



Statement

of

Scott Lincicome

**Vice President, General Economics & Stiefel Trade Policy Center
Cato Institute**

before the

U.S. Congress Joint Economic Committee

June 12, 2024

Made in America: The Boom in U.S. Manufacturing Investment

Dear Chairman Heinrich, Vice Chairman Schweikert, and Members of the Committee: Thank you for inviting me to testify today.¹

Industrial policy is back in Washington, and supporters claim not only that it *can* bring about a market-beating manufacturing renaissance for critical industries, but that this renaissance has already begun. In my testimony today, I'll offer several notes of caution.

First, while domestic investment in manufacturing and related construction has increased substantially, it must be put into context. Both demand for and onshore investment in goods targeted by new U.S. industrial policy were increasing prior to the measures' enactment, and recent increases in related private spending are still a relatively small share of U.S. economic output. Actual U.S. manufacturing performance, meanwhile, remains subdued.

Second, we must also consider the actual return on these investments. When the government showers preferred companies with trillions of taxpayer dollars and numerous restrictions on foreign trade competition, the policies will inevitably produce *something* in the real economy. The question is what, exactly, all that government support is getting us. If, for example, the policies generate hundreds of billions of dollars in private manufacturing investment that eventually translates into dozens of vibrant, innovative, and globally competitive American factories and a sterling U.S. economy, then the federal government's gamble will have paid off. On the other hand, declarations of policy victory today will look foolish in retrospect if government coddling results in a few such successes but as many or more failures—not just a few empty fields or moribund facilities but entire companies and industries that depend on continuous federal protection or support—and myriad unintended or unseen costs in the broader U.S. economy.

Today it is too early to definitively say what new U.S. industrial policy will produce. However, there are already signs that the subsidies and protectionism supposedly fueling a U.S. manufacturing “boom” are encountering problems both domestically and internationally—problems that could undermine the industrial policies' objectives at great budgetary and economic cost, *and* ones that the United States has encountered many times before in previous industrial policy experiments.

What *Is* Industrial Policy?

Examining the effects of the current U.S. industrial policy push requires clarifying what is and isn't “industrial policy”—especially since advocates routinely claim that a wide range of past industrial or technological successes were caused by U.S. “industrial policies” that cannot meet any plausible definition of the term. Instead, both theory and practice in the United States lead analysts to coalesce around four elements that an industrial policy must reflect:

1. It is focused on *manufacturing*;
2. It consists of targeted and specific *microeconomic* (firm or industry-specific) support (e.g., tax credits, tariffs, or subsidies), as opposed to horizontal, sector-wide, or economy-wide policies (e.g., corporate tax reductions);

¹ The views I express in this testimony are my own and should not be construed as representing any official position of the Cato Institute.

3. It implements a *broader government plan or strategy* to achieve market-beating *commercial* outcomes in targeted industries or companies; and
4. It requires that these outcomes are generated *within national borders*.²

Industrial policy does not seek to make the macroeconomic environment more conducive to industrial development in general. It does not target the overall levels of research, jobs, or even industrial activity in the United States, nor does it even correct perceived or real shortcomings of markets by any means necessary. Instead, industrial policy seeks to dictate the specific composition of commercial industrial activity within the nation to achieve a broader national goal. Thus, for example, industrial policy does not say “we need to lower carbon emissions” (via, for example, a carbon tax or a nondiscriminatory consumer subsidy paired with unilateral free trade in environmental goods); it says, “we need to lower carbon emissions by subsidizing or protecting American solar panel companies and workers.”

Based on these four criteria, the United States has indeed embarked on a vast new industrial policy experiment through a wide array of measures. This includes potentially *trillions* of dollars in federal grants, loans, loan guarantees, and tax credits extended to commercial manufacturers and buyers of “green” products and technologies under the Inflation Reduction Act (IRA), as well as tens of billions of dollars more in similar subsidies to semiconductor producers under the CHIPS and Science Act. (Energy analysts at Wood Mackenzie recently found that the cumulative cost of IRA tax credits alone could reach \$2.5 to \$3 trillion (about \$9,200 per person in the United States) or more.³ The CHIPS and Science Act includes both \$53 billion in direct government spending and an open-ended 25 percent tax credit for equipment that “some [semiconductor] executives estimate has already funneled tens of billions of dollars into the industry,” and that industry lobbyists are already seeking to extend beyond 2026.⁴) New U.S. industrial policies also include various “Buy American” restrictions in the Infrastructure Investment and Jobs Act and implemented via executive action, as well as recent U.S. restrictions on imported solar panels, semiconductors, electric vehicles, and other “strategic” goods.

In all cases, the measures at issue are intended to achieve market-beating outcomes in furtherance of broader federal environmental, industrial, or national security objectives. They are classic industrial policy.

The four criteria also reveal many past and ongoing U.S. industrial policies, such as the Jones Act, ethanol mandates, 1980s automotive import quotas, Bush- and Trump-era steel tariffs, Department of Energy loans, subsidies for “clean coal”, the U.S. antidumping law, and others. As I and other Cato Institute scholars have written⁵, these measures have been studied extensively

² Scott Lincicome and Huan Zhu, “[Questioning Industrial Policy: Why Government Manufacturing Plans Are Ineffective and Unnecessary](#),” Cato Institute White Paper, September 28, 2021.

³ Travis Fisher, “[The Inflation Reduction Act’s Energy Subsidies Are More Expensive Than You Think](#),” *Cato at Liberty* (blog), Cato Institute, September 5, 2023.

⁴ Asa Fitch, “[The U.S. Gave Chip Makers Billions. Now Comes the Hard Part.](#),” *Wall Street Journal*, updated June 4, 2024.

⁵ Colin Grabow, Inu Manak, and Daniel J. Ikenson, “[The Jones Act: A Burden America Can No Longer Bear](#),” Cato Institute Policy Analysis no. 845, June 28, 2018; Scott Lincicome, “[Doomed to Repeat It: The Long History of America’s Protectionist Failures](#),” Cato Institute Policy Analysis no. 819, August 22, 2017; Scott Lincicome, “[Green Industrial](#)

and provide valuable lessons about not only the costs and failures of past industrial policy, but also possible warning signs in today's industrial policy initiatives.

As I'll discuss in the following sections, those signs are indeed appearing.

Putting the "Boom" in Context

First, however, we must put recent increases in both manufacturing investment and construction spending in proper context. For starters, it is unclear just how much of these gains have been caused by, instead of merely coincident with, new U.S. industrial policies. Prior to the measures' enactment, the pandemic, geopolitics, and other factors had already increased companies' interest in diversifying semiconductor sourcing⁶, and private demand for and investment in green energy was already soaring.⁷ As I document in Figure 1 below, moreover, a large share of major U.S. semiconductor and EV investment announcements trumpeted by the White House came months or even years before the CHIPS and Science Act and IRA became law:

[Policy Is Back \(Again\)](#)," Cato Institute, August 11, 2021; Scott Lincicome, "['Dumping' Doesn't Mean What You Think It Means](#)," Cato Institute, February 16, 2022; and Sallie James, "[Food Fight](#)," Cato Institute Free Trade Bulletin no. 31, January 30, 2008.

