

Article #3

Europe joins the US in its chip war with China

By Juliana Liu and Wayne Chang | CNN | Published 7:11 AM EST, Thu March 9, 2023

Europe's biggest producer of advanced chipmaking technology has joined the United States in its escalating standoff with China.

The Netherlands announced Wednesday, via a letter from its trade minister to parliament, that new restrictions on overseas sales of semiconductor technology were needed to protect national security.

While the letter didn't name ASML Holdings, Europe's biggest tech firm, the curbs will affect the Dutch company, which is a key supplier to global chipmakers, including those in China.

The announcement marks the first public move by the Dutch government toward adopting rules, advocated by Washington, to restrict China's chipmaking industry.

Japan has also been involved in three-way discussions with the Netherlands and the United States, a source familiar with the talks told CNN. Reuters reported that Tokyo is expected to issue an update on its policies on chip equipment exports as soon as this week.

China said Thursday it "firmly opposes" the Netherlands' upcoming curbs, which come just months after the United States restricted sales of some semiconductor machinery to Beijing. For those measures to really bite, Washington needs other important suppliers, located in the Netherlands and Japan, to join.

Chinese foreign ministry spokesperson Mao Ning accused "certain countries" of "coercing and inducing other countries to take export restriction measures against China at the expense of their allies' interests."

She didn't name the United States, but Chinese officials often use the term "certain countries" or "some countries" when making critical comments about Washington.

"We hope the Netherlands won't follow some countries in abusing export control measures," Mao said. "China will take all necessary countermeasures to protect our legitimate rights and interests."

This week, Chinese leader Xi Jinping hit out at the United States with unusually direct comments as he called on China's private companies to "fight" alongside the Communist Party at a time of mounting challenges. He accused Western countries led by the United States of trying to "contain" and "suppress" China.

Beijing has set a target for China to become a global leader in a wide range of industries, including artificial intelligence, 5G wireless technology and quantum computing.

Intensifying competition

In October, those plans came up against a major obstacle when the Biden administration banned Chinese companies from buying advanced chips and chipmaking equipment without a license. It also restricted the ability of American citizens to provide support for the development or production of chips at certain manufacturing facilities in China.

Chips are vital for everything from smartphones and self-driving cars to advanced computing and weapons manufacturing.

Veldhoven-based ASML is a global leader in the production of lithography machines, which employ light to print patterns on silicon. Customers such as TSMC, Samsung (SSNLF) and China's SMIC use the Dutch company's equipment to mass-produce microchips.

"These new export controls focus on advanced chip manufacturing technology, including the most advanced deposition and immersion lithography tools," ASML said in a statement. "Due to these upcoming regulations, ASML will need to apply for export licenses for shipment of the most advanced immersion ... systems."

It added that it didn't expect the upcoming measures to have a material effect on its 2023 financial outlook. The company has mainly sold "mature" products to China.

European battleground

The announcement of the Netherlands' export restrictions, the details of which are expected to be confirmed before the summer, isn't the first time the US-China tech rivalry spilled over into Europe.

Two European semiconductor deals ran into trouble last year over links with Beijing, in a sign of concern spreading in the West over potential Chinese control of critical infrastructure.

In November, the new owner of Britain's biggest chipmaker was ordered to unwind its takeover, just days after another chip factory sale was blocked in Germany. Both transactions were hit by national security concerns, and had involved acquisitions by Chinese-owned companies.

In the United Kingdom, Nexperia, a Dutch subsidiary of Shanghai-listed semiconductor maker Wingtech, was told by the government to sell at least 86% of its stake in Newport Wafer Fab, more than a year after taking control of the factory. Staffers have since protested the decision, saying it puts nearly 600 jobs at risk.

In Germany, the economic ministry barred Elmos Semiconductor, an automotive chipmaker, from selling its factory in the city of Dortmund to Silex, a Swedish subsidiary of China's Sai Microelectronics.

