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When the Chips Are Down

China's homegrown chip industry rallies in the face of the U.S. ban on ZTE By Zhou Xiaoyan

Amid already fierce trade frictions between China and the U.S. are signs of a technology war between the world's two largest economies, with a leading Chinese telecom equipment maker caught in the crossfire.

On April 16, the U.S. Department of Commerce (DOC) imposed a seven-year ban on ZTE's purchase of crucial U.S. technologies, commodities, components and parts, including chips, for its alleged violation of the terms of a sanctions settlement.

On April 20, at a news conference in Shenzhen, in south China's Guangdong Province, ZTE Chairman Yin Yimin stated that ZTE will safeguard its legitimate rights and interests through all available legal means. On the same day, the DOC granted ZTE's request to submit more evidence. In a filing to the Shenzhen Stock Exchange on May 6, ZTE said that it had submitted an application to the DOC requesting the suspension of the business ban and had provided additional material at its request.

Since ZTE mainly imports microchips, a key component used in telecommunications equipment, from its U.S. suppliers, industry insiders predict that the company's production will come to a halt once its current chip inventory is used up. It remains to be seen whether the company can find a way back from this seemingly insurmountable setback.

One thing, however, is certain: The U.S. ban has brought into focus China's over-reliance on chip imports and the stagnant development of its domestically produced chips, especially for high-end products. Many in China are now calling for the country to speed up plans to develop and patent domestic chip technologies. The stock prices of Chinese chip makers rallied on the news as more resources will likely be diverted into the sector amid a national bid to gain self-reliance in this and other key technologies.

Laggard development

China is the world's largest market for integrated circuits (ICs), accounting for more than half of total consumption globally.

However, the country mainly relies on imports for most IC products. According to data from the General Administration of Customs, China has been importing over $200 billion worth of microchips a year since 2013, with this figure reaching a record high of $260.1 billion in 2017, roughly double the value of China's crude oil imports.

Data from the CCID Research Institute, a think tank under the Ministry of Industry and Information, show that 13 of the top 20 semiconductor manufacturers are U.S. companies, with sales of around $180 billion in the Chinese market in 2017. Leading U.S. chipmakers Qualcomm, Broadcom and Micron realize half of their global sales in China.

Gu Wenjun, Chief Analyst with ICwise, a leading provider of market research and advisory services to China's semiconductor and electronics industry, said that the reason why China relies so heavily on chip imports is because domestic producers lag behind their global peers in almost every way, and that everyone has a share in the blame for this shortcoming.

"Chip users prefer global suppliers over domestic chip-makers, unless domestic ones have the same performance as global chips but cost less. They even use domestic companies as a bargaining chip when negotiating with their global suppliers," Gu told *Beijing Review*, explaining that this has significantly narrowed the profit margin of Chinese chip makers.

"Things are the same when it comes to the chip-makers. They too prefer global suppliers over domestic ones, and continuously squeeze their suppliers' profit margin," Gu said.

Yuan Lanfeng, an Associate Researcher with the University of Science and Technology of China, said in an interview with Guan Video that the ZTE fallout has raised social awareness of technology self-sufficiency and could present a precious development opportunity for Chinese chipmakers.

Yuan said that the chip industry is extremely capital-intensive, requiring substantial investment to make technological breakthroughs.

"Chip users and chip producers have to cooperate from the very beginning—customizing chips according to user demand, testing chips in a real environment and finally starting production. The expenditure on developing and testing one kind of chip can easily run into the tens of millions of yuan before production," Yuan said.

"China has invested too little in the chip-making industry. China established an IC Fund in 2014, which accumulatively invested 81.8 billion yuan [$12.9 billion] in the sector from 2014 to 2017. But Intel invested $12.7 billion in 2016 alone," Yuan said. "You cannot expect Chinese researchers to achieve more with less funding than their global peers."

"The more we spend on research and development now, the more we'll save in the future," said Yuan.

Seeking a new edge

Experts predict that the domestic chip sector will enter a new phase of development as a result of the U.S. ban.

