsibility of a business was to increase its own profits and the primacy of free markets was stressed as paramount.[237] The stakeholder model espoused by Schwab is described as follows:

> When the well-being of people and planet are at the center of business, the four remaining key groups of stakeholders contribute to their betterment. These stakeholders each have their own primary objectives:
>
> - companies pursue profits and seek long-term value creation;
> - civil society's primary aim is each organization's purpose or mission;
> - governments pursue equitable prosperity; and
> - the international community works toward peace.[238]

Nevertheless, the WEF is not blind to the limits of globalization. In 2019, the WEF published a prescient white paper entitled *Outbreak Readiness and Business Impact: Protecting Lives and Livelihoods across the Global Economy*. Somewhat chillingly, the white paper notes that "the world remains ill-prepared to detect and respond to outbreaks and is not prepared to respond to a significant pandemic threat."[239]

The 2019 report also posits that trends related to globalization itself – such as increased international travel, trade flows, and connectivity – are the very basis of the higher frequency of disease outbreaks.[240] Once again, the report seems eerily predictive, noting that "An outbreak can travel from a remote village to any major city in the world in less than 36 hours, and the

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[236] Ibid., 168.
[237] Ibid., 14.
[238] Ibid., 179.
[239] World Economic Forum, "Outbreak Readiness and Business Impact Protecting Lives and Livelihoods across the Global Economy," 6.
[240] Ibid., 7.

economic or social disruption often travels faster and further."[241] Rising urbanization has also contributed to the more rapid spread of disease, especially in cases where hygiene is poorly practiced or population density is high.[242]

Schwab himself recognizes the challenge of managing further globalization and greater integration, pointing to "the disillusionment among so many workers, convinced that their real income may not increase over their lifetime and that their children may not have a better life than theirs."[243] He also acknowledges the expansion of what he calls 'negative globalization' embodied by the increasing pace of climate change and the international spread of viruses.[244] This last point is key as it relates to the 'vaccine diplomacy' surrounding the production and distribution of COVID-19 vaccines.

4.3 Vaccine diplomacy and the limits of interdependence

While this section could detail the theoretical outlines of a range of critiques about globalization, it will instead consider the real-world example of COVID-19 'vaccine diplomacy' and the lessons it suggests regarding international dependencies.

Difficulties encountered with both the production and distribution of COVID-19 vaccines have challenged long-held beliefs about the benefits of globalization, and have been an object lesson for countries reliant on overseas production. While peer-reviewed studies addressing this subject do not yet exist, following daily and weekly developments via the popular press provides a measure of insight into the varying degrees of national progress and the popular sentiment

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[241] Ibid.

[242] Ibid.

[243] Klaus Schwab, *The Fourth Industrial Revolution*, OverDrive (New York: Crown Business, 2016), sec. Introduction.

[244] Schwab, *Stakeholder Capitalism: A Global Economy That Works for Progress, People and Planet*, 107.

regarding vaccination efforts. Contemporaneously highlighting such progress and accompanying national attitudes is important since the presumed eventual vaccination of all persons in the United States or Canada risks overshadowing the difficulties encountered on the way.

In February 2021, the Canadian government updated its vaccination timeline based on additional vaccine contracts and accelerated deliveries; the government had initially expected 13 million Canadians to be vaccinated by the end of June 2021, but increased its estimate to 14.5 million people.[245] More importantly, the federal government projected it would be able to vaccinate 42 million people by the end of September 2021 – more than ample for Canada's approximate population of 38 million.[246] Reported broadly in the press, this timeline was repeated via an official Government of Canada website detailing COVID-19 vaccines, with achievement of the September 2021 goal based on "the continued supply of safe and effective vaccines."[247] Given previous delivery delays and the reduction of expected shipments from Pfizer, such a disclaimer is likely prudent.[248]

Still, the proviso is also notable since it reflects the growing international tensions and 'vaccine diplomacy' that continued to surround COVID-19 vaccines in early 2021. Such negotiations had previously affected Canada's 2020 efforts to develop its own vaccine in partnership with a Chinese pharmaceutical company; shortly after an announcement from Prime

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[245] Rachel Aiello, "14.5M Canadians to Be Immunized by June, Updated Vaccination Timeline Shows," *CTV News*, February 18, 2021, https://www.ctvnews.ca/health/coronavirus/14-5m-canadians-to-be-immunized-by-june-updated-vaccination-timeline-shows-1.5314048.