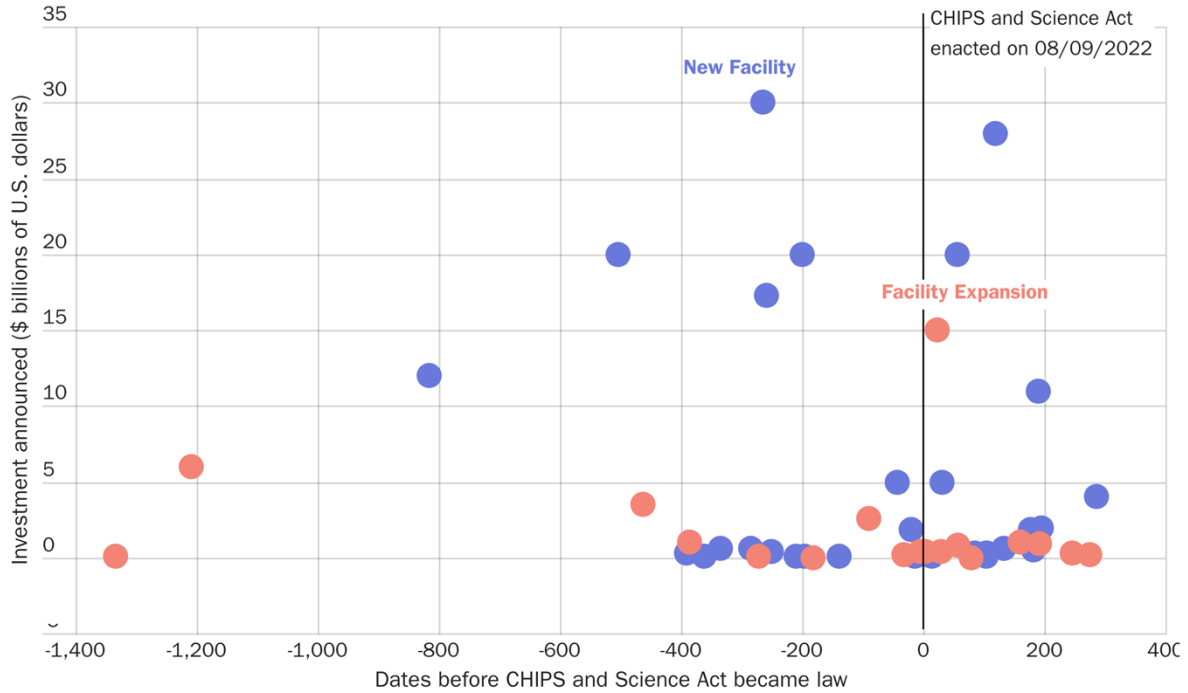
⁶ "[Should the U.S. Government Subsidize Domestic Chip Production? Two Advocates Square Off](#)" "Should the U.S. Government Subsidize Domestic Chip Production? Two Advocates Square Off," *Wall Street Journal*, February 27, 2022.

⁷ Amrith Rankumar, "[Private Sector's Role in Climate Fight Grows during War in Ukraine](#)," *Wall Street Journal*, July 1, 2022.

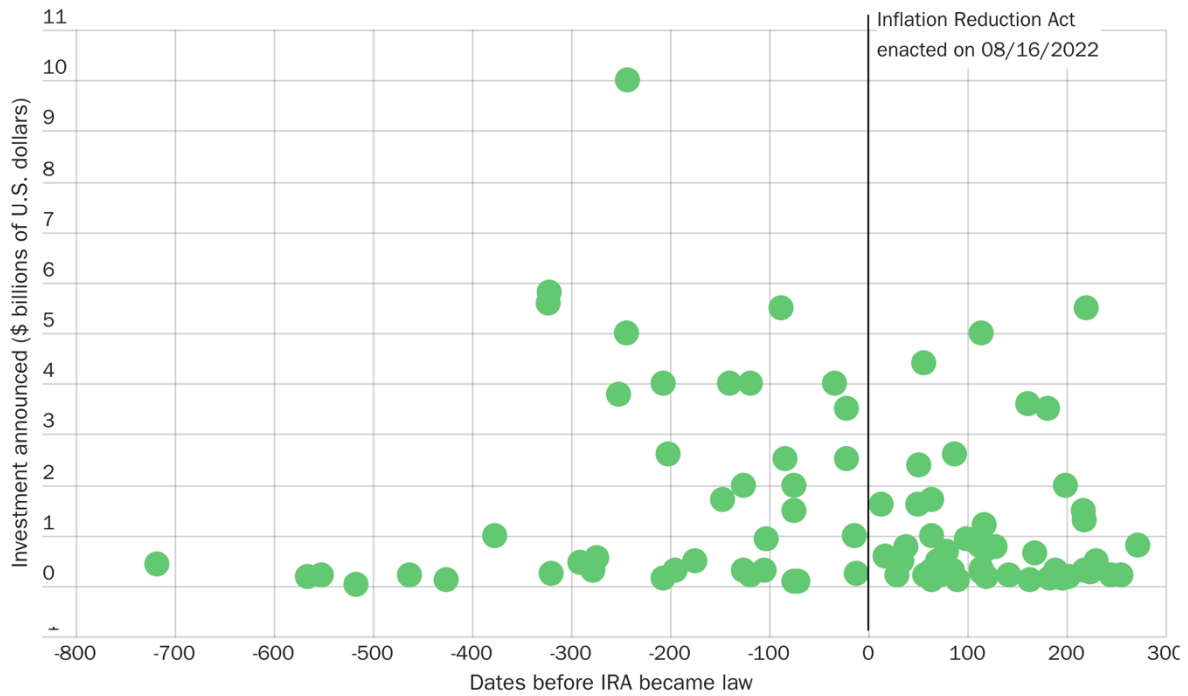
Figure 1

As of mid-2023, a large share of U.S. investments in semiconductor and electric vehicle production were announced before the relevant industrial policy bill became law

Semiconductors



Electric Vehicles and Batteries



Sources: "President Joe Biden: Investing in America," The White House, accessed on August 16, 2023; and research on individual projects compiled from press releases, industry associations, and news articles.

Notes: A negative value along the x-axis indicates that a project was announced before the enactment of the CHIPS and Science Act or the Inflation Reduction Act. A positive value along the x-axis indicates that a project was announced after the enactment of these industrial policies.

It is possible that some of these early announcements were made in anticipation of new U.S. subsidies or tariffs, but many if not most probably weren't. Even as late as July 2022, climate-related incentives in the IRA were considered off the table due to insufficient votes in the Senate⁸, and the CHIPS and Science Act also faced uncertainty until the very end.⁹ It is therefore reasonable to conclude that a nontrivial portion of the manufacturing investments that occurred before (or even shortly after) these bills passed Congress were not owed to the policies themselves. Indeed, even the Treasury Department, when heralding U.S. industrial policies' effect on manufacturing investment last year, admitted that the increase in semiconductor and related electronics construction spending "began in the months before the CHIPS Act passed, as many factors beyond policy contribute to construction spending," and that construction of several chipmaking facilities began before the law was enacted.¹⁰

Regardless, the manufacturing investments at issue, while historically elevated, are still a relatively small share of total private investment and even smaller share of total economic output. Real private fixed investment in manufacturing structures in Q12024, for example, was \$147.6 billion (in chained 2017 dollars) and thus accounted for only 3.6 percent and 0.6 percent of total private fixed investment (\$4.1 trillion) and Real Gross Domestic Product (\$22.7 trillion), respectively, recorded during that same quarter.¹¹ The month-over-month increases in nominal U.S. manufacturing construction spending also have stalled since February—though at still-higher levels than they were before 2022.¹² And as the Treasury Department noted last year, total inflation-adjusted construction spending in the United States through April of 2023 was actually below levels seen in 2019 and early 2020.¹³

Thus, while the manufacturing investments might someday be important for the U.S. manufacturing sector, they are not the *current* economic gamechangers that they are often made out to be.