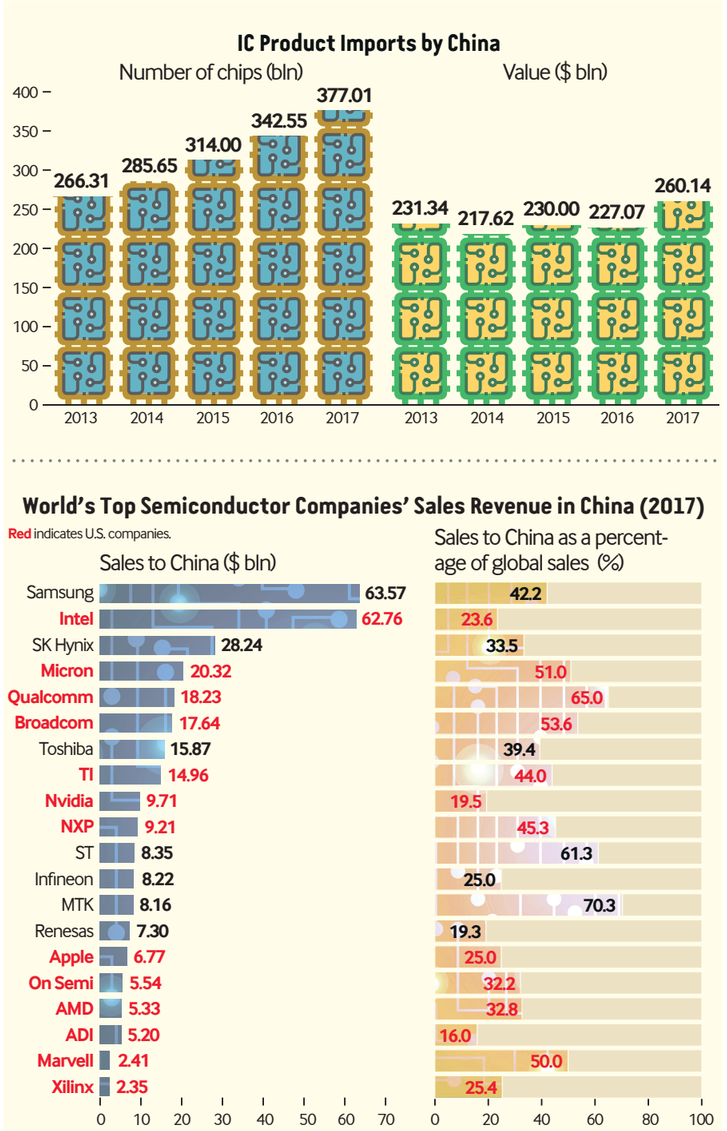
According to Yuan, the keys to development of the chip industry are more investment and luring more talent.

"Once more and more chip users realize that they cannot rely on foreign products, they will start using Chinese chips. Building a production line requires considerable investment. But once production starts, the marginal cost of producing more chips will be lower as shipments increase," Yuan said.

"Also, if we use China's market size to collectively negotiate with foreign suppliers, we could create more favorable conditions and a development miracle in which China leapfrogs its competitors, as happened with China's high-speed railway sector," Yuan said.

The rapid growth of domestic chip-makers depends on a supportive environment from chip buyers—one in which they are willing to spend time, energy and resources to grow together.

"Chinese companies should strengthen internal control, intensify investment in R&D and attach greater significance to core competitiveness," said Gu. "Chinese telecom equipment manufacturers should support domestic suppliers and not only rely on foreign chips for convenience and lower costs. They should diversify their supply structure and give domestic suppliers a chance," he said.



Sources: General Administration of Customs, CCID Consulting. Designed by Pamela Tobey.

In June 2014, China released guidelines on the development of the domestic IC industry, predicting that its annual revenue will reach 870 billion yuan [$137.3 billion] by 2020, with technologies in key areas expected to reach leading global levels and materials and equipment entering the global supply chain. A fund has also been set up to support the industry's development.

"The training of talent and the stricter protection of intellectual property rights are also necessary. Moreover, China's homegrown chip industry should be integrated into the global industrial chain, and an atmosphere of cooperation should be created," Gu suggested.

Tech giants chipping in

According to industry experts, artificial intelligence and the cloud-based Internet of Things are two major areas where China's homegrown chips stand a good chance of being able to compete with global players.

China's e-commerce giant Alibaba Group announced on April 20 that it had acquired IC design house Hangzhou C-SKY Microsystems in a bid to increase its own chip-making capacity.

Alibaba has previously invested in five chip manufacturers, including U.S. AI chip designer Kneron, and Barefoot Networks.

Alibaba's new research institute, DAMO Academy, is now developing a neural network chip to be used in artificial intelligence. The cost performance of the new chip is reportedly 40 times that of similar products currently on the market.

In addition to Alibaba, China's search engine giant Baidu is sparing no effort in the development of new-generation chips. In March 2017, Baidu released the DuerOS smart chip and began strategic cooperation with domestic and foreign chip producers, and in August 2017, Baidu launched a new type of chip in collaboration with U.S. chip maker Xilinx.

According to Gu, the growing presence of tech giants in the sector will definitely boost the domestic chip industry's development. "But it will still take time and require diligent work," he said. ■

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