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.

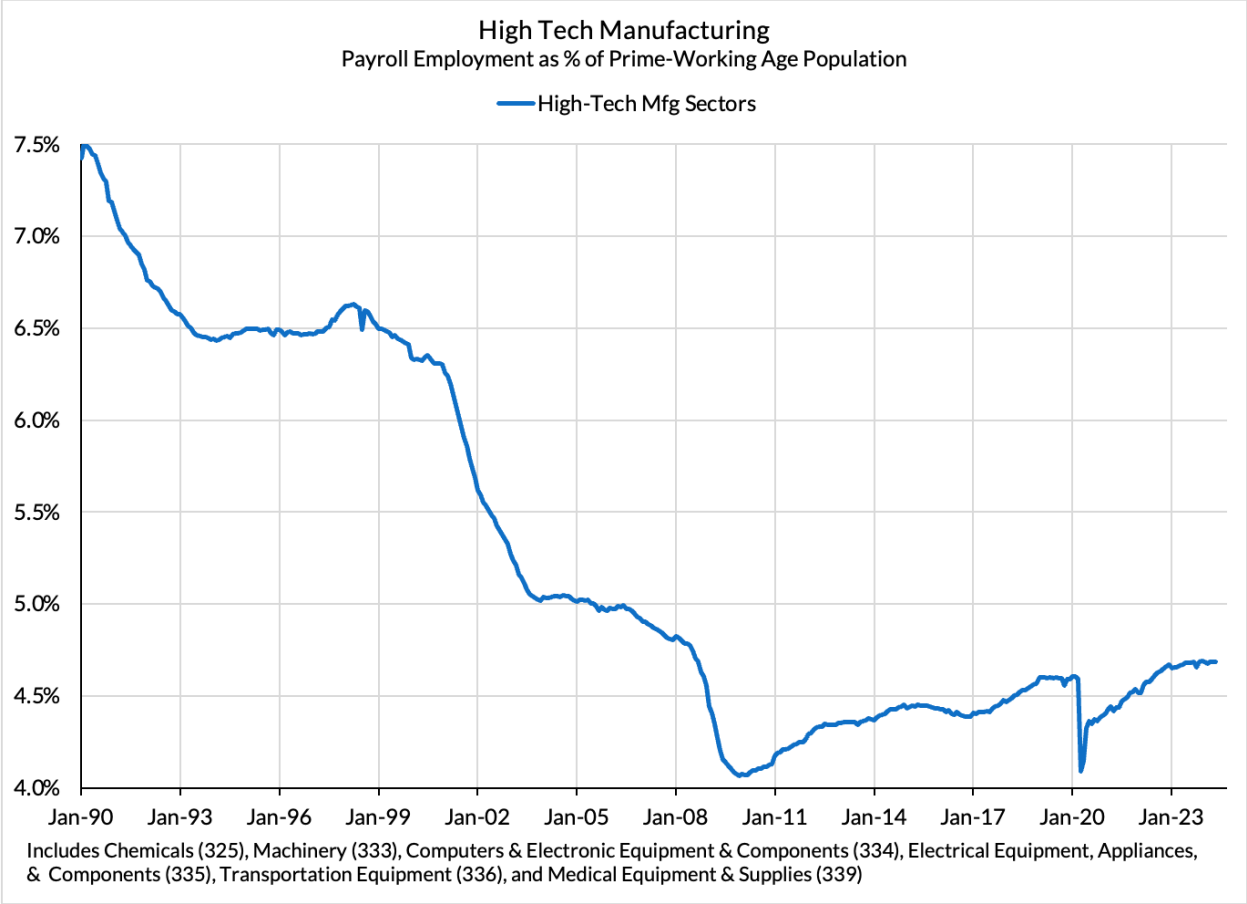
I plan on spending most of my time discussing what the available macroeconomic data tells us about the nature of recent manufacturing investments, and associated policies. But first, I'd like to lay out some reasons why manufacturing and industrial investment are of unique relevance.

