QUARTZ MEMBERSHIP

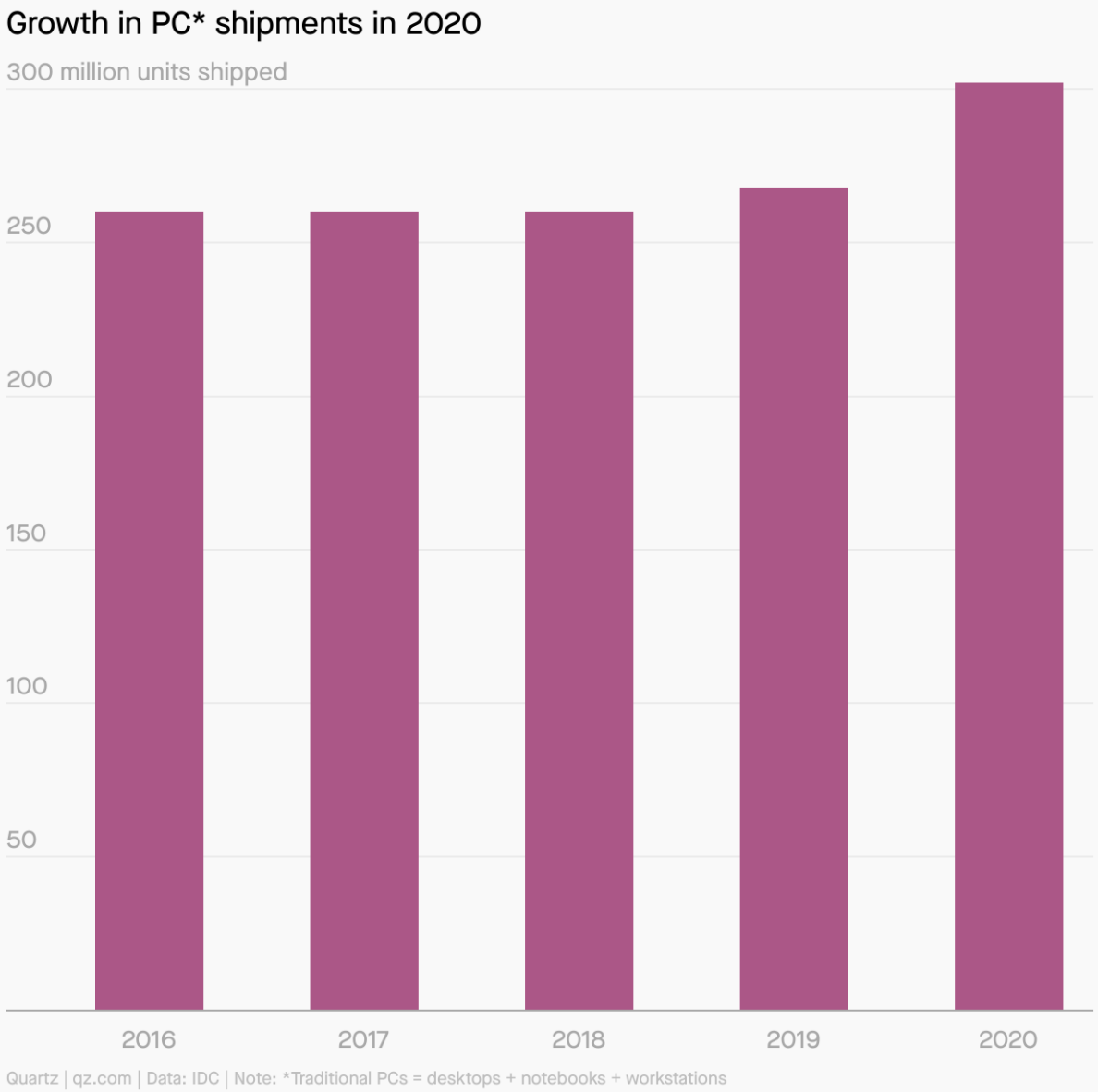
What you need to know about the global chip shortage

Member exclusive by Chika Dunga

PHOTO BY ALEXANDRE DEBIEVE ON UNSPLASH

We’re in the middle of a chip shortage

Back in 2020, Covid-19 sent millions of people indoors, resulting in a surge in demand for consumer electronics. People around the world bought laptops to set up home offices and virtual schools; they splurged on televisions and gaming systems to keep them entertained. Companies making chips couldn’t keep up. Now there’s a shortage that’s affecting everything from cars to smartphones.



