

Special Commentary — March 20, 2024

# Building the Future

## Implications of the High-Tech Construction Boom

### Summary

There is a construction boom underway that is quietly transforming the production capabilities and other aspects of the U.S. economy. The fastest growing category within nonresidential construction in recent years has been manufacturing (Figure 1), specifically high-tech manufacturing. The crews that are putting up these cutting-edge facilities are building more than cleanrooms, they are changing the shape of manufacturing output and shortening far-flung global supply chains for U.S. producers. We need not wait to see it in the data. The high-tech manufacturing sector in the United States is already producing half-again as much as it was in 2017, but the roughly tenfold increase in the building of high-tech factories suggests the 50% increase could be just a down payment.

Our initial assessment is that this is not a manufacturing renaissance in the sense that it will lead to massive hiring in the manufacturing sector. In other words, we do not anticipate a major onshoring of jobs, but we do expect to see the onshoring of technical capabilities. That, in turn, has the potential to contribute to a rise in productivity which may offset structural labor force challenges stemming from an aging demographic. There is no shortage of things to worry about in terms of negative risks to our economic outlook. When we look for potential upside risks, however, the high-tech building boom is emerging as a key bright spot.

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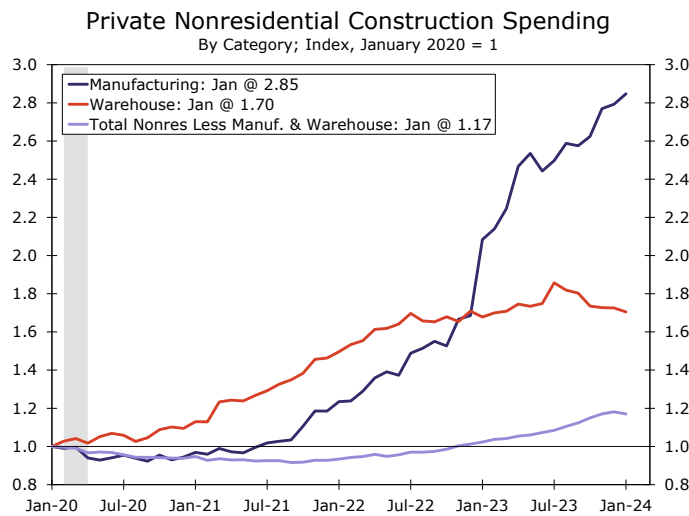
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Figure 1



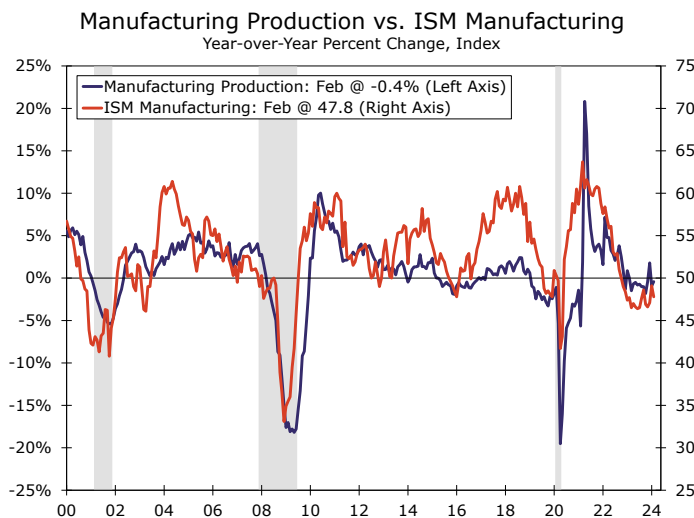
Source: U.S. Department of Commerce and Wells Fargo Economics

## Manufacturing Activity Has Stalled, but Construction Has Not

There are not a ton of reasons to be upbeat about the manufacturing sector at present. The broader U.S. economy may have avoided contraction, but the manufacturing sector has not been as lucky. The ISM manufacturing index has been signaling contraction for 16-straight months and manufacturing production has been negative on a year-ago basis for 10 of the past 12 months (Figure 2). But even as these measures are running at rates historically consistent with broader economic contraction, the level of manufacturing output shows more of a stalling rather than large retrenchment in activity. While it's about 2% below its post-pandemic high, output remains roughly in line with the run-rate throughout the second half of the prior cycle (Figure 3).

