

**MADE IN AMERICA: THE BOOM IN U.S.
MANUFACTURING INVESTMENT**

HEARING
BEFORE THE
JOINT ECONOMIC COMMITTEE
OF THE
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ONE HUNDRED EIGHTEENTH CONGRESS
SECOND SESSION

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MADE IN AMERICA: THE BOOM IN U.S. MANUFACTURING INVESTMENT

WEDNESDAY, JUNE 12, 2024

UNITED STATES CONGRESS,
JOINT ECONOMIC COMMITTEE,
Washington, DC.

The hearing was convened, pursuant to notice, at 2:58 p.m., before the Joint Economic Committee Chairman, Martin Heinrich in Room G-50 Dirksen Senate Office Building.

Present: Senators Heinrich, Hassan, Welch.

Representatives: Schweikert, Smucker.

Staff Present: Hannah Ceja, Sebi Devlin-Foltz, Kobe Barthdemy, Douglas Simons, Ron Donado, Matthew Cernicky, Alexander Schunk, Colleen Healy, Jeremy Johnson, Jessica Martinez.

Chairman Heinrich. This hearing will come to order. I'd like to welcome everyone to today's Joint Economic Committee hearing titled, "Made in America: The Boom in U.S. Manufacturing Investment."

Today's hearing will begin with five-minute opening statements from myself and Vice Chairman Schweikert, and each of our four witnesses, and then we'll proceed to questions, alternating between parties in the order of member arrival.

I'm just going to remind members to keep their questions to no more than five minutes, but I think you and I can handle that.

Vice Chairman Schweikert. You just remind me.

Chairman Heinrich. Now, on to opening statements. Over the past few years, we have seen a truly remarkable comeback story for American manufacturing, impacting communities both in my home state of New Mexico, but across the country. The economy has added hundreds of thousands of new jobs in manufacturing and construction, as private investment has flowed into the clean energy sector, semiconductor production and advanced technology manufacturing through the U.S.

This was not an accident. We fought hard to bring real solutions to the table and move forward with the Inflation Reduction Act, the Bipartisan Infrastructure Law and the CHIPS and Science Act. These policies have driven the comeback story that we are seeing, and this graph shows how factory investment surged after the passage of those laws, a trend that we hadn't seen under any prior administration's policies.

With these historic bills, we've spurred a manufacturing renaissance across America, and not only is this benefitting our economy, but it will also bolster our national security and protect our chil-

dren and grandchildren from the impacts of climate change for years to come.

The buildout of these key industries will pay dividends by creating middle class jobs that people can build a family around in their home communities. They will create thousands of careers in New Mexico and across the U.S. in the skilled trades and in advanced manufacturing, and it is critical in this moment that we work with unions, with industry, with training centers and local leaders to make sure that implementation of these policies is done right.

To ensure our workforce can capitalize on these opportunities, we need to focus on training and upskilling. Apprenticeships and vocational training, as well as partnerships with community colleges and universities will give more Americans the chance to meet rising demand for these careers, that will help move our communities, our country and our economy forward.

That is why our legislation made sure to invest in these efforts, and in companies that commit to building up America's workforce. Array Technologies is a perfect example of a company that is leading the way by expanding its manufacturing facilities here in the U.S. I was happy to be at Array's ground-breaking ceremony in April of this year with Secretary of Energy Granholm, and am glad that their CEO could join us here today.

For decades now, Array has been a world leader in manufacturing solar trackers, the hardware that rotates solar panels towards the sun throughout the day. This year, Array is investing more than \$50 million to construct a new 216,000 square foot campus in Albuquerque, New Mexico, that will support 300 new jobs in the near-term.

And they are expanding largely because of the production tax credits that we worked so hard to include in the Inflation Reduction Act. Just as they did for Array, these incentives sent a powerful signal to companies that we are ready to build big things in this country once again.

In the last few years, we have seen hundreds of manufacturing announcements representing billions of dollars in private investment, and along with the Inflation Reduction Act, we are seeing booming private investment in semiconductor manufacturing from the CHIPS and Science Act. This law is already boosting employment and wages in New Mexico, with Intel announcing a \$3.5 billion investment in its Rio Rancho campus and fab.

This facility is expected to create at least 700 permanent manufacturing jobs, but thousands of construction jobs in the meantime, and we are not stopping there. Just yesterday, the Department of Commerce announced new CHIPS Act funding for Solaro, a home-grown New Mexico company that can now expand production and hire 100 new manufacturing workers.

With support from these policies, companies are opening new factories in American communities, to build everything from semiconductors to wind turbines and heat pumps, to solar panels and energy storage. That's what good policy does.

But I want to make sure that it is clear that due to these policies, business is not only growing in urban centers. We are driving investment in rural America. I have seen this firsthand back in

New Mexico, where Arcosa recently opened a new wind tower manufacturing facility in Belen in Valencia County.

Back in April, I got to meet the workers there and see the first wind towers coming off the line at that facility, and this is just one example of how these laws that we have passed here invest in the economy of the future. These bills are also driving investment in rural energy and infrastructure that can reduce operating costs, lay the groundwork for future economic growth.

With this approach, we are making sure that the benefits of this manufacturing boom reach the entire country. I am looking forward to hearing from our witnesses on how these federal investments have guided business and manufacturing decisions in the U.S., and how we can continue to support this expansion and make its benefits as—and make sure it benefits as many Americans as possible.

With that, now I will turn to our Vice Chairman, Chairman Schweikert.

[The prepared statement of Chairman Heinrich appears in the Submissions for the Record.]

Vice Chairman Schweikert. Thank you, Chairman Heinrich, and would you believe that I see parts of this differently. Being a big fan of something that is often referred to as allocation theory, when it is done through a government grant, will that government always be granting to the latest, best, fastest, most nimble, most cutting edge, most disruptive technology, or do we often fund incumbency.

I think that the record shows that much of the capital expenditure, which every dime has been borrowed. Once again, this cash flow that is going out, every dime is borrowed money. So, you actually have to now think of the rate of return. We are paying interest on that.

We also have a chart, and we are happy to put it into the record without objection, that also will demonstrate that manufacturing and employment functionally are the same as it was in 2022, once again demonstrating that yes, you may get spikes in trade as a plant is being built, but are we back into the cycle once again of a planned economy industrial policy, where we actually—a fraction of that money could have gone into the research and development of the next generation that disrupts and makes America truly leap ahead of the rest of the world.

Instead, this policy has set off a cascade of subsidized chip manufacturing. You see China now organizing what was the last fund, \$30 billion, and the EU is now setting aside a massive subsidy to have theirs. We have actually now created a race to the bottom.

At the very same time, we are doing tax policy, saying we need a global minimum, but over here we have functionally financed something that is dramatically more expensive in the global race to the bottom, a subsidy policy. Its math, you cannot avoid the reality.

The other thing I will also give is the basic belief of if you are going to have industrial policy, the concept of having government handing out grants and the political danger that comes around when I must go knock on the door of the administration or the politicians to get my cash, the distorting effects that has on society, on

competitive markets, and the allocation theory comes back into play.

If we are going to borrow money from your retirement and my kids' future, are we actually getting the long-run economic growth, or as so often as is quoted around here, are we just seeing the sugar high for a short time without long-term extended growth and sustainable employment? And with that, I yield back.

Chairman Heinrich. Now I would like to introduce our distinguished witnesses today. Mr. Kevin Hostetler is the Chief Executive Officer of Array Technologies, a global company specializing in utility-scale solar trackers and renewable energy, headquartered in Albuquerque, New Mexico.

Array has been a leader in the solar industry for over three decades, and has helped build out the U.S. supply chain for solar components. Prior to joining array, Mr. Hostetler served as CEO at Rotork, where he led the company's growth acceleration program, and as CEO of FDH Infrastructure Services, an engineering consulting company, focused on critical infrastructure like bridges, dams and transmission towers.

Mr. Skanda Amarnath is the Executive Director at Employ America, a research and advocacy organization committed to the macroeconomic policies that can sustain full employment outcomes. Employ America has written at length about the interconnections between manufacturing investment, productivity growth and employment gains for workers, among other pressing economic policy topics.

Now, prior to joining Employ America in April of 2019 as research director, Mr. Amarnath worked as a market economist and strategist, and as an analyst at the Federal Reserve Bank of New York.

Dr. Adam Michel is the Director of Tax Policy Studies at the Cato Institute, where he focuses on analyzing the economic and budgetary effects of taxation in the United States. Prior to joining Cato, Dr. Michel served as the deputy director at the Joint Economic Committee under Senator Mike Lee.

Mr. Scott Lincicome is the Vice President of General Economics at Cato's Herbert A. Stiefel Center for Trade Policy Studies. Mr. Lincicome is also a senior visiting lecturer at Duke University Law School, where he has taught a course on international trade policy and previously taught international trade policy.

Mr. Hostetler, let us begin with your testimony, and then we will just continue in the order of the introductions.

STATEMENT OF KEVIN HOSTETLER, CHIEF EXECUTIVE OFFICER, ARRAY TECHNOLOGIES, ALBUQUERQUE, NEW MEXICO

Mr. Hostetler. Thank you, Mr. Chairman, Mr. Vice Chairman and all members of this Committee. It is an honor to be here today. My name is Kevin Hostetler, and I am the CEO of Array Technologies. Our U.S. footprint includes Albuquerque, New Mexico, where we have our manufacturing facility, and our research and development hub in Chandler, Arizona.

Array is a leading American manufacturer and global provider of tracker solutions for utility-scale solar energy projects. Our solar trackers are an integral part of solar farms, rotating panels to fol-

low the sun, which increases energy production by up to 25 percent.

Founded in 1989 in Albuquerque as one of the first U.S. solar manufacturers, Array is a true American manufacturing success story. We are proud to be an American company, sourcing low carbon domestic steel, supporting local jobs and using a traceable U.S. supply chain with trusted partners.

I am grateful to be leading Array during this nation's manufacturing renaissance. In April, Array broke ground on a new manufacturing campus in Albuquerque, where we will make our clamps, center structures, drive system components and electrical controllers. The IRA and 45(x) credits are helping us to onshore critical components and realize this 50 plus million dollar expansion.

To start, our new facility will employ more than 300 local residents in the near term. This growth will enable us to further develop more onshore capacity and make more solar technology here at home. Over the next decade, we anticipate significant growth in industry employment, with solar manufacturing jobs expected to more than triple.

In the meantime, we need to create a skilled, renewable energy workforce. That is why we partner with schools like Central New Mexico Community College. In 2022, we donated a 1.3 megawatt solar site that generates power for the campus and serves as a training facility for Array to provide hands-on learning to students.

Collaborations like these are building a pipeline of talent, ensuring that students and job-seekers have the necessary skills and knowledge to thrive as the industry creates jobs. The IRA and other federal investments have helped grow our domestic production. As an example, the 45(x) tax credits are allowing us to onshore plant manufacturing, where we were importing and this will double our manufacturing capacity in Albuquerque.

We have also invested in new capital equipment to support the current and future growth of our facility. Since the passage of the IRA, there has been a notable uptick in announcements from new solar manufacturing facilities across the supply chain, driven by the law's provisions and the anticipated rise in solar demand.

This has caused a ripple effect, as our business growth has also spurred growth for our partners. Copper State Bolts and Nuts Company has added an additional 30,000 square feet in their Good-year, Arizona facility to support their solar business. Our partner Priefert Steel in Mount Pleasant, Texas has invested \$25 million in solar in the last 24 months, employing over 200 people.

Lock Joint Tube in Temple, Texas invested \$16 million in a dedicated tube line to support solar tracker manufacturing. And finally our partner Nucor is investing \$70 million in capital for a new steel plant in Kentucky to support the growth in solar demand.

The IRA has set the stage for long-term growth and stability for our business and the U.S. solar industry. The law is expected to facilitate nearly triple the current solar capacity by 2028, fostering a strong, sustainable future for renewable energy in America.

Array's presence in New Mexico not only boosts the local economy, but also positions the region as a hub for renewable energy innovation and manufacturing. We are proud to work with company like Enchanted Machine Works, Knockout Metal Works and

Precision Sharpening. This growth contributes to a more resilient and diverse economic landscape benefiting the broader community and promoting long-term prosperity.

The IRA has spurred a true manufacturing resurgence and Array is just one example of how this legislation is paying dividends. With policies that supercharge solar manufacturing and create new jobs, together we are paving the way for a brighter, more sustainable future. Thank you for the time and I look forward to answering your questions.

[The prepared statement of Mr. Hostetler appears in the Submissions for the Record.]

Chairman Heinrich. Mr. Amarnath.

**STATEMENT OF SKANDA AMARNATH, EXECUTIVE DIRECTOR,
EMPLOY AMERICA, WASHINGTON, D.C.**

Mr. Amarnath. Chairman Heinrich, Vice Chairman Schweikert, thank you for the invitation to testify today. My name is Skanda Amarnath. I am the Executive Director of Employ America, a non-partisan macroeconomic policy research organization.

Before discussing what the available macroeconomic data tells us about the nature of manufacturing investment and public policy, I would like to first lay out some reasons why manufacturing and industrial investment may be of unique relevance.

Economic development and manufacturing advancement have long been tied together. No major advanced economy has sidestepped the industrialization process on its path to becoming wealthy. If you compare what each country exports, it becomes clear which countries are richer and which countries are poorer.

Richer countries tend to produce a broader diversity and a higher complexity of traded products. That is because richer societies have accumulated superior know-how for producing highly complex leading-edge products, and can do so across a broader range of goods.

The reasons to encourage investment in manufacturing are thus twofold: ensuring that workers and enterprises in the U.S. capture the knowledge spillovers associated with producing technologically advanced goods, and encouraging broader industrial diversification at the national, state and local levels.

A more diversified economy also goes hand in hand with a wider range of opportunities for workers and businesses. But where other sectors have thrived over the past few decades, manufacturing has seen a general decline. Some reasons for the decline were inevitable, but it is worth noting that this trend also grew more visible in high-tech, advanced manufacturing sectors.

With this mind, the surge in construction of manufacturing facilities is worth studying. The level of spending that the private sector has engaged in to construct manufacturing facilities has increased from approximately \$80 billion in 2019 to around \$220 billion today.

Even after adjusting for specific cost increases, the level of real investment has more than doubled since 2019. While public policy is surely supporting much of this increase, it is worth clarifying that these expenditures are directly deployed by private firms, not by governmental actors.

Not all manufacturing subsectors have seen a surge in investment, but the ones most closely adjacent to recently enacted legislation have. The manufacturing supersector encompassing computer and electronic products, and electrical equipment, appliances and components have seen a tenfold increase in real manufacturing structures investment since 2019.

This supersector includes not only the primary subject matter of CHIPS, but also photovoltaic cells for solar panels, batteries for motor vehicles and transformers for the utility sector, all potentially facilitated by CHIPS and IRA.

The timing of the surge in investment in manufacturing construction is the most compelling evidence that CHIPS and IRA are having a sizeable impact on the willingness of manufacturers to build out and improve their facilities. The effects of policy enactment are especially clear cut across census regions in the Midwest and Sun Belt, where manufacturing investments surged noticeably following the enactment of legislation.

To fully evaluate the success of policy, it will require translating capacity gains, which recent construction spending should represent, into gains in manufacturing output and productivity. But importantly, it is still far too soon to expect relevant manufacturing facilities to reach productive maturity and achieve the anticipated level of output.

