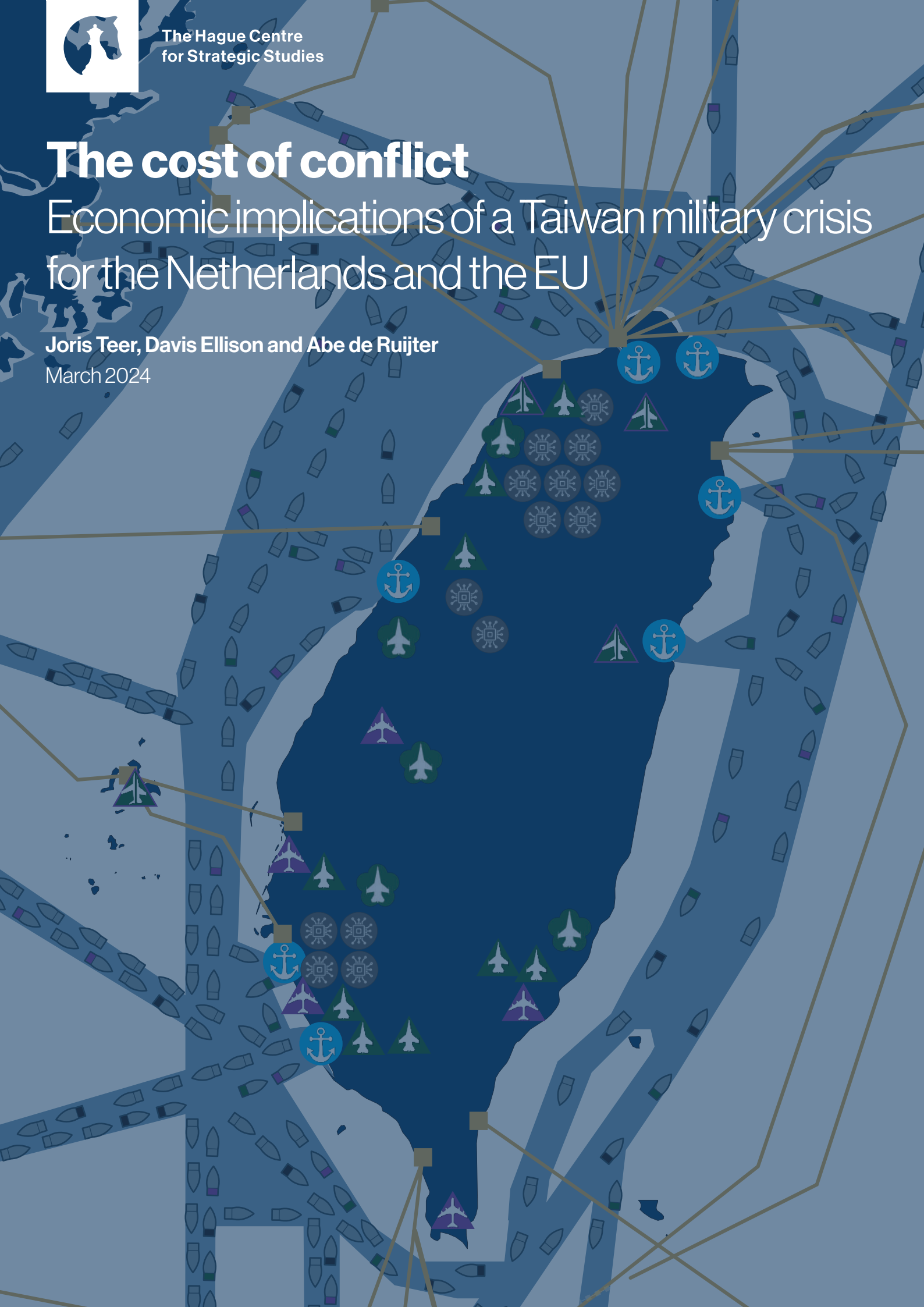
The Hague Centre
for Strategic Studies

The cost of conflict

Economic implications of a Taiwan military crisis for the Netherlands and the EU

Joris Teer, Davis Ellison and Abe de Ruijter

March 2024



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Economic implications of a Taiwan military crisis for the Netherlands and the EU

Authors:
Joris Teer, Davis Ellison and Abe de Ruijter

Contributors:
Rob de Wijk, Tim Sweijs, Han ten Broeke, Benedetta Girardi, Anna Sophie den Ouden and Berend Kwak

Visual design:
Jelle van der Weerd and Anna Sophie den Ouden

Quality assurance:
Rob de Wijk

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Executive Summary

East Asia has become *the* manufacturing and one of the consumption centres of the world economy throughout the last fifty years. Dangerously, the probability of a military crisis in East Asia, in particular a military conflict over Taiwan, has increased throughout the last decade. Tensions between China on the one hand, and the US and its allies and partners on the other, have structurally and rapidly increased. Trends, such as China's rapid military modernisation, Beijing's expansion of actions below the threshold of war against Taiwan, the relative decline of U.S. power in East Asia (and Washington's efforts to reverse this development), China's distrust of the DPP (Taiwan's ruling party), and Taiwan's underinvestment in defence, may eventually lead to conflict. At the very least, as a result of these trends, tensions are unlikely to fall below 2016 levels.

The probability of a military crisis in East Asia, in particular a military conflict over Taiwan, has increased throughout the last decade.

Disruptions in the supply of essential components, such as semiconductors, and end-products will have consequences for the functioning of critical sectors and the economy of the Netherlands and the EU. As a result, both the Netherlands and the EU have a strong interest in maintaining peace and stability in the Taiwan Strait. The committee on Foreign Trade and Development Cooperation of the Netherlands House of Representatives has asked HCSS to assess the geo-economic consequences of a military conflict on and around Taiwan.

This report outlines the geopolitical-military context in which Dutch-European trade relations with Taiwan take place (in *Chapter 1: How did we get here?*). It maps the consequences of war-related disruption of an (armed) conflict around Taiwan for these relations. In order to do so, this report sets out to identify the likely and possible consequences for critical sectors (e.g., the medical and defence industry) and the broader economy (e.g., financial stability and overall prices) of the Netherlands and the EU, if China applies military power to change the status quo in its relations with Taiwan. By outlining these impacts, the report seeks to facilitate the Committee in identifying measures that may contribute to the prevention of conflict and to mitigate the negative consequences of a conflict. In the section "Policy implications and recommendations" on pages 50 to 53, the authors make policy recommendations to contribute to these goals.

Chapter 2: What is at stake? outlines the dependence of critical sectors and the broader economy of the Netherlands and the EU on trade with Taiwan in particular, but also with East Asia more broadly. Crucially, over 70 percent of front-end and over 80 percent of back-end manufacturing of all semiconductors is completed in East Asia.[1] Whereas companies on Taiwan, in particular TSMC, dominate front-end manufacturing of logic chips, China seeks to consolidate its role as the world's primary back-end manufacturer of semiconductors in general. South Korea and to a lesser extent Japan also play important roles in this value chain. Dutch companies active in the semiconductor value chain heavily rely on sales to Taiwan and China and rely on production on Taiwan. South Korea and Japan are important sources of revenue too.

1 Semiconductors are essential building blocks of our economies and societies: advanced semiconductors push the advances of the 4th industrial revolution such as artificial intelligence (AI) whilst mature (or "foundational") chips are ubiquitous in critical sectors like medical, defense, green, automotive and ICT-industries.

In addition to semiconductors, the Netherlands and the EU came to rely on manufacturing in the region more generally, in particular on China. In 2020, approximately 35 percent of all goods worldwide were manufactured in China.[2] This includes a dependence on a wide variety of important materials, components and end-products in critical sectors, including in medical, green, ship-building and digital industries. At present the EU relies on materials, components and end-products from China for among other things MRI-systems, a wide variety of medicine, wind turbines, solar panels, container ships, supercomputers, and telecommunication networks. Finally, East Asia's ability to supply semiconductors and end-products to the world hinges on uninterrupted access to some of the world's busiest waterways, such as the Malacca Strait and the South and East China Seas. Respectively 28, 30 and 31 percent of global trade passes through their shipping lanes.[3] Likewise, global trade hinges on aerial routes and subsea cables.

There is no guarantee that China's actions remain below the threshold of war throughout the 2020s or thereafter. *Chapter 3: What can go wrong?* gauges the impact on the Netherlands and the EU of three military crises that may occur in East Asia throughout the 2020s or thereafter. The chapter cited authoritative scenario-exercises that mapped the effects of a one year higher-intensity military conflict. The findings of these exercises have one thing in common: the costs of a blockade of, or war over, Taiwan are staggering. Impact projections range between a 10.2 percent fall in global GDP (twice the impact of the 2008 Financial Crisis or the COVID-19 pandemic) during an invasion; a five percent fall in global GDP during a blockade;[4] and an over $2 trillion cost during a blockade, "even before factoring in international responses or second-order effects."[5]

There is no guarantee that China's actions remain below the threshold of war throughout the 2020s or thereafter.

The indirect effects on societies and critical sectors will likely be severe too, in particular because replacing the lost semiconductor manufacturing capacity on Taiwan specifically (and perhaps in East Asia more broadly) in other geographies takes many years (if not over a decade). Possible second-order effects are disruptions of critical sectors (e.g., medical, telecommunication, harvesting, and mining). Possible third order effects are "a global economic recession, sustained inflation, widespread sovereign [debt] defaults, rising unemployment, and potential social unrest."[6] In addition, critical industries will likely face large-scale production issues. For example, the 2020-2023 global chip shortage already delayed the production of medical equipment.[7] A complete suspension of semiconductor exports from Taiwan would result in far steeper price rises and more severe shortages (especially in the developing

2 OECD TiVa database; Baldwin, "China Is the World's Sole Manufacturing Superpower".

3 Lincoln F. Pratson, "Corrigendum to "Assessing Impacts to Maritime Shipping from Marine Chokepoint Closures" [Commun. Transport. Res. 3 (2023) 100083]," *Communications in Transportation Research* 3 (December 1, 2023): 5, https://doi.org/10.1016/j.commtr.2023.100100.

4 Jennifer Welch, Jenny Leonard, Maeva Cousin, Gerard DiPippo, and Tom Orlik, "Xi, Biden and the $10 Trillion Cost of War Over Taiwan," *Bloomberg Economics,* January 9, 2024, https://www.bloomberg.com/news/features/2024-01-09/if-china-invades-taiwan-it-would-cost-world-economy-10-trillion

5 Vest, Kratz, and Goujon, "The Global Economic Disruptions from a Taiwan Conflict."

6 Vest, Kratz, and Goujon, "The Global Economic Disruptions from a Taiwan Conflict."

7 Stephen Bradley and Bill Murray, 'How Is the Semiconductor Shortage Affecting Medtech?' "Chips for Lives: Global Chip Shortages Put Production of Life-Saving Medical Devices and Systems at Risk," Philips, 2022, https://www.philips.com/a-w/about/news/archive/standard/news/articles/2022/20220608-chips-for-lives-global-chip-shortages-put-production-of-life-saving-medical-devices-and-systems-at-risk.html. 'Global Semiconductor Shortage Need for Prioritisation of Healthcare Capabilities'. Dependence of critical sectors on Taiwan's semiconductors may even grow throughout the 2020s and thereafter, as the automation of critical sectors would make critical sectors increasingly dependent on trailing-edge and advanced chips. Teer, Bertolini, and Girardi, Great Power Competition and Social Stability in the Netherlands," 62. Yuka Hayashi, "Chip Shortage Limits U.S.'s Ability to Supply Weapons to Ukraine, Commerce Secretary Says," *The Wall Street Journal*, April 27, 2022, https://www.wsj.com/livecoverage/russia-ukraine-latest-news-2022-04-27/card/chip-shortage-limits-u-s-s-ability-to-supply-weapons-to-ukraine-commerce-secretary-says-pCWERV2HkSPzTdQG4CRI.

world) in critical sectors.[8] Indirect effects for the Netherlands and the EU may include threats to societal stability. After all, shortages would exacerbate economic inequality, poverty, and the functioning of critical sectors. Finally, shortages will lead to competition for scarce resources between advanced economies. This will test relations between the EU, the U.S., and U.S. allies and partners in East Asia.[9]

War-related disruption as a result of a high-intensity conflict in a shorter time frame or a lower-level intensity contingency may already impose high costs on the critical sectors and the economy of the Netherlands and the EU. The Taiwan Crisis Storyline-exercise in *Chapter 3: What can go wrong?* underlined this. For example, an invasion (Crisis Storyline 1), a semi-permanent blockade (Crisis Storyline 2),–and perhaps even an on-and-off-blockade (Crisis Storyline 3)– already within the first month(s) may cause long-lasting damage to Taiwan's semiconductor production sites. After all, brief interruptions in energy and material supplies to fabs can take them offline for extended periods of time.[10]

Brief interruptions in energy and material supplies to fabs can take them offline for extended periods of time.

In turn, these disruptions in the production of semiconductors and U.S. military action against China (e.g., a counter-blockade of the Malacca Strait to choke-off Beijing's oil and LNG supplies) then lead to disruptions in the manufacturing of critical components, such as electronics, and end-products more broadly, most importantly in China. Conflict-related disruption such as inaccessible sea-lanes and aerial routes may lead to disruptions of materials and energy to South Korea and Japan as well, further hampering semiconductor production. Hence, shortages of essential goods for critical sectors in the Netherlands and the EU and the subsequent threats to social stability may already be the result of a shorter crisis around Taiwan. Finally, even the least intense crisis storyline, a short-term on-and-off-blockade of Taiwan, will contribute to inflation. After all, this causes supply chain disruptions and will make shipping more expensive (for example due to rerouting, container ship shortages and spikes in maritime insurance prices). For a summary overview of the negative effects all three Taiwan Crisis Storylines, please see Table I.

8 Consequences may unfold along similar lines as when Russia halted around 80 percent of its natural gas exports to the EU. Energy prices soured across Europe. Yet, actual shortages and power outages plagued the developing world, as shipments of liquified natural gas (LNG), originally en route to places such as Bangladesh, Pakistan and Africa, were diverted to Europe. Even though patterns may be similar, the impact is likely to be much more severe. Teer, Bertolini, and Girardi, "Great Power Competition and Social Stability in the Netherlands," 49–63.

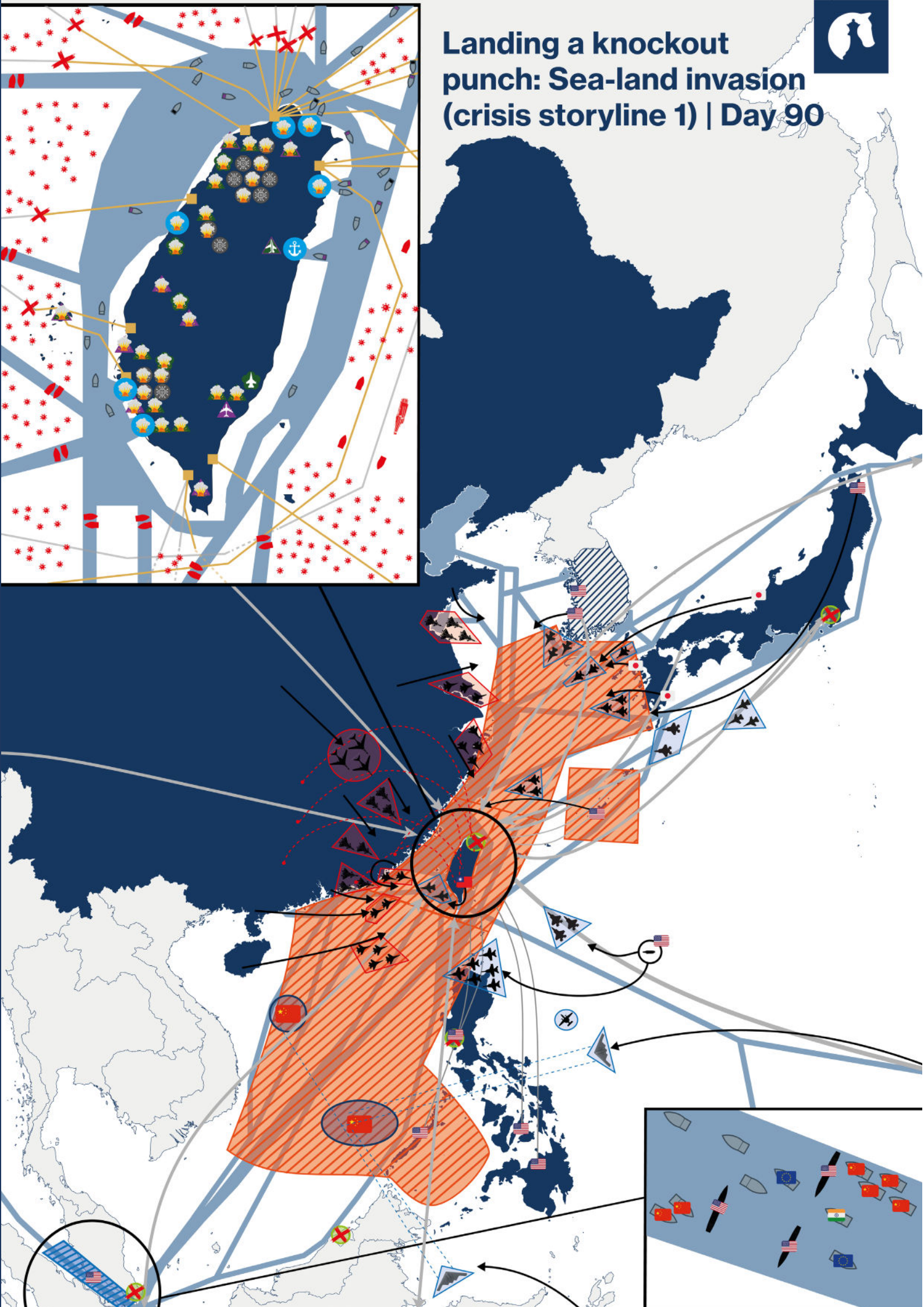
9 Teer, Bertolini, and Girardi, 63–71.

10 *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Forstering Broad-Based Growth: 100-Day Reviews under Excutive Order 14017*, The White House, 36. Steve Frezon, 'Through the Storm: The Complex Process of Restarting a Semiconductor Facility' (NXP Semiconductors N.V., March 2021), https://www.nxp.com/company/blog/through-the-storm-the-complex-process-of-restarting-a-semiconductor-facility:BL-RESTARTING-SEMICONDUCTOR-FACILITY. Jon Porter, "Samsung Loses over $270M from Texas Plant Shutdown as Quarterly Profits Boom," *The Verge*, April 29, 2021, https://www.theverge.com/2021/4/29/22409273/samsung-austin-texas-plant-month-shut-down-losses-smartphone-sales-chip-shortage.

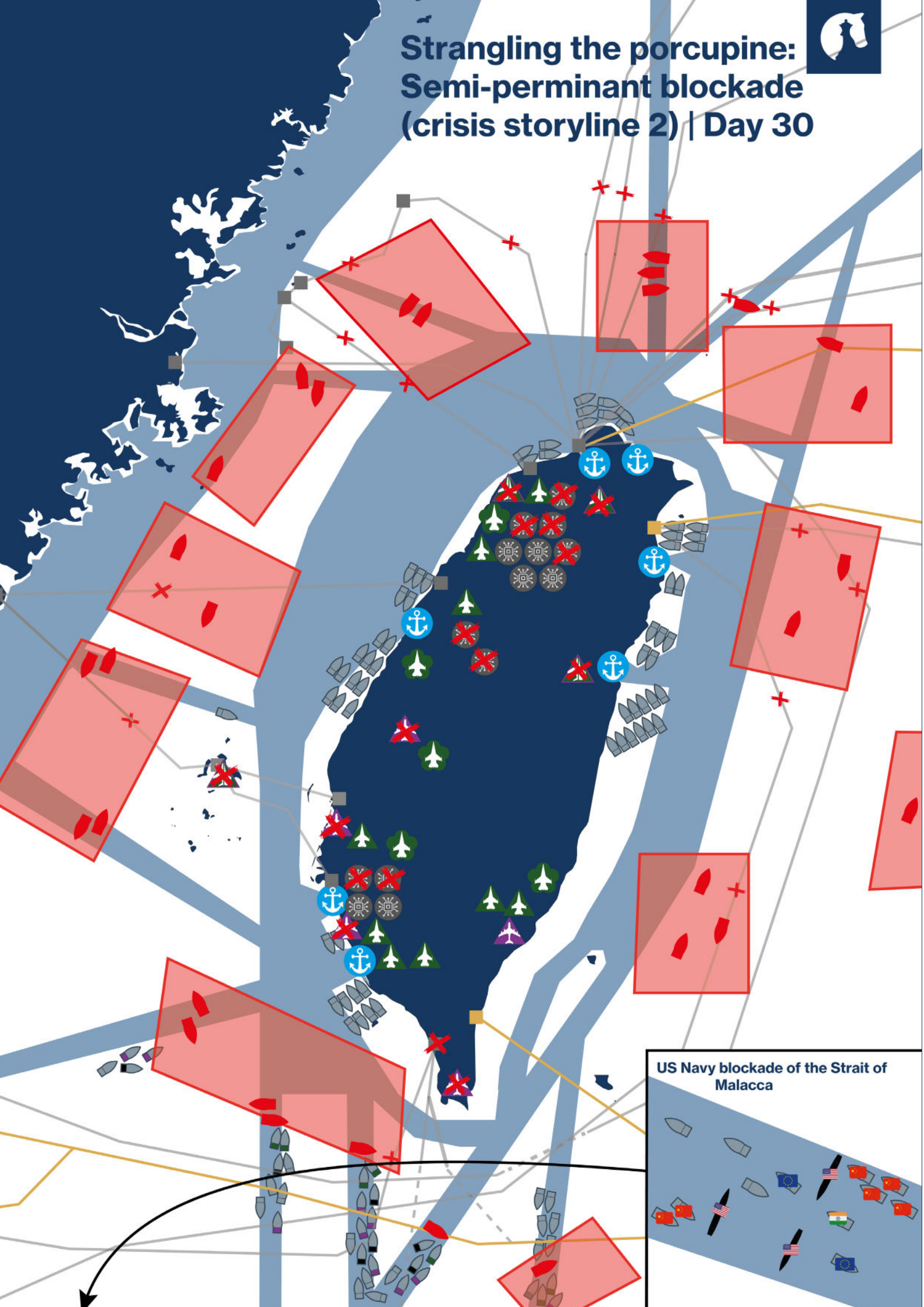
Table I. Overview of disruption in East Asia during a Taiwan invasion, a semipermanent blockade or an on-and-off blockade

Impact area	**Probable impact crisis storyline 1 on Dutch and EU interests in East Asia:** *Landing a knock-out punch*: a sea-land invasion (>180 days)	**Probable impact crisis storyline 2 on Dutch and EU interests in East Asia:** *Strangling the porcupine*: a semi-permanent blockade (>4 weeks)	**Probable impact crisis storyline 3 on Dutch and EU interests in East Asia:** *Boiling the frog*: an on-and-off blockade (4-days-to-2-weeks)
Semiconductor production	Taiwan: Entirely disrupted and likely encoutering long-lasting or permanent damage due to near-complete interruption of energy and material imports; destruction by China's bombardments; deployment of skilled workforce (including engineers) to war effort.	Taiwan: Large-scale disruption to production. Export of semiconductors entirely halted for the duration of the blockade, as well as likely longer-lasting damage to fabs afterwards due to interruption of energy and material imports; deployment of skilled workforce (including engineers) to Taiwan's defence.	Taiwan: Some fabs may face production disruptions, due to sporadic longer-duration interruption of energy and material supplies and deployment of skilled workforce (including engineers) to Taiwan's defence. If flow of energy interrupted, semiconductor fabs may incur long-lasting damages.
	China: Probable large-scale disruptions due to interruption of energy, material and wafer imports possibly encountering long-lasting damage (as a result of large-scale kinetic conflict in South China Sea and East China Sea and U.S. blockade of Strait of Malacca); possible disruptions due to deployment of skilled workforce (including engineers) to the war effort; other war-related disruption due to direct military confrontation with Taiwan, the U.S., and Japan.	China: Possible large-scale disruptions due to interruption of energy and material imports, potentially encountering long-lasting damage (as a result of U.S. blockade of Strait of Malacca); other disruptions related to global crisis over Taiwan..	China: Likely largely unaffected.
	Japan: Probable large-scale disruptions due to interruption of energy and material imports (as a result of large-scale conflict in South China Sea and East China Sea); possible disruptions due to deployment of skilled workforce (including engineers) to war effort; additional war-related disruption due to direct military confrontation with China.	Japan: Possible large-scale disruptions due to interruption of possible material imports from China and Taiwan; other disruptions related to global crisis over Taiwan.	Japan: Likely largely unaffected.
	South Korea: Probable large-scale disruptions due to interruption of energy and material imports, possibly encountering long-lasting damage (as a result of large-scale conflict in South China Sea and East China Sea); disruptions due to deployment of skilled workforce (including engineers) to war effort; additional war-related disruption due to direct military confrontation with China.	South Korea: Possible large-scale disruptions due to interruption of possible material imports from China and Taiwan; other disruptions related to global crisis over Taiwan.	South Korea: Likely largely unaffected.
Netherlands semiconductor industry sales/production (ASML/NXP)	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan entirely lost; Sales to China (13,8% in 2022) halted; Sales to Japan (4,8% in 2022) and South Korea (28,6% in 2022) probably affected by energy and material shortages, as well as unsafe aerial and maritime routes.	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan entirely halted; Sales to China (13,8% in 2022) in question; Sales to Japan (4,8% in 2022) and South Korea (28,6% in 2022) may be affected by material shortages.	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan possibly affected; Sales to China (13,8% in 2022); to Japan (4,8% in 2022) and South Korea (28,6% in 2022) likely unaffected.
	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan entirely lost; Sales to China (35,6% in 2022) halted; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) most likely affected by energy and material shortages, as well as unsafe aerial and maritime routes.	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan entirely halted; Sales to China (35,6% in 2022) in question; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) may be affected by material shortages.	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan possibly affected; Sales to China (35,6% in 2022) in question; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) may be affected by material shortages.
Manufacturing critical economic inputs beyond semicon (e.g., medicine, med-equip, electronics, batteries)	China: Probable large-scale disruptions due to interruption of energy and material imports (as a result of large-scale conflict in South China Sea and East China Sea and U.S. blockade of Strait of Malacca); disruptions due to deployment of workforce (factory workers) to the front and engineers to the broader war effort; other war-related disruption due to direct military confrontation with Taiwan, the U.S., and Japan.	China: Possible large-scale disruptions due to interruption of energy and material imports (as a result of U.S. blockade of Strait of Malacca); other disruptions related to global crisis over Taiwan.	China: Likely largely unaffected, except if Taiwan's semiconductor production faces production issues. After all, China's undisputed leadership in global manufacturing partially relies on the constant supply of semiconductors from Taiwan (of which China is the main importer).
Access to trade routes	Maritime and aerial routes in the South China Sea and East China Sea most likely almost entirely inaccessible; Disruptions in trade in services with Taiwan due to severed subsea cables; possible disruptions in internet connections to South Korea, Japan, China.	Maritime and aerial routes in and around Taiwan and the Taiwan Strait entirely disrupted; Very stark increase in shipping costs for all goods traveling through the South and East China Sea due to rerouting, possible shortages of container ships, spikes in maritime insurance prices; Trade in services with Taiwan almost entirely disrupted due to severed subsea cables; possible disruptions in internet connections to South Korea, Japan, China.	Maritime and aerial routes in and around Taiwan and the Taiwan Strait on-and-off disrupted; Stark increase in shipping costs for most goods traveling through the South and East China Sea due to rerouting, possible shortages of container ships, spikes in maritime insurance prices; Trade in services with Taiwan impacted (lightly) due to severed subsea cables.

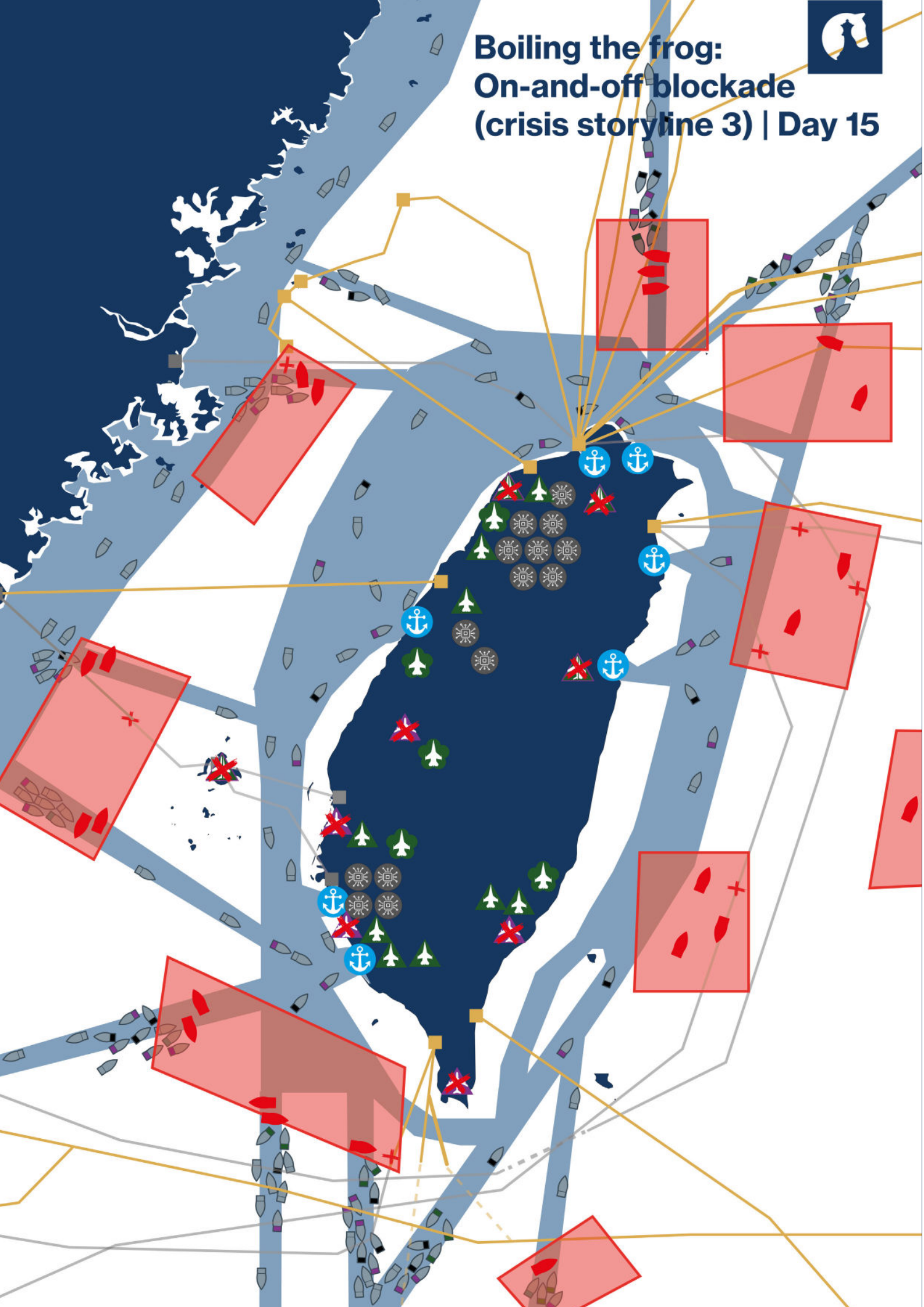
Landing a knockout punch: Sea-land invasion (crisis storyline 1) | Day 90



Strangling the porcupine: Semi-perminant blockade (crisis storyline 2) | Day 30



Boiling the frog: On-and-off blockade (crisis storyline 3) | Day 15



Policy implications and recommendations

Rising tensions around Taiwan present the Netherlands and other European powers with a problem that is almost entirely beyond their control: Neither the Hague, nor Berlin, Paris or London, have the military capacity to credibly deter China's aggression against Taiwan or in East Asia more broadly. The limited defence capabilities that they do have are needed closer to home. Russia's war against Ukraine is going into its third year. A return of Trump to the U.S. Presidency may well weaken NATO's ability to deter aggression against its member-states already in 2025 (perhaps fatally). The Israel-Hamas war may escalate further. Already today, the Yemen-based Houthis continue to disrupt shipping lanes in the Red Sea.[11] Finally, an escalation of tensions within Europe, perhaps between Kosovo and Serbia, could require European military intervention. In the face of their limitations, European navies should protect "maritime approaches [...] to the United States [...] and to the Red Sea and the Gulf; practically this means that the NATO-Euro-Atlantic region comes first, the Western Indian Ocean second, and then everything else."[12] Whether peace and stability in the Taiwan Strait and East Asia can be maintained will be the result of decisions taken in Beijing, most importantly. In addition, the outcome of events will be shaped by Washington, Taipei and to a lesser extent by U.S. allies in the Indo-Pacific, most importantly Japan and the Philippines.