Data: IDC

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Chips move everything around me

Chips—also known as semiconductors—play a major role in how we live. They are key components of electric devices such as smartphones, computers, and cars and the building blocks to technology like artificial intelligence and quantum computing. A chip shortage affects everyday devices that we use. That has financial implications for a number of industries.

Things you probably didn't know that use chips

Smart refrigerators

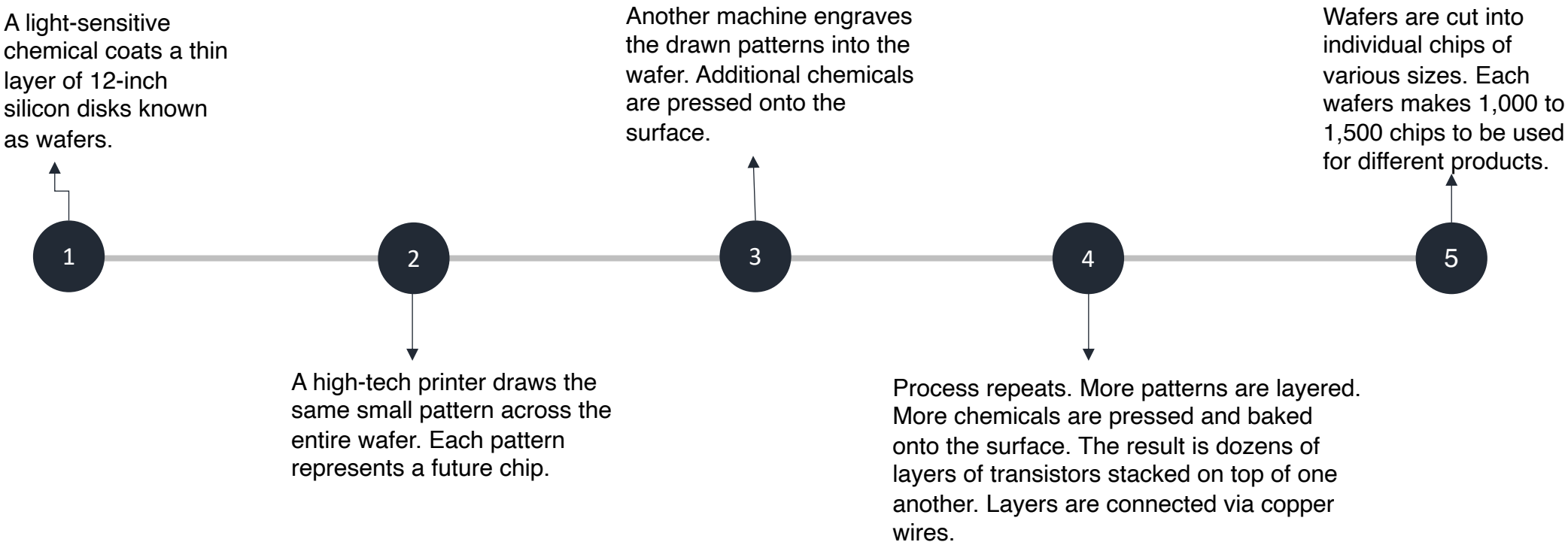
Digital pianos

Wireless headphones

Icons made by freepik from www.flaticon.com

How chips are made