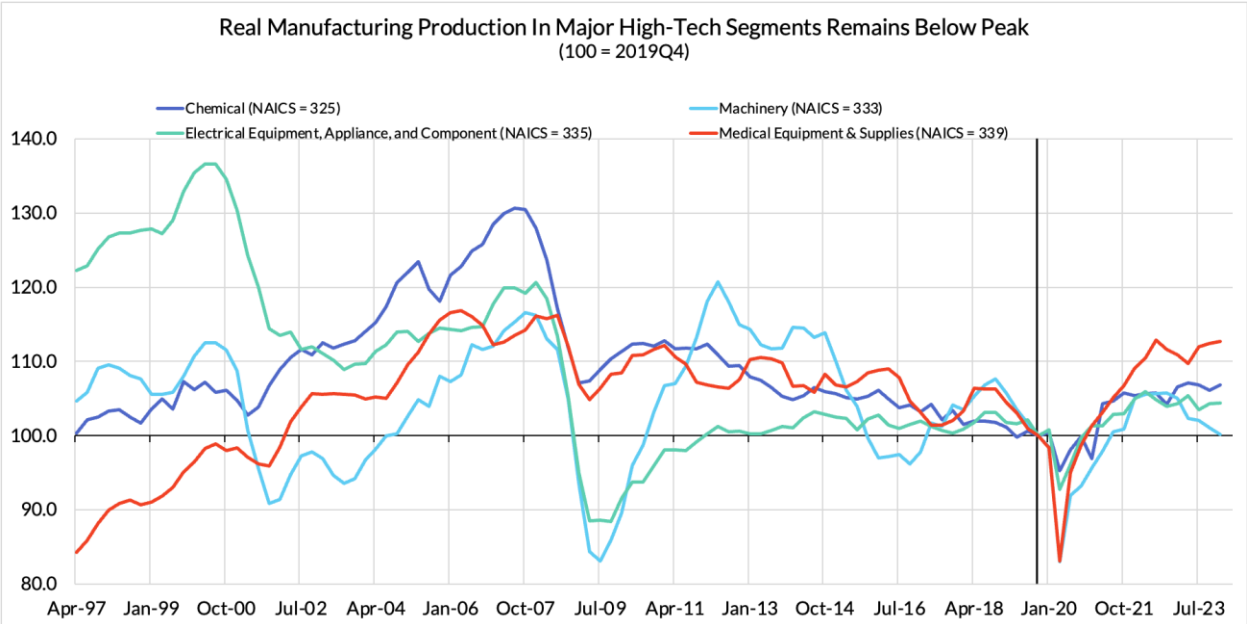
Economic development and manufacturing advancement have long been tied together. No major advanced economy has sidestepped the industrialization process on its path to becoming wealthy[1]. If you compare what each country exports, it becomes clear which countries are richer and which are poorer[2][3]. 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.

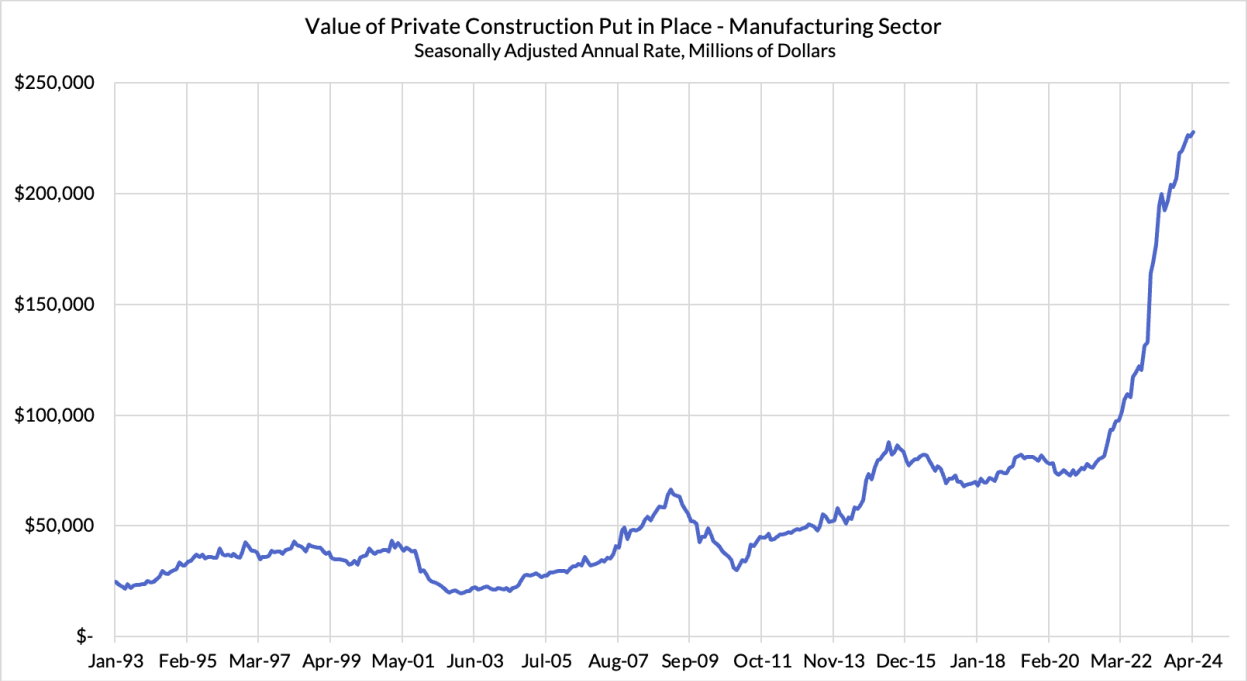
[1] Rodrik, D (2007). "Industrial Development: Stylized Facts and Policies," UNDESA. *Industrial Development for the 21st Century: Sustainable Development Perspectives.* 1.1: 7-28.
[2] Hausmann, R. and C. Hidalgo (2009). "The Building Blocks of Economic Complexity," *Proceedings of the National Academy 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.