Rising tensions around Taiwan present the Netherlands and other European powers with a problem that is almost entirely beyond their control

In light of this lack of shaping power, the Netherlands and the EU are advised to take a three-pronged approach to deal with the risk of conflict over Taiwan:

1. Contribute to deterring China through economic means;
2. Expand manufacturing and diversify critical supply chains together with allies and partners; and
3. Invest in critical technologies and indispensable positions in international value chains.

In order to contribute to deterring China from blockading or invading Taiwan, the Netherlands can, together with other technologically-advanced democracies, communicate the economic costs of a military conflict to Beijing. Western leaders and U.S. allies in Asia ought to communicate the enormous costs to China's economy of a Taiwan conflict during high-level meetings with Beijing. This should include a clear message that Taiwan's semiconductor industry cannot be taken over by conquest: production facilities are (highly likely) inoperable if China occupies the island, following a blockade or an invasion. Then, at moments of high tension the EU, its member-states, the U.S., and US-allies in East Asia should (privately) communicate to China their willingness to impose sanctions to deter China from starting a military conflict.[13] Behind closed doors, technologically-advanced democracies should compile "a comprehensive overview of [economic] pressure points [they control] vis-à-vis China and evaluate to what extent each party is willing to use these pressure points to deter China" long before any conflict takes place.[14] In this way, EU economic deterrence can complement US-led military deterrence in East Asia.

11 These waterways are far more important to EU prosperity than to U.S. prosperity.

12 Hooft, Ellison, and Mertens, 'Maritime Security in a Time of Renewed Interstate Competition', VIII.

13 The European Council tried to deter Russia from "any further aggression", prior to its invasion of Ukraine, by threatening "massive consequences" and "severe cost" that would be imposed "coordinated with partners." European Council, 'European Council Conclusions, 16 December 2021', accessed 3 October 2022, https://www.consilium.europa.eu/en/press/press-releases/2021/12/17/european-council-conclusions-16-december-2021/.

14 Joris Teer and Mattia Bertolini, 'Reaching Breaking Point: The Semiconductor and Critical Raw Material Ecosystem at a Time of Great Power Rivalry' (The Hague Centre For Strategic Studies (HCSS), October 2022), 87–88, https://hcss.nl/report/reaching-breaking-point-semiconductors-critical-raw-materials-great-power-rivalry/.

In order to be better prepared for the economic shockwaves that would be the result of a conflict, the Netherlands and the EU should expand their manufacturing base with allies and partners, reshore, friendshore or neutral-shore critical supply chains, and invest in critical technologies and an indispensable position in international value chains. This is like taking out a geopolitical insurance policy.[15] Guaranteed access to critical economic inputs will lessen the destructive impact of an international crisis, such as a military conflict over Taiwan and related war-related disruption throughout East Asia. To achieve this, states must make investments in the production and diversification of supply chains for strategic goods long before a crisis takes place. In addition, achieving a technological edge in critical technologies, such as ASML's monopoly position in the production of the latest lithography semiconductor manufacturing equipment, helps dissuade rivals from undertaking coercion against the EU. Control over such chokepoints in the global economy can help deter rival states (i.e., China and Russia) from artificially choking-off critical supplies to the EU (during a crisis). Making upfront investments in a stronger Dutch and European position (or in other words a position of strategic indispensability) in strategic value chains contributes to deterrence through economic strength more generally.[16]

European control over chokepoints in international value chains can deter rival States from using trade as a means of pressure.

The EU is worse-positioned to expand production than China and the U.S., including of critical economic inputs, especially in energy-intensive industries. Manufacturers in the Netherlands and the EU have been heavily impacted by high energy prices since the weaponisation of energy supplies from Russia in 2022. The reduction of energy production throughout the EU makes the Netherlands and the EU more vulnerable to volatile international energy markets. Energy prices are likely to remain higher rather than lower in the EU for the foreseeable future, especially when compared to the U.S. and in China.[17] This in combination with Not-in-my-backyard (NIMBY) protests, CO2-reduction targets, the nitrogen-crisis, a lack of skilled labour (especially with STEM-backgrounds) and some of the highest wages in the world makes it difficult for the EU to expand manufacturing. The EU risks deindustrialisation at a time when a geopolitically volatile world requires reindustrialisation.

Dealing with these disadvantages requires targeted investment in domestic production of those strategic goods we find most important (e.g., medicine and ammunitions), policies to improve the overall business climate, trade deals with countries and blocs that produce strategic goods, as well as new measures to protect the EU market from unfair competition (in manufacturing) from first and foremost China, and the use of public procurement to stimulate production of critical economic inputs and manufacturing in partner instead of rival states.

15 Joris Teer, Abe de Ruijter, and Michel Rademaker, 'Navigating the Great Game of Choke Points: Assessing Geopolitical Risks and Advancing Dutch and European Strategic Indispensability in Digital Value Chains', Report commissioned by MinEconAffairs (The Hague Center for Strategic Studies, March 2024). Teer, Ruijter, and Ouden, 'Blocs and Barriers: Are There Limits to Great Power Decoupling in the next Five Years?'

16 Julian Ringhof and Tobias Gherke, 'Indispensable Leverage: How the EU Can Build Its Technological Edge', 12 September 2023, https://ecfr.eu/article/indispensable-leverage-how-the-eu-can-build-its-technological-edge/. The Government of Japan, in its 2022 National Security Strategy, focuses its economic security policies explicitly on both enhancing Japan's self-reliance as well as making its technologies more "indispensable." 'National Security Strategy of Japan (Provisional Translation)' (Tokyo: Ministry of Foreign Affairs of Japan, December 2022), 30, https://www.cas.go.jp/jp/siryou/221216anzenhoshou/nss-e.pdf.

17 The EU has fewer funds available for reindustrialization as a result of the 2022 energy crisis. The cost of energy compensation and diversification away from Russian natural gas supplies is estimated to be above one trillion euros. Jilles van den Beukel and Lucia van Geuns, 'Olie En Gas Tijdens de Energietransitie', November 2023, 21, https://hcss.nl/report/olie-en-gas-tijdens-de-energietransitie/. Bloomberg News, "Europe's $1 Trillion Energy Bill Only Marks Start of the Crisis," *Bloomberg*, December 18, 2022, https://www.bloomberg.com/news/articles/2022-12-18/europe-s-1-trillion-energy-bill-only-marks-start-of-the-crisis.

The Netherlands and the EU are better positioned to expand strengths in critical technologies and, as a result, claim an indispensable position in high-tech value chains. To achieve this, the Netherlands and the EU should, among other things, better align an already world-class basic research system with societal and geopolitical needs, by investing in STEM-education and by better attracting international STEM-talent to come and study in the Netherlands. The government ought to do more to prevent technology leakage to rival states via universities and companies. In addition, the government should strengthen the valorisation chain to help foster industry champions, among other things by deepening ties between civilian and defence industries. Furthermore, the government could prioritise strategic regions such as Eindhoven (e.g., for large-scale construction of houses), introduce targeted tax benefits for companies active in critical technologies and expand the financial size of the National Growth Fund. Finally, in light of talent shortages in these industries, the government could also seek to foster better conditions to attract high-skilled labour from across the globe for Dutch and EU industries. This can be complemented by an expansion of cooperation on high-tech with technologically-advanced democracies in North America, Europe and East Asia.[18]

Manufacturers in the Netherlands and EU suffer from high energy prices.

18 These policy recommendations will be presented in more detail in upcoming HCSS research: Teer, Ruijter, and Rademaker, 'Navigating the Great Game of Choke Points: Assessing Geopolitical Risks and Advancing Dutch and European Strategic Indispensability in Digital Value Chains', Chapter 6.

Introduction

The era of carefree economic reliance on places far from home is definitively over. The COVID-19 pandemic strained supply chains for many years. Russia's invasion of Ukraine resulted in an energy crisis in Europe and rising food prices around the world. The Houthi attacks in the Red Sea laid bare the vulnerabilities of international shipping chokepoints. Yet, the intensification of military competition in East Asia, between the US and its Asian allies and partners on the one hand, and China on the other, puts far greater economic stakes at risk.

The probability of a military crisis in East Asia, in particular a military conflict over Taiwan, has increased throughout the last decade.

East Asia has become *the* manufacturing and one of the consumption centres of the world economy throughout the last fifty years. Taiwan, an island republic that China views as a renegade province, plays an indispensable role. It is home to the world's largest semiconductor manufacturing industry, most importantly the Taiwan Semiconductor Manufacturing Company (TSMC). Semiconductors, or "tiny pieces of silicon with millions or even billions of little circuits etched into them", underpin all computing power globally.[1] Semiconductors enable electronic devices to "process, store and transmit data".[2] Defence, medical, energy, telecommunications and other critical industries would grind to a halt without semiconductors. The ongoing digitalisation of our economies, for instance through data centers, cloud services, 5G and artificial intelligence (AI), is made possible by the production of more and more powerful and increasingly energy-efficient semiconductors. Therefore, semiconductors can rightly be considered the global economy's central nervous system.

Free and open trade connects this central nervous system to the rest of the world. Taiwan's ability to supply semiconductors to the world hinges on uninterrupted access to waterways, aerial routes and subsea cables. Taiwan almost entirely depends on shipments by sea for the fuels and materials to produce chips; semiconductors are shipped out by air; finally, the maintenance and system updates for the equipment used in its factories (or "fabs") rely on subsea cables (see full-page map below). Neighbouring China is the world's manufacturing powerhouse, making up 35 percent of total global output in 2020. This is more than the next nine countries combined.[3] As a result, China is the primary importer of Taiwan's semiconductors. Not coincidentally, the waterways connecting East Asian economies with each other and with Europe are among the most important in the world. For example, almost ninety percent of the world's "largest ships transited through the Taiwan Strait" in the first eight months of 2022.[4] Dangerously, the probability of a military crisis in East Asia, in particular a military conflict over Taiwan, has increased throughout the last decade.

1 Chris Miller, "Taiwan's security came into question just when they became an irreplaceable supplier of chips," interview by Maarten Muns, *Atlantisch Perspectief,* Atlantische Commissie, January 18, 2024, https://www.atlcom.nl/must-read/we-might-end-up-more-reliant-on-chinese-made-chips-for-our-supply-chains/.

2 Antonio Varas et al., *Strengthening the Global Semiconductor Supply Chain in an Uncertain Era* (The Boston Consulting Group (BCG) and Semiconductor Industry Association (SIA), April, 2021), 9, https://www.semiconductors.org/strengthening-the-global-semiconductor-supply-chain-in-an-uncertain-era/.

3 OECD TiVa database cited in Richard Baldwin, "China Is the World's Sole Manufacturing Superpower: A Line Sketch of the Rise" (The Centre for Economic Policy Research (CEPR), January 17, 2024), https://cepr.org/voxeu/columns/china-worlds-sole-manufacturing-superpower-line-sketch-rise.

4 Kevin Varley, "Taiwan Tensions Raise Risks in One of Busiest Shipping Lanes," *Bloomberg*, August 2, 2022, https://www.bloomberg.com/news/articles/2022-08-02/taiwan-tensions-raise-risks-in-one-of-busiest-shipping-lanes.

Europe's stake in peace and stability in the Taiwan Strait and East Asia

Disruptions in the supply of essential components, such as semiconductors, and end-products will have consequences for the functioning of critical sectors and the economy of the Netherlands and the EU. As a result, both the Netherlands and the EU have a strong interest in maintaining peace and stability in the Taiwan Strait. The committee on Foreign Trade and Development Cooperation of the Netherlands House of Representatives has asked HCSS to assess the geo-economic consequences of a military conflict on and around Taiwan. This report outlines the geopolitical-military context in which Dutch-European trade relations with Taiwan takes place. Specifically, it seeks to map the consequences of war-related disruption of an (armed) conflict around Taiwan for these relations. In order to do so, this report sets out to identify the likely and possible consequences for critical sectors (e.g., the medical and defense industry) and the broader economy (e.g., financial stability and overall prices) of the Netherlands and the EU, if China applies military power to change the status quo in its relations with Taiwan.

Both the Netherlands and the EU have a strong interest in maintaining peace and stability in the Taiwan Strait.

By outlining these impacts, the report seeks to facilitate the Committee in identifying measures that may contribute to the prevention of conflict and to mitigate the negative consequences of a conflict. In the section "Policy implications and recommendations" on pages 50 to 53, the authors make policy recommendations to contribute to these goals. On request of the committee, geo-military consequences of an armed conflict around Taiwan, for instance military action by Russia against NATO in Europe due to U.S. Navy entanglement in East Asia, fall outside of the scope of this report. For the same reason, the severe geo-economic impact of a sanction-spiral between the US and the EU on the one hand and China on the other, which would likely be the result of military action by China around Taiwan, is (largely) excluded from the analysis.

In order to arrive at an answer, the report answers sub-questions in three chapters. First, *Chapter 1: How did we get here?* sketches the geopolitical context. It outlines the structural and rapid growth of tensions over Taiwan throughout the last decade. The chapter identifies trends, such as China's rapid military modernisation and Taiwan's underinvestment in defence, which conjointly may lead to military conflict in the 2020s. The crisis storylines presented in Chapter 3 were designed on the basis of these trends.

Chapter 2: What is at stake? assesses the importance of peace and stability in the Taiwan Strait for critical sectors and the economy of the Netherlands and the EU. Specifically, it gives a broad overview of key areas of Dutch and European dependence on Taiwan specifically, and China and the rest of East Asia more broadly, by outlining...

1. Dutch and European dependence on semiconductor production on most importantly Taiwan, but also on China. In addition, the paper sketches the main Dutch and EU dependencies on the rest of East Asia for the production of semiconductors more broadly.
2. Dependence of Dutch (and European) companies in the semiconductor value chain on exports to Taiwan and China and on production on Taiwan. These companies, ASML and NXP, play an important role in the Dutch and European economy. In addition, their dependence on exports to East Asia more broadly is also examined.
3. Reliance of critical sectors and the economy of the Netherlands and the EU on China, beyond the semiconductor sector.
4. Reliance on the most important trade routes from and to East Asia, primarily focusing on waterways as the majority of goods around the globe is still transported via maritime routes.

Chapter 3: What can go wrong? maps the geo-economic impact on the Netherlands and the EU of three military crises that may occur throughout the 2020s or thereafter. First, the chapter cites the findings of a handful of authoritative impact-assessments by different research institutes and an industry group. These exercises use a variety of methods to map the global fallout of a one-year People's Liberation Army (PLA) blockade and invasion of Taiwan. Second, the report presents Taiwan Crisis Storylines to make an assessment of the shorter-term war-related disruption impact of a PLA blockade or invasion on the Netherlands and the EU. In addition, one storyline presents a broad outline of the economic effects of a lower-intensity conflict (on-and-off blockade), which are less often taken into account.

The Taiwan Crisis Storylines presented in Chapter 3 outline a chain of events, meaning a sequence of actions by the People's Liberation Army and its adversaries, which either end in a state of lower-intensity conflict (a blockade) or high-intensity conflict (an invasion). Crisis storylines are not predictions of the future. Rather, they are conceivable sequences of events that, on the basis of current developments, may well play out. Storylines are hence illustrative scenarios: they cover a diverse range of conflict pathways in order to help organisations think through a broad range of eventualities.[5] These do not cover the entire range of possible futures of conflict around Taiwan, as the future of peace and stability in the Taiwan Strait depends on a large number of uncertain factors.[6] By mapping the possible and probable disruptive effects of three specific illustrative crises, however, storylines can still facilitate The committee on Foreign Trade and Development Cooperation, governments, and companies in systematically thinking through the fallout of a crisis and charting actions to mitigate the effects of war-related disruption. The storylines are:

1. *Landing a knock-out punch*: a sea-land invasion (>180 days), taking place in 2029;
2. *Strangling the porcupine*: a semi-permanent blockade (>4 weeks), taking place in 2026; and
3. *Boiling the frog*: an on-and-off blockade (alternating 4-days-to-2-weeks), taking place in 2025.

Each of these scenarios is concluded with an impact assessment, outlining the:

1. Level of disruption to the supply from and production of semiconductors on primarily Taiwan, but also China, Japan and South Korea if they occur;
2. Level of disruption to the production and sales of important Dutch companies in the semi-conductor value chain;
3. Level of disruption to manufacturing in China beyond the semiconductor value chain; and the
4. Level of disruption of trade routes from and to East Asia, primarily focusing on waterways as the majority of goods is still transported via maritime routes.[7]

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5 Crisis Storylines serve as "stress-tests" for companies, governments and other organizations.

6 For instance, the first storyline *"Landing a knock-out punch: a sea-land invasion (>180 days)"* ends in direct conventional high-intensity, regional military conflict between the US and China. It is important to note that during a conflict of that kind the belligerents may also escalate to the nuclear level. In fact, "44 percent of U.S. experts believed China would be willing to detonate nuclear weapons against U.S. or coalition forces in a Taiwan conflict; only 11 percent of Taiwan experts thought the same." Bonny Lin et al., 'Surveying the Experts: U.S. and Taiwan Views on China's Approach to Taiwan' (China Power Project - The Center for Strategic and International Studies (CSIS), January 2024), 3, https://www.csis.org/analysis/surveying-experts-us-and-taiwan-views-chinas-approach-taiwan.

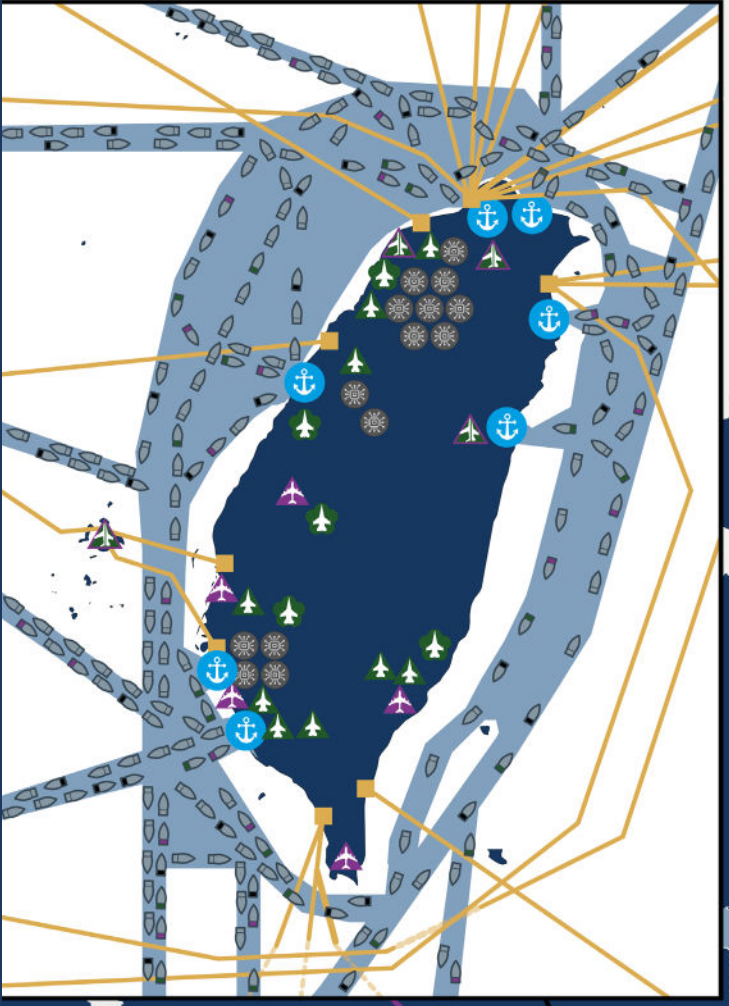
7 Trade in digital services relies on (subsea) telecommunication cables. At a time of great power competition, these have become more vulnerable.

Methods

The analysis is based on a wide variety of sources. These include a literature review, an analysis of expert survey findings on the possibility and possible shapes of Cross-Strait conflict and analysis of population survey outcomes on the identity and political preferences of Taiwan's population. Furthermore, the authors concluded interviews with semiconductor industry representatives and political economy, defence, and regional experts from the EU and East Asia. In addition, they participated in round tables attended by representatives from industry, government, academia and thinktanks in Europe and Taiwan (for a complete overview please find Annex B). Finally, they completed an internal Crisis Storyline-workshop. Analysts with deep expertise on defence and (maritime) security issues, as well as analysts with expertise on geo-economics, semiconductors, energy, and critical raw materials, participated in the internal workshop. The storylines, which were designed during the internal workshop, are grounded in thinktank reports, academic literature, defence and national strategies of relevant states and prior HCSS research. The findings of the workshop were verified through additional expert interviews and internal reviews by analysts at HCSS. Finally, the crisis-storylines were contrasted with a handful of scenario exercises on the geo-economic effects of a blockade or invasion of Taiwan and projections of authoritative organisations.[8]

[8] These scenarios and projections include Charlie Vest, Agatha Kratz, and Reva Goujon, "The Global Economic Disruptions from a Taiwan Conflict' (Rhodium Group, December 2022), https://rhg.com/research/taiwan-economic-disruptions/. 'If China Invades Taiwan, It Would Cost World Economy $10 Trillion - Bloomberg', accessed 23 January 2024, https://www.bloomberg.com/news/features/2024-01-09/if-china-invades-taiwan-it-would-cost-world-economy-10-trillion?embedded-checkout=true. ; 'Global Peace Index 2023: Measuring Peace in a Complex World', (Sydney: Institute for Economics & Peace, June 2023), 44–50, https://www.visionofhumanity.org/wp-content/uploads/2023/06/GPI-2023-Web.pdf. Robert A. Manning, 'Would Anyone "Win" a Taiwan Conflict? • Stimson Center', *Grand Strategy*, 9 January 2024, https://www.stimson.org/2024/us-china-taiwan-conflict-global-economy/. Varas et al., 'Strengthening the Global Semiconductor Supply Chain in an Uncertain Era'. Joris Teer, Mattia Bertolini, and Benedetta Girardi, 'Competitie Tussen Grootmachten En Maatschappelijke Stabiliteit in Nederland: De Risico's van Russisch Gas, Chinese Grondstoffen En Taiwanese Chips ("Great Power Competition and Social Stability in the Netherlands: The Risks of Russian Gas, Chinese Raw Materials and Taiwanese Chips to Vital Sectors")' (The Hague Center for Strategic Studies (HCSS), March 2023), https://hcss.nl/news/great-power-competition-and-social-stability-in-the-netherlands/.

Taiwan's approaches and points of entry



Legend

Maritime

- Shipping lane
- Contestation / blockade / quarantine
- Seaport
- Ship
- Weapons & ammunition
- Fuel & industrial goods
- Food
- Seamines
- China People's Liberation Army Navy (PLAN) vessel

Internet traffic

- Subsea cables
- Severed subsea cables

Aerial

- Military airfield
- Military airstrip (highway)
- Civilian & military airfield
- Commercial airport
- Military re-supply
- Passenger & freight flights
- Chinese aerial assets
- Taiwanese, Japanese & US aerial assets

Other

- Cyber attack
- TSMC fabrication plant
- Chinese missile strike / bombardment
- Taiwanese, Japanese or US missile strike / bombardment
- Destroyed / battle
- Chinese sea-land attack
- Taiwanese counter-attack
- United States Navy 7th Fleet
- Blocked
- Disrupted

Chapter 1. **How did we get here?**

Dangerously, the probability of a military crisis in East Asia, in particular a crisis over Taiwan, has increased throughout the last decade. Tensions between China on the one hand, and the US and its allies and partners on the other, have structurally and rapidly increased. In fact, a December 2023 survey of U.S. and Taiwan experts found that respectively 67 percent and 57 percent "believed a Taiwan Strait Crisis is likely [already] in 2024".[9] Trends, such as China's rapid military modernisation, Beijing's expansion of actions 'below the threshold of war' against Taiwan, the relative decline of U.S. power in East Asia (and Washington's efforts to reverse this development), China's distrust of the Democratic Progressive Party (DPP) (Taiwan's ruling party), and Taiwan's underinvestment in defence, may eventually lead to conflict. At the very least, as a result of these trends, tensions are unlikely to fall below 2016 levels.

Tensions between China on the one hand, and the US and its allies and partners on the other, have structurally and rapidly increased.

1.1. China's military rise and actions 'below the threshold of war'

Under Xi Jinping, China has sought to force Taiwan to accept "reunification" on the terms of the Chinese Communist Party, by rapidly expanding its military capabilities and actions in the hybrid domain.[10] First, enforcing sovereignty over Taiwan is an important aim behind the rapid modernisation and expansion of China's PLA, a process that started in the 1990s and accelerated in the last ten years.[11] In a 2019 address to Taiwan's people, Xi stressed that "our country must be reunified, and will surely be reunified [...] it is critical to rejuvenation of the Chinese nation in the new era." Xi stressed that China does "not renounce the use of force" to achieve this.[12] China's 2019 National Defense Policy, published a few months later, states that "the People's Liberation Army will defeat anyone attempting to separate Taiwan from China." It calls on the PLA to become "a modern and specialized military capable of fighting and winning wars in the information age."[13] In a November 2023 meeting, President Xi

9 Bonny Lin et al., *Surveying the Experts: U.S. and Taiwan Views on China's Approach to Taiwan,* China Power Project (The Center for Strategic and International Studies (CSIS), January 2024), 4, https://www.csis.org/analysis/surveying-experts-us-and-taiwan-views-chinas-approach-taiwan.

10 Achieving "reunification" has been a standing objective since the founding of the PRC in 1949. In the "hybrid domain" states take actions against each other that are "below the threshold of war". These actions seek to achieve their political objectives, but seek to prevent soliciting a military response. Examples are import boycotts, influence campaigns, cyber-attacks, and subsea sabotage.

11 Joris Teer et al., *China's Military Rise and the Implications for European Security* (The Hague Centre for Strategic Studies (HCSS), November 10, 2021), https://hcss.nl/report/chinas-military-rise/.

12 Xi Jinping, "Speech at the Meeting Marking the 40th Anniversary of the Issuance of the Message to Compatriots in Taiwan", Interpret: China, *Center for Strategic & International Studies (CSIS)*, January 2, 2019, https://interpret.csis.org/translations/speech-at-the-meeting-marking-the-40th-anniversary-of-the-issuance-of-the-message-to-compatriots-in-taiwan/.

13 "Full Text: China's National Defense in the New Era," *The State Council Information Office of the People's Republic of China*, July 24, 2019, http://english.scio.gov.cn/2019-07/24/content_75026800_5.htm.

reportedly told President Biden that Taiwan is the "biggest, most potentially dangerous issue in U.S.-China relations".[14]

China has invested accordingly. Whereas in 1990 China and Taiwan's military budget were still equal, in 2021 China spent 20-times more on defence.[15] Decades-long investments in a large number of increasingly sophisticated long-range missiles (such as the DF21-D and the DF-26), submarines and mines have made it extremely dangerous for the US Navy to come to Taiwan's aid during a conflict (especially close to China's shore).[16] By continuing to add to its conventional and nuclear long-range strike stockpile and invest in space capabilities, China seeks to force Washington to stay out of any conflict in East Asia altogether.[17] Beijing's ongoing rapid expansion of its coast guard, maritime militia, and navy better enable China to project power in the East China Sea, South China Sea and the Western-Pacific more broadly.[18] The construction and subsequent militarisation of artificial islands enables Beijing to deny access to commercial ships and navies of rivals and neighbours in waters further from home.[19] Importantly, China's military rise tests Washington's commitment to its alliances with Japan, Korea and the Philippines. In the same vein, this is meant to weaken long-standing U.S. commitment to deter Chinese aggression in the Taiwan Strait. These combined U.S. commitments are the foundation underpinning the security of all of these East Asian nations and free and open trade between Asia and Europe.

Through hybrid conflict, Beijing has sought to create a sense of powerlessness among Taiwan's people and thus convince the government in Taipei to accept "reunification" on Chinese terms.