It will take time to fully build out capacity, and more time still to reach productive maturity. The relevant manufacturing investments, given their capital intensity, are also unlikely to share their full labor market impact through factory floor jobs alone. Instead, what we see is how manufacturing investments can drive growth in construction-related or product research and development jobs.

While targeted sectors are likely to see further gains in employment only as production scales up, the bigger gains in employment are materializing right now for electricians, engineers, architects, lab testers and a range of other fields I describe in more depth in my written testimony.

As we look to the future, it is important to remember that leading edge manufacturing production, whether tied to semiconductors or the vast array of new energy technologies, often requires available and affordable financing, a proximate supply chain and industrial base, and a skilled workforce.

These necessary conditions for investment often depend on the presence of industry in the first place, thereby giving rise to what might be understood as a chicken or the egg dilemma. It often takes a critical mass of policy support to ensure investment decisions can overcome hurdle rates that otherwise would deter the sorts of investments that we are seeing right now.

We have had decades of declining interest rates and falling cost of capital, but only in recent years has a flurry of investment in capital intensive manufacturing sectors emerged. This flurry has even defied the Fed's recent campaign to tighten financial conditions thus far.

But even with this progress, old and new constraints, whether they stem from financial constraints, regulatory burdens or something entirely different, are likely to bind. In ensuring that enacted legislation yields maximum benefit for the public, my hope is that

lawmakers and policymakers stay attentive, open-minded and pragmatic.

[The prepared statement of Mr. Amarnath appears in the Submissions for the Record.]

Chairman Heinrich. Dr. Michel.

**STATEMENT OF DR. ADAM MICHEL, DIRECTOR OF TAX
POLICY, THE CATO INSTITUTE, WASHINGTON, D.C.**

Dr. Michel. Chairman Heinrich, Vice Chairman Schweikert and members of the Committee, thank you for inviting me to testify today. It is a particular honor to participate in a hearing for a Committee I once worked for, and which I have many fond memories.

To understand the state of our current economy, it is important to begin with the tax reforms passed in 2017. By cutting the corporate tax rate and allowing full deductions for new investments, called “full expensing,” the Tax Cuts and Jobs Act empowered businesses to expand their U.S. operations.

These changes were particularly helpful for investment-intensive sectors like manufacturing. The tax cuts led to faster growth and higher wages. Today, those same tax cuts continue to support a strong labor market, additional investment and a larger economy. Instead of building on these successes of the tax cuts by making 2017 reforms permanent, Congress has more recently done the opposite.

Instead of letting individual Americans, investors, consumers, entrepreneurs determine the quantity, quality and location of new projects, Congress and the President have repeatedly inserted themselves into the private economic decision-making, allocating scarce resources according to their own design and for Washington’s benefit.

These types of centrally planned industrial policies have a multi-decade track record of spectacular failures. Such policies inevitably require more than just incentives. For example, generous subsidies support electric vehicles and their infrastructure. But the billions of dollars of support is not enough.

The subsidies come with heavy-handed regulations that all but ban the competitors, and the administration now tells us that tariffs are also necessary to protect the industry from foreign competition. Market manipulation on one margin always leads a cascade of new state interventions that are not just windfall profits of corporate industry, but costs to American consumers.

Industrial policy also breeds corruption and fraud. Past tax credits have resulted in schemes designed to drain the U.S. Treasury of hundreds of billions of dollars. These fiscal costs—fiscal resources lost to the programs also represent multi-trillion dollar opportunity costs, such as foregone opportunities to make more effective tax cuts permanent.

For example, Congress chose to spend trillions of dollars on dubious energy subsidies in the Inflation Reduction Act, instead of pursuing broad-based policies like making expensing for research spending permanent, a policy that would have benefited millions of businesses and their employees all across America. As a result of

Congress's failure, business R&D plummeted when expensing expired.

I will end with the most worrying trend. The Biden administration is actively exporting these industrial policies around the world, and they are doing this over the explicit objections of Congress. Working through the Organization for Economic Cooperation and Development, the administration has designed the building blocks for an international tax cartel that targets America's most successful employers with higher taxes in more than 100 new countries.

The minimum tax they have designed not only raises tax rates, but explicitly encourages competition with state subsidies. Paired with domestic U.S. corporate subsidies, the OECD minimum tax has prompted new industrial policies in countries around the world, including the European Union, South Korea, Japan, Israel, Germany, Vietnam, Bermuda, Singapore, Ireland, Taiwan, India and China, just to name a few.

These offsetting subsidies trade no new productive economic activity. They simply pad the profits of big, politically connected firms. Congress might as well have lit a trillion dollars of taxpayer money on fire. At least a bonfire would not have fueled multiple years of high inflation.

Which leads me to my concluding recommendations. Congress should reject the Biden administration-led OECD tax cartel by cutting its funding and withdrawing from the OECD membership. Congress should also reject industrial policies here at home by repealing the more than \$3 trillion of tax subsidies, including those in the CHIPS Act and the Inflation Reduction Act.

Pursuing neutral, pro-growth tax policies that support American employers—that support American employers by keeping taxes low for everyone will provide the biggest benefits to workers, to manufacturers, to service providers and to families across the country. Thank you. I look forward to your questions.

[The prepared statement of Dr. Michel appears in the Submissions for the Record.]

Chairman Heinrich. Mr. Lincicome.

STATEMENT OF SCOTT LINCICOME, VICE PRESIDENT OF GENERAL ECONOMICS AND STIEFEL TRADE POLICY CENTER, CATO INSTITUTE, WASHINGTON, D.C.

Mr. Lincicome. Chairman Heinrich, Vice Chairman Schweikert, members of the Committee, thank you for having me here today. Industrial policy is indeed back in Washington, and supporters are already taking credit for an American manufacturing boom.

Today, I will offer two notes of caution detailed in my written testimony. First, the recent increase in U.S. manufacturing investment must be put into context. Before the CHIPS Act and IRA were enacted, market factors had pushed companies to reconsider semiconductor supply chains. Private demand for and investment in green energy was soaring, and several major U.S. projects had been announced.

It is thus unclear how much manufacturing spending today has been caused by instead of just coincident with new U.S. industrial policies. Furthermore, increases in industrial spending is still a relatively small share of total output and investment. That spending

might still be important some day, but it is not currently an economic game-changer.

Indeed, actual U.S. manufacturing performance has been flat since 2022. Private surveys have been pessimistic, and 2024 projections are now softening. Maybe a boom eventually arrives, but it is just as likely we are again seeing what critics of targeted tax credits, subsidies, tariffs and other industrial policy measures have long cautioned, that they do not generate sustainable long-term growth, but instead just redistribute existing resources to favored companies at a net loss to the U.S. economy.

Second, we must also consider the actual return on all these investments. When the government showers preferred industries with trade restrictions and trillions of taxpayer dollars, the policies will inevitably produce something in the real economy.

The real question is what exactly all that government support is getting us. Is it generating dozens of innovative and globally competitive American factories and a strong U.S. economy, or will it produce a few more successes and many other failures?

Not just unfinished projects, but entire industries dependent on government support, plus unintended and unseen costs elsewhere in the economy. Today, it is too early to say, but there are already warning signs here and abroad, ones we have seen before. Here at home, the cost of building, staffing and starting production of subsidized facilities has skyrocketed, thanks in large part to supply side barriers like the National Environmental Policy Act, tariffs and Buy American restrictions.

High costs and other unforeseen issues have now delayed or cancelled many semiconductor, EV and solar projects, even some where construction had already begun. And there are already worrying signs that factories eventually completed here will not produce cutting edge technologies that compete globally without open-ended government help.

Solar panels, for example, still cost more to make here than abroad, even with all the subsidies and tariffs. The industry's solution: even more tariffs. Finally, politics is again distorting industrial policy's implementation, social policy a tap to CHIPS Act subsidies, IRA dollars funneled to swing states, slow and complicated bureaucracy, election-related investment uncertainty and of course a lobbying boom there on K Street.

These and other issues remind us that there is a huge chasm between celebrated investment announcements and actual productive factories. They also show that the risk of today's industrial policies is that they produce small and discrete benefits at a massive cost, including not just a budgetary hit but by diverting finite taxpayer and private resources away from better targets.

There are also concerns abroad, because subsidies here have prodded the EU, Japan and South Korea, Taiwan and India, China and others to offer subsidies of their own. Thousands of new industrial policy measures in the last year alone likely worth trillions of dollars.

If history is any guide, this uncoordinated and predictable global subsidies race could generate gluts and trade wars that would undermine the very domestic investments our industrial policies are trying to encourage. In the end, almost everyone would be worse

off, especially developing countries that can afford big subsidies and, in the case of green goods, the environment.

In closing, American industrial policy has long faced challenges that limit its effectiveness and inflict unintended economic and geopolitical damage. It is too soon to conclude that we are following the same path today, but signs do point in that direction.

Now this does not mean that Congress should just sit back and watch things unfold, simply hoping our trillion dollar gamble pays off.

As I and Adam and others have written, there is a long list of proven tax, trade, regulatory, immigration and other reforms that Washington can and should pursue to boost strategic industries, and address strategic challenges. But subsidies and protectionism still are not on that list. Thank you, and I look forward to your questions.

[The prepared statement of Mr. Lincicome appears in the Submissions for the Record.]

Chairman Heinrich. Thank you. Mr. Hostetler, I want to ask you a question. I was really pleased to visit Array in April with Secretary Granholm, to break ground on your new manufacturing facility. But one of the things that really struck me was the stories that individual folks who work for Array were telling about their jobs and their impact on their families.

Can you talk a little bit about the kind of benefits the working family can access through a career in advanced manufacturing, and what that means for the wider community?

Mr. Hostetler. Absolutely, Mr. Chairman. As you were able to witness at our groundbreaking in April, the stories of our employees coming into this industry and those that have been in for some time, are enjoying very strong wages, great benefits and great additional education opportunities through our local—resources with our local community colleges.

They are able to build a solid foundation for their family, and again contribute a great deal to the local economy.

Chairman Heinrich. You know, one of the challenges we have in New Mexico right now is that there are so many simultaneous construction projects going on between the transmission that's being built, the manufacturing that's being stood up. Workforce is a real challenge. Can you talk about, a little bit about the relationship between the Inflation Reduction Act and your efforts to invest in local workforce to build that capacity?

Mr. Hostetler. Absolutely. As I said in my prepared remarks, Mr. Chairman, we have been working with the local community college. We have provided them some additional systems to which they could train employees early on in how to build, install, maintain and control solar systems.

We are also employing local engineers, local maintenance, a very wide degree of different employees in customer service, and all of that is geared at once again providing a very stable, very strong foundation for their lives in the community.

Chairman Heinrich. Mr. Amarnath, talk a little bit—expand on how this focus on energy tech, on semiconductor production and infrastructure, how do those relate to the overall groundwork for

U.S. job growth, and what does that mean for the future of the American middle class?

Mr. Amarnath. Sure. So I would start with the—obviously the gains have come through construction investment so far, and so especially if you look at the labor market data, while manufacturing employment has recovered from the Covid Recession and in spite of pretty stable overall, the real gains have probably been more visible in other sectors, especially in terms of first as I said, the trades construction. But also if we look to the repair and maintenance and into particular sectors of especially engineering services and engineering and drafting and lab testing and there are at least a few key sectors, again where manufacturing and services actually go hand in hand, where there is a tendency to say “manufacturing” and just focus on particularly that subsector. But I would actually encourage people to think a little bit more holistically about how manufacturing and services are pretty complimentary in these contexts.

And especially when you think about where the good jobs are, right, those are jobs that are typically attached to when you are higher in the value chain, right, where you actually are at the leading edge. And that is, to my mind, the merits of focusing on semiconductor manufacturing, on particularly newer energy tech, and these are jobs that would be good jobs on the factory floor but also elsewhere.

That is typically also good for—in terms of commercial opportunity for American businesses as well.

Chairman Heinrich. Yeah. Many of the people in the skilled trades that I talked to would point out that, you know, when you are building these things, they are inherently temporary jobs. But those are the good jobs that support their middle class families. They are temporary. When they are standing up an Intel factory and then they move on to building transmission, and then they move on building their research facility at our national labs, we think of those as temporary.

But they are really permanent jobs for those individuals. I want to ask you as well, you know, we have seen some of the supply chain that we hemorrhaged for decades, particularly to China but more broadly to Southeast Asia for things like—for solar panels, for modules, for electric motor components, for battery storage.

Some of that supply chain is beginning to move back onto U.S. shores. How important is that, and how critical is the structure of a production tax credit to have incentivized that reshoring of critical supply chains?

Mr. Amarnath. It definitely seems like this flurry of manufacturing investment that we have seen is pretty concentrated in terms of the timing of it, and so while I—it is very possible there are layers of policy supports that have been helpful, it definitely was unleashed all at once I would say, in terms of it being over a very concentrated time period.

And that suggests that it does require a critical mass to get over these hurdles, and these things are—you have to get to actually—while I think there are actually a lot of merits to what some of another testimony—people have testified as far as having broad-based policies that are supportive of all industries, there is also a certain

quantum of investment that is needed in a lot of cases, especially where you get into capital-intensive sectors.

And so these are things that have clearly been helpful as far as seeing the surge, especially in 2022 and 2023. Again, this is the first phase of manufacturing investment in terms of structures. We obviously want to see it shore up in equipment and production later on, and these are obviously open questions that need to be tackled in real time.

But there is clearly something that is valuable about having on-shore supply chains that we have probably learned over the last few years in certain contexts, where we have had a knockout of auto production for two years.

There is definitely certain things that can build in more resilience, and then there are things that are especially valuable in terms of leading edge technologies, where again, I think there is a lot of national security and economic security relevance to just being at the leading edge there.

And then I would say at least in the context of call it better batteries and semiconductors, there has been evidence that the U.S. has fallen behind.

Chairman Heinrich. Vice Chairman.

Vice Chairman Schweikert. Thank you, Mr. Chairman. Doctor, first off a couple of things from your testimony, your written testimony, and I am chasing a couple of things.

So in my opening statement, I tried to touch on, shall we say, allocation cost of—because I remember the rage from our brothers and sisters on the left when we did tax reform, being a trillion and a half dollars which, as you know, Joint Tax missed the number by \$900 billion, actually, on top of receipts that came in.

But this is direct subsidies that is over two trillion, and the distortion factors of allocation. So my couple of questions are when we look at the distortion of a planned economy industrial policy, which the left embraced, wages, wage growth, the cost to society of the inflation it helped fuel, is society functioning poorer today?

Will I see that the couple of trillion dollars of planned economy spending in workers' wages? Will the wages long-run be healthier and stronger, or did we actually create a—functionally a short-term sugar high in a limited number of politically connected organizations?

Dr. Michel. Thank you for the question. It is, I think, the second one. The chart that you—that you are holding up there shows the cost of the direct subsidies compared to making policies that were expiring at the same time, mainly business expensing for research and spending in physical investments like manufacturing facilities.

Those policies were expiring and so—and the cost, the \$2 trillion cost of the direct subsidies, is significantly larger than setting neutral policy that gets out of the way of investment for all businesses, rather than targeted businesses that receive specific checks from Washington.