High Tech Manufacturing
Payroll Employment as % of Prime-Working Age Population
High-Tech Mfg Sectors
7.5%
7.0%
6.5%
6.0%
5.5%
5.0%
4.5%
4.0%
Jan-90
Jan-93
Jan-96
Jan-99
Jan-02
Jan-05
Jan-08
Jan-11
Jan-14
Jan-17
Jan-20
Jan-23
Includes Chemicals (325), Machinery (333), Computers & Electronic Equipment & Components (334), Electrical Equipment, Appliances, & Components (335), Transportation Equipment (336), and Medical Equipment & Supplies (339)


Real Manufacturing Production In Major High-Tech Segments Remains Below Peak
(100 = 2019Q4)
Chemical (NAICS = 325)
Machinery (NAICS = 333)
Electrical Equipment, Appliance, and Component (NAICS = 335)
Medical Equipment & Supplies (NAICS = 339)
140.0
130.0
120.0
110.0
100.0
90.0
80.0
Apr-97
Jan-99
Oct-00
Jul-02
Apr-04
Jan-06
Oct-07
Jul-09
Apr-11
Jan-13
Oct-14
Jul-16
Apr-18
Jan-20
Oct-21
Jul-23

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 sector[4].

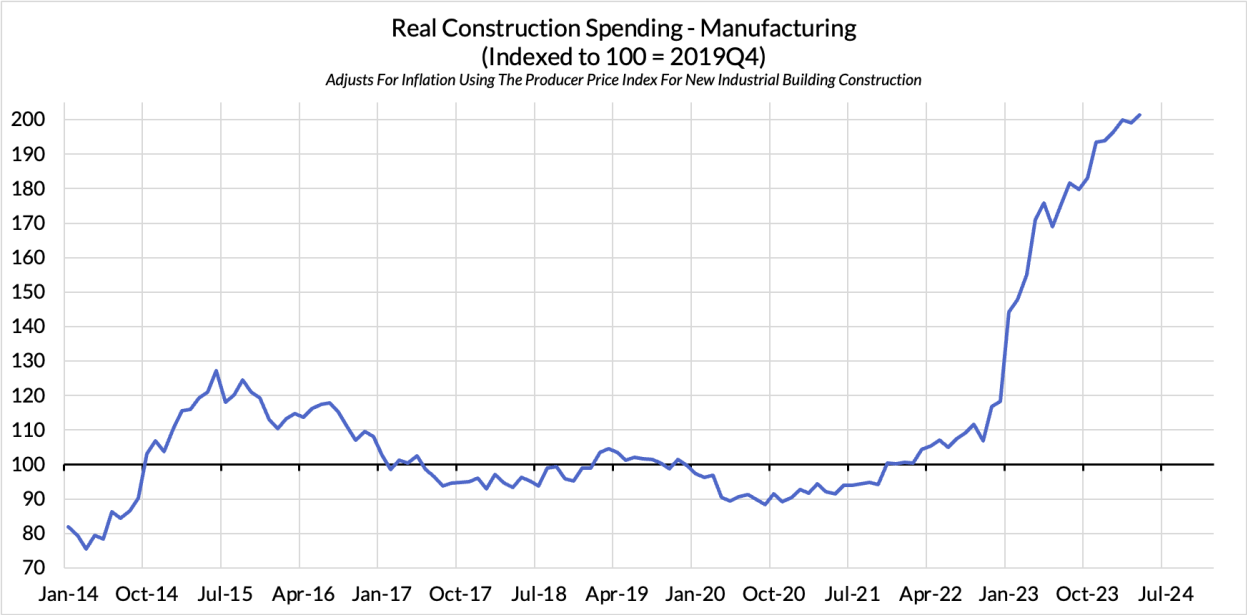
With all of these nuances in mind, the break-out in manufacturing investment is worth studying. The surge is most distinctly visible within manufacturing structures. The level of spending that the private sector has engaged in to construct manufacturing facilities has increased from approximately $80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



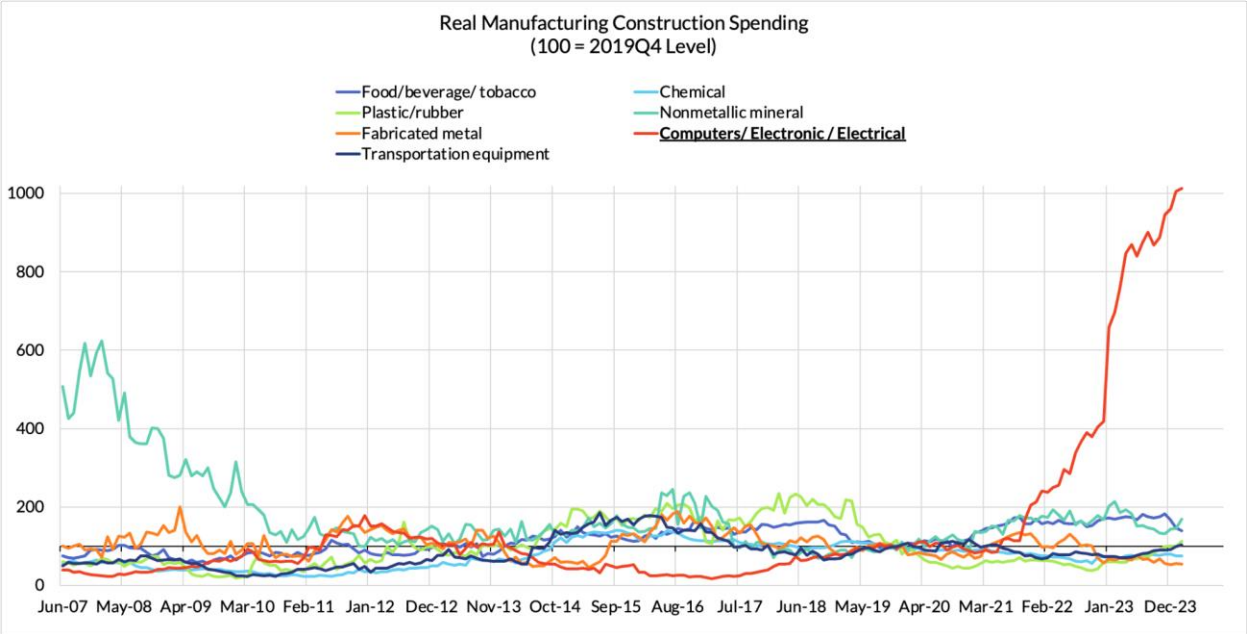
While public policy is surely supporting much of this increase, it's worth clarifying that these expenditures are directly deployed by private firms, not by governmental actors.