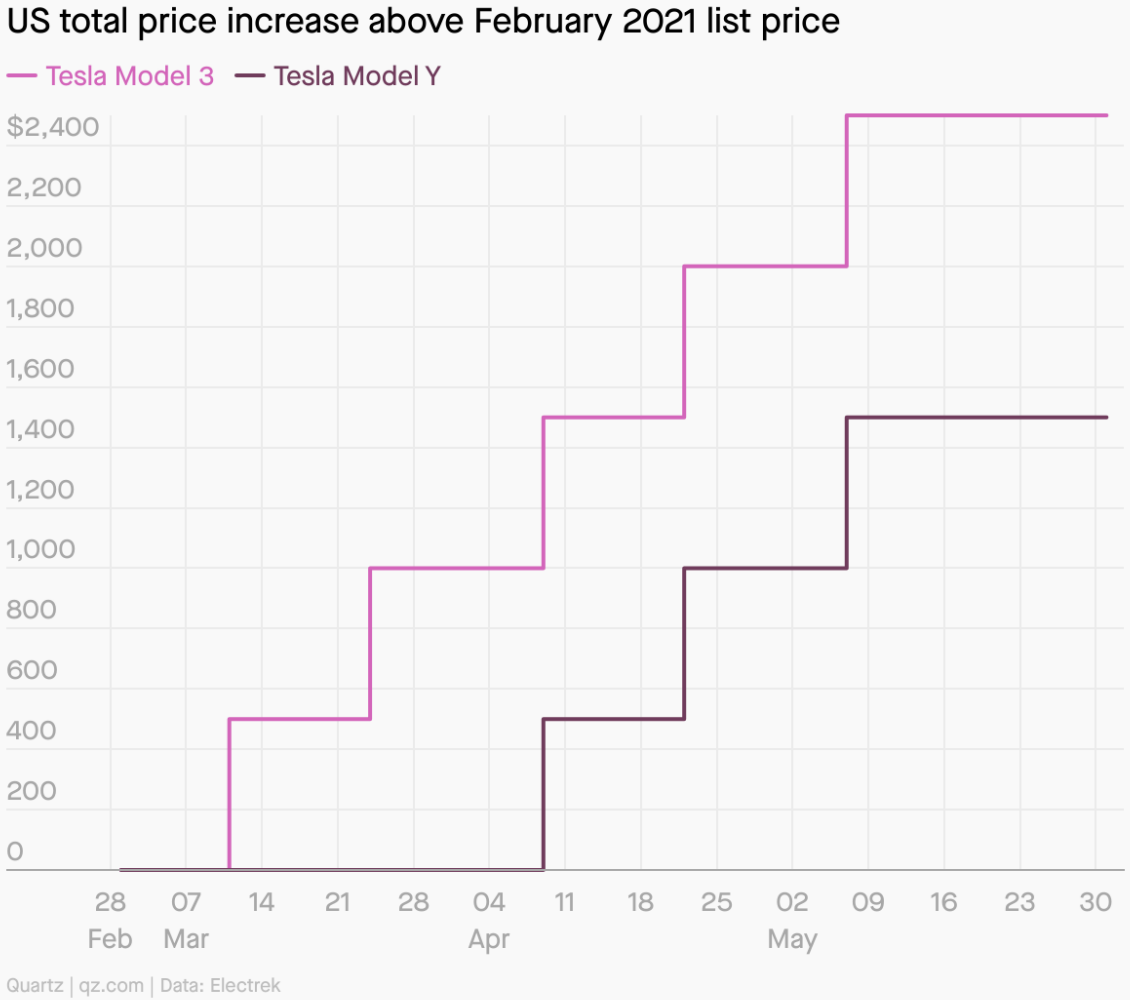
The process of building a 60-75 layer silicon wafer. Total time to complete: 2.5-3 months.



Data: Washington Post, WSJ

Effects in the car industry

The automobile industry is taking a big hit from the chip shortage. The latest car models are increasingly computerized, requiring up to 100 chips to function. Car production lines all over the world have suffered from the chip shortage; the industry is expected to lose $110 billion in revenue in 2021. Tesla even raised the prices of its Model 3 and Y cars in response to the rising cost of chips.



Data: Electrek. Analysis by Nicolás Rivero of Quartz.