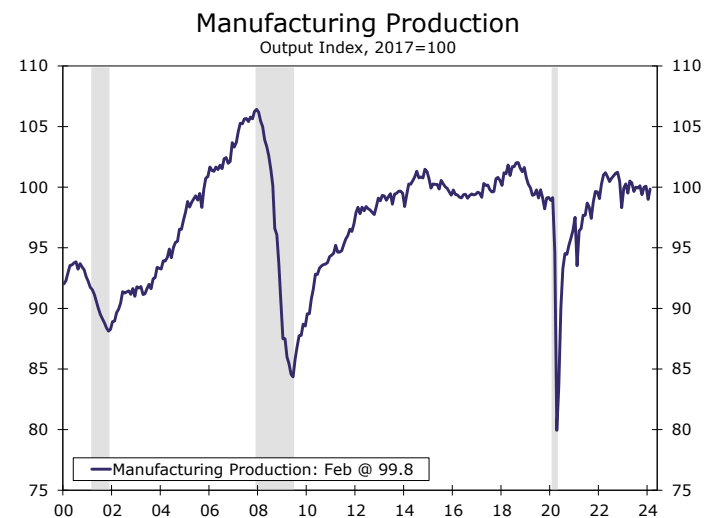
This stalling in activity is unsurprising in the context of a world still finding its bearings in the wake of the pandemic and the fastest pace of monetary tightening in 40+ years. After the consumer-goods driven boom in activity, domestic demand for goods softened amid a rebuild in inventories. At the same time, the higher cost of financing new capital investment has discouraged businesses from making large outlays. These factors together have been weighing on manufacturing output. Yet, even as manufacturing activity has stalled, manufacturing *construction* has not.

Figure 2



Source: Federal Reserve Board, Institute for Supply Management and Wells Fargo Economics

Figure 3



Source: Federal Reserve Board and Wells Fargo Economics

While manufacturing output has done little more than tread water over the past few years, spending on private manufacturing construction today is more than double what it was just three years ago (Figure 4). While these data are nominal, or not adjusted for the run-up in inflation, they still speak to an unmatched boom in spending on manufacturing facilities. The question is, as rates fall and new factories come online, does this construction translate to a rapid rebound in manufacturing activity?

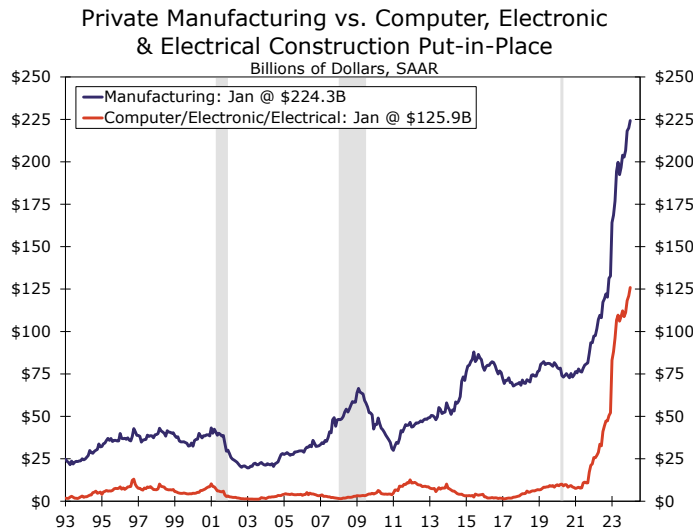
## Innovation Overdrive: High-Tech Construction Spending

The surge in manufacturing construction spending can largely be explained by one key sector: computer, electronic & electrical manufacturing. Outlays in that specific sector are up more than tenfold in the past three years alone; an unfathomable amount that translates to a nearly \$120 billion increase since early 2021 (revisit Figure 4). In level terms, the dollar amount of spending in this fast-growing sector today actually tops total manufacturing construction prior to the pandemic by about \$48 billion. There has been rapid growth in construction dollars put-in-place for other private manufacturing industries as well, but as seen in Figure 5, growth in other types of manufacturing construction pale in comparison to the computer & electric space.