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.



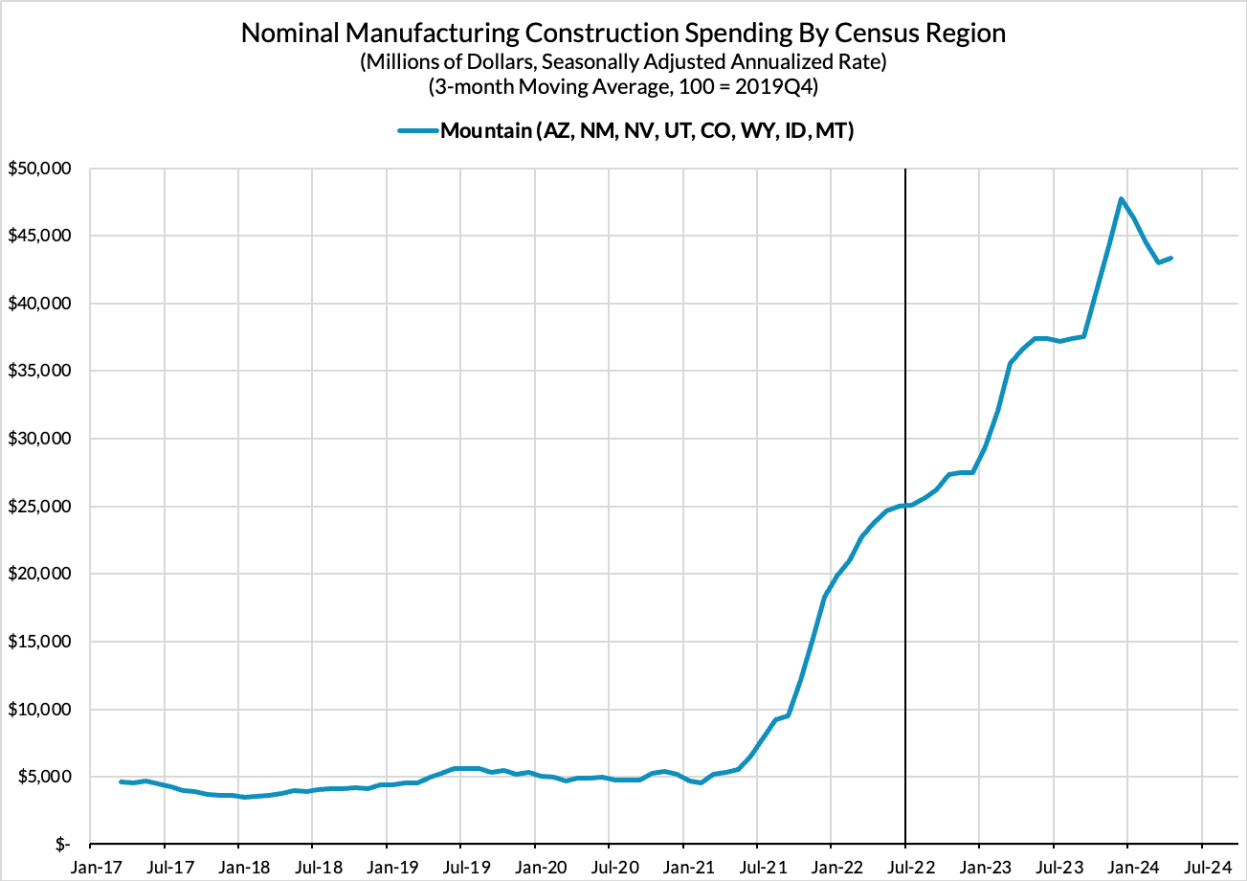
Any discussion of manufacturing investment in the here-and-now needs to get granular. The manufacturing investments and policies are aligned to specific subsectors. Not all manufacturing subsectors have seen a surge in investment, but the ones most closely adjacent to recently enacted legislation have. 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.