[246] Rachel Gilmore, "Feds Unveil Accelerated Rollout Schedule Following Fresh Coronavirus Vaccine Deals," *Global News*, February 18, 2021, https://globalnews.ca/news/7647696/coronavirus-vaccine-rollout-timeline-government/.

[247] Government of Canada, "Vaccines for COVID-19: Shipments and Deliveries," 2021, https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks/covid-19-vaccine-treatment/vaccine-rollout.html.

[248] Raisa Patel, "Temporary Pfizer Vaccine Delays Are 'largely behind Us,' Procurement Minister Says," *CBC News*, February 7, 2021, https://www.cbc.ca/news/politics/temporary-pfizer-vaccine-delays-anand-1.5904756.

Minister Trudeau in May 2020, China blocked shipment of vaccine samples in what was seen as retaliation for the ongoing detention of Huawei executive Meng Wanzhou in Canada.[249]

Perhaps as a result of such false starts, and also based on an inability to produce vaccines within its own borders, by December 2020 Canada had contracts in place to vaccinate 154 million people – enough for 400% of the national population, a percentage higher than any other country in the world.[250] Groups such as Amnesty International were critical of countries such as Canada, claiming that wealthy nations were "in breach of their human rights obligations" through their actions to purchase the majority of the global vaccine supply.[251]

Despite securing access to an excess of vaccine, the Canadian government surprised many when the country signaled its intent in early 2021 to draw vaccine doses via the COVID-19 Vaccines Global Access (COVAX) program. The COVAX initiative, a worldwide vaccine-sharing initiative led by a variety of agencies including the World Health Organization (WHO) and UNICEF, was created to allow wealthy countries to purchase vaccine doses for poorer countries. Unsurprisingly, Canada has been criticized for its willingness to draw vaccines from COVAX stockpiles, with 1.9 million AstraZeneca doses destined for Canada by the end of June 2021.[252]

Regardless of the criticism and damage to its international prestige, as of this chapter's writing in early April 2021 Canada's COVID-19 vaccine website showed that nearly 317,000 doses of AstraZeneca vaccine were received by the country in early April through the COVAX

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[249] Tristin Hopper, "How Ottawa Utterly Botched Canada's COVID Vaccine Acquisition," *National Post*, February 5, 2021, https://nationalpost.com/news/how-ottawa-utterly-botched-canadas-covid-vaccine-acquisition.

[250] Rastello and Bolongaro, "Canada Has Reserved More Vaccine Doses Per Person Than Anywhere."

[251] Win, "Canada the Biggest Hoarder of COVID-19 Vaccine Pre-Orders in First World, NGOs Say."

[252] Peter Zimonjic and Catherine Cullen, "Canada to Take COVAX Vaccines, Won't Share Doses until Every Canadian Is Inoculated: Anand," *CBC News*, March 5, 2021, https://www.cbc.ca/news/politics/covax-anand-vaccine-timetable-1.5939270.

program.[253] Though critics pointed out that Canada drawing doses via COVAX meant that poorer nations elsewhere would not receive them, Canadian national interest won out in the short term, with Public Services and Procurement Minister Anita Anand stating that Canada would only start sharing vaccines once its own population was inoculated.[254] Such a stance was in line with one writer's opinion in the *National Post* when he noted "Any national government has to put its own interests first. Whatever ethical qualms this may raise will always get crushed by pragmatic expediency."[255]

A similar attitude was displayed by the Biden administration regarding American vaccine sharing with both Canada and Mexico. During a press conference on March 1, 2021, White House Press Secretary Jen Psaki indicated that should the President of Mexico request access to the American AstraZeneca vaccine supply during his first meeting with President Biden, such a request would be denied: "[President Biden] has made clear that he is focused on ensuring that vaccines are accessible to every American. That is our focus."[256] Acknowledging the importance of economic recovery for the Biden administration, Psaki added that sharing vaccines with both Canada and Mexico would only be considered after all Americans were vaccinated since doing so would hasten the re-opening of national borders and spur increased trade.[257]

The American government changed tack weeks later, announcing at a March 18 press conference that it would loan 4 million combined doses of its AstraZeneca vaccine stockpile to

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[253] Government of Canada, "Vaccines for COVID-19: Shipments and Deliveries."

