

EVERYTHING IS CLIMATE NOW: NEW DIRECTIONS FOR INDUSTRIAL POLICY FROM BIDEN'S SUPPLY CHAIN REPORTS

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EXECUTIVE SUMMARY

On February 24, 2022, the Biden administration unveiled a massive, history-making collection of supply chain reports. A combined 1,358 pages in length, these 19 reports were written by seven federal agencies and numerous staff from a network of 17 national labs. Collectively, they represent the first time since the Franklin D. Roosevelt administration that the US federal government has taken it upon itself to not only inventory the industrial resources of the national and global economies, but also set out detailed industrial policy targets designed to equip those industries to meet today's most important existential challenges. Released on the same day as Russia's illegal invasion of Ukraine, the reports understandably received little notice from the press and public. But amid the growing geo-economic rift wrought by the war, policymakers of democracies are attempting to rapidly unwind their economic exposure to autocracies—making the reports even more relevant.

This issue brief highlights three of the reports' most important contributions. First, the reports demonstrate that everything is related to climate now. Whether the authoring agency is seen as having an environmental mandate or not, and whether the industry under study in a given report is obviously climate-related (like green hydrogen) or not (semiconductors), guaranteeing the future resilience of every industry requires planning for the destabilization that the climate crisis has brought and will continue to bring. Second, the supply chain reports show that policy in Washington is increasingly oriented toward a broader conception of the role of the state in the economy that goes beyond remedying narrow market failures. The final—and crucial—point these reports demonstrate is that policymakers have still not settled on a fully fledged paradigm for what precisely this broader role for the state could or should look like, nor what governance institutions should be formed to support that new role. The scope of this new role could include fostering better coordination among competing and complementary demands for scarce resources, standing up new institutions and sticks to hold industry



accountable, and directly producing and owning needed resources. Additionally, policymakers should rewrite international rules to better support this agenda and learn to leverage the power of organized labor as a partner in industrial policy, which can in turn aid racial justice and material equality.



SECTION ONE

INTRODUCTION

In July 2020, the Biden-Harris presidential campaign released the “Biden Plan to Rebuild US Supply Chains and Ensure the US Does Not Face Future Shortages of Critical Equipment.” It was just four months into the COVID-19 pandemic, at which point over 100,000 Americans had died (Jones 2022),¹ and the Trump administration was hesitating to put the full power of the government behind addressing shortages of personal protective equipment (PPE) and other medical materials. The Biden-Harris campaign put in stark terms what was at stake:

The COVID-19 pandemic has exposed how President Trump has left America’s supply chains for critical products more vulnerable to global disruptions, creating a heightened risk that the US ends up at the back of the line when there are worldwide shortages, or that our competitors cut us off from needed products and inputs. As President, Joe Biden will put Americans to work rebuilding domestic manufacturing of critical products to ensure that the US and our allies have the capacity and resilience to make what we need for our national security, rather than be dependent on countries like China. This is the opposite of the approach taken by President Trump. Trump tweets about “America First” but his policies put outsourcing corporations first. (Biden-Harris 2020b)²

One of the first major steps the Biden administration took to deliver on this pledge was to issue Executive Order Number 14107 on February 24, 2021. This order had a wide focus, noting that “pandemics and other biological threats, cyber-attacks, climate shocks and extreme weather events, terrorist attacks, geopolitical and economic competition, and other conditions can reduce critical manufacturing capacity and the availability and integrity of critical goods, products, and services” (EOP 2021).³ The order tasked seven federal agencies with conducting supply chain analyses over a 100-day and one-year timetable. Table 1 describes the specific tasks and outputs for each agency (The White House 2022).⁴

¹ See <https://www.pewresearch.org/politics/2022/03/03/the-changing-political-geography-of-covid-19-over-the-last-two-years/>.

² See <https://www.documentcloud.org/documents/6982369-Biden-Supply-Chain-Fact-Sheet-07-07-20.html>.

³ See <https://www.federalregister.gov/documents/2021/03/01/2021-04280/americas-supply-chains>.

⁴ In addition to the agency-specific outputs, the National Economic Council and National Security Council produced capstone reports at both the 100-day and one-year marks, though these focused more on cataloguing a number of policy interventions the administration took in its first year in office. The original reports can be found at this link: <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/24/the-biden-harris-plan-to-revitalize-american-manufacturing-and-secure-critical-supply-chains-in-2022/>.



TABLE 1.			
Agency	100-Day Study Assignment	Object of Study for One-Year Report	Output Released at One-Year Mark
Department of Defense (DOD)	Supply chain for critical minerals and other strategic materials, including rare earth elements	Defense industrial base	78-page report, supplementing previously released outputs
Department of Health and Human Services (HHS)	Supply chain for pharmaceuticals and active pharmaceutical ingredients	Public health and biological preparedness industrial base	41-page report, supplementing previously released outputs
Department of Commerce (DOC) and Department of Homeland Security (DHS) (for one-year report)	Semiconductor manufacturing and advanced packaging supply chains	Part of the information and communications technology industrial base	97-page report, supplementing previously released outputs
Department of Energy (DOE), which relied on staff from the 17 national labs	Supply chain for high-capacity batteries, including electric vehicle batteries	Energy sector industrial base	76-page report, supplemented by 11 industry-specific reports (811 pages) and two cross-cutting thematic reports (63 pages)
Department of Transportation (DOT)	N/A	Transportation industrial base	141-page report, focused on freight and logistics
US Department of Agriculture (USDA)	N/A	Supply chains for production of agricultural commodities and food products	51-page report
			Total: 1,358 pages

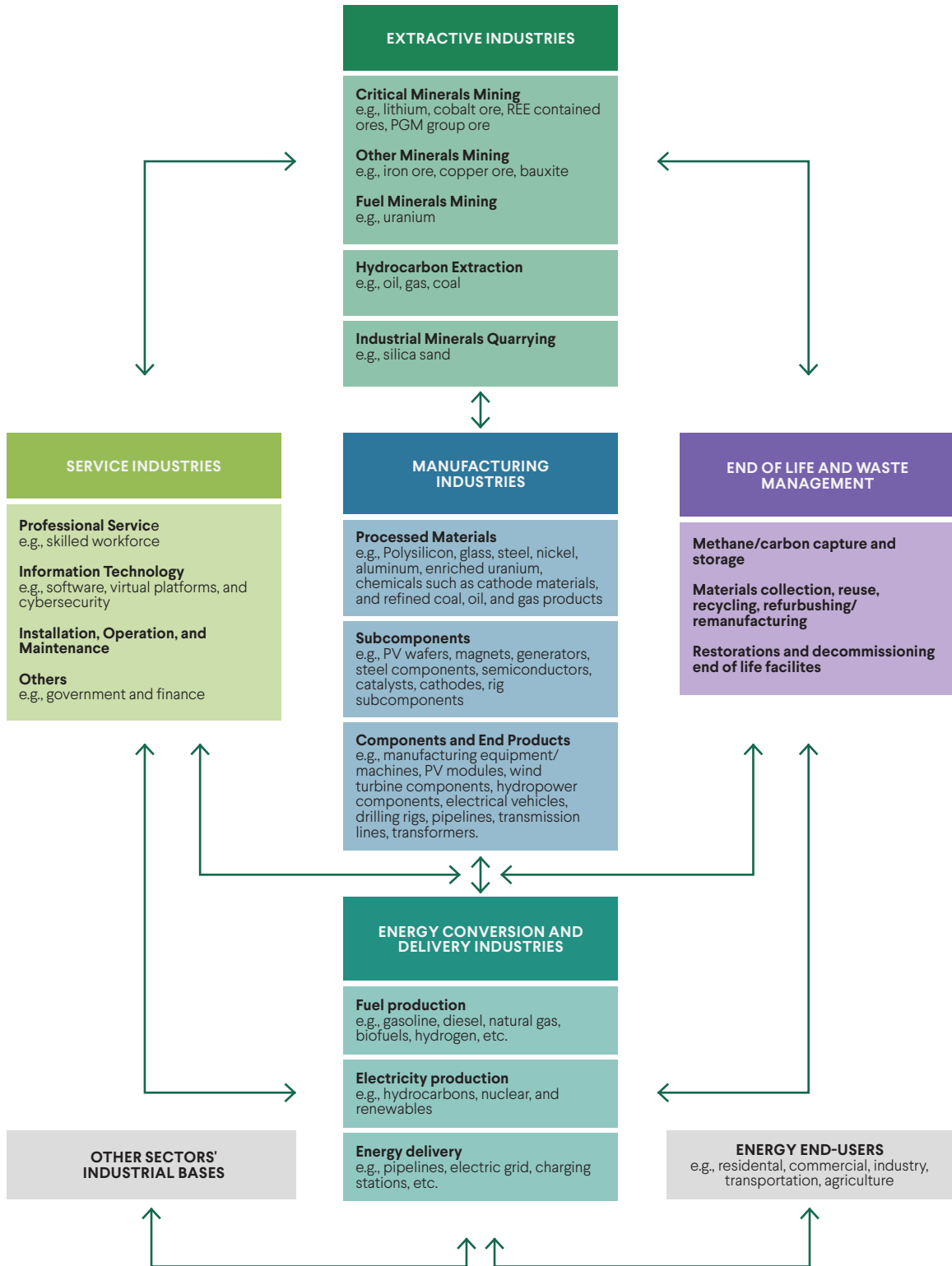
A few things stand out from this summary in Table 1. First, six of the seven agencies had assignments to study not just specific industries or supply chains, but rather a more encompassing notion of an economic “base” (USDA was the exception.) Notably, only the defense industrial base had been previously defined, meaning that five of this subset of six agencies enjoyed substantial discretion in setting the parameters for their studies.



The Department of Energy (DOE) went the furthest in expansively defining an energy sector industrial base, producing not only a summary study but also an additional 11 studies examining distinct clean energy industries and an additional 2 studies examining cross-cutting competitiveness and cybersecurity issues. In its report, the DOE defined its base as “the energy sector and associated supply chains that include all industries, companies and stakeholders directly and indirectly involved in the energy sector . . . including extractive industries, manufacturing industries, energy conversion and delivery industries, end of life and waste management industries, and service industries that include providers of digital goods and services” (DOE 2022a, ix). Figure 1 reproduces how the DOE conceptualizes the Energy Sector Industrial Base.



FIGURE 1: ENERGY SECTOR INDUSTRIAL BASE



Source: DOE 2022a



The Department of Transportation, in contrast, arguably narrowed its assumed mandate, focusing “only” on freight transport rather than the broader transportation industrial base, which also includes commuter traffic, pipelines, and other activities.

What could explain this variance in departments’ output? First, departments that were established with specific industries of jurisdictional focus—such as the DOE—have been able to develop deeper expertise than those with wider mandates. For instance, the Department of Commerce (DOC) has historically covered all industries until they are deemed important enough to merit the creation of a designated department (DOC 1995). Second, departments with substantial research and policy resources can produce more content than those without it. Again, the Department of Energy exemplifies this: Its network of 17 national labs employs 13,000 full-time employees and 95,000 staff, many of whom are scientists and researchers (DOE 2021, 13). In comparison, the Department of Transportation’s policy office has around 200 full-time equivalent positions (DOT 2022a). Finally, White House policy direction matters. The Biden administration demanded that departments focus on climate resilience, so all did, with those departments whose mandates most closely related to climate policy producing relatively more.⁵



⁵ The administration’s other cross-cutting mandates have had varied results. Daly and Gunn-Wright (2022) document gaps in the environmental justice mandate, while the pace of implementation of executive actions to boost labor power has frustrated some (Cunningham-Cook and Bragman 2022; Heckman 2022). The Made in America Office recommendations appear to be more successful in increasing Buy American rules and may benefit relatively from stronger statutory grounding (DOD, GSA, and NASA 2022). The Presidential Commission on the Supreme Court of the United States succeeded in its narrow mandate to canvass reform options and *not* make recommendations—a missed opportunity to propose changes that many observers agree are necessary for the preservation of democracy (Sarat 2021).