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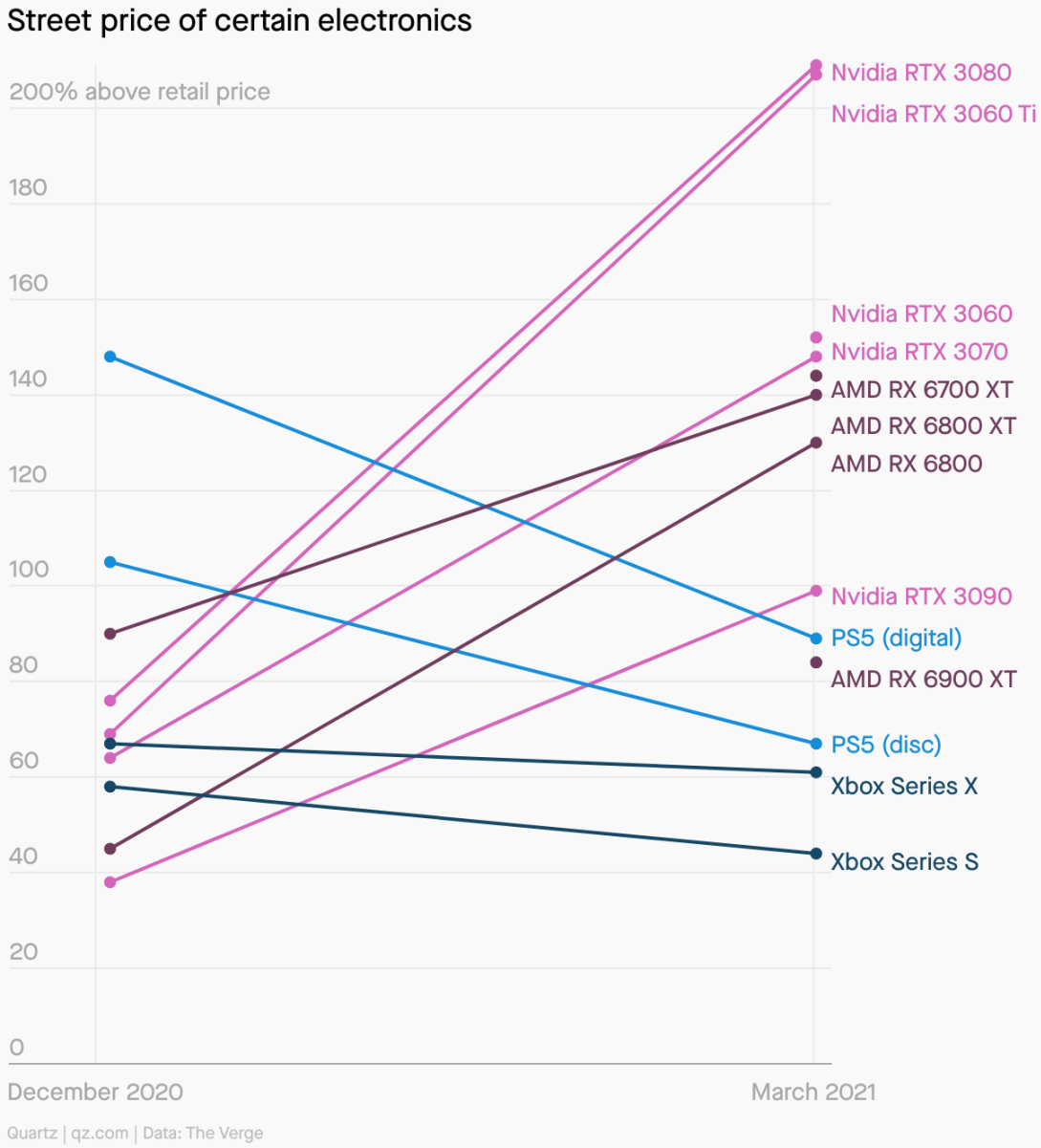
Gaming

Gaming consoles such as the PS5 and Xbox One require PC graphic cards to run. The chip shortage has led to a booming resale market for NVIDIA and AMD chips, critical for PC graphic cards to run their fancy visuals. Customers are fighting to pay up to 300% more than retail price for the elusive technology. If you're itching to buy a new PS5, which went on sale Nov. 2020, you can expect delays in 2021.