The failed deals illustrate how, at a time of escalating US-China tensions, Europe is also under growing pressure to act, particularly as officials face US calls for key sectors to be kept out of Chinese control.

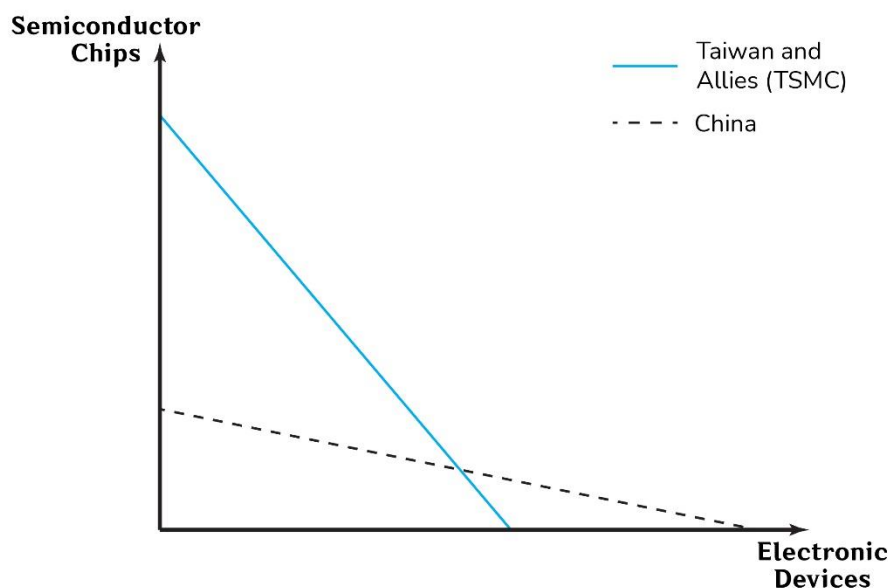
Commentary #3

This article discusses the developments in the ongoing chip war between the US and China. Specifically, how the US and its allies plan on collectively placing embargos to restrict the export and supply of chips and chip-making technologies to China.

This corresponds to the key concept of **interdependence** as China is not self-sufficient in its chip-making industry. They rely on foreign technologies from companies such as Taiwan Semiconductor Manufacturing Company (TSMC), the global leader in semiconductor production with over 50% market share, Samsung, and ASML, a European “key supplier to global chipmakers, including those in China,” of photolithography machines used in the manufacturing process of advanced chips. With these “new restrictions on overseas sales of semiconductor technology,” the entire tech industry of China is at risk as computer chips are a modern necessity and China will be forced to supply itself to stay afloat with the competition. Thus, this raises the question, does China have the capability of becoming self-dependent and not reliant on the technologies of the US and its allies?

Currently, the majority of the world’s chips are manufactured by TSMC, Samsung, and Intel. Additionally, photolithography machines used to “employ light to print patterns on silicon” from ASML and chip design technology from ARM are needed to produce these chips. Much like the rest of the world, since TSMC already specializes in the manufacturing of chips, Chinese firms heavily depend upon TSMC for its reliable supply of chips which allows China to focus on the assembly of electronics instead as they specialize in cheap human labour. Using a production possibilities curve (PPC), Taiwan and its American allies have the absolute advantage in the manufacturing of semiconductors as semiconductor fabrication plants (FABs) are extremely expensive to build, whereas China has the absolute advantage in the manufacturing and assembly of hardware electronics as they have a surplus in human capital which keeps labour cheap.