In the meantime, the *actual* U.S. manufacturing sector—i.e., the one producing goods and hiring manufacturing (not construction) workers today—has stagnated, thanks to higher interest rates,

⁸ Ximena Bustillo and Laura Benschoff, "[Biden Urges Democrats to Pass Slim Health Care Bill after Manchin Nixes Climate Action](#)," *NPR*, updated July 15, 2022.

⁹ Morgan Chalfant, "[McConnell Threatens Semiconductor Bill, Prompting White House Rebuke](#)," *The Hill*, June 30, 2022.

¹⁰ Eric Van Nostrand, Tara Sinclair, and Samarth Gupta, "[Unpacking the Boom in U.S. Construction of Manufacturing Facilities](#)," U.S. Department of the Treasury, June 27, 2023.

¹¹ "[Real Private Fixed Investment](#)," U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 30, 2024; "[Real Private Nonresidential Fixed Investment](#)," U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 30, 2024; "[Real Private Fixed Investment: Nonresidential: Structures: Manufacturing](#)," U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 30, 2024; "[Real Gross Private Domestic Investment: Fixed Investment: Nonresidential: Equipment](#)," U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 30, 2024; and "[Real Gross Domestic Product: Gross Private Domestic Investment: Fixed Investment: Nonresidential: Equipment: Industrial Equipment](#)," U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 30, 2024.

¹² "[Total Private Construction Spending: Manufacturing in the United States](#)," U.S. Census retrieved from FRED, Federal Reserve Bank of St. Louis, updated June 3, 2024.

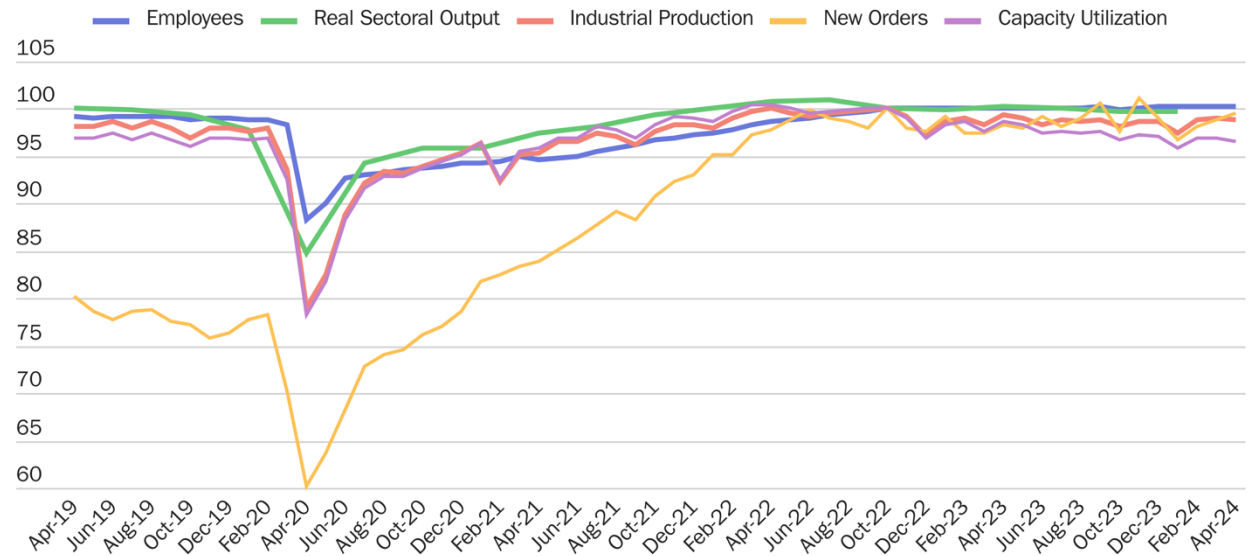
¹³ Eric Van Nostrand, Tara Sinclair, and Samarth Gupta, "[Unpacking the Boom in U.S. Construction of Manufacturing Facilities](#)," U.S. Department of the Treasury, June 27, 2023.

continued materials inflation, worker availability, economic uncertainty, tariffs and trade disputes, and other headwinds. Thus, Figure 2 shows that total U.S. manufacturing employment, output, orders, and capacity utilization have been basically flat since the Fall of 2022 (i.e., right after the IRA and CHIPS and Science Act were signed into law).¹⁴

Figure 2

After a post-pandemic jump, U.S. manufacturing production and output have stalled

Index, October 2022=100



Sources: "All Employees, Manufacturing," U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis, updated June 7, 2024; "Manufacturing Sector: Real Sectoral Output for All Workers," U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis, updated June 6, 2024; "Industrial Production: Manufacturing (NAICS)," Board of Governors of the Federal Reserve System, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 16, 2024; "Manufacturers' New Orders: Total Manufacturing," U.S. Census Bureau, retrieved from FRED, Federal Reserve Bank of St. Louis, updated June 4, 2024; and "Capacity Utilization: Manufacturing (NAICS)," Board of Governors of the Federal Reserve System, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 16, 2024.

Note: Data for employees, industrial production, new orders, and capacity utilization is reported on a monthly basis. Data for real sectoral output is reported on a quarterly basis.

Private surveys show similar trends. The latest (April 2024) Institute for Supply Management’s private survey of manufacturing purchasing managers (aka the “Manufacturing PMI”) sat at 49.2 percent—a contraction in economic activity that followed one month of expansion and 16 consecutive months of contraction before that, dating back to September 2022.¹⁵ The National

¹⁴ "All Employees, Manufacturing," U.S. Bureau of Labor Statistics retrieved from FRED, Federal Reserve Bank of St. Louis, updated June 7, 2024; "Manufacturing Sector: Real Sectoral Output for All Workers," U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis, updated June 6, 2024; "Industrial Production: Manufacturing (NAICS)," Board of Governors of the Federal Reserve System, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 16, 2024; "Manufacturers' New Orders: Total Manufacturing," U.S. Census Bureau, retrieved from FRED, Federal Reserve Bank of St. Louis, updated June 4, 2024; and "Capacity Utilization: Manufacturing (NAICS)," Board of Governors of the Federal Reserve System, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 16, 2024.

¹⁵ "Manufacturing PMI at 49.2%: April 2024 Manufacturing ISM Report On Business," Institute for Supply Management, May 1, 2024.

Association of Manufacturers latest (Q1 2024) Manufacturers' Outlook Survey, meanwhile, found that 68.7 percent of respondents felt "either somewhat or very positive about their company's outlook"—"the sixth straight reading below the historical average of 74.8%." The NAM report added that "the expiration of federal tax incentives related to R&D, interest deductibility and expensing for capital investments has already caused nearly 40 percent of respondents to pull back on hiring and investing due to increased taxes," while 72.4 percent cited the costly federal permitting process as also affecting their investment decisions.¹⁶ The previous quarter's report cited pessimism as particularly high among small and medium-sized businesses.¹⁷

Industries such as semiconductors and transportation have performed better in recent months. But, so far at least, the United States is witnessing less a "manufacturing boom," and more the possible formation of a two-tier industrial economy. In Tier One are large companies in industries preferred by the government and, to a lesser extent, reshoring operations because of pandemic-related and geopolitical uncertainties. According to various reports, these firms are investing, more optimistic, and, theoretically at least, poised to grow in the future. In Tier Two, however, are many existing American manufacturers, especially smaller ones and ones not targeted for government support, that are weaker and more pessimistic. Their future remains more in doubt.

