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Shoring Up Semiconductors

A reliable supply of semiconductors is important for communication, consumption and national security.

By Ryan James Boyle

I gained a new perspective on the prevalence of microchips when we purchased a seemingly simple $20 table lamp for our front room. The lamp required a wi-fi connection to control its timing and color temperature with a smartphone app. Whatever happened to the simple pull-chain?

Today, nearly everything contains semiconductors. And any item that contains chips has likely encountered procurement problems during the past two years. Fortunately, the acute shortage of semiconductors is improving, and going forward, reforms will reduce the economy's sensitivity to chip supplies.

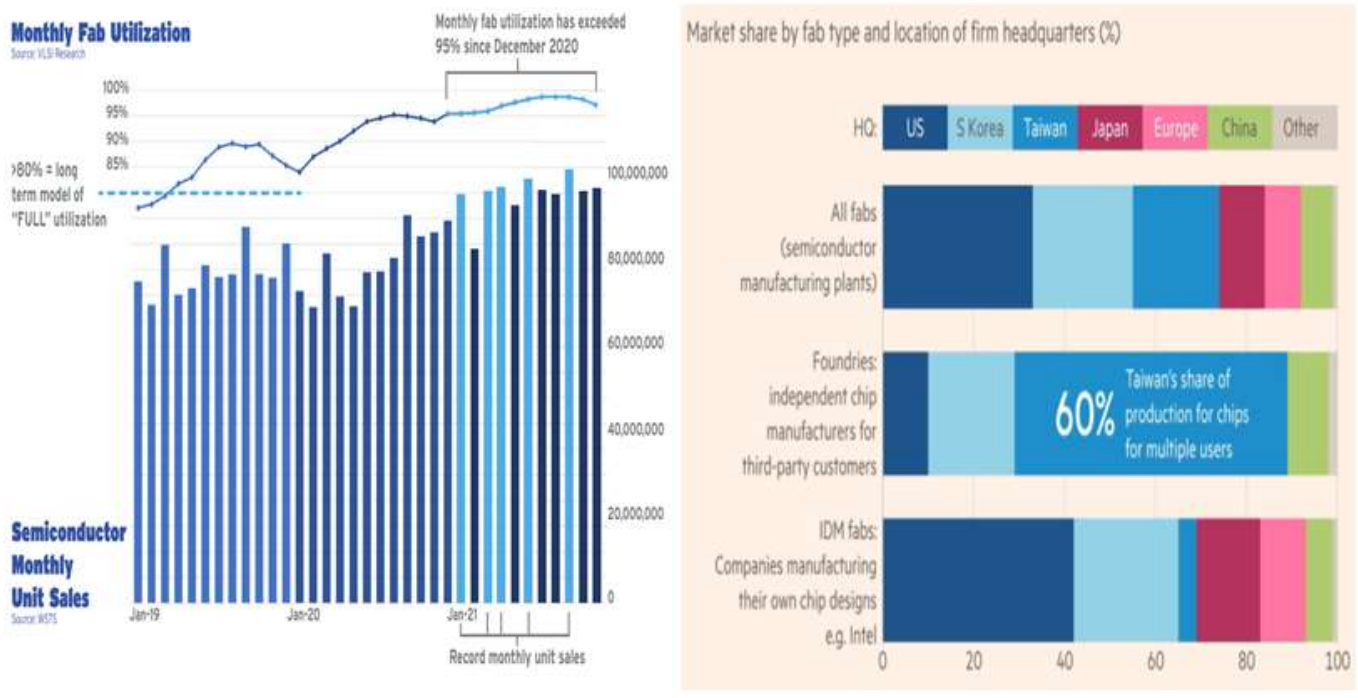
The chip shortage has been **well-covered** in the past two years, as pandemic disruptions and other calamities distorted the market. The biggest surprise is how quickly shortages have now faded.

At the start of the year, the U.S. Commerce Department estimated manufacturers' inventories of semiconductors had fallen from forty to only **five days**, a serious risk. From there, the situation has improved. Retail inventories of electronics have bounced back from a pandemic depletion, as demand cooled while production carried on. The automotive sector remains the most disrupted, with modern vehicles dependent on hundreds of chips, but auto inventories have arrested their descent. Chipmakers are now encountering **bearish markets** as demand for chips settles and worries grow of a near-term glut.

Industry capacity did not keep pace with demand, and growth has been geographically skewed. The Semiconductor Industry Association estimates about 37 percent of the world's chips were manufactured in the U.S. in 1990, dwindling to about 12 percent in 2020, as production economics shifted. Construction of a modern fabricator (or fab), a chip factory, costs about $10 billion, and demand is highly cyclical. These dynamics led to the rise of contract chipmakers, especially in Taiwan; many well-known semiconductor brands do not have their own plants.

Chipmakers already had plans in place to expand their capacity. New fabs are under construction in Ohio, Arizona and Texas. Given their complexity, none will be online until 2024 at earliest, but they will provide important resiliency thereafter.

The semiconductor shortage rippled through the markets for most durable goods.



Sources: VLS Research/Semiconductor Industry Association, Center for Security and Emerging Technology/FT

New fiscal policy will underpin these projects. Earlier this month, Congress passed the bipartisan **Chips and Science Act**, which will provide over $52 billion to support domestic production of microchips. In practice, these subsidies will lower the cost of building a new U.S.

fab by about $3 billion, reducing some of the cost premium of domestic production. The U.S. is not alone, as the European Commission has proposed **similar support** for its electronics sector.

A reliable supply of semiconductors is necessary for communication, consumption and even national security. The COVID crisis revealed a fault line, but it can be healed. Judicious use of industrial policy will ensure we keep the lights on.

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