SECTION TWO

IT'S ALL CLIMATE NOW

During his campaign for the presidency, then-candidate Joe Biden said of the climate crisis: “It’s the number one issue facing humanity. And it’s the number one issue for me” (Newburger 2020). The supply chain reports reflect that prioritization.

ENERGY

The focus on climate is unsurprisingly clearest in the contributions of the Department of Energy, whose mandate includes expanding the supply of renewable energy. The DOE’s capstone report mentions the word “climate” 47 times, and the annexes mention it at least as much.

Though the reports do not use the term “green industrial policy,” that is essentially their focus. The reasons are clear: In the move to a clean economy, the central supply chain issue is not access to petroleum or natural gas resources that are only available in specific countries and regions, but rather access to manufacturing facilities that could be sited practically anywhere. As such, policy—particularly what economic development scholars call “infant industry” promotion—can make up for lack of initial resource endowments or international competitiveness.⁶ While the US has been relatively technology-neutral in its approach to climate change, other countries, in their effort to capture a share of a clean energy market projected to grow to \$23 trillion by 2030, have not. In its 76-page capstone report, the DOE notes that “an analysis of the global energy marketplace shows that many governments and government coalitions have adopted coordinated, government-led strategies and industrial policies to advance and unlock significant investment in key supply chain segments” (DOE 2022a, x, 3-5).⁷

⁶ While a caricature of infant industry theory focuses solely on the provision of tariff barriers against foreign trade from more advanced international producers, thinkers from Alexander Hamilton and beyond have called for a full range of policy supports for emerging industries and industrial ecosystems (Andreoni and Chang 2019).

⁷ In contrast, “through the 1990s, the United States was a global leader in solar PV applications, but due to lack of strong, systematic, and consistent industrial policy to support the solar industry, other countries—most recently China—subsequently took over global leadership in solar PV manufacturing.” While the reports call for “strategic government investment and policy support,” (Ibid, 5) it is clear from the content of the recommendations that the report is discussing a green industrial policy.

In response to the strategies pursued by foreign nations, the Department of Energy outlines a 62-point US industrial policy for the clean energy industrial base that encompasses everything from mining to manufacturing to services. The specific targets are as follows:

- 50 percent of vehicles sold by 2030 will be electric;
- 30 gigawatts of offshore wind will be built in the US by 2030 (roughly four times the annual energy use of New York City);
- Battery storage costs will be reduced by 90 percent by 2030 (DOE 2022f, 37);
- Green hydrogen production costs will be lower than the \$1/kg cost of blue hydrogen (DOE 2022g, 1); and
- 90 percent of iridium will be recycled (Ibid, 30).

While not adopting specific targets in other technologies, the DOE cites the possibility of a nearly 300-fold increase in carbon capture deployment (from 6.8 megatons per year to 200 megatons per year) by 2050 (DOE 2022b, 5), a fivefold increase in deployment of solar (from 19 gigawatts to nearly 100 by 2030 (DOE 2022k, 2), and a nearly tenfold increase in deployment of wind (onshore and offshore, from 122 gigawatts today to nearly 1,150 gigawatts by 2050 (Wind 2022, 10). The Infrastructure Investment and Jobs Act of 2021 also requires a national plan for green hydrogen, which many US competitors already have and which may result in a numerical target (DOE 2022g, 24).

These new and expanded industries are projected to employ many workers. The department reports that energy storage could create 461,000 jobs, expanded wind could create 436,000 jobs, and green hydrogen could create 700,000 jobs within the next 10 to 15 years (DOE 2022a, 10). Carbon capture and storage could generate up to 1.8 million jobs (DOE 2022b, 48). Moreover, the number of jobs created in offshore wind vary from 15,500 with 25 percent domestic content to 64,000 with 100 percent domestic content (Shields et al. 2022, xi). Several reports call for attention to job quality (including in solar [iv, 10, 82], batteries [47], neodymium [48], semiconductors [21], and carbon capture [vii]), while the nuclear report notes that these jobs already are high quality (1). The capstone report mentions “job” 51 times, often with adjectives like “good-paying,” “quality domestic,” “family-sustaining,” or “unionized.”



Crucially, this focus on jobs also comes with a call for environmental justice. The carbon capture report mentions the value of Justice40 (2), while “environmental justice” standards are flagged as an issue once in the wind power report (vi), three times in the batteries report (xii, 39, 46), and nine times in the fuel cells report (viii, viv, 31, 33, 36, 38). The focus of the latter two is unsurprising, since both rely on toxic and controversial processes.⁸

The climate focus manifests in how the DOE discusses technologies like semiconductors. While much of the public discussion treats the chips debate as an issue of concern for the traditional tech industry, increasing the carbon efficiency of semiconductors is key to driving down energy use, as evidenced by some alarming statistics: Several leading artificial intelligence applications are doubling their power usage every two months, while bitcoin mining now uses more energy than the country of Finland. The DOE is thus targeting a 1,000-fold increase in semiconductors’ energy efficiency by 2040, or a doubling every two years (DOE 2022a, 19).

TRANSPORTATION

The Department of Energy is not alone in surveying climate risks and opportunities. The Department of Transportation (DOT) report mentions “climate” 49 times and “environmental justice” 8 times, noting that:

Storm-related flooding—exacerbated by rising sea levels in coastal areas—can close railyards, low-lying roads, and maritime port cargo facilities. High temperatures can accelerate the deterioration of pavement on roads and runways, and cause railroad track failure. Beyond affecting physical infrastructure, extreme weather events can disrupt the supply of equipment, technology, and labor on which our freight system depends. To address the threats from climate change, freight and logistics systems will need to both reduce emissions to keep climate disruptions from becoming worse and build them to withstand the climate disruptions that are already occurring. (DOT 2022b, 18)

The department goes on to note that nearly a third of the nation’s largest airports have at least one runway at risk from storm surges and that ports facilitating freight traffic are intensely polluting, spreading 100 tons of smog and chemicals to working class communities in places like Southern California (Ibid, 25-29).

⁸ The report on green batteries, for instance, notes that “the environmental, social, and climate impacts of lithium-ion battery raw material extraction and heavy industry (refining and recycling) are known to be and/or are likely to be significant . . . Although recycling can mitigate some of these concerns, improper design and operation of facilities can result in environmental, equity, and health issues. In fact, a planned battery recycling facility in New York by SungEel MCC was canceled due to community concerns with toxic emissions” (DOE 2022f, 41).

AGRICULTURE

The US Department of Agriculture report mentions “climate” 68 times and “equity” 9 times. Seeking to draw a link between climate risk and the consequences of monopolization in food production, the report notes that:

Climate change and the increased frequency of extreme weather events such as frosts in Florida and the recent mega-drought in the western US pose significant threats, which are exacerbated when market players are concentrated or consolidated geographically or within a subsector. Excessive heat could lead to results similar to what occurred in the Pacific Northwest in 2021 with blueberries drying on the bushes and sweet cherries drying on the trees . . . The Corn Belt suffered one of the worst droughts on record in 2012, major flooding in 2019, and significant wind damage (derecho storm) in 2020. Drought in southern plains states in 2011-2013 reduced the beef cow herd to its lowest level since 1952 and led to historically high prices. Both heavy rains and drought can severely disrupt inland waterways on which much bulk commodity and fertilizer shipments depend. Loss of electrical power can cause total losses to perishable foods in cold storage. (USDA 2022, 15, 21)

COMMERCE / HOMELAND SECURITY

The Department of Commerce report mentions “climate” 19 times, addresses equity concerns in several places, and has a dedicated section on climate risk, which notes that:

[O]ver 80 percent of the nearly 3,000 manufacturing locations surveyed, which represented all tiers of the [information and communications technology] ICT supply chain, had a very high risk of flooding, with another 68 percent of sites facing high or very high risk due to poor water quality. The study further identified that, within China, the Taihu, Dong and Zhu River basins are most crucial to the ICT sector given the concentration of facilities in these areas. Other important concentrated sites are located in the Danube and Rhine River basins in Europe and the Colorado and Great Lakes River basins in North America. While this study sought to pursue water risks for primary analysis, the concentration of ICT supply chain facilities in Chinese, European, and North American river basins and their concentration in large urban environments would suggest that this industry is subject to the localized risks associated with evolving climate patterns. (DOC 2022, 75)

The report observes that this risk is not purely hypothetical: Floods in Thailand have already disrupted hard disk drive manufacturing.



HEALTH AND HUMAN SERVICES

For some agencies, the connection to climate matters was present but less pronounced. For instance, the Department of Health and Human Services report does not mention “climate,” but instead adjacent environmental and environmental justice issues. The department notes that the offshoring of pharmaceutical production has been driven in part by environmental concerns: “Critical domestic environmental protections that safeguard public health and welfare, including the health and welfare of communities adjacent to manufacturing facilities, do not always exist in foreign supply chains. Subpar environmental and public health protections result in lower production costs that allow offshore competitors to undercut US products” (HHS 2022, 8). The report goes on to note that an onshored public health industrial base needs to “address the interests and needs of communities with environmental justice concerns” (Ibid, 14).

DEFENSE

When it comes to climate, the Department of Defense is the outlier. While its report mentions “climate” only twice, “energy” is mentioned 27 times—almost always in the context of the green economic transformation. For instance, the report cites one social benefit of cleaner energy as “reduced emissions and a reversal of adverse impacts on disadvantaged communities who lived in proximity to traditional energy sources and infrastructure” (DOD 2022, 42).



SECTION THREE

REDEFINING THE RELATIONSHIP BETWEEN STATE AND MARKETS

The supply chain reports also mark the beginning of a change in how federal policymakers are thinking about the relationship between states and markets. This includes a more critical view of market actors and outcomes that offers a sharper criticism of offshoring and corporate and geographic concentration than has been common in government in recent decades. It also envisions a more ambitious role for policy, characterized by greater public sector visibility into private supply chains, more robust use of industrial planning and procurement, and less emulation of market norms.

FIRMS HAVE OFFSHORED THEIR WAY TO EXTREME VULNERABILITY

In report after report, agencies detail how offshoring has created chokepoints in private firms' supply chains that leave them extremely vulnerable. Examples of this abound: No major US company is involved in liquid crystal displays (DOC 2022, 31); 4G and 5G infrastructure providers are heavily concentrated in non-US firms (Ibid, 58); and the US has only one foundry that can produce the large titanium castings needed for defense applications—while China produces four times as many at a price equivalent to what a US forge pays for raw materials alone (DOD 2022, 26-27). Outsourcing in the microelectronics sector also drives a relentless search for low-cost inputs by firms that are “source agnostic,” meaning the country of origin of crucial inputs may not even be known by defense contractors, let alone the Department of Defense itself (Ibid, 35). In transportation, China accounts for 96 percent of dry cargo container and 100 percent of refrigerated container production (DOT 2022b, 21). The Department of Commerce states it plainly: “One of the primary economic risks posed by the current structure of the global ICT supply chain is that it incentivizes companies to allocate capital outside of the United States, particularly for manufacturing” (Ibid, 71).

