



# Hold the CHIPS: The Private Sector Is Fixing the Semiconductor Shortage

FRED ASHTON | JULY 25, 2022

## Executive Summary

- The fallout from the COVID-19 pandemic left global supply chains in disarray, resulting in a shortage of semiconductors.
- Chip manufacturers and end-users quickly began to address the problem by diversifying supply chains and preparing for future shortages; to date, the private sector has announced plans to spend more than \$830 billion globally over the next decade to expand capacity.
- Nevertheless, Congress is moving forward with the CHIPS Act of 2022, with \$52 billion in grants aimed at boosting domestic chip production; as it would subsidize domestic producers that are already investing a tremendous amount of capital, the bill is an unnecessary intervention that would disincentivize companies from making their own investments and incentivize them to overproduce semiconductors.

## Introduction

The fallout from the COVID-19 pandemic left global supply chains in disarray, resulting in shortages of countless commodities. Semiconductors quickly became a noticeable and particularly damaging casualty of the disruption. Many automakers then fell victim to the short supply, leaving the industry unable to meet a surge in demand, a problem that continues, albeit to a lesser extent, today.

From 2015 to the onset of the pandemic in February 2020, monthly vehicle sales averaged about 17.7 million units at a seasonally adjusted annualized rate. Two months after the pandemic began, that pace had been nearly halved. Auto manufacturers expected this collapse in demand to persist for an extended period and as a result canceled orders for semiconductors. Unexpectedly, demand for vehicles surged as massive amounts of fiscal stimulus made its way into the pockets of consumers, pushing vehicle sales back above 17 million units by early 2021. This spike in demand caught manufacturers flatfooted as they did not have enough semiconductors to satisfy consumers.

The semiconductor industry responded to these market forces and pledged more than \$80 billion dollars in new domestic production facilities while implementing new business practices designed to avoid future shortages. With such a backlog and an estimated three-year construction period for a new chip manufacturing facility, Intel's CEO [said](#) that supply problems would most likely persist into 2024. Taiwan Semiconductor Manufacturing Company said it will be able to increase capacity by the end of 2023, but increasing production could be delayed into 2024 and 2025.

Reacting to the semiconductor shortage, Congress proposed various iterations of the current CHIPS Act of 2022, first introduced in 2020. The original version pledged \$16 billion to the industry but has since morphed

into \$52 billion of direct subsidies and \$24 billion in tax credits aimed at boosting domestic chip production while preventing recipients of federal funds from building advanced semiconductor production facilities in countries that pose a national security risk. In other words, the bill would subsidize the expansion of semiconductor production in the United States to reduce the reliance on imports from China.

The CHIPS Act of 2022 is an unnecessary taxpayer handout at a time when private money is already working to solve the problem. With potential government money in the pipeline, the bill would run the risk of holding up domestic investment in production as firms may choose to delay their plans and wait for the bill to be approved and the funds distributed. This will likely take months, if not years, and further delay domestic industry expansion. Additionally, the bill could result in an overproduction of semiconductors as firms may decide to use government money to make investments the market does not require. Today's shortage could lead to tomorrow's glut. Last, another problem – as with many government programs – is moral hazard. It would not be unexpected to see other industries lining up for similar subsidies as semiconductors were far from the only commodity in short supply during the pandemic.

### **Competition Among Manufacturers**

Manufacturers of semiconductors are currently working on remedies to avoid such a shortage of supply in the future. Several chipmakers have announced their intention to build out domestic production and have done so in the absence of the government subsidies included in the CHIPS Act of 2022.

On January 21, 2022, the White House released a [fact sheet](#) that included an excerpt from a Semiconductor Industry Association (SIA) report highlighting that since the beginning of 2021, the semiconductor industry has announced nearly \$80 billion in new investments in the United States through 2025. Some of the projects listed include a \$17 billion Samsung factory in Texas, \$30 billion in investments from Texas Instruments, and a new \$20 billion Intel factory in Ohio. In 2020, prior to the pledges included in the SIA report, Taiwan Semiconductor Manufacturing Co (TSMC) announced plans to build a \$12 billion semiconductor facility in Arizona.