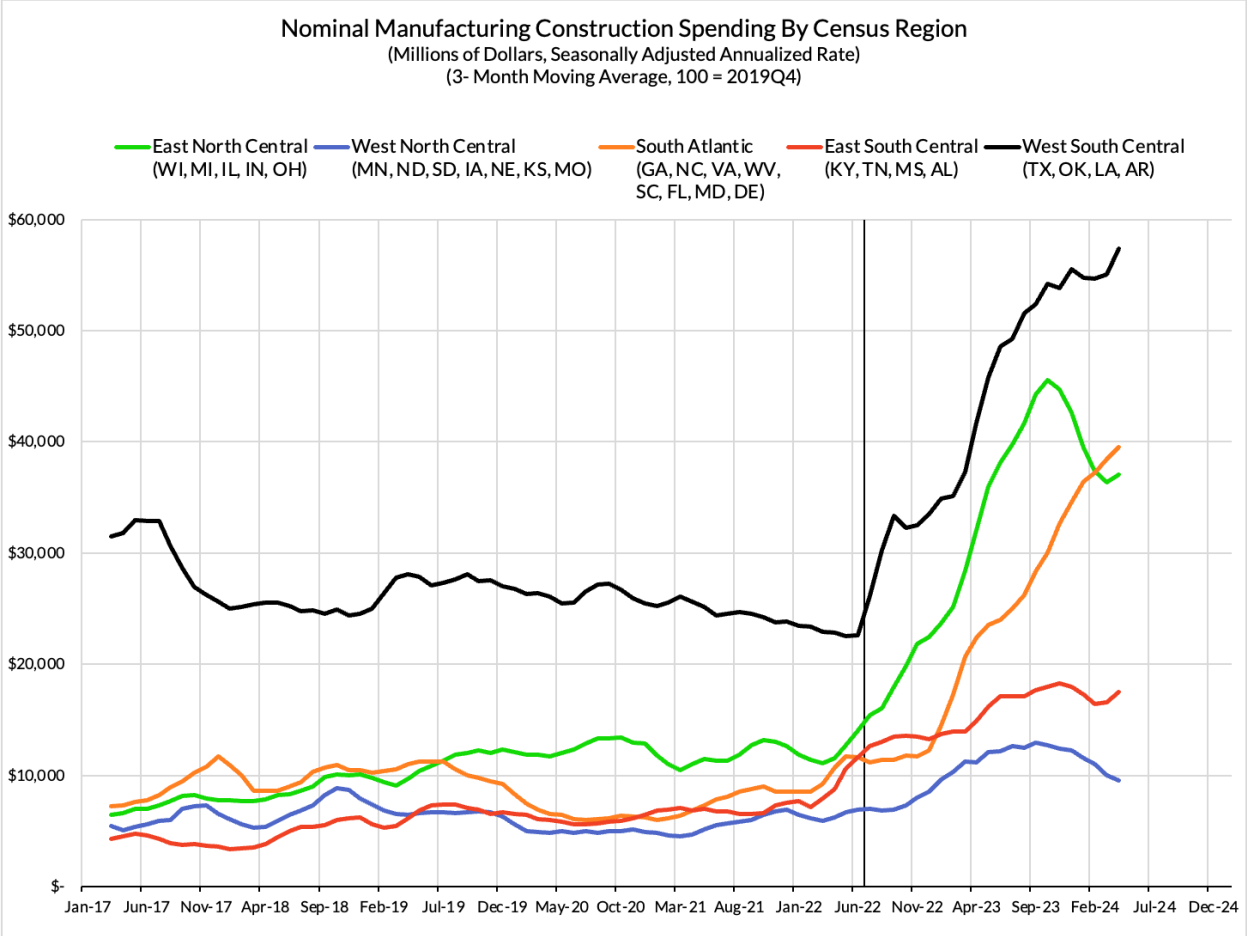
Computers, electronic, and electrical equipment and components are a broad category that intuitively encompass semiconductors, the primary subject-matter of the CHIPS & Science Act. What may be less obvious is that this same supersector also encompasses a variety of other products that are likely aided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