Turning to energy, China accounts for 80 percent of rare earth production and refining,⁹ 61 percent of global lithium refining for batteries and electric vehicles, and 100 percent

⁹ This includes 89 percent of rare earth oxide separation (DOE 2022i, 11). In fact, the only significant rare earths producer in the US (MP Materials) is minority owned by a partly Chinese state-owned company, Shenghe Resources, which also is the sole purchaser of its output, according to an investigation by Quartz (Hui 2021).

of the processing of natural graphite needed for batteries. Even in industries like cobalt mining, which other countries, such as the Democratic Republic of Congo, dominate, it is Chinese companies that own the production (DOE 2022a, 13). China controls 97 percent of production of silicon wafers used in solar panels, and of the few solar modules assembled domestically, 75 percent rely on silicon solar cells produced in China (DOE 2022k, iii).¹⁰ China has seven times greater capacity than the US to provide glass for solar panels (Ibid, 18), and 80 percent of the global lithium-ion battery recycling capacity, compared to 7 percent in the US (Ibid, x). The US does not have any manufacturing capacity for high voltage direct current transmission equipment, and even US firms like General Electric conduct their manufacturing in China and other offshore locales (DOE 2022e, 34). The US does not produce large steel castings for hydropower turbines (DOE 2022h, viii), and there is only one domestic manufacturer of grain-oriented electrical steel, a key input for the large power transformers needed to expand the electrical grid (DOE 2022e, viii, 15). One Department of Energy report summarizes these trends: “US decarbonization goals are reliant on both Chinese firms and the Chinese government” (DOE 2022i, 46).

To put these numbers in comparison, the Organization of Petroleum Exporting States (OPEC) controls only 40 percent of global petroleum production—a fact that nonetheless has generated substantial angst in geopolitical policy conversations for decades.¹¹ The vast scope of these supply chain reports—and their consistent focus on China—shows that policymakers are finally waking up to the competitive challenges of the 21st century.

Differences in labor costs are often cited as a driving factor behind these offshoring trends. The Department of Energy, for instance, reports that supervisory staff for solar manufacturing can cost up to \$52 an hour in the US, as opposed to as low as \$6.20 an hour in China (DOE 2022a, 15). The DOE also reports that labor costs are “the principal source of difference” for US and Chinese solar production, accounting for 22 percent and 8 percent of total manufacturing costs respectively (DOE 2022k, 10). Similarly, the Department of Health and Human Services appears to concede in its report that it is not economical to produce rubber gloves domestically (HHS 2022, 18).¹²

Another factor behind the increase in offshoring is changes in corporate governance. According to the Department of Defense, “low venture capital interest is attributed to the fact that venture capitalists seek large and quick returns on investment and the manufacturing sector requires longer than average times to yield returns,” leading to

¹⁰ US wafer production was once relatively healthy but ended completely in 2015 due to a series of bankruptcies stemming from low-cost import competition (Ibid, 5).

¹¹ China is not the only country to dominate key supply chains. Kazakhstan controls a similar amount of global uranium production as OPEC does of oil (Nuclear 2022, 37). Meanwhile, South Africa and Russia account for 70 to 90 percent of platinum group metals—an input into green hydrogen production (DOE 2022j, 12). A South African firm owns the only PGM mines in the US (in Montana), which ship to South Africa for processing.

¹² This is ironic, since among the US’s most successful historical industrial policies was the creation of a synthetic rubber industry during World War II (Jones and Angly 1951).

a diversion of investment flows into services or software (DOD 2022, 64). Investors in railroads have insisted on business practices like precision railroading that decrease redundancy in train availability “due at least partially to pressure from investors seeking to prioritize reducing operating ratios and increasing stock value over transportation efficiency and resilience” (DOT 2022b, 17). While US-based private equity firms like Apollo Global Management have made investments in inputs for high powered magnets for green technology, they have not returned production from China (DOE 2022i, 16).

CONCENTRATED CHOKEPOINTS HINDER RESILIENCE

Another major theme is the risks of concentration, both at home and abroad. The three consortia that now control the global ocean shipping market have outsourced container chassis leasing to three companies (DOT 2022b, 21-22). In meatpacking, there is a small number of facilities, and an even smaller number of owners—increasing the risk that a single COVID outbreak, technical failure, or corporate miscalculation could shut down a significant share of US meat production (USDA 2022, 12-13). Three companies dominate hydropower turbine manufacturing and have steadily concentrated that control over 100 years (DOE 2022h, 33). Only one US port is ready to service offshore wind needs, with West Coast ports in particular too involved in the import business to focus on the infant offshore wind sector (DOE 2021).

In cases where the US has only one domestic producer of certain rare earths, the country’s economy and industries can be held hostage by specific missteps or hiccups at a single firm. This occurred when a rare earth mine in California (Molycorp) was shut down for environmental misdeeds in 2002 and again when it went bankrupt in 2015. Bought up by a consortium of investors in 2017, production has still not resumed. If workers are unable to find employment in a sector for years at a time, a trained workforce will not be available to respond to onshoring incentives (DOE 2022f, 41, 46; Topf 2017).¹³

This concentration carries real costs. The Department of Commerce cites estimates that the COVID-19 pandemic’s impact on supply chains will cost firms nearly half a year’s profits on average. A 2016 incident demonstrates the breadth of these consequences: An earthquake in Japan (which supplies silicon to manufacturers across Asia) led to lower stock market returns for connected Chinese companies, while only a year earlier another Japanese earthquake knocked half of a point off the country’s GDP. Yet, despite that, only 3 out of every 20 firms in the ICT sector were interested in supply chain overhauls, lower than other industries surveyed (DOC 2022, 9-10).

¹³ The life-and-death cycle of corporations affects green energy dynamics in other ways. For instance, the hydropower facilities in the US are all old, and the companies that provided the original parts often have gone out of business or no longer make those products—so replacements have to be reverse-engineered by machinists (DOE 2022h, viii).

STATE POLICIES AGGRAVATE PRIVATE VULNERABILITIES

These changes to markets are not happening “naturally” through private forces, but come also as a result of state policies, including restrictive intellectual property practices. For instance, while government once focused on using its power to offer public R&D on crop improvement, in recent decades it has turned toward offering the power of the state—in particular, the courts—for patent protection for genetically modified organisms. This in turn creates a barrier to entry and competition in food supply chains (USDA 2022, 13). Another example: The technology exists to reduce reliance on rare earths in magnet production, but the technique is not available to all producers due to expensive equipment and intellectual property constraints held by Hitachi Metal, which will soon be acquired by Bain Capital (DOE 2022c, 8). Finally, the Department of Energy notes, with regards to platinum group metals necessary for green energy:

While data on global PGM mining and production are broadly available, data and information on PGM catalyst markets, supply, and demand are not freely accessible. The catalyst industry is highly competitive and reliant on intellectual property for sustaining their businesses. However, information is important for both public and private decision makers to support RDD&D, policy development, and capital investment that will effectively advance progress in decarbonizing global economies. (DOE 2022j, 37)

The relentless focus on cost saving that has driven corporate offshoring has also spread to the public sector. The Department of Defense notes that procurement practices actually push contractors to favor low costs over resilience, including in the green battery sector:

Despite a preference for domestic sources, present acquisition regulations provide limited mechanisms for prioritizing domestic or allied sources in solicitations for commercial solutions. Even in a best value source selection, the incentive to provide systems at the lowest practicable cost often leads to selection of low-cost cells produced in China with inherent environmental and human rights concerns. The challenges can be even greater with sub-tier suppliers. Building out domestic capacity in battery production without establishing demand will not resolve this challenge because the existing procurement methods may drive contractors toward lowest cost. (DOD 2022, 20)

GOVERNMENT NEEDS GREATER VISIBILITY INTO MARKETS

One of the major takeaways from the supply chain reports is that the government needs radically increased visibility into private markets if it is to meaningfully contribute to greater resilience. This was evident in numerous examples of the government's limited access to information. For instance, the government does not collect data on which countries are the source of specific products like large steel castings for hydropower plants (DOE 2022h, ix), and a combination of rapid technological innovation and proprietary processes complicates US visibility into the platinum group metal catalyst market (DOE 2022j, 42). Furthermore, the Department of Transportation notes that the "Federal Government does not currently have information to identify and respond to bottlenecks or to assess metrics of delay and congestion, like truck turn times at ports across multiple facilities on an ongoing basis" (DOT 2022b, 32).

Several challenges limit the public sector's ability to access, collect, share, and analyze freight data. Data are often collected or produced by the private sector and can be proprietary. When the private sector shares data with the public sector, the scale may not be appropriate and can require specialized expertise to analyze; privately maintained freight databases generally include very granular data. It can be particularly challenging for public sector officials to access and analyze supply chain data immediately after an incident affecting the transportation system occurs" (DOT 2022b, 32-33). In some instances, foreign governments also face their own data challenges. For example, in China, illegal mining of rare earths is definitionally not tracked or trackable (DOE 2022f, 36).

As many of the relevant industrial "bases" were only defined this year by these reports, these efforts will understandably require new databases and monitoring tools to capture all necessary information (DOE 2022a, 16). And as government takes steps toward regulating trade in "dirty products," it will have to cooperate with companies and foreign governments to establish common traceability standards (DOE 2022k, 82). The most progress to date has been made at the Department of Health and Human Services, whose Supply Chain Control Tower leverages the chokepoint of distributors that account for 85 percent of US supply to share reports in real time (HHS 2022, 12). These types of data collection interventions make it at least conceivable for supply chains to come under democratic regulation.

DEVELOPMENT OF INDUSTRIAL BASES REQUIRES INDUSTRIAL PLANNING

Promoting the health of a widely defined “industrial base” is far different than picking winners among individual firms, as the longstanding libertarian critique of industrial policy has contended. Current US policy around solar photovoltaics, for instance, has focused far more on supporting condition-free acquisition for importing firms, rather than supporting a broad ecosystem of supplies of inputs that can collectively ensure economic resilience (DOE 2022k). History shows that a more holistic public approach is warranted. As the Department of Energy notes, “if a domestic industry is not competitive relative to other countries at present, and the United States wishes to establish supply chain resiliency through onshoring, policy interventions will be required to help the US industry establish an economically competitive position.” The department notes that Puerto Rico became a pharmaceuticals manufacturing hub because of willful policy decisions (DOE 2022c, 2).

Notably, the supply chain reports advocate for industrial policy and planning not only for their benefits for the domestic availability of specific resources but also for their impact on the economy and society more broadly. For instance, the green energy targets discussed above are framed in terms of their multiplier effect: “The Administration’s national offshore wind target represents an opportunity for the United States to establish a new domestic industry, with a possible average of \$942 million to \$3,800 million per year injected into the US economy” (DOE 2022l, 32). Unsurprisingly for the product of an administration whose slogan is “Build Back Better,” the reports frame the supply chain initiatives as a way to make industries better social actors from their inception: “A developing supply chain for electrolyzers and fuel cells [for a new industry] is an opportunity to lead equity and environment in a growing industry, instead of addressing them after commercialization” (DOE 2022g, 36). The Department of Energy goes so far as to say that industrial planning can be a substitute for low labor costs that originally drove offshoring:

While some argue that lower labor costs (across the energy sector, as well as other sectors) in other countries do help attract manufacturing activities to those countries, lower labor costs are not the only possible reason for the loss of domestic manufacturing. A range of industrial policies and planning in other countries have helped secure their domestic manufacturing capabilities, even and sometimes especially where labor rates and worker protections are high, such as in Germany. For example, policies and practices such as heavily subsidizing manufacturing and associated supply chains; streamlining siting and permitting; investing in necessary infrastructure; creating workforce education and training programs; and ensuring procurement with environmental conditions that preference their own domestic manufacturers have encouraged the development of in situ manufacturing needed to support the energy sector. (DOE 2022a, 13)



GOVERNMENT CAN BE GETTING MUCH MORE BANG FOR ITS PROCUREMENT BUCK

A primary government tool to incentivize domestic manufacturing is federal procurement. The US government is the largest purchaser of goods and services in the world, accounting for \$600 billion in sales (Aeppel and Kahn 2021). That’s roughly 3 percent of US GDP, or about the size of the economy of Sweden. Thus, when the federal government establishes rules that it will only purchase goods made domestically, or made under certain labor conditions, or producing low lifecycle carbon emissions, these directives can move markets. The Buy American Act is one of the US’s most significant procurement directives. Dating from 1933, it directs the federal government to only procure items made in America. Under current regulations, the definition of what constitutes “American-made” is that an item must contain at least 55 percent US content. While seemingly straightforward, this policy has been rendered significantly weaker through a series of exceptions and waivers (GAO 2018).