Perhaps a broad, nationwide "boom" materializes in the future, but it is just as likely—if not more so—that we are again seeing what critics of targeted tax credits, subsidies and tariffs have long cautioned regarding these types of policies, i.e., that they do not expand the overall economic pie in the United States or generate sustainable, long-term growth, but instead simply redistribute existing resources (money, materials, manpower, etc.) to favored companies at a net loss to the U.S. economy. This unfortunate outcome is especially a concern today, absent significant tax, regulatory, trade, immigration and other supply-side reforms that would allow total national output to increase in response to stimulus-fueled demand—reforms that American manufacturers, including in government-preferred industries, are expressly seeking.

Early Warning Signs in the United States

As noted, it is too early to definitively judge new U.S. industrial policies. Measures of national manufacturing investment, even when adjusted for inflation, cannot tell us what those dollars—and U.S. taxpayer subsidies—will generate for targeted industries, in terms of output, jobs, innovation, and other concrete measures of success. Nor can such data tell us the extent to which U.S. industrial policy directly caused the increase in investment (as opposed to merely paying companies to do what they had already planned to do), or how the broader national economy will fare if or when subsidized and protected U.S. facilities come online. Thus far, we mainly have just national investment data and optimistic reports from government officials and the corporate recipients of federal support.

Recent developments in the United States, however, give us at least four reasons to be concerned about whether these investments will pay off.

¹⁶ "[2024 First Quarter Manufacturers' Outlook Survey](#)," National Association of Manufacturers, March 5, 2024

¹⁷ "[Manufacturers' Outlook Survey: Fourth Quarter 2023](#)," National Association of Manufacturers, January 8, 2024.

First, the costs of building, staffing, and starting production within subsidized facilities has increased substantially—thanks in large part to U.S. policy. Part of the cost increase is owed to macroeconomic factors, as well as U.S. government subsidies further boosting demand for a limited supply of construction goods, services, and equipment.¹⁸ But it is also the result of new U.S. industrial policies colliding with longstanding supply-side constraints that prevent more resources from becoming available to U.S. builders and manufacturers – constraints often caused or exacerbated by other federal policies. For example:

- Long environmental impact assessments, litigation under the National Environmental Policy Act (NEPA), and other permitting restrictions have delayed or scuttled U.S. wind and solar projects and related domestic manufacturing.¹⁹ Semiconductor, EV, and minerals projects have faced similar regulatory constraints.²⁰
- Restrictions on legal immigration are contributing to subsidized firms’ difficulties in finding workers to build and operate new facilities.²¹ This is a particular problem for high-tech manufacturing, which requires specialized talent in limited supply (here and abroad).²² Thus, for example, Taiwan Semiconductor Manufacturing Company (TSMC) has reportedly sought to bring in more than 1,000 workers from Taiwan to staff its Arizona project.²³
- Tariffs, “Buy American” provisions, trade remedies duties, and other U.S. trade restrictions inflate the cost of construction materials and manufacturing inputs. Buy American restrictions in the IRA, for example, force companies to exclusively source products from American producers when cheaper alternatives are available from foreign sources and to undergo lengthy and bureaucratic compliance proceedings.²⁴ Meanwhile, steel prices in the United States remain far higher than elsewhere, thanks to myriad import restrictions.

For these and other policy-related reasons, many subsidized manufacturing projects’ costs have increased substantially²⁵, and even advocates have recently worried that existing supply-side impediments threaten U.S. industrial policies’ implementation and efficacy. As the former director of the White House National Economic Council Brian Deese just wrote in *The Atlantic*²⁶, he and his colleagues “underestimated just how big a barrier [regulations] would pose to clean-

¹⁸ See, e.g., Sebastian Obando, “[Input Price Surge Signals Bumpy Road Ahead](#),” *Construction Dive*, March 15, 2024.

¹⁹ Scott Lincicome, “[Offshore Headwinds](#),” Cato Institute, December 6, 2023; and Brian Deese, “[The Next Front in the War against Climate Change](#),” *The Atlantic*, May 24, 2024.

²⁰ Phillip Singerman and Alexander Kersten, “[Implementing CHIPS: The NEPA Permitting Challenge](#),” Center for Strategic and International Studies, May 1, 2023; Hannah Northey, “[Feds Offer \\$700M to Lithium Project at Heart of ESA Dispute](#),” *E&E News*, January 13, 2023; and Cindy Bae, “[Permit Issue Halts Construction at Future VinFast Car Manufacturing Plant in Chatham County](#),” *ABC 11*, April 17, 2024.

²¹ See, e.g., John Keilman, “[The Megafactories Are Coming. Now the Hustle Is On to Find Workers](#),” *Wall Street Journal*, December 10, 2023.

²² Dylan Sloan, “[CHIPS Act Faces Talent Shortage despite \\$500 Billion Investment: ‘We Have to Make Semiconductor Manufacturing Sexy’](#),” *Fortune*, June 9, 2024.

²³ Viola Zhou, “[TSMC’s Debacle in the American Desert](#),” *Rest of World*, April 23, 2024.

²⁴ Shuting Pomerleau, “[‘Buy American’ Would Delay the U.S.’s Decarbonization Progress](#),” Niskanen Center, March 2, 2023; and “[Inflation Reduction Act: Build America, Buy America](#),” McKinstry.

²⁵ See, e.g., Joe Lancaster, “[Taiwanese Company Demands U.S. Taxpayers Cover the Higher Costs of Making Semiconductors in Arizona](#),” *Reason*, July 25, 2023; and Brady Knox, “[Price Tag for New Samsung Texas Chip Factory Soars over \\$25 Billion](#),” *Washington Examiner*, March 16, 2023.

²⁶ Brian Deese, “[The Next Front in the War against Climate Change](#),” *The Atlantic*, May 24, 2024.

energy adoption” and the IRA itself²⁷—even though many experts had warned of these very problems long before the IRA became law.²⁸

Second, higher costs, changing market conditions, and other issues have already caused many announced U.S. manufacturing projects to be delayed or canceled outright, some after companies had already spent significant sums on initial siting and construction. For example:

- TSMC has delayed production at its first semiconductor facility in Arizona (announced before CHIPS became law) from 2024 to 2025, while delaying its second plant from 2026 to 2028.²⁹ Samsung originally said in 2021 (again, pre-CHIPS) that its Taylor, Texas facility would be mass producing chips in the first half of 2024 but has since punted the deadline to next year.³⁰ In March of this year, Intel pushed the launch date of its Ohio factory from 2025 to 2027 or even 2028.³¹ Many other promised investments from these and other chip companies have not yet broken ground, and there is no guarantee they ever will. SkyWater Technology, for example, received a glowing 2023 *New York Times* review of its \$1.8 billion investment in Indiana, yet just recently canceled those plans after losing out on CHIPS funds.³² Applied Materials’ \$4 billion semiconductor research hub in Silicon Valley has been downgraded for similar reasons.³³
- Numerous EVs and battery projects have also experienced delays and cancellations. For example, Vietnamese EV company VinFast has already pushed its factory in North Carolina, which President Biden in 2022 called “the latest example of my economic strategy at work,” from 2024 to at least 2025 but is now considering even further delays, as its already-cleared land sits quiet.³⁴ Ford has announced that it would stall production of a new electric pickup truck at its new factory in Tennessee amid waning U.S. consumer demand for EVs (the company recently reported losses of 100,000 for every EV unit sold).³⁵ Other issues have arisen with Ford in Michigan and the company’s battery ventures with China’s CATL and Korea’s SK, as well as with Rivian in Georgia, Nissan in Mississippi, GM in Michigan, the Apple Car project in California, Tesla in New York and Texas, VW/Scout in South Carolina, Panasonic in Kansas and Oklahoma, an un-sited Honda/GM joint

²⁷ Brian Deese, “[The Next Front in the War against Climate Change](#),” *The Atlantic*, May 24, 2024.