Second, since 2016 China has diversified and intensified hostile actions against Taiwan. So far, these actions remained below the threshold of war. Through hybrid conflict, Beijing has sought to create a sense of powerlessness among Taiwan's people and thus convince the government in Taipei to accept "reunification" on Chinese terms. Influence campaigns to fuel polarisation in Taiwan, the detention of a growing number of Taiwan residents in mainland China, the haphazard blocking of specific imports from Taiwan, and attacks in the cyber and subsea domains are becoming more commonplace.[20] In February 2023, both telecommunication cables connecting Taiwan's Matsu Archipelago to the Taiwan's mainland were cut,

14 Jeff Mason, Trevor Hunnicutt, and Jeff Mason, "Xi Told Biden Taiwan Is Biggest, Most Dangerous Issue in Bilateral Ties", *Reuters*, November 16, 2023, https://www.reuters.com/world/us/xi-told-biden-taiwan-is-biggest-most-dangerous-issue-bilateral-ties-us-official-2023-11-16/. Xi's pronouncements have become of great importance over the last ten years. Xi has effectively centralised power into his own hands, doing away with presidential term limits and the CCP's "collective leadership" approach to governing China in the post-Mao era. Chun Han Wong, *Party of One: The Rise of Xi Jinping and the Superpower Future of China* (S.l.: CORSAIR, 2023).

15 "SIPRI Military Expenditure Database," Stockholm International Peace Research Institute, accessed December 14, 2023, https://www.sipri.org/databases/milex.

16 Rush Doshi, *The Long Game: China's Grand Strategy to Displace American Order* (New York: Oxford University Press, 2021); In military jargon, these capabilities are referred to as Anti-Access Area-Denial (A2/AD) capabilities. Andrew S. Erickson, "China's DF-21D And DF-26B ASBMs: Is The U.S. Military Ready?", interview by Harry J. Kazianis, November 15, 2020, https://www.andrewerickson.com/2020/11/chinas-df-21d-and-df-26b-asbms-is-the-u-s-military-ready/.

17 Ryan Hass, Bonnie Glaser and Richard Bush, *U.S.-Taiwan Relations: Will China's Challenge Lead to a Crisis?* (Washington, D.C.: Brookings Institution Press, 2023), 112.

18 Department of the Navy. *China: Naval Construction Trends Vis-à-Vis U.S. Navy Shipbuilding Plans, 2020- 2030* (Office of Naval Intelligence, Farragut Technical Analysis Center Naval Platforms Department, February 6, 2021), https://fas.org/irp/agency/oni/plan-trends.pdf.

19 Chun Han Wong, "China Appears to Have Built Radar Facilities on Disputed South China Sea Islands," *Wall Street Journal*, February 23, 2016, https://www.wsj.com/articles/china-appears-to-have-built-radar-gear-in-disputed-waters-1456198634.

20 Ryan Hass, Bonnie S. Glaser and Richard C. Bush, *U.S.-Taiwan Relations: Will China's Challenge Lead to a Crisis?* (Washington, D.C.: Brookings Institution Press, April 15, 2023); Ben Lewis, "2022 in ADIZ Violations: China Dials Up the Pressure on Taiwan," China Power Project, Center for Strategic & International Studies (CSIS), March 23, 2023, https://chinapower.csis.org/analysis/2022-adiz-violations-china-dials-up-pressure-on-taiwan/; Eric Cheung, "Taiwanese Intelligence Says Chinese Leaders Met to Plan out Presidential Election Interference," *CNN*, December 8, 2023, https://www.cnn.com/2023/12/08/asia/taiwan-intelligence-china-leaders-meeting-election-interference-intl-hnk/index.html; Marek Jestrab, "A Maritime Blockade of Taiwan by the People's Republic of China: A Strategy to Defeat Fear and Coercion," Atlantic Council (blog), December 12, 2023, 18–20, https://www.atlanticcouncil.org/content-series/atlantic-council-strategy-paper-series/a-maritime-blockade-of-taiwan-by-the-peoples-republic-of-china-a-strategy-to-defeat-fear-and-coercion/.

resulting in large-scale disruption of the island group's internet connection for 50 days.[21] This goes hand in hand with record numbers of PLA Air Force incursions into Taiwan's Air-Defence Identification Zone (ADIZ). Even large-scale military exercises around Taiwan, often simulating a PLA invasion or blockade of the island, have become frequent.[22] These actions impose real costs on Taiwan. The exercises that followed the 2022 visit of then-Speaker of the U.S. House of Representatives Nancy Pelosi to Taiwan disrupted shipping and led to the cancellation of flights.[23] Beijing's rhetoric suggests more is to come. Chinese officials framed Taiwan's January 2024 Presidential Election between the nationalist KMT and the DPP as a choice "between peace and war" and between "prosperity and recession".[24] The DPP candidate, according to Beijing the choice for "war" and "recession", won the election.

1.2. U.S. attempts to reverse the relative decline of its power in East Asia

Washington seeks to contain China through strengthening its military alliances, partnerships and capabilities in the Indo-Pacific.

Washington seeks to ensure that China's actions remain below the threshold of war. In other words, the U.S. seeks to deter China from taking military action against Taiwan, in spite of the decline of U.S. relative power and its military commitments in Europe and the Middle East. The military rise of China, its increasingly powerful (near-)peer great power rival, has become the U.S.' most important foreign policy concern.[25] Specifically, it seeks to contain China through strengthening its military alliances, partnerships and capabilities in the Indo-Pacific. Likewise, Washington seeks to curtail China's progress in the domestic development of civilian and military technologies and industries. The loss of U.S. power vis-à-vis China was on display already in 2022. US President Clinton, during the Third Taiwan Strait Crisis in 1996, still forcefully ended PLA naval intimidation of Taiwan by deploying two Carrier Strike Groups (CSGs) in the Taiwan Strait. The PLA exercises that followed the visit of Nancy Pelosi in 2022, however, were not answered with similar U.S. actions. This situation may get worse before it gets better: important U.S. air and naval platforms are planned to be retired in the mid-20202s whilst many "new PLA capabilities will come online in a similar period."[26]

To make matters even worse, China's challenge comes at a time when US treasure and military aid (most pressingly ammunitions) are needed elsewhere. Russia's 2022 invasion of Ukraine led Washington to (again) vastly expand its troop presence in Europe and to give

21 Lii Wen, "After Chinese Vessels Cut Matsu Internet Cables, Taiwan Seeks to Improve Its Communications Resilience," *The Diplomat,* April 15, 2023, https://thediplomat.com/2023/04/after-chinese-vessels-cut-matsu-internet-cables-taiwan-shows-its-communications-resilience/.

22 Emily Feng and Connie Hanzhang Jin, "China Is Subtly Increasing Military Pressure on Taiwan. Here's How," *NPR*, December 18, 2023, https://www.npr.org/2023/12/18/1216317476/china-military-taiwan-air-defense.

23 Joe Brock, "China's Military Drills near Taiwan Disrupt Key Shipping Lanes," *Reuters*, August 5, 2022, https://www.reuters.com/world/asia-pacific/chinas-military-drills-near-taiwan-disrupt-key-shipping-lanes-2022-08-05/; Joyce Lee and Jamie Freed, "Airlines Scrap, Reroute Flights as China Fires Live Missiles in Drills near Taiwan," *Reuters*, August 5, 2022, https://www.reuters.com/world/asia-pacific/airlines-cancel-reroute-flights-during-chinese-military-drills-near-taiwan-2022-08-05/.

24 "Zhang Zhijun, president of the Association for Relations Across the Taiwan Straits, a quasi-official body that handles ties with Taiwan" cited in Yi Zhang, "Taiwan Residents Urged to Make Right Choice between Peace, War" *China Daily*, January 4, 2024, https://www.chinadaily.com.cn/a/202401/04/WS659612f0a3105f21a507a84a.html.

25 The White House, *National Security Strategy of the United States of America* (The White House, December 2017), https://trumpwhitehouse.archives.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf; The White House, *National Security Strategy* (The White House, October 2022), https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf.

26 Hass, Glaser, and Bush, *U.S.-Taiwan Relations*, 117.

large-scale military and financial aid to Kyiv. Likewise, the U.S. faces a crisis in the Middle East. Following the October 7 Hamas terror attack, Washington deployed its navy to the Eastern-Mediterranean to prevent a regional escalation of the Israel-Hamas War. In the face of Houthi attacks against international shipping, subsequently, Washington and several allies deployed vessels to the Red Sea to ensure freedom of navigation. Due to the proliferation and reduced costs of small and increasingly precise drones and missile systems, Houthi attacks continue to disrupt international shipping, in spite of U.S. strikes against Houthi positions in Yemen.[27] Alongside all of this, U.S. forces have struck Iranian-backed militias in both Iraq and Syria. They did this in response to these militias' attacks on American troops in the region. The stage is set for a significant escalation of Middle Eastern conflict.

Nonetheless, the U.S. has undertaken efforts to move the balance of military power in East Asia back in its favour. For instance, the US introduced a trilateral military cooperation framework (AUKUS) with the United Kingdom and Australia. To strengthen its position in the South China Sea, Washington expanded access to military bases in the Philippines.[28] The U.S. also brokered trilateral security cooperation between South Korea and Japan, which includes a "multi-year trilateral exercise plan".[29] Most importantly, President Biden made at least four explicit verbal commitments to defend Taiwan in case of a PLA attack and expanded military aid to the island.[30] In terms of concrete military capabilities, the U.S. seeks to expand its long-range strike capability, that of its allies and partners, and its own naval and aerial presence in the region.[31] By doing so, Washington in turn seeks to make it extremely costly for the PLA to take naval action against its neighbours in East and Southeast Asia.

President Biden has made at least four explicit verbal commitments to defend Taiwan in case of a PLA attack.

Washington's strategy of containment goes beyond the military realm. Both the Trump and Biden Administrations took action to widen the gap between the US and China in foundational technologies, especially those that can be used to strengthen advanced military capabilities.[32] For example, the US aims to hamper the PLA integration of new applications of Artificial Intelligence (AI) in the military domain. To stay ahead in its technology competition with China, the US seeks to prevent the development of an advanced semiconductor industry inside

27 Simon Scarr et al., 'How Yemen's Houthi Rebels Are Carrying out Attacks on Red Sea Ships', *Reuters*, 2 February 2024, https://www.reuters.com/graphics/ISRAEL-PALESTINIANS/SHIPPING-ARMS/lgvdnngeyvo/. For an overview of military-technological developments and the proliferation of weapon systems that make international shipping more dangerous, please find: Paul van Hooft, Davis Ellison, and Frederik Mertens, 'Maritime Security in a Time of Renewed Interstate Competition' (The Hague: The Hague Center for Strategic Studies, January 2024), 12–20, https://hcss.nl/wp-content/uploads/2024/01/Maritime-Security-in-a-Time-of-New-Interstate-Competition-HCSS-2024.pdf.

28 "Philippines, U.S. Announce Locations of Four New EDCA Sites," U.S. Department of Defense, April 3, 2023, https://www.defense.gov/News/Releases/Release/Article/3349257/philippines-us-announce-locations-of-four-new-edca-sites/.

29 "The Spirit of Camp David: Joint Statement of Japan, the Republic of Korea, and the United States," The White House, August 2023, https://www.whitehouse.gov/briefing-room/statements-releases/2023/08/18/the-spirit-of-camp-david-joint-statement-of-japan-the-republic-of-korea-and-the-united-states/; "United States-Japan-Republic of Korea Trilateral Ministerial Joint Press Statement," U.S. Department of Defense, December 19, 2023, https://www.defense.gov/News/Releases/Release/Article/3621235/united-states-japan-republic-of-korea-trilateral-ministerial-joint-press-statem/.

30 Vincent Ni, "Joe Biden Again Says US Forces Would Defend Taiwan from Chinese Attack," *The Guardian*, September 19, 2022, https://www.theguardian.com/world/2022/sep/19/joe-biden-repeats-claim-that-us-forces-would-defend-taiwan-if-china-attacked.

31 Veerle Nouwens et al., *Long-Range Strike Capabilities in the Asia-Pacific: Implications for Regional Stability* (International Institute for Strategic Studies (IISS), January 2024), https://www.iiss.org/research-paper/2024/01/long-range-strike-capabilities-in-the--asia-pacific-implications-for-regional-stability/.

32 "Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution," The White House, April 27, 2023, https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/04/27/remarks-by-national-security-advisor-jake-sullivan-on-renewing-american-economic-leadership-at-the-brookings-institution/.

China.[33] From 2018 until today, the US has structurally expanded technology restrictions. Among other measures, it has curbed exports of semiconductor manufacturing equipment to China, expanded inbound investment screening and introduced outbound investment screening. It nudged allies to introduce similar measures.[34] These diplomatic, military and tech measures have heightened threat perceptions in Beijing. President Xi in 2022 warned that China is faced with US efforts to "contain, blockade, and exert maximum pressure" against China. These "may escalate at any time".[35]

1.3. Taiwan's distinct national identity and lack of military preparations

Maintaining the status quo "indefinitely" or at least until "a later date" is the preference of the majority of Taiwan's population.

Taiwan's people have grown more wary of engagement with China and have structurally leaned even more towards the U.S., as evidenced by the DPP's third consecutive victory. Yet, Taiwan is committed to the status quo: the island republic is entirely unlikely to submit to reunification, but not likely to declare independence either. Opposition to China on Taiwan has increased, in spite of China's pressure tactics in the hybrid domain. In the January 2024 Presidential Elections the DPP, according to China the "choice for war and recession", achieved an unprecedented third victory in a row.[36] The so-called China cleavage, or "the split attitude towards Taiwan's national identity and how this relates to China", has become the dominant issue in such elections.[37] Polls suggest that reunification is political suicide for any politician, as a mere six percent of Taiwanese surveyed in 2023 supported this.[38] In addition, 60 percent of Taiwan's population identifies as solely Taiwanese, whereas only 2.5 percent identifies as exclusively Chinese in 2023.[39] Politicians do not have a clear-cut incentive to (dangerously) declare independence either. First, the vast majority of China, Taiwan and cross-strait experts expect that a declaration of that kind will be answered by Beijing with an immediate invasion.[40] Second, such a declaration is not popular. Only 21.4 percent of the electorate wants to "maintain the status quo, move toward independence". A mere 4.5 percent is in favour of declaring "independence as soon as possible." Maintaining the status quo

33 Reva Goujon et al., "Freeze-in-Place: The Impact of US Tech Controls on China," Rhodium Group, October 21, 2022, https://rhg.com/research/freeze-in-place/.

34 Joris Teer, Abe de Ruijter, and Anna Sophie den Ouden, *Blocs and Barriers: Are There Limits to Great Power Decoupling in the next Five Years?* (The Hague Centre for Strategic Studies (HCSS), Q1 (upcoming 2024).

35 Xi Jinping, "Full Text of the Report to the 20th National Congress of the Communist Party of China: *Hold High the Great Banner of Socialism with Chinese Characteristics and Strive in Unity to Build a Modern Socialist Country in All Respects*", Ministry of Foreign Affairs of the People's Republic of China, October 25, 2022, 21, https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/202210/t20221025_10791908.html.

36 "Zhang Zhijun, president of the Association for Relations Across the Taiwan Straits, a quasi-official body that handles ties with Taiwan" cited in Yi Zhang, "Taiwan Residents Urged to Make Right Choice between Peace, War" *China Daily*, January 4, 2024, https://www.chinadaily.com.cn/a/202401/04/WS659612f0a3105f21a507a84a.html.

37 Sense Hofstede, "How the China Cleavage Shapes Taiwan's Elections," *Clingendael Spectator*, November 28, 2023, https://spectator.clingendael.org/en/publication/how-china-cleavage-shapes-taiwans-elections.

38 "Changes in the Unification – Independence Stances of Taiwanese as Tracked in Surveys by Election Study Center, NCCU (1994~2023.06)", Election Study Center, National Chengchi University, July 12, 2023, https://esc.nccu.edu.tw/PageDoc/Detail?fid=7805&id=6962.

39 In 2007, a larger part of the population of Taiwan still identified as both Taiwanese and Chinese than as just Taiwanese. "Changes in the Taiwanese/Chinese Identity of Taiwanese as Tracked in Surveys by the Election Study Center, (NCCU (1992-2023.6)", Election Study Center, National Chengchi University, July 12, 2023), https://esc.nccu.edu.tw/PageDoc/Detail?fid=7800&id=6961.

40 In one poll 77% of China, Taiwan, and cross-Strait relations experts indicated that they believed "China would immediately invade if Taiwan declared independence." "Survey Results: China's Approach to Taiwan," China Power Project, Center for Strategic and International Studies (CSIS), 2022, https://chinapower.csis.org/data/survey-results-chinas-approach-to-taiwan/.

"indefinitely" or at least until "a later date" is the preference of the majority of Taiwan's population.[41] In short, both reunification with China and a dangerous declaration of independence seem out of the question.

Recent electoral trends and Taiwan's insufficient preparations for a conflict may still increase Beijing's appetite for military action, in spite of Taiwan's unambiguous preference for the status quo. In addition to vastly expanding its gray zone actions, Beijing's rhetoric on Taiwan hardened since the DPP's election in 2016. In fact, already in China's 2019 national defence strategy, it warned that the DPP has "gone further down the path of separatism by stepping up efforts to sever the connection with the mainland in favor of gradual independence, pushing for de jure independence, intensifying hostility and confrontation, and borrowing the strength of foreign influence."[42] Beijing's sense of provocation may prove especially dangerous, if combined with a perception of military weakness on the part of Taiwan. In 2022, Taiwan, like the Netherlands, only spent 1.6 percent of its GDP on defence.[43] The DPP-government may have expanded conscription for men, but only from four months to one year, which is about half of conscription time in South Korea.[44] In addition, domestic polarization and the lack of a DPP majority in parliament might lead "decisions on defense budgets and arms procurement [to] become gridlocked."[45]

In 2022, Taiwan, like the Netherlands, only spent 1.6 percent of its GDP on defence.

41 "Changes in the Unification – Independence Stances of Taiwanese as Tracked in Surveys by Election Study Center, NCCU (1994~2023.06)", Election Study Center, National Chengchi University, July 12, 2023, https://esc.nccu.edu.tw/PageDoc/Detail?fid=7805&id=6962.

42 "Full Text: China's National Defense in the New Era," *The State Council Information Office of the People's Republic of China.*

43 "SIPRI Military Expenditure Database," Stockholm International Peace Research Institute.

44 Timothy S. Rich and Serena White, "What Do Taiwanese Think About Expanding Conscription?," *The Diplomat,* June 24, 2023, https://thediplomat.com/2023/06/what-do-taiwanese-think-about-expanding-conscription/.

45 Simona Grano, "The Geopolitical Implications of the Taiwanese Elections for China, the United States and the World," Asia Society Policy Institute, January 2024, https://asiasociety.org/policy-institute/geopolitical-implications-taiwanese-elections-china-united-states-and-world.

Chapter 2. **What is at stake?**

What would critical sectors and the broader economy of the Netherlands and the EU look like without trade with first and foremost Taiwan, but also without East Asia more broadly? This chapter assesses the importance of peace and stability in the Taiwan Strait for critical sectors and the economy of the Netherlands and the EU. Specifically, it gives a broad overview of key areas of Dutch and European dependence on Taiwan specifically, and China and the rest of East Asia more broadly. It highlights that:

1. Over 70 percent of front-end and over 80 percent of back-end manufacturing of all semiconductors is completed in East Asia. Semiconductors are essential building blocks of our economies and societies: advanced semiconductors push the advances of the 4th industrial revolution such as AI whilst mature (or "foundational") chips are ubiquitous in critical sectors like medical, defence, green, automotive, and ICT-industries. Whereas Taiwan, in particular TSMC, dominates front-end manufacturing of logic chips, China seeks to consolidate its role as the world's primary back-end manufacturer of semiconductors in general. The EU relies on East Asia for the production of semiconductors more broadly. Samsung and SK Hynix make South Korea the undisputed global leader in memory chip production. Japan, a world leader in the semiconductor value chain in the 1980s, still continues to supply chip manufacturers with chemicals and processed materials, such as wafers and lithography equipment manufacturers with essential components.
2. Dutch companies active in the semiconductor value chain, namely ASML and NXP, generate a large share of their revenue through sales to Taiwan and China and rely on production on Taiwan. Both would be primary parties involved in any Taiwan Strait conflict. South Korea and Japan, which due to their geographic proximity and strong commercial ties to Taiwan and China would likely be heavily negatively affected by a conflict, are important sources of revenue too.
3. In addition to semiconductors, the Netherlands and the EU came to rely on manufacturing more generally on first and foremost China. In 2020, approximately 35 percent of all goods produced by manufacturing industries worldwide were manufactured in China, a larger share than the next nine countries combined. This includes a dependence on a wide variety of important materials, components and end-products in critical sectors, including in medical, green, ship-building, and digital industries.
4. East Asia's ability to supply semiconductors and end-products to the world hinges on uninterrupted access to some of the world's busiest waterways, such as the Malacca Strait and the South and East China Seas, but also to aerial routes and subsea cables.

2.1. EU dependence on semiconductor manufacturing in Taiwan, China and East Asia more broadly

Semiconductors are essential building blocks of our economies and societies.

Semiconductors are essential building blocks of our economies and societies: advanced semiconductors push the advances of the 4th industrial revolution such as AI whilst mature (or "foundational") chips are ubiquitous in critical sectors like medical, defence, green, automotive, and ICT-industries (see full-page infographic below). The ongoing digitalisation of our economies, for instance through data centers, cloud services, 5G and AI, is made possible by the production of enormous quantities of more and more powerful and increasingly energy-efficient semiconductors. Advances in semiconductor technology drive the development of new generations of smartphones, PCs, cloud services, data centers, telecommunications and supercomputers. Supported by trailing-edge and mature chips, these advanced chips lie at the heart of technological progress of national industries and militaries. For example, technology companies and powerful militaries train AI to increase the autonomy of battlefield drones or to more efficiently go through intelligence data. This is made possible by the ever-greater computing power of the most advanced semiconductors.[46] As a result, access to advanced semiconductors plays a central role for great powers to achieve a technological edge vis-à-vis their rivals, in both the economic and military domains. Importantly, advances in computing can provide solutions to societal problems. Populations in the EU, North America and East Asia are aging rapidly. Through increased automation of medical, defence, green, automotive, and ICT-industries, advanced economies may deal with labour shortages. In short, advanced semiconductors push national industries and militaries to new technological heights, play a central role in great power competition, and are expected to become increasingly central in the critical sectors of the future.

Trailing-edge and legacy (or "mature") semiconductors enable the functioning of critical sectors such as medical, defense, green and automotive industries. To ensure key functionalities, critical industries oftentimes prioritise reliability over peak performance.[47] Subject to many safety rules and regulations, these industries look for well-established semiconductors and trusted suppliers. Changing the semiconductors in their products may require them to again go through lengthy verification procedures to establish the security of their products. This can threaten production.

Imagining a world without trailing-edge and mature semiconductors is difficult. They can be found in medical equipment ranging from "CT-scanners, MRI-systems [...], ventilators and pacemakers."[48] The same goes for the defense sector. Drones, fighter jets, submarines, radar systems, and missiles all rely on trailing-edge and legacy semiconductors. Every

46 Chris Miller, "Taiwan's security came into question just when they became an irreplaceable supplier of chips," interview by Maarten Muns, *Atlantisch Perspectief,* Atlantische Commissie, January 18, 2024, https://www.atlcom.nl/must-read/we-might-end-up-more-reliant-on-chinese-made-chips-for-our-supply-chains/.

47 'Semiconductors in the Aviation Industry', accessed 10 October 2022, https://www.waferworld.com/post/semiconductors-aviation-industry. 'High Reliability Semiconductor Market', accessed 10 October 2022, https://www.transparencymarketresearch.com/high-reliability-semiconductors-market.html.

48 'Global Semiconductor Shortage Need for Prioritisation of Healthcare Capabilities', MedTech Europe, 2022, https://www.medtecheurope.org/resource-library/global-semiconductor-shortage-need-for-prioritisation-of-healthcare-capabilities/. Philips, 'Chips for Lives: Global Chip Shortages Put Production of Life-Saving Medical Devices and Systems at Risk', Philips, 2022, https://www.philips.com/a-w/about/news/archive/standard/news/articles/2022/20220608-chips-for-lives-global-chip-shortages-put-production-of-life-saving-medical-devices-and-systems-at-risk.html. Joris Teer, Mattia Bertolini, and Benedetta Girardi, *Great Power Competition and Social Stability in the Netherlands* (The Hague Centre for Strategic Studies, August 3, 2023), 55.

Javelin-missile launch system contains more than 250 chips.[49] Important NATO-weapon systems such as the F-35 fighter jet rely on semiconductors manufactured by TSMC.[50] Solar panels and wind turbines rely on less advanced chips too.[51] Then there is mobility. The average car contains over 1400 chips. Less advanced chips unlock basic functionalities, such as "electrical breaks and airbag control."[52] These are also used in Information and Communication Technology (ICT). "Audio and video, sensors, Wi-Fi and Bluetooth connectivity" all rely on less advanced semiconductors.[53] Only a small number of car functions, for instance Advanced Driver Assistance Systems (ADAS), actually make use of advanced logic chips.

Important NATO-weapon systems such as the F-35 fighter jet rely on semiconductors manufactured by TSMC.

In relative terms, the critical sectors mentioned above do not use large quantities of semiconductors, with the exception of ICT. In fact, consumer electronics, mobile phones, game consoles and PCs are good for over half of all semiconductor demand globally. The vast majority of the world's logic chips are absorbed by consumer electronics, PCs and ICT-infrastructure absorb.[54] Medical, defence, green, and automotive industries rely on far fewer semiconductors. Therefore, even though semiconductor-intensive consumer industries are likely to be hit harder financially by supply disruptions, the production of end-products for critical sectors will still be negatively impacted too.

49 Yuka Hayashi, 'Chip Shortage Limits U.S.'s Ability to Supply Weapons to Ukraine, Commerce Secretary Says', The Wall Street Journal, 27 April 2022, https://www.wsj.com/livecoverage/russia-ukraine-latest-news-2022-04-27/card/chip-shortage-limits-u-s-s-ability-to-supply-weapons-to-ukraine-commerce-secretary-says-pCWERV2HkSPzTdQG4CRI.

50 Jeanne Whalen and Ellen Nakashima, 'Pelosi to Meet with Taiwan's Biggest Semiconductor Manufacturer', *Washington Post*, 8 February 2022, https://www.washingtonpost.com/technology/2022/08/02/pelosi-tsmc-meeting-taiwan/.

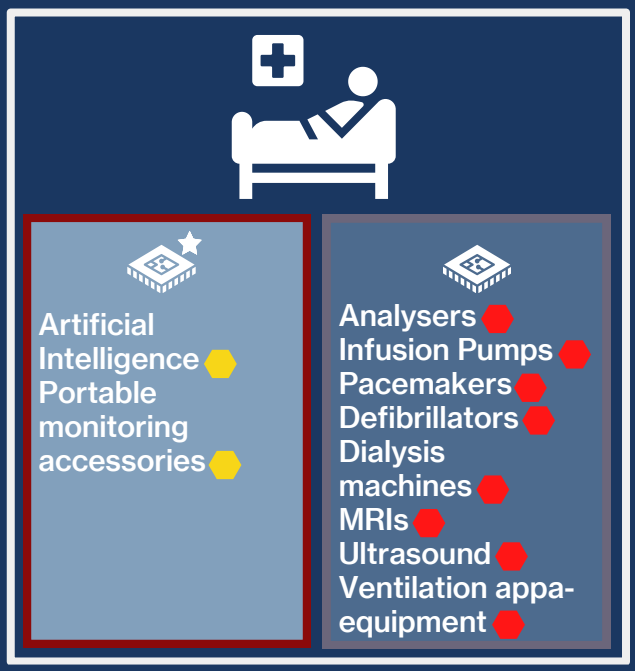
51 Jiwu Lu et al., 'Integration of Solar Cells on Top of CMOS Chips Part I: A-Si Solar Cells', *IEEE Transactions on Electron Devices* 58, no. 7 (July 2011): 2014–21, https://doi.org/10.1109/TED.2011.2143716..

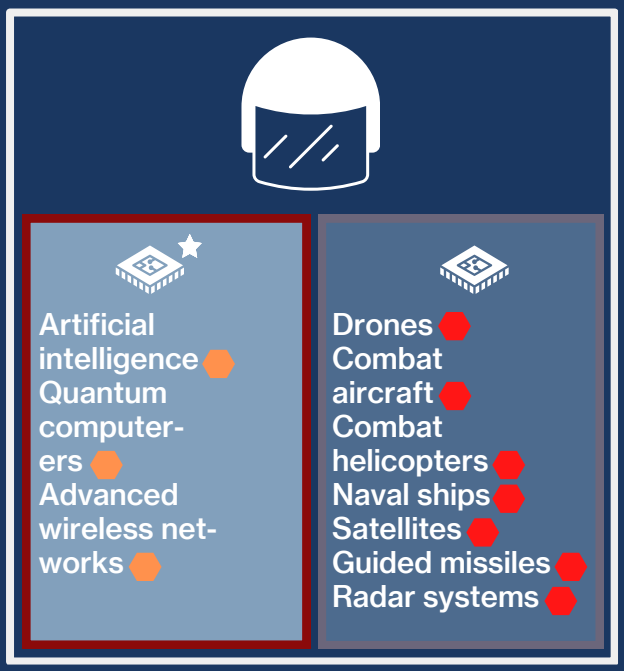
52 'Computer Chips inside Cars', Vintage Computer Chip Collectibles, Memorabilia & Jewelry, accessed 20 October 2022, https://www.chipsetc.com/computer-chips-inside-the-car.html. Peter Brown, '2 Automotive Chips Begin Production on TSMC's 16 Nm FinFET Process | Electronics360', Electronics360, 6 March 2021, https://electronics360.globalspec.com/article/16795/2-automotive-chips-begin-production-on-tsmc-s-16-nm-finfet-process.

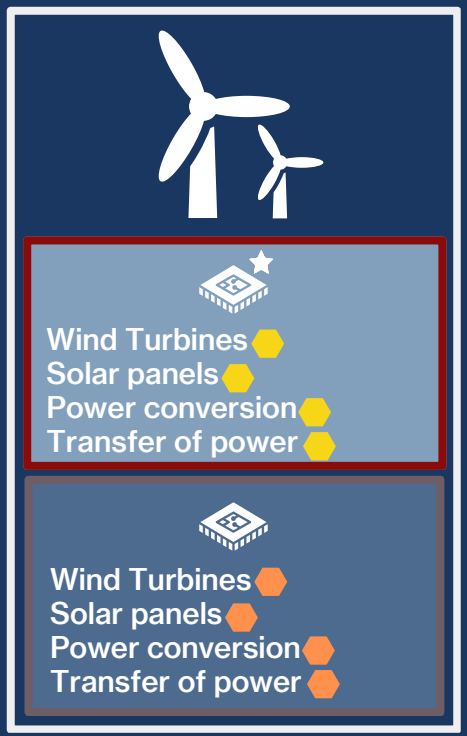
53 'Logic Technology - Taiwan Semiconductor Manufacturing Company Limited', accessed 10 October 2022, https://www.tsmc.com/english/dedicatedFoundry/technology/logic.