Unsurprisingly, the supply chain reports make extensive and repeated references to the utility of expanded Buy American requirements. For instance, the Department of Energy calls for strengthening Buy American requirements for clean energy generally and green hydrogen specifically, such that not only the products themselves but also the equipment used to make and store the products are American-made (DOE 2022a, 42). Likewise, the department notes that while the US is not currently competitive in offshore wind manufacturing, sub-federal governments are driving investments in those supply chains due to local content requirements (DOE 2022l, 26). Hydropower was unique among the 11 sectors studied by the department in that much of the domestic production is made directly by publicly owned companies. As a result, the public sector need not rely on indirect tools like nudging private firms to increase their purchases of domestic inputs. Rather, the public hydropower companies can simply follow Buy American requirements (DOE 2022a, xiv-xv). The department will also now require that grantees that develop their technology with taxpayer dollars must do most of their manufacturing of the commercialized technology in the US (DOE 2022a, 20).¹⁴ Finally, the department also calls for procuring domestically produced electronics (DOE 2022a, 34)—marking a sea change from current policy, which exempts most electronics purchases from Buy American rules.¹⁵

¹⁴ Relatedly, the department recommends invoking special authority under the Bayh-Dole Act—not just for the most innovative investments, as is current practice, but also for those investments that will produce in the US (DOE 2022a, 47).

¹⁵ There is also a recognition that other countries are even more ambitious than the US in some aspects of their procurement policy. For instance, French procurement officials now reject bids for public tenders that have too large of a carbon footprint (DOE 2022k, 80).



POLICY IS MOVING PAST A DEFAULT OF EMULATING MARKETS

The Department of Energy’s proposed approach to the green transition does not rely on market-like mechanisms that have been hegemonic among many environmental economists and policymakers in recent decades. For example, the four recommended actions under the strategy to “Create Clear Market Signals to Increase the Adoption and Deployment of Clean Energy” are procuring domestically produced clean energy products, developing governmental clean preference lists for procurement that to help industry and foreign governments plan production, boosting demand for sustainable transportation fuels, and using foreign countries’ demand pull for clean technology to boost US manufacturing (DOE 2022a, xi). Notably absent is a carbon price or tax that might indirectly over time incentivize investment in clean industries.¹⁶

Rather, the interventions directly target prescribed production changes in specific industries chosen on the basis of policy rationale, not efficiency maximization. For instance, the Department of Energy appears to define market failures justifying policy intervention not under traditional neoclassical rubrics like externalities, but rather in instances where regional clusters might fail to otherwise materialize due to high risk and poor reward to investments (DOE 2022a, 30). Elsewhere, the department deems price volatility brought on by financial speculation a form of market failure (DOE 2022j, 40). The industries that are selected for intervention are those with greater market concentration (both geographic and in terms of corporate ownership), greater geopolitical risk, and higher price volatility (DOE 2022c, 5-6). A separate report identifies seven indexes where low or high scores might trigger policy intervention: where markets are characterized by

1. Significant domestic manufacturers: number of domestic manufacturers is considered significant if there are at least three manufacturers or domestic supply meets at least 50% domestic demand.
2. Significant domestic demand: if the market value is of at least \$1 billion, the domestic demand is significant.

¹⁶ This non-market policy approach is not new for some departments. For instance, USDA has a very developed sense of what makes the agriculture industry different than the rest of the economy. “First, even temporary disruptions to food supply chains immediately affect nearly every American household, as food needs to be frequently purchased and consumed daily. Second, agricultural production is seasonal and highly exposed to (abiotic and biotic) environmental stresses, and products are often highly perishable. These features warrant both general and specific measures to strengthen agri-food supply chain resilience both domestically and abroad” (USDA 2022, 2). This means that agriculture is dramatically different from the spot markets that characterize the perfectly competitive market of neoclassical economics. Inputs are bought at a different time than production, which takes place at a different time from marketing. As a result, since at least the New Deal, USDA has paid close attention to food supply chains. Even before the COVID-19 pandemic, the agency employs an army of economists and analysts that track every element of the farm to table economy.

3. Projected significant domestic demand: if the projected annual compounded demand growth rate is greater than or equal to 2% over a period of 5 years, projected domestic demand is considered significant.
4. Significant global market: if the market value is of \$10 billion dollars or more, the market under evaluation is considered significant.
5. Projected significant global demand: if the projected annual compounded demand growth rate is greater than or equal to 3% over a period of 5 years, projected global demand is considered significant.
6. Cost-competitive among U.S. manufacturers: this criterion can be evaluated based on one of the following three metrics, depending on data availability. The simplest metric is the diversity of domestic producers. If there are at least three domestic producers, the market is competitive. The next metric is market share. If no single company has more than 50% of the domestic market share, the market is considered competitive. The last metric is directly based on the cost/selling price. If the same grade products produced/offered domestically are within $\pm 10\%$ cost/selling price, it is considered competitive.
7. Cost-competitive between U.S. manufacturers and global manufacturers: this criterion can be evaluated based on one of the following two metrics, depending on data availability. If no single producer has more than 15% of the global market share, the market is considered competitive. Alternatively, if the same grade products produced in the United States are within $\pm 15\%$ cost/selling price compared to products manufactured elsewhere, it is considered competitive. (DOE 2022e, 43-44)



SECTION FOUR

WHAT'S MISSING: A THEORY OF COUNTERVAILING POWER

For all the empirical richness of the supply chain studies, they fail to present a unified theory of *why* it is the government's responsibility to shape markets. This renders the strategy vulnerable to rollback, under the neoliberal objection that states should confine themselves to addressing discrete instances of narrowly defined market failure. Or, as President Donald J. Trump put it when asked why the federal government was not making greater use of the Defense Production Act to resolve medical supply chain woes, "the federal government is not supposed to be out there buying vast amounts of items and then shipping. You know, we're not a shipping clerk" (Forgey 2020).

There are three bodies of scholarship that can begin to provide an alternative intellectual framework to justify a more permanent state role in supply chain management. First, in his 1944 opus *The Great Transformation*, social theorist Karl Polanyi argues that land and labor are so-called "fictitious commodities." This means they are traded in markets without being created for them: Land predates markets, and labor is another word for humans, reproduced not for pecuniary but social reasons. This tension means that governments *should not* (for normative reasons)—and, ultimately, *will not* (for social stability reasons)—subject land and labor to too much market pressure (Polanyi 1944).

Second, in 1952, former Roosevelt administration economist John Kenneth Galbraith published *American Capitalism*, which argued that the power of corporations and markets needed checking by strong government agencies and unions, much in the same way branches of government must check and balance against one another to safeguard liberty (Galbraith 1952). Finally, a more recent body of political science scholarship has emphasized the importance of feedback loops in public policy design. The idea here is that policy regimes are never neutral as to how they distribute power within society. For example, policies that rely on litigation as an enforcement mechanism reward lawyers and those interests that can afford them. In contrast, if policy designers want more egalitarian outcomes, they will have to structure a policy's process and material payoffs such that working people and the vulnerable are given greater clout, which in turn allows them to mobilize and defend the regime against rollback (Hacker and Pierson 2019) (Hertel-Fernandez 2020). This is particularly true when it comes to designing policy that is intended to achieve material equality and reparation for racial injustices (Strickland and Wong 2021).



Together, these ideas point to a lasting rationale for state involvement in supply chains. First, drawing on Polanyi, there is no reason to think that markets alone will deliver effective protections to the environment or the dignity of workers. Indeed, markets tend to stretch both to the breaking point—an outcome that governments cannot countenance.¹⁷ Thus, if the market-determined outcome is that all clean energy production goes to China because of low costs, government must step in to either cover the cost differential, or otherwise engage in public production to effectively de-commodify energy. Second, drawing on Galbraith and the policy feedback literature, supply chain onshoring and management cannot merely use financial “carrots” that incentivize private firms to, for the time being, produce in the US or allied nations. Rather, public policy should develop an ample reserve of “sticks” that are beyond the control of the industries in question, which can better bind firms’ perception of their self-interest to that of the countries in which they produce—for example, using the supply chain process to bolster worker power and racial justice.

Here are six ways that government and labor could be mobilized to increase the strength and longevity of the US federal government’s work on supply chain.

GOVERNMENT CAN COORDINATE AMONG COMPETING DEMANDS

The supply chain reports are replete with instances where state support for one industry will pull resources away from others. For instance, similar steel is needed for production of both large power transformers and electric vehicles. An onshored consumer electronics supply chain will compete with wind and solar industries for semiconductors. Metallurgical grade silicon is used for solar panels, but also for semiconductors, silicones, and aluminum (DOE 2022k, 15). While the absolute number of magnets demanded by traditional sectors like consumer electronics and motored vehicles is expected to double or even triple by 2050, the relative share of magnet use by these sectors will be diluted by the growth of wind turbines and electric vehicles. Vaccines and therapeutics compete with one another for the supply of scarce glass vials (HHS 2022, 27). The price competitiveness of nuclear power is seen as under threat by both natural gas and renewables (DOE 2022m, 34). Demand for rare earth elements for wind power alone could exceed the supply for all uses by 1.6 to 3.5 times over (DOE 2022l, 21).¹⁸

¹⁷ At least one supply chain report appeared to recognize this, noting that geographic concentration of production is dangerous, as nations prioritize their own citizens in an emergency (HHS 2022, 7).

¹⁸ In a supplement to the wind report, the National Renewable Energy Laboratory notes that the European supply chain that now exists is insufficient to service both US and European wind needs, so a US supply chain must be built (Shields et al. 2022, vii).

These chokepoints can lead to price pressure in civilian markets, both “naturally” and through speculation. Yet in the Department of Energy supply chain reports, there is only one mention of the role that financial speculation could have in hindering the green energy transition (DOE 2022j, 40). There is nonetheless implicit acknowledgment that price volatility reduces private firms’ willingness to invest. For instance, the market for rare earths is thin, and prices are heavily influenced by government policy, principally that of China. In competitive markets, high prices lead to new firms entering the market and replacement of high-cost inputs by cheaper substitutes. Yet for some key inputs, neither adjustment is viable, meaning high prices stay high (DOE 2022f, viii, 45). This scenario is far from hypothetical: The market for platinum group metals for green hydrogen production have been found to be 50 percent more volatile than for other metals (DOE 2022j, 26).