And so that is why we should first get the government out of the way of investment before the government starts getting in the business of picking who is investing and where.

Vice Chairman Schweikert. This borrowing and spending and its contribution to inflation. Ultimately, is society poorer?

Dr. Michel. Yes, undoubtedly. When the government is taxing the money out of the economy to then redistribute, or borrowing—or borrowing, all of these things make us poor. There is deadweight loss on the tax side, there is inefficiencies on the spending side. Inflation is making people poorer—

Vice Chairman Schweikert. So for those of us in the Phoenix-Scottsdale area, unless you make 26 percent more today than when this all began, you are poorer. Mr. Lincicome—Lincicome. Look, you actually have a great chart in here, because you remember part of this hearing was titled, you know, the manufacturing boom.

But if you actually look at the dot plot and say hey, here is where, you know, the industrial policy, the spending began, and the number of, you know, plants that were happening under existing Tax Code and considering if you actually put in the hiccup, as we will call it, during COVID-19, how do you call this a boom?

It might be a tighter concentration, but the fact of the matter is under an allocation theory of tax policy, we were actually doing quite well and it was a wider distribution.

Mr. Lincicome. Right, thank you. If you look at, you know, the headlines around that time, whether it is in 2019, 2020, 2021, you saw there was a lot of interest for various market-related reasons, the pandemic, pure politics and the rest. There was interest in changing supply chains, changing sourcing, onshoring certain production of defense-related technologies or other critical industries.

And you know, I think it is undeniably true we are going to see some sort of sugar high, some sort of investment and because of all of these subsidies. I mean again, we are talking trillions of dollars potentially in government and taxpayer money going to favored industries.

But the question is not only about whether that is inducing that sugar high, it is what we are actually getting.

Because in the previous, in the pre-IRA, pre-CHIPS era where we were seeing some of those announcements and some of those investments, those were not coming because somebody was dangling cash at a company, or they were not coming because there was some sort of tax credit expiring or whatever.

They were coming because the investors saw a legitimate long-term investment that they wanted to make. Those are the types of investments we want here in the United States.

Vice Chairman Schweikert. All right, and Doctor, I want you to confirm something I believe I understand. When we do it through sort of tax regulatory allocation theory, our policy, the vast majority of that goes to corporate America actually goes to workers' wages.

Dr. Michel. When we are—when the Tax Code is treating investment neutrally through something like expensing or a lower corporate tax rate, most of that is shared by workers through higher wages, the theory—the additional investment leads to higher productivity, which then leads to higher wages.

The opposite is not true. A tax credit does not have that same passthrough to higher wages. It primarily goes to pad the profits of the corporation doing—

Vice Chairman Schweikert. Which I have always found amazing irony in where the two parties are, and what we say about each

other. And yet we can demonstrate mathematically this policy over here is actually what helps workers, and with that, I yield back, Mr. Chairman.

Chairman Heinrich. Senator Welch.

Senator Welch. Thank you—I want to thank all our witnesses. It is interesting listening, because really there are two economic philosophies at work here. There is the industrial policy that obviously underlies a lot of the Acts that have been recently passed, and there is the very strong free market approach, with government not being involved at all.

I voted for those pieces of legislation and support them, and think the government does have a role. But I think that is really the debate as I listen to you. But I want to ask you, Mr. Hostetler, right?

Mr. Hostetler. That is correct, yes.

Senator Welch. You have to deal with—you have to deal with this guy in New Mexico?

Mr. Hostetler. I do.

Senator Welch. Well my—it is tough. It is tough.

You know, it is really interesting what you are saying, because the legislation, there is some funds available for you to help folks learn how to do solar installations and then move towards providing more clean energy; correct?

Mr. Hostetler. Yes.

Senator Welch. The CHIPS Act also provided some funds that got invested in Vermont at Global Foundries, and folks there see that as jobs. They do not see it as the government involved or not involved. I mean the bottom line for them is that it is going to give them a new lease on life in these advanced chips.

But tell me how it makes a difference for young people, whose job prospects in many of our rural communities are really pretty limited until they get an opportunity to do something that has a sustainable future?

Mr. Hostetler. Yes, absolutely. First, I mean I would like to think of this as here is a great example where you separate the theory from practice and the reality, right? So these specific provisions passed within the IRA has led to a definitive practice of onshoring, and that is bringing jobs back to the U.S. that were previously done in Southeast Asia.

That—as we discussed, that new factory will generate 50 additional jobs that we are again onshoring back from Southeast Asia into the U.S. This coupled with the fact that some of the provisions that were outlined in the IRA provides prevailing wages and apprenticeship programs for all construction projects, which not only ensures good-paying jobs and an opportunity to learn a new career in what will be a sustainable future for the U.S., that is in the renewable energy.

So we feel really strong about those specific provisions and what they are doing in terms of assuring good wages, and wages that will be able to be sustained over a long period of time.

Senator Welch. Thank you. And you know to be fair to the free market argument, as a result of some of these so-called industrial policies and really putting a limitation on imports with tariffs, American consumers are going to pay a little more, right?

But what I have seen is that if the whole goal is to just get the lowest price, then capital will go to the cheapest labor and pretty soon you have hollowed out communities like we had in Vermont, when we lost our machine tool industry. And coming from a rural state, I have seen that manufacturing is a critical part in these rural communities that have depended on agriculture, but had the benefit of manufacturing.

So I guess I will ask you, Mr. Amarnath. You see some benefit in these policies that are being disputed about their economic efficacy, with having as a goal trying to bring some of these manufacturing jobs back to our communities.

Mr. Amarnath. So I would say especially where it deals with—you are trying to rationalize particular policies for a particular industry, right, there is obviously places where it could be in excess, but it is also worth thinking about what types of capacities are being built up in the process, right?

In the case of machine tooling, for example, that is a pretty specialized industry and where there is also—also a lot of evidence of where competition is not exactly fair on a global scale, and where there needs to be some thought given to what capacities are we losing in the process.

These are people who obviously are working and they are earning a paycheck, but they also are developing a certain set of skills, a certain type of know-how. That is pretty valuable and very costly to lose.

Senator Welch. Thank you. I will—my time is up, and I did not have a chance to address you, but I want to acknowledge when you do have industrial policy, you do have tax policy, there is going to be winners and losers. And if you are on the side, as I was, to support the Inflation Reduction Act, it really does demand of those of us who supported those policies that there be a hard-headed, hard-nosed assessment of what has been the cost and what has been the benefit.

So your point in that respect I—I agree with. I will yield back and I guess Mr. Smucker you—

Chairman Heinrich. Go ahead.

Representative Smucker. Thank you, Senator Welch, and just a follow-up to some of the comments that Senator Welch just made, and I think—I think he aptly described, perfectly described the debate that we are having now, the debate that we will be having next year as we look extending certain provisions of our Tax Code and other changes that could be made.

How do we design the best system to achieve what I think are shared goals. We want all Americans to prosper. We want the economy to grow. We want to encourage innovation. We want to promote job growth and opportunity. So I think it is a very valuable discussion to have.

Mr. Hostetler, I understand or I hear the impact on your business, and I think your employees have benefited from that, you have benefited from that. But I worry about the broader impact on all Americans, and I think if you look at the—the what has happened after the IRA was passed, I think it is called the Inflation Resurgence Act it should be, because we saw inflation grow and

our folks on our side have learned that is exactly what would happen when you expand supply that much.

And while it is benefiting some people, I think on a much broader basis I have talked to people in my community who have not seen the benefits of some of the companies that have benefited, and they are hurting. It is—it is difficult for them sometimes to put food on the table, gas in their car.

Prices have gone up 20 percent at least, some items much, much more. Since we have implemented some of these industrial policy items, as Senator Welch was talking about. It is painful for people, and you could pare that back and I will get maybe Mr. Lincicome, I will ask you to respond to this.

But compare that back to the impact of the Tax Cuts and Jobs Act. Now that bill was not perfect, but it attempted to broaden the—you know, it attempted to implement good tax policy that provided a broad benefit, that grew the economy, that encouraged innovation. It is pretty difficult to look at that and say it did not work.

Middle income, real household income had increased by 5,000 per household. The economy was growing at a much faster clip than it had been before, which by the way helps to address, I think what is one of the biggest existential problems and that is the growing debt and the fiscal trajectory that we are on.

And so—and more people were employed, typically disadvantaged populations had the lowest employment rate ever, and one of the numbers I am most proud of is we had the lowest poverty rate ever in the history of the country after just several years of implementation of the Tax Cuts and Jobs Act.

So Mr. Lincicome, am I looking at this correctly? Would you want to—do you want to expand on what I said or react to what I said? It seems to me there are two very clear examples of policy, economic policy that was put in place. We have a pretty good record of the impact after a few years in each case. So am I—you want to respond to that?

Mr. Lincicome. Well, I mean I think you are directionally correct. I think the reality you have, and I think it is correct, that we all share the same objectives. We want good jobs, a strong labor market, a strong economy. The question is what is going to actually generate that in a sustainable way, while minimizing the distortions.

Not just the economic distortions, but the political distortions as well, that your free market approach not only avoid taxing certain jobs. So we tax solar panels that hurt solar installation jobs; we tax, you know, half of all imports are manufacturing inputs. So those are inputs used by American manufacturers, support American jobs.

You not only are taking from consumers and raising the costs and shrinking their budgets, but you also put Washington in charge of making decisions about what factory gets money and what factory does not, what place gets those dollars as well. And that over the long term creates enormous problems.

I think it also creates a risk for even more subsidies and protectionism in the future. We had solar panels in 2012 that have then—tariffs in 2012 that have just steamrolled, and now have an-

other solar panel tariff case now pending. The Intel CEO is now talking about the CHIPS ACT 2.0, just weeks after the first subsidies were implemented.

These things have a way of simply sticking around forever, if not being expanded, because the industries that we are supporting are not actually globally competitive.

Representative Smucker. I have more questions, but thank you Mr. Vice Chairman.

Vice Chairman Schweikert. Thank you, Congressman Smucker. And I apologize to the panel and everyone in the room, because there is—we would love to dive down into this. We have votes on in the House, so it is the tyranny of the calendar.

Please understand, I think actually there may be—I think even the Chairman may also have some other questions. Three days we have to sort of submit some additional questions to. I know I have a couple of allocation ones I want to send to the good doctor, and with that, the hearing is adjourned.

[Whereupon, at 3:53 p.m., the hearing was adjourned.]

Joint Economic Committee
Opening Remarks for Hearing “Made in America: The Boom in U.S. Manufacturing Investment”
June 12, 2024

This hearing will come to order.

I would like to welcome everyone to today’s Joint Economic Committee hearing, titled “Made in America: The Boom in U.S. Manufacturing Investment.”

Today’s hearing will begin with five-minute opening statements from myself, Vice Chairman Schweikert, and each of our four witnesses.

We will then proceed to questions, alternating between parties in the order of Member arrival.

Members are reminded to please keep their questions to no more than five minutes.

Now, on to opening statements.

Over the past few years, we have seen a truly remarkable comeback story for American manufacturing, impacting communities both in New Mexico and across the country.

The economy has added hundreds of thousands of new jobs in manufacturing and construction as private investment has flowed into the clean energy sector, semiconductor production, and advanced technology manufacturing throughout the U.S.

This wasn’t an accident.

Democrats fought hard to bring real solutions to the table and move forward the Inflation Reduction Act, the Bipartisan Infrastructure Law, and the CHIPS and Science Act.

These policies have driven the comeback story we are seeing. And this graph shows how factory investment surged after the passage of those laws—a trend we hadn’t seen under the prior administration’s policies.

With these historic bills Democrats have spurred a manufacturing renaissance across America.

Not only is this benefitting our economy, but it will also bolster our national security and protect our children and grandchildren from the impacts of climate change for years to come.

The buildout of these key industries will pay dividends by creating middle class jobs that people can build a family around in their home communities.

They will create thousands of careers in New Mexico and across the U.S. in new trades and advanced manufacturing.

It is critical in this moment that we work with unions, industry, training centers, and local leaders to make sure implementation of these bills is done right.

To ensure our workforce can capitalize on these opportunities, we need to focus on training and upskilling.

Apprenticeships and vocational training, as well as partnerships with community colleges and universities, will give more Americans the chance to meet rising demand for these careers that will help move our communities, country, and economy forward.

That's why our legislation made sure to invest in these efforts, and in companies that commit to building up America's workforce.

Array Technologies is a perfect example of a company that is leading the way by expanding its manufacturing facilities in the U.S.

I was happy to be at Array's groundbreaking in April this year with Secretary of Energy Jennifer Granholm and am glad their CEO could join us here today.

For decades now, Array has been a world leader in manufacturing solar trackers—the hardware that rotates solar panels toward the sun throughout the day.

This year, Array is investing more than \$50 million to construct a new 216,000-square-foot campus in Albuquerque, New Mexico that will support 300 new jobs in the near term.

And they are expanding largely because of the production tax credits that we worked so hard to pass in the Inflation Reduction Act.

Just as they did for Array, these incentives sent a powerful signal to companies that we are ready to build big things in this country again.

In the last few years, we've seen hundreds of manufacturing announcements representing billions of dollars in private investment.

Along with the Inflation Reduction Act, we're also seeing booming private investment in semiconductor manufacturing from the CHIPS and Science Act.

This law is already boosting employment and wages in New Mexico, with Intel announcing a \$3.5 billion investment in its Rio Rancho campus.

This facility is expected to create at least 700 manufacturing jobs and 1,000 construction jobs in the state.

And we're not stopping there.

Just yesterday the Department of Commerce announced new CHIPS Act funding for SolAero, a homegrown New Mexico company that can now expand production and hire 100 new manufacturing workers.

With support from these laws, companies are opening new factories in American communities to build everything from semiconductors to wind turbines and heat pumps to solar panels and batteries.

That's what good government does.

But I want to make sure it's clear that, due to these policies, business isn't only growing in urban centers.

We are driving investment in rural America, too.

I have seen this first-hand back in New Mexico, where Arcosa recently opened a new wind tower manufacturing facility in Belén.

Back in April, I got to meet the workers there and see the first wind towers coming off the line at that facility.

This is just one example of how the laws we've passed here invest in the economy of the future.

These bills are also driving investment in rural energy and infrastructure that can reduce operating costs and lay the groundwork for future economic growth.

With this approach, Democrats are making sure that the benefits of this manufacturing boom reach the whole country.

I'm looking forward to hearing from our witnesses on how these federal investments have guided business and manufacturing decisions in the U.S., and how we can continue to support this expansion and make sure it benefits as many Americans as possible.

I will now turn to Vice Chairman Schweikert for his opening statement.

[End]

Kevin G. Hostetler - CEO, Array Technologies
Hearing Testimony
June 12, 2024
Congressional Joint Economic Committee
“Made in America: The Boom in U.S. Manufacturing Investment”

Thank you Mr. Chairman, Mr. Vice Chairman, and all members of this committee. It’s an honor to be here today.

My name is Kevin Hostetler, and I am the CEO of Array Technologies. We are a leading American manufacturer and global provider of tracker solutions for utility-scale solar energy projects. Our solar trackers are an integral part of solar farms, rotating panels to follow the sun, which increases energy production by up to 25%.