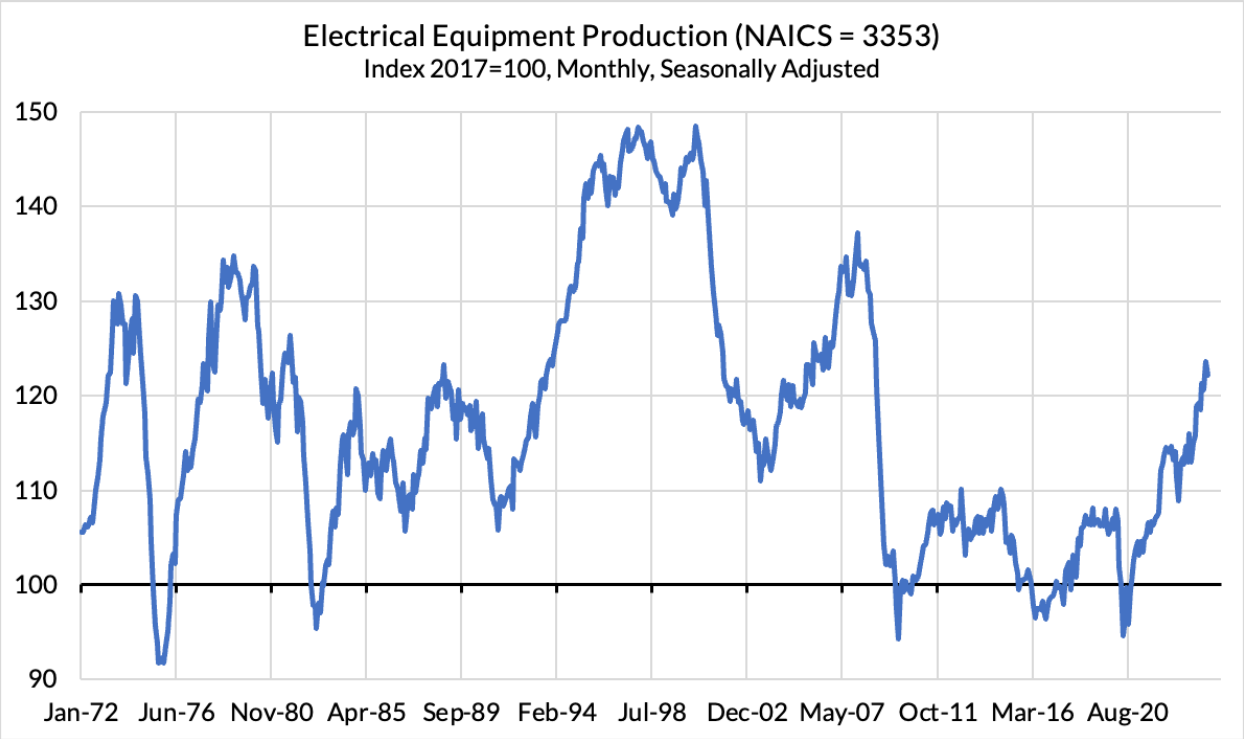


At least some of this investment was still substantially related to semiconductor manufacturing and likely in anticipation of CHIPS' ultimate enactment. Nevertheless, the effects of policy enactment are more clear-cut across other census regions in the Midwest and the Sun Belt, where manufacturing investment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



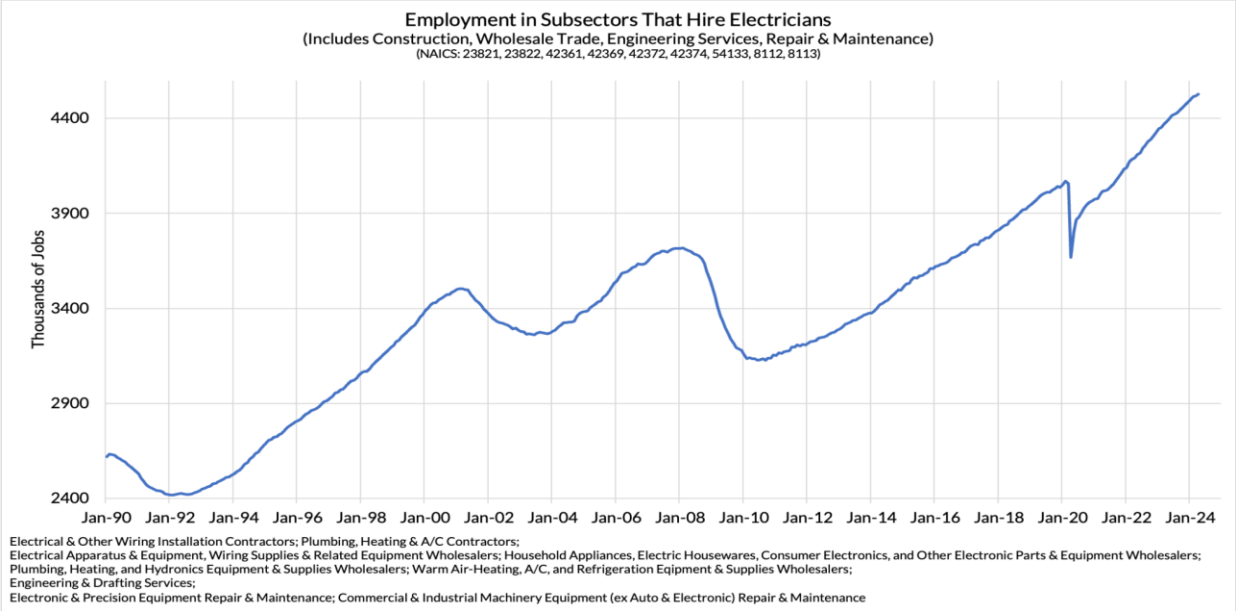
The timing of so many regions' surge in investment is the most compelling evidence that CHIPS and IRA have had a sizable impact on the willingness of manufacturers to build and improve their facilities, especially relative to the counterfactual.

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.