To avoid inflation when faced with these mismatches in supply needs, governments will eventually need standby ability to allocate resources—which, luckily, the US federal government already has. One of the US’s foremost tools for industrial planning is the Defense Production Act (DPA). With roots in the World War II economic mobilization, it has been one of the Department of Defense’ core tools for maintaining and expanding productive capacity to support war and defense needs (Tucker 2022).

Several DPA actions are noted or recommended by the supply chain reports, including to create incentives for production of information technology (DOC 2022, 4),¹⁹ emergency health resources (HHS 2022, 11), rare earths (DOE 2022f, viii, 16, 38),²⁰ and more.

However, these actions fall under the scope of the DPA’s Title III financial incentives section, rather than its more robust Title I priorities and allocation section. Exceptions include the Department of Health and Human Services’ extensive recourse over the last two years to use Title I to promote both vaccines and PPE (HHS 2022, 5). There is also a candid acknowledgment that the civilian economy bears the risk to a supply shock to rare earths production, since the Department of Energy presumes that military production will be prioritized.²¹ The omission of substantial discussion of Title I usage is a missed opportunity to prepare the public for at least occasional government allocations of scarce goods to socially important uses.

¹⁹ This can be a means to circumvent DOD dependence on the part of the few remaining domestic manufacturers of certain products like printed circuit boards (DOC 2022, 24).

²⁰ Troublingly, despite provision of this support, the Department of Energy appears to have no firm knowledge regarding the production plans of the recipients of money.

²¹ At the same time, the department notes that demand for defense purposes would be inadequate on its own to support an economically viable rare earths industry, so consumer demand is needed. That, however, will increase costs to civilian consumers, which government will not be able to help with through stockpiling, because the needs of the civilian economy are deemed too varied. Thus, specific strategies to get domestic industries like autos to pay a price premium for domestic rare earths is recommended (DOE 2022i, 36-37).

GOVERNMENT CAN COORDINATE COMPLEMENTARY DEMANDS

The supply chain reports are full of instances where development of one industry is contingent on or will benefit from the development of others. If the green hydrogen industry develops, so will the electrolyzer and fuel cell industries (DOE 2022g, 5, 12). In the wind energy industry, turbines' continuously increasing size will eventually exceed rail, road, and port infrastructure's ability to transport them safely or legally. This will incentivize development of the relevant manufacturing capacity in locations near where the turbines will be ultimately sited (DOE 2022a, 18; DOE 2022l, 34). Investing in US-flagged ships could speed deployment of offshore wind (DOT 2022b, 62), while investing in warehouses helps importers and railroads (DOT 2022b, 63). Metallurgical grade silicon production would benefit from cheap hydropower (DOE 2022k, 17). If solar ingot and wafer production are supported with tax credits, US polysilicon producers will also benefit (DOE 2022k, 81). The facilities needed to generate hydropower can also perform other functions, like flood control or recreation, which are not typically monetized (DOE 2022h, 14). The 2021 infrastructure bill will expand broadband, thus incentivizing production of associated components (DOC 2022, 45). The list goes on.

A central insight of industrial policy research is that policies directed at one industry can have spillover benefits for other industries. Economist Albert Hirschman argued that any dollar invested in a given project (e.g., a steel plant) would also increase demand for industries that supply inputs to steel factories. The latter are called "upstream" industries, and the relationship dynamic between the two is called a "backward linkage." Likewise, that dollar—if invested in making the steel plant more productive and its steel products cheaper—will benefit industries that use steel. Here, the latter are called "downstream" industries, and the relationship a "forward linkage" (Hirschman 1958; Tucker 2019). Economist Mariana Mazzucato has advanced this literature through her work on society-wide missions that coordinate efforts across disparate actors in society and the economy (Mazzucato, Kettel, and Ryan-Collins 2021). A rich literature showcases both industrial policy failures and successes across many countries (Oqubay 2020). Yet the supply chain reports fail to embed the analysis in this theoretical framework that could better motivate the undertakings. This is ironic, because even some conservatives have now incorporated this scholarship (often seen, correctly or otherwise, as having a progressive inclination) into their thinking (Rubio 2019; AC 2020).

Despite the lack of explicit linking to this scholarship or framing, the reports show that policymakers increasingly understand the value of a linkage strategy from an empirical perspective. The supply chain reports recognize that China has effectively deployed these types of development tools—for example, by subsidizing the printed circuit board industry in the 2000s, making it easier for the country to attract semiconductor



production today (DOC 2022, 23). Colocation of server manufacturing and assembly has allowed for quicker upgrading and customization (Ibid, 29).²² Likewise, China focused upstream production for the solar industry in Western regions like Xinjiang, which had access to cheap electricity and labor, whereas its more developed and trained workforce in the east of China focused on final stages of production like module assembly. China invested \$50 billion to attract ingot and wafer manufacturing from 2000 to 2010, allowing its producers to develop 50 times greater scale than their previously efficient US competitors (DOE 2022k, 8, 31-32). By investing in rare earth mining (where China controls 58 percent of production), China developed even more pronounced dominance in downstream sectors like separation (89 percent), refining (90 percent), and magnet alloy manufacturing (92 percent) (DOE 2022f, 26).²³

The Department of Commerce report outlines something of a strategy in its 100-day report, for which the department was initially tasked with making recommendations for expanding domestic manufacturing capacity for semiconductors, the chips that power electronics and a growing share of other industries. Laudably, the department recognized in its one-year review that onshoring chips would be harder if the largest customers in the broader consumer electronics industry were not onshored themselves. The authors cite social science and engineering research that documents the benefits of this proximity, which is said to be higher for information and communications technology than for other types of manufacturing or services (Li, Lee, and Kong 2019).

NEW INSTITUTIONS AND STICKS ARE NEEDED TO HOLD INDUSTRY ACCOUNTABLE

One reason the government's potential to marshal economic coordination has not been more boldly asserted is a lack of recent governance or institutional experience. During the New Deal and its immediate aftermath, powerful agencies like the Reconstruction Finance Corporation (RFC) and National Resources Defense Board enjoyed diverse and various oversight over supply chains (Hogan 2000). In contrast, today, each federal department and agency has scattered authority (Tucker 2022). This deficit has led some to call for the establishment of a National Investment Authority, an update of the RFC for the modern financialized era (Omarova 2020). Such institutions can help build what social scientists call "embedded autonomy" (Evans 1995). This refers to the ability of government agencies to work closely enough with the private sector to understand their supply chain

²² In contrast, Foxconn's investment in Wisconsin floundered because of a lack of input suppliers in the vicinity (Ibid, 56).

²³ Some of this concentration comes from economies of scale and policy, others from physical features of products—such as the fact that powders used in powerful magnets spontaneously ignite upon contact with water, so cannot be shipped over oceans (Ibid, 43). China is now moving into increased use of patents, further concentrating economic power.

and competitiveness challenges, without being beholden to these industries' interests.²⁴ They can also engender a more experimentalist form of governance, where the state commits to exclude laggard firms from markets in the long run to encourage innovation in the short run. This form of exclusion—also called “penalty defaults”—is only possible with high levels of state capacity and low levels of corporate capture of the state (Victor and Sabel 2022).

The supply chain reports largely refrained from calling for new institutions or sticks. One exception that seems in line with the mode of experimentalist governance mentioned previously is the Department of Health and Human Services' proposal for an innovation center to

facilitate expedition of the processes and approvals required for domestic manufacturing of [medical] products. The innovation center will provide a platform for entrepreneurs, manufacturers, and product developers to obtain early regulatory feedback, and serve as a multi-sided matchmaking platform for new domestic manufacturers to connect with [governments] and private sector end-users seeking reliable supplies of quality products, particularly during surge events when normal distribution channels are limited. (HHS 2022, 14)

The department also acknowledges a seemingly effective use of sticks to exclude slave labor from the US market—Xinjiang products are now presumptively assumed to contain slave labor, and producers are required to prove they are not in order to sell to US markets. The Department of Energy considers this idea as well, contemplating a mix of carrots to incentivize the use of domestic materials in government-supported energy projects (including those that receive tax benefits), and penalties for those that do not after 2025 (DOE 2022k, 81). Elsewhere, the DOE notes that trade sanctions under Section 232 of the Trade Expansion Act could be used to restrict the supply of imports to such a level that it would increase domestic prices and unlock domestic production of rare materials. This price effect is particularly doable since almost all consumption is imported—meaning government through its custom power can influence prices (DOE 2022f, 28, 49).

²⁴ The Department of Energy, as noted, actually has relatively high levels of capacity. Of all the Department of Energy reports, national labs or department staff were the lead authors on all of them. The exception was the report on carbon capture supply chains, which was written by consultants from outside government, including Deloitte and KeyLogic (DOE 2022b, iv).

THERE IS A ROLE FOR STATE PRODUCTION AND OWNERSHIP

Beyond carrots and sticks, the state can also participate directly in the economy as an investor and producer. Instead of having to invest resources in monitoring private firms' compliance with public mandates, the state can ensure these mandates are followed through internal management. A growing body of literature is documenting the economic and governance payoffs to greater public ownership and equity stakes in industry (Beuselinck et al. 2017; Hanna 2018).

Yet the default of many agencies is to assert the preeminence of the private sector. For instance, the Department of Health and Human Services (HHS) writes that

the public health supply chain and industrial base are primarily within the purview of the private sector. However, the US Government has a role to play to ensure the foundations of our market economy provide for resilient and transparent supply chains, which are critical to the economic prosperity and national security of the United States . . . Stability is essential if the Nation is to count on the private sector to invest in innovations, new facilities, and an expanded workforce. (HHS 2022, 4, 10)

Yet the department's own report documents the peril of relying too much on market actors. In its section on pharmaceuticals and over-the-counter products, it notes the US government does not even know the location of production for many products due to private confidentiality practices (HHS 2022, 27). In contrast, the state's much more direct role in test and vaccine production yielded better supply chain results. For instance, by using government purchasing power, the Biden administration could ensure that a certain number of tests will be purchased, enabling scale up from 24 million at home tests in August 2021 to 375 million six months later. Likewise, HHS controlled the distribution and allocation of monoclonal antibodies used to treat COVID-19 and was able to make informed decisions in that regard. Finally, the COVID-19 vaccines were produced domestically, therefore making the supply chain visible to HHS and freeing the agency to focus on the strength of the vaccine component supply chain (HHS 2022, 25, 31).²⁵

²⁵ The Department of Health and Human Services also notes that not having patents on test components can make flows throughout the supply chain easier: "The interchangeability of non-patented test components would ensure vendors are producing interchangeable supplies, increase volume of common components, and reduce spot shortages. Improving human capital through training and education, while a difficult challenge, could improve test production, and warrants further investigation" (HHS 2022, 25).

Turning to the Department of Energy, its capstone report describes the pioneering state role in the development of solar technologies (DOE 2022a, 5). It also states that government has co-invested in facilities alongside the private sector, such as through the Semiconductor Manufacturing Technology consortium (SEMATECH). But it then goes on to characterize those instances as “highly specific” that were “rare, targeted, and time-limited” (Ibid, 24). It is unclear why such caveats are needed; US trading partners do not impose such self-limitations that close off ongoing revenue streams into public coffers. Yet, while noting China and Taiwan’s successful use of tools like preferential equipment lease rates, below-market loan rates, and direct state equity investments (Ibid, 36), the department stops short of advocating for this tool kit’s use in the US.²⁶

It is ironic that the supply chain reports shy away from a paradigm of public ownership and more direct state involvement, since they provide numerous ad hoc examples where these practices are clearly useful or desirable. Among the Department of Energy’s cross-cutting recommended actions are the establishment of a publicly owned hydrogen reserve (DOE 2022a, xii-xiii). The department notes the value of industry having access to the most powerful computers on Earth at publicly owned national labs (DOE 2022a, 26; DOE 2022d, 13). The DOE operates a public nuclear waste plant (DOE 2022m, 24), while government’s ownership of hydropower facilities gives the public sector much more visibility into and control over that resource (DOE 2022h). Eminent domain can help acquire electric transmission rights of way (DOE 2022e, 59). The Department of Defense notes that the government can license out technical data on manufacturing processes to an expanded supplier base of private firms, driving more competition and a “democratization” of manufacturing (DOD 2022, 28). Later, the DOD notes the value of its “maintenance facilities that are government owned and operated” (Ibid, 65).