The ready explanation for such rapid growth stems from a push to rethink far-flung supply chains in the wake of the pandemic, both through public investment as well as private initiative. The CHIPS Act, passed in 2022, allocated funds for domestic production by specifically setting aside financial incentives for investment in facilities and equipment in the U.S. semiconductor space.<sup>1</sup> The intent was to reduce the cost gap between the construction and operation of semiconductor manufacturing

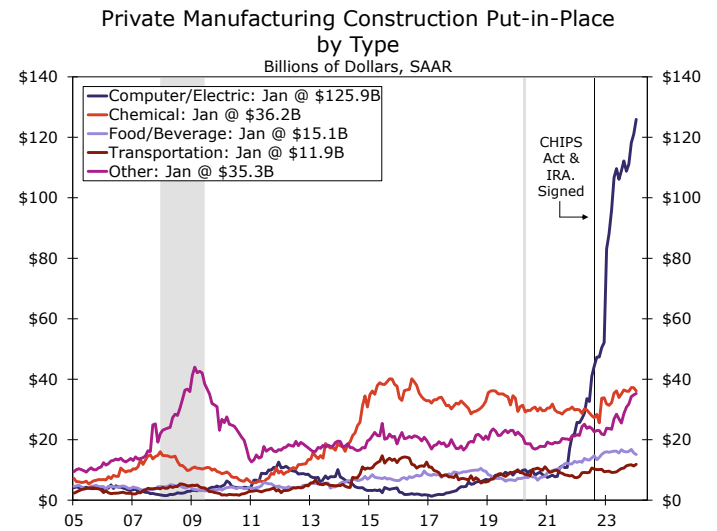
facilities abroad and those on the domestic side. These public incentives for domestic production spurred investment in the space as public dollars have served as a catalyst for a significant rise in private-sector spending. But in returning to [Figure 5](#) we see that computer, electronic & electrical private manufacturing construction was on the rise before the CHIPS Act was passed, which suggests public incentives are not the only catalyst. A realignment of supply chains generally is likely also supporting this push to produce key inputs like semiconductors locally after the all-to-recent memory of the pandemic-related supply throes.

Figure 4



Source: U.S. Department of Commerce and Wells Fargo Economics

Figure 5



Source: U.S. Department of Commerce and Wells Fargo Economics

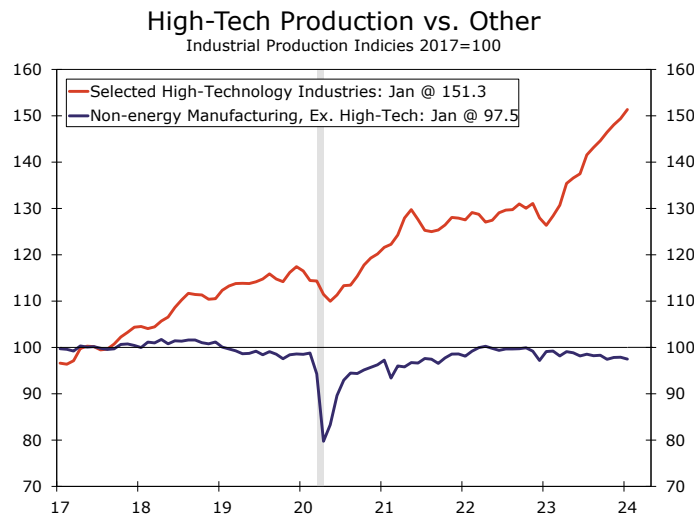
While the construction of these semiconductor facilities is well underway, the Congressional Research Service estimates a two-to-four-year lag between the start of facility construction and the beginning of semiconductor chip production.<sup>2</sup> Just now, we are only beginning to see effects of that build on actual output in U.S. industrial activity as the uptick in construction commenced in early 2021.

### High-Tech Production Already Rising Fast

So how big of an impact will this have on coming production? The domestic computer and electrical manufacturing sector is relatively small today; the computer & electronic products and electrical equipment, appliances & components manufacturing industries together account for about 6.4% of total U.S. industrial production (or about 8.5% of manufacturing). But the amount of investment flowing into private construction suggests this sector is set to grow in coming years. Production in selected high-technology industries is already showing signs of outsized growth. As seen in [Figure 6](#), this is particularly true over the course of the past year. Even as today's broader non-energy manufacturing remains fairly consistent with 2017 levels, high-tech production is already rapidly accelerating.