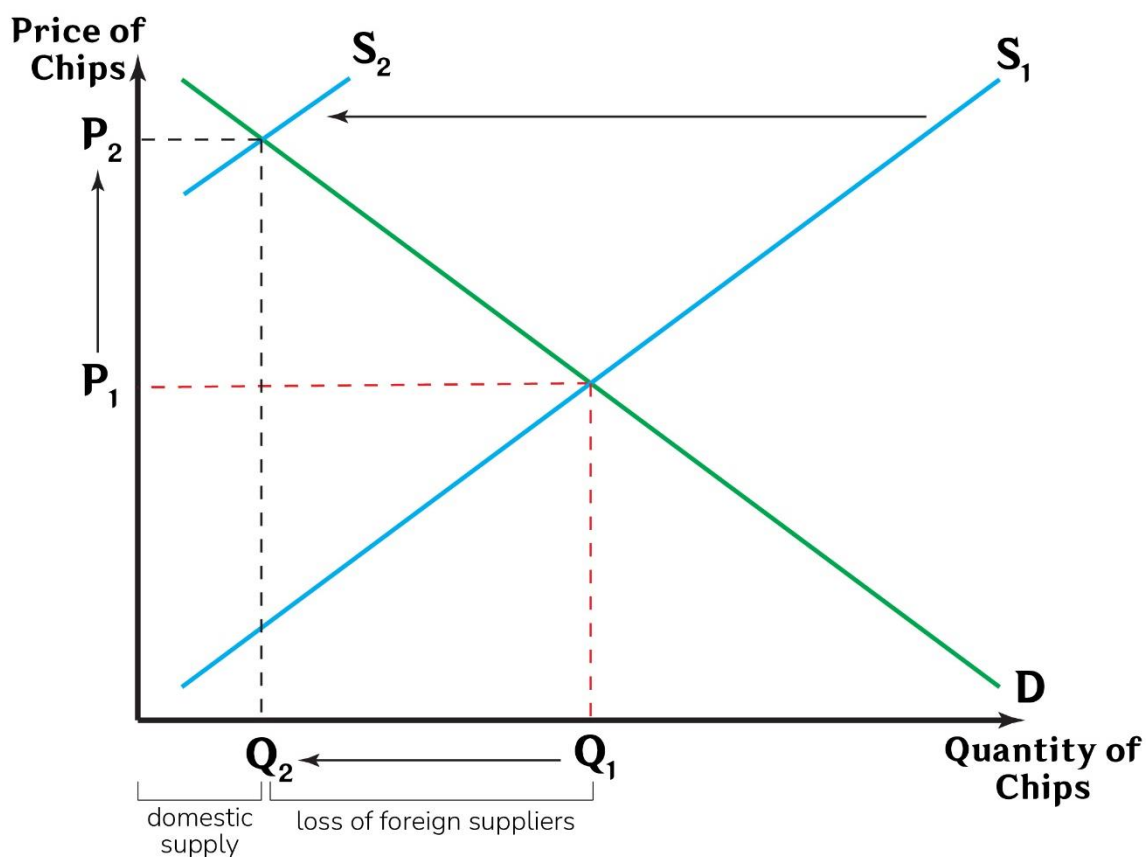
PPC of Semiconductor Chips and Electronic Devices



Nations that hold an absolute advantage in the production of certain goods should specialize in producing those goods and trade with other nations to maximize the overall economic output of both nations. However, these new restrictions make it difficult for “American citizens to provide support for the development or production of chips at certain manufacturing facilities in China” as Chinese firms are already banned from “buying advanced chips and chipmaking equipment without a license.” This shows the negative consequences of a country’s **interdependence** on other nations.

