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Coming Full Circle on Semiconductor Deterrence

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In November of 2021, as the world faced semiconductor shortages due to fragile supply chains and just-in-time business practices, a colleague and I proposed an idea intended to reduce the risk of war in the Taiwan Strait: Taiwan should threaten to self-destruct its prized semiconductor machinery in response to a People’s Republic of China (PRC) invasion.¹

The idea, as originally conceived, was inspired by two sources.

The first source was the longstanding idea of a “Silicon Shield in Taiwan,” which suggested that semiconductors were to Taiwan what oil was to Kuwait: something so important the United States would intervene to see the resource protected.² However, by 2021 it was not just the United States that was dependent on Taiwan’s chips, but China too. The problem had become one of interdependence, with Taiwan as the critical node.

The second source was a Chinese novel series, the *Three-Body Problem*, which introduced the idea of “dark forest” deterrence.³ The dark forest described a structural condition of hostility among civilizations across the universe. Could understanding this “cosmic sociology” allow Earth to deter an invasion? This was to be done by threatening to reveal the location – to the universe – of both Earth and the Trisolaran home world, which would result in the destruction of both. The trick was: could such a threat be credibly made?

In the context of the Taiwan Strait, where the PLA’s rapid modernization was shifting the balance of power in an unfavorable manner to Taiwan and the United States, could Taiwan’s Silicon Shield be used to disincentivize Chinese action? Dark forest deterrence suggested it



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could: by threatening something that would gravely harm both the deterrer and the deterree. In Taiwan's case, this was its invaluable extreme ultraviolet lithography (EUV) machinery, none of which the PRC possessed itself, but upon which it increasingly relied for access to advanced semiconductors.

After the article was published, the idea was denounced with distortion, denial, disinformation, and disavowal. The Chinese Government led the way on all four fronts, issuing a full-page refutation on the website of its Taiwan Affairs Office⁴ informed by quotations from the *China Times*, a Taiwanese newspaper owned by a media group with extensive interests in the Mainland, and which, according to the *Financial Times*, receives a "call every day" from the Taiwan Affairs Office to coordinate media spins.⁵ For the past two-and-a-half years, it appeared that the spin campaign had worked. But now Taiwan's authorities and their Dutch technology supplier appear to have adopted, and to be actively messaging, a modified version of the original idea.⁶ How did this happen?

First, the initial responses.

The distortion response claimed that since the PRC desired unification with Taiwan before semiconductors existed, this proved that semiconductors would not one way or another affect the PRC's invasion calculus.⁷ Many making this argument likely did so in good faith. After all, it seems self-evidently true. But it also misunderstands deterrence. Of course, the PRC has historical-ideological-political reasons for its imagined "reunification" with Taiwan.⁸ And of course these existed before semiconductors. But why has the PRC not already invaded the island? Because for the past 75 years the costs of an invasion outweighed the benefits.⁹ Taiwan's world-leading semiconductor industry, over the past 25 years, has become part of this overall cost-benefit equation. If the PRC thinks it stands to gain a Silicon windfall as part of its invasion, the benefits go up; if it thinks it will further lose out on modern computing power as a result, they go down.

Those who claimed there was no evidence that Chinese analysts were thinking in these terms were wrong, because there was. Chen Wenling, a famous Chinese economist and former Director of the Research Office of China's State Council, called for seizing TSMC in June 2022 in order to ensure China's industrial security.¹⁰ Similarly, Chen Feng, a popular Chinese columnist, called Taiwan's semiconductor industry a potential "springboard for China's economic transformation and crossing the middle-income trap."¹¹ These examples may not in themselves be dispositive. But they show that influential thinkers in China are thinking in such cost-benefit terms, and that TSMC is part of the equation. Donald Trump recently told Bloomberg that the PRC would hesitate to bombard Taiwan because "they don't want to lose all those chip plants," which he claimed were the "apple of President Xi's eye."¹² Based on public evidence, this may be an overstatement, but it is not misguided to consider how Taiwan's semiconductor industry – which is powering exponential increases in computing power – might play into the PRC's geopolitical calculations.

The denial response centered on the idea that Taiwan should not disturb its semiconductor fabs, even in the event of a Chinese invasion, because this would impose too much harm on Taiwan, the United States, and the world economy.¹³ At a 2023 dialogue at the Milken Institute,



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former Under Secretary of Defense Michèle Flournoy responded to the idea of destroying TSMC in the face of a PRC invasion by passionately stating: “No, no, no...If you do that, you have a two trillion dollar economic impact on the global economy within the first year and you’d put manufacturing around the world at a standstill.”¹⁴ This is a strange argument because a Chinese invasion of Taiwan would already—on its own—have caused massive physical damage to Taiwan and distortions to the global economy and might even provoke World War III. Furthermore, consider the implication: Flournoy apparently thinks that after a Chinese invasion of Taiwan, it would be in the national interest to continue buying exports from the PRC, including highly sensitive advanced semiconductors manufactured in occupied Taiwan. Her statement implies the United States would trade peace for semiconductors. This is the exact opposite of a policy of deterrence. Other critics argued that “physical destruction of fabs would lock in the worst-case outcome even more deeply,”¹⁵ but that is exactly the point. Locking in the outcome—no functional fabs for invading forces, ever—is the way to make the deterrent robust. The less locked the outcome, the less effective the deterrent.