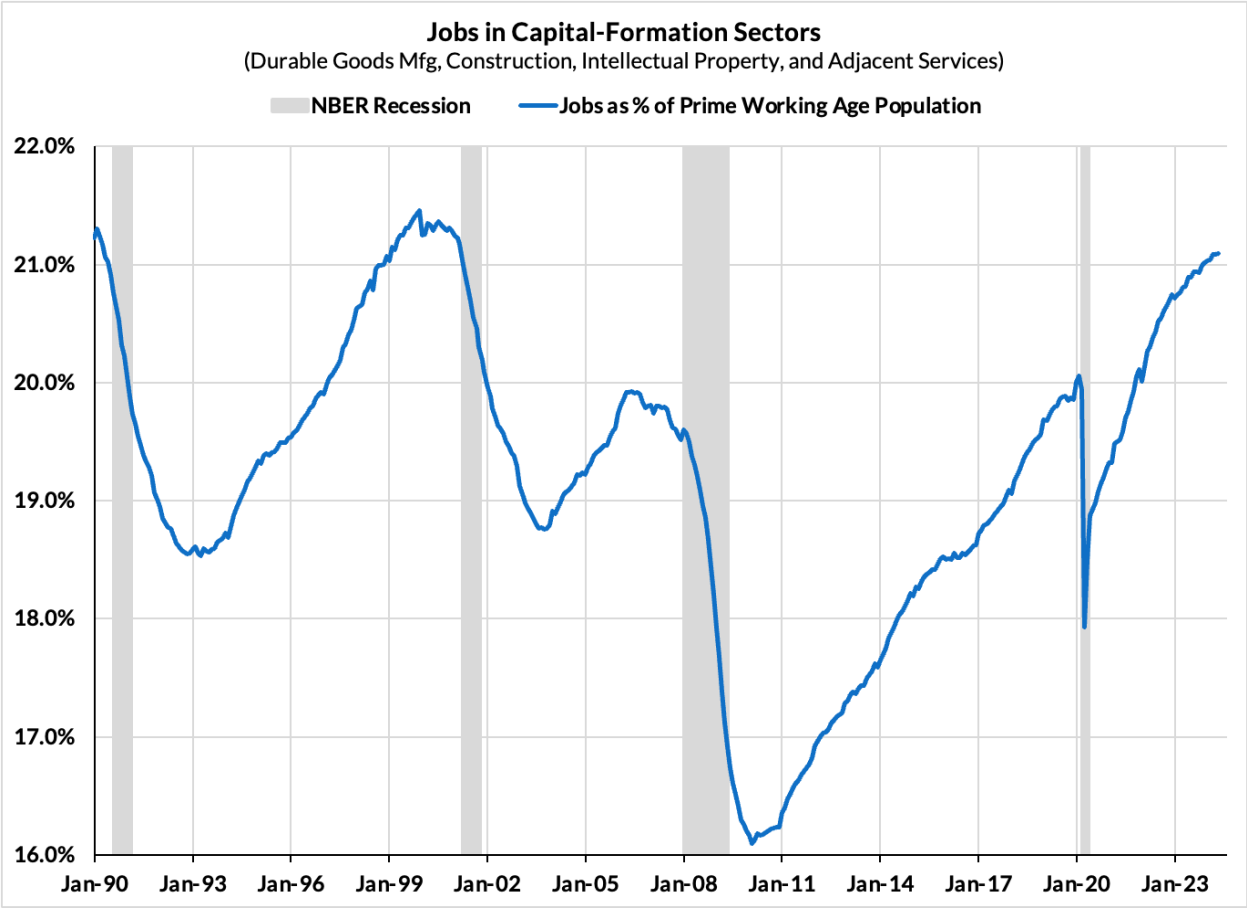


The success of enacted legislation will ultimately be judged by whether benefitting firms deliver production scalably and efficiently at the cutting edge of the technological spectrum.

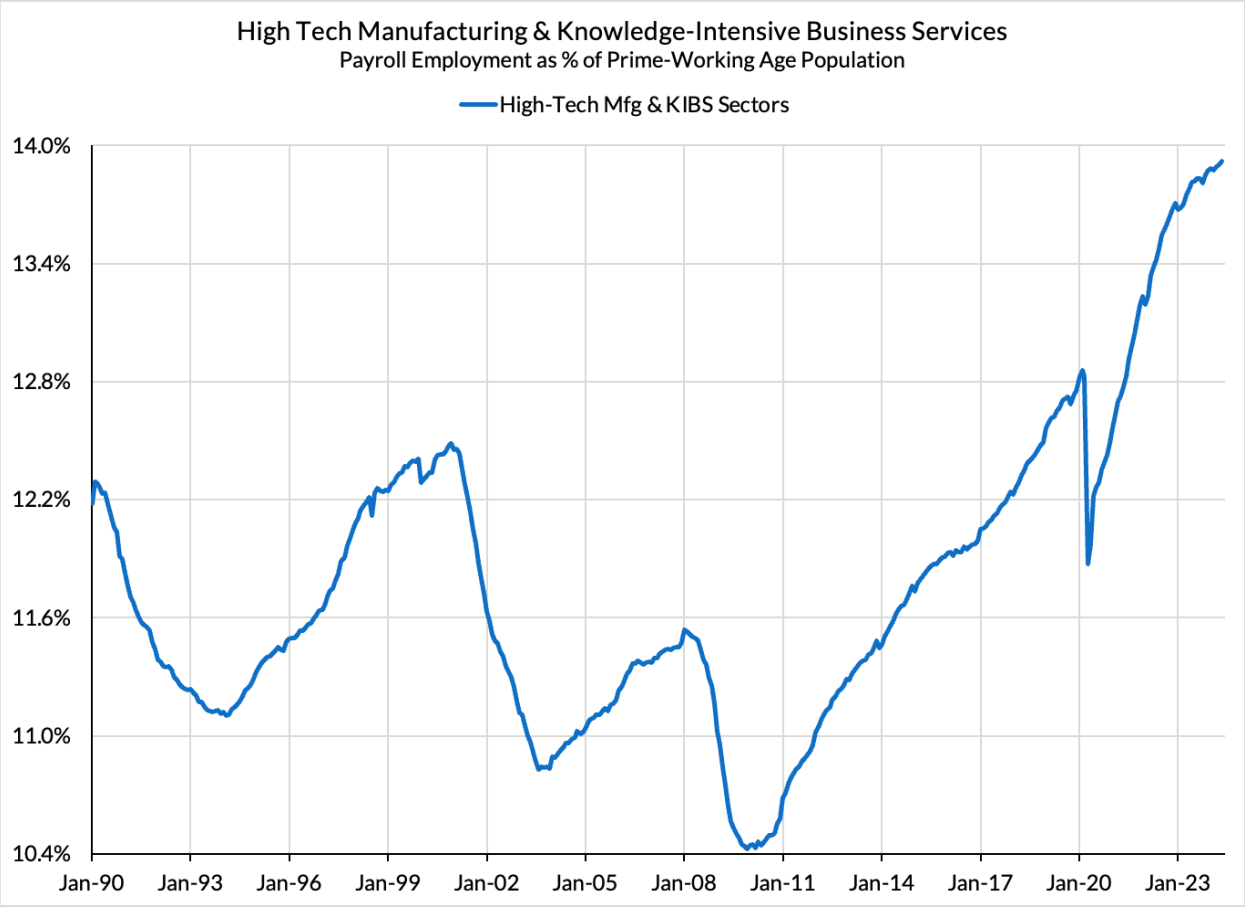
The relevant manufacturing investments, given their capital intensity, are also unlikely to show their full labor market impact through factory floor jobs. Instead, what we see is how manufacturing investments can drive a boom for jobs in construction, professional, scientific & technical services, as 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.