²⁸ Scott Lincicome, “[... But We Won’t Do That](#),” Cato Institute, August 10, 2022.

²⁹ “[TSMC Arizona and U.S. Department of Commerce Announce up to US\\$6.6 Billion in Proposed CHIPS Act Direct Funding, the Company Plans Third Leading-Edge Fab in Phoenix](#),” Taiwan Semiconductor Manufacturing Company, press release, April 8, 2024.

³⁰ Kara Carlson, “[Samsung to Delay Mass Chip Production at Massive Taylor Facility until 2025, Report Says](#),” *Austin American-Statesman*, December 27, 2023.

³¹ Sean McDonnell, “[Intel’s Ohio Plants Delayed 2 Years; Will Start Production in 2027 or Later](#),” *Cleveland.com*, March 20, 2024.

³² Burl Gilyard, “[SkyWater Technology Cancels Option on Land for \\$1.8B Indiana Semiconductor Plant](#),” *Yahoo Finance*, April 8, 2024.

³³ Christine Mui, “[‘I Don’t Know How This Happened’: A \\$3B Secret Program Undermining Biden’s Tech Policy](#),” *Politico*, May 24, 2024.

³⁴ Zachery Eanes, “[VinFast Tells Investors Its North Carolina Plant Remains on Track](#),” *Axios*, April 17, 2024; and Scott Lincicome, “[VinFast in North Carolina Shows the Perils of Industrial Policy](#),” Cato Institute, May 26, 2023.

³⁵ “[Ford to Delay Production of New Electric Pickup and Large SUV as US EV Sales Growth Slows](#),” *Associated Press*, updated April 5, 2024; and Keith Naughton, Archie Hunter, and Heejin Kim, “[Ford Cuts Battery Orders as EV Losses Top \\$100,000 per Car](#),” *Bloomberg*, May 10, 2024.

venture.³⁶ Various EV startups, such as Rivian and Lucid motors, are also struggling financially.

- Finally, *Bloomberg* reported last month that, less than two years after the IRA “unleashed a \$16 billion flood of promised investments in solar manufacturing” (and despite numerous tariffs on imported solar modules and cells), “manufacturers have quietly shelved or slowed plans for at least four of those plants”, including Enel SpA in Oklahoma, Mission Solar in Texas, CubicPV in Massachusetts, Heleine in Minnesota.³⁷ As the *Financial Times* reported in March, more than 115GW of solar manufacturing commitments are at risk because of higher costs and a surge of Southeast Asian imports that “remain far cheaper than US-made counterparts even accounting for tariffs and IRA subsidies.”³⁸

Surely, not every subsidized and protected U.S. manufacturing investment is experiencing such difficulties, but these and other episodes nevertheless remind us that a wide and uncertain chasm lies between investment announcements and construction starts on the one hand and actual, functioning production facilities on the other. They also highlight the risk of industrial policies imposing not only significant budgetary costs, but also numerous unseen costs, including higher consumer prices (where higher costs are passed on³⁹) and the diversion of taxpayer and private resources away from more productive and timely U.S. endeavors.

Third, there are already signs that at least some of the U.S. factories eventually completed might not produce innovative technologies that can compete in a global marketplace without open-ended government support. For example, even with numerous import restrictions and “hugely lucrative” IRA subsidies, BloombergNEF estimates that “US-made solar cells and modules will cost 18.5 cents a watt, compared with 15.6 cents for a product from south-east Asia.”⁴⁰ Thus, U.S. solar producers recently filed yet another petition for import protection⁴¹—the *seventh* such action since 2012.⁴²

³⁶ Author’s research.

³⁷ Jennifer A. Dlouhy, “[Biden’s Solar Factory Boom Slows as Cheap Imports Flood Market](#),” *Bloomberg*, updated May 13, 2024.

³⁸ Amanda Chu and Demetri Sevastopulo, “[US Solar Manufacturers in ‘Dire Situation’ as Imports Soar](#),” *Financial Times*, March 13, 2024.

³⁹ See, e.g., Dan Robinson, “[US Chipmakers Don’t Want to Be Locked Out of Industry’s Biggest Market: China](#),” *The Register*, May 3, 2023.

⁴⁰ Amanda Chu and Demetri Sevastopulo, “[US Solar Manufacturers in ‘Dire Situation’ as Imports Soar](#),” *Financial Times*, March 13, 2024.

⁴¹ Scott Lincicome, “[On Biden’s New China Tariffs, History Provides Good Reasons for Almost Everyone to Worry](#),” Cato Institute, May 22, 2024.

⁴² John Fitzgerald Weaver, “[Solar Panel Import Tariffs Are Affecting the Industry by Increasing Prices by up to 286%](#),” *pv magazine*, June 6, 2024.

US trade policies that affect solar PV

Solar imports must navigate an array of trade barriers

Agency	Policy	Type	Product scope	Geographic scope	Rate	Timeline
US Customs and Border Protection	Uyghur Forced Labor Prevention Act	Import ban	All products; polysilicon and products made with polysilicon are a priority sector	Global imports suspected of having inputs from Xinjiang or made using forced labor	n/a	June 2022 onward
US Trade Representative	Section 201	Import tariff	Solar cells and modules	Global, with limited exceptions (Canada, Mexico, Indonesia, Jordan, South Africa, etc.)	14.25% (until February 2025) 14.0% (February 2025-February 2026)	February 2018 through February 2026
US Trade Representative	Section 301	Import tariff	Hundreds of products including solar cells and modules, li-ion batteries, EVs, battery materials	China	7.5% - 100%, depending on product	2018 onward (various dates)
Commerce Department	AD/CVD – solar 1	Anti-dumping and countervailing duty orders; anti-circumvention orders	Solar cells (whether or not assembled into modules)	China; anti-circumvention orders apply to Cambodia, Malaysia, Thailand, and Vietnam	Varies by company and by year (AD range: 0-239%, CVD range: 3-526%)	December 2012 onward (AD/CVD) August 2022 onward (anti-circumvention)
Commerce Department	AD/CVD – solar 2	Anti-dumping and countervailing duty orders	Solar modules	China	Varies by company and by year	February 2015 onward
Commerce Department	AD – solar 3	Anti-dumping duty order	Solar cells	Taiwan	Varies by company and by year	February 2015 onward
Commerce Department	AD/CVD – solar 4	Anti-dumping and countervailing duty investigation	Solar cells (whether or not assembled into modules)	Cambodia, Malaysia, Thailand, and Vietnam	Unknown / none yet	Investigation initiated in May 2024; Duty orders anticipated in 2025

Copyright © 2023 Clean Energy Associates

1

New U.S. semiconductor facilities raise similar competitiveness concerns. TSMC’s first Arizona facility will produce 4-nanometer chips in relatively small volumes (20,000 wafers per month) when it begins commercial production in mid-2025, but the company is already producing 3-nanometer chips in Taiwan in much larger volumes (100,000 wafers/month this year⁴³) and intends to begin mass producing 2-nanometer chips there next year.⁴⁴ Samsung will also reportedly begin 4-nanometer production in Texas in 2025, at which time the company will be moving to 2-nanometer production in Korea.⁴⁵ Both companies have also reported substantial cost overruns at their U.S. facilities—costs that they may pass on to U.S. customers.⁴⁶ (TSMC’s U.S. chipmaking operations reportedly cost 50 percent or more than they do in Taiwan.⁴⁷) The companies’ executives also have repeatedly maintained that they will keep “the most cutting-edge chip fabrication technologies in their home countries.”⁴⁸ National champion Intel,

⁴³ Omar Sohail, “[TSMC 3nm Wafer Production to Reach 100,000 Units by End of 2024, Increased iPhone Chip Orders, Qualcomm, MediaTek Accelerating This Growth](#),” *WCCF Tech*, November 21, 2023.