Founded in 1989 in Albuquerque, New Mexico as one of the first U.S. solar manufacturers, Array is a true American manufacturing success story. We’re proud to be an American company, sourcing low-carbon domestic steel, supporting local jobs, and using a traceable U.S. supply chain with trusted partners.

I am grateful to be leading Array during this nation’s manufacturing renaissance. In April, Array broke ground on a new manufacturing campus in Albuquerque where we make our clamps, center structures, drive systems and electrical controllers.

To start, our new facility will employ more than 300 local residents in the near term. This growth will enable us to further develop more onshore capacity and make more solar technology here at home.

Over the next decade, we anticipate significant growth in industry employment, with solar manufacturing jobs expected to more than triple. In the meantime, we need to create a skilled renewable energy workforce. That’s why we partner with schools like Central New Mexico Community College. In 2022, we donated a 1.3 MW solar site that generates power for the campus and serves as a training facility for Array to provide hands-on learning to students.

Collaborations like these are building a pipeline of talent, ensuring that students and job seekers have the necessary skills and knowledge to thrive as the industry creates jobs.

The IRA and other federal investments have helped to grow our domestic production. Since the passage of the IRA, there has been a notable uptick in announcements for new solar manufacturing facilities across the supply chain, driven by the law’s provisions and the anticipated rise in solar demand.

This has caused a ripple effect, as our business’s growth has also spurred growth for our partners. Copper State Bolts and Nuts Co. has added an additional 30,000 square feet at their Goodyear, Arizona facility to support their solar business. Our partner, Priefert Steel in Mt. Pleasant, Texas has invested \$25 million in solar in the last 24 months, employing over 200 people. Lock Joint Tube in Temple, Texas invested \$16 million in a dedicated tube line

to support solar tracker manufacturing. And finally, our partner Nucor, is investing \$70 million in capital for a new steel plant in Kentucky to support the growing solar demand.

Despite some ongoing challenges, such as high interest rates and regulatory uncertainties, the IRA has set the stage for long-term growth and stability in the U.S. solar industry. The law is expected to facilitate nearly triple the current solar capacity by 2028, fostering a strong, sustainable future for renewable energy in America.

Array's presence in New Mexico not only boosts the local economy, but also positions the region as a hub for renewable energy innovation and manufacturing. We're proud to work with companies like Enchanted Machine Works, Knockout Metalworks and Precision Sharpening. This growth contributes to a more resilient and diverse economic landscape, benefiting the broader community and promoting long-term prosperity.

The IRA has spurred a true manufacturing resurgence, and Array is just one example of how this legislation is paying dividends. With policies that supercharge solar manufacturing and create new jobs, together we are paving the way for a brighter, more sustainable future.

Thank you.

Skanda Amarnath – Executive Director at Employ America
Testimony before the Joint Economic Committee for the hearing titled:
“Made in America: The Boom in U.S. Manufacturing Investment”
June 12, 2024

Chairman Heinrich, Vice Chairman Schweikert, and all other members of the Joint Economic Committee, thank you for the invitation to testify today.

My name is Skanda Amarnath. I am the Executive Director of Employ America, a nonpartisan macroeconomic policy research organization.

I plan on spending most of my time discussing what the available macroeconomic data tells us about the nature of recent manufacturing investments, and associated policies. But first, I’d like to lay out some reasons why manufacturing and industrial investment are of unique relevance.

Economic development and manufacturing advancement have long been tied together. No major advanced economy has sidestepped the industrialization process on its path to becoming wealthy¹. If you compare what each country exports, it becomes clear which countries are richer and which are poorer^{2,3}. Richer countries tend to produce a broader diversity and higher complexity of traded products than those of poorer countries. That’s because richer societies have accumulated superior knowhow for producing highly complex leading-edge products, and can do so across a broad range of goods.

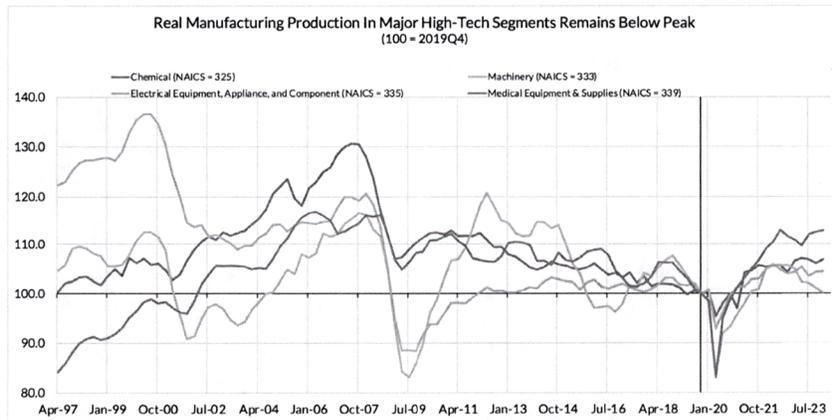
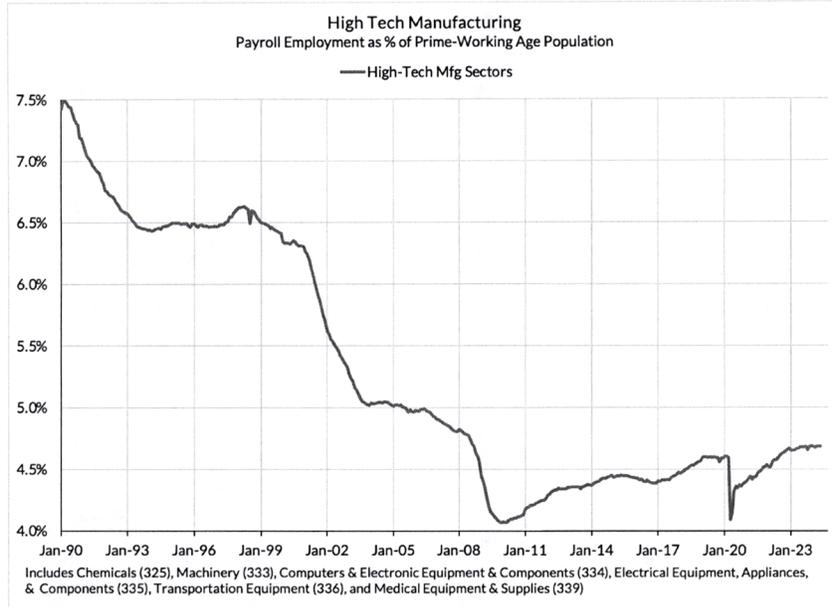
The reasons to encourage investment in manufacturing are thus twofold: (1) ensuring that domestic workers and enterprises capture the knowledge spillovers associated with producing goods at the leading edge of technological difficulty, and (2) encouraging broader industrial diversification at the national, state, and local levels. For the sake of US national and economic security, ensuring that technological knowhow in manufacturing is preserved and advanced has enormous relevance to ensuring the presence of high quality jobs and successful American enterprises.

A more diversified economy also goes hand-in-hand with a wider range of opportunities for workers and businesses. But where other sectors have thrived over the past few decades, manufacturing has seen a general decline. Some reasons for decline were inevitable, but it’s worth noting that this trend also grew more visible in manufacturing subsectors with high technological intensity.

¹ Rodrik, D (2007). “Industrial Development: Stylized Facts and Policies,” UNDESA. *Industrial Development for the 21st Century: Sustainable Development Perspectives*. 1.1: 7-28.

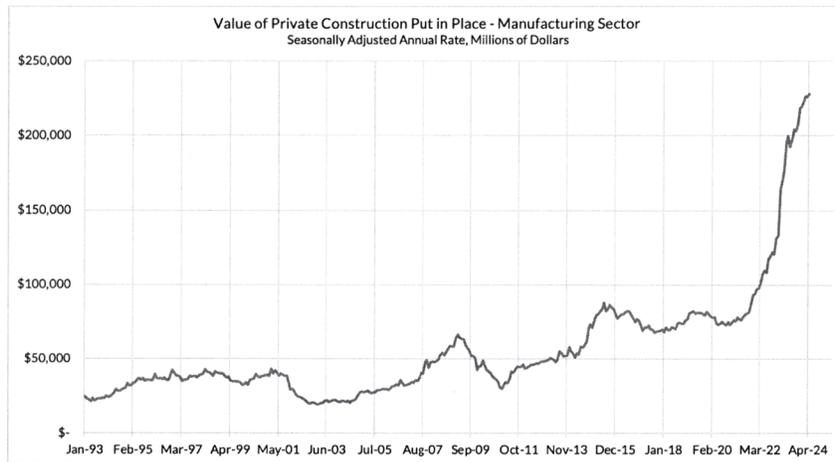
² Hausmann, R. and C. Hidalgo (2009). “The Building Blocks of Economic Complexity,” *Proceedings of the National Academy of Sciences of the United States of America*, vol. 106 no. 26, 10570-75.

³ Hausmann, R. and C. Hidalgo (2010). “Country Diversification, Product Ubiquity, and Economic Divergence.” *HKS Faculty Research Working Paper Series RWP10-045*.



Recapturing capabilities and knowhow tied to high-tech manufacturing need not come at the expense of other sectors. If done right, it can unlock innovation both within and outside of manufacturing. It is no accident that Silicon Valley, now known primarily for software, derived its name from the manufacture of transistors and integrated circuits. Nor was America’s period of booming and outperforming productivity in the 1990s divorced from the presence of a domestic high-tech manufacturing sector⁴.

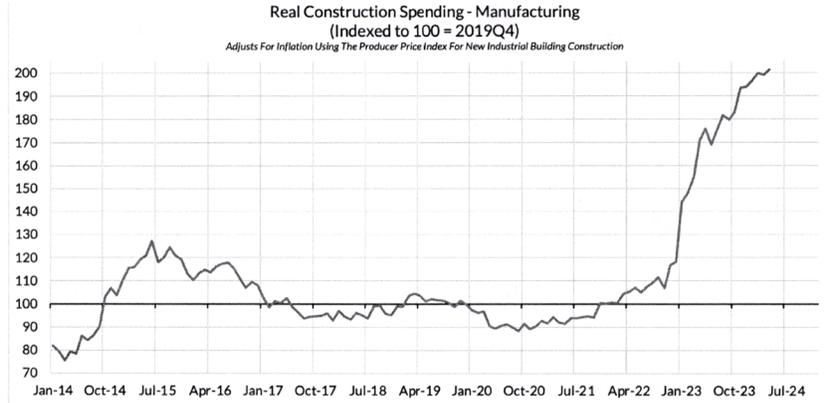
With all of these nuances in mind, the break-out in manufacturing investment is worth studying. The surge is most distinctly visible within manufacturing structures. The level of spending that the private sector has engaged in to construct manufacturing facilities has increased from approximately \$80 billion in 2019 to a \$220 billion annualized pace in recent months.



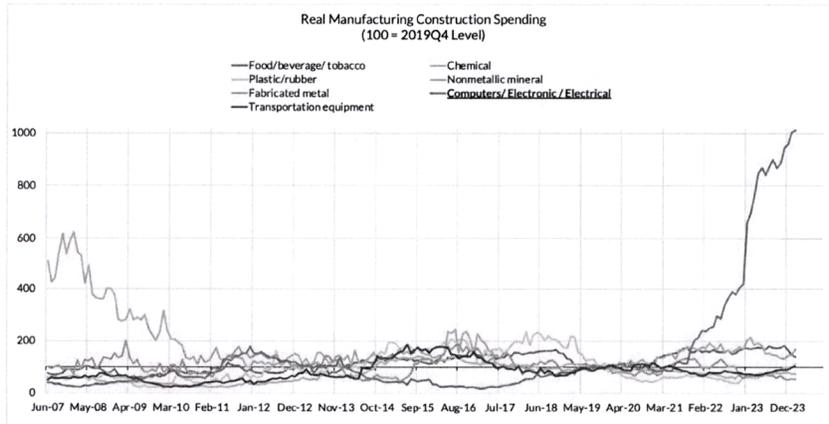
While public policy is surely supporting much of this increase, it’s worth clarifying that these expenditures are directly deployed by private firms, not by governmental actors.

Construction cost inflation has also been a substantial issue in the past few years, but even after accounting for the specific costs involved in the construction of industrial building, there has been a doubling in the real inflation-adjusted output associated with manufacturing structures.

⁴ Gordon, R J and H Sayed (2020), “Transatlantic Technologies: The Role of ICT on the Evolution of U.S. and European Productivity Growth”, *International Productivity Monitor* 38: 50-80.



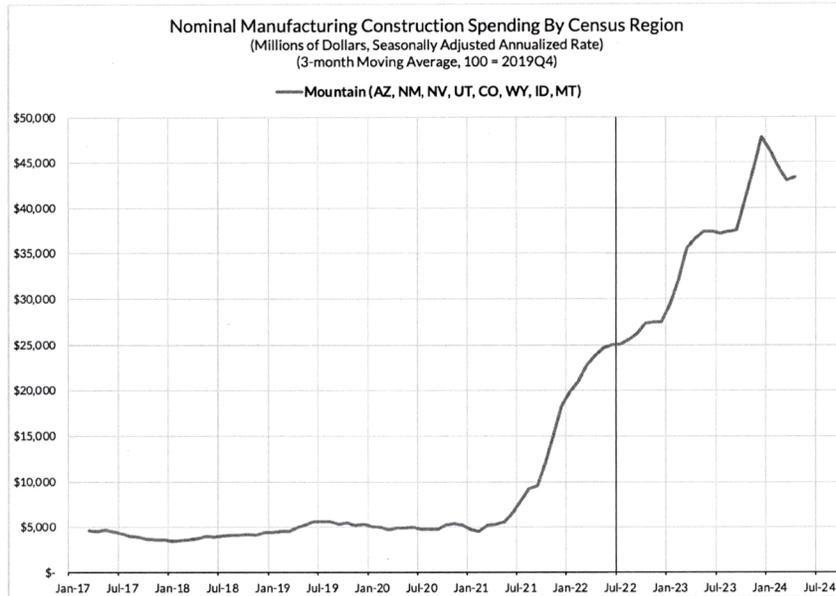
Any discussion of manufacturing investment in the here-and-now needs to get granular. The manufacturing investments and policies are aligned to specific subsectors. Not all manufacturing subsectors have seen a surge in investment, but the ones most closely adjacent to recently enacted legislation have. The supersector encompassing “Computer and Electronic Product” and “Electrical Equipment, Appliance, and Component” manufacturing segments has seen a tenfold increase in real manufacturing construction investment relative to 2019 levels.