Orders activity is also supportive of coming production. Overall durable goods orders are showing some initial signs of life but have yet to fully take off. The recent awakening can be seen in orders for computers & electronic products in particular, which have risen for six straight months, outpacing broader core capital goods orders over the past year ([Figure 7](#)). As factories come online, production in these industries will likely benefit from the uptick in demand. Computer products and electrical equipment are also key inputs for an array of domestic industries. The construction space is an outsized user of electrical inputs, utilizing 36% of all the electrical inputs supplied to the economy. But machinery, electrical equipment & appliances, and motor vehicles together round out the top four industries utilizing about 60% of all electrical inputs.

Figure 6



Source: Federal Reserve Board and Wells Fargo Economics

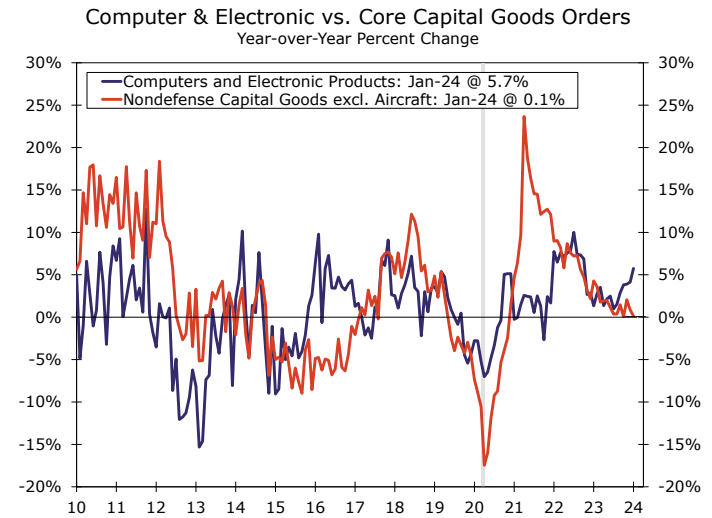
The semiconductor industry is highly integrated in U.S. production as well with the computers & electronic products space being the largest user.<sup>3</sup> But as the pandemic supply chain bottlenecks reminded us, a disruption to a small share of inputs can have a dramatic effect on production. For example, semiconductors represent less than 1% of the inputs in the auto & parts manufacturing industry, yet producers suspended production when they couldn't get their hands on enough chips. While it can take just one missing part to upend a product's entire manufacturing process, the flip side is that increased supply can support activity and eventually drive down prices. Today the economy relies largely on foreign economies for some key inputs like semiconductors, with about 40% of U.S. semiconductor inputs imported. But the uptick in domestic supply will also help diminish domestic reliance on foreign production.

### Inventories Supportive of Coming Production

Manufacturers have also generally been wise to not overproduce this cycle, which suggests as demand picks up we'll see a related increase in production. Compared to the years leading up to the pandemic, the broad manufacturing inventory-to-sales (I/S) ratio is elevated today. But the key thing to note here is that rather than unintended stockpiling, the inventory build is actually concentrated in inputs (materials & supplies) rather than finished manufactured goods. This is not a subtle distinction and points to scope for hyper-charged growth in production, particularly if it occurs alongside easing in monetary policy and a lower cost of capital.

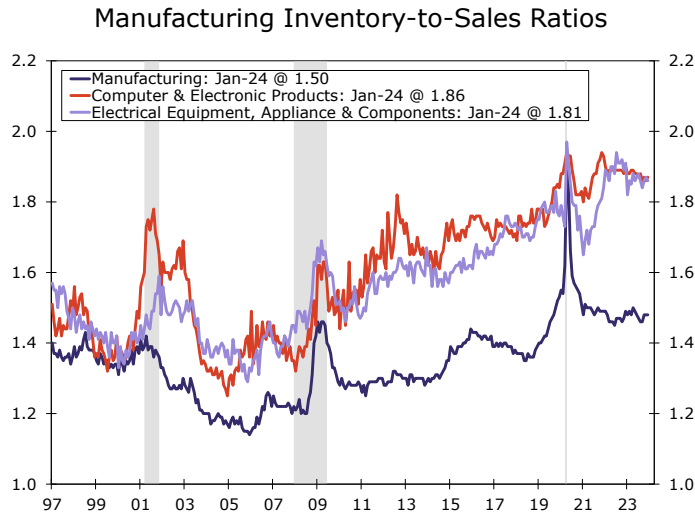
As you might expect given the recent construction boom, this input-driven inventory build is particularly evident in the computer & electronic product and electrical equipment, appliance & component industries. As seen in [Figure 8](#), the computer and electrical industries tend to hold more inventory on hand relative to sales than broader manufacturing. The fact that I/S ratios are running ahead of pre-pandemic levels is not too shocking given the wrench the pandemic threw in the all-important supply chain of these valuable products, which has likely led to some overstocking. But here too the stocking has been concentrated in materials & supplies, which have seen the largest gains in inflation-adjusted inventories across different manufacturing stages ([Figure 9](#)). Inventory dynamics therefore remain supportive of a coming pickup in production.