⁴⁴ Anton Shilov, “[TSMC 2nm Update: Two Fabs in Construction, One Awaiting Government Approval](#),” *AnandTech*, January 19, 2024; Anton Shilov, “[TSMC Delays 3nm Arizona Fab by a Year, Cites Lack of U.S. Subsidies and Waning Demand](#),” *Tom’s Hardware*, January 18, 2024; and Christian Davis et al., “[The Race between Intel, Samsung, and TSMC to Ship the First 2 nm Chip](#),” *Ars Technica*, December 11, 2023.

⁴⁵ Asif Iqbal Shaik, “[Samsung Wants to Keep 2nm Chip Production to Its Home Country](#),” *SamMobile*, February 2, 2024; and Abigail Jones and Sarah Al-Shaikh, “[Samsung Delays Production at Taylor Factory to 2025, Reports Say](#),” *KXAN*, updated December 27, 2023.

⁴⁶ Alfonso Maruccia, “[Chips Manufactured in the US and Germany Will Cost More, TSMC Says](#),” *TechSpot*, April 22, 2024.

⁴⁷ Taijing Wu, “[Taiwan Chip Pioneer Warns US Plans Will Boost Costs](#),” *Associated Press*, March 16, 2023.

⁴⁸ Asif Iqbal Shaik, “[Samsung Wants to Keep 2nm Chip Production to Its Home Country](#),” *SamMobile*, February 2, 2024.

meanwhile, has suffered setbacks in advanced chip production since at least 2018⁴⁹, and many analysts today question the company's ability to catch industry leaders like TSMC and Samsung.⁵⁰

Finally, recent articles on the state of Chinese EV production suggest that U.S. producers' vehicles are lagging not just in price, but also in quality and innovation.⁵¹ President Biden supposedly imposed high tariffs on these vehicles in the hopes that American automakers can catch up.

As I have documented⁵², however, there are strong economic and historical reasons to suspect that solar, EV, semiconductor, and other government supported industries will *not* become efficient, innovative, and globally competitive enterprises in the years ahead. There is also a serious risk that, instead of letting struggling industrial policy projects fail, U.S. policymakers will be tempted to keep them afloat with more subsidies and protectionism, and that American consumers and the broader U.S. economy and environment will suffer as a result.⁵³

Fourth, we have strong reasons to worry that politics will undermine industrial policies' implementation and efficacy—a common problem for such measures, especially the American political system.⁵⁴ For example:

- The Biden administration has conditioned receipt of CHIPS and Science Act subsidies on applicants fulfilling certain social conditions—such as providing care for the children of workers; implementing diversity, equity, inclusion, and accessibility (DEIA) initiatives; and paying construction workers local “prevailing wages,” as defined under the Davis-Bacon Act—that will inevitably raise chipmakers' costs.⁵⁵ Per *Bloomberg*, nearly half of the IRA's factory spending thus far has gone to a handful of swing states⁵⁶, while a separate analysis recently found that the nine new U.S. “workforce hubs” targeted for place-based subsidies were located in politically important states instead of ones well-suited to receive workforce-growing subsidies (because of labor market slack).⁵⁷ Given that U.S. industrial policies have generated a lobbying boom in Washington⁵⁸, other political distortions seem likely.

⁴⁹ [“Report: Intel Is Cancelling Its 10nm Process. Intel: No, We’re Not,”](#) *Ars Technica*, October 22, 2018.

⁵⁰ Kif Leswing, [“Intel Used to Dominate the U.S. Chip Industry. Now It’s Struggling to Stay Relevant,”](#) *CNBC*, April 26, 2024.

⁵¹ Jason Torchinsky, [“America Is Missing Out on the Best Electric Cars,”](#) *The Atlantic*, January 30, 2024.

⁵² Scott Lincicome, [“On Biden’s New China Tariffs, History Provides Good Reasons for Almost Everyone to Worry,”](#) Cato Institute, May 22, 2024.

⁵³ Scott Lincicome and Huan Zhu, [“Questioning Industrial Policy: Why Government Manufacturing Plans Are Ineffective and Unnecessary,”](#) Cato Institute White Paper, September 28, 2021.

⁵⁴ Scott Lincicome and Huan Zhu, [“Questioning Industrial Policy: Why Government Manufacturing Plans Are Ineffective and Unnecessary,”](#) Cato Institute White Paper, September 28, 2021.

⁵⁵ Scott Lincicome, [“Social Policy with a Side of Chips,”](#) Cato Institute, March 8, 2023.

⁵⁶ Josh Saul, [“Swing States Net Half of \\$114 Billion in Inflation Reduction Act Factory Investment,”](#) *Bloomberg*, April 2, 2024.

⁵⁷ Matt Darling, [“Are We Putting Workforce Hubs in the Right Places?,”](#) Niskanen Center, May 8, 2024.

⁵⁸ David Boaz, [“The CHIPS Act Lays Out a Picnic for Lobbyists,”](#) *Cato at Liberty* (blog), Cato Institute, March 22, 2023; Brandan Bordelon and Caitlin Oprysko, [“Everybody in Washington Wants a Byte of the CHIPS Law,”](#) *Politico*, March 17, 2023; and Timothy Cama, [“Energy Interests Spent Big in ’23 Lobbying on IRA, Permitting,”](#) *Politico Pro*, January 26, 2024.

- Bureaucratic delays and confusion have also materialized. For example, the EV transition requires availability of a vast network of charging stations, yet despite Congress previously agreeing to spend \$7.5 billion to deploy thousands of chargers, not a single charger had been installed through this program by the end of 2023, with state governments and the industry blaming “the labyrinth of new contracting and performance requirements they have to navigate to receive federal funds.”⁵⁹ Meanwhile, the eligibility of EV models for the IRA’s tax credits has changed multiple times as the Treasury Department has modified the relevant rules.⁶⁰ The Environmental Protection Agency has similarly made multiple changes to tailpipe emissions rules—partly due to swing-state opposition—and thus changed the incentives surrounding EV adoption.⁶¹ And various groups have repeatedly blamed confusing and onerous Buy American rules for delaying, if not thwarting, the rollout of other industrial policy initiatives.⁶²
- Political uncertainty and partisanship also threaten industrial policies’ ability to incentivize long-term investments in the United States. Given the differing positions taken on climate by the presumptive candidates for this year’s presidential election, firms cannot know whether at least some of the incentives currently available to them could be rolled back.⁶³ An analysis by Wood Mackenzie reports that a change in administration come November would risk \$1 trillion in investments in the U.S. energy sector.⁶⁴ Similar uncertainty exists with regard to investments in electric vehicle production.⁶⁵ Finally, politics means partisanship, which might be dictating many Americans’ views on, for example, buying an EV.⁶⁶ Ford’s Motor Co.’s executive chair recently went so far as to worry that EVs have become as politically polarizing as COVID-19 vaccines.⁶⁷

In sum, even if we assume that new industrial policies have caused most of the recent increase in U.S. manufacturing investment, many questions remain as to whether this spending will ultimately result in thriving domestic semiconductor, EV and other industries and thus justify the industrial policies’ exorbitant seen and unseen costs.

Many signs, in fact, point to the opposite conclusion.

Bring on the Subsidy Race (and Future Trade Disputes)

Recent U.S. industrial policy also raises concerns internationally. Subsidies here have prodded Japan, South Korea, Taiwan, the European Union, India, and other countries to offer subsidies of

⁵⁹ James Bikales, “[Congress Provided \\$7.5B for Electric Vehicle Chargers. Built So Far: Zero.](#),” *Politico*, December 5, 2023.