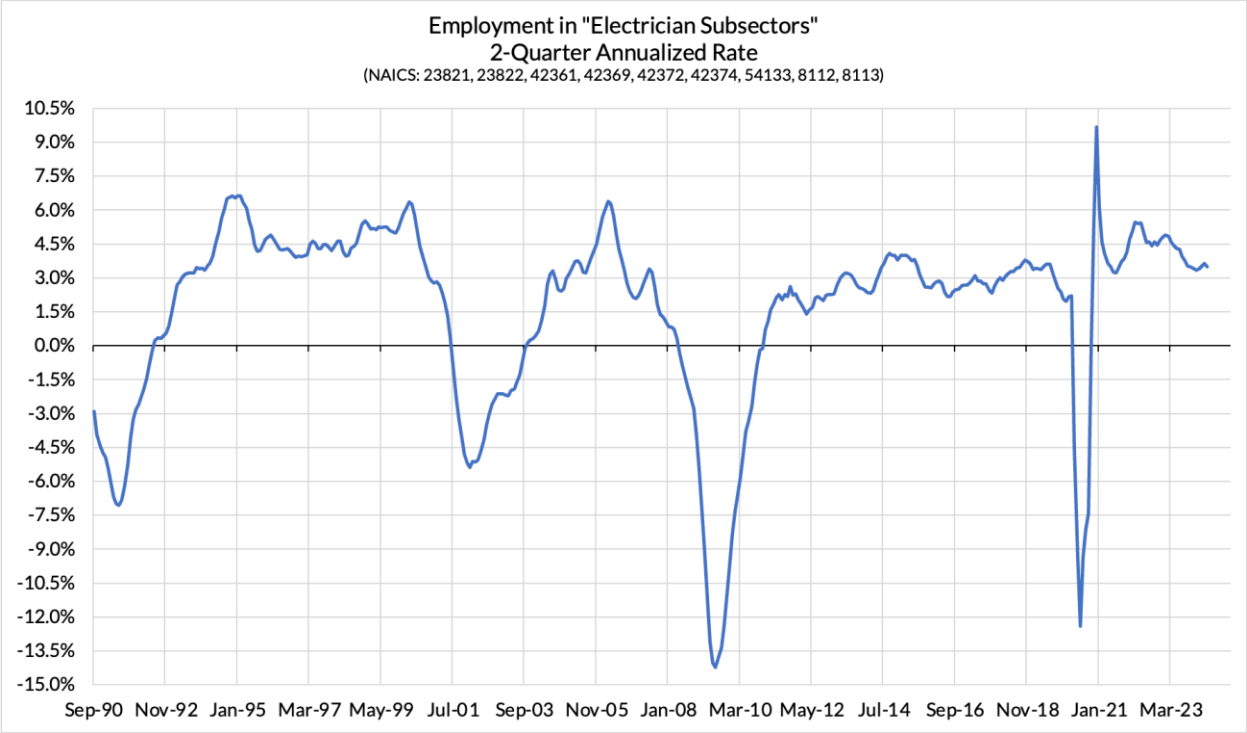
If we look at those sectors most directly responsible for the production of structures, equipment, and intellectual property, employment in those sectors has seen a noticeable outperformance in the past few years.



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 easily[5]. 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 development[6].

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.