Data: The Verge

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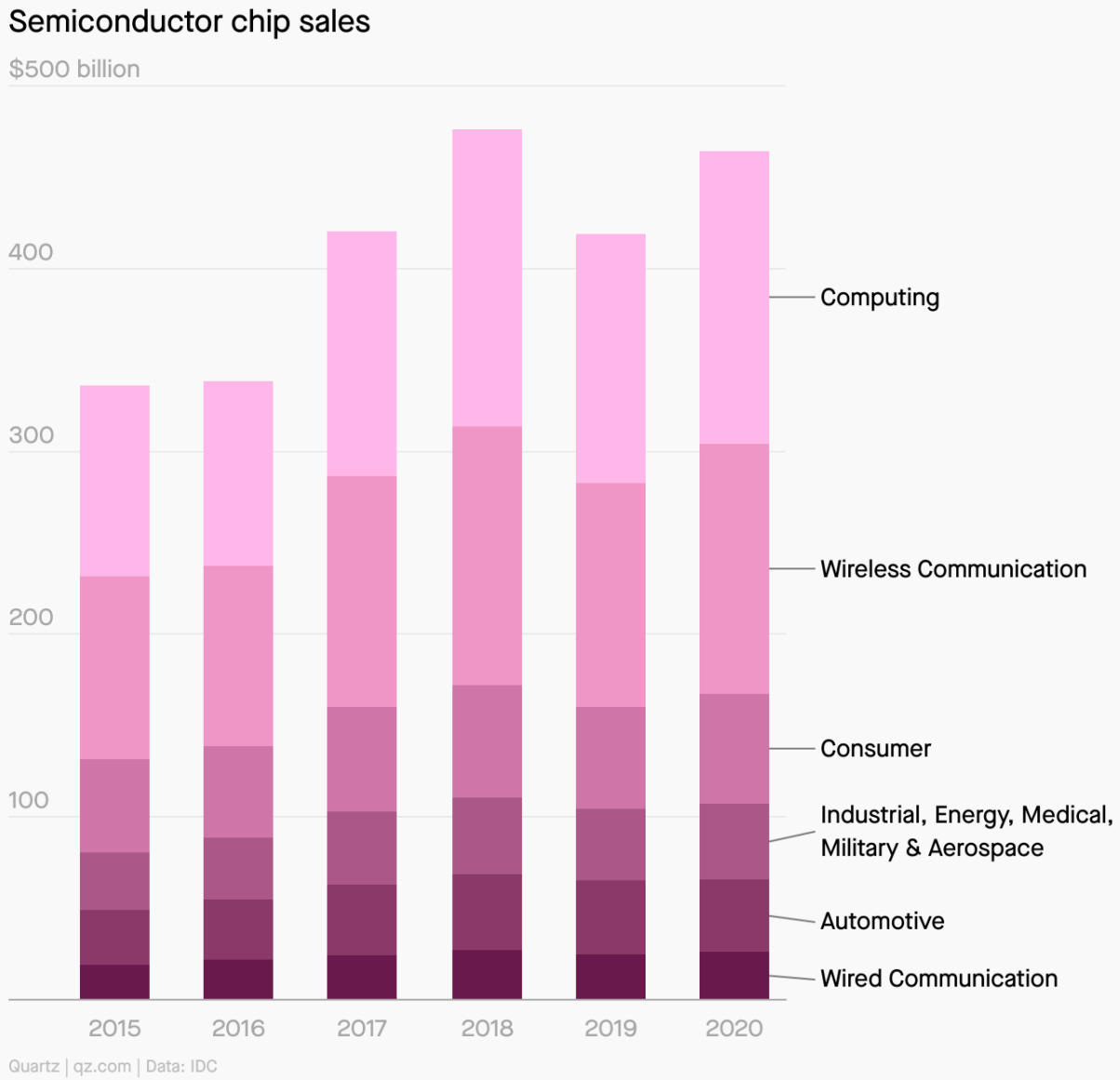
Consumer electronics

The quick switch to remote work and Zoom school was difficult for all, but especially for those without the right equipment. PCs and computer accessories like monitors and webcams went flying off the shelves in 2020; some are still experiencing delays. A smattering of other products like TVs and audio devices are also in short supply, depending on the brand. If you've got your heart set on a specific product, the best advice is to wait and be flexible.