⁶⁰ Camila Domonoske, “[The \\$7,500 Tax Credit for Electric Cars Keeps Changing. Here’s How to Get It Now.](#),” *NPR*, May 3, 2024.

⁶¹ David Shepardson and Joseph White, “[US Eases Tailpipe Rules, Slows EV Transition through 2030.](#),” *Reuters*, March 20, 2024.

⁶² Scott Lincicome, “[Bye, America.](#),” Cato Institute, February 15, 2023.

⁶³ Valerie Volcovici, “[A Trump Presidency Would Risk \\$1 Trillion in Clean Energy Investment, WoodMac Says.](#),” *Reuters*, May 17, 2024.

⁶⁴ “[US November Election Results Could Decelerate Energy Transition, with \\$1 Trillion in Energy Investment on the Line.](#),” Wood Mackenzie, news release, May 16, 2024.

⁶⁵ Timothy Cama and James Bikales, “[Republican Lawmakers Want to Keep Parts of Biden’s Climate Law — but Trump Might Not.](#),” *Politico*, June 5, 2024.

⁶⁶ Mike Colias, “[Another Roadblock to the EV Transition: Personal Politics.](#),” *Wall Street Journal*, May 27, 2024.

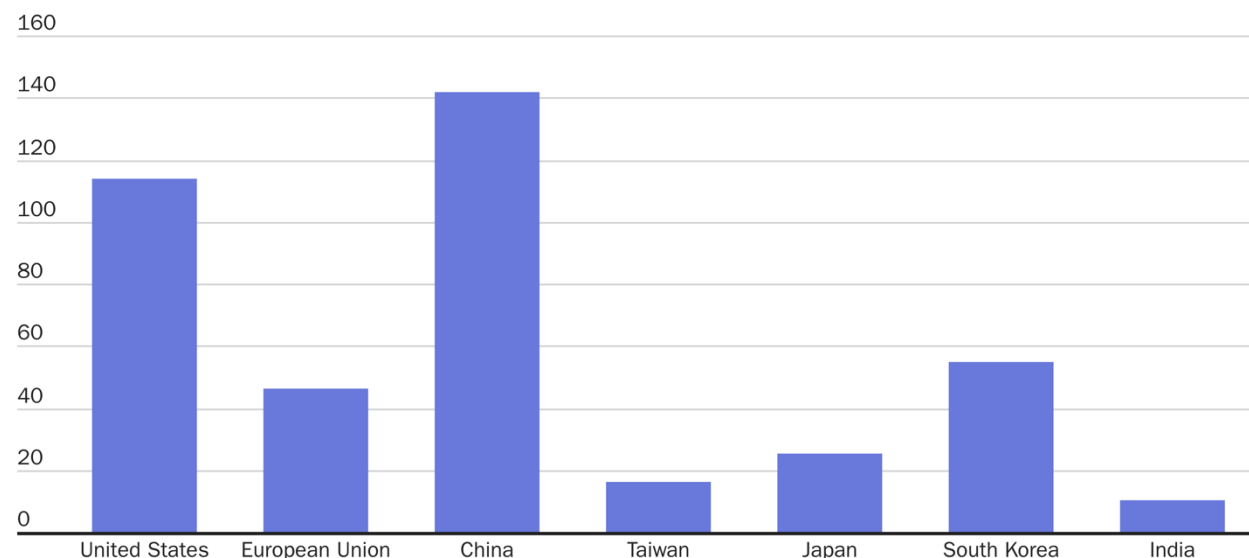
⁶⁷ Nick Bunkley, “[Bill Ford: EVs and Vaccines Both Caught in Blue-Red Fight.](#),” *Automotive News*, October 22, 2023.

their own, while encouraging the Chinese government to double- or triple-down on its recent industrial policy schemes.⁶⁸ Since the CHIPS Act was passed, for example, governments have offered more than \$300 billion in grants, loans, tax credits, and other supports to keep or attract semiconductor investments (see Figure 3). The IRA fomented a similar reaction abroad.⁶⁹

Figure 3

U.S. semiconductor subsidies join billion-dollar efforts by other countries to spur domestic chip production

Reported value of planned subsidies and tax incentives, billions of nominal U.S. dollars



Source: Mackenzie Hawkins et al., "[Global Chips Battle Intensifies With \\$81 Billion Subsidy Surge](#)," *Bloomberg*, May 12, 2024.

Note: Data for the United States includes \$39 billion in grants and \$75 billion in loans and loan guarantees authorized under the CHIPS and Science Act. Data for the European Union excludes subsidies from the governments of individual EU member-states. Data for South Korea and Taiwan represent estimated values of tax incentives.

Overall, experts at the International Monetary Fund and the organization Global Trade Alert, which tracks nations' use of industrial policy and related measures, have found a dramatic global increase in such measures in recent years—more than 2500 last year alone. They further concluded that this wave was “primarily driven by advanced economies” like the United States, with subsidies “the most employed instrument.”⁷⁰

⁶⁸ Mackenzie Hawkins et al., "[Global Chips Battle Intensifies with \\$81 Billion Subsidy Surge](#)," *Japan Times*, May 13, 2024.

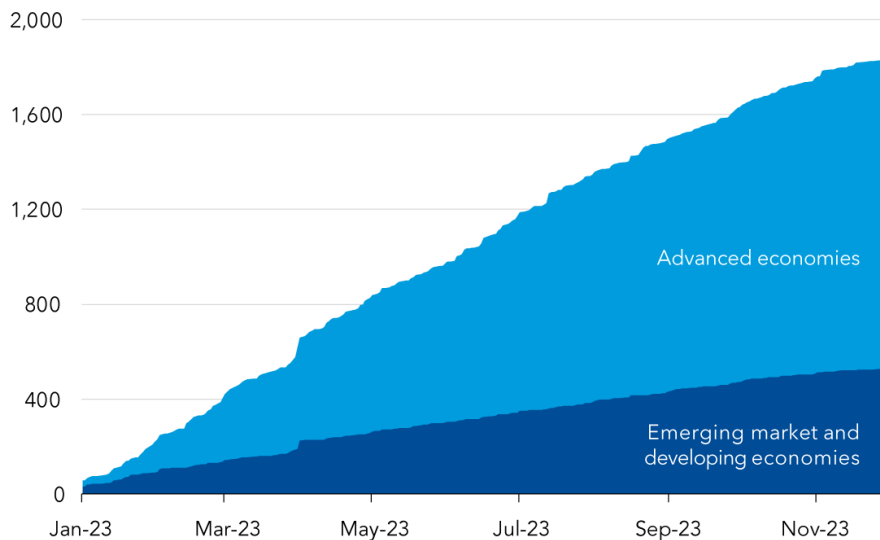
⁶⁹ Ana Swanson et al., "[Europe and Asia React to U.S. Push for Tech and Clean Energy](#)," *New York Times*, updated December 8, 2023.

⁷⁰ Simon Evenett et al., "[The Return of Industrial Policy in Data](#)," International Monetary Fund Working Paper no. 2024/001, January 4, 2024; and Anna Ilyina, Ceyla Pazarbasioglu, and Michele Ruta, "[Industrial Policy is Back But the Bar to Get it Right Is High](#)," *IMF Blog*, International Monetary Fund, April 12, 2024.

New measures

Advanced economies have been more active users of industrial policies in 2023.

Number of industrial policy measures implemented in 2023



Source: Evenett and others (2024); IMF staff calculations.

Note: Cumulative number of industrial policy measures starting from January 1, 2023.

It is possible that the gap between AEs and EMDEs in resort to subsidy interventions will narrow over time as reports from the latter tend to be published with a lag.