Figure 7



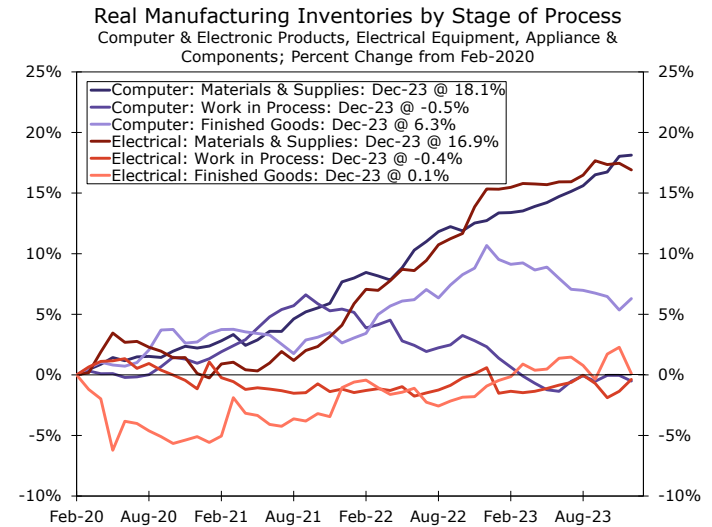
Source: U.S. Department of Commerce and Wells Fargo Economics

Figure 8



Source: U.S. Department of Commerce and Wells Fargo Economics

Figure 9



Source: U.S. Department of Commerce and Wells Fargo Economics

### Manufacturing Construction Poses Upside Risk to Growth

The track has been laid for an ensuing boost to activity, and we’re starting to see the early signs of this investment through a pickup in high-tech production. As the Fed begins to ease policy in the second half of the year, we anticipate more accommodative conditions to translate to a modest recovery in capex investment generally. But a medium-to-longer term support factor will likely come from this recent manufacturing construction boom, which looks set to be transformative for those who rely on key inputs, like semiconductors. There are sure to be knock-on effects from this surge in development as well. Specifically, a more readily available supply of chips will likely contribute to a rise in automation generally, which has the potential to contribute to a rise in productivity and offset structural labor force challenges stemming from an aging demographic. The manufacturing construction boom is therefore somewhat of an underappreciated upside risk to economic growth that you want to be awake to.

### Endnotes

1 – Recall the CHIPS Act (or *Creating Helpful Incentives to Produce Semiconductors for America Act* as it is known formally) was passed by Congress in 2022 with the goal of strengthening the domestic semiconductor manufacturing sector. The act appropriated around \$53 billion for semiconductor manufacturing, research & development and jobs training between 2023 and 2027. Of this amount, \$39 billion was specifically set aside for the implementation of a program that would provide financial incentives to covered entities for investment in facilities and equipment in the U.S. semiconductor industry. These funds have been and are being used to provide both incentives for legacy chip production as well as the cost of direct loans and loan guarantees for new equipment and facilities. [\(Return\)](#)

2 – “[Frequently Asked Questions: CHIPS Act of 2022 Provisions and Implementation.](#)” Congressional Research Service. April 2023. [\(Return\)](#)

3 - Specifically, semiconductors (NAICS 334413) represent about 8% of the intermediate inputs used in the computer & electronic product manufacturing industry. When incorporating other electronic component manufacturing such as printed circuit assembly manufacturing (NAICS 34418) and other electronic component manufacturing (NAICS 33441A), the share of inputs associated with this broader representation of chip production (NAICS 3344) accounts for about a fifth of total computer & electronic product manufacturing intermediate inputs. We rely on the Bureau of Economic Analysis [Input-Output Account Data](#) to calculate these intermediate input shares. [\(Return\)](#)

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