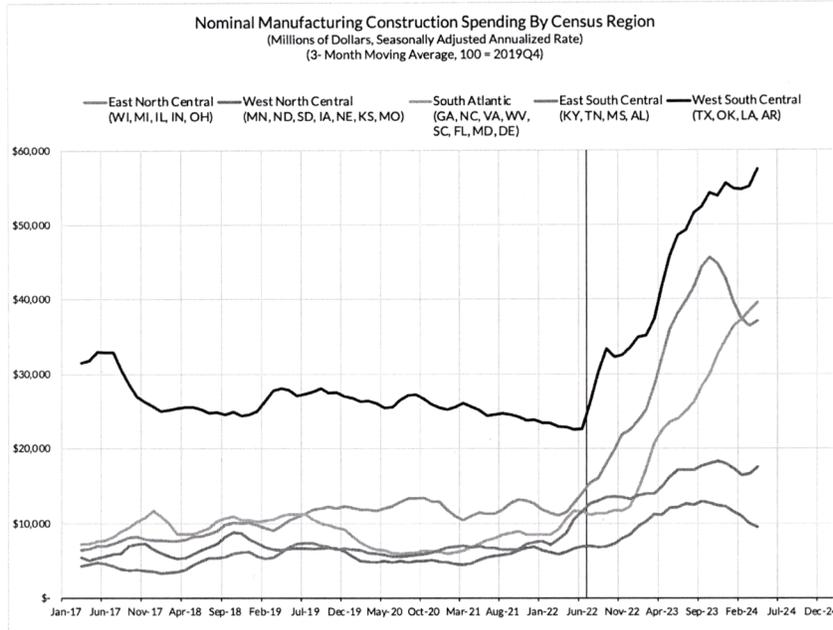
Computers, electronic, and electrical equipment and components are a broad category that intuitively encompass semiconductors, the primary subject-matter of the CHIPS & Science Act. What may be less obvious is that this same supersector also encompasses a variety of other products that are likely aided by

CHIPS and IRA, including the production of photovoltaic cells for solar panels, batteries for motor vehicles, instruments for controlling industrial processes, or transformers for the utilities sector.

The regional-level data on manufacturing construction is illuminating about the timing along which many of these investments took place. As should already be clear when breaking out manufacturing construction data by subsector, some of the major investments began before either CHIPS or IRA were enacted, particularly in the Mountain region.

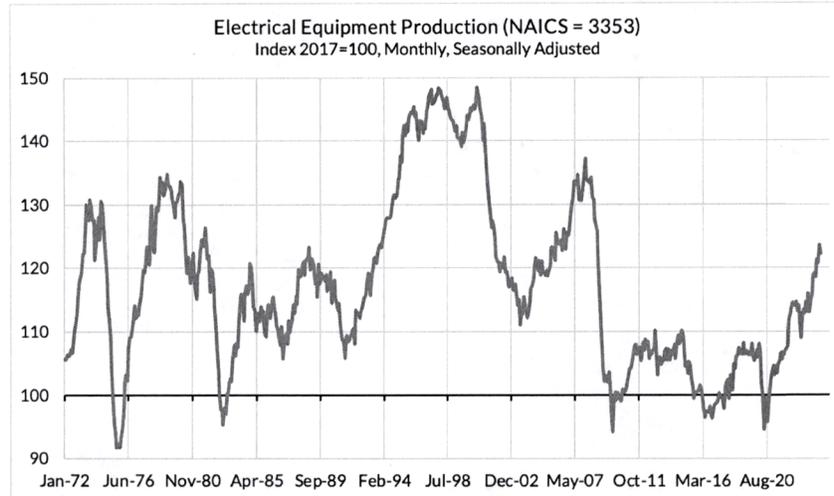


At least some of this investment was still substantially related to semiconductor manufacturing and likely in anticipation of CHIPS' ultimate enactment. Nevertheless, the effects of policy enactment are more clear-cut across other census regions in the Midwest and the Sun Belt, where manufacturing investment surged more noticeably following the enactment of legislation.



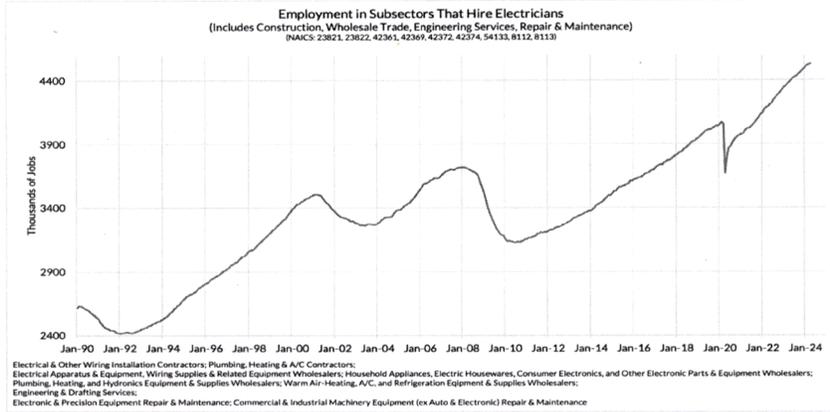
The timing of so many regions’ surge in investment is the most compelling evidence that CHIPS and IRA have had a sizable impact on the willingness of manufacturers to build and improve their facilities, especially relative to the counterfactual.

It is worth warning that the future is likely to show some cooling in both the growth rate and outright level of construction spending for manufacturing facilities. To fully evaluate the success of policy, it will require translating the capacity gains, which recent construction spending should represent, into gains in manufactured output and productivity. Most relevant segments of manufacturing production have yet to show a meaningful inflection, but it is also far too soon to expect the relevant manufacturing facilities to reach productive maturity. Electrical equipment production remains a notable exception, breaking out of a decade-long depression that began with the 2008 financial crisis.

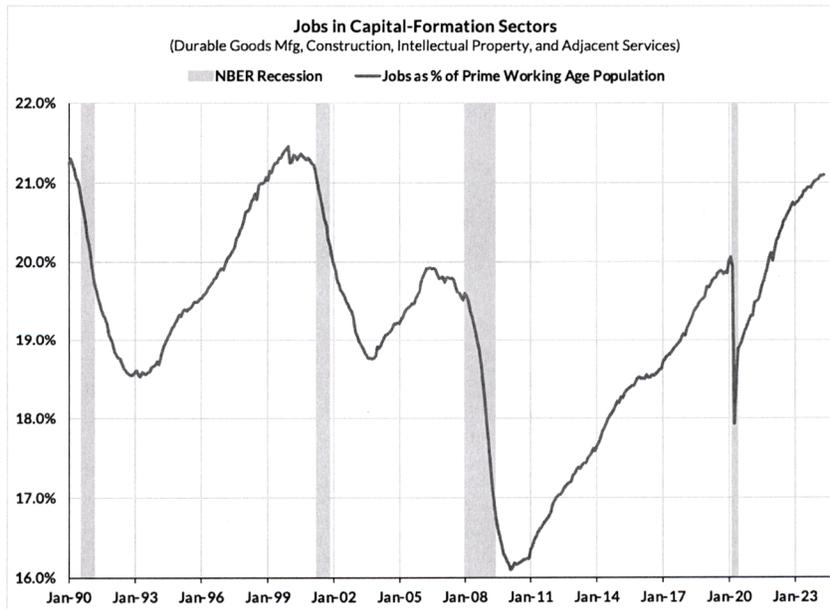


The success of enacted legislation will ultimately be judged by whether benefitting firms deliver production scalably and efficiently at the cutting edge of the technological spectrum.

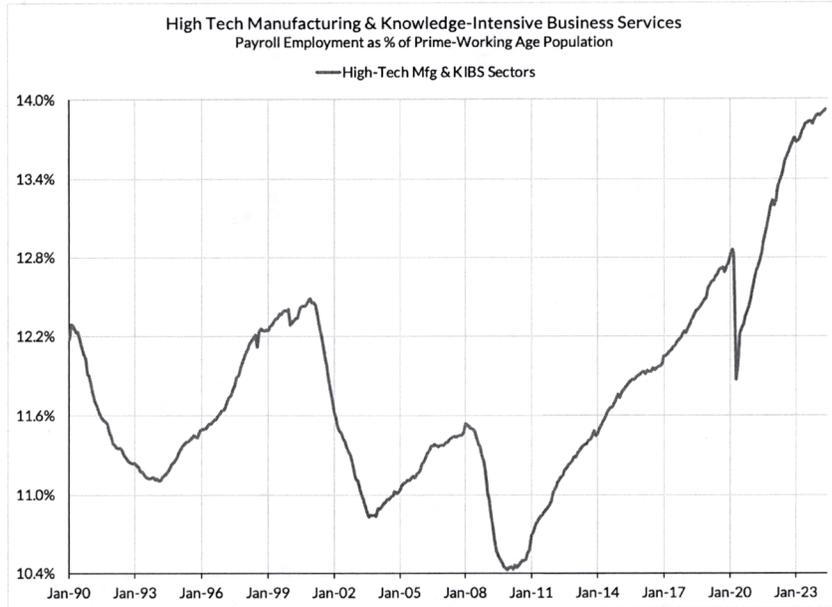
The relevant manufacturing investments, given their capital intensity, are also unlikely to show their full labor market impact through factory floor jobs. Instead, what we see is how manufacturing investments can drive a boom for jobs in construction, professional, scientific & technical services, as well as repair & maintenance. While targeted sectors are likely to see further gains in employment only as production scales up, the bigger gains in employment are likely materializing right now across a wider range of industries.



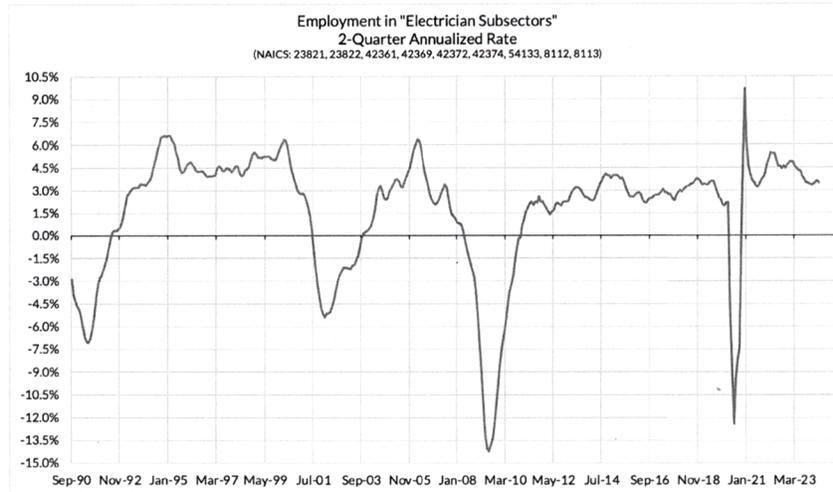
If we look at those sectors most directly responsible for the production of structures, equipment, and intellectual property, employment in those sectors has seen a noticeable outperformance in the past few years.



Knowledge-Intensive Business Services, which include a number of industrial-adjacent services, such as engineering, drafting, and laboratory testing, have all shown sizable gains in employment that bode well for scaling up investment in the future more efficiently.



When seeking to evaluate the effect of manufacturing investments in construction output, the necessity of more electricians has long been noted. Yet establishments that hire electricians stem from a range of sectors, including services subsectors and construction trades. If we aggregate across the full range of relevant sectors, the trend and growth rate in employment look especially impressive.



As we look to the future, it's important to remember that leading-edge manufacturing production, whether tied to semiconductors or the vast array of nascent energy technologies, often requires the presence of available and affordable financing, a proximate supply chain and industrial base, and a skilled workforce. These necessary conditions for investment often depend on the presence of industry in the first place, thereby giving rise to what economists might describe as "coordination problems" or as what most might understand as "the chicken or the egg" dilemma.

Insofar as increasing returns to scale give manufacturing and software special weight, it's important to recognize that unlike software, which is "capital-light" and thus enables more favorable risk-adjusted returns, manufacturing is capital-intensive. The scale and duration of up-front fixed investment, combined with the array of technological and market uncertainties, creates unique idiosyncratic risks that cannot be managed or hedged easily⁵. As a result, hurdle rates tend to be especially high and investment is often constrained for the sake of superior risk-adjusted returns, even when the cost of capital might be low and even if it comes at the expense of technological development⁶.

It often takes a particular kind and quantum of policy support to fully reshape the risk-return calculus and ensure investment decisions can overcome internal hurdle rates. We have had multiple decades of declining interest rates and a falling cost of capital, but only in recent years has a flurry of investment in

⁵ Decaire, P (2019), "Capital Budgeting and Idiosyncratic Risk", Available at SSRN: <https://ssrn.com/abstract=3480884> or <http://dx.doi.org/10.2139/ssrn.3480884>

⁶ Barry, J.W. and B. Carlin and A.D. Crane and J.R. Graham (2024), "Project Development with Delegated Bargaining: The Role of Elevated Hurdle Rates", Available at SSRN: <https://ssrn.com/abstract=4412436> or <http://dx.doi.org/10.2139/ssrn.4412436>

capital-intensive manufacturing sectors emerged. This flurry has even defied the Fed's recent campaign to tighten financial conditions thus far.

While the surge in investment marks a welcome inflection point, we are only at its initial phases. Manufacturing facilities must ultimately be filled with the requisite capital goods and there must be a sufficiently staffed and skilled workforce to deliver scalable production. New problems and binding constraints are likely to emerge, whether they stem from financial constraints, regulatory barriers, or something entirely different. In ensuring that enacted legislation yields maximum benefit for the public if and when that happens, my hope is that lawmakers and policymakers stay attentive, open-minded, and pragmatic.



Statement

of

Adam N. Michel, Ph.D.

**Director of Tax Policy Studies
Cato Institute**

before the

Joint Economic Committee

June 12, 2024

Tax Cuts are Better than Central Planning

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

Americans have widely benefited from the neutral, pro-growth tax policies passed in 2017. By cutting business taxes and allowing full deductions for new investments, the Tax Cuts and Jobs Act (TCJA) allowed businesses to expand domestic investment, which is still supporting higher wages and a larger economy today.

I will make three related points in my testimony.

First, the underlying US income tax system is biased against investment by double- and triple-taxing investment returns. These additional layers of tax are a particular burden on investment-intensive sectors like manufacturing. The TCJA helped alleviate some of this built-in bias through lower tax rates and full expensing.

Second, instead of expanding and making permanent the pro-growth tax policies of 2017, Congress has recently relied on industry-specific targeted subsidies to promote politically popular investments. These industrial policy strategies have a long track record of failure and come with multi-trillion-dollar opportunity costs.

Third, the Biden administration and the Organisation for Economic Co-operation and Development (OECD) are working to institutionalize industrial policy by creating a global tax cartel to raise global tax rates—primarily on American businesses—and sanction state competition for international investment using direct subsidies.

Congress should reject the Biden administration-led OECD tax cartel, repeal more than \$3 trillion of targeted tax subsidies—including those in the CHIPS and Science Act (CHIPS Act) and the Inflation Reduction Act (IRA)—and permanently expand the tax cuts in the TCJA.

Pro-Growth Policy and the Tax Cuts and Jobs Act

The TCJA was a wide-ranging reform that simplified and cut taxes for Americans at every income level. The law boosted private investment, wages, and economic growth. The most economically powerful changes allowed for additional business investment by allowing full deductions for new investments (called full expensing) and cutting the federal corporate income tax from 35 percent—the highest rate in the developed world—to 21 percent, giving the US a corporate tax rate that is slightly above the average of other developed countries.

The corporate tax rate cut is permanent. Expensing is temporary.² Beginning in 2023, the 100 percent expensing deduction is reduced by 20 percent each year through 2026, when the bonus deduction is entirely phased out. Research expensing expired in 2022.

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.

² The TCJA allows all businesses to fully expense asset classes with lives of 20 years or less that were put in service after September 27, 2017, and before January 1, 2023. Section 179 of the Internal Revenue Code

At the time of passage, using a diverse set of assumptions, researchers estimated that the TCJA would increase the country's capital stock and boost GDP by between 0.7 percent and 1.7 percent.³ Almost every study agreed that the reform would produce positive changes in economic growth. Since then, various empirical investigations of the actual economic outcomes have confirmed the model's estimates.

