



The Bottom Line

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SEMICONDUCTOR SHORTAGE IMPACTS MANUFACTURING

Summary

A growing number of manufacturers around the world are having trouble securing supplies of semiconductors, delaying the production and delivery of goods and threatening to push up the prices paid by consumers.

Background

A six-decade-old invention, the microchip, has gone from little-understood workhorse in powerful computers to the most crucial and expensive component under the hood of modern-day gadgets. Semiconductors are the chips that manage functions like data storage, graphic rendering, and power consumption in electrical devices. They are typically made of silicon wafers and are omnipresent in today's digital world. Microchips are found in nearly everything, from the obvious (cellphones, smart devices) to the not-so-obvious (your power tool's lithium-ion battery). In your car, computer modules control everything from engine and transmission operation to in-car tech. The microchip is as ubiquitous in modern consumer products as wood is in home construction. But unlike lumber, microchips aren't merely refined raw material. While many chips (such as those used for computer memory) have numerous applications, that doesn't mean that all computer chips are created equal. The specialized computers that manage your car's powertrain components, infotainment and onboard safety systems can't simply be swapped out for whatever's available. Semiconductor fabrication is a complex and expensive process - taking up to six months for each chip - which limits the size of the field, and not every manufacturer can supply the chips needed by manufacturers. By and large, silicon producers are several steps removed from the assembly of the products their chips power.

Current Status

Several factors are driving the crunch, which was initially concentrated in the auto industry. The first is the coronavirus pandemic, which plunged the global economy into recession last year, upending supply chains and changing consumer shopping patterns. Carmakers cut back orders for chips while tech companies, whose products were boosted by lockdown living, snapped up as many as they could. At the same time, some key semiconductor manufacturers had to temporarily suspend production. In Austin, Texas, Samsung shut down a chip plant for more than a month because of power outages arising from blistering cold weather; and in Japan, Renesas recently paused production following the outbreak of a fire on-site.

Asia's two largest chipmakers, Taiwan Semiconductor Manufacturing Co. and Samsung Electronics Co., are responsible for making the vast majority of the world's most advanced silicon, yet don't have the capacity to meet current

demand. It's a bottleneck that could last several quarters—or into next year. While the supply squeeze has been felt across the semiconductor industry, those display-bound integrated circuits pose specific challenges. Since they are not especially advanced, the circuits are typically made at chip factories that are several generations behind the cutting edge. With chipmakers focused on building more advanced fabrication plants that yield more valuable components, there has been little incentive to invest in capacity at older facilities. It's simply not possible to churn out more of them even when demand spikes.

Impact

The US government has proposed a \$50 billion stimulus for the US chip industry to bolster American chipmaking capabilities. But this will do nothing to help with the current situation, according to Michael Hurlston, CEO of Synaptics, a company that sells integrated circuits for controlling touchscreen displays to manufacturers of consumer electronics. "It's just simple economics," he says. "There's a finite amount of supply, we're all fighting for it."

RESOURCES

[How a Chip Shortage Snarled Everything from Phones to Cars](#) (Bloomberg)

[The Global Chip Shortage is Going from Bad to Worse. Here's Why You Should Care](#) (CNN)

[Chip Shortage Explained: Low Inventory, Skyrocketing Used Car Prices and No End in Sight](#) (Yahoo News)

[Global Microchip Shortage Could Last Two Years](#) (WHIO News/Dayton)

[The Chip Shortage is Driving Up Tech Prices - Starting with TVs](#) (Wired)