INTERNATIONAL RULES NEED TO BE REWRITTEN

Another role for the state is in renegotiation of international agreements and treaties. Yet the supply chains take an internally inconsistent approach to this tactic, despite the Biden campaign and administration’s pledge to renegotiate and “modernize international trade rules and associated domestic regulations regarding government procurement to make sure that the US and allies can use their own taxpayer dollars to spur investment in their own countries” (Biden-Harris 2020a).

²⁶ Elsewhere, the DOE notes a similarly interventionist policy, where the Japanese government invested alongside a private Japanese company to allow the latter to be the sole distributor of rare earths from an Australian company, buying the output at guaranteed amounts to ensure at least 30 percent of what other Japanese companies would need, each year for a 10-year period (DOE 2022i; JOGMEC 2011).

The Department of Energy notes that consumer incentives to purchase goods made with American content have been found to be in violation of WTO rules, but calls for them to be used anyway (DOE 2022k, 76, 82). The department also notes that it is “important to support US domestic downstream semiconductor manufacturing” but also to “not violate World Trade Organization fair-trade agreement similar to ARRTA of 2009” (DOE 2022e, 57). The hydropower report describes the WTO-negotiated threshold of \$7 million, above which the Buy American Act does not apply, as an obstacle to securing supply chains. At the same time, the fact that 50 percent of US capacity is owned by federal agencies (US Army Corps of Engineers, US Bureau of Reclamation, and the Tennessee Valley Authority) creates unique levers relative to other energy generation. The report recommends exploring maximizing Buy American coverage (DOE 2022h, x, 45).

Turning to the Department of Commerce, the report contends that Buy American procurement can meaningfully impact whether a domestic information technology sector develops or not, and that waiving the requirement to buy domestic content undermines the intent of the act (DOC 2022, 77). Curiously, at the same time, the department twice mentions that Buy American practice “should be consistent with US international trade obligations” (DOC 2022, 77). The waivers granted for compliance with the Trade Agreements Act of 1979 are arguably among the most significant, since they treat dozens of countries’ exports to the US as if they were American-made.

In another part of the report, Commerce says the US should “encourage partners and allies that have not yet joined the World Trade Organization (WTO)’s Information Technology Agreement (ITA) or agreed to the WTO ITA Expansion to participate in those agreements” (DOC 2022, 79). This is also curious; the report extensively documents how China engaged in predatory behavior to claim high market shares in the information technology sector—which it achieved in large part through membership in the ITA, which guarantees zero-tariff treatment of Chinese imports into the US.

The Department of Health and Human Services, for its part, remained consistent in its message, calling for “*reviewing domestic sourcing and international procurement commitments* to ensure they support US supply chain capacity and resiliency” (italics added, HHS 2022, 15).

THE POWER OF LABOR MUST BE LEVERAGED

Despite the Biden administration’s record and reputation of being the most pro-labor in history, unions receive relatively short shrift in the supply chain reports. The Department of Commerce, for instance, pledges to “partner with industry, labor, and other public and private stakeholders to strengthen resilience throughout the ICT industry” (DOC 2022, 78). But in the substance of the report, workers are treated as an input into the production



process, not as a constituency capable of organization (Ibid, 46). The Department of Transportation notes in passing that longshore unions were able to help the federal government unstick supply backlogs by moving to 24-7 service (DOT 2022b, 31), but this is not acknowledged as an example of the benefits unions bring as partners in industrial planning—even though the report twice extols the benefits that the right to unionize affords workers (Ibid, vii, 44).

The Department of Defense doesn't mention the word "union" at all in its report. While it uses the term "labor" 23 times, it's used to refer to an asset into a production process, rather than an organized or organizable social force. Indeed, the agency points to issues with labor—specifically, low pay and job loss—as one of the major roadblocks to strengthening the defense industrial base,²⁷ without bothering to make note of the institutional decline in worker power since the 1970s that brought about these conditions. The decline of the manufacturing workforce is thus presented as a facet of generational politics: Baby Boomers liked to work in manufacturing, and younger cohorts do not.

The Department of Energy goes further than other agencies in its commitment to workforce development strategy, pledging to "embed strong labor standards and support for organized labor in federal funding for the Energy Sector Industrial Base" (DOE 2022a, xii). Specifically, it aims to "provide direction to award funding with consideration given to employers that offer competitive wages and benefits, training in transferrable skills, the free and fair choice to join a union, and strong labor, safety, and environmental standards" (Ibid, 48). The department even appears to advocate for some type of sectoral bargaining, committing to "support unionization across technologies to facilitate the ability of workers to switch jobs without losing union benefits or taking wage or benefit cuts" (Ibid, 37-38). Despite the strong language in the capstone report, none of the 13 specialist reports list any consultations with unions that do or could represent clean energy workers, even though most of them list workforce skills and retention as a problem.²⁸ Two note in passing the potential to create or preserve union jobs (DOE 2022b, vii; DOE 2022m, 41), while two mention the value of unions as partners in workforce training (DOE 2022l, vii, 24, 37; DOE 2022k, 82).

²⁷ "The Nation is facing a skilled labor shortage, which is undermining its productivity and innovation. Today, the United States has the smallest population coming into the labor force since the Civil War. As a result of these lower numbers, changing worker expectations, and a lack of interest in manufacturing, the labor pool of traditional manufacturing employees is decreasing. This labor shortage is combined with a manufacturing skills deficiency where 'the labor market [is] unable to find workers who have the manual, operational, and highly technical skills, knowledge, or expertise to take the open positions.' The skills deficiency impairs US manufacturing, including the DIB, and is exacerbated by a lack of effective job training and ongoing retirement of experienced baby boomers" (DOD 2022, 47).

²⁸ Despite a shortfall of supply in grain-oriented electrical steel at the single company (Cleveland Cliffs) that produces it domestically, the minimum wage is \$13 an hour—which is making it difficult to attract workers (DOE 2022e, 21).

Finally, the USDA notes that, for the seasonal farm industry, “increasing union density in the sector can address labor supply challenges and worker turnover” (USDA 2022, 18), and describes several ways the administration is working with unions.

For the supply chain work to be lasting²⁹ and garner broad support, it needs to mobilize constituencies that can fight against its rollback. One concrete way of doing this would be for every department or national lab to explicitly identify union partners that have a desire or plausible jurisdiction for organizing the workers in these industries. This could spur unions—many of whom have lagged in aggressive organizing efforts in recent decades—to play a more active role in developing pathways to increase union density.

CONCEPTS IN THE 100-DAY REPORT MISSING OR MUTED IN THE ONE-YEAR REPORT

While the focus of this issue brief has been the one-year supply chain reports, the 100-day reports from June 8, 2021 feature a number of concepts that resonate more with a theory of countervailing power.

On just one page of the 100-day report (NSC 2021, 7), the reader encounters the following phrases (*italics added*):

“Our private sector and public policy approach to domestic production, which for years, *prioritized efficiency and low costs* over security, sustainability and resilience, has resulted in the supply chain risks identified in this report.”

“American workers must be the foundation for resilience. Resilient production requires quick problem-solving, driven by the knowledge, leadership, and full engagement of people on the factory floor. *Decades of focusing on labor as a cost to be controlled—not an asset to be invested in—have depressed real wages and driven down union density* for workers, while also contributing to companies’ challenges finding and keeping skilled talent.”

“We must ensure that economic opportunities are available in all parts of the country and for *women, people of color*, and others who are too often left behind. *Inequality in income, race, and geography* is keeping millions of potential workers, researchers, and entrepreneurs from contributing fully to growth and innovation.”

²⁹ Or “sticky,” in the institutionalist social science parlance.

Later, we read that:

“Misaligned Incentives and *short-termism in private markets*: All four reports make clear that current US market structures fail to reward firms for investing in quality, sustainability or long-term productivity . . . A focus on maximizing short-term capital returns has led to the private sector’s underinvestment in long-term resilience. For example, firms in the S&P 500 Index distributed 91 percent of net income to shareholders in either *stock buybacks* or dividends between 2009 and 2018. This has meant a declining share of corporate income going into R&D, new facilities or resilient production processes.” (Ibid, 11)

Congress should “include standards that cover construction, such as: (1) mandated hiring percentages from registered apprenticeships and other labor or labor-management training programs; (2) project labor, community labor and local hire requirements; and (3) *employer neutrality agreements*. We recommend implementing similar standards for production workers. The resulting high productivity allows these firms both to pay high wages and be profitable.” (Ibid, 16)

“Children who do not have access to needed medications may be unable to attend school, concentrate on learning, or socialize with other children, and their caregivers may be unable to enter the workforce. Employees who do not have access to needed medications may be unable to work. Both situations can lead to housing and food insecurity, cause substantial suffering for American families, and *exacerbate inequities in the racial wealth gap*.” (Ibid, 210)

In contrast, many of these concepts are missing or more muted in the one-year reports. In the one-year report, the potential to “lower inequality” is mentioned in passing as a reason to consult with workers and other groups (NEC 2022, 9). Otherwise, income inequality is missing. As noted above, the only mention of “union density” was in USDA’s report. “Short-termism” is only mentioned in citation to the 100-day report (NEC 2022, 4) and “stock buybacks” are not mentioned. Finally, the only reference to “low cost” as a possible negative obsession is in the HHS report.³⁰

³⁰ “Consumers, both individuals and wholesale purchasers, prefer low-cost goods, which are often foreign made, as opposed to more expensive goods produced domestically” (HHS 2022, 8). Commerce, in an even more muted tone, notes, “The typical approach to supply chain management emphasizes the need to strike a balance between efficiency and resiliency” (DOC 2022, 62).

“Race” is mentioned in passing with reference to ensuring recipients of federal funds comply with civil rights laws (DOT 2022b, xxiii), and apprenticeship programs are touted as “a way to address gender and racial diversity issues in the ICT workforce” (DOC 2022, 53).³¹ Advancing “diversity, equity, and inclusion” is noted in the Commerce report as an important goal, as is assisting “minority serving institutions” (Ibid, 77). Defense recommends “apprentice programs to find, attract, and hire minority and female employees” (DOD 2022, 52). Energy lists “minority ownership” as one factor Congress might consider in new funding programs (DOE 2022a, 49). Transportation notes that “many communities, especially majority-minority and low-income communities, are already overburdened with health, environmental and quality of life impacts from pollution sources related to movement of freight through various transportation modes” (DOT 2022b, xiv). Otherwise, explicit discussion of race is absent, and there is no reference to the “racial wealth gap” or “employer neutrality.”

GREATER LABOR FOCUS IN TURN AIDS GREATER MATERIAL RACIAL EQUITY OUTCOMES

The sparseness of the discussion of union power is mirrored in the minimal discussion of racial justice concerns, as noted in the box above. This is unfortunate, because onshoring of manufacturing presents an unprecedented opportunity to leverage the power of unions to help close the racial wealth gap and potentially reduce racial polarization.