[254] Zimonjic and Cullen, "Canada to Take COVAX Vaccines, Won't Share Doses until Every Canadian Is Inoculated: Anand."

[255] Matt Gurney, "COVID Shows Why Canada Can't Depend on Its Friends When the Chips Are Down," *National Post*, March 3, 2021, https://nationalpost.com/opinion/matt-gurney-covid-shows-why-canada-cant-depend-on-its-friends-when-the-chips-are-down.

[256] The White House, "Press Briefing by Press Secretary Jen Psaki and Secretary of Homeland Security Alejandro Mayorka, March 01, 2021," *White House Press Briefing* (Washington, D.C., 2021), https://www.whitehouse.gov/briefing-room/press-briefings/2021/03/01/press-briefing-by-press-secretary-jen-psaki-and-secretary-of-homeland-security-alejandro-mayorkas/.

[257] Ibid.

Canada and Mexico. However, it should be noted that while apparently benevolent, at the time of the announcement the AstraZeneca vaccine was not approved for use within the United States, and that 'repayment' of the loan was expected one-for-one in vaccine doses, AstraZeneca or otherwise.[258] As with the AstraZeneca doses received via COVAX, by April 2021 the Canadian government noted 1,504,200 doses under the heading "U.S. AstraZeneca forecasted allocation" on its COVID-19 vaccine website.[259]

The evidence of vaccine nationalism was also visible outside the North American continent. In late March 2021 India imposed strict limits on the export of domestically-produced AstraZeneca vaccine amidst rapidly rising infection rates in the country. India's export controls "trigger[ed] setbacks for vaccination drives in many other countries"[260] including delays for approximately 100 million doses earmarked for poor countries as part of the COVAX program.[261]

Production delays also added to national anxieties and caused knock-on effects for other countries. In March 2021, the European Union (EU) grew concerned when AstraZeneca was unable to meet its contractual obligation to deliver 90 million doses of vaccine to the EU between January and March 2021; the company forecast that it would instead deliver 30 million doses by the end of March with 20 million more deliveries by the end of April.[262] Amid national concern of a third wave of COVID-19, Italy blocked a shipment of 250,000 doses of

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[258] The White House, "Press Briefing by Press Secretary Jen Psaki and Secretary of Housing and Urban Development Marcia L. Fudge, March 18, 2021," *White House Press Briefing* (Washington, D.C., 2021), https://www.whitehouse.gov/briefing-room/press-briefings/2021/03/18/press-briefing-by-press-secretary-jen-psaki-and-secretary-of-housing-and-urban-development-marcia-l-fudge-march-18-2021/.

[259] Government of Canada, "Vaccines for COVID-19: Shipments and Deliveries."

[260] Jeffrey Gettleman, Emily Schmall, and Mujib Mashal, "India Cuts Back on Vaccine Exports as Infections Surge at Home," *New York Times*, March 25, 2021, https://www.nytimes.com/2021/03/25/world/asia/india-covid-vaccine-astrazeneca.html.

[261] Ibid.

[262] Francesco Guarascio, "AstraZeneca Further Cuts EU Vaccine Supply Target to 30 Million: Document," *Reuters*, March 11, 2021, https://www.reuters.com/article/us-health-coronavirus-eu-astrazeneca-idUSKBN2B402Y.