IMF

This recent trend is again unsurprising, as subsidy races are common throughout history.⁷¹ In fact, Global Trade Alert previously examined governments' subsidy awards since 2008 and found that new measures in one economy were typically followed by similar subsidies in another economy just six months later.⁷²

Today's uncoordinated and predictable subsidy race raises several concerns. First, it could offset or even undermine the very domestic investments that the U.S. industrial policy is trying to encourage. Semiconductor subsidies, for example, were largely justified on the grounds that the United States' share of global chipmaking has declined substantially in recent decades. However, as the *Wall Street Journal* recently reported, the Boston Consulting Group estimates that the semiconductor "building boom" here will—optimistically assuming everything announced actually gets built—boost the U.S. share of global chip production from 12 percent in 2020 to just to 14 percent in 2032, largely because other governments are also "stepping up" their own spending on these industries.⁷³

⁷¹ Scott Lincicome, "[Countervailing Calamity: How to Stop the Global Subsidies Race](#)," Cato Institute Policy Analysis no. 710, October 9, 2012.

⁷² Johannes Fritz and Simon Evenett, "[Subsidies and Market Access: New Data and Findings from the Global Trade Alert](#)," October 25, 2021.

⁷³ Asa Fitch, "[The U.S. Gave Chip Makers Billions. Now Comes the Hard Part.](#)," *Wall Street Journal*, June 4, 2024.

Furthermore, rampant government subsidies raise a serious risk of global overcapacity that could collapse prices and put U.S. and foreign producers of subsidized goods in serious financial distress. In fact, there are already signs that the global semiconductor, solar panel, EV, and battery markets are reaching a point of saturation (or worse).⁷⁴ Should global gluts materialize and persist, domestic manufacturers in the United States and other jurisdictions could request government protection from foreign competition, via “trade remedy” measures (i.e., antidumping or countervailing duties) or other import restrictions. This common move, in turn, could spawn retaliatory actions here and abroad, not only exacerbating economic losses from tit-for-tat protectionism but also raising diplomatic and geopolitical tensions with allies and challengers alike. In the end, almost everyone—consumers, producers, investors, etc.—would be worse off. And in the case of “green” goods, the environment would suffer too. (Solar panel prices in the tariff-protected United States, for example, are today around twice the global spot market price.⁷⁵)

The risk of U.S. industrial policy encouraging subsidy races and trade conflicts is not merely theoretical. As I have documented repeatedly in several papers and columns⁷⁶, this very scenario has played out many times throughout U.S. trade policy history—including in automotive goods and semiconductors in the 1980s and 1990s and solar panels today. Similar problems are not guaranteed to unfold in other industries in the future, but we should not be surprised if they do.

Second, subsidy races and trade conflicts can significantly harm developing countries that lack wealthy governments’ resources and typically depend on manufacturing and exports to move up the development ladder. The most common example of such harms is in agriculture, where subsidized and protected products from the United States, Europe, China, and other jurisdictions displace poor local farmers’ products in both domestic and export markets. As the World Bank recently noted in cautioning against the use of trade-distorting subsidies, the same problems exist for manufacturing: Poor countries are less integrated into global supply chains, in part because “subsidized exports of industrial goods, including parts and components, prevent developing countries from entering manufacturing value chains,” and “this may especially be the case as they lack the resources to counter the effects of other countries’ subsidies.” The authors further warn that this displacement “can limit the growth potential that trade offers low- and middle-income countries, as participation in manufacturing value chains is typically associated

⁷⁴ Tim McDonnell, “[Tariffs Won’t Save the US Battery Industry from China](#),” *Semafor*, May 31, 2024; Christian Davies and Song Jung-a, “[South Korean EV Battery Makers Lay Off Workers and Scale Back Investments in US](#),” *Financial Times*, November 22, 2023; Richard Waters, “[US Chipmakers Reel from Sharp Boom to Bust](#),” *Financial Times*, November 13, 2022; Colin McKerracher, “[China Already Makes as Many Batteries as the Entire World Wants](#),” *Bloomberg*, April 12, 2024; Harry Dempsey and Edward White, “[China’s Battery Plant Rush Raises Fears of Global Squeeze](#),” *Financial Times*, September 4, 2023; Rhiannon Hoyle and Julie Steinberg, “[The Boom in Battery Metals for EVs Is Turning to Bust](#),” *Wall Street Journal*, February 19, 2024; Scott Lincicome, “[Countervailing Calamity: How to Stop the Global Subsidies Race](#),” Cato Institute Policy Analysis no. 710, October 9, 2012. <https://www.cato.org/policy-analysis/countervailing-calamity-how-stop-global-subsidies-race>; and Scott Lincicome and Huan Zhu, “[Questioning Industrial Policy: Why Government Manufacturing Plans Are Ineffective and Unnecessary](#),” Cato Institute White Paper, September 28, 2021.

⁷⁵ David Feldman et al., “[Winter 2024 Solar Industry Update](#),” NREL, January 25, 2024.

⁷⁶ Scott Lincicome, “[On Biden’s New China Tariffs, History Provides Good Reasons for Almost Everyone to Worry](#),” Cato Institute, May 22, 2024.

with higher investment and technological spillovers.”⁷⁷ Other organizations, such as the IMF and World Trade Organization, have expressed similar concerns about the effects of today’s global subsidy race on the developing world.⁷⁸

Conclusion

Industrial policy in the United States has long been hampered by economic, political, and practical challenges that limit its effectiveness, and it has repeatedly created unintended problems that harm the U.S. and global economies while fomenting government dysfunction along the way.⁷⁹ While it is too soon to conclude that our latest round of industrial policy is following a similar path, the initial returns—both here and abroad—raise serious concerns and should, at the very least, caution against declaring victory based on a few positive stories and datapoints.

Plenty of warning signs indicate that history is indeed repeating again.

This does not mean that Congress should sit back and watch things unfold, simply hoping for the best. As I and others have written, including years before the CHIPS and Science Act and IRA became law, there are many market-oriented reforms that Congress should pursue to boost U.S. manufacturing and minimize problems associated with industrial policies. This includes eliminating tariffs and other restrictions on imports of key industrial and construction inputs; using international agreements to help U.S. companies access other markets and to expand our industrial base to include close allies; improving the tax treatment of capital investments; reforming NEPA and other burdensome regulations; increasing legal immigration; injecting competition in K-12 and higher education; and enacting other market-based reforms. Global overcapacity, moreover, is best addressed through multilateral dispute settlement, instead of self-defeating, tit-for-tat protectionism.⁸⁰

In short, there is a long list of time-tested policies that Congress and the administration can pursue to boost strategic industries in the United States and address some of the most pressing challenges facing our country today. Tariffs and subsidies, however, are not on that list.

⁷⁷ “[Unfair Advantage: Distortive Subsidies and Their Effects on Global Trade](#),” World Bank Group, 2023.

⁷⁸ Joe Lo, “[IMF Warns against ‘Protectionism’ in Rich World’s Green Subsidies](#),” *Climate Home News*, March 1, 2023; and Anabel González, “[Five Reasons to Fear a Global Subsidy Race and What to Do about It](#),” *Trade Thoughts, from Geneva* (blog), World Trade Organization, June 27, 2023.

⁷⁹ Scott Lincicome and Huan Zhu, “[Questioning Industrial Policy: Why Government Manufacturing Plans Are Ineffective and Unnecessary](#),” Cato Institute White Paper, September 28, 2021.

⁸⁰ Scott Lincicome, “[What Should America Do about Chinese Overcapacity?](#),” Cato Institute, March 20, 2024.