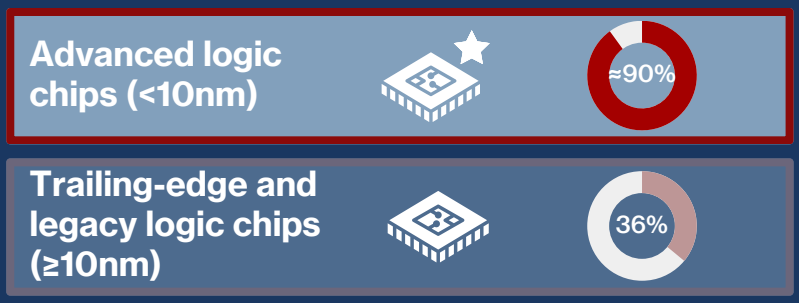
54 Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 10.

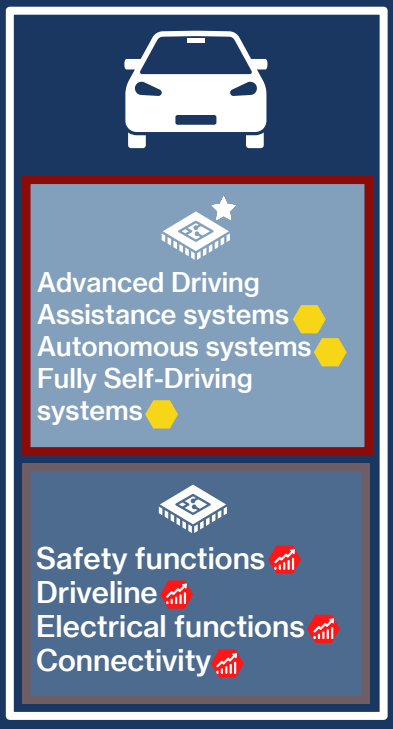
Dutch vital sectors heavily rely on semiconductors from Taiwan











Legend

- xx% Dependence on manufacturing in Taiwan
- Relatively high usage
- Relatively medium usage
- Relatively low usage
- Large increase in demand expected

Semiconductor production in Taiwan, China, and East Asia more broadly

Over the last decades, critical sectors and the economy of the Netherlands and the EU have come to heavily rely on the production of semiconductors, other components and end-products produced in East Asia in general, and Taiwan in particular. The global semiconductor value chain consists of a large number of sequential production steps, most importantly 1. Design, 2. Front-end fabrication and 3. Back-end manufacturing, or "assembly, testing and packaging (ATP)" (see Figure 1). Each individual step constitutes an indispensable link in the chain. Decades of task specialisation have led to the concentration of these individual production steps in specific geographical regions.[55] As a result of this drive for economic efficiency (and cost reductions), over 70 percent of front-end and over 80 percent of back-end manufacturing of all semiconductors is completed in East Asia.

Over 70 percent of all semiconductor manufacturing is completed in East Asia.

Whereas Taiwan dominates front-end manufacturing of logic chips, China seeks to consolidate its role as the world's primary back-end manufacturer of semiconductors in general. Taiwan, mainly due to TSMC, is home to the primary front-end logic chip industry in the world. Its companies lead both in terms of ability to produce the most advanced chips and overall production capacity. 92 percent of advanced logic chip (<10 nanometer) and 36 percent of trailing-edge and mature logic chip (≤10 nanometer) front-end fabrication takes place on Taiwan.[56] This is the result of a decades-long industrial and innovation policy. Taiwan's government has focused for decades on creating the required conditions for large-scale front-end manufacturing: it put up the enormous capital investments (the cost of one "modern fab easily exceeds $15 billion"), trained a highly skilled labour population, and ensured a constant, enormous flow of energy and water inputs.[57] A sizeable portion of the capital required goes to importing and ensuring the supply of electricity for semiconductor manufacturing equipment (SME), most importantly the lithography systems produced by ASML.[58] Front-end fabs are vulnerable to energy disruptions as a result. "Power outages and voltage irregularities" leading to interruptions in the 24-hours per day operations of fabs "can damage highly sensitive equipment."[59] Even the shortest interruption can cause long-term damage to a fab. For instance, a blizzard led NXP and Samsung to shut down production plants in Austin Texas. The shutdown in Samsung's case went on for a month, leading to losses of over $270mn.[60]

Back-end manufacturing, the essential subsequent step in the manufacturing process, predominantly takes place in China and Taiwan in particular and East Asia in general. This step has significantly lower barriers to entry, as it is less complicated, less capital-intensive,

55 Jan-Peter Kleinhans and Nurzat Baisakova, *The Global Semiconductor Value Chain: A Technology Primer for Policy Makers* (Stiftung Neue Verantwortung, October 2020), 7, https://www.stiftung-nv.de/sites/default/files/the_global_semiconductor_value_chain.pdf.

56 Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 35.

57 Kleinhans and Baisakova, "Global Semiconductor Value Chain," 7. ; Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 33.

58 *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Forstering Broad-Based Growth: 100-Day Reviews under Excutive Order 14017* (Washington D.C.: The White House, June 2021), 36, https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf.

59 *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Forstering Broad-Based Growth: 100-Day Reviews under Excutive Order 14017*, The White House, 36.

60 Steve Frezon, "Through the Storm: The Complex Process of Restarting a Semiconductor Facility," NXP Semiconductors N.V., March 22, 2021, https://www.nxp.com/company/blog/through-the-storm-the-complex-process-of-restarting-a-semiconductor-facility:BL-RESTARTING-SEMICONDUCTOR-FACILITY ; Jon Porter, "Samsung Loses over $270M from Texas Plant Shutdown as Quarterly Profits Boom," *The Verge*, April 29, 2021, https://www.theverge.com/2021/4/29/22409273/samsung-austin-texas-plant-month-shut-down-losses-smartphone-sales-chip-shortage.

but more labour intensive.[61] Almost 40 percent of all back-end manufacturing globally is done in China. Taiwan, the world's second most important location for back-end manufacturing, is good for almost 30 percent.[62] In short, a disruption in the fabrication processes and exports of semiconductors from especially Taiwan but also China, both primary parties involved in any military conflict over Taiwan, would put critical sectors and the broader economy in the EU at risk.

The world relies on East Asia for the production of semiconductors more broadly. South Korea is the undisputed global leader in memory chip production, even though estimates on its market share vary. Korea's Samsung and SK Hynix, reportedly, hold a combined "market share of over 60 percent" for the production of "DRAM and NAND memory chips". These memory chips "are used for managing and storing data on devices, on PCs, smartphones and SD cards" globally.[63] Another estimate found that Japan and Korea together made up 64 percent of worldwide memory chip production in 2019, with Korea producing over two thirds of that share.[64] A logic chip produced on Taiwan cannot replace a memory chip produced in Korea. Therefore, South Korea forms a separate but again essential link in the semiconductor ecosystem. Japan, a world leader in the semiconductor value chain in the 1980s, still continues to supply Taiwan, Korea and China with essential chemicals and processed materials, such as wafers, for semiconductor fabrication. In addition, Japan holds over "90 percent [...] of the photoresist market, vital equipment to the lithography process."[65] Lithography equipment, in turn, is essential for the production of semiconductors. In short, especially South Korea but also Japan play indispensable roles in the production of ever larger numbers of semiconductors.

Especially South Korea but also Japan play indispensable roles in the production of ever larger numbers of semiconductors.

61 Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era", 19.

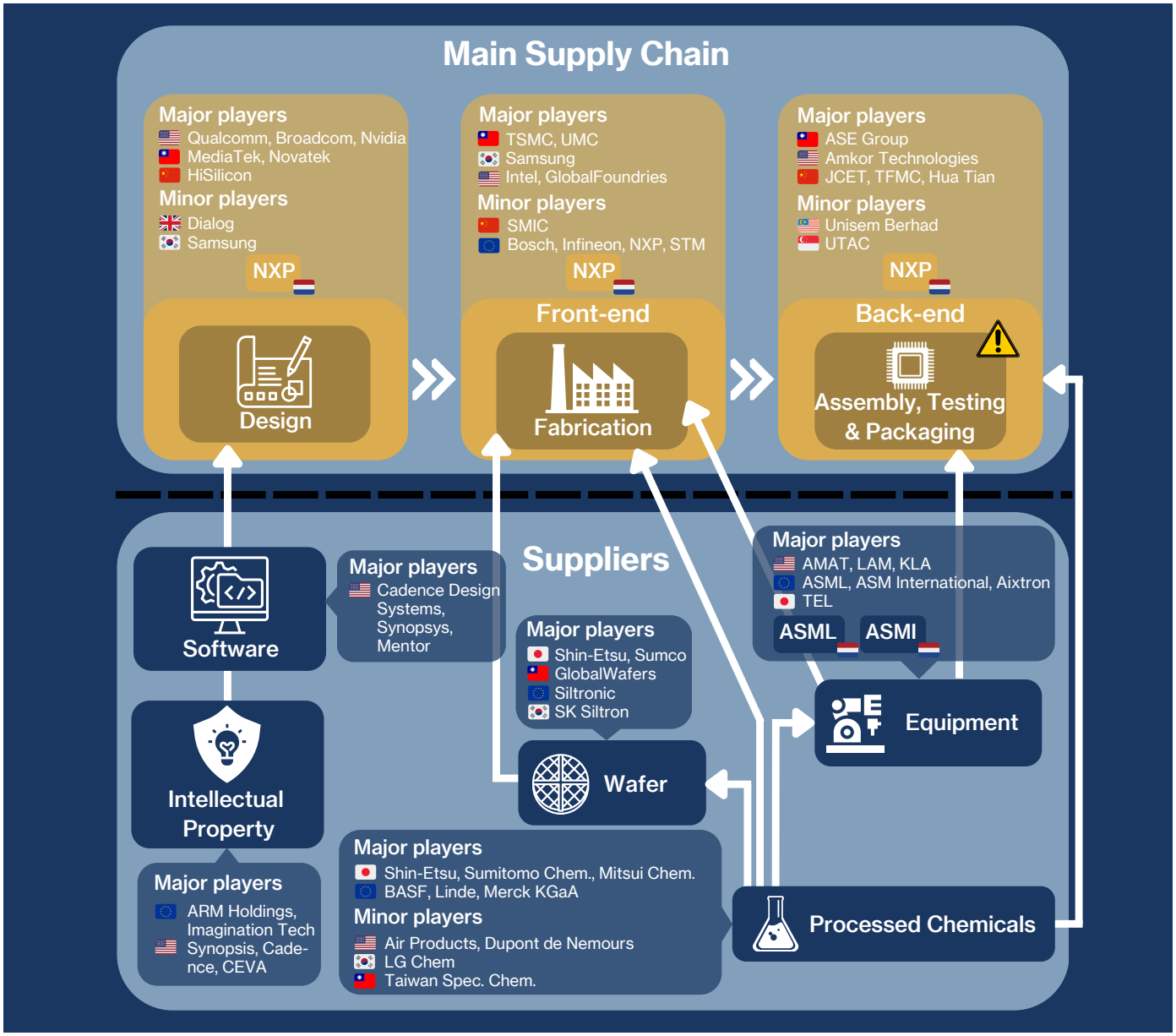
62 Utmel Electronic, 'Top 10 OSAT (Outsourced Semiconductor Assembly and Test) Companies', Utmel Electronic, 10 January 2022, https://www.utmel.com/blog/categories/semiconductor/top-10-osat-outsourced-semiconductor-assembly-and-test-companies#3. Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 4.

63 Martin Fritz, "South Korea Invests Big in Becoming a Global Chip Leader," *Deutsche Welle,* January 24, 2024, https://www.dw.com/en/south-korea-invests-big-in-becoming-a-global-chip-leader/a-68073870.

64 Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 35.

65 Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 41.

Figure 1. Manufacturing of semiconductors mostly takes place in East Asia: Taiwan and Korea dominate front-end fabrication. China is becoming ever more important in Assembly, Testing & Packaging (ATP) (Source: The Hague Centre for Strategic Studies, 2022 "Reaching breaking point")



In spite of industrial policies such as the US Chips and Science Act and the European Chips Act, the world's reliance on semiconductor production in East Asia in general and on Taiwan in particular will not be undone in the 2020s. Semiconductor production is not easily moved, nor at low cost. Two TSMC fabs for advanced logic chip production in Arizona, the U.S., are expected to be completed in respectively 2024 and 2026. The combined projected costs of these fabs is $40 billion, almost twice the defence budget of the Netherlands in 2024.[66]

[66] TSMC, 'TSMC Announces Updates for TSMC Arizona', TSMC, 6 December 2022, http://pr.tsmc.com/english/news/2977. Zaken, 'Plannen voor Defensie - Prinsjesdag: Miljoenennota en Rijksbegroting - Rijksoverheid.nl', onderwerp (Ministerie van Algemene Zaken, 19 September 2023), https://www.rijksoverheid.nl/onderwerpen/prinsjesdag/defensie. Paul van Hooft et al., 'Worlds of Access or Absence: Supply Security and Maritime Security in an Era of Intense Geopolitical Competition' (The Hague Center for Strategic Studies, October 2023), 46, https://hcss.nl/wp-content/uploads/2023/10/Worlds-of-Access-or-Absence-Supply-Security-Maritime-Security-HCSS-2023.pdf.

TSMC is also diversifying its manufacturing sites outside of the US. One fab in Japan will open in 2024. Furthermore, the company is negotiating an additional expansion in Japan and plans to bring online a fab in Germany, as part of a joint venture with European partners and on the basis of German subsidies.[67] Yet, the total production capacity of both fabs in Arizona will only be "less than 5 percent of TSMC's total production capacity."[68] Differences in working cultures, a lack of access to skilled labour, and higher production costs became additional obstacles to the projects in Arizona.[69]

Moving fabs to the EU may prove even more difficult. These fabs would likely have even higher production costs, due to relatively high energy prices. Russia's invasion of Ukraine and the subsequent energy crisis has put enormous pressure on energy-intensive industries in Europe. In fact, natural gas prices were over six times higher in the EU than in the US and over two-and-a-half times higher than in China throughout 2022.[70] In the first six months of 2023 the price of natural gas in the EU was still far higher than in the U.S., even though prices fell.[71] The future of energy-intensive industries in the EU is uncertain, as the EU has become almost entirely dependent on energy imports. This comes at a time when international energy markets will likely remain more volatile, due to geopolitical disruptions and other trends. As a result, energy prices are more likely to remain higher rather than lower in the foreseeable future.[72]

Russia's invasion of Ukraine and the subsequent energy crisis has put enormous pressure on energy-intensive industries in Europe.

In summary, the Netherlands and the EU have an enormous interest in peace and stability in the Taiwan Strait and East Asia more broadly. After all, this is a prerequisite for an uninterrupted supply of semiconductors, components and end-products from the region to the EU. Imagining a world without trailing-edge and mature semiconductor production in East Asia is difficult: these are central to critical sectors such as the medical, defence, ICT, green energy, and sustainable mobility industries. The production of end-products for critical sectors will be negatively impacted by semiconductor disruptions. Over the last decades, critical sectors and the economy of the Netherlands and the EU have come to heavily rely on the production of semiconductors, other components and end-products produced in East Asia in general, and Taiwan in particular. In spite of industrial policies such as the US Chips and Science Act and the European Chips Act, the world's reliance on semiconductor production in East Asia in general and on Taiwan in particular will not be undone in the 2020s. Moving fabs to the EU may prove even more difficult. These fabs would likely have even higher production costs, due to relatively high energy prices.

67 'Taiwan's TSMC to Build Semiconductor Factory in Germany – DW – 08/08/2023', accessed 17 February 2024, https://www.dw.com/en/taiwans-tsmc-to-build-semiconductor-factory-in-germany/a-66469463. Chiang Taipei Jen-Chieh, DIGITIMES Asia, 'TSMC's Japan Fab Progresses Smoothly as Employees Move In', DIGITIMES, 6 September 2023, https://www.digitimes.com/news/a20230905PD212/ic-manufacturing-japan-tsmc.html. Gorin Chris, 'Proposed second TSMC fab in Japan would be partially subsidized - Rti', RTI Radio Taiwan International, accessed 10 September 2023, https://en.rti.org.tw/news/view/id/2009758.

68 Hooft et al., 'Worlds of Access or Absence: Supply Security and Maritime Security in an Era of Intense Geopolitical Competition', 46.

69 Michael Sainato, '"They Would Not Listen to Us": Inside Arizona's Troubled Chip Plant', *The Guardian*, 28 August 2023, sec. Business, https://www.theguardian.com/business/2023/aug/28/phoenix-microchip-plant-biden-union-tsmc.

70 International Energy Agency (IEA), 'World Energy Outlook 2023 – Analysis', October 2023, 96, https://www.iea.org/reports/world-energy-outlook-2023.

71 "USA natural gas prices," Global Petrol Prices, 2023, https://www.globalpetrolprices.com/USA/natural_gas_prices/; "Gas prices for household [and non-household] customers – bi-annual data (from 2007 onwards), Eurostat, 2023, https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_202/default/table?lang=en; "*China Usage Price: 36 City Avg: Natural Gas: Natural Gas for Public Service Sector,"* CEIC Data, 2023, https://www.ceicdata.com/en/china/price-monitoring-center-ndrc-36-city-monthly-avg-transaction-price-production-material/cn-usage-price-36-city-avg-natural-gas-natural-gas-for-public-service-sector - :~:text=Monitoring%20Center%2C%20NDRC-,China%20Usage%20Price%3A%2036%20City%20Avg%3A%20Natural%20Gas%3A%20Natural,Cub%20m%20for%20Oct%202023.); "Coal Market Update – July 2023," International Energy Agency (IEA), 2023, https://www.iea.org/reports/coal-market-update-july-2023/prices.

72 Jilles van den Beukel and Lucia van Geuns, 'Olie En Gas Tijdens de Energietransitie', HCSS, November 2023, 21, https://hcss.nl/report/olie-en-gas-tijdens-de-energietransitie/.

2.2. Dependence of the Dutch semiconductor industry on East Asia

The Netherlands has a strong interest in peace and stability in the Taiwan Strait and East Asia more broadly.

The Netherlands has a strong interest in peace and stability in the Taiwan Strait and East Asia more broadly. After all, Dutch companies active in the semiconductor value chain heavily rely on sales to and production on Taiwan and in China (see Table 1).[73] Both would be primary parties involved in any Taiwan Strait conflict. South Korea and Japan, likewise, are important sources of revenue. ASML, the world's only producer of the most advanced lithography systems in the world and the EU's most important technology company, has 22.860 employees in the Netherlands.[74] Dutch exports to Taiwan in 2021 stood at almost €10bn. Taiwan in 2022 was the most important purchaser of ASML semiconductor manufacturing equipment. Net sales to Taiwan rounded out at just over 8bn euros in 2022 (approximately 38 percent of total ASML annual revenue). In fact, over 50 percent of ASML's 2022 total net sales were generated through sales to the primary parties involved in any Taiwan conflict, as another 13,8 percent of its revenue came from sales to China. ASML's total sales to East Asia in general account for the vast majority of its revenue (85%), as South Korea (28,6%) and Japan (4,8%) are also important sources of income. NXP, a Dutch Integrated Device Manufacturer (IDM) that produces semiconductors for automotive, industrial, mobile and communications sectors, is highly reliant on sales to China (35,6% of total revenue). Sales to Taiwan are of far less concern (6%). In total, NXP relies for over 50 percent of its revenue on East Asia.[75] In short, a disruption in sales to East Asia, for whatever reason, would likely heavily impact the revenue generated through the sales of both companies to the region.[76]

Table 1. ASML and NXP total net sales in Million euros and share by country in 2022

	ASML total net sales (% of total) in 2022	NXP total net sales (% of total) in 2022
Taiwan	€8.095,5 (38,2%)	€506 (3,8%)
China	€2.916,0 (13,8%)	€4.700 (35,6%)
Japan	€1.008,6 (4,8%)	€902 (6,8%)
South Korea	€6.045,6 (28,6%)	€674 (5,1%)
East Asia	**€18.065,7 (85,3%)**	**€6.782 (51,3%)**

73 Other actors in the semiconductor value chain, such as Nexperia and Besi, are also headquartered in the Netherlands. Nexperia has front-end production sites in for instance the UK and Germany. Nexperia is an important provider of legacy chips to automotive, industrial, mobile and consumer sectors. Besi designs and manufacturers semiconductor equipment. These companies, however, fall outside of the scope of this paper.

74 Mirela Dacic and Merlijn van Dijk, In 2 minuten uitgelegd: hoe de rol van het groeiende ASML groter en groter wordt, 13 January 2023, https://www.bd.nl/eindhoven/in-2-minuten-uitgelegd-hoe-de-rol-van-het-groeiende-asml-groter-en-groter-wordt~a51d0718/.

75 *Annual Report - For the Financial Year Ended* (NXP Semiconductors N.V., December 31, 2022), 102, https://www.nxp.com/docs/en/supporting-information/2022-IFRS-SAR.pdf.

76 However, demand for ASML-systems might rapidly rise in other geographies, if sales to East Asia are compromised. The U.S. and EU, in such an event, may quickly want to replace chip production capacity lost in East Asia within their own borders. Since ASML holds a monopoly position in Extreme Ultraviolet (EUV)-systems and near total dominance of the market in Deep Ultraviolet (DUV)-systems, orders for ASML-systems to produce these chips would rise dramatically in the U.S. and EU.

The dependence of ASML and NXP on East Asia does not end with sales, however. Both companies rely on the region for part of their production processes. "All of [ASML's] manufacturing activities, including subassembly, final assembly and system testing, take place in cleanroom facilities in Veldhoven (the Netherlands), Berlin (Germany), Wilton, San Diego (US), Pyeongtaek (South Korea), and Linkou and Tainan (Taiwan)", the company writes in its 2022 annual report.[77] These cleanrooms, or indoor areas "that permit absolutely zero particles of [0.5 micron or bigger]," are fragile too. They can be disrupted by a variety of events "including [...] energy shortages, pandemic outbreaks, cyberattacks, blockages, sabotage, or other disasters natural or otherwise."[78] In layman's terms, the production of ASML systems but also of chip production can only be completed under very specific conditions, which will be difficult to maintain at a time of war-related disruption. In Veldhoven (NL) ASML assembles its systems, in San Diego, California and Wilton (US) produces critical subsystems, whilst in Linkou and Tainan "other modules and systems" are produced.[79] The 2022 annual report states that ASML "cannot ensure that alternative production capacity would be available if a major disruption were to occur", citing that a fire in its Berlin factory had led to "significant recovery efforts to secure operations".[80] Likewise, the production of the manufacturers of highly specialised components for ASML-systems may experience disruptions for similar reasons, ASML warns.[81] Of NXP's four major back-end fabrication facilities, one is located in Tianjin, China and one in Kaohsiung, Taiwan.[82] NXP, however, follows a "fab-lite approach", meaning that it also relies on production in "foreign foundries."[83] TSMC is one such foundry.[84]

The production of ASML systems and of semiconductors can only be completed under very specific conditions, which will be difficult to maintain at a time of war-related disruption.

2.3. EU dependence on manufacturing in China beyond semiconductor production

In addition to semiconductors, the Netherlands and the EU came to rely on manufacturing in general on first and foremost China. In 2020, approximately 35 percent of all goods produced by manufacturing industries worldwide were manufactured in China, a larger share than the next nine countries combined. The U.S., which had overtaken the U.K. in manufacturing output before the First World War, still manufactured four times more than China in 1995. By 2020, China was good for roughly three times the output of the U.S. (see Figure 2).[85] In some important strategic

77 *Small Patterns. Big Impact. 2022 Annual Report* (ASML, February 15, 2023), 289, https://www.asml.com/en/investors/annual-report/2022.

78 Typically, outdoor air in an urbanized area "contains 350.000.000 particles [of this size]". Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 16.

79 "Inside the World of High-Tech Manufacturing at ASML," ASML, October 23, 2020, https://www.asml.com/en/news/stories/2020/inside-high-tech-manufacturing.

80 *Small Patterns. Big Impact. 2022 Annual Report*, ASML, 64.

81 ASML is extra vulnerable in disruptions in component supplies, as it depends increasingly on "single suppliers or a limited number of suppliers" due to "the highly specialized nature of many of [ASML's] components." *Small Patterns. Big Impact. 2022 Annual Report*, ASML,62.

82 *Annual Report - For the Financial Year Ended*, NXP Semiconductors N.V., 12.

83 Kleinhans and Baisakova, "Global Semiconductor Value Chain," 22.

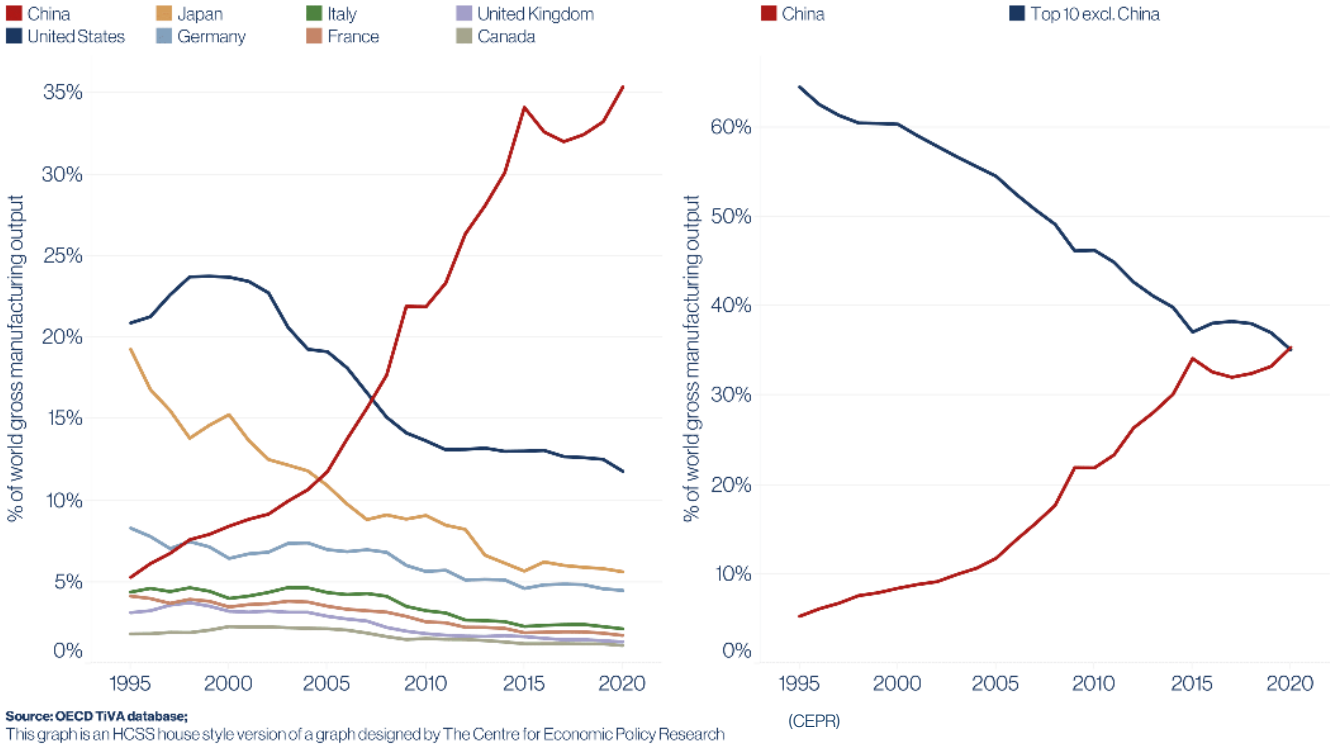
84 In fact, in 2020 NXP and TSMC announced a collaboration that would further integrate advanced semiconductors into cars, further driving "the transformation of automobiles into powerful computing systems for the road." It does this by "combin[ing] NXP's automotive quality and functional safety with TSMC's industry-leading 5nm technology." "NXP Selects TSMC 5nm Process for Next Generation High Performance Automotive Platform," NXP Semiconductors N.V., June 2020, https://www.nxp.com/company/about-nxp/nxp-selects-tsmc-5nm-process-for-next-generation-high-performance-automotive-platform:NW-TSMC-5NM-HIGH-PERFORMANCE.

85 OECD TiVa database; Baldwin, "China Is the World's Sole Manufacturing Superpower".

industries that underpin both industrial sectors and militaries, such as shipbuilding, China's lead is even more lopsided. China manufactures close to 50 percent of the world's ships whilst the UK, US and Germany combined account for less than one percent (see Figure 3).[86]

Figure 2. China has become the world's undisputed manufacturing champion

Whereas U.S. manufacturing output was almost four times greater than China's in 1995, China produced more than the next nine countries combined in 2020 (1995-2020)



Source: OECD TiVA database;
This graph is an HCSS house style version of a graph designed by The Centre for Economic Policy Research

Not coincidentally, the EU developed "critical strategic dependence on imports from China" across 103 product categories within the "electronics, chemicals, minerals/metals, and pharmaceutical/medical products".[87] In terms of exports, in 1995, China accounted for only three percent of global manufacturing exports, but by 2020, its share had increased to 20 percent.[88] Stark examples of dependencies can be found across critical sectors. 97 percent of gallium, a raw material used to produce electronics, semiconductors, and defence equipment, is mined in China. Approximately 90 percent of rare earth refining and of the production of permanent magnets, important components in many digital products such as iPhones and green energy solutions such as offshore wind turbines, is done in China.[89] China is the main

[86] "Ships Build by Country of Building, Annual," United Nations Conference on Trade and Development (UNCTAD), November 2023, https://unctadstat.unctad.org/datacentre/dataviewer/shared-report/573e15e1-2001-4d02-9018-5b63becaaae7.

[87] Max J. Zenglein, *Mapping and Recalibrating Europe's Economic Interdependence with China* (Mercator Institute for China Studies (MERICS), November 18, 2020), 2, 7, https://merics.org/sites/default/files/2020-11/Merics%20ChinaMonitor_Mapping%20and%20recalibrating%20%281%29.pdf.