Kyle Pomerleau and Donald Schneider find that in the years immediately after 2017, "real GDP, consumption, business investment, and payrolls grew more rapidly than expected" by pre-reform forecasts.⁴ Gabriel Chodorow-Reich and coauthors report similar results. Using variations in how the 2017 tax reform impacted different corporations, they found that the tax cut "caused domestic investment of firms with the mean tax change to increase by roughly 20% relative to firms experiencing no tax change." This result is in line with some of the most optimistic projections from the time of passage. Another paper by Patrick Kennedy et al. similarly finds that the corporate tax cuts caused "increases in sales, profits, investment, employment, and payrolls."⁵

As I've estimated elsewhere, the average production and nonsupervisory worker received about \$1,400 more in annualized earnings by spring 2020, measured from the pre-TCJA trend.⁶ These estimates are consistent with a long academic literature of sophisticated economic analyses that almost universally finds taxes matter for investment and growth.⁷

The Tax Code's Anti-Investment Bias

The normal income tax system is biased against investment in two important ways.

First, the income tax system encourages consumption over saving by assessing multiple layers of tax on interest and investment returns. Wages are first taxed by income and payroll taxes. Individuals then choose to spend or save their after-tax income. The increased value of saved and invested income is often taxed again as interest, capital gains, dividends, and transfers at death. The corporate income tax adds another layer of tax on income earned from corporate equity investments. Taxing investment returns—as the US

allows some small businesses—those with less than \$2.7 million in annual investments—to expense up to \$1,080,000 in qualified short-lived investments.

³ Adam N. Michel, "[Protecting American Families from Higher Taxes](#)," Testimony, Committee on the Budget, United States Senate, May 17, 2023.

⁴ Kyle Pomerleau and Donald Schneider, "[Making the Tax Cuts and Jobs Act Permanent: Two Revenue-Neutral, Pro-Growth Options for Tax Reform](#)," American Enterprise Institute Report, April 8, 2024.

⁵ Patrick J. Kennedy, Christine L. Dobridge, Paul Landefeld, Jacob Mortenson, "[The Efficiency-Equity Tradeoff of the Corporate Income Tax: Evidence from the Tax Cuts and Jobs Act](#)," March 21, 2024.

⁶ Adam N. Michel, "[Protecting American Families from Higher Taxes](#)," Testimony, Committee on the Budget, United States Senate, May 17, 2023.

⁷ Adam N. Michel, "[Research Shows Taxes Matter for Investment and Growth](#)," Cato At Liberty (blog), Cato Institute, November 9, 2023.

tax code does—reduces the incentives to save by lowering the market’s payment to delay consumption.⁸

Second, the normal income tax code effectively denies businesses the full value of deductions for expenditures on physical investments. Because businesses pay income taxes on their profits (revenues minus expenditures), the tax code artificially inflates taxable profits by denying full deductions and, thus, inflates the after-tax cost of additional physical investments.⁹

Expenses such as employee salaries, utilities, and rent are all deductible in the year they are incurred.¹⁰ However, different rules have historically applied to expenditures on longer-lived capital investments, such as equipment and structures. Businesses are typically required to deduct the cost of physical investments from their revenues over multiple years, according to depreciation schedules that usually range from 3 years to 39 years.

Spreading out an investment’s deductible expenditures over multiple years increases its after-tax cost because the real value of the deduction decreases each year due to inflation and the opportunity cost of passing time. A deduction delayed is a deduction (partially) denied.

For example, say, Intel builds a new semiconductor fabrication plant at a cost of \$1 billion. If the new structure has to be depreciated over 39 years, Intel can only deduct roughly 1/39 (about \$26 million) of what it paid to offset revenues in the first year.¹¹ In 39 years, the final deduction of \$26 million will be worth less than \$3 million to the company. The partial deduction means that Intel will have artificially high profits and thus pay a higher effective tax rate. The higher taxes will cut into its ability to make other investments in new technologies and future expansions.

The tax code divides investment types into asset classes, each with different depreciation schedules. Most business equipment falls under the 3-year, 5-year, 7-year, 10-year, 15-year, or 20-year depreciation schedule, while residential property has a 27.5-year schedule and commercial real property has a 39-year schedule. Figure 1 shows how the present value of a \$1 deduction can decline quickly under longer asset lives.¹² At 3 percent inflation, a \$1 investment depreciated over 5 years is worth only 92 cents to the business in present value.

⁸ Adam N. Michel “[Less Government, More Savings](#),” Testimony, Committee on Finance, United States Senate, May 21, 2024.

⁹ This section draws heavily from Adam N. Michel, “[Expensing and the Taxation of Capital Investment](#),” Cato Institute Briefing Paper No. 159, June 7, 2023.

¹⁰ From 1954 to 2022, research expenses were also fully deductible.

¹¹ Equipment and other related investments are subject to different schedules.

¹² Present value assumes a 3 percent real discount rate; 3-year to 20-year assets are placed in service in the first quarter of the year using 200 percent (3–10 years) or 150 percent (15 years and 20 years) declining balance general depreciation system (GDS); 27.5-year to 39-year assets are placed in service in January using GDS straight line method; and R&D is amortized over 5 years using the midyear convention.

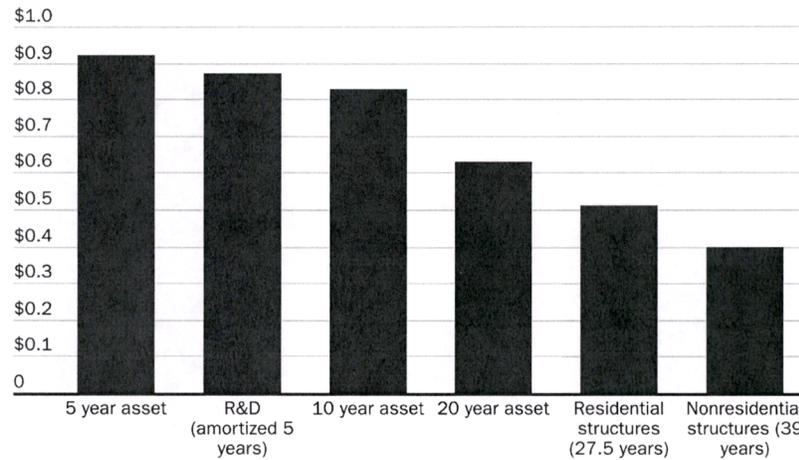
A \$1 investment in a nonresidential structure, depreciated over 39 years, has a present value of only 40 cents.

If the business could write off the full investment immediately (full expensing), it could recover the entire cost of the investment. The \$1 investment would be worth \$1 in write-offs.

Figure 1

Deduction values fall quickly with longer write-off times

Present value of \$1 write-off when inflation is 3%



Source: author's calculations.

Research Spending Plummets When Expensing for R&D Expired

The TCJA also included some changes that increased the cost of investment, which provides a cautionary lesson for policymakers. Starting in 2022, full expensing for research expenses expired, requiring the costs to be amortized over five years (15 years for non-domestic expenditures). Research expenses include related wages for the researchers and their supervisors and other attributable costs such as rent, utilities, and overhead. Five-year amortization effectively reduces the value of research deductions by about 13 percent, making research spending more costly after tax.

Figure 2 shows that the pre-COVID quarterly growth rate in real private R&D investment was 6.7 percent, and 2021 R&D spending growth remained strong. Following the loss of full expensing for R&D in the first quarter of 2022, R&D spending growth steadily declined,

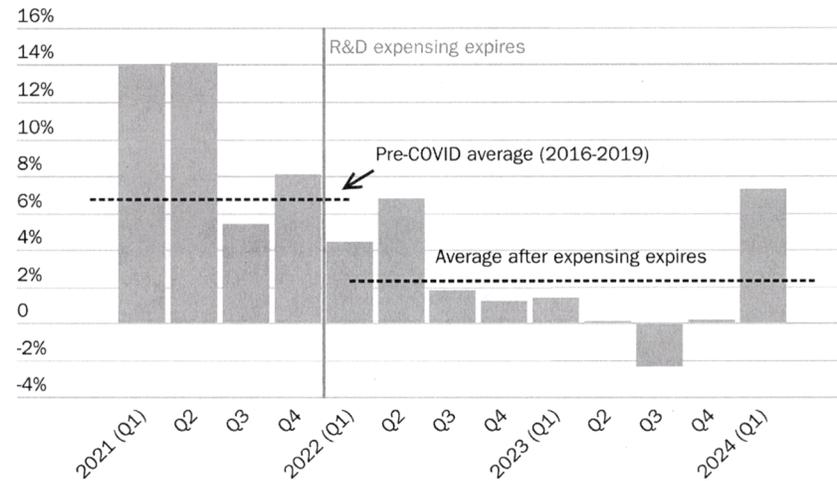
averaging 2.3 percent through the first quarter of 2024—a 66 percent decline from the pre-COVID average.

The decline in R&D spending provides a stark example of how tax policy can significantly affect investment behavior. Policymakers should expect similar effects across the rest of the economy as expensing for the remaining short-lived assets continues to phase out.

Figure 2

After full expensing expired, new research spending fell by two thirds

Percent change in real private R&D investment



Sources: US Bureau of Economic Analysis, "Table 5.3.1. Percent Change From Preceding Period in Real Private Fixed Investment by Type," last revised, May 30, 2024; author's calculations.

Manufacturing is Disproportionately Affected

Focusing too narrowly on the manufacturing sector can distract policymakers from pursuing neutral, pro-growth policies that benefit all sectors of the economy. However, because the manufacturing sector tends to rely heavily on physical investments and research spending, the tax code creates a particular disadvantage for America's manufacturers and their employees.

Due to the depreciation system, the tax code has a built-in bias against the longest-lived capital investments. Allowing a business to recoup only 40 percent of its expenditures on nonresidential structures (Figure 1) makes building new plants and fabs more costly than they would be under a neutral tax code. In the UK, the Adam Smith Institute has noted that

a similar system creates a “Factory Tax” that largely falls on investment-heavy sectors, such as manufacturing.¹³ Full expensing for structures or a “neutral cost-recovery system” (which allows businesses to index their write-offs for inflation and time) would eliminate the US factory tax and allow all sectors of the economy to invest without the distortion of the current write-off system.

Individual income tax rates are also important for manufacturers and other small or family-owned businesses. Over 90 percent of businesses in the United States pass their income through from the entity level to the owners, where it is taxed as personal income at individual income tax rates.¹⁴ These pass-through businesses (S corporations, partnerships, LLCs, cooperatives) account for about two-thirds of all manufacturing businesses and employ a third of the manufacturing workforce. In 2026, when the TCJA expires, income tax rates will increase automatically. After the tax increase, manufacturers in the top income tax bracket will face tax rates above 50 percent in 15 states (accounting for state and local taxes).¹⁵

The Tax Code’s \$3 trillion of Industrial Policy Subsidies

The tax code is littered with credits and deductions intended to support specific industries, technologies, and business types. These targeted preferences will provide \$209 billion in federal support in 2025. The subsidies are in addition to the tens of billions of dollars in direct expenditures and government-subsidized loans.

Table 1 includes a selection of the largest and most targeted tax subsidies intended to manipulate a business’s location, timing, legal form, or inputs. The table includes each provision’s cost in 2025 and the ten-year cost under current law, as reported by the Treasury Department. However, over time, many provisions phase down and expire, which understates their fiscal cost because Congress tends to extend expiring tax provisions. To approximate the true cost of these provisions, Table 1 also includes the annual cost at each provision’s peak cost (usually before it begins to phase out). The annual peak cost of \$356 billion implies a ten-year cost of more than \$3.5 trillion for targeted industrial policy in the tax code.

¹³ Sam Dumitriu and Pedro Serodio, “[Abolishing The Factory Tax: How to Boost Investment and Level Up Britain](#),” The Adam Smith Institute, February 19, 2020.

¹⁴ Scott Greenberg and Nicole Kaeding, “[Reforming the Pass-Through Deduction](#),” Tax Foundation Fiscal Fact No. 593, June 2018.

¹⁵ Adam N. Michel, “[Top Tax Rates Are Already on Wrong Side of Laffer Curve in at Least Ten States](#),” Cato At Liberty (Blog), Cato Institute, April 24, 2024.

Table 1
Industrial policy tax subsidies could be as high as \$3.5 trillion over 10 years

	2025	Peak year	2024-2033
Pass-through deduction	\$65.2	\$65.2	\$154.0
Research and development credit	\$31.9	\$48.3	\$388.7
Clean vehicles and refueling credits	\$26.3	\$35.9	\$182.1
Energy investment credit	\$19.9	\$29.1	\$156.6
Low-income housing credit	\$14.4	\$17.9	\$174.8
Energy production credit	\$9.9	\$49.8	\$290.2
Advanced manufacturing production credit	\$9.8	\$36.4	\$222.6
Residential energy efficiency credits	\$7.9	\$11.0	\$64.2
Clean fuel credits	\$7.8	\$7.8	\$27.5
Advanced manufacturing investment credit	\$5.8	\$6.2	\$39.8
Credit union income exemption	\$3.1	\$4.2	\$35.8
Orphan drug research credit	\$2.2	\$5.3	\$33.5
Other energy provisions	\$2.0	\$2.0	\$9.9
Clean hydrogen production credit	\$1.5	\$20.0	\$75.0
Carbon oxide sequestration credit	\$0.9	\$14.2	\$61.8
Historic structures credit	\$0.7	\$0.9	\$7.3
Nuclear power production credits	\$0.2	\$1.9	\$5.6
Railroad track maintenance credit	\$0.1	\$0.1	\$0.3
Total	\$209.3	\$356.0	\$1,929.8

Source: author's calculations; US Treasury, Office of Tax Analysis, Estimates of Total Income Tax Expenditures, March 11, 2024.

New Semiconductor and Energy Subsidies

Recent legislation—the CHIPS Act and the IRA—make up about half of the cost of the programs in Table 1. These two pieces of legislation represent an unprecedented expansion of government subsidies to support investment in politically popular technologies.

The CHIPS and Science Act was a significant shift in US industrial strategy, focusing on bolstering domestic semiconductor manufacturing to reduce dependency on foreign suppliers and stimulate innovation. The CHIPS Act combines direct subsidies, tax incentives, and research grants, which the Congressional Budget Office estimates will cost \$79 billion over ten years, including about \$50 billion in direct funding and \$24 billion in new tax credits. If Congress appropriates the remaining funds in future years, as planned, the cost of the legislation could increase to almost \$280 billion.¹⁶

¹⁶ Congressional Budget Office, “[Estimated Budgetary Effects of Division C of H.R. 4346, as Amended by the Senate and as Posted by the Senate Committee on Commerce, Science, & Transportation on July 20, 2022.](#)” CBO Cost Estimate, July 21, 2022

The Inflation Reduction Act (IRA) also marked a significant shift in US energy policy—to one that pairs costly and complicated regulatory requirements with open-ended tax subsidies to manipulate consumer and producer incentives toward politically popular energy sources. Since its passage, the estimated cost of the IRA's new and expanded energy tax credits has increased dramatically. Congressional scorekeepers initially estimated the tax provisions would cost \$271 billion over ten years.¹⁷ Due to higher projected uptake, the cost of the IRA tax credits is likely to be more than \$907 billion over ten years, three times larger than initially projected.¹⁸ These estimates bring the entire cost of the green energy spending in the IRA to about \$1.1 trillion over ten years and possibly more than \$3 trillion over a longer time horizon.¹⁹

Industrial Policy Comes With Trillion Dollar Opportunity Costs

Industrial policy spending, in the tax code or elsewhere, has large opportunity costs. Open-ended tax credits have a multi-decade track record of failing to meet their stated goals, creating billion-dollar cottage industries for fraud and manipulation, and representing lost opportunities for more effective policies, such as full expensing.