AstraZeneca vaccine bound for Australia in what was believed to be the first instance of Europe intervening in a vaccine shipment to a non-European Union country.[263]

By late March 2021, the EU had responded to supply shortages throughout the bloc by considering emergency legislation that would have permitted broad export controls on vaccines until mid-May 2021, with the United Kingdom and Canada likely to be most affected by limits on EU exports.[264] Ursula von der Leyen, president of the EU's executive branch, remarked that "We are in the crisis of a century. And I'm not ruling out anything for now, because we have to make sure that Europeans are vaccinated as soon as possible."[265]

Facing criticism and government pressure, British-Swedish vaccine manufacturer AstraZeneca pointed to the dates of its agreements with the United Kingdom and the EU, stating that the former had signed its contracts first, ensuring the UK's prioritization over the EU.[266] Still, expressing frustration with AstraZeneca's seeming inability to meet its original commitments to Europe, French President Emmanuel Macron noted that he supported "block[ing] all exports for as long as some drug companies don't respect their commitments with Europeans."[267]

Demonstrating the uncertain dynamics surrounding vaccine diplomacy in early 2021, EU leadership ultimately decided against an export ban.[268] The Prime Ministers of both Canada and the United Kingdom spoke with EU leaders to attempt to dissuade the bloc from implementing

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[263] Australian Broadcasting Corporation, "Italy, EU Refuse AstraZeneca Request to Ship 250,000 Doses of Vaccine to Australia," March 5, 2021, https://www.abc.net.au/news/2021-03-05/italy-eu-block-250000-astrazeneca-doses-to-australia/13218348.

[264] Matina Stevis-Gridneff, "E.U. Will Curb Covid Vaccine Exports for 6 Weeks," *New York Times*, March 23, 2021, https://www.nytimes.com/2021/03/23/world/europe/eu-curbs-vaccine-exports.html.

[265] Ibid.

[266] British Broadcasting Corporation, "Coronavirus Vaccines: PM to Telephone EU Leaders in Bid to Stop Export Ban Being Imposed," *BBC News*, March 22, 2021, https://www.bbc.com/news/uk-politics-56479814.

[267] British Broadcasting Corporation, "Coronavirus: EU Stops Short of Vaccine Export Ban," *BBC News*, March 26, 2021, https://www.bbc.com/news/world-europe-56529868.

[268] Ibid.

export controls, demonstrating the national importance of vaccine supplies and the necessity of conducting vaccine diplomacy at the highest levels of government.[269] [270]

Finally, while not strictly part of vaccine diplomacy per se, questions about the origins of COVID-19 have also had international implications and affected the norms of globalization. Australia's 2020 calls for an independent probe into COVID-19's origins sparked a trade war with China, the country's largest trading partner. China, sensitive to the western perception that it is responsible for COVID-19 given its initial detection in Wuhan, accused Australia of racism and threatened economic consequences including a potential boycott of Australian goods.[271]

As of this paper's writing in the spring of 2021, China remained wary of outside scrutiny regarding COVID-19. While the Chinese government has signaled its intent for transparency to the international community – recall the 'opening up' as pointed to in Chapter 2 of this paper – many of the Chinese participants in an as-yet unpublished collaborative report with the WHO "hold official positions or work at government-run institutions, giving Beijing great influence over [the report's] conclusions."[272] Not surprisingly, the Chinese government has leveraged its power over Chinese participants and "repeatedly tried to bend the [2021] investigation to its advantage."[273]

The results of a similar joint mission to Wuhan by WHO and Chinese officials a year earlier suggest the likely tone of the 2021 report when it is released. The 2020 report details

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[269] Sean Boynton, "Trudeau, EU Leader Talk Vaccines but No Assurance Canada Exempt from Export Controls," *Global News*, March 24, 2021, https://globalnews.ca/news/7718016/trudeau-eu-vaccine-exports/.

[270] British Broadcasting Corporation, "Coronavirus Vaccines: PM to Telephone EU Leaders in Bid to Stop Export Ban Being Imposed."

[271] Michael Walsh, "Australia Called for a COVID-19 Probe. China Responded with a Trade War," *Australian Broadcasting Corporation News*, January 2, 2021, https://www.abc.net.au/news/2021-01-03/heres-what-happened-between-china-and-australia-in-2020/13019242.

[272] Javier C. Hernandez and James Gorman, "Virus Origins Remain Unclear in W.H.O.-China Inquiry," *New York Times*, March 29, 2021, https://www.nytimes.com/2021/03/29/world/asia/china-virus-WHO-report.html.