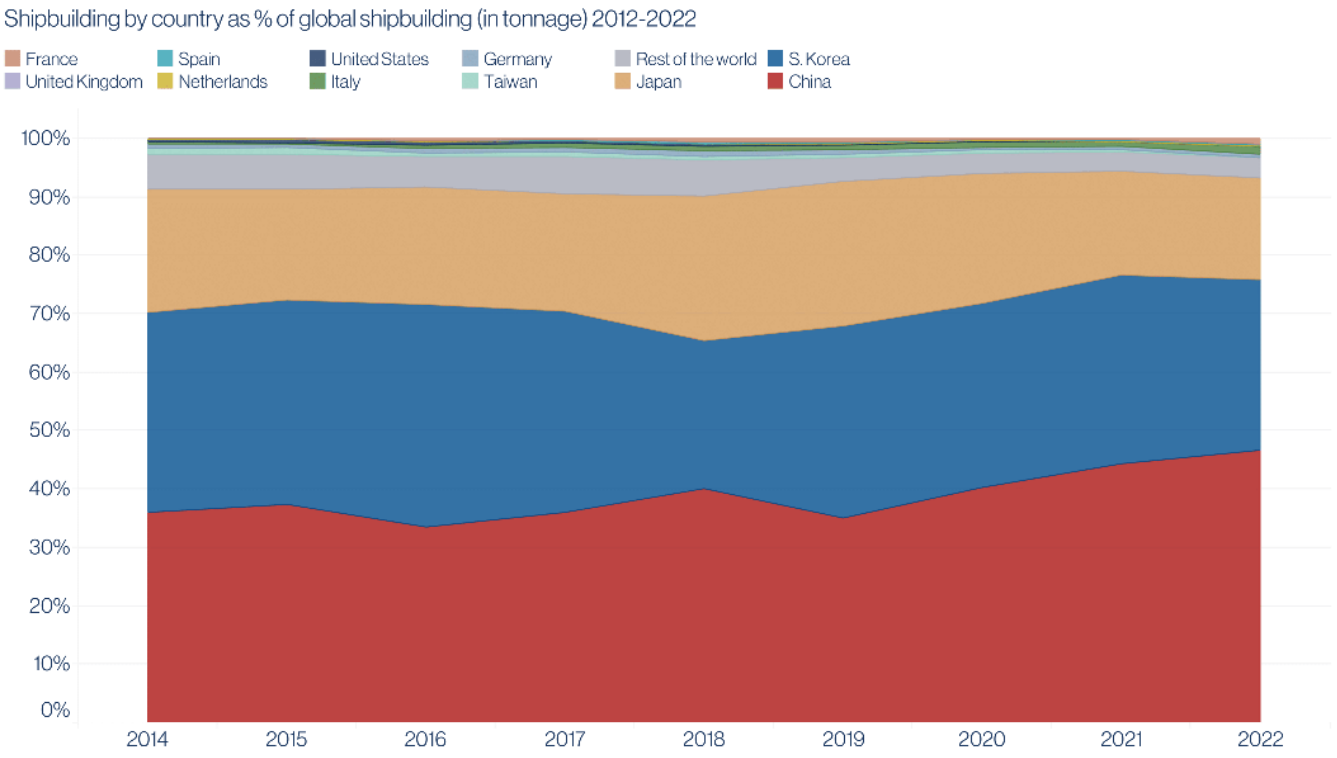
[88] Baldwin, "China Is the World's Sole Manufacturing Superpower".

[89] European Commission, "Critical Raw Materials," European Union, accessed February, https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en. Teer, Bertolini, and Girardi, "Great Power Competition and Social Stability in the Netherlands," 33–48.

global supplier of active pharmaceutical ingredients (APIs). China supplies over 40 percent of these essential components to produce a wide range of medicine.[90] China manufactured roughly 76,4 percent of lithium-ion batteries worldwide and supplied the EU with 89 percent of its solar photovoltaic (PV) panels in 2021.[91] In short, following China's reform and opening up, the EU's critical sectors and economy has grown incredibly dependent on manufacturing in China.

These dependencies are not likely to be undone easily and without pushback throughout the 2020s. Maintaining and even expanding these strategic dependencies is a foreign policy goal of the Chinese Communist Party. Xi Jinping in 2020 called on the CCP to "tighten international production chains' dependence on China, forming powerful countermeasure and deterrent capability against foreigners who would artificially cut off supply [to China]."[92]

Figure 3. Almost half of the world's ships are built in China. South Korea and Japan are the only other maritime manufacturing powerhouses



Source: United Nations Conference on Trade and Development (UNCTAD)

[90] Julia Payne, 'Group of EU States Seeks to Reduce Dependency on China for Pharmaceuticals', *Reuters*, 2 May 2023, sec. Europe, https://www.reuters.com/world/europe/group-eu-states-seeks-reduce-dependency-china-pharmaceuticals-2023-05-02/. Max J. Zenglein, '*Mapping and Recalibrating Europe's Economic Interdependence with* (Mercator Institute for China Studies (MERICS), 18 November 2020), https://merics.org/sites/default/files/2020-11/Merics%20ChinaMonitor_Mapping%20and%20recalibrating%20%281%29.pdf.

[91] Statista Research Department, 'Li-Ion Battery Production Capacity by World Leader', Statista, 27 October 2023, https://www.statista.com/statistics/1420153/lithium-ion-battery-manufacturing-capacity-by-world-region-forecast/. Alicia García Herrero, 'China-EU Roller-Coaster Relations: Where Do We Stand and What to Do?', Hearing Book (Bruegel, 15 June 2023), https://www.uscc.gov/sites/default/files/2023-06/Alicia_Garcia-Herrero_Testimony.pdf.

[92] Xi Jinping 'Major Issues Concerning China's Strategies for Mid-to-Long-Term Economic and Social Development', CSIS Interpret: China, 31 October 2020, 3, https://interpret.csis.org/translations/major-issues-concerning-chinas-strategies-for-mid-to-long-term-economic-and-social-development/.

2.4. EU dependence on trade routes from and to East Asia

East Asia's ability to trade with the world hinges on uninterrupted access to first and foremost waterways, but also to aerial routes and subsea cables. Taiwan's production and export of semiconductors relies on all three connections: the island almost entirely depends on shipments by sea for the fuels and materials to produce chips; its semiconductors are shipped out by air; finally, part of the maintenance and system updates for the equipment used in its factories (or "fabs") is done remotely and therefore relies on subsea cables. "An estimated 80 percent of global trade by volume and 70 percent by value moves via cargo ships," as ever larger ships are capable of carrying enormous amounts of goods of relatively high weight and large volume.[93] Seven of the world's ten largest container ports are located in China.[94] Specifically, the share of global trade passing through the Malacca Strait, the South China Sea and the East China Sea stood at respectively 28, 30 and 21 percent in 2019.[95] Almost ninety percent of the world's "largest ships transited through the Taiwan Strait" in the first eight months of 2022.[96] In short, the waterways, but also the aerial routes and subsea cables, connecting East Asian economies with each other and with Europe are among the most important in the world.

East Asia relies on maritime oil imports from the Middle East. Taiwan in particular.

The cost of inaccessible sea lanes and maritime chokepoints is very high: rerouting through other maritime straits causes extra milage and hence higher shipping costs and later arrival times, which can even cause shortages in critical sectors and the general economy; the current shortages in the shipping industry (e.g., for oil tankers) would be compounded by such delays, leading to higher prices;[97] finally, war-related disruption at sea leads to additional insurance costs for shipping, increasing prices even further.[98] In turn, production throughout East Asia relies on the imports of petrochemicals, mostly oil from the Middle East. Taiwan, as a resource poor island, is vulnerable in particular: it relies for almost the entirety of its energy security (97%) on imports.[99] This makes the Netherlands and the EU extremely vulnerable for disruptions in maritime routes in East and Southeast Asia in two ways: it may impede trade from the region to Europe directly and it can obstruct the production of critical components and goods in East Asia on which Europe relies.

93 Girardi Benedetta, Paul van Hooft, and Giovanni Cisco, *What the Indo-Pacific Means to Europe: Trade Value, Chokepoints, and Security Risks* (The Hague Center for Strategic Studies (HCSS), November 2023), 1, https://hcss.nl/wp-content/uploads/2023/11/What-the-Indo-Pacific-means-to-Europe-Trade-Value-Chokepoints-and-Security-Risks-HCSS-2023.pdf. UNCTAD, 'UNCTAD's Review of Maritime Transport 2022: Facts and Figures on Asia and the Pacific | UNCTAD', 29 November 2022, https://unctad.org/press-material/unctads-review-maritime-transport-2022-facts-and-figures-asia-and-pacific.

94 The World Shipping Council, 'The Top 50 Container Ports', 2021, https://www.worldshipping.org/top-50-ports.

95 Lincoln F. Pratson, "Corrigendum to "Assessing Impacts to Maritime Shipping from Marine Chokepoint Closures" [Commun. Transport. Res. 3 (2023) 100083]," *Communications in Transportation Research* 3 (December 1, 2023): 5, https://doi.org/10.1016/j.commtr.2023.100100.

96 Varley, 'Taiwan Tensions Raise Risks in One of Busiest Shipping Lanes'.

97 Benedetta Girardi, Paul van Hooft, and Giovanni Cisco, *What the Indo-Pacific means to Europe: trade value, chokepoints, and security risks (*The Hague Centre for Strategic Studies, November 2023), https://hcss.nl/wp-content/uploads/2023/11/What-the-Indo-Pacific-means-to-Europe-Trade-Value-Chokepoints-and-Security-Risks-HCSS-2023.pdf

98 Jade Man-yin Lee and Eugene Yin-cheung Wong, "Suez Canal Blockage: An Analysis of Legal Impact, Risks and Liabilities to the Global Supply Chain," *MATEC Web of Conferences* 339 (2021): 01019, https://doi.org/10.1051/matecconf/202133901019.

99 Joseph Webster, "Does Taiwan's Massive Reliance on Energy Imports Put Its Security at Risk?," Atlantic Council (blog), July 7, 2023, https://www.atlanticcouncil.org/blogs/new-atlanticist/does-taiwans-massive-reliance-on-energy-imports-put-its-security-at-risk/.

Trade in digital services mostly relies on subsea infrastructure. Over 97 percent of "the world's internet traffic passes through subsea cables at some point."[100] The ostensibly purposeful severing of subsea cables around Norway in 2021, between Finland and Estonia and around Taiwan's Matsu Islands in 2023 underlines the vulnerability of these cables.[101] In short, the EU's critical sectors do not just depend on on-land production of critical components and end-products throughout East Asia, but also on the maritime, aerial, and cable routes connecting East Asia to the EU.

The EU's critical sectors depend on the maritime, aerial, and cable routes connecting East Asia to the EU.

100 ENISA, 'Dive into the Deep Sea: A View of the Subsea Cable Ecosystem', News Item, 31 August 2023, https://www.enisa.europa.eu/news/dive-into-the-deep-sea-a-view-of-the-subsea-cable-ecosystem.

101 Thomas Newdick, "Undersea Cable Connecting Norway With Arctic Satellite Station Has Been Mysteriously Severed," *The Drive*, January 10, 2022, https://www.thedrive.com/the-war-zone/43828/undersea-cable-connecting-norway-with-arctic-satellite-station-has-been-mysteriously-severed. Lii, 'After Chinese Vessels Cut Matsu Internet Cables, Taiwan Seeks to Improve Its Communications Resilience'. Claudia Chiappa and Pierre Emmanuel Ngendakumana, 'Finland: We "Trust" China Will Help Probe Baltic Sea Pipeline Damage', *POLITICO*, 8 December 2023, https://www.politico.eu/article/finland-we-trust-china-help-probe-baltic-sea-pipeline-damage/.

Chapter 3. **What can go wrong?**

War leads to large-scale trade disruptions.

Tensions between Taiwan, China and possibly the U.S. and US-allies throughout the Indo-Pacific can escalate in a wide variety of ways. Importantly, until today China's actions against Taiwan have mostly taken place in the hybrid domain, meaning below the threshold of war. Through the rapid modernisation and expansion of its military forces, however, Beijing seeks to attain the capabilities in the near future to –if necessary– achieve "reunification" through military means. The trend analysis in *Chapter 1: How did we get here?* shows that tensions are unlikely to decrease structurally. Furthermore, expert and population surveys have been completed to get an indication of how events may unfold in the near future. A December 2023 survey of U.S. and Taiwan experts found that respectively 67 and 57 percent "believed a Taiwan Strait Crisis is likely [already] in 2024."[102] One 2023 poll found that over half of Chinese and just under 40 percent of Americans find it "likely" that the U.S. and China "enter into a direct military confrontation over Taiwan" within the next five years.[103] Therefore, there is no guarantee that actions remain below the threshold of war throughout the 2020s or thereafter.

The costs of a military conflict in East Asia are likely to be enormous. *Chapter 2: What is at stake?* showed that uninterrupted trade with Taiwan specifically and with East Asia more broadly enables the functioning of important critical sectors and the broader economy in the Netherlands and the EU. After all, East Asia has become *the* manufacturing and one of the consumption centres of the world economy throughout the last fifty years. War is destructive to commerce. During the two world wars, trade between direct adversaries declined by respectively 96% and 97%.[104] Admittedly, these are extreme cases of military conflict, but they do underline the general principle. As a result, if China expands its military activity around Taiwan, perhaps even taking action beyond the threshold of war, this will in many cases negatively affect the functioning of critical sectors and the broader economy in Europe.

This chapter maps the geo-economic impact on the Netherlands and the EU of three military crises that may occur in East Asia throughout the 2020s or thereafter. First, the chapter cites the findings of a handful of impact-assessments by three research institutes and one industry group. These exercises use a variety of methods to map the global fallout of a one-year PLA

102 Bonny Lin et al., *Surveying the Experts: U.S. and Taiwan Views on China's Approach to Taiwan,* China Power Project (The Center for Strategic and International Studies (CSIS), January 2024), 4, https://www.csis.org/analysis/surveying-experts-us-and-taiwan-views-chinas-approach-taiwan.

103 Source: Datapraxis and YouGov (Denmark, France, Germany, Great Britain, Italy, Poland, Portugal, Romania, Spain, Switzerland), Datapraxis and Norstat (Estonia), Gallup International Association (Brazil, China, India, Indonesia, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United States), September/October 2023. cited in Timothy Garton Ash, Ivan Krastev, and Mark Leonard, 'Living in an à La Carte World: What European Policymakers Should Learn from Global Public Opinion' (European Council on Foreign Relations (ECFR), 15 November 2023), https://ecfr.eu/publication/living-in-an-a-la-carte-world-what-european-policymakers-should-learn-from-global-public-opinion/.

104 Reuven Glick and Alan M. Taylor, 'Collateral Damage: Trade Disruption and the Economic Impact of War', *The Review of Economics and Statistics* 92, no. 1 (2010): 109.

blockade and invasion of Taiwan. Second, the report presents Taiwan Crisis Storylines to make an assessment of the shorter-term war-related disruption impact of a PLA blockade or invasion on the Netherlands and the EU. In addition, one storyline presents a broad outline of the economic effects of a lower-intensity conflict (on-and-off blockade), which are less often taken into account.

3.1. The cost of a one year Taiwan conflict

A variety of organisations have outlined the enormous negative effects to the world economy of disruptions in the supply of semiconductors from Taiwan in particular, or the effects of a military conflict over Taiwan more broadly. Some organisations specifically looked at the disruption caused by a maritime blockade, whilst others have focused on the costs of an outright invasion. Some have covered both. Bloomberg Economics took into account a wide variety of impact indicators, relying on econometric models. These indicators are trade and shipping disruptions (including effects on trade of Japan, Korea, and ASEAN with the rest of the world), financial market shocks and international responses (sanctions and tariffs).[105] Boston Consulting Group (BCG) and the Semiconductor Industry Association (of America) (SIA) took a narrow approach. Their projection focused on the financial impact on chip-dependent sectors of a complete disruption in the export of semiconductors from Taiwan.[106]

These exercises, however, have one thing in common: they find that the cost to economies and societies after one year of either contingency, a blockade or an invasion, is staggering. In the case of a war over Taiwan, Bloomberg Economics projects that global GDP would fall by 10.2 percent, twice the impact of the Global Financial Crisis of 2008 or the COVID-19 pandemic. Taiwan and China's GDP would dip by 40 and 16.7 percent, respectively. In the case of a one year blockade they expect global GDP to contract by 5 percent whilst Taiwan and China's GDP will shrink by 12.2 and 8.9 percent respectively.[107] Rhodium Group expects the cost of a blockade to the global economy to be over $2 trillion, "even before factoring in international responses or second-order effects." This includes an expected greater than $1.6 trillion cost to companies involved in the automotive industry and for companies manufacturing smartphones, PCs and servers.[108] The US government arrived at a similar number, warning its European allies that the cost of such a crisis would be $2.5 trillion per year.[109] BCG and SIA project that a one year disruption of semiconductor supply (for whatever reason) from Taiwan "may cause a $490 billion drop in revenue [...] for electronic device makers across markets."[110] In short, the financial fallout of either an invasion or a blockade is likely to have a severe financial impact on the Netherlands and the EU.

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105 "A suite of models is used to estimate the impact on GDP, taking account of the blow to semiconductor supply, disruption to shipping in the region, trade sanctions and tariffs, and the impact on financial markets." Jennifer Welch, Jenny Leonard, Maeva Cousin, Gerard DiPippo, and Tom Orlik, "Xi, Biden and the $10 Trillion Cost of War Over Taiwan," *Bloomberg Economics,* January 9, 2024, https://www.bloomberg.com/news/features/2024-01-09/if-china-invades-taiwan-it-would-cost-world-economy-10-trillion

106 Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 41.

107 Jennifer Welch, Jenny Leonard, Maeva Cousin, Gerard DiPippo, and Tom Orlik, "Xi, Biden and the $10 Trillion Cost of War Over Taiwan," *Bloomberg Economics,* January 9, 2024, https://www.bloomberg.com/news/features/2024-01-09/if-china-invades-taiwan-it-would-cost-world-economy-10-trillion

108 Vest, Kratz, and Goujon, "The Global Economic Disruptions from a Taiwan Conflict."

109 Katrin Hille, Demetri Sevastopulo, "US Warns Europe a Conflict over Taiwan Could Cause Global Economic, *Financial Times*, November 10, 2022, https://www.ft.com/content/c0b815f3-fd3e-4807-8de7-6b5f72ea8ae5.

110 Varas et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," 41.

A military conflict in East Asia can lead to societal instability in the Netherlands.

The indirect effects to societies and critical sectors will likely also be far-reaching, especially since replacing the lost semiconductor manufacturing capacity on Taiwan elsewhere takes time. In fact, building just one fab can take many years. As a result, in a scenario in which Taiwan's production capacity becomes unavailable critical sectors would face semiconductor shortages for many more years. Rhodium Group highlights possible second-order effects such as disruptions of critical sectors (e.g., medical, telecommunication, harvesting and mining) and possible third order effects like "a global economic recession, sustained inflation, widespread sovereign [debt] defaults, rising unemployment, and potential social unrest."[111] Researchers at The Hague Centre for Strategic Studies (HCSS) in 2023 completed a Taiwan-blockade impact-assessment, specifically focusing on the production of medical, defence, green energy, (sustainable) mobility, and ICT-products. They found that even though consumer products that depend heavily on advanced logic chips (such as telecommunications, smartphones and PCs) are likely to experience the greatest disruptions in production, critical industries will still face large-scale production issues. They point out that the 2020-2023 global chip shortage already delayed the production of medical equipment and limited U.S. ability to supply weapons to Ukraine.[112] Much steeper price rises and more extreme shortages (especially in the developing world) in critical sectors are very likely the result of a complete suspension of semiconductor exports from Taiwan.[113] Indirect effects for the Netherlands and the EU may include threats to societal stability. Shortages would exacerbate inequality, poverty, and the functioning of critical sectors. Finally, shortages will test the relations between advanced economies, like the EU and the US, due to competition for scarce resources.[114]

3.2. Taiwan Crisis Storylines: Gauging the effect of shorter and lower-intensity conflicts

However, even high-intensity conflict in a shorter time frame or lower-level intensity contingencies may already impose high costs on the critical sectors and the economy of the Netherlands and the EU. This section presents a qualitative assessment of the effects of war-related disruptions in three crisis scenarios on a below one year timeframe. It does not

111 Vest, Kratz, and Goujon, "The Global Economic Disruptions from a Taiwan Conflict."

112 Stephen Bradley and Bill Murray, 'How Is the Semiconductor Shortage Affecting Medtech?' (Deloitte, 28 June 2022), https://www2.deloitte.com/us/en/blog/health-care-blog/2022/how-is-the-semiconductor-shortage-affecting-medtech.html. "Chips for Lives: Global Chip Shortages Put Production of Life-Saving Medical Devices and Systems at Risk," Philips, 2022, https://www.philips.com/a-w/about/news/archive/standard/news/articles/2022/20220608-chips-for-lives-global-chip-shortages-put-production-of-life-saving-medical-devices-and-systems-at-risk.html. 'Global Semiconductor Shortage Need for Prioritisation of Healthcare Capabilities'. Dependence of critical sectors on Taiwan's semiconductors may even grow throughout the 2020s and thereafter, as the automation of critical sectors would make critical sectors increasingly dependent on trailing-edge and advanced chips. Teer, Bertolini, and Girardi, Great Power Competition and Social Stability in the Netherlands," 62.; Yuka Hayashi, "Chip Shortage Limits U.S.'s Ability to Supply Weapons to Ukraine, Commerce Secretary Says," *The Wall Street Journal*, April 27, 2022, https://www.wsj.com/livecoverage/russia-ukraine-latest-news-2022-04-27/card/chip-shortage-limits-u-s-s-ability-to-supply-weapons-to-ukraine-commerce-secretary-says-pCWERV2HkSPzTdQG4CRI.

113 Consequences may unfold along similar lines as when Russia halted around 80 percent of its natural gas exports to the EU. Energy prices soured across Europe. Yet, actual shortages and power outages plagued the developing world, as shipments of liquified natural gas (LNG), originally en route to places such as Bangladesh, Pakistan and Africa, were diverted to Europe. Even though patterns may be similar, the impact is likely to be much more severe. Teer, Bertolini, and Girardi, "Great Power Competition and Social Stability in the Netherlands," 49–63.

114 Teer, Bertolini, and Girardi, 63–71.

take into account the disruptive effects of a sanction-spiral between the West and China that is likely to follow any US-China conflict. What follows are three storylines of military-strategic crises, which are all at the very least considered *possible*, throughout the 2020s. By drawing on crisis storylines, the report outlines disruptive military chains of events that may occur in the upcoming decade. Crisis storylines are not predictions of the future. Rather, they are conceivable sequences of events that, on the basis of current developments, may well play out. Storylines are hence illustrative scenarios: they cover a diverse range of conflict pathways in order to help organisations deal with a broad range of eventualities.[115]

The Taiwan Crisis Storylines below outline a chain of events, meaning a sequence of actions by the People's Liberation Army and its adversaries, which either end in a state of lower-intensity conflict (a blockade) or high-intensity conflict (an invasion). They do not cover the entire range of possible futures of conflict around Taiwan, as the future of peace and stability in the Taiwan Strait depends on a large number of uncertain factors. For instance, the first storyline "Landing a knock-out punch: a sea-land invasion (>180 days)" ends in direct conventional high-intensity, regional military conflict between the US, Japan and Taiwan and China. It is important to note that during a conflict of that kind the belligerents may also escalate to the nuclear level.[116] By mapping the possible and probable disruptive effects of three specific illustrative crises, however, storylines can still facilitate the committee on Foreign Trade and Development Cooperation in charting actions to mitigate the effects of war-related disruption. These crisis storylines are:

1. *Landing a knock-out punch*: a sea-land invasion (>180 days), taking place in 2029;
2. *Strangling the porcupine*: a semi-permanent blockade (>4 weeks), taking place in 2026; and
3. *Boiling the frog*: an on-and-off blockade (4-days-to-2-weeks), taking place in 2025.

For each storyline, the section below outlines China's strategic and political goals (behind the military action it takes) and an overview of the likely disruption caused by that action. Annex A presents the Taiwan Crisis Storylines in full. Each of these storylines is concluded with an impact assessment, outlining the expected:

1. Level of disruption to the supply from and production of semiconductors on primarily Taiwan, but also China, Japan and South Korea if they occur;
2. Level of disruption to the production and sales of important Dutch companies in the semiconductor value chain;
3. Level of disruption to manufacturing in China beyond the semiconductor value chain; and
4. Level of disruption of trade routes from and to East Asia, primarily focusing on waterways as these serve as the global highways over which goods travel.[117]

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115 Storylines serve as "stress-tests" for companies, governments and other organizations.

116 In fact, "44 percent of U.S. experts believed China would be willing to detonate nuclear weapons against U.S. or coalition forces in a Taiwan conflict; only 11 percent of Taiwan experts thought the same." Lin et al., 'Surveying the Experts', 3.

117 Trade in digital services relies on subsea telecommunication cables. At a time of great power competition, these have become more vulnerable.

Landing a knock-out punch: Sea-land invasion (>180 days) (Crisis Storyline 1)

Crisis storyline summary

In this scenario, China aims to deliver a swift and overwhelming knock-out blow to Taiwan, attempting to undermine Taipei's ability for extended resistance and swiftly occupying the island to solidify a comprehensive military foothold (see Figure 4 and full-page map "day 3" below). By rapidly neutralising Taiwan's defence mechanisms and landing a deafening strike against U.S. forces throughout the region, including in Japan, the Philippines and Guam, China seeks to forestall an extended conflict that risks international escalation. In the months leading up to Spring 2029, a discernible military and industrial buildup is observed in China's provinces proximate to Taiwan.[118] Within the first 48 hours of the conflict, the skies are dominated by engagements between the US and Japanese, and Chinese air forces, paralleled by a high-stakes naval confrontation in the surrounding seas. On the ground, Taiwan's vital infrastructure, such as its airports and highways, and its air defence systems, are heavily bombarded with long-range missiles and bombers, limiting its ability to mobilise a response. Taiwan's communication infrastructure — from undersea cables and cellular networks to satellites — is comprehensively disrupted by electro-magnetic warfare and subsea and in-space sabotage. The aftermath of the initial Chinese offensive witnesses Taiwan adopting a determined asymmetric defence strategy while aggressively seeking more US aid.[119] Japan, sensing the regional implications, deploys its available naval forces to defend its territories and interests.[120] Tokyo has also recalled reserve personnel, while South Korea has called for conscription.

Taiwan's territory would serve as a comprehensive military foothold to the PLA.

Despite their overwhelming initial offensive, the Chinese amphibious invasion is eventually repelled (Day 7).[121] However, this setback doesn't defeat China's resolve. Taiwan finds itself under an unyielding siege as the Chinese military subjects the island to incessant bombardment from the air and sea. Anything that holds strategic value to Taiwan's defence and economy, including energy infrastructure, is systematically razed.

A full-scale invasion and subsequent occupation of this type would require enormous effort by the PLA to set the conditions before an attack. Before this scenario plays out, there would be plentiful early warning signs. The three-month "build-up" phase, meaning China's industrial, logistical and military personnel preparations for an attack, likely being longer in practice.[122]

118 Gerard DiPippo, 'Economic Indicators of Chinese Military Action against Taiwan', Center for Strategic and International Studies, 16 August 2022, https://www.csis.org/analysis/economic-indicators-chinese-military-action-against-taiwan.

119 Robert D. Blackwill and Philip Zelikow, 'Three Scenarios for a Military Conflict Over Taiwan', The United States, China, and Taiwan: (Council on Foreign Relations, 2021), https://www.jstor.org/stable/resrep28673.10; 'Taiwan National Defense Report 2021' (Taipei: Ministry of National Defense, October 2021), https://www.ustaiwandefense.com/tdnswp/wp-content/uploads/2021/11/Taiwan-National-Defense-Report-2021.pdf.

120 Sheila A. Smith, *Japan Rearmed: The Politics of Military Power* (Cambridge, MA: Harvard University Press, 2019).

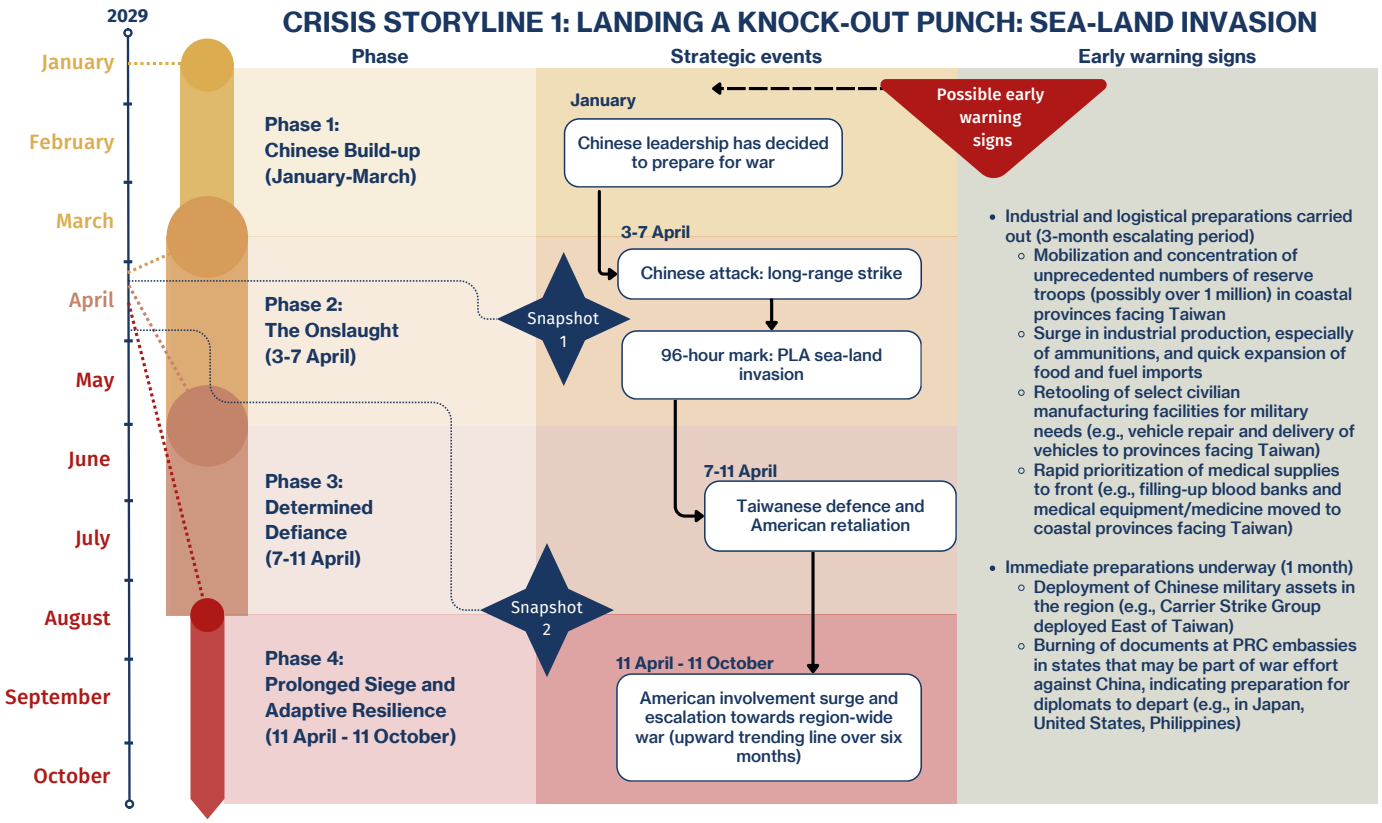
121 Roger Cliff, *China's Military Power: Assessing Current and Future Capabilities* (Cambridge, UK: Cambridge University Press, 2015); Mark F. Cancian, Matthew Cancian, and Eric Heginbotham, 'The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan', CSIS International Security Program (Center for Strategic and International Studies: Washington, D.C., January 2023), https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/230109_Cancian_FirstBattle_NextWar.pdf?VersionId=WdEUwJYWIySMPIr3ivhFolxC_gZQuSOQ; David A. Ochmanek et al., 'Inflection Point: How to Reverse the Erosion of U.S. and Allied Military Power and Influence' (RAND Corporation, 25 July 2023), https://www.rand.org/pubs/research_reports/RRA2555-1.html; Stacie Pettyjohn, Becca Wasser, and Chris Dougherty, 'Dangerous Straits: Wargaming a Future Conflict over Taiwan', Center for a New American Security, 15 June 2022, https://www.cnas.org/publications/reports/dangerous-straits-wargaming-a-future-conflict-over-taiwans.