Track record of failures. The tax code has included subsidies for wind and solar energy technologies for more than four decades since the Section 48 investment tax credit was created in the Energy Tax Act of 1978.²⁰ Instead of being temporary support for nascent industries—as originally intended²¹—the federal energy subsidies have created government-dependent industries that are more responsive to public money than consumer demand. The Biden administration has sold many of the newest energy subsidies in the IRA as phasing out by 2035, but Energy Information Administration data suggests tax dollars could flow to these industries well after 2050.²²

Many credits also do not stand up to simple cost-benefit analysis. A Tax Foundation report summarizes the failures of targeted tax policies intended to reduce carbon emissions, concluding they have “proven ineffective, or at the very least inefficient.... The tax credit for

¹⁷ Committee for a Responsible Federal Budget, “[IRA Energy Provisions Cost Could Double With New Emissions Rule](#),” CRFB Blog, February 13, 2024.

¹⁸ Adam N. Michel, “[Energy Tax Subsidies Could Top \\$1.8 Trillion](#),” Cato At Liberty (Blog), Cato Institute, March 26, 2024.

¹⁹ Travis Fisher, “[The Inflation Reduction Act's Energy Subsidies Are More Expensive Than You Think](#),” Cato At Liberty (Blog), Cato Institute, September 5, 2023.

²⁰ Salvatore Lazzari, “[Energy Tax Policy: History and Current Issues](#),” Congressional Research Service RL33578, last revised October 30, 2008.

²¹ In 2003, Senator Chuck Grassley, an original author of the 1992 wind energy production tax credit said, “I'd say we're going to have to do it for at least another five years, maybe for 10 years. Sometime we're going to reach that point where it's competitive (with other forms of energy). I think the argument for any tax credit is to make the new source of energy economically competitive.” Brendan O'Bryhim, “[Wind Energy Rides Roller Coaster Year](#),” Electrical Wholesaling, April 1, 2003.

²² Travis Fisher, “[New IRS Guidance Makes the Inflation Reduction Act's Energy Subsidies Harder to Eliminate](#),” Cato At Liberty (Blog), Cato Institute, May 31, 2024; Travis Fisher, “[The Inflation Reduction Act's Energy Subsidies Are More Expensive Than You Think](#),” Cato At Liberty (Blog), Cato Institute, September 5, 2023.

ethanol in motor fuel, as one example, effectively spent \$1,000 to reduce carbon emissions by one ton, magnitudes more than the societal cost of one ton of emissions.”²³

Less targeted tax credits, such as those for R&D, also come with high administrative and economic efficiency costs that undermine the traditional academic case for such subsidies.²⁴ When compared to other policies—such as a lower corporate tax rate or full expensing—government subsidies for R&D are likely a less efficient means of encouraging private research spending and innovation.²⁵

Fraud and Manipulation. Because they are often open-ended subsidies and claimed on tax returns without prior validation, tax credits have a long track record of inducing fraud, corruption, and unintended legal manipulation.

In the case of biofuel tax credits, the Treasury Inspector General for Tax Administration (TIGTA) has found widespread misuse of the credits that have led to “one of the largest fraud schemes in US history.” The TIGTA report concludes that “with the passage of additional and expanded clean energy tax credits in the IRA, there is even greater incentive to take advantage of biofuel tax credits and make fraudulent claims for biofuel that does not exist or does not qualify for the biofuel tax credits.”²⁶

The biofuel tax credits are only one small microsome of the problems that follow in the wake of overly generous, targeted federal tax subsidies. For example, the fiscal cost of the Employee Retention Tax Credit (a pandemic-era payroll tax credit) increased from \$77 billion to as much as \$550 billion due to a combination of lax rules and outright fraud.²⁷ Other tax programs, such as the Low-Income Housing Tax Credit—a lucrative subsidy awarded in a discretionary manner—has been the center of numerous corruption scandals. The credit is also ineffective at inducing additional low-income housing.²⁸

Better Policies Forgone. In 2017, expensing was not made permanent due to its fiscal cost. Making full expensing permanent and extending similar treatment to structures would lower revenue by about \$600 billion over ten years. This is a fraction of the cost of the

²³ Erica York, Alex Muresianu, and Alex Durante, “[Taxes, Tariffs, and Industrial Policy: How the U.S. Tax Code Fails Manufacturing](#),” Tax Foundation Fiscal Fact No. 788, March 2022; Gilbert E. Metcalf, “[Using Tax Expenditures to Achieve Energy Policy Goals](#),” *American Economic Review*, vol. 98, no. 2, May 2008.

²⁴ Tax credits are different from deductions. Martin A. Sullivan, “[Putting the Research Tax Credit to the Test](#),” *Tax Notes*, March 17, 2014; Jeffrey Miron and Jacob Winter, “[Governments Should Not Fund Research](#),” *Cato at Liberty* (blog), Cato Institute, July 31, 2023.

²⁵ Jason J. Fichtner and Adam N. Michel, “[Can a Research and Development Tax Credit Be Properly Designed for Economic Efficiency?](#),” *Mercatus Research*, Mercatus Center, George Mason University, July 14, 2015; Maxwell Tabarrock “[Tax Cuts and Innovation](#),” *Maximum Progress* (Blog), May 29, 2024.

²⁶ Treasury Inspector General for Tax Administration, “[Additional Actions Need to Be Taken to Identify and Address Noncompliant Biofuel Tax Credit Claims](#),” U.S. Department of the Treasury Inspector General for Tax Administration Report 2024-300-021, April 24, 2024; and Adam N. Michel, “[A Case Study in Tax Credit Fraud and Manipulation, Biofuel Edition](#),” *Cato At Liberty* (Blog) Cato Institute, May 2, 2024.

²⁷ Adam N. Michel, “[Employee Retention Credit Shows Folly of Tax Code Subsidies](#),” *Cato At Liberty* (blog) Cato Institute, October 12, 2023.

²⁸ Chris Edwards and Vanessa Brown Calder, “[Low- Income Housing Tax Credit: Costly, Complex, and Corruption- Prone](#),” *Cato Institute Tax and Budget Bulletin* No. 79, November 13, 2017.

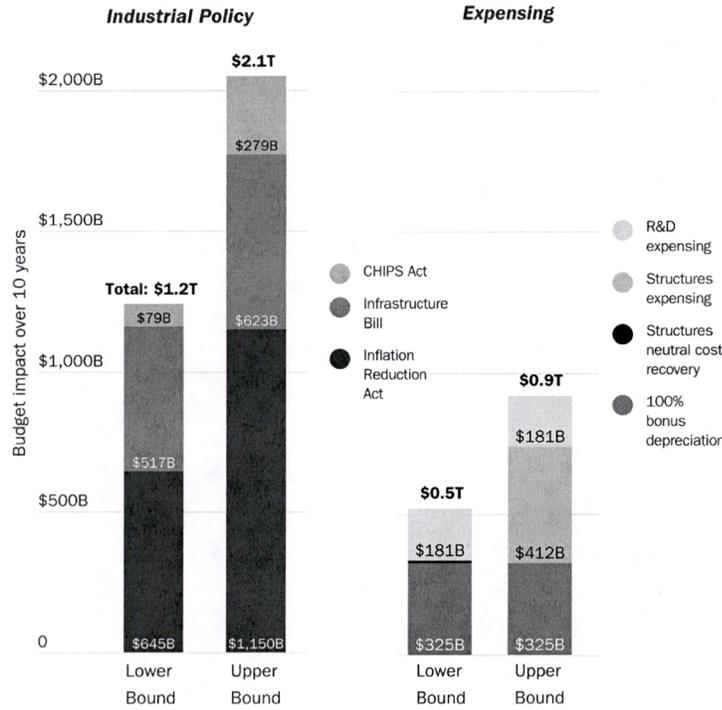
existing \$3 trillion tax subsidy regime. Expensing also avoids the capital misallocation, cronyism, and other costs that too often result from targeted subsidies.

In 2023, Scott Lincicome and I made a similar point, comparing the uncertain costs of the three big subsidy bills—the Infrastructure Investment and Jobs Act (2021), the CHIPS Act, and the IRA—to full expensing. We concluded that “even the most aggressive, pro-growth expensing package would still be dwarfed by the amounts that Congress has just spent on industrial policy.” (Figure 3)

The opportunity costs are even larger because, at best, the targeted subsidies will just reallocate existing resources to less efficient political priorities. Whereas pro-growth tax cuts expand the pool of total private investment and put private investors—not politicians—in charge of determining where new investments should be made.

Even when state subsidies result in successful projects, it does not mean that those resources would not have been better spent elsewhere. For example, a lower tax rate for all companies could result in additional R&D and successful new projects at 100 companies instead of only the innovations from the one firm that received a government subsidy. Government subsidies also distort private investment by attracting scarce resources to government-subsidized activities at the expense of other investment opportunities.

Figure 3
Industrial subsidies are more expensive (and less effective) than neutral, pro-growth tax reform



Sources: Congressional Budget Office, Joint Committee on Taxation, Goldman Sachs, Tax Foundation, CRFB.
 Note: Industrial policy spending estimates include direct outlays, grants, and tax credits. The estimates reflect industrial policy spending exclusive of other associated revenue raisers and non-industrial policy outlays.

Biden Administration’s Zero-Sum International Subsidy Wars

Treasury Secretary Janet Yellen recently described China’s state subsidies for solar energy, electric vehicles, batteries, and other emerging technologies as distorting global prices, noting that it “hurts American firms and workers, as well as firms and workers around the world.”²⁹ She left out that the United States is doing the same thing—pouring massive

²⁹ Fatima Hussein, “Yellen Says China’s Rapid Buildout of its Green Energy Industry ‘Distorts Global Prices.’” Associated Press World News, last updated March 27, 2024.

government subsidies into strategic industries and manipulating global markets to everyone's detriment.

Making matters worse, the Biden administration has led the development of the OECD's project to create a global tax system that will institutionalize the US and China-led move toward industrial policy.

Pillar Two of the OECD global tax framework includes a global minimum corporate tax rate of 15 percent, enforced by a system of extraterritorial taxes. The OECD tax cartel has numerous economic and political costs that make it a bad deal for American workers and businesses, which I've outlined in detail elsewhere.³⁰ For the purposes of this discussion, I will focus on how the Pillar Two rules incentivize and institutionalize industrial policy.

By focusing narrowly on tax rate competition (setting a 15 percent tax rate floor), the OECD rules push international fiscal policy competition to the more inefficient form of targeted subsidies. The minimum tax does this by treating refundable tax credits (cash payments through the tax code) and direct state subsidies as income instead of reductions in taxes paid.³¹

The OECD's minimum tax will not reduce governments' incentive to attract new business; it will simply shift the margin on which this competition takes place. The US has ensured the transition to competition with direct subsidies by simultaneously creating trillions of dollars of open-ended subsidies through the CHIPS Act and the IRA.

Unlike lower tax rates, which expand total global investment, dueling state subsidies for specific companies are a net negative; they cost fiscal resources to both countries and create few new investments. When the subsidies are funded by higher general taxes—as they are in the case of the OECD proposal—they will depress overall levels of investment and still not bring in any additional fiscal resources.

Some countries have already begun reforming their fiscal systems in response to the OECD's proposal and the US subsidies. A few examples include:

- South Korea expanded domestic subsidies by \$19 billion for companies like Samsung and SK Hynix through the K-Chips Act in response to the US CHIPS Act and resulting pressure from domestic manufacturers.³²

³⁰ For more see, Adam N. Michel, "[Bold International Tax Reforms to Counteract the OECD Global Tax](#)," Cato Policy Analysis No. 968, February 13, 2024; Adam N. Michel, "[It's Time to Defund the OECD](#)," Cato At Liberty (Blog), Cato Institute, May 9, 2024.

³¹ Adam N. Michel, "[OECD Rules Risk Fueling Competition for State Subsidies](#)," GIS Reports Online, December 12, 2023.

³² Alex Kim, "[CHIP on the Shoulder](#)," The Wilson Center Asia Dispatches: A blog of the Indo-Pacific Program, October 10, 2023; Kimberley Kao, "[South Korea Unveils \\$19 Billion Package for Chip Industry](#)," Wall Street Journal, May 23, 2024.

- Intel received 10 billion euros from Germany and \$3.2 billion from Israel to stay in the respective countries following the passage of the CHIPS Act.³³
- Germany pledged new state funding for battery manufacturer Northvolt after they threatened to exclusively open new projects in the US unless the EU matched the subsidies they are eligible for under the IRA.³⁴
- Vietnam is considering ways to directly compensate Samsung and other foreign companies for the higher taxes the firms will be forced to pay under the new 15 percent minimum rate.³⁵
- Bermuda—which previously did not have a corporate income tax—will introduce a 15 percent corporate income tax in 2025 and use the revenue to provide new types of incentives.³⁶
- Singapore acknowledged that the new minimum tax revenue would be spent on other incentives, stating, "given the significant spending required to stay competitive, at this point, I do not expect the new moves to generate net revenue gains for Singapore on a sustained basis."³⁷
- The EU's new STEP initiative and Temporary Crisis Framework shift the bloc's economic policy toward fiscal subsidy regimes, which is embodied in the Green Deal Industrial Plan (GDIP), a direct response to the IRA.³⁸

Policy Recommendations

Ensuring permanently low and economically neutral taxes is the most important way the tax code can support manufacturing and the rest of the American economy. Permanent policy is important so that investors and workers have the certainty they need to plan for the future.

Congress will need to cut spending to keep taxes from rising over time. Over the long run, spending is the true tax rate. So, if Congress wants to keep the United States a relatively low-tax country (compared to most of the developed world), spending will need to come

³³ Steven Scheer, "[Israel Grants Intel \\$3.2 Billion for New \\$25 Billion Chip Plant](#)," Reuters News, December 26, 2023; Friederike Heine, Supantha Mukherjee and Andreas Rinke, "[Intel Spends \\$33 Billion in Germany in Landmark Expansion](#)," Reuters News, June 19, 2023.

³⁴ Guy Chazan and Richard Milne, "[Northvolt to Build German Battery Factory After Berlin Pledges State Aid](#)," Financial Times, May 12, 2023.

³⁵ Francesco Guarascio and Khanh Vu, "[Exclusive: Vietnam Eyes Multi-Million-Dollar Handouts to Samsung, Others to Offset Global Tax](#)," Reuters Asia Pacific, May 30, 2023; Martin A. Sullivan, "[Vietnam Pillar 2 Revenue to Be Funneled Into New FDI Incentives](#)," *Tax Notes*, May 28, 2024.