Historically, union and manufacturing jobs have presented one of the few pathways for Black Americans to reach the middle class. Scholars have long studied the unique attributes of manufacturing relative to agriculture or services, including the scope for continual productivity gains that create at least the possibility of rising compensation (Millemaci and Ofria 2014) (Felipe, Mehta, and Rhee 2014). Moreover, we know that coverage by collective bargaining agreements is associated with reductions in community poverty and a wage and benefits premium for workers overall (Farber et al. 2021; VanHeuvelen and Brady 2021). Moreover, union membership for workers of color reduces their racial wealth gap relative to white workers (Weller and Madland 2022).

³¹ The only other mention of “inequality,” “racial,” and/or “race” is a definitional footnote and citation to an executive order by USDA (2022, 7, 17, 40).



The offshoring of production from the US led to fewer union and manufacturing jobs for Black workers (Western et al. 2021). One way to achieve greater equity through supply chain reshoring would be to use the historic peaks of Black union membership and associated benefits in economic outcomes of interest—income, wealth, poverty—to form the basis for preliminary projections of what gains might be anticipated were substantial onshoring and re-unionization to occur.

There are other potential spillover benefits to a racially inclusive onshoring and re-unionization. A robust social science and historical literature³² finds that greater union density is associated with deeper civic participation and better understanding by citizens of the content of policy. Moreover, the availability of manufacturing and presence of unions can help reduce the racial and political polarization that exposure to trade competition increases (Autor et al. 2020; Minchin 2016; Morgan 2018). In short, there are “public good” dimensions. To the extent offshoring led to a decline in labor power, there were negative externalities for racial inclusion and civic health. And because Black workers are nearly twice as likely to vote yes in a hypothetical union election (Gumber and Padavic 2020), focusing the benefits of policy in industries that disproportionately employ workers of color could drive positive spillovers for all workers and society as a whole.



³² Reviewed in (Ahlquist 2017) and (Tucker 2018). See also (Macdonald 2021a), (Macdonald 2021b), and (Kim 2022).

CONCLUSION

The supply chain reports rightly note that the political economy is shifting in favor of greater resilience. The Department of Defense writes that, “Because supply chain resilience is critical for US national security and economic strength, a clear national consensus—bolstered by public, private, and social sector prioritization—has emerged around the need for bold action in support of supply chain security” (DOD 2022, 6). The Department of Transportation states that “Americans benefit when we bring manufacturing jobs, production, and sourcing to the United States rather than outsourcing them abroad, which we can do by reducing transportation costs, adding resilience, and owning the industries of the future” (DOT 2022b, 50). Indeed, the climate crisis has and will continue to force the public and government departments to think expansively about addressing the multiple interlocking “market failures” that have impeded meaningful reductions in emissions.³³ The COVID-19 pandemic and climate change are major drivers of this new consensus.

Industrial policy is a vital tool in an all-of-government approach to the green economic transition, complementing tools more familiar to a US audience like workforce development, price stabilization, utility regulation, and consumer subsidies (Kahn and Gunn-Wright 2022). The supply chain reports outline numerous ways the government’s role in industrial and economic coordination can be bolstered, from increasing visibility into production networks, to enhancing procurement practices. There are other practices not discussed in detail in the report that also show promise, including greater state coordination among competing and complementary demands, as well as direct state production and ownership and rewriting of international rules. For these efforts to be effective and resistant to rollback, the public should understand how and why the state is taking on this new role, and how they as workers—in all their diversity—can concretely benefit.

³³ In a more recent report, the White House’s Council of Economic Advisers offers a useful typology of these failures, including the incentives private firms have against investing in unproven green technologies, sharing of information with their competitors, and making investments in public goods like national security. Even if “hub” industries wanted to insure against their own supply shocks, the costs to society from their losses far outweigh these industries’ revenues (CEA 2022).

BIBLIOGRAPHY

- American Compass (AC). 2020. "Foundations for American Renewal." American Compass. July 7, 2020. <https://americancompass.org/projects/required-reading/foundations-for-american-renewal/>.
- Aepfel, Timothy, and Chris Kahn. 2021. "Americans Want the Government to Buy US-Made Goods, Even If They Cost More." *Reuters*, March 30, 2021, sec. reboot-live. <https://www.reuters.com/article/us-usa-economy-madeinusa-poll/americans-want-the-government-to-buy-u-s-made-goods-even-if-they-cost-more-idUSKBN2BM1DA>.
- Ahlquist, John S. 2017. "Labor Unions, Political Representation, and Economic Inequality." *Annual Review of Political Science* 20 (March): 409–32. <https://doi.org/10.1146/annurev-polisci-051215-023225>.
- Andreoni, Antonio, and Ha-Joon Chang. 2019. "The Political Economy of Industrial Policy: Structural Interdependencies, Policy Alignment and Conflict Management." *Structural Change and Economic Dynamics* 48 (March): 136–50. <https://doi.org/10.1016/j.strueco.2018.10.007>.
- Autor, David, David Dorn, Gordon Hanson, and Kaveh Majlesi. 2020. "Importing Political Polarization? The Electoral Consequences of Rising Trade Exposure." *American Economic Review* 110, no. 10 (October): 3139–83. <https://doi.org/10.1257/aer.20170011>.
- Beuselinck, Christof, Lihong Cao, Marc Deloof, and Xinping Xia. 2017. "The Value of Government Ownership during the Global Financial Crisis." *Journal of Corporate Finance* 42 (February): 481–93. <https://doi.org/10.1016/j.jcorpfin.2015.05.002>.
- Biden-Harris Presidential Campaign. 2020a. "The Biden Plan to Ensure the Future is "Made in All of America" by All of America's Workers." July 9, 2020. <https://joebiden.com/made-in-america/>.
- Biden-Harris Presidential Campaign. 2020b. "The Biden Plan to Rebuild U.S. Supply Chains and Ensure the U.S. Does Not Face Future Shortages of Critical Equipment." July 29, 2020. <https://joebiden.com/supplychains/>.
- Council of Economic Advisers (CEA). 2022. *Economic Report of the President*. Washington, DC: CEA. https://www.whitehouse.gov/wp-content/uploads/2022/04/ERP_2022_.pdf.
- Cunningham-Cook, Matthew, and Walker Bragman. 2022. "Biden Offers Amazon Workers Rhetoric, But No Action." *The Lever*, April 7, 2022. <https://www.levernews.com/biden-offers-amazon-workers-rhetoric-but-no-action/>.



- Daly, Lew, and Rhiana Gunn-Wright. 2022. "A New Administrative Architecture for Justice40." *Roosevelt Institute* (blog). April 18, 2022. <https://rooseveltinstitute.org/2022/04/18/a-new-administrative-architecture-for-justice40/>.
- Department of Commerce (DOC). 1995. *From Lighthouses to Laserbeams: A History of the Department of Commerce*. Washington, DC: Department of Commerce. https://library.doc.gov/ld.php?content_id=20863251.
- DOC. 2022. *Assessment of the Critical Supply Chains Supporting the US Information and Communications Technology Industry*. Washington, DC: Department of Commerce. <https://www.commerce.gov/sites/default/files/2022-02/Assessment-Critical-Supply-Chains-Supporting-US-ICT-Industry.pdf>.
- Department of Defense (DOD). 2022. "Securing Defense-Critical Supply Chains." Washington, DC: Department of Defense. <https://media.defense.gov/2022/Feb/24/2002944158/-1/-1/1/DOD-EO-14017-REPORT-SECURING-DEFENSE-CRITICAL-SUPPLY-CHAINS.PDF>.
- DOD, General Services Administration (GSA), National Aeronautics and Space Administration (NASA). 2022. "Federal Acquisition Regulation: Amendments to the FAR Buy American Act Requirements." *Federal Register* 87, no. 44 (March 7, 2022): 12780. <https://www.federalregister.gov/documents/2022/03/07/2022-04173/federal-acquisition-regulation-amendments-to-the-far-buy-american-act-requirements>.
- Department of Energy (DOE). 2021. *DOE National Labs Report 2020*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2021/01/f82/DOE%20National%20Labs%20Report%20FINAL.pdf>.
- DOE. 2022a. *America's Strategy to Secure the Supply Chain for a Robust Clean Energy Transition*. Washington, DC: Department of Energy. https://www.energy.gov/sites/default/files/2022-02/America%20E2%80%99s%20Strategy%20to%20Secure%20the%20Supply%20Chain%20for%20a%20Robust%20Clean%20Energy%20Transition%20FINAL.docx_0.pdf.
- DOE. 2022b. *Carbon Capture, Transport, & Storage*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Carbon%20Capture%20Supply%20Chain%20Report%20-%20Final.pdf>.
- DOE. 2022c. *Competitiveness and Commercialization of Energy Technologies*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Commercialization%20%26%20Competitiveness%20Supply%20Chain%20Report%20-%20Final.pdf>.



- DOE. 2022d. *Cybersecurity and Digital Components*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Cybersecurity%20Supply%20Chain%20Report%20-%20Final.pdf>.
- DOE. 2022e. *Electric Grid Supply Chain Review: Large Power Transformers and High Voltage Direct Current Systems*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Cybersecurity%20Supply%20Chain%20Report%20-%20Final.pdf>.
- DOE. 2022f. *Grid Energy Storage*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Energy%20Storage%20Supply%20Chain%20Report%20-%20final.pdf>.
- DOE. 2022g. *Water Electrolyzers and Fuel Cells Supply Chain*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Fuel%20Cells%20%26%20Electrolyzers%20Supply%20Chain%20Report%20-%20Final.pdf>.
- DOE. 2022h. *Hydropower*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Hydropower%20Supply%20Chain%20Report%20-%20Final.pdf>.
- DOE. 2022i. *Rare Earth Permanent Magnets*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Neodymium%20Magnets%20Supply%20Chain%20Report%20-%20Final.pdf>.
- DOE. 2022j. *Platinum Group Metal Catalysts*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/PGM%20catalyst%20supply%20chain%20report%20-%20final%20draft%202.25.22.pdf>.
- DOE. 2022k. *Solar Photovoltaics*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Solar%20Energy%20Supply%20Chain%20Report%20-%20Final.pdf>.
- DOE. 2022l. *Wind Energy*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Wind%20Energy%20Supply%20Chain%20Report%20-%20Final.pdf>.
- DOE. 2022m. *Nuclear Energy*. Washington, DC: Department of Energy. <https://www.energy.gov/sites/default/files/2022-02/Nuclear%20Energy%20Supply%20Chain%20Report%20-%20Final.pdf>.
- Department of Transportation (DOT). 2022a. *Budget Estimates FY 2023, Office of the Secretary of Transportation*. Washington, DC: Department of Transportation. https://www.transportation.gov/sites/dot.gov/files/2022-03/OST_Budget_Estimates_FY23.pdf.