Data: IDC

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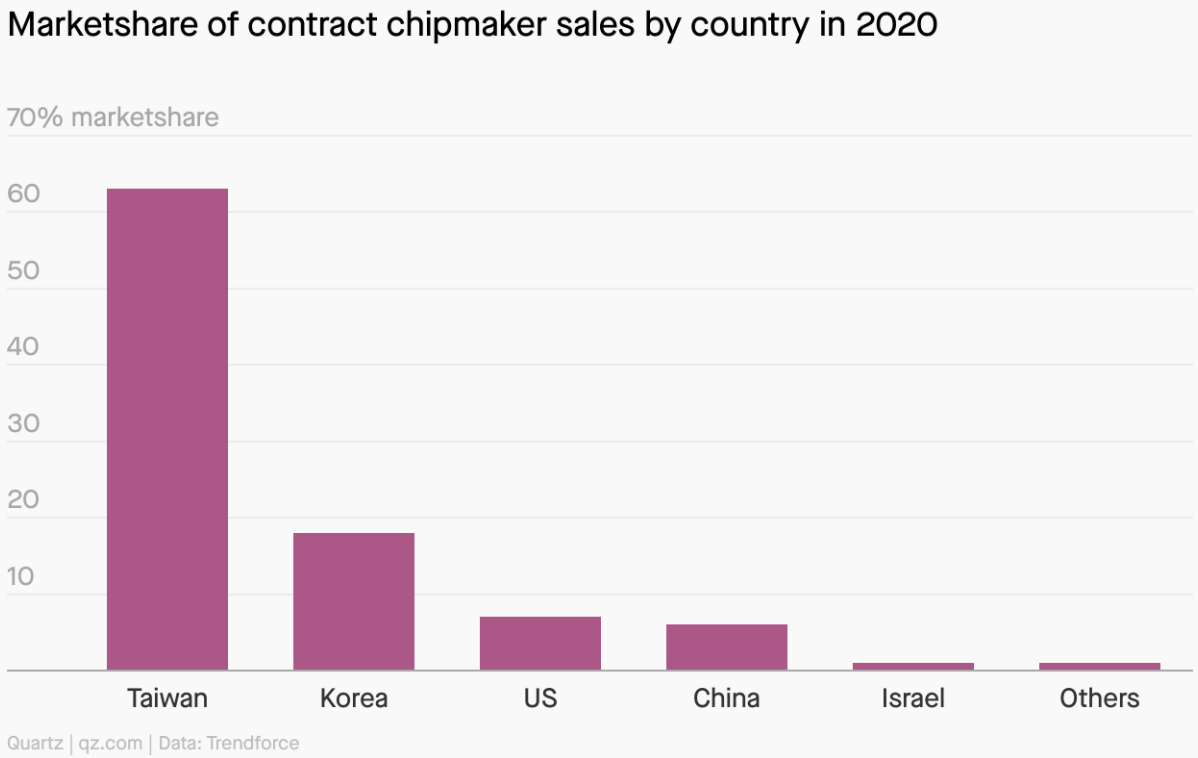
Revamping the semiconductor ecosystem

Countries and companies will have to work together to fix weaknesses in the global supply chain for chips. In the 1990s, the United States produced nearly 40% of the world's chips. That number has since dropped to 12%. While the US still leads in design, production shifted overseas to Asia to lower costs. Now countries are investing in domestic production to make enough chips to meet demand.