³⁶ Sean Bray and Cecilia Perez Weigel, "[How Bermuda's New Corporate Income Tax Could Negatively Impact Some OECD Member States](#)," Tax Foundation Blog, August 29, 2023; Martin A. Sullivan, "[Gain and Little Pain From New Bermuda Corporate Tax](#)," Tax Notes Today International, April 22, 2024.

³⁷ Martin Sullivan (@M_SullivanTax), "[Will Pillar 2 raise a lot of revenue?](#)" X Post, April 8, 2024.

³⁸ European Commission "[The Green Deal Industrial Plan: Putting Europe's Net Zero Industry in the Lead](#)," The European Commission Strategy and Policy, February 1, 2023.

down to meet revenues. If Congress decides that current spending levels and projected spending increases are appropriate, taxes will eventually need to increase on Americans at every income level to cover the costs of projected spending levels. Every other large modern welfare state funds its higher government spending with high taxes on a broad swath of the population because there is not enough money at the top of the income distribution to fund current spending patterns.³⁹

Specific tax reforms should include:

- **Permanently extend the TCJA and continue to lower taxes on work and investment.** The most important policy is permanent full expensing for all investments. Congress should expand expensing to longer-lived structures by allowing the same immediate deduction or implementing a “neutral cost-recovery system,” which provides a similar economic benefit as expensing by allowing businesses to index their write-offs for inflation and time.
- **Repeal the IRA and CHIPS Act.** Congress should repeal all distortionary subsidies in the tax code, including those in the IRA and CHIPS Act. The higher revenue from repealing tax credits should be used to lower business tax rates.
- **Defund the OECD.** One important way Congress can stop the OECD global tax process is by explicitly rejecting the OECD framework and moving to withdraw from OECD membership if it continues to advocate for higher taxes on American businesses.⁴⁰ Withdrawal from the OECD should be paired with a prohibition on any US funding for the OECD in future budgets.⁴¹ Congress could further undermine the OECD tax cartel by lowering the US corporate income tax rate to 12 percent—the lowest rate in the OECD—and making America the most attractive place to do business in the world.⁴²

³⁹ Adam N. Michel, “[Biden’s Math of Just Taxing the Rich Doesn’t Add Up](#),” Cato at Liberty (blog), Cato Institute, March 22, 2023.

⁴⁰ To withdraw from the OECD, Congress must instruct the president to immediately notify the depository government (the government of France, where the OECD is based) under Article 17 of the Convention on the Organisation for Economic Co-operation and Development that the United States will terminate the application of the Convention and the Convention’s protocols.

⁴¹ Adam N. Michel, “[It’s Time to Defund the OECD](#),” Cato at Liberty (Blog), Cato Institute, May 9, 2024

⁴² Adam N. Michel, “[Bold International Tax Reforms to Counteract the OECD Global Tax](#),” Cato Policy Analysis No. 968, February 13, 2024.

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Statement

of

Scott Lincicome

**Vice President, General Economics & Stiefel Trade Policy Center
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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:

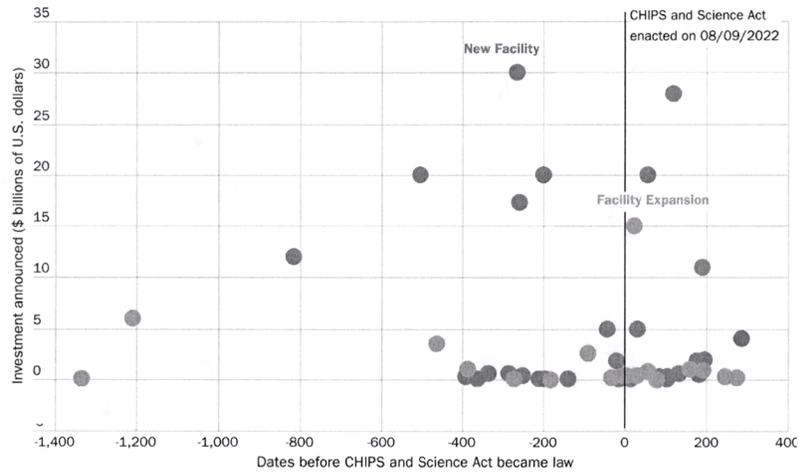
Policy Is Back (Again)," Cato Institute, August 11, 2021; Scott Lincicome, "'Dumping' Doesn't Mean What You Think It Means," Cato Institute, February 16, 2022; and Sallie James, "Food Fight," Cato Institute Free Trade Bulletin no. 31, January 30, 2008.

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.

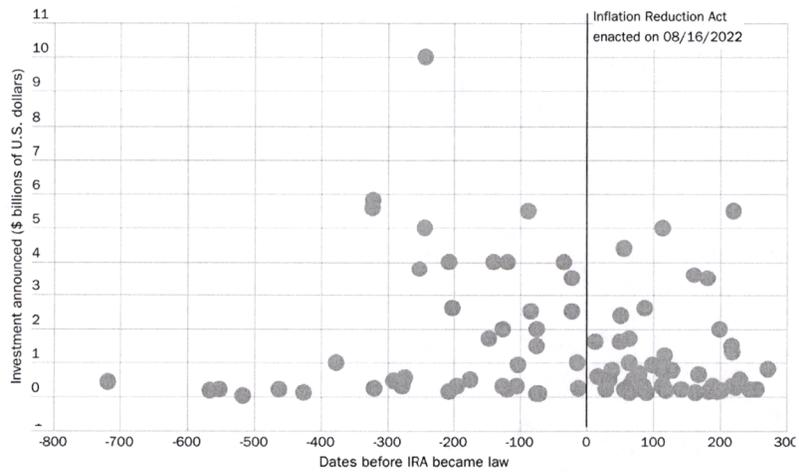
⁷ Amrith Rankumar, "Private Sector's Role in Climate Fight Grows during War in Ukraine," *Wall Street Journal*, July 1, 2022.

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 Benshoff, "[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.

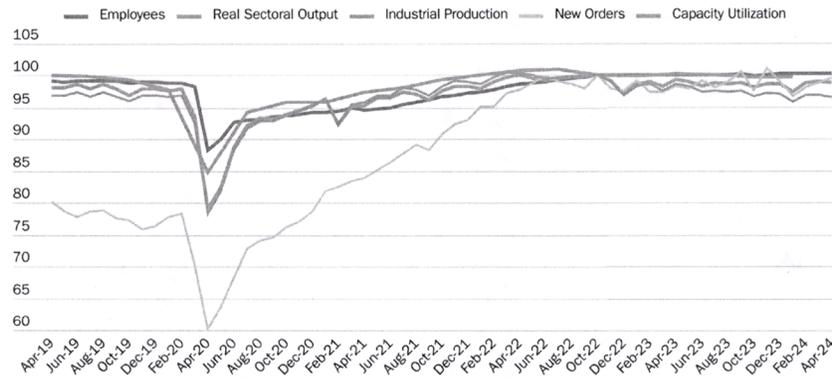
¹¹ "[Real Private Fixed Investment](#)," U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 30, 2024; "[Real Private Nonresidential Fixed Investment](#)," U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis, updated 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

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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; Brandon 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 Domanoske, “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.

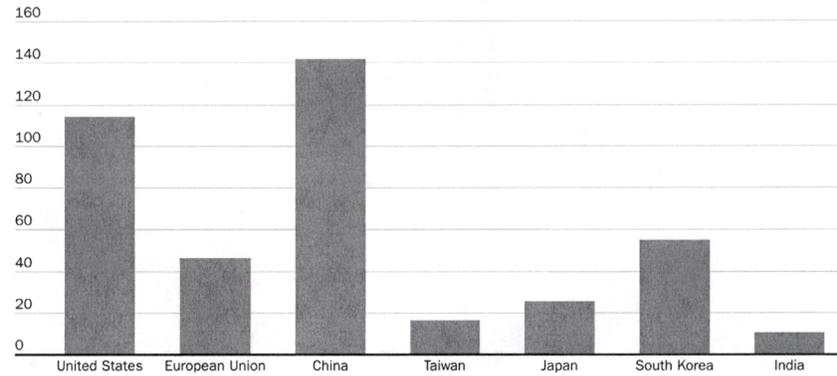
⁶⁶ Mike Colias, “Another Roadblock to the EV Transition: Personal Politics,” *Wall Street Journal*, May 27, 2024.

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.

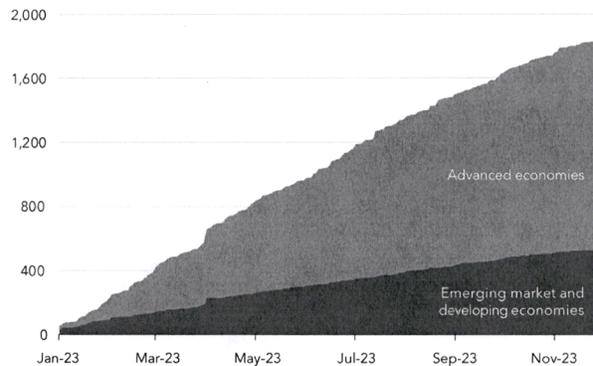
⁶⁹ Ana Swanson et al., "Europe and Asia React to U.S. Push for Tech and Clean Energy," *New York Times*, updated December 8, 2023.

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 EMEs 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 Lincome, "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.

Joint Economic Committee

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

June 12th, 2024

Responses For The Record

Questions From Senator Amy Klobuchar
Responses From Skanda Amarnath (July 12, 2024)

1. Minnesota is home to world-class chip manufacturing companies and a key operating base for so many others, including Polar Semiconductor, Skywater Technology, Onto Innovation, Seagate Technology, Honeywell, and TEL. Polar Semiconductor’s facility in Bloomington, Minnesota will receive significant federal funding as part of the CHIPS Act, allowing it to expand its production capacity. This investment is expected to create 160 manufacturing and construction jobs in Minnesota.
 - How will CHIPS Act investments in companies like Polar Semiconductor help our economy in the long-run? What are the expected returns on these investments?
 - How might the expansion of manufacturing capacity within the state impact other sectors of the Minnesota economy?

Response: Investments like the ones in Polar Semiconductor have a multitude of potential benefits over the longer run. I would draw particular attention to the role that a robust onshore supply chain can have in supporting supply chain resilience across a range of industries. We saw through the pandemic and the ensuing recovery how a global inability to produce semiconductors for the automotive industry led to multiple years of depressed motor vehicle production and elevated supply-induced inflation as a result. Ensuring a robust, resilient and modern domestic supply chain can have downstream benefits to the industries that depend on abundant access to key inputs, thereby allowing them to produce and innovate at scale. The past few years are instructive about how fragile supply chains can become and for the need to proactively invest in resiliency; it may be another sector that could be hamstrung and stoke inflation in the event of a future shortage.

There is also the obvious spillover benefits and positive externalities that can flow from making the hard investments in modernizing manufacturing production. Some of these benefits can flow from technological understandings of how to leverage semiconductors in new applications. Private firms in capital-intensive industries are often unilaterally unwilling to undertake additional investments, but the learnings from modernizing production techniques (‘learning-by-doing’) tend to be meaningfully valuable to economic development and can diffuse to other manufacturing firms and subsectors seeking to find new forms of competitive efficiency.

2. The CHIPS for America program aims to grow a diverse semiconductor workforce and build strong communities. For example, to encourage women's increased participation in the workforce, the CHIPS Incentives program requires certain applicants to submit plans to provide facility and construction workers with access to child care.
 - Why does access to child care contribute to ensuring semiconductor fabricators can attract and retain the skilled labor force they need?

Response: Child care availability can enhance both the ability for working-age persons to participate in the labor force on a sustained basis and help firms avoid dealing with the loss of experience, training, and knowledge associated with excessive workforce turnover. We have some key sources of evidence to suggest that child care, which historically was provided within the home and disproportionately by women, can play a vital role in accelerating labor force participation and employment. In the United States, just about three out of four women between the ages of 25 to 54 are employed, roughly two percentage points below the average OECD country. For comparison, in Canada, where there are active policies to constrain the cost of child care and promote its availability, just over 80% of women within the ages of 25 and 54 are employed. In the province of Quebec, 84% of women are employed, with much of that leading figure driven specifically by the initiation of a universal childcare policy.

At a time when the US economy has seen historically strong and tight labor markets, industries across the occupational spectrum will need to identify new approaches to attract and retain a skilled workforce. For the sake of successful acceleration of manufacturing investment and output, the provision of critical benefits and the attraction of workers from overlooked pools of potential labor supply will prove pivotal.

3. Minnesota is one of the 31 inaugural Tech Hubs as created in the CHIPS and Science Act. Minnesota's MedTech Hub 3.0 will leverage investments and local expertise to improve our standing as a center of innovation in medical technology.
 - Would you expand on how Tech Hubs across the country are capitalizing on local expertise to ensure the U.S. becomes globally competitive across a range of industries?

Response: Development patterns are rarely random. They are closer to a sequential ladder, where one set of existing capabilities provides the basis for identifying opportunities in new but adjacent business and product lines. It is no accident that Silicon Valley, now home to a leading software industry, first earned its name from the manufacturing of technological hardware.

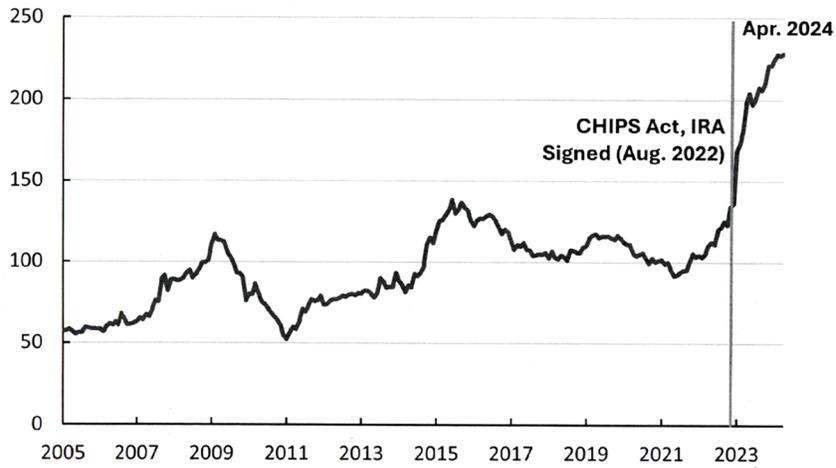
The United States is thankfully a highly diversified economy with a wealth of leading-edge firms and technologies, but it is also true that progress has stagnated across a number of dimensions. While still a leader in production of leading-edge research, the United States has fallen behind in the economic complexity of its patents and exported products.

Tech Hubs are thus an opportunity for investing in the connective tissue that translates existing capabilities, including leading research and a wealth of intangible know-how tied to incumbent industries, into successful commercialization of new and innovative products. The benefits of agglomeration can be profound if fully captured. They include the ability for more firms to benefit from shared and technologically-specific infrastructure, greater workforce specialization, and greater technological diffusion across workers and businesses. In the process,

more firms and workers develop highly valuable knowledge that translates into successful businesses, more good-paying jobs, and thriving communities.

After Passage of the CHIPS Act and IRA, Real Construction Spending on Manufacturing Surged

Billions of Apr. 2024 U.S. Dollars



Source: FRED Total Manufacturing Construction Spending, monthly at a seasonally adjusted, annualized rate using Price Index of Materials and Components for Construction