[273] Ibid.

investigative efforts from February 16-24, 2020, and explicitly praises Chinese leaders such as General Secretary Xi Jinping, Prime Minister Li Keqiang, and Vice Premier Sun Chunlan.[274] Similarly, the joint report is effusive in its praise of initial Chinese efforts to counter COVID-19, suggesting that "China has rolled out perhaps the most ambitious, agile and aggressive disease containment in history"[275], hailing China's "bold approach to contain the rapid spread of this new respiratory pathogen,"[276] and stating that China's success with containment measures "has only been possible due to the deep commitment of the Chinese people to collective action."[277] Though this paper lacks the scope to do so, the impact of COVID-19's genesis on international relations is certainly worthy of further research and reporting in the future.

The case of COVID-19 vaccine diplomacy suggests a few lessons for national governments. One is that while deals may be struck and contracts may be signed to signal the arrival of a crucial consumer good (in this case, a vaccine), such accords are ultimately subject to the production realities of far-flung factories as well as international agreements. While Canada is often seen as both a supporter and beneficiary of the international rules-based order, the fragility of such customs – as well as the lack of immediacy in related enforcement mechanisms – showed that in times of crisis, many (if not all) bets were off.

Ultimately, the ability to produce vaccines domestically is a critical matter of national security because it speaks to the underlying health of a nation's populace. Being able to produce and distribute a needed vaccine also speaks to the very raison d'être for a government – to ensure the ongoing security of its populace. Recognizing this, the Canadian government announced in

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[274] World Health Organization, "Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)," *The WHO-China Joint Mission on Coronavirus Disease 2019*, 2020, 14, https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf.

[275] Ibid., 16.

[276] Ibid., 17.

[277] Ibid.

February 2021 its plans to produce COVID-19 vaccine at a facility in Montreal; however, when the announcement was made the facility remained under construction and will only be able to produce vaccine doses "several months into 2022."[278]

Not unlike the American reaction to Chinese REE dominance outlined in Chapter 2 of this paper, such a reactive measure may be too little, too late. Though it may arrive too late to assist Canadian efforts in countering COVID-19, the creation of the vaccine facility underlines the importance of investment in infrastructure, which is the final subject addressed by this chapter.

4.4 American infrastructure and plans for investment

While running for the American presidency in 2020, then-candidate Joe Biden's official campaign website referred to a 'Clean Energy Revolution' and stated that "Biden believes the Green New Deal is a crucial framework for meeting the climate challenges we face."[279] Biden echoed these claims on the campaign trail, promising investments in green infrastructure in order to create "high-quality, middle-class jobs in cities and towns across the United States."[280] Biden's campaign website also stated that "American workers should build American infrastructure and manufacture the materials that go into it,"[281] and suggested that a focus on

[278] René Bruemmer, "Montreal's New Vaccine Plan Will Be Late, but Useful, Observers Say," *Montreal Gazette*, February 3, 2021, https://montrealgazette.com/news/local-news/montreals-new-vaccine-plant-will-be-late-but-useful-observers-say.

[279] Democratic National Committee, "The Biden Plan for a Clean Energy Revolution and Environmental Justice," *Joe Biden for President: Official Campaign Website*, 2020, https://joebiden.com/climate-plan.

[280] Ibid.

[281] Democratic National Committee, "The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future," *Joe Biden for President: Official Campaign Website*, 2020, https://joebiden.com/clean-energy/.

'building back better' would 'reshore' manufacturing jobs, strengthen vital supply chains, and reduce American dependency on other countries in future crises.[282]

As suggested in Chapter 3 of this paper, sustained American investment in aging infrastructure is overdue; per the American Society of Civil Engineers' *2021 Report Card for America's Infrastructure*, the United States received an overall grade of C- for its national infrastructure.[283] Per the *2021 Report Card*'s accompanying Executive Summary, this grade falls on the low end of a category described as "Mediocre, requires attention"[284] but marks an improvement from the 2017 grade of D+, which placed American infrastructure in the 'Poor, At Risk' category.