The disinformation response was driven by PRC-linked sources¹⁶ which, according to Neal Robbins, “snowballed into a long-running campaign similar to those orchestrated. . . by secret propaganda units of the People’s Liberation Army.”¹⁷ The campaign, as Robbins says, aimed to “kill the possibility of rational debate.” The key assertion of the disinformation campaign was that the U.S. intended to “blow up TSMC.” Almost without fail, the context of the claim—in response to a Chinese invasion—was left out. Furthermore, the idea as originated was never for the United States to act autonomously, but to support Taiwan’s leaders, who would have to “make it known” that they “will not allow these industries to fall into other hands of an adversary,” as the original article put it.¹⁸ The disinformation was a way to drive a wedge between the United States and Taiwan and to discredit the whole Silicon deterrence idea. The unexplained inference was that if the PRC invaded Taiwan, it should be able to waltz into TSMC and seize fully functioning EUV machines and fabs. The disinformation campaign seemed to work: senior Taiwanese leaders denounced the supposed U.S. plot to bomb TSMC.¹⁹

The disavowal response claimed that there was no need to destroy the fab machinery because the PRC would not be able to use it without new parts from Dutch supplier ASML.²⁰ In the United States, still others repeated the argument that without backed supply and support from U.S. and Western entities, the Chinese would not be able to run the fabs anyway, rendering a decision to allow them to be seized moot.²¹ The problem with these disavowals was that they functioned almost as invitations to take TSMC. They also promoted a peculiar narrative, which is that the PRC would not be able to maintain and operate advanced machinery without foreign assistance. While the semiconductor industry is of course highly globalized, with time, Chinese engineers would likely get to a good enough solution, something they have already accomplished with the older generation of deep ultraviolet lithography (DUV) technology, to the surprise of many.²² In short, relying on the globalized supply chain does not make for good deterrence because it does not confront the PRC with a certain negative outcome across a longer time horizon.



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But now, after two-and-a-half years, Silicon deterrence is back. In a bombshell story, *Bloomberg* reported in May 2024 that ASML has a remote shut-off kill switch for its EUV machines and that the Dutch Government has exercised using it.²³ Taiwan's technology minister, speaking just after assuming office in the new administration, implied that this ability could be transmitted over the internet and used on Taiwan's EUV machines.²⁴ To be clear, the only such necessary case would be amid a Chinese invasion.

A soft kill option is in some ways a cleaner way to achieve the desired deterrent effect, which is to demonstrate to China that it only stands to lose – and not gain – economically were it to invade. The soft kill option would allow for near-simultaneous implementation and the avoidance of accidental triggering. And having a third party – ASML and the Dutch Government involved – adds credibility to the threat.

That being said, a note of caution should be stressed: fifteen fiber-optic cables connect Taiwan to the internet. Already, PRC vessels have “accidentally” cut the two cables that link the island of Matsu to Taiwan.²⁵ If the PRC were to cut Taiwan's cables prior to an invasion of Taiwan, in combination with expected cyber and electronic warfare attacks,²⁶ transmitting the threatened “software update” to the EUV machines would likely be challenging. A robust space-based internet capability in Taiwan would alleviate this challenge, but unless Taiwan works to get access to SpaceX's Starlink or Amazon's Project Kuiper soon, the basic capabilities²⁷ it is acquiring through Eutelsat's OneWeb are inadequate in this regard. Starlink and Kuiper both use a mesh satellite typology, with inter-satellite links, while OneWeb uses a point-to-point typology without inter-satellite links, making it easier to jam.

The bottom line is that by threatening to deny to the PRC something it values, Taiwan and the Netherlands are strengthening deterrence. The improvement is without question on the margin, and the actors' different stakes and perceptions make the practical deterrent effect hard to measure. At the same time, U.S. export controls, which are reducing Taiwan-China interdependence, and sparking initiatives for self-reliance in China, will with time reduce Taiwan's – and the West's – ability to weaponize interdependence.²⁸ This is because in peacetime, the PRC will be forced to find substitutes and innovate, reducing reliance on imported designs from the West and manufactured products from Taiwan (something already happening). In the event of an invasion, the shock of losing access to Taiwan silicon for China will be directly proportional to the number of export controls already imposed on it in peacetime. The more export controls in peace, the less the technological shock when all access is denied in war. It does not appear that the advocates of export controls – who are apparently even now seeking to further expand their remit²⁹ – understand this dynamic.

If Chinese substitution and innovation efforts fail, furthermore, this merely raises the stakes, as it would seem to present the PRC with a proposition that the only way to get ahead in the computing race is to forcibly acquire Taiwan's semiconductor industry. Hence, export controls reinforce the imperative for Silicon deterrence. The PRC cannot even hope an invasion might reap huge technological and economic rewards for China. Ensuring the threat to deny such gains is fully credible will decisively defeat the distortions, denials, disinformation, and disavowals that have unfortunately clouded the discussion since 2021.



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