122 For comparison, Russian forces had approximately 12 months of preparation ahead of the 24 February 2022 invasion of Ukraine.

Chinese Strategic and Political Goals

By going all in in the first phase of the war, the PRC tries to win a swift victory and present the world with a fait accompli.[123] In this scenario, the military endeavour complements China's broader ambition to assert its dominance over the East and South China Seas, affirming its role as the predominant regional power. Politically, Beijing's intention is twofold: to integrate Taiwan into mainland China and to methodically eradicate any political currents within Taiwan advocating for independence or expressing anti-China sentiments. It showcases the lengths Beijing is willing to go to enforce its one-China principle, meaning the position that the People's Republic of China is the only China in the world, of which Taiwan is an inalienable part. The successful integration of Taiwan's sophisticated semiconductor fabs, including human capital, into China might be a secondary goal (but is highly likely unachievable).[124]

Figure 4. Crisis storyline 1: Landing a knock-out punch: Sea-land invasion



[123] Cliff, *China's Military Power: Assessing Current and Future Capabilities*, 182–83; Cancian, Cancian, and Heginbotham, 'The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan'; Ochmanek et al., 'Inflection Point'; Pettyjohn, Wasser, and Dougherty, 'Dangerous Straits'.

[124] Even if an invasion and occupation would succeed and war-related power outages would not have permanently damaged the fabs already. For one, TSMC's fabs rely on the continuous maintenance and software updates by US and European equipment providers. These would likely be suspended. Second, their functioning requires the continued services of highly specialised Taiwanese labour.

Maritime routes throughout the entire East and South China Seas may become inaccessible during an invasion.

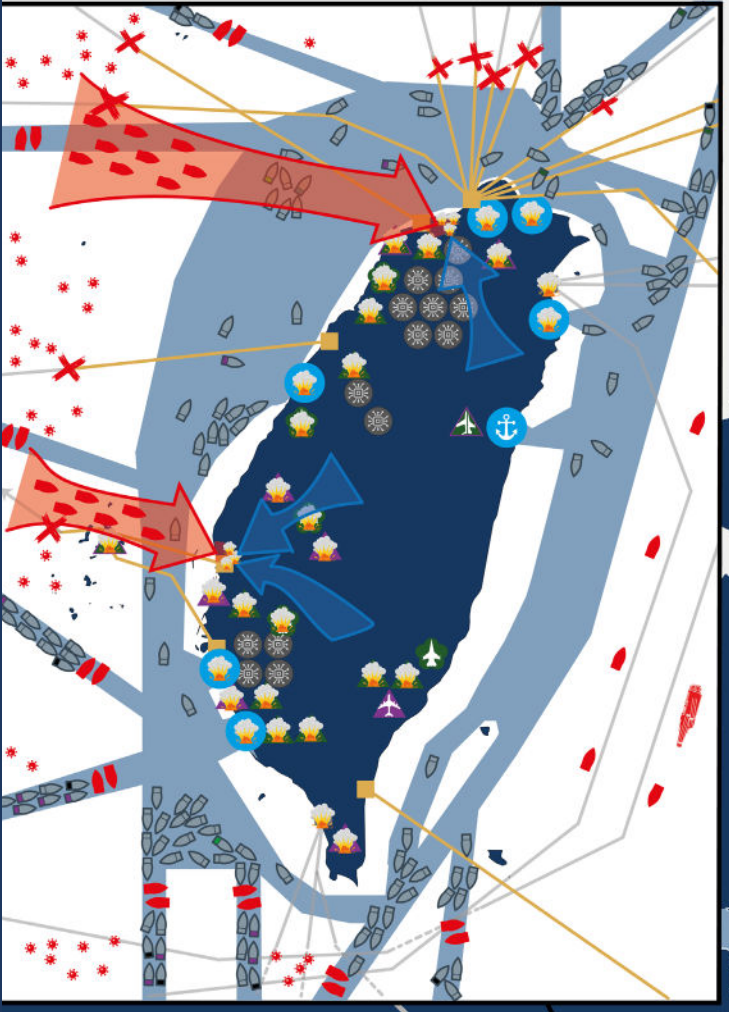
Overview of disruption: Semiconductor production in East Asia, Chinese manufacturing and waterways in the Indo-Pacific during a PLA invasion

In this scenario, energy-intensive production on Taiwan and trade over sea and through air with Taiwan experiences extreme disruptions (see Table 2 for a summary overview). In the initial stages of the crisis storyline (Snapshot Moment 1: Day 3, see full-page map "day 3" below), Taiwan confronts extreme disruptions across multiple fronts. Aerial domains, inclusive of passenger flights, freight, and military resupply, are completely disrupted. Similarly, maritime supplies, encompassing weapons, fuel, industrial assets, and food, are also completely inaccessible. Subsea communication cables are completely severed, while communications via satellites face disruptions too, but still function sporadically. By Snapshot Moment 2 (see full-page map "day 90" below), there is a discernible yet moderate alleviation in these constraints. Satellite and subsea-cable disruptions are slowly alleviating, allowing for greater communication with the outside world. However, considerable challenges persist across domains, as food and energy supplies are incredibly scarce in Taiwan. Maritime and aerial points of access remain very severely disrupted, due to the large-scale mining of waterways to and around Taiwan. Semiconductor production is halted, in order to provide energy to Taiwan's suffering population instead (see Table 2). Disruptions are not contained to Taiwan and its surrounding waters. Sea-lanes throughout the entire East and South-China Sea are contested, as the US navy and Japan's Self-Defence Forces remain engaged in sporadic confrontation with China's People's Liberation Army Navy. Maritime trade with China has become largely impossible due to the fighting and mining, but the East Coast of Japan and Northeast coast of South Korea are still by-and-large accessible – but judged to be too dangerous by many crews to sail to.

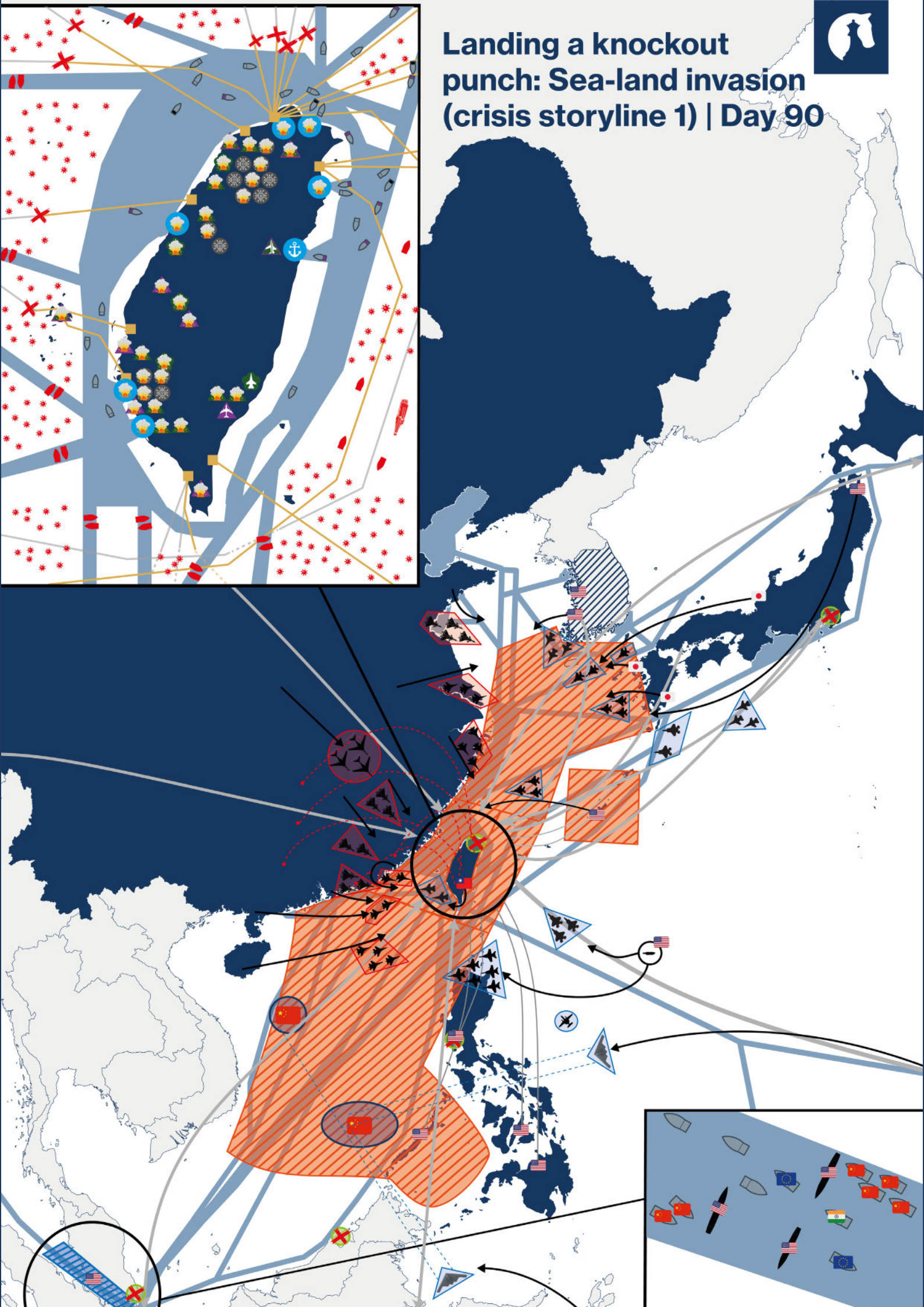
Table 2. Overview of probable disruption in East Asia due to a PLA invasion (>180 days)

Impact area	Probable impact of war-related disruption Dutch and EU interests in East Asia
Semiconductor production	Taiwan: Entirely disrupted and likely encoutering long-lasting or permanent damage due to near-complete interruption of energy and material imports; destruction by China's bombardments; deployment of skilled workforce (including engineers) to war effort.
	China: Probable large-scale disruptions due to interruption of energy, material and wafer imports possibly encountering long-lasting damage (as a result of large-scale kinetic conflict in South China Sea and East China Sea and U.S. blockade of Strait of Malacca); possible disruptions due to deployment of skilled workforce (including engineers) to the war effort; other war-related disruption due to direct military confrontation with Taiwan, the U.S., and Japan.
	Japan: Probable large-scale disruptions due to interruption of energy and material imports (as a result of large-scale conflict in South China Sea and East China Sea); possible disruptions due to deployment of skilled workforce (including engineers) to war effort; additional war-related disruption due to direct military confrontation with China.
	South Korea: Probable large-scale disruptions due to interruption of energy and material imports, possibly encountering long-lasting damage (as a result of large-scale conflict in South China Sea and East China Sea); disruptions due to deployment of skilled workforce (including engineers) to war effort; additional war-related disruption due to direct military confrontation with China.
NL semiconductor industry sales/production (ASML/NXP)	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan entirely lost; Sales to China (13,8% in 2022) halted; Sales to Japan (4,8% in 2022) and South Korea (28,6% in 2022) probably affected by energy and material shortages, as well as unsafe aerial and maritime routes.
	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan entirely lost; Sales to China (35,6% in 2022) halted; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) most likely affected by energy and material shortages, as well as unsafe aerial and maritime routes.
Manufacturing of critical economic inputs beyond semiconductors (e.g., medicine, med-equipment, electronics, batteries)	China: Probable large-scale disruptions due to interruption of energy and material imports (as a result of large-scale conflict in South China Sea and East China Sea and U.S. blockade of Strait of Malacca); disruptions due to deployment of workforce (factory workers) to the front and engineers to the broader war effort; other war-related disruption due to direct military confrontation with Taiwan, the U.S., and Japan.
Access to trade routes	Maritime and aerial routes in the South China Sea and East China Sea most likely almost entirely inaccessible; Disruptions in trade in services with Taiwan due to severed subsea cables; possible disruptions in internet connections to South Korea, Japan, China.

Landing a knockout punch: Sea-land invasion (crisis storyline 1) | Day 3



Landing a knockout punch: Sea-land invasion (crisis storyline 1) | Day 90



Strangling the porcupine: Semi-permanent blockade (Crisis storyline 2)

Crisis storyline summary and overview of disruption: Semiconductor production in East Asia, Chinese manufacturing and waterways in the Indo-Pacific during a semi-permanent blockade

For weeks, news in Taiwan has been dominated by a planned visit by a large U.S. congressional delegation by representative of both parties to Taipei. The Chinese president has threatened 'serious reprisals' if any outside powers incentivise Taipei to take the 'dangerous path' of 'furthering Taiwan independence' (see Figure 5 for an overview of crisis storyline 2).[125] In the event of a Chinese blockade of Taiwan, the island's lines of communication are first partially and then almost entirely blocked. As China initiates a semi-permanent blockade of Taiwan (Snapshot 1: Day 2; see full page map below), the initial impact on aerial access is moderate, with many passenger and freight flights disrupted and military resupply efforts unannounced. Internet traffic remains largely unfazed, with only minor limitations affecting subsea cables (see Table 3 for an overview of probable disruption in East Asia during a blockade). Maritime transport begins to encounter medium-level disruptions, as especially weapon and ammunition shipments are halted by China's Coast Guard and navy. Food supplies are for the most part allowed to pass unaffected. Over the span of 30 days, these actions are expanded upon: aerial routes to Taiwan are blocked, as China issues an official Notice to Air Missions (NOTAM). Internet connectivity suffers greatly as both subsea cables and satellite communications encounter structural damage and interference by the PLA. Maritime routes experience very high levels of disruption, severely restricting the inflow of crucial resources like fuel, industrial goods, weapon and ammunitions, and also food, which become highly restricted as the blockade continues (Snapshot 2: day 30; see full page map below).

Taipei decides to prioritise vital sectors over chip fabrication plants, leading TSMC's major fabs to run out of the required materials and fuels for its production. TSMC engineers worry that even when energy is restored, the wafers currently under production have become useless. More broadly they fear that shutting-down the fab like this will take it out of service for at least a month (and likely longer) even after a restart. The blockade, including the NOTAM, had already made it impossible to ship out semiconductors anyway. The U.S. Secretary of State has held emergency meetings with the leaders of Japan and the Philippines, with talks reportedly centered on how to possibly force open a pathway for supplies and aide to Taiwan. US naval deployments in the Persian Gulf, the Indian Ocean and in the South-China Sea are partially moved to the Strait of Malacca, to block all Chinese-flagged vessels including those that deliver oil and LNG to the PRC. Meanwhile, in Taiwan a protest movement calling on authorities to negotiate a 'new arrangement' with Beijing has begun to grow.

Yet, as China does not enter direct conflict with the US and Japan, maritime traffic encounters delays -is forced to reroute (avoiding the straits around Taiwan)- but is not entirely impossible between the EU and East Asia. Likewise, the U.S. blockade against Chinese ships in Malacca leads to shipping delays for non-Chinese flagged vessels too. The costs are still high: since the start of the conflict shipping times, total container ship shortages and maritime insurance costs have spiked.

[125] Paul Haenle and Nathaniel Sher, 'How Pelosi's Taiwan Visit Has Set a New Status Quo for U.S-China Tensions', Carnegie Endowment for International Peace, 17 August 2022, https://carnegieendowment.org/2022/08/17/how-pelosi-s-taiwan-visit-has-set-new-status-quo-for-u.s-china-tensions-pub-87696.

Much of the PLA resources and intelligence are in place currently (meaning already in 2024), and a significant build-up period would not be easily recognisable. The establishment of a blockade could come within hours of a decision by the Chinese leadership, likely without clear early warning signs.

Chinese Strategic and Political Goals

This evolution from relatively minor disruptions to a near-total blockade over the first weeks reveals China's strategic aim to coerce Taiwan into reunification talks while critically weakening its resistance and operational capacity. Chinese ends in this scenario remain relatively similar to those for a full-scale invasion, though the approach is far more risk averse. The political goal remains to force Taiwan into a 'reunification' with the mainland. The strategic aim is to do so more peacefully than throughout a sea-land invasion, putting extra efforts into 1) not inviting external (i.e., American) intervention and 2) avoiding causing catastrophic damage to Taiwan itself. Rather than a 'knock-out punch', the main effort is to slowly strangle the island through a semi-permanent blockade that gradually increases in pressure to undermine the political authorities of Taiwan and sap the strength of the armed forces (see Figure 5 and the two full page maps below). By opting for a blockade, the PLA does not have to deal directly with Taiwan and US "porcupine strategy",[126] meaning the preparation of Taiwan's military for drawn-out asymmetric warfare and high-intensity fighting on the beaches with ever larger amounts of US-provided weaponry.

The establishment of a blockade could come within hours of a decision by China's leadership.

[126] Raymond Kuo, "The Counter-Intuitive Sensibility of Taiwan's New Defense Strategy," War on the Rocks, December 6, 2021, https://warontherocks.com/2021/12/the-counter-intuitive-sensibility-of-taiwans-new-defense-strategy/.

Figure 5. Crisis storyline 2: Strangling the porcupine: Semi-permanent blockade

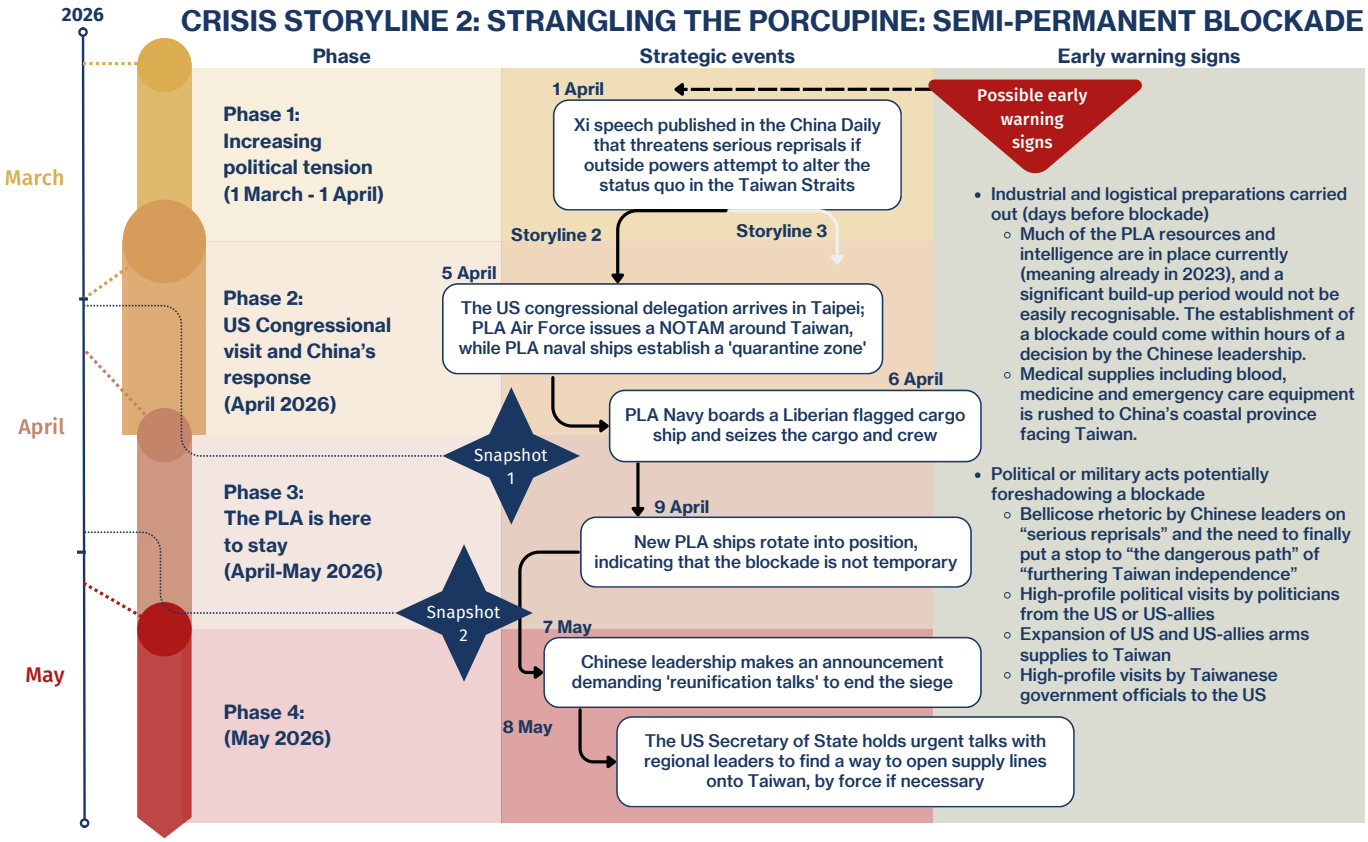
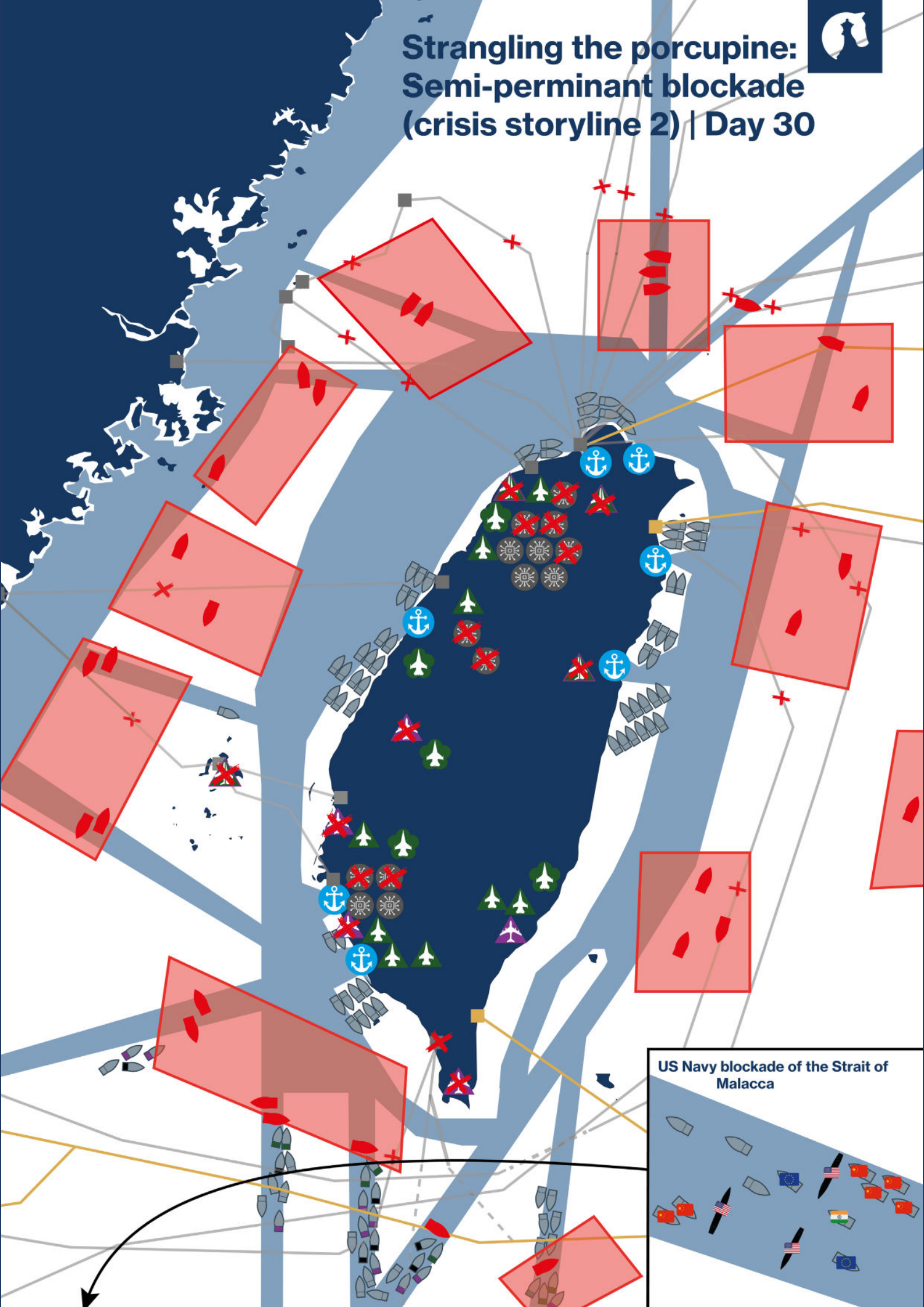


Table 3. Overview of disruption in East Asia due to a semi-permanent blockade (>4 weeks)

Impact area	Probable impact of war-related disruption on Dutch and EU interests in East Asia
Semiconductor production	Taiwan: Large-scale disruption to production. Export of semiconductors entirely halted for the duration of the blockade, as well as likely longer-lasting damage to fabs afterwards due to interruption of energy and material imports; deployment of skilled workforce (including engineers) to Taiwan's defence.
	China: Possible large-scale disruptions due to interruption of energy, material and wafer imports, potentially encountering long-lasting damage (as a result of U.S. blockade of Strait of Malacca); other disruptions related to global crisis over Taiwan.
	Japan: Possible large-scale disruptions due to interruption of possible material imports from China and Taiwan; other disruptions related to global crisis over Taiwan.
	South Korea: Possible large-scale disruptions due to interruption of possible material imports from China and Taiwan; other disruptions related to global crisis over Taiwan.
NL semiconductor industry sales/production (ASML/NXP)	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan entirely halted; Sales to China (13,8% in 2022) in question; Sales to Japan (4,8% in 2022) and South Korea (28,6% in 2022) may be affected by material shortages.
	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan entirely halted; Sales to China (35,6% in 2022) in question; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) may be affected by material shortages.
Manufacturing of critical economic inputs beyond semiconductors (e.g., medicine, med-equipment, electronics, batteries)	China: Possible large-scale disruptions due to interruption of energy and material imports (as a result of U.S. blockade of Strait of Malacca); other disruptions related to global crisis over Taiwan.
Access to trade routes	Maritime and aerial routes in and around Taiwan and the Taiwan Strait entirely disrupted; Very stark increase in shipping costs for all goods traveling through the South and East China Sea due to rerouting, possible shortages of container ships, spikes in maritime insurance prices; Trade in services with Taiwan almost entirely disrupted due to severed subsea cables; possible disruptions in internet connections to South Korea, Japan, China.

Strangling the porcupine: Semi-perminant blockade (crisis storyline 2) | Day 3

Strangling the porcupine: Semi-perminant blockade (crisis storyline 2) | Day 30



Boiling the frog: an on-and-off blockade (Crisis storyline 3)

Crisis storyline summary and overview of disruption: Semiconductor production in East Asia, Chinese manufacturing and waterways in the Indo-Pacific during an on-and-off blockade

For weeks, news in Taiwan has been dominated by a planned visit by a large U.S. congressional delegation by representative of both parties to Taipei.[127] China's President has threatened 'serious reprisals' if any outside powers incentivise Taipei to take the 'dangerous path' of 'furthering Taiwan independence'. China's imposition of an on-and-off blockade causes fluctuating disruptions, aimed at pressuring Taiwan's government into reunification talks (see Figure 6 for an overview of the full crisis storyline). Initially, this has a limited effect on Taiwan's aerial lines of communication, as only some passenger flights are cancelled. Maritime routes for fuel, industrial goods, and food remain open, despite a high level of disruption in weapons and ammunition supplies, due to China Coast Guard custom checks (Snapshot 1: Day 2; see full page map below). Internet connectivity remains unaffected, with no impact on subsea cables or satellite communications. The exercise ends after seven days: almost all PLAN vessels leave the areas around Taiwan for six days. However, at the two week mark (Snapshot 2: day 15; see full page map below), the PLAN is back. The situation is more severe than during the first round of excercises: aerial disruptions become more serious, with increased military activity leading to more frequent diversions and cancellations of flights. The maritime transport of essential commodities like fuel, industrial goods, and food, which were initially unaffected, now face medium-level disruptions due to an increasing number of 'customs' checks including arbitrary seizures by China's Coast Guard, creating problems for Taiwan's economy and society. Electricity is prioritised for vital sectors. TSMC engineers worry that even when energy is restored, the wafers currently under production have become useless. More broadly they fear that shutting-down the fab like this will take it out of service for at least a month (and likely longer) even after a restart (see Table 5 for a full overview of probable disruption during an on-and-off blockade). The intermittent easing of restrictions, however, ensures that outright conflict between Taiwan and its quasi-allies, Japan and the US, and China is avoided.

China has all the necessary resources to suddenly and without warning start a blockade.

Yet, maritime traffic between the EU and East Asia encounters delays -is forced to reroute (avoiding the straits around Taiwan)- but is not entirely impossible. The costs are still high: since the start of the conflict shipping times, total container ship shortages and maritime insurance costs have risen structurally. These prices are expected to remain volatile for the foreseeable future. Much of the PLA resources and intelligence are in place currently (meaning already in 2024), and a significant military build-up period would not be easily recognisable. The establishment of an on-and-off blockade could come within hours of a decision by the Chinese leadership.