The *2021 Report Card* also suggests that $2.6 trillion will be required to close the national infrastructure 'investment gap' over 10 years,[285] which marks a decrease from the 2017 report's suggestion that $4.59 trillion dollars were needed to improve American infrastructure to a 'B' grade.[286] As the *2021 Report Card* optimistically notes, the United States is "headed in the right direction, but a lot of work remains."[287]

The *2021 Report Card* also notes the need for resilience in infrastructure, stating that America "must utilize new approaches, materials, and technologies to ensure our infrastructure can withstand or quickly recover from natural or man-made hazards."[288] Such a suggestion aligns

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[282] Democratic National Committee, "Build Back Better: Joe Biden's Jobs and Economic Recovery Plan for Working Families," *Joe Biden for President: Official Campaign Website*, 2020, https://joebiden.com/build-back-better/.

[283] American Society of Civil Engineers, "2021 Report Card for America's Infrastructure" (Reston, VA, 2021), 2, https://infrastructurereportcard.org/wp-content/uploads/2020/12/National_IRC_2021-report.pdf.

[284] American Society of Civil Engineers, "2021 Report Card for America's Infrastructure: Executive Summary" (Reston, VA, 2021), 3, https://infrastructurereportcard.org/wp-content/uploads/2020/12/2021-IRC-Executive-Summary.pdf.

[285] American Society of Civil Engineers, "2021 Report Card for America's Infrastructure," 8.

[286] Ibid., 168.

[287] Ibid., 2.

[288] Ibid., 8.

with both the 2018 National Defense Strategy and 2017 National Security Strategy referred to in this paper's previous chapters. As with many other elements of national security outlined in this paper, infrastructure requires ongoing investment: "Just as cars demand tune-ups and roofs require incremental repairs, … infrastructure needs robust and sustainable funding to make continued needed improvements over time."[289] This language is similar to that of the American defense establishment in calling for predictable, sustained funding for the American military.

The WEF's annual *Global Competitiveness Report* series provides a wider perspective on the state of American infrastructure. While the 2020 iteration was a special edition detailing countries' recovery from COVID-19[290], the 2019 version lists the United States as the second-most competitive nation out of 141 countries, but notes that it ranks 13th out of the same 141 nations when judged from an infrastructure perspective.[291] This ranking is based on aggregate scores addressing a combination of transport and utility infrastructure. While the United States was given a perfect score of 100 for its road connectivity, for example, its road quality was separately scored at 74.5, which ranked America #17 worldwide in terms of road quality.[292]

In response to the state of America's infrastructure, the Biden administration announced a $2 trillion infrastructure and jobs package called the American Jobs Plan (AJP) on March 31, 2021. The official statement from the White House noted the plan is part of the Biden administration's plan to "reimagine and rebuild a new economy," claiming that "The American

[289] Ibid., 167.

[290] Klaus Schwab, Saadia Zahidi, and World Economic Forum, "The Global Competitiveness Report Special Edition 2020: How Countries Are Performing on the Road to Recovery," *World Economic Forum* (Geneva, 2020), www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2020.pdf.

[291] Klaus Schwab and World Economic Forum, "The Global Competitiveness Report 2019" (Geneva, 2019), 583, http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf.

[292] Ibid.

Jobs Plan will invest in America in a way we have not invested since we built the interstate highways and won the Space Race."[293]

Citing America's infrastructure ranking from the WEF's 2019 *Global Competitiveness Report* as a driver, the statement highlights the disconnect between America's position as the wealthiest country in the world and its placement at 13th globally in terms of overall infrastructure quality.[294] As a result, the Biden White House intends to improve both national infrastructure and national competitiveness via the AJP, suggesting the initiative is necessary "to meet the great challenges of our time: the climate crisis and the ambitions of an autocratic China."[295]

Given the exigencies of this paper's research and drafting – and that both activities occurred contemporaneously with the announcement of the AJP – it is possible that Biden's plan will not pass the U.S. Congress to become law, and perhaps likely that its original outlines will be modified. That said, there is merit to a brief examination of the AJP here to understand its contours and what it means for American federal spending in the next few years.