Data: Trendforce

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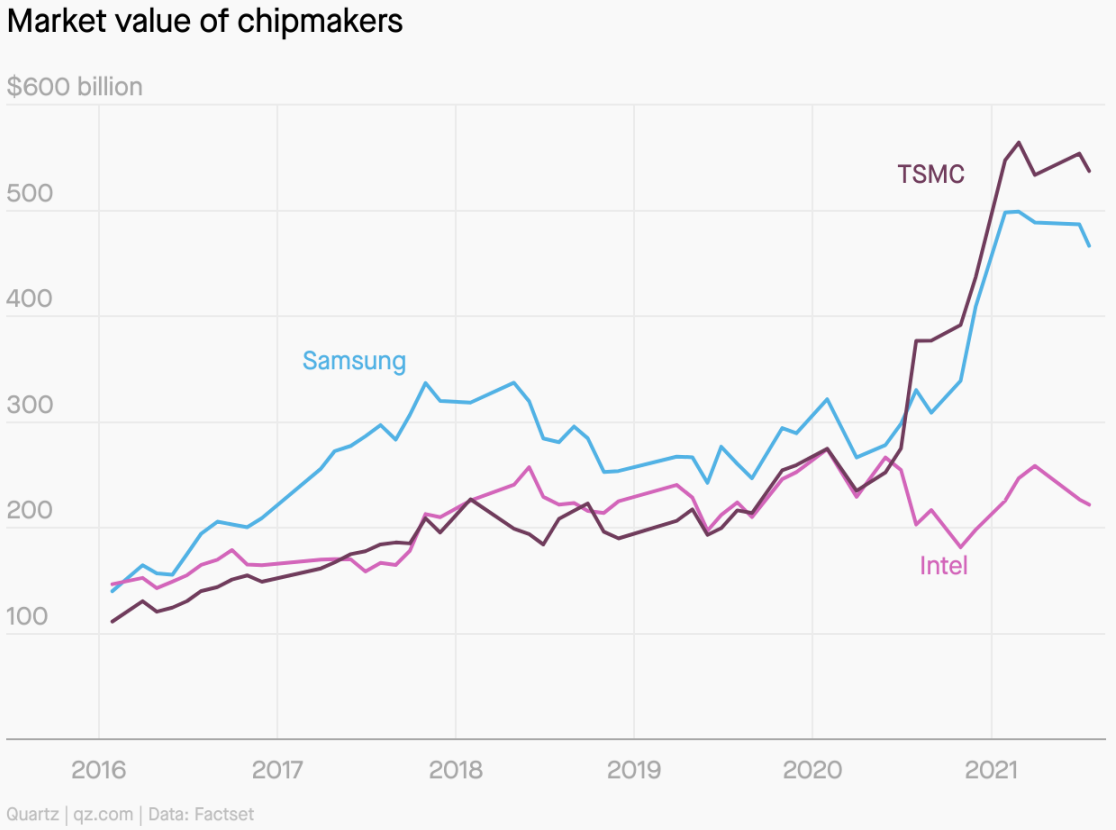
The rise of TSMC

TSMC, headquartered in Taiwan, is a linchpin in the global chip manufacturer ecosystem. TSMC makes chips on contract, and its advanced technology makes it the go-to manufacturer for brands like Tesla, Apple, and Qualcomm.

Its influence also shields Taiwan from China's looming expansionist interests; China knows that military action wouldn't be beneficial because of TSMC's relationships with firms in the US and US-allied countries.



Data: Factset

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Government responses

Countries have plans to address the chip shortage: They want to fix the bottleneck by building more manufacturing plants within their own borders and strengthening their own supply chains.

Government	Budget allocation	Time frame	Goal
United States 🇺🇸	$50 billion	The larger $2.3 trillion infrastrure plan is proposed over 8 years	Part of the money will go towards a research and development fund to develop top-of-the-line semiconductor manufacturing plants
China 🇨🇳	$32 billion (2019)	10 years since the launch of Made in China in 2015	Part of Made in China 2025 initiative to produce 70% of chips domestically. This fund is just one of many
European Union 🇪🇺	Part of a $150 billion digital transformation budget	9 years	Europe aims to build 20% of the world's next-generation chips by 2030
Korea 🇰🇷	$451 billion	9 years	Increasing domestic chipmakers' competitiveness by 2030

Quartz | qz.com | Data: WSJ, Nikkei

Data: WSJ, Nikkei, WSJ (2)

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What's next

As more everyday objects are digitally connected in the future, the world will need more chips. To meet that demand, the world needs more chip manufacturing plants. However, this takes time: Manufacturing plants take at least two years and billions of dollars to build, and chips themselves can take up to three months to complete.

Near term projects

$100 billion
TSMC's investment over the next three years to increase chip capacity.

$20 billion
Intel's commitment to build two new facilities in Arizona.

$116 billion
Samsung's allocation to diversify chip manufacturing.

Want to know more? Read Quartz coverage of semiconductors.

- The chip shortage is pitting bitcoin miners against gamers. Gamers are battling for chips without unexpected opponents.
- Tesla raised Model 3 prices by $2500 as the chip shortage drags on. Blame it on the chips.
- Semiconductor's helped make Taiwan Asia's top-performing economy in 2020. Taiwan's dominance in semiconductors helped the country's economy expand.
- The global semiconductor shortage can be explained by the bullwhip effect. How a major disruption can start from a small decision
- Broadcom won't catch up on semiconductor orders until at least November. The line just keeps getting longer.

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