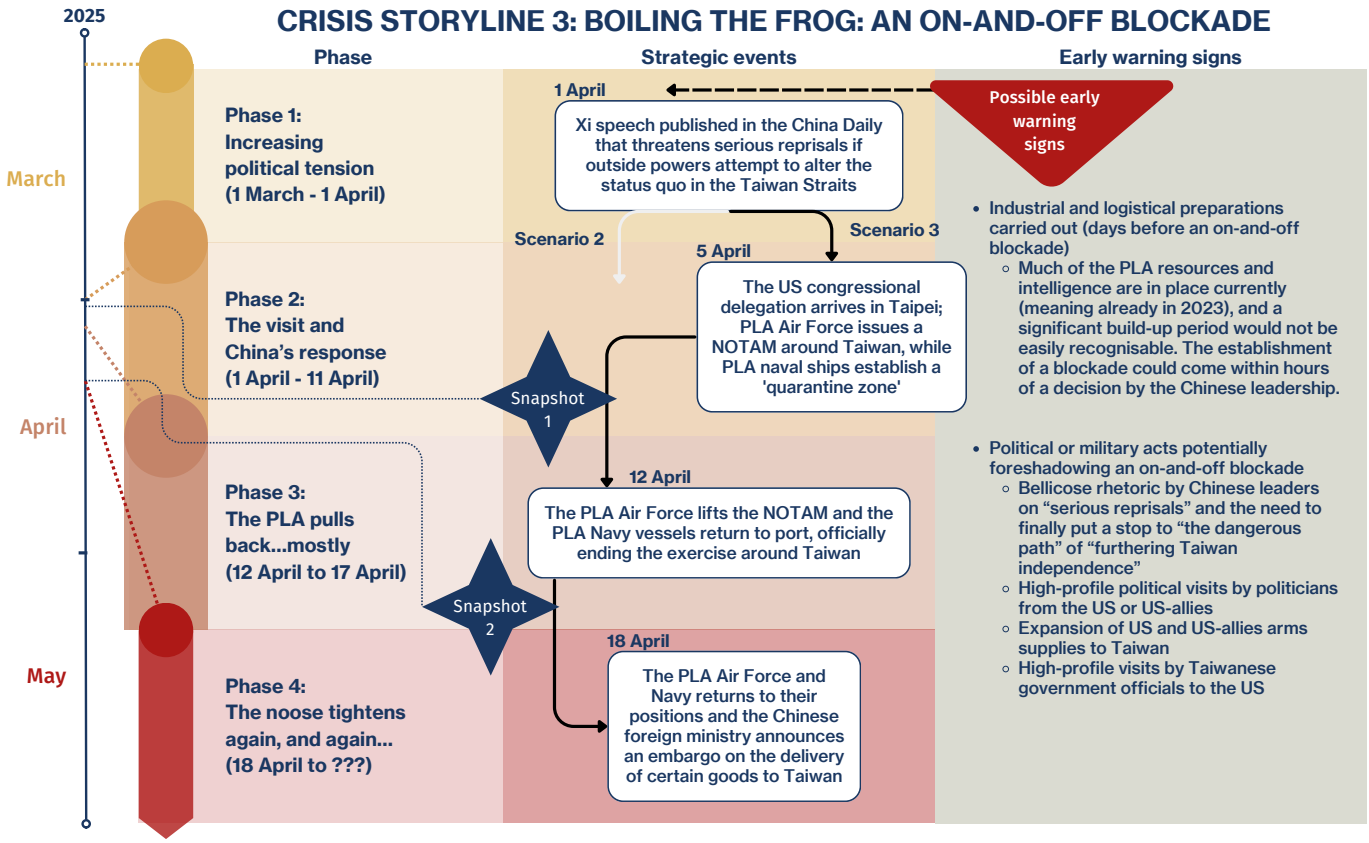
Chinese Strategic and Political Goals

Chinese ends in this scenario are exactly similar to those for a near permanent blockade, though the approach is even more risk averse. The political goal remains to force Taiwan into a 'peaceful reunification' with Mainland China. The strategic aim is to do so without 1) inviting external (i.e., American and Japanese) intervention and 2) avoid causing catastrophic damage to Taiwan itself. Rather than strangling the island, the aim is to simply make political and economic life increasingly difficult so as to make forcing reunification negotiations simpler

[127] Haenle and Sher, 'How Pelosi's Taiwan Visit Has Set a New Status Quo for U.S-China Tensions'.

or to lead to a change in political leadership in Taipei.[128] The slow boiling of the frog ensures that Taiwan remains under a cloud of indefinite uncertainty, leaving business and government leaders in the West to reconsider their long-term investment commitments to the island. The lead up period is identical, as similar political triggers can cause different outcomes. China, however, makes careful efforts to not provoke Taiwan or the U.S. into actual conflict, by opting to merely 'boil the frog'.

Figure 6. Crisis storyline 3: Boiling the frog: On-and-off blockade



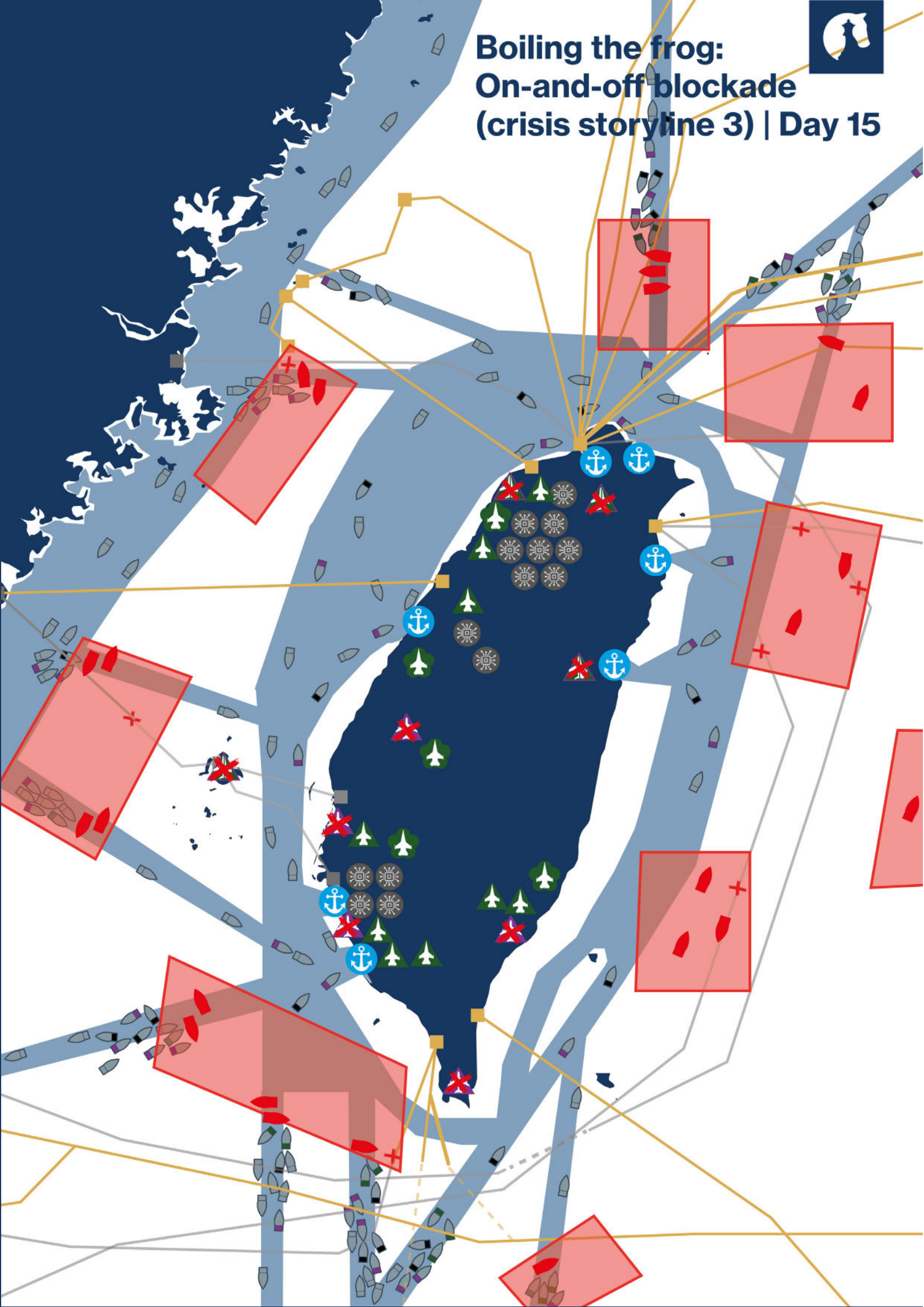
[128] Peter Kornbluh and George Gelzer, 'Cuba Embargoed: U.S. Trade Sanctions Turn Sixty', George Washington University National Security Archive, 2 February 2022, https://nsarchive.gwu.edu/briefing-book/cuba/2022-02-02/cuba-embargoed-us-trade-sanctions-turn-sixty; William M. LeoGrande, "A Policy Long Past Its Expiration Date: US Economic Sanctions Against Cuba," *Social Research* 82, no. 4 (2015): 939–66; Fiona S. Cunningham, "The Maritime Rung on the Escalation Ladder: Naval Blockades in a US-China Conflict," *Security Studies* 29, no. 4 (7 August 2020): 730–68, https://doi.org/10.1080/09636412.2020.1811462.

Table 4. Overview of disruption in East Asia due to an on-and-off blockade (alternating 4-days-to-2-weeks)

Impact area	Probable impact of war-related disruption on Dutch and EU interests in East Asia
Semiconductor production	Taiwan: Some fabs may face production disruptions, due to sporadic longer-duration interruption of energy and material supplies and deployment of skilled workforce (including engineers) to Taiwan's defence. If flow of energy interrupted, semiconductor fabs may incur long-lasting damages.
	China: Likely largely unaffected.
	Japan: Likely largely unaffected.
	South Korea: Likely largely unaffected.
NL semiconductor industry sales/production (ASML/NXP)	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan possibly affected; Sales to China (13,8% in 2022); to Japan (4,8% in 2022) and South Korea (28,6% in 2022) likely unaffected.
	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan possibly affected; Sales to China (35,6% in 2022) in question; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) may be affected by material shortages.
Manufacturing of critical economic inputs beyond semiconductors (e.g., medicine, med-equipment, electronics, batteries)	China: Likely largely unaffected, except if Taiwan's semiconductor production faces production issues. After all, China's undisputed leadership in global manufacturing partially relies on the constant supply of semiconductors from Taiwan (of which China is the main importer).
Access to trade routes	Maritime and aerial routes in and around Taiwan and the Taiwan Strait on-and-off disrupted; Stark increase in shipping costs for most goods traveling through the South and East China Sea due to rerouting, possible shortages of container ships, spikes in maritime insurance prices; Trade in services with Taiwan impacted (lightly) due to severed subsea cables.

Boiling the frog: On-and-off blockade (crisis storyline 3) | Day 1

Boiling the frog: On-and-off blockade (crisis storyline 3) | Day 15



Conclusion

East Asia has become *the* manufacturing and one of the consumption centres of the world economy throughout the last fifty years. Dangerously, the probability of a military crisis in East Asia, in particular a military conflict over Taiwan, has increased throughout the last decade. Tensions between China on the one hand and the US and its allies and partners on the other have structurally and rapidly increased. Trends, such as China's rapid military modernisation, Beijing's expansion of actions below the threshold of war against Taiwan, the relative decline of U.S. power in East Asia (and Washington's efforts to reverse this development), China's distrust of the DPP (Taiwan's ruling party), and Taiwan's underinvestment in defence, may eventually lead to conflict. At the very least, as a result of these trends, tensions are unlikely to fall below 2016 levels.

East Asia is *the* manufacturing centre of the world economy.

This report outlined the geopolitical-military context in which Dutch-European trade relations with Taiwan take place (in *Chapter 1: How did we get here?*). Then, it mapped the consequences of war-related disruption of an (armed) conflict around Taiwan for these relations. Finally, likely and possible consequences for critical sectors and the broader economy of the Netherlands and the EU were identified.

Chapter 2: What is at stake? outlined the dependence of critical sectors and the broader economy of the Netherlands and the EU on trade with Taiwan in particular, but also with East Asia more broadly. Crucially, over 70 percent of front-end and over 80 percent of back-end manufacturing of all semiconductors is completed in East Asia.[129] Whereas companies on Taiwan, in particular TSMC, dominate front-end manufacturing of logic chips, China seeks to consolidate its role as the world's primary back-end manufacturer of semiconductors in general. South Korea and to a lesser extent Japan also play important roles in this value chain. Dutch companies active in the semiconductor value chain heavily rely on sales to Taiwan and China and rely on production on Taiwan. South Korea and Japan are important sources of revenue too.

In addition to semiconductors, the Netherlands and the EU came to rely on manufacturing in the region more generally, in particular on China. In 2020, approximately 35 percent of all goods worldwide were manufactured in China.[130] This includes a dependence on a wide variety of important materials, components and end-products in critical sectors, including in medical, green, ship-building and digital industries. At present the EU relies on materials, components and end-products from China for among other things MRI-systems, a wide variety of medicine, wind turbines, solar panels, container ships, supercomputers, and telecommunication networks. Finally, East Asia's ability to supply semiconductors and end-products to the world hinges on uninterrupted access to some of the world's busiest waterways, such as the Malacca Strait and the South and East China Seas. Respectively 28, 30 and

129 Semiconductors are essential building blocks of our economies and societies: advanced semiconductors push the advances of the 4th industrial revolution such as artificial intelligence (AI) whilst mature (or "foundational") chips are ubiquitous in critical sectors like medical, defense, green, automotive and ICT-industries.

130 OECD TiVa database; Baldwin, "China Is the World's Sole Manufacturing Superpower".

31 percent of global trade passes through their shipping lanes.[131] Likewise, global trade hinges on aerial routes and subsea cables.

There is no guarantee that China's actions remain below the threshold of war throughout the 2020s or thereafter. *Chapter 3: What can go wrong?* gauged the impact on the Netherlands and the EU of three military crises that may occur in East Asia throughout the 2020s or thereafter. The chapter cited authoritative scenario-exercises that mapped the effects of a one year higher-intensity military conflict. The findings of these exercises have one thing in common: the costs of a blockade of, or war over, Taiwan are staggering. Impact projections range between a 10.2 percent fall in global GDP (twice the impact of the 2008 Financial Crisis or the COVID-19 pandemic) during an invasion; a five percent fall in global GDP during a blockade;[132] and an over $2 trillion cost during a blockade, "even before factoring in international responses or second-order effects."[133]

A complete suspension of semiconductor exports from Taiwan would likely result in steep price rises and shortages.

The indirect effects on societies and critical sectors will likely be severe too, in particular because replacing the lost semiconductor manufacturing capacity on Taiwan specifically (and perhaps in East Asia more broadly) in other geographies takes many years (if not over a decade). Possible second-order effects are disruptions of critical sectors (e.g., medical, telecommunication, harvesting and mining). Possible third order effects are "a global economic recession, sustained inflation, widespread sovereign [debt] defaults, rising unemployment, and potential social unrest."[134] In addition, critical industries will likely face large-scale production issues. For example, the 2020-2023 global chip shortage already delayed the production of medical equipment.[135] A complete suspension of semiconductor exports from Taiwan would result in far steeper price rises and more severe shortages (especially in the developing world) in critical sectors.[136] Indirect effects for the Netherlands and the EU may include threats to societal stability. After all, shortages would exacerbate economic inequality, poverty and the functioning of critical sectors. Finally, shortages will lead to competition for scarce resources between advanced economies. This will test relations between the EU, the U.S. and US allies and partners in East Asia.[137]

131 Lincoln F. Pratson, "Corrigendum to "Assessing Impacts to Maritime Shipping from Marine Chokepoint Closures" [Commun. Transport. Res. 3 (2023) 100083]," *Communications in Transportation Research* 3 (December 1, 2023): 5, https://doi.org/10.1016/j.commtr.2023.100100.

132 Jennifer Welch, Jenny Leonard, Maeva Cousin, Gerard DiPippo, and Tom Orlik, "Xi, Biden and the $10 Trillion Cost of War Over Taiwan," *Bloomberg Economics,* January 9, 2024, https://www.bloomberg.com/news/features/2024-01-09/if-china-invades-taiwan-it-would-cost-world-economy-10-trillion

133 Vest, Kratz, and Goujon, "The Global Economic Disruptions from a Taiwan Conflict."

134 Vest, Kratz, and Goujon, "The Global Economic Disruptions from a Taiwan Conflict."

135 Stephen Bradley and Bill Murray, 'How Is the Semiconductor Shortage Affecting Medtech?' "Chips for Lives: Global Chip Shortages Put Production of Life-Saving Medical Devices and Systems at Risk," Philips, 2022, https://www.philips.com/a-w/about/news/archive/standard/news/articles/2022/20220608-chips-for-lives-global-chip-shortages-put-production-of-life-saving-medical-devices-and-systems-at-risk.html. 'Global Semiconductor Shortage Need for Prioritisation of Healthcare Capabilities'. Dependence of critical sectors on Taiwan's semiconductors may even grow throughout the 2020s and thereafter, as the automation of critical sectors would make critical sectors increasingly dependent on trailing-edge and advanced chips. Teer, Bertolini, and Girardi, Great Power Competition and Social Stability in the Netherlands," 62. Yuka Hayashi, "Chip Shortage Limits U.S.'s Ability to Supply Weapons to Ukraine, Commerce Secretary Says," *The Wall Street Journal*, April 27, 2022, https://www.wsj.com/livecoverage/russia-ukraine-latest-news-2022-04-27/card/chip-shortage-limits-u-s-s-ability-to-supply-weapons-to-ukraine-commerce-secretary-says-pCWERV2HkSPzTdQG4CRI.

136 Consequences may unfold along similar lines as when Russia halted around 80 percent of its natural gas exports to the EU. Energy prices soured across Europe. Yet, actual shortages and power outages plagued the developing world, as shipments of liquified natural gas (LNG), originally en route to places such as Bangladesh, Pakistan and Africa, were diverted to Europe. Even though patterns may be similar, the impact is likely to be much more severe. Teer, Bertolini, and Girardi, "Great Power Competition and Social Stability in the Netherlands," 49–63.

137 Teer, Bertolini, and Girardi, 63–71.

War-related disruption as a result of a high-intensity conflict in a shorter time frame or a lower-level intensity contingency may already impose high costs on the critical sectors and the economy of the Netherlands and the EU. The Taiwan Crisis Storyline-exercise in *Chapter 3: What can go wrong?* underlined this. For example, an invasion, semi-permanent blockade,–and perhaps even an on-and-off-blockade– already within the first month(s) may cause long-lasting damage to Taiwan's semiconductor production sites. After all, brief interruptions in energy and material supplies to fabs can take them offline for extended periods of time.[138] In turn, these disruptions in the production of semiconductors and U.S. military action against China (e.g., a counter-blockade of the Malacca Strait to choke-off Beijing's oil and LNG supplies) then lead to disruptions in the manufacturing of critical components, such as electronics, and end-products more broadly, most importantly in China. Conflict-related disruption such as inaccessible sea-lanes and aerial routes may lead to disruptions of materials and energy to South Korea and Japan as well, further hampering semiconductor production. Hence, shortages of essential goods for critical sectors in the Netherlands and the EU and the subsequent threats to social stability may already be the result of a shorter crisis around Taiwan. Finally, even the least intense crisis storyline, a short-term on-and-off-blockade of Taiwan, will contribute to inflation. After all, this causes supply chain disruptions and will make shipping more expensive (for example due to rerouting, container ship shortages and spikes in maritime insurance prices). For a summary overview of the negative effects all three Taiwan Crisis Storylines, please see Table 5.

Brief interruptions in energy supplies to fabs can take them offline for extended periods of time.

138 *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Forstering Broad-Based Growth: 100-Day Reviews under Excutive Order 14017*, The White House, 36. Steve Frezon, 'Through the Storm: The Complex Process of Restarting a Semiconductor Facility' (NXP Semiconductors N.V., March 2021), https://www.nxp.com/company/blog/through-the-storm-the-complex-process-of-restarting-a-semiconductor-facility:BL-RESTARTING-SEMICONDUCTOR-FACILITY. Jon Porter, "Samsung Loses over $270M from Texas Plant Shutdown as Quarterly Profits Boom," *The Verge*, April 29, 2021, https://www.theverge.com/2021/4/29/22409273/samsung-austin-texas-plant-month-shut-down-losses-smartphone-sales-chip-shortage.

Table 5. Overview of disruption in East Asia during a Taiwan invasion, a semipermanent blockade or an on-and-off blockade

Impact area	**Probable impact crisis storyline 1 on Dutch and EU interests in East Asia:** *Landing a knock-out punch*: a sea-land invasion (>180 days)	**Probable impact crisis storyline 2 on Dutch and EU interests in East Asia:** *Strangling the porcupine*: a semi-permanent blockade (>4 weeks)	**Probable impact crisis storyline 3 on Dutch and EU interests in East Asia:** *Boiling the frog*: an on-and-off blockade (4-days-to-2-weeks)
Semiconductor production	Taiwan: Entirely disrupted and likely encoutering long-lasting or permanent damage due to near-complete interruption of energy and material imports; destruction by China's bombardments; deployment of skilled workforce (including engineers) to war effort.	Taiwan: Large-scale disruption to production. Export of semiconductors entirely halted for the duration of the blockade, as well as likely longer-lasting damage to fabs afterwards due to interruption of energy and material imports; deployment of skilled workforce (including engineers) to Taiwan's defence.	Taiwan: Some fabs may face production disruptions, due to sporadic longer-duration interruption of energy and material supplies and deployment of skilled workforce (including engineers) to Taiwan's defence. If flow of energy interrupted, semiconductor fabs may incur long-lasting damages.
	China: Probable large-scale disruptions due to interruption of energy, material and wafer imports possibly encountering long-lasting damage (as a result of large-scale kinetic conflict in South China Sea and East China Sea and U.S. blockade of Strait of Malacca); possible disruptions due to deployment of skilled workforce (including engineers) to the war effort; other war-related disruption due to direct military confrontation with Taiwan, the U.S., and Japan.	China: Possible large-scale disruptions due to interruption of energy and material imports, potentially encountering long-lasting damage (as a result of U.S. blockade of Strait of Malacca); other disruptions related to global crisis over Taiwan..	China: Likely largely unaffected.
	Japan: Probable large-scale disruptions due to interruption of energy and material imports (as a result of large-scale conflict in South China Sea and East China Sea); possible disruptions due to deployment of skilled workforce (including engineers) to war effort; additional war-related disruption due to direct military confrontation with China.	Japan: Possible large-scale disruptions due to interruption of possible material imports from China and Taiwan; other disruptions related to global crisis over Taiwan.	Japan: Likely largely unaffected.
	South Korea: Probable large-scale disruptions due to interruption of energy and material imports, possibly encountering long-lasting damage (as a result of large-scale conflict in South China Sea and East China Sea); disruptions due to deployment of skilled workforce (including engineers) to war effort; additional war-related disruption due to direct military confrontation with China.	South Korea: Possible large-scale disruptions due to interruption of possible material imports from China and Taiwan; other disruptions related to global crisis over Taiwan.	South Korea: Likely largely unaffected.
Netherlands semiconductor industry sales/production (ASML/NXP)	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan entirely lost; Sales to China (13,8% in 2022) halted; Sales to Japan (4,8% in 2022) and South Korea (28,6% in 2022) probably affected by energy and material shortages, as well as unsafe aerial and maritime routes.	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan entirely halted; Sales to China (13,8% in 2022) in question; Sales to Japan (4,8% in 2022) and South Korea (28,6% in 2022) may be affected by material shortages.	ASML: Sales to Taiwan (38% in 2022) and production on Taiwan possibly affected; Sales to China (13,8% in 2022); to Japan (4,8% in 2022) and South Korea (28,6% in 2022) likely unaffected.
	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan entirely lost; Sales to China (35,6% in 2022) halted; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) most likely affected by energy and material shortages, as well as unsafe aerial and maritime routes.	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan entirely halted; Sales to China (35,6% in 2022) in question; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) may be affected by material shortages.	NXP: Sales to Taiwan (3,8% in 2022) and production on Taiwan possibly affected; Sales to China (35,6% in 2022) in question; Sales to Japan (6,8% in 2022) and South Korea (5,1% in 2022) may be affected by material shortages.
Manufacturing critical economic inputs beyond semicon (e.g., medicine, med-equip, electronics, batteries)	China: Probable large-scale disruptions due to interruption of energy and material imports (as a result of large-scale conflict in South China Sea and East China Sea and U.S. blockade of Strait of Malacca); disruptions due to deployment of workforce (factory workers) to the front and engineers to the broader war effort; other war-related disruption due to direct military confrontation with Taiwan, the U.S., and Japan.	China: Possible large-scale disruptions due to interruption of energy and material imports (as a result of U.S. blockade of Strait of Malacca); other disruptions related to global crisis over Taiwan.	China: Likely largely unaffected, except if Taiwan's semiconductor production faces production issues. After all, China's undisputed leadership in global manufacturing partially relies on the constant supply of semiconductors from Taiwan (of which China is the main importer).
Access to trade routes	Maritime and aerial routes in the South China Sea and East China Sea most likely almost entirely inaccessible; Disruptions in trade in services with Taiwan due to severed subsea cables; possible disruptions in internet connections to South Korea, Japan, China.	Maritime and aerial routes in and around Taiwan and the Taiwan Strait entirely disrupted; Very stark increase in shipping costs for all goods traveling through the South and East China Sea due to rerouting, possible shortages of container ships, spikes in maritime insurance prices; Trade in services with Taiwan almost entirely disrupted due to severed subsea cables; possible disruptions in internet connections to South Korea, Japan, China.	Maritime and aerial routes in and around Taiwan and the Taiwan Strait on-and-off disrupted; Stark increase in shipping costs for most goods traveling through the South and East China Sea due to rerouting, possible shortages of container ships, spikes in maritime insurance prices; Trade in services with Taiwan impacted (lightly) due to severed subsea cables.

Policy implications and recommendations

Rising tensions around Taiwan present the Netherlands and other European powers with a problem that is almost entirely beyond their control.

Rising tensions around Taiwan present the Netherlands and other European powers with a problem that is almost entirely beyond their control: Neither the Hague, nor Berlin, Paris or London, have the military capacity to credibly deter China's aggression against Taiwan or in East Asia more broadly. The limited defence capabilities that they do have are needed closer to home. Russia's war against Ukraine is going into its third year. A return of Trump to the U.S. Presidency may well weaken NATO's ability to deter aggression against its member-states already in 2025 (perhaps fatally). The Israel-Hamas war may escalate further. Already today, the Yemen-based Houthis continue to disrupt shipping lanes in the Red Sea.[139] Finally, an escalation of tensions within Europe, perhaps between Kosovo and Serbia, could require European military intervention. In the face of their limitations, European navies should protect "maritime approaches [...] to the United States [...] and to the Red Sea and the Gulf; practically this means that the NATO-Euro-Atlantic region comes first, the Western Indian Ocean second, and then everything else."[140] Whether peace and stability in the Taiwan Strait and East Asia can be maintained will be the result of decisions taken in Beijing, most importantly. In addition, the outcome of events will be shaped by Washington, Taipei and to a lesser extent by U.S. allies in the Indo-Pacific, most importantly Japan and the Philippines.

In light of this lack of shaping power, the Netherlands and the EU are advised to take a three-pronged approach to deal with the risk of conflict over Taiwan:

1. Contribute to deterring China through economic means;
2. Expand manufacturing and diversify critical supply chains together with allies and partners; and
3. Invest in critical technologies and indispensable positions in international value chains.

In order to contribute to deterring China from blockading or invading Taiwan, the Netherlands can, together with other technologically-advanced democracies, communicate the economic costs of a military conflict to Beijing. Today, China's dependence on the world for components and end-products for its economy, for instance on semiconductors from Taiwan, South Korea and the U.S., is still consequential. Western leaders and U.S. allies in Asia ought to communicate the enormous costs to China's economy of a Taiwan conflict during high-level meetings with Beijing, in particular in direct conversations with President Xi. This should include a clear message that Taiwan's semiconductor industry cannot be taken over by conquest: production facilities are (highly likely) inoperable if China occupies the island, following a blockade or an invasion. Then, at moments of high tension the EU, its member-states, the U.S., and US-allies in East Asia should (privately) communicate to China their willingness to impose sanctions to

139 These waterways are far more important to EU prosperity than to U.S. prosperity.

140 Hooft, Ellison, and Mertens, 'Maritime Security in a Time of Renewed Interstate Competition', VIII.

deter China from starting a military conflict.[141] Behind closed doors, technologically-advanced democracies should compile "a comprehensive overview of [economic] pressure points [they control] vis-à-vis China and evaluate to what extent each party is willing to use these pressure points to deter China" long before any conflict takes place.[142] In this way, EU economic deterrence can complement US-led military deterrence in East Asia.

In order to be better prepared for the economic shockwaves that would be the result of a conflict, the Netherlands and the EU should expand their manufacturing base with allies and partners, reshore, friendshore or neutral-shore critical supply chains, and invest in critical technologies and an indispensable position in international value chains. Investing upfront in greater control over the production of critical economic inputs, such as strategic materials, semiconductors and medicine, and into maintaining and achieving a technological-edge in value chains, is like taking out a geopolitical insurance policy.[143] Guaranteed access to critical economic inputs will lessen the destructive impact of an international crisis, such as a military conflict over Taiwan and related war-related disruption throughout East Asia. To achieve this, states must make investments in the production and diversification of supply chains for strategic goods long before a crisis takes place. After all, states located on military fault lines (such as Taiwan, South Korea and Japan) may be unable to continue supply due to war-related disruption. In addition, achieving a technological edge in critical technologies, such as ASML's monopoly position in the production of the latest lithography semiconductor manufacturing equipment, helps dissuade rivals from undertaking coercion against the EU. Control over such chokepoints in the global economy can help deter rival states (i.e., China and Russia) from artificially choking-off critical supplies to the EU (during a crisis). Making upfront investments in a stronger Dutch and European position (or in other words a position of strategic indispensability) in strategic value chains contributes to deterrence through economic strength more generally.[144] This can again be leveraged to maintain peace and stability around Taiwan and in East Asia more broadly.

European control over chokepoints in international value chains can deter rival states from using trade as a means of pressure.

