Opinion **Semiconductors**

The ‘chip choke’ on China may breathe air into semiconductor industry

A fresh wave of global government investment might well stimulate broader innovation

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A clean room at Taiwan Semiconductor Research Institution. The island state and South Korea, whose companies dominate the industry, are being forced to choose between the US and China © Annabelle Chih/Getty Images

John Thornhill YESTERDAY

The modern semiconductor industry is a manufacturing miracle. In 1961 a state of the art computer chip contained just four transistors. Such has been the industry’s extraordinary innovation since then that the latest graphics chip from Nvidia contains 76bn. According to a calculation by the historian Chris Miller, the global chip industry manufactured more transistors last year than the combined quantity of all other goods produced by all other industries in all of human history.

The astonishing expansion of the semiconductor industry, which powers everything from smartphones to ballistic missiles, has been mostly driven by the ingenuity of chip designers and the dynamism of the market. But, given its strategic importance, it has been periodically stimulated and steered by governments. The risk today is that geopolitical tensions between the US and China threaten to rip apart this intricate, and highly interconnected, sector. The possibility is that intensified competition might yet incentivise further innovation.

Since 2020, the US has imposed a “chip choke” on China, banning the export of leading edge semiconductor technology to Beijing. In response, China has been pouring billions into developing its own chips sector. Costs are increasing for the global industry and production efficiencies are declining as existing supply chains are rewired. But national security now overrides economic logic.

This stand-off is already inflicting pain on semiconductor companies in countries allied to the US, especially in East Asia, where so much manufacturing capacity is clustered. The Taiwanese and South Korean companies that dominate the industry are reluctantly being forced to choose between Washington and Beijing. Without China, they lose access to one of their biggest markets, but they are also now facing increasing competition from the US itself. Passed in July, the US Chips Act, which provides $52bn of subsidies to the national semiconductor industry, has signalled Washington's determination to revive domestic manufacturing.

This week, South Korea's science minister warned that a "sense of crisis" was gripping his country's much-valued semiconductor industry amid the intensifying global chip war. In an interview with the Financial Times, Lee Jong-ho expressed fears that the competitiveness of South Korea's chip sector was threatened by both Washington's campaign to lure the country's manufacturers to the US and Beijing's massive state support for China's chip sector.

According to a report by New Street Research, governments in China, the US, the EU, Japan and India have collectively promised $190bn of subsidies over a decade as they seek to localise manufacturing capacity. The sheer scale of state intervention is likely to result in overcapacity in some segments, which could trigger future dumping and trade disputes. But the wall of money may also amplify the wild cyclical swings that have historically characterised the industry.

Two years ago, the Covid pandemic disrupted global supply chains, causing severe chip shortages in the car industry and leading to a subsequent surge in investment. This year, the slowdown in the global economy is damping demand. Gartner predicts that semiconductor revenues will fall by 2.5 per cent to $623bn next year. Governments may be pouring money into the sector just at the point when excess capacity comes on stream and prices tumble.

However, Pierre Ferragu, managing partner at New Street Research, says it will take several years before subsidies feed into additional capacity, giving manufacturers time to calibrate supply. "I do not think it will affect the cycle a lot in the long run. It will be a positive for the industry," he says.

This fresh wave of investment might well stimulate innovation. "My guess is that when we look back at the Chips Act in 10 years' time we will think the money spent on manufacturing investment was not as important as the money spent on R&D," says Miller, author of *Chip War*, a new book on the semiconductor industry. "Whereas companies tend to have a two- to three-year time horizon, governments have a 10- to

15-year time horizon.”

The huge remaining unknown overshadowing the industry is whether China tries to take over Taiwan. Tsai Ing-wen, Taiwan’s president, argues her island is protected by a “silicon shield”, considering how vital its leading-edge chips are for the global economy. But the US is showing how much it prizes national security over economic efficiency. It would not be a surprise if one day China makes a similar argument.

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