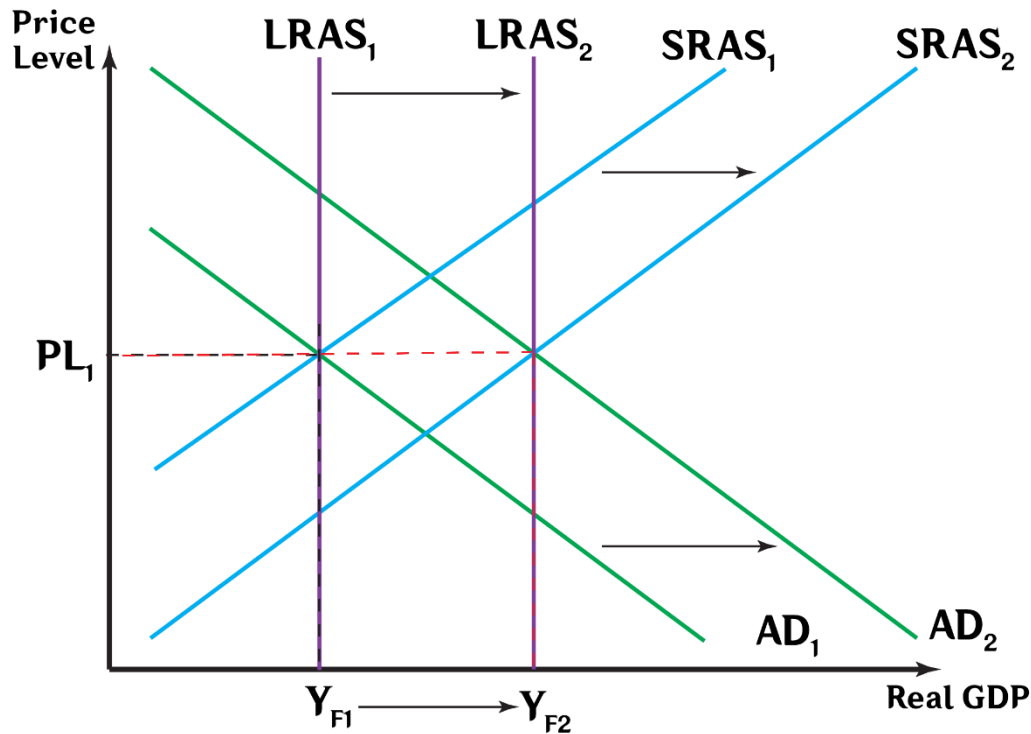
As “chips are vital for everything from smartphones and self-driving cars to advanced computing and weapons manufacturing,” China must become self-dependent to protect its technology industry, economy, and national security.

Short-Term Economic Consequences of US Restrictions



Without access to foreign semiconductor technologies, the chips supply in China will reduce drastically (S_1 to S_2) as all foreign suppliers are unavailable. This leaves China’s sole chips manufacturer, UNISOC, the only option for Chinese firms and without ASML’s technology, these chips cannot be readily mass-produced, leading to increased prices and potentially harming China’s exports. To achieve self-dependency, the Chinese government will have to heavily invest in building its own FABs (FOPs of semiconductors) by reallocating its foreign direct investments in Africa and potentially taking on debt by borrowing money and spending on a budget deficit.

Long-Term Economic Effects of FABs Investments



This government spending will increase SRAS₁ to SRAS₂ as more fabrication plants will be available to produce semiconductors, increasing the supply of chips. Additionally, AD and LRAS will increase as more jobs and infrastructure are being created, increasing household income and economic growth due to the money multiplier effect from consumer expenditure.

In conclusion, China does have the resources and capital to become self-dependent in its semiconductor manufacturing, however, it will require heavy investment and comes with an extensive time lag as a singular factory takes about three years and \$10B USD to complete. In the short run, China will have to find alternative suppliers before its domestic production of chips meets its demand. Although China does currently have UNISOC and HiSilicon (owned by Huawei) to produce chips, their technology, and chips architecture lag behind the global competition. TSMC is currently at 2nm technology with plans to reach 1nm soon, meanwhile, Chinese firms are still at 12nm. While these trade restrictions negatively affect the global economy since trade and product specialization is not being utilized, along with suppliers losing overseas consumers and revenue, these investments will force innovation in China's technology sector to no longer rely on the **interdependence** of foreign technologies. The US is already doing something similar by investing to build Intel FABs in the US to distance their reliance on TSMC.