- DOT. 2022b. *Supply Chain Assessment of the Transportation Industrial Base: Freight and Logistics*. Washington, DC: Department of Transportation. https://www.transportation.gov/sites/dot.gov/files/2022-02/EO%2014017%20-%20DOT%20Sectoral%20Supply%20Chain%20Assessment%20-%20Freight%20and%20Logistics_FINAL.pdf.
- Evans, Peter B. 1995. *Embedded Autonomy: States and Industrial Transformation*. Princeton, NJ: Princeton University Press.
- Executive Office of the President (EOP). 2021. Executive Order. "America's Supply Chains." *Federal Register* 86, no. 38 (March 1, 2021): 11849. <https://www.federalregister.gov/documents/2021/03/01/2021-04280/americas-supply-chains>
- Farber, Henry S, Daniel Herbst, Ilyana Kuziemko, and Suresh Naidu. 2021. "Unions and Inequality over the Twentieth Century: New Evidence from Survey Data." *The Quarterly Journal of Economics* 136, no. 3 (August): 1325–85. <https://doi.org/10.1093/qje/qjab012>.
- Felipe, Jesus, Aashish Mehta, and Changyong Rhee. 2014. "Manufacturing Matters ... but It's the Jobs That Count." Working Paper no. 420. Asian Development Bank Economics Working Paper Series. Manila, Philippines: Asian Development Bank. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2558904.
- Forgey, Quint. 2020. "'We're Not a Shipping Clerk': Trump Tells Governors to Step up Efforts to Get Medical Supplies." *POLITICO*, March 19, 2020. <https://www.politico.com/news/2020/03/19/trump-governors-coronavirus-medical-supplies-137658>.
- Galbraith, John Kenneth. 1952. *American Capitalism*. New York: Houghton Mifflin.
- Government Accountability Office (GAO). 2018. *Buy American Act: Actions Needed to Improve Exception and Waiver Reporting and Selected Agency Guidance*. Washington, DC: Government Accountability Office. <https://www.gao.gov/products/GAO-19-17>.
- Gumber, Clayton, and Irene Padavic. 2020. "Race Differences in Motivations for Joining Unions: The Role of Prosocial Beliefs." *Social Science Quarterly* 101, no. 2 (January): 490–502. <https://doi.org/10.1111/ssqu.12772>.
- Hacker, Jacob S., and Paul Pierson. 2019. "Policy Feedback in an Age of Polarization." *The ANNALS of the American Academy of Political and Social Science* 685, no. 1 (September): 8–28. <https://doi.org/10.1177/0002716219871222>.
- Hanna, Thomas M. 2018. *Our Common Wealth: The Return of Public Ownership in the United States*. Manchester, UK: Manchester University Press.

- Heckman, Jory. 2022. "OPM Outlines More Steps for Agencies to Highlight Collective Bargaining Rights for Feds." *Federal News Network*, April 12, 2022. <https://federalnewsnetwork.com/unions/2022/04/opm-outlines-more-steps-for-agencies-to-highlight-collective-bargaining-for-feds/>.
- Hertel-Fernandez, Alexander. 2020. *How Policymakers Can Craft Measures That Endure and Build Political Power*. New York: Roosevelt Institute. <https://rooseveltinstitute.org/publications/how-policymakers-can-craft-measures-that-endure-and-build-political-power/>.
- Department of Health and Human Services (HHS). 2022. "Public Health Supply Chain and Industrial Base: One-Year Report in Response to Executive Order 14017." Washington, DC: Department of Health and Human Services. <https://aspr.hhs.gov/MCM/IBx/2022Report/Pages/default.aspx>.
- Hirschman, Albert O. 1958. *The Strategy of Economic Development*. New Haven: Yale University Press.
- Hogan, Michael J. 2000. *A Cross of Iron: Harry S. Truman and the Origins of the National Security State, 1945–1954*. Cambridge, UK: Cambridge University Press.
- Hui, Mary. 2021. "A Chinese Rare Earths Giant Is Building International Alliances Worldwide." *Quartz*, February 19, 2021. <https://qz.com/1971108/chinese-rare-earths-giant-shenghe-is-building-global-alliances/>.
- Japan Oil, Gas, and Metals National Corporation (JOGMEC). 2011. "Sojitz and JOGMEC Enter into Definitive Agreements with Lynas Including Availability Agreement to Secure Supply of Rare Earths Products to Japanese Market." Press release, March 30, 2011. <https://www.jogmec.go.jp/english/news/release/release0069.html>.
- Jones, Jesse H., and Edward Angly. 1951. *Fifty Billion Dollars: My Thirteen Years with the RFC*. New York: The Macmillan Company.
- Jones, Bradley. 2022. *The Changing Political Geography of COVID-19 Over the Last Two Years*. Washington, DC: Pew Center for Research. <https://www.pewresearch.org/politics/2022/03/03/the-changing-political-geography-of-covid-19-over-the-last-two-years/>.
- Kim, Gidong. 2022. "Labor Unions and Voter Turnout in the American States: Direct Versus Indirect Mobilization." *State Politics & Policy Quarterly*, 1–20. <https://doi.org/10.1017/spq.2021.33>.
- Kahn, Suzanne, and Rhiana Gunn-Wright. 2022. *All Economic Policy Is Climate Policy: Tools for a Post-Neoliberal Green Transition*. New York: Roosevelt Institute. <https://rooseveltinstitute.org/publications-all-economic-policy-is-climate-policy>.



- Li, Yongfei, Sang-Gun Lee, and Myungjai Kong. 2019. "The Industrial Impact and Competitive Advantage of China's ICT Industry." *Service Business* 13, no. 1 (March): 101–27. <https://doi.org/10.1007/s11628-018-0368-7>.
- Macdonald, David. 2021a. "How Labor Unions Increase Political Knowledge: Evidence from the United States." *Political Behavior* 43, no. 1 (April): 1–24. <https://doi.org/10.1007/s11109-019-09548-7>.
- Macdonald, David. 2021b. "Labor Unions and White Democratic Partisanship." *Political Behavior* 43, no. 2 (June): 859–79.
- Mazzucato, Mariana, Rainer Kattel, and Josh Ryan-Collins. 2021. "Industrial Policy's Comeback." *Boston Review*, September 15, 2021. <https://bostonreview.net/forum/industrial-policys-comeback/>.
- Millemaci, Emanuele, and Ferdinando Ofria. 2014. "Kaldor-Verdoorn's Law and Increasing Returns to Scale: A Comparison across Developed Countries." *Journal of Economic Studies* 41, no. 1 (January): 140–162. <https://doi.org/10.1108/JES-02-2012-0026>.
- Minchin, Timothy J. 2016. "A Pivotal Role? The AFL–CIO and the 2008 Presidential Election." *Labor History* 57, no. 3 (March): 299–322. <https://doi.org/10.1080/0023656X.2016.1164380>.
- Morgan, Stephen L. 2018. "Status Threat, Material Interests, and the 2016 Presidential Vote." *Socius* 4 (January): 2378023118788217. <https://doi.org/10.1177/2378023118788217>.
- National Economic Council (NEC). 2022. "Executive Order on America's Supply Chains: A Year of Action and Progress." Washington, DC: National Economic Council. <https://www.whitehouse.gov/wp-content/uploads/2022/02/Capstone-Report-Biden.pdf>.
- Newburger, Emma. 2020. "Joe Biden Calls Climate Change the 'Number One Issue Facing Humanity.'" *CNBC*, October 24, 2020, sec. Environment. <https://www.cnn.com/2020/10/24/joe-biden-climate-change-is-number-one-issue-facing-humanity.html>.
- National Security Council (NSC) 2021. *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth: 100-Day Reviews under Executive Order 14017*. Washington, DC: National Security Council. <https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf>.
- Omarova, Saule T. 2020. "Why We Need a National Investment Authority." Cornell Legal Studies Research Paper no. 20–34. Ithica: Cornell Legal Studies. <https://dx.doi.org/10.2139/ssrn.3566462>.

- Oqubay, Arkebe, Christopher Cramer, Ha-Joon Chang, and Richard Kozul-Wright, eds. 2020. *The Oxford Handbook of Industrial Policy*. Oxford: Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780198862420.001.0001>.
- Polanyi, Karl. 1944. *The Great Transformation*. New York: Farrar & Rinehart.
- Rubio, Marco. 2019. *Made in China 2025 and the Future of American Industry*. Washington, DC: US Senate Committee on Small Business and Entrepreneurship. https://www.rubio.senate.gov/public/_cache/files/d1c6db46-1a68-481a-b96e-356c8100f1b7/3EDECA923DB439A8E884C6229A4C6003.02.12.19-final-sbc-project-mic2025-report.pdf.
- Sarat, Austin. 2021. "Why Did Biden's Supreme Court Commission Fail So Completely?" *Slate*, December 9, 2021. <https://slate.com/news-and-politics/2021/12/bidens-scotus-commission-was-a-failure-from-the-start.html>.
- Shields, Matt, Ruth Marsh, Jeremy Stefek, Frank Oteri, Ross Gould, Noe Rouxel, Katherine Diaz, Javier Molinero, Abigayle Moser, Courtney Malvik, and Sam Tirone. 2022. *The Demand for a Domestic Offshore Wind Energy Supply Chain*. Golden, CO: National Renewable Energy Laboratory. <https://doi.org/10.2172/1860239>.
- Strickland, Kyle, and Felicia Wong. 2021. *A New Paradigm for Justice and Democracy: Moving beyond the Twin Failures of Neoliberalism and Racial Liberalism*. New York: Roosevelt Institute. <https://rooseveltinstitute.org/publications/new-paradigm-for-justice-and-democracy-moving-beyond-the-twin-failures-of-neoliberalism-and-racial-liberalism/>.
- Topf, Andrew. 2017. "Mountain Pass Sells for \$20.5 Million." *MINING.COM*, June 16, 2017. <https://www.mining.com/mountain-pass-sells-20-5-million/>.
- Tucker, Todd N. 2018. *Seven Strategies to Rebuild Worker Power for the 21st Century Global Economy: A Comparative and Historical Framework for Policy Action*. New York: Roosevelt Institute. <http://rooseveltinstitute.org/seven-strategies-rebuild-worker-power/>.
- Tucker, Todd N. 2019. *Industrial Policy and Planning: What It Is and How to Do It Better*. New York: Roosevelt Institute. <https://rooseveltinstitute.org/industrial-policy-and-planning/>.
- Tucker, Todd N. 2022. *Priorities and Allocations: How the Defense Production Act Allows Government to Mobilize Industry to Ensure Popular Well-Being*. New York: Roosevelt Institute. <https://rooseveltinstitute.org/publications/priorities-and-allocations-how-the-defense-production-act-allows-government-to-mobilize-industry-to-ensure-popular-well-being/>.

- US Department of Agriculture (USDA). 2022. *USDA Agri-Food Supply Chain Assessment: Program and Policy Options for Strengthening Resilience*. Washington, DC: US Department of Agriculture. <https://www.ams.usda.gov/sites/default/files/media/USDAAgriFoodSupplyChainReport.pdf>.
- VanHeuvelen, Tom, and David Brady. 2021. "Labor Unions and American Poverty." *ILR Review* (May). <https://doi.org/10.1177/00197939211014855>.
- Victor, David G., and Charles F. Sabel. 2022. *Fixing the Climate: Strategies for an Uncertain World*. Princeton: Princeton University Press.
- Weller, Christian E., and David Madland. 2022. "Unions, Race, Ethnicity, and Wealth: Is There a Union Wealth Premium for People of Color?" *Journal of Economics, Race, and Policy* 5, no. 1 (January): 25–40.
- Western, Grace, Daniella Zessoules, Nyanya Browne, Bethel Cole-Smith, and William Spriggs. 2021. *The Impact of Trade on Black Workers*. Washington, DC: Groundwork Collaborative. <https://groundworkcollaborative.org/wp-content/uploads/2021/06/The-Impact-of-Trade-on-Black-Workers.pdf>.
- The White House. 2022. "The Biden-Harris Plan to Revitalize American Manufacturing and Secure Critical Supply Chains in 2022." Press release, February 24, 2022. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/24/the-biden-harris-plan-to-revitalize-american-manufacturing-and-secure-critical-supply-chains-in-2022/>.



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