The value of these near-term investments dwarfs the \$52 billion government subsidy program.

The surge in expected investment is not just limited to the United States. [According](#) to *Forbes*, the private sector is expected to unleash nearly \$834 billion in spending globally over the next 10 years to expand capacity, including projects such as:

- Samsung's proposed investment over the next three years: \$205 billion
- SK Hynix's plan to spend \$97 billion on expanding its existing foundry facilities – in addition to a previously pledged \$106 billion for four new plants
- Micron's spending plans in the next decade: \$150 billion
- TSMC's investment in next three years: \$100 billion
- Intel's proposed investment in the European Union in the next 10 years: \$95 billion

*Forbes* reported that these domestic and international investments are far greater than China's rumored \$180 billion investment plan.

But what is causing chip manufacturers to favor expanding to new locations rather than doubling down on their

operations in China? It is simple – they are responding to market forces. Manufacturers know that their customers are diversifying their supply chains in the wake of the COVID-19 disruption, and they are reacting. In addition to adding capacity, they are expanding their manufacturing capabilities geographically to ensure they can meet the needs of their customers, and they are doing so without government subsidies.

TSMC [highlighted the importance](#) of such diversification when they noted that, “[T]his project is of critical, strategic importance to a vibrant and competitive U.S. semiconductor ecosystem that enables leading U.S. companies to fabricate their cutting-edge semiconductor products within the United States and benefit from the proximity of a world-class semiconductor foundry and ecosystem.”

### **Adjustments by Downstream Chip Users**

During the COVID-19 supply chain fallout, Toyota emerged as an outperformer. Unlike its peers, who temporarily shut down production due to a lack of semiconductors, Toyota was able to keep its manufacturing plants running. It was prepared.

Toyota had implemented new business practices in response to the Tohoku earthquake in 2011, a natural disaster that left the Japanese car industry reeling. The company created a supply chain early warning system. This system allowed the company to maintain production during the COVID-19 semiconductor shortage because it saw the problem sooner than its peers and was able to stockpile supply.

An article by *Jalopnik*, citing an article from *Bloomberg Businessweek*, [describes](#) the early warning system:

“Toyota asks its Tier 1 suppliers to input detailed information about their most obscure parts and materials providers in a complex database that it maintains. Using this system to glean information about, say, a single headlight Toyota purchases for one of its cars, it can get information as granular as the names and locations of the companies that make the materials.... These lines of communication alerted the company early on that it needed to stockpile chips.”

*Fortune* notes that BMW, Volkswagen, and Daimler’s Mercedes-Benz, as well as other firms, have partnered to create an early warning system of their own. These companies, while late compared to Toyota, are responding to market events, and adjusting their business plans.

Supply chain diversity is another adjustment many companies are making, specifically shifting operations out of China as the country’s zero-COVID policy continues to snarl supply chains. An article that appeared in *The Wall Street Journal* published by Deloitte emphasized the result of a recent survey of 700 global manufacturers. The survey found that, “companies based in the U.S. and Europe have reduced their reliance on China for sourcing over the last two years. Specifically, the survey found that U.S.-based companies reporting that China was one of their top three sourcing countries fell to 77% in the first quarter of 2021, from 96% in 2019. For companies based in Europe this figure fell to 80% in Q1 2021, down from 100% in 2019.”

Diversifying supply chains is not something that can happen overnight, but early indications suggest that companies are responding to market forces without government subsidies. Many companies missed an unprecedented surge in demand for goods brought on by the COVID-19 pandemic because they were unable to source enough materials, specifically from China.

## **Conclusion**

The CHIPS Act of 2022 is, at its best, a feeble attempt to solve a specific, and likely temporary, problem of a shortage of semiconductors by providing incentives for manufacturers to expand capacity in the United States.

The bill also runs the risk of encouraging an overproduction of semiconductors as manufacturers will be subsidized to build capacity that the market does not necessarily require. Additionally, moral hazard could lead to other industries lining up for similar subsidies as semiconductors were not the only commodity in short supply during the pandemic. Manufacturers and end-users alike are responding to market forces and competition to address this problem and will undoubtedly come to a better result than this taxpayer handout.