Though hailed in the popular press as a $2 trillion infrastructure package, the actual amount of money dedicated to infrastructure is much less. For example, a full 20% of the package ($400 billion) is dedicated to "expanding access to quality, affordable home- or community-based care for aging relatives and people with disabilities" while an additional $213 billion would be directed to "produce, preserve, and retrofit more than two million affordable and sustainable places to live."[296] Though such investments are important, they would likely not

[293] The White House, "Fact Sheet: The American Jobs Plan," 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/.

[294] Ibid.

[295] Ibid.

[296] Ibid.

be considered as critical infrastructure. A generous totaling of various planned investments in transportation, utility, and communications infrastructure amounts to $932 billion – less than half of the overall package.[297]

Similarly, while $115 billion is earmarked to "fix highways, rebuild bridges, upgrade ports, airports and transit systems,"[298] this amount will effectively address 20,000 miles of highways and "the ten most economically significant bridges in the country in need of reconstruction."[299] Given that Chapter 3's reference to STRAHNET made clear that the network spans nearly 63,000 miles of roads and highways, this element of the AJP may fall far short of shoring up military requirements. Indeed, the White House statement itself notes that 173,000 miles of American roads and highways are in poor conditions[300], and the *2021 Report Card* estimates that $786 billion would be required to clear the backlog of road and bridge capital requirements, with $435 billion of that amount needed to repair existing roads.[301]

Notably, $174 billion of the $621 billion planned for transportation infrastructure in the AJP is dedicated to "[winning] the EV market", including retooling American factories to build electric vehicles and their batteries.[302] Also included in this amount are rebates and tax incentives to encourage American consumers to purchase American-made electric vehicles, and incentives for state and local governments to help in building a nationwide network of 500,000 EV charging stations by 2030.[303] While well intentioned, the fact that such EV-centric allocations outpace badly needed investments in roads, highways, and bridges by 51% is perhaps indicative of the

[297] Ibid.
[298] Ibid.
[299] Ibid.
[300] Ibid.
[301] American Society of Civil Engineers, "2021 Report Card for America's Infrastructure," 111.
[302] The White House, "Fact Sheet: The American Jobs Plan."
[303] Ibid.

dangerous infatuation of 'going green' and 'building back better'. The most technologically advanced car in the world still needs well-maintained roads to drive on.

The Biden administration's $2 trillion infrastructure plan has also drawn criticism from within Biden's own party. Though it is set to be paired with a follow-on infrastructure strategy, architects of the Green New Deal like Rep. Alexandria Ocasio-Cortez have suggested that Biden's investments do not go far enough, calling for more than double the amount of funding.[304] Another potential headwind for Biden's proposal is the expense of the recently passed $1.9 trillion COVID-19 relief package (also referred to as the American Rescue Plan Act of 2021); the deficit spending required to fund the Rescue Plan Act could dissuade moderate Democrats from supporting Biden's AJP. Though Biden plans to fund the AJP with tax increases, in the short term its execution would likely increase the national deficit.

A renewed focus on investing in national infrastructure could offer myriad benefits for America. However, in order to maximize the national security dividend derived from such investments, items such as roads, bridges, and power grids must be prioritized over 'soft' infrastructure like affordable housing or retirement homes. Beyond bolstering national security, structuring infrastructure spending in this way would add to the overall quality of life for Americans and facilitate the conduct of business. Moreover, should defense spending on big-ticket items like the F-35 face downward pressure, infrastructure investment could offer a more palatable option for taxpayers.

[304] Danielle Kurtzleben, "'Green New Deal' Leaders See Biden Climate Plans As A Victory, Kind Of," *National Public Radio*, April 2, 2021, https://www.npr.org/2021/04/02/983398361/green-new-deal-leaders-see-biden-climate-plans-as-a-victory-kind-of.

CONCLUSION

The four preceding chapters of this paper have highlighted the interconnected nature of defense acquisition and its related fields. Maintaining a national capability in defense acquisition requires a defense industrial base; maintaining such a base requires investments in critical infrastructure and manufacturing capability; and those investments require patience, foresight, and money.

In the case of the United States, the DIB is not in the poor condition the Trump administration suggested. Despite enacting tariffs on both imported steel and aluminum, Chapter 1 demonstrated that steel usage by the American military only requires 3% of annual American production. Reliance by the US military on the aluminum sector is perhaps so embarrassingly low that the actual results of a governmental inquiry into the sector were redacted to avoid undercutting political objectives.

Chapter 2 demonstrated how China's strategic ambitions have led to substantial investment in national infrastructure and in a vast increase in physical and economic linkages with neighbouring states. These investments, perhaps best embodied by the Belt and Road Initiative, are representative of China's desire to ascend to a position of global leadership. While the United States turned its focus inward during the Trump administration and partially withdrew from its assumed mantle of preeminence, it created a power vacuum that China was eager to fill.

COVID-19 has changed countless facets of our daily lives, and the effects of the pandemic may well shape the American approach to defense investment moving forward. Though the amount of national and international debt accrued by countries around the world is staggering, the United States has spent more than any other nation on COVID-19 relief. Though the US dollar's status as the world's reserve currency means that America's position is

somewhat different than other countries, at some point the country will have to deal with its massive debt.

Given that defense spending makes up nearly half of America's discretionary spending (roughly 3.5% of GDP in 2019), it could be tempting for American lawmakers to curtail defense spending as part of a national effort to lower budget deficits and reduce debt. At the same time, deeply entrenched business interests in the country will fight to keep bloated projects like the F-35 afloat, potentially redirecting cuts elsewhere and reducing national readiness or resilience.

As suggested by Taleb, accruing debt is essentially an expression of confidence in one's ability to repay in the future. While the global amount spent on debt servicing has decreased since the declaration of a pandemic in March 2020, individuals, businesses, and nations that are relying on interest rates to remain low for the foreseeable future will be that much more susceptible to shocks should central banks need to raise rates in order to quell inflation. In the meantime, the raft of worldwide stimulus spending may be raising the likelihood of the very inflation that governments are seeking to avoid.

As both the production and distribution of COVID-19 vaccines has shown, globalization has not eliminated the existence of national interests. Rather, such interests remain important and can manifest themselves in unexpected ways. The 'vaccine diplomacy' that emerged in late 2020 and early 2021 underscores an important point for national governments – in times of crisis all bets may be off, with other countries placing national interests ahead of diplomacy. The lessons for governments are many, including that a truly resilient supply chain might be one that doesn't stretch beyond national borders, and that national manufacturing capacity can benefit from thoughtful direction and the occasional incentivized push.

While infrastructure spending during the Biden administration may provide opportunities for defense reinvestment, such spending will need to be carefully targeted to ensure an optimal return on investment. Given the uncertainty caused by the rapid growth of America's national debt as a result of COVID-19 stimulus spending, as well as the ambitious scale of infrastructure investments not seen for generations, it will be crucial for the United States to remain focused if it truly hopes to 'build back better' from the pandemic. While investment in categories such as long-term care homes is important, such action is not equivalent to improving core national infrastructure like transportation networks, and should not be touted as such.

With an aging population, American discretionary spending on health care is likely to increase in the coming decades and put further downward pressure on funds presently earmarked for defense. Should 'traditional' military spending – such as that directed toward weapon system procurement or expeditionary operations – soon fall out of favour, it does not necessarily mean that national security (in a holistic sense) will be underfunded. Instead, a generational opportunity exists for the United States to recapitalize its critical infrastructure, revitalizing and building upon the national investments made in the wake of World War II.

Looming in the background behind all of the worldwide stimulus spending is the risk of a Black Swan event, its very nature as an 'unknown unknown' all but guaranteeing that the world will receive little warning of its occurrence. As a result, a continued focus on redundancy and resiliency in national capabilities and national defense will be required as a bulwark against the next catastrophe, whether it is another pandemic, a financial market crash, or an environmental disaster. Building safeguards into our existing systems will require vast investments from nations in terms of time, effort, resources, and money.

While the well-known adage that an ounce of prevention is worth a pound of cure may seem passé, in the case of national defense investment it is nevertheless true. The biblical parable of Noah and his Ark also serves as a ready example of preparedness – Noah, of course, having built his lifeboat *before* the storm.

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