China and the U.S. commit large-scale investments to achieve control over critical economic inputs by expanding manufacturing and to maintain/achieve a technological-edge vis-à-vis rivals. Cognisant of geopolitical risks, China is implementing enormous industrial policies to transform its manufacturing sector, already the largest in the world (with 35% of global output), into the most advanced in the world.[145] Beijing's Made in China 2025 Strategy and

141 The European Council tried to deter Russia from "any further aggression", prior to its invasion of Ukraine, by threatening "massive consequences" and "severe cost" that would be imposed "coordinated with partners." European Council, 'European Council Conclusions, 16 December 2021', accessed 3 October 2022, https://www.consilium.europa.eu/en/press/press-releases/2021/12/17/european-council-conclusions-16-december-2021/.

142 Joris Teer and Mattia Bertolini, 'Reaching Breaking Point: The Semiconductor and Critical Raw Material Ecosystem at a Time of Great Power Rivalry' (The Hague Centre For Strategic Studies (HCSS), October 2022), 87–88, https://hcss.nl/report/reaching-breaking-point-semiconductors-critical-raw-materials-great-power-rivalry/.

143 Joris Teer, Abe de Ruijter, and Michel Rademaker, 'Navigating the Great Game of Choke Points: Assessing Geopolitical Risks and Advancing Dutch and European Strategic Indispensability in Digital Value Chains', Report commissioned by MinEconAffairs (The Hague Center for Strategic Studies, March 2024). Teer, Ruijter, and Ouden, 'Blocs and Barriers: Are There Limits to Great Power Decoupling in the next Five Years?'

144 Julian Ringhof and Tobias Gherke, 'Indispensable Leverage: How the EU Can Build Its Technological Edge', 12 September 2023, https://ecfr.eu/article/indispensable-leverage-how-the-eu-can-build-its-technological-edge/. The Government of Japan, in its 2022 National Security Strategy, focuses its economic security policies explicitly on both enhancing Japan's self-reliance as well as making its technologies more "indispensable." 'National Security Strategy of Japan (Provisional Translation)' (Tokyo: Ministry of Foreign Affairs of Japan, December 2022), 30, https://www.cas.go.jp/jp/siryou/221216anzenhoshou/nss-e.pdf.

145 PRC State Council, 'Notice of the State Council on the Publication of "Made in China 2025"' (Translation by the Center for Security and Emerging Technologies (CSET), 2015), https://cset.georgetown.edu/publication/notice-of-the-state-council-on-the-publication-of-made-in-china-2025/. Max J. Zenglein and Jacob Gunter, 'The Party Knows Best: Aligning Economic Actors with China's Strategic Goals | Merics' (Berlin: MERICS, 12 October 2023),

Xi's New Development Philosophy fundamentally aim at expanding domestic production.[146] Washington has enacted increasingly ambitious industrial policies too, such as the Inflation Reduction Act (IRA) and the US Chips and Science Act. These include generous tax benefits for companies in particular in digital (e.g., semiconductor) and green industries to set-up production in the U.S. and enormous investments in Science, Technology, Engineering and Mathematics (STEM)-research.

The EU is worse-positioned to expand production, including of critical economic inputs, especially in energy-intensive industries. Manufacturers in the Netherlands and the EU have been heavily impacted by high energy prices since the weaponisation of energy supplies from Russia in 2022. The reduction of energy production throughout the EU, including the closure of the Groningen gas field, makes the Netherlands and the EU more vulnerable to volatile international energy markets. Energy prices are likely to remain higher rather than lower in the EU for the foreseeable future, especially when compared to the U.S. and in China.[147] This in combination with Not-in-my-backyard (NIMBY) protests, CO2-reduction targets, the nitrogen-crisis, a lack of skilled labour (especially with STEM-backgrounds) and some of the highest wages in the world makes it difficult for the EU to expand manufacturing. Not coincidentally, the CEO of ASML has called the European Chips Act's goal of reshoring 20 percent of global semiconductor manufacturing to the EU by 2030 "totally unrealistic".[148] The EU risks deindustrialisation at a time when a geopolitically volatile world requires reindustrialisation.

Manufacturers in the Netherlands and EU suffer from high energy prices.

Dealing with these disadvantages requires targeted investment in domestic production of those strategic goods we find most important (e.g., medicine and ammunitions), policies to improve the overall business climate, trade deals with countries and blocs that produce strategic goods, as well as new measures to protect the EU market from unfair competition (in manufacturing) from first and foremost China, and the use of public procurement to stimulate production of critical economic inputs and manufacturing in partner instead of rival states.

The Netherlands and the EU are better positioned to expand strengths in critical technologies and, as a result, claim an indispensable position in high-tech value chains. To achieve this, the Netherlands and the EU should, among other things, better align an already world-class basic research system with societal and geopolitical needs, by investing in STEM-education and by better attracting international STEM-talent to come and study in the Netherlands. The government ought to do more to prevent technology leakage to rival states via universities and companies. In addition, the government should strengthen the valorisation chain to help foster industry champions, among other things by deepening ties between civilian and defence industries. Furthermore, the government ought to prioritise strategic regions such as Eindhoven (e.g., for large-scale construction of houses), introduce targeted tax benefits for companies active in critical technologies and expand the financial size of the National Growth

146 As part of this philosophy, Xi calls on the Chinese economy to "accelerate efforts to foster *a new pattern* of development that is focused on *the domestic economy* and features positive interplay between domestic and international economic flows." Xi Jinping, 'Full Text of the Report to the 20th National Congress of the Communist Party of China', 34. Part of this is creating value chains that are "independently controllable, secure and reliable, and strive for important products and supply channels to all have at least one alternative source."

147 The EU has fewer funds available for reindustrialization as a result of the 2022 energy crisis. The cost of energy compensation and diversification away from Russian natural gas supplies is estimated to be above one trillion euros. Jilles van den Beukel and Lucia van Geuns, 'Olie En Gas Tijdens de Energietransitie', November 2023, 21, https://hcss.nl/report/olie-en-gas-tijdens-de-energietransitie/. Bloomberg News, "Europe's $1 Trillion Energy Bill Only Marks Start of the Crisis," *Bloomberg*, December 18, 2022, https://www.bloomberg.com/news/articles/2022-12-18/europe-s-1-trillion-energy-bill-only-marks-start-of-the-crisis.

148 Toby Sterling, 'Europe Will Miss 2030 Chip Market Goal, Says ASML CEO', *Reuters*, 25 January 2024, sec. Technology, https://www.reuters.com/technology/europe-will-miss-2030-chip-market-goal-says-asml-ceo-2024-01-25/.

Fund. Finally, in light of talent shortages in these industries, the government should also seek to foster better conditions to attract high-skilled labour from across the globe for Dutch and EU industries. This can be complemented by an expansion of cooperation on high-tech with technologically-advanced democracies in North America, Europe and East Asia.[149]

The government could expand the National Growth Fund to strengthen the geopolitical resilience of the Netherlands.

[149] These policy recommendations will be presented in more detail in upcoming HCSS research: Teer, Ruijter, and Rademaker, 'Navigating the Great Game of Choke Points: Assessing Geopolitical Risks and Advancing Dutch and European Strategic Indispensability in Digital Value Chains', Chapter 6.

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Annex A. Taiwan Crisis storylines in full

(Outcome of HCSS internal scenario workshop)

Landing a knock-out punch: Sea-land invasion (>180 days) (Crisis Storyline 1), taking place in 2029

Chinese Strategic and Political Goals

By going all in in the first phase of the war, the PRC tries to win a swift victory and present the world with a fait accompli.[150] In this scenario, the military endeavour complements China's broader ambition to assert its dominance over the East and South China Seas, affirming its role as the predominant regional power. Politically, Beijing's intention is twofold: to integrate Taiwan into mainland China and to methodically eradicate any political currents within Taiwan advocating for independence or expressing anti-China sentiments. It showcases the lengths Beijing is willing to go to enforce its one-China principle, meaning the position that the People's Republic of China is the only China in the world, of which Taiwan is an inalienable part. The successful integration of Taiwan's sophisticated semiconductor fabs, including human capital, into China might be a secondary goal (but is highly likely unachievable).[151]

Phase 1: Chinese Build-up (January-February-March 2029)

In the months leading up to Spring 2029, a discernible military and industrial buildup is observed in China's provinces proximate to Taiwan. It is highly likely that a decision has been taken by the Chinese leadership to prepare for war. Alongside a notable mobilisation of reserve troops, calling up conscripts, there is an unprecedented surge in industrial production.[152] This includes the retooling of select civilian manufacturing facilities to support military needs, such as vehicle repair and the large-scale delivery of vehicles and logistics components to the eastern and southern provinces of China. President Xi and his foreign minister have hosted high level closed-door visits from the Russian and North Korean leadership. A clear signal of their strategic intent, a Chinese carrier group permanently positions itself East of Taiwan, projecting power and establishing a maritime stronghold. Concurrently, the rapid filling of blood banks and prioritisation to the military of other medical supplies provide

150 Cliff, *China's Military Power: Assessing Current and Future Capabilities*, 182–83; Cancian, Cancian, and Heginbotham, 'The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan'; Ochmanek et al., 'Inflection Point'; Pettyjohn, Wasser, and Dougherty, 'Dangerous Straits'.

151 Even if an invasion and occupation would succeed and war-related power outages would not have permanently damaged the fabs already. For one, TSMC's fabs rely on the continuous maintenance and software updates by US and European equipment providers. These would likely be suspended. Second, their functioning requires the continued services of highly specialised Taiwanese labour.

152 DiPippo, 'Economic Indicators of Chinese Military Action against Taiwan'.

an unsettling prelude, suggesting preparation for potential large-scale combat casualties.[153] By the end of March the desire, expectation, knowledge, and resources are in place for the PLA to strike. The only step remaining is the decision to initiate an attack, which could come only hours before its execution. In spite of these warning signs, European states remain warry of accepting that a comprehensive attack on Taiwan may be coming, citing the high-risk of sea-land invasions as these have proven to be among the most difficult military operations throughout history.

Yet, military leaders in the West also realize that April and October are the two most auspicious months for the PLA to attack, as in other months the Taiwan Strait is plagued by combinations of gales, plum rains, typhoons, heavy winds, heavy fog, strong currents or low clouds.[154] And April is near. Taiwan has started calling reserves and eligible young men for conscription. On 1 April, smoke is seen emanating from the PRC embassy's in Washington, Tokyo, and Manila, indicating the disposal of strategic documents prior to a possible rapid departure of Chinese diplomats.

Phase 2: The Onslaught (April 2029)

The pre-dawn hours of April 3rd witness a coordinated and devastating Chinese attack. Long-range missile strikes target key U.S. and Taiwanese military locations including Okinawa, Guam, and Taiwan itself.[155] Within the first 48 hours, the skies are dominated by engagements between the US and Japanese, and Chinese air forces, paralleled by a high-stakes naval confrontation in the surrounding seas. On the ground, Taiwan's vital infrastructure, such as its airports and highways, and its air defence systems, are heavily bombarded with long-range missiles and bombers, limiting its ability to mobilise a response. The digital realm isn't spared either; Taiwan's communication infrastructure — from undersea cables and cellular networks to satellites — is comprehensively disrupted by electro-magnetic warfare and subsea and in-space sabotage. Reports confirm that at least one satellite has been taken down by an anti-satellite weapon.[156] Despite potential capability, Elon Musk, who happens to have major business ties to mainland China, refuses to provide Starlink support like he did for Ukraine to maintain Kyiv's civil and military communications, citing his commitment to "neutrality".[157] Both the internet and telephone lines are unavailable.

Simultaneously, cyber warfare intensifies, with China attacking crucial Taiwanese systems and the digital infrastructure of Taiwan's allies, including in Tokyo and Washington.[158] Port facilities in the wider region are targeted, specifically in Manila, Singapore, and Brunei. Operatives on the island attempt targeted assassinations of pivotal Taiwanese government officials,

153 Phil Stewart, 'Russia Moves Blood Supplies near Ukraine, Adding to U.S. Concern, Officials Say | Reuters', Reuters, 29 January 2022, https://www.reuters.com/world/europe/exclusive-russia-moves-blood-supplies-near-ukraine-adding-us-concern-officials-2022-01-28/.

154 Tanner Greer, 'Taiwan Can Win a War With China', *Foreign Policy* (blog), 25 September 2018, https://foreignpolicy.com/2018/09/25/taiwan-can-win-a-war-with-china/.

155 Cliff, *China's Military Power: Assessing Current and Future Capabilities*; Cancian, Cancian, and Heginbotham, 'The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan'; Pettyjohn, Wasser, and Dougherty, 'Dangerous Straits'.

156 Ochmanek et al., 'Inflection Point'; Cancian, Cancian, and Heginbotham, 'The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan'; Pettyjohn, Wasser, and Dougherty, 'Dangerous Straits'.

157 Tara Copp, 'Elon Musk's Refusal to Have Starlink Support Ukraine Attack in Crimea Raises Questions for Pentagon', AP News, 11 September 2023, https://apnews.com/article/spacex-ukraine-starlink-russia-air-force-fde93d9a69d7dbd1326022ecfdbc53c2.

158 Erica D. Lonergan and Grace B. Mueller, 'What Are the Implications of the Cyber Dimension of the China-Taiwan Crisis?', Council on Foreign Relations, accessed 9 February 2023, https://www.cfr.org/blog/what-are-implications-cyber-dimension-china-taiwan-crisis.

succeeding in some cases. As government buildings crumble under Chinese bombardment and the aerial dropping of sea mines choke Taiwan's maritime access, an observer remarks: "China is doing everything it can to make it impossible for the Taiwanese government to manage this attack". By the 96-hour mark, a massive amphibious invasion follows the missile salvos, leading to fierce beachfront battles between the invading Chinese and the defending Taiwanese.[159]

Phase 3: Determined Defiance (Day 4 to day 7)

The aftermath of the initial Chinese offensive witnesses Taiwan adopting a determined asymmetric defence strategy while aggressively seeking more US aid.[160] Meanwhile, the US mobilises the 3rd Marine Division on Okinawa as well as the Army's Immediate Reaction Force to reinforce units in the region.[161] China's overarching objective has become evident: to completely wipe out US capabilities on the first island chain." This aggressive stance puts US-operated military bases in the Philippines squarely in the crosshairs, risking a broader contagion of conflict. Even US-bases further afield, namely in South Korea, support the US war effort, making the maritime routes between the Korean Peninsula and Taiwan unsafe. As part of a wider strategy to reduce Chinese advantages in the region, US forces launch bombing campaigns against China's man-made islands in the South China Sea, operating from bases in Australia and Guam.[162] Japan, sensing the regional implications, deploys its available naval forces to defend its territories and interests.[163] Tokyo has also recalled reserve personnel, while South Korea has called for conscription ahead of the normal cycle out of fear of North Korean opportunism. The beaches of Taiwan turn into prolonged combat zones, remaining bitterly contested.

Phase 4: Prolonged Siege and Adaptive Resilience (Day 7 – Six Months)

Despite their overwhelming initial offensive, the Chinese amphibious invasion encounters stiff resistance and is eventually repelled.[164] However, this setback doesn't defeat China's resolve. Taiwan finds itself under an unyielding siege as the Chinese military subjects the island to incessant bombardment from the air and sea, including advanced drone swarms saturating the skies. Dual-use targets –those with both civilian and military applications– along with shipyards and infrastructure bearing industrial significance, are methodically targeted and destroyed by the People's Liberation Army in order to ensure that Taiwan cannot rebuild its forces. Semiconductor production is halted, in order to provide energy to Taiwan's suffering population instead. Anything that holds strategic value to Taiwan's defence and economy, including energy infrastructure, is systematically razed.

159 Cliff, *China's Military Power: Assessing Current and Future Capabilities*; Cancian, Cancian, and Heginbotham, 'The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan'.

160 Blackwill and Zelikow, 'Three Scenarios for a Military Conflict Over Taiwan'; 'Taiwan National Defense Report 2021'.

161 Cliff, *China's Military Power: Assessing Current and Future Capabilities*.

162 Ochmanek et al., 'Inflection Point'; Pettyjohn, Wasser, and Dougherty, 'Dangerous Straits'.

163 Smith, *Japan Rearmed: The Politics of Military Power*.

164 Cliff, *China's Military Power: Assessing Current and Future Capabilities*; Cancian, Cancian, and Heginbotham, 'The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan'; Ochmanek et al., 'Inflection Point'; Pettyjohn, Wasser, and Dougherty, 'Dangerous Straits'.

Yet, amid this widespread devastation, sparks of resilience emerge. Over the subsequent months, Taiwan and its allies manage to repair some of the destroyed subsea cables, gradually restoring vital communication links. Furthermore, the low Earth orbit (LEO) satellite mesh network, though initially disrupted, proves its robustness. The Chinese find it challenging to sustain long-term jamming against this intricate web of satellites. Consequently, Taiwan begins to re-establish some semblance of digital communication, offering a glimmer of hope in the beleaguered island's darkened horizon. On day-10, the US Navy moves against China further afield as it blockades the Malacca Strait for all Chinese-flagged vessels, as well as ships under other flags suspected of aiding China's war effort. The US aims to choke-off the supply of oil and Liquified Natural Gas (LNG) to China, in order to definitively cripple the PLA's fighting capability. Frustrated by Taiwan's continued resistance and in spite of the essential role that Taiwan's semiconductor fabs play in China's economy and its production of electronics, the PLAAF and the PLARF strike at some front-end production facilities. It does not make a lot of difference, as the long-term power outages the invasion caused had already badly damaged the fabs.

Overview of disruption: Semiconductor production in East Asia, Chinese manufacturing and waterways in the Indo-Pacific during a PLA invasion

In this scenario, energy-intensive production on Taiwan and trade over sea and through air with Taiwan experiences extreme disruptions. In the initial stages of the crisis storyline (Snapshot Moment 1: Day 3), Taiwan confronts extreme disruptions across multiple fronts. Aerial domains, inclusive of passenger flights, freight, and military resupply, are completely disrupted. Similarly, maritime supplies, encompassing weapons, fuel, industrial assets, and food, are also completely inaccessible. Subsea communication cables and geosynchronous orbits are completely disrupted, while mesh satellite constellations in low earth orbit face significant interferences, but still function sporadically. (Emergency) communication with the rest of the world becomes impossible for the majority of the island. By Snapshot Moment 2 (Day 90), there is a discernible yet moderate alleviation in these constraints. Satellite and subsea-cable disruptions are slowly alleviating, allowing for greater communication with the outside world. However, considerable challenges persist across domains, as food and energy supplies are incredibly scarce in Taiwan. Maritime and aerial points of access remain very severely disrupted, due to the large-scale mining of waterways to and around Taiwan (See Table 6 and Table 9 for legend). Semiconductor production is halted, in order to provide energy to Taiwan's suffering population instead. Disruption is not contained to Taiwan and its surrounding waters. Sealines throughout the East and South-China Sea are contested, as the US navy and Japan's self-defence forces remain engaged in sporadic confrontation with China's People's Liberation Army Navy. Maritime trade with China has become largely impossible due to the fighting and mining, but the East Coast of Japan and Northeast coast of South Korea are still by-and-large accessible – but judged to be too dangerous by many crews to sail to.

Table 6 PLA invasion (crisis storyline 1) impact on approaches and points of entry of Taiwan

Taiwan's approaches and points of entry		Impact on access to Taiwan's approaches and points of entry	
		Snapshot 1 Day 3	Snapshot 2 Day 90
Aerial	Passenger flights	Very high	High
	Aerial Freight		
	Military re-supply		
Internet traffic	Subsea-Cables	Very high	High
	Civilian and military: Low Earth Orbit (LEO) Satellite Constellation	High	Limited
Maritime	Fuel (oil, gas, coal)	Very high	High
	Industrial goods	Very high	Very high
	Food	Very high	High
	Weapons and ammunitions	Very high	Very high

Strangling the porcupine: Semi-permanent blockade (Crisis storyline 2), taking place in 2026

Chinese Strategic and Political Goals

This evolution from relatively minor disruptions to a near-total blockade over the first weeks reveals China's strategic aim to coerce Taiwan into reunification talks while critically weakening its resistance and operational capacity. Chinese ends in this scenario remain relatively similar to those for a full-scale invasion, though the approach is far more risk averse. The political goal remains to force Taiwan into a 'reunification' with the mainland. The strategic aim is to do so more peacefully than throughout a sea-land invasion, putting extra efforts into 1) not inviting external (i.e., American) intervention and 2) avoiding causing catastrophic damage to Taiwan itself. Rather than a 'knock-out punch', the main effort is to slowly strangle the island through a semi-permanent blockade that gradually increases in pressure to undermine the political authorities of Taiwan and sap the strength of the armed forces (see Figure 5 and the two full page maps below). By opting for a blockade, the PLA does not have to deal directly with Taiwan and US "porcupine strategy",[165] meaning the preparation of Taiwan's military for drawn-out asymmetric warfare and high-intensity fighting on the beaches with ever larger amounts of US-provided weaponry.

Phase 1: Increasing political tension – March 2026

For weeks, news in Taiwan has been dominated by a planned visit by a large U.S. congressional delegation by representative of both parties to Taipei. Even though China's censors initially decide not to pay attention to the visit in state media, three days before the visit takes place CGTN and the Global Times lead with scathing editorials on US "gross provocations". Vigorously opposed by Beijing as 'provocative' and 'irresponsible', China's authorities have prepared large military demonstrations as well as high-level consultations with American diplomatic representatives. The Chinese president has threatened 'serious reprisals' if any outside powers incentivise Taipei to take the 'dangerous path' of 'furthering Taiwan independence'.[166] The visit is not Xi's only grievance, as he cites the ever growing supplies of US lethal arms including drones to Taiwan, in order to bolster Taipei's asymmetric capability to resist Chinese aggression, as well as a trip by a high-ranking Taiwanese government official to the US in the previous year. One day before the visit, medical supplies including blood, medicine and emergency care equipment is rushed to China's coastal province facing Taiwan.

Phase 2: The visit and China's response– April 2026

On the morning of 5 April, the plane carrying 30 U.S. representatives lands at Taipei's Taoyuan International Airport. Within a few hours, China issues a NOTAM (Notice to Air Missions) that it is closing the airspace around Taiwan. Simultaneously, warnings are sent to vessels in the

165 Raymond Kuo, "The Counter-Intuitive Sensibility of Taiwan's New Defense Strategy," War on the Rocks, December 6, 2021, https://warontherocks.com/2021/12/the-counter-intuitive-sensibility-of-taiwans-new-defense-strategy/.

166 Haenle and Sher, 'How Pelosi's Taiwan Visit Has Set a New Status Quo for U.S-China Tensions'.

region that any ships coming within a 100-nautical mile 'quarantine zone' will be boarded and inspected for 'suspicious materials'.[167]

Passenger and freight flights inbound to Taipei are quickly diverted to other regional airports, while several cargo planes are tailed by PLA Air Force jets and forced to change their course. On 6 April, while the Congressional delegation meets with Taiwan's president, the PLA Navy boards and seizes the cargo of an inbound Liberian-flagged ship, announcing it had found 'illicit weapons onboard'. The fate of the crew is unknown.

After the third day of the U.S. visit, special permission is given by the PLA Air Force to the chartered flight to allow the American representatives to leave the island for Tokyo. It is assumed, both in Washington and Taipei, that this spasm of Chinese military action will cease.

Phase 3: The PLA is here to stay – April-May 2026

By 9 April, some Chinese military vessels remain in place while new ones are rotated in. The NOTAM-warning remains in effect. Pilots report a constant harassment by the Chinese air and naval forces, including a number of dangerous near collisions at sea. The Chinese Ministry of Defence announces that these 'exercises' have been extended due to the concerns surrounding incoming 'shipments of military materiel that threaten Chinese interests'.[168] Taipei has responded by calling up all reserve forces and calls for conscription ahead of the normal cycle.

By day 15 of the quarantine, it is clear that something is very different than previous episodes, like the one following the visit of Speaker Pelosi in 2022. The messaging from the Chinese leadership has shifted, stating that all shipments from the air and sea will be subject to a full customs check by Chinese officials. In practice, this appears to be the seizure of near all goods to the island, save food. In high-level negotiations, Beijing has made it clear to Washington it is willing to continue food supply, provided that the US does not intervene militarily to try and break the blockade. By this period, the Taiwanese government has had to activate emergency reserves of gas and oil to maintain vital processes such as medical care around the island. Space-based communication and information services appear systematically disrupted.[169] The US Seventh Fleet semi-circles China's blockade on the Eastern, Northern and Southern side of Taiwan, but does not intervene. As a result, unlike the waters around Taiwan, maritime routes in the broader East and South China Seas as well as the Pacific remain largely unaffected.

167 Raul (Pete) Pedrozo, 'Russia-Ukraine War at Sea: Naval Blockades, Visit and Search, and Targeting War-Sustaining Objects', Lieber Institute West Point, 25 August 2023, https://lieber.westpoint.edu/russia-ukraine-war-naval-blockades-visit-search-targeting-war-sustaining-objects/.

168 Charles Hutzler, 'China's Drills Around Taiwan Give Hint About Its Strategy', WSJ, 4 August 2022, https://www.wsj.com/articles/chinas-drills-around-taiwan-give-hint-about-its-strategy-11659633265; M. Taylor Fravel, 'China's New Military Strategy: "Winning Informationized Local Wars"', *China Brief* XV, no. 13 (2 July 2015): 3–7; Cunningham, 'The Maritime Rung on the Escalation Ladder'.

169 Eric Hagt and Matthew Durnin, 'Space, China's Tactical Frontier', *Journal of Strategic Studies* 34, no. 5 (October 2011): 733–61, https://doi.org/10.1080/01402390.2011.610660.

Phase 4: China pushes for talks and food and fuel no longer reaches Taiwan - May 2026

On 7 May, the news flashing across the screen in Taiwan and around the world is that the Chinese president has demanded a new round of cross-strait talks to 'resolve the Taiwan issue'. It is understood by most that this is a demand for 'reunification talks'. It coincides with a new mission for PLA forces to interdict food shipments to the island.

Reserves of fuel and perishable supplies on the island have reached critically low levels, with some areas being sustained by quietly delivered humanitarian aid from regional states. Industrial processes have long grinded to a halt, as Taiwan's government prioritizes the use of fuel for vital sectors. Officials on the island fear that if the blockade continues for two more months, food already rationed will finally run out and vital sectors such as hospitals will no longer be able to perform their functions.[170] Taipei decides to prioritise vital sectors over chip fabrication plants, leading TSMC's major fabs to run out of the required materials and fuels for its production. Engineers worry that even when energy supply is restored, definitive damage to the fabs is done, shutting them off indefinitely. The blockade, including the NOTAM, had already made it impossible to ship out semiconductors anyway.

The U.S. Secretary of State has held emergency meetings with the leaders of Japan and the Philippines, with talks reportedly centered on how to possibly force open a pathway for supplies and aide to Taiwan. US naval deployments in the Persian Gulf, the Indian Ocean and in the South-China Sea are partially moved to the Strait of Malacca, to block all Chinese-flagged vessels including those that deliver oil and LNG to the PRC. Meanwhile, in Taiwan a protest movement calling on authorities to negotiate a 'new arrangement' with Beijing has begun to grow.

Crisis storyline summary and overview of disruption: Semiconductor production in East Asia, Chinese manufacturing and waterways in the Indo-Pacific during a semi-permanent blockade

In the event of a Chinese blockade of Taiwan, the island's lines of communication are first partially and then almost entirely blocked (see Table 7 for a summary and Table 9 for a legend). As China initiates a semi-permanent blockade of Taiwan (Snapshot 1: Day 2), the initial impact on aerial access is moderate, with many passenger and freight flights disrupted and military resupply efforts unannounced. Internet traffic remains largely unfazed, with only minor limitations affecting subsea cables. Maritime transport begins to encounter medium disruptions, as especially weapon and ammunition shipments are halted due to China Coast Guard custom checks. Food supplies are for the most part allowed to pass unaffected. Over the span of 30 days, these actions are expanded upon: aerial routes to Taiwan are blocked, as China issues an official NOTAM. Internet connectivity suffers greatly as both subsea cables and satellite communications encounter structural damage and interference by the PLA. Maritime routes experience very high levels of disruption, severely restricting the inflow of crucial resources like fuel, industrial goods, weapon and ammunitions, and also food, which become highly restricted as the blockade continues (Snapshot 2: day 30). Taipei decides to prioritise vital sectors over chip fabrication plants, leading TSMC's major fabs to run out of the required

[170] Lonnie D. Henley, 'Beyond the First Battle: Overcoming a Protracted Blockade of Taiwan', China Maritime Report (Providence, RI: US Naval War College, March 2023), https://digital-commons.usnwc.edu/cmsi-maritime-reports/26/.

materials and fuels for its production. Engineers worry that even when energy supply is restored, definitive damage to the fabs is done, shutting them off indefinitely. The blockade, including the NOTAM, had already made it impossible to ship out semiconductors anyway.

This evolution from relatively minor disruptions to a near-total blockade over the first weeks reveals China's strategic aim to coerce Taiwan into reunification talks while critically weakening its resistance and operational capacity. Yet, as China does not enter direct conflict with the US and Japan, maritime traffic encounters delays -is forced to reroute (avoiding the straits around Taiwan)- but is not entirely impossible between the EU and East Asia. Likewise, the U.S. blockade against Chinese ships in Malacca leads to shipping delays for non-Chinese flagged vessels too. The costs are still high: since the start of the conflict shipping times, total container ship shortages and maritime insurance costs have spiked.

Table 7 Impact on Taiwan's approaches and points of entry in the case of a semi-permanent blockade

Taiwan's approaches and points of entry		Impact on access to Taiwan's approaches and points of entry	
		Snapshot 1 Day 2	Snapshot 2 Day 30
Aerial	Passenger flights	Medium	High
	Aerial Freight		
	Military re-supply		
Internet traffic	Subsea-Cables	Limited	High
	Civilian and military: Low Earth Orbit (LEO) Satellite Constellation	Unaffected	Limited
Maritime	Fuel (oil, gas, coal)	Medium	Very high
	Industrial goods	Medium	Very high
	Food	Very limited	High
	Weapons and ammunitions	Very high	Very high

Boiling the frog: an on-and-off blockade (Crisis storyline 3)

Chinese Strategic and Political Goals

Chinese ends in this scenario are exactly similar to those for a near permanent blockade, though the approach is even more risk averse. The political goal remains to force Taiwan into a 'peaceful reunification' with Mainland China. The strategic aim is to do so without 1) inviting external (i.e., American and Japanese) intervention and 2) avoid causing catastrophic damage to Taiwan itself. Rather than strangling the island, the aim is to simply make political and economic life increasingly difficult so as to make forcing reunification negotiations simpler or to lead to a change in political leadership in Taipei.[171] The slow boiling of the frog ensures that Taiwan remains under a cloud of indefinite uncertainty, leaving business and government leaders in the West to reconsider their long-term investment commitments to the island. The lead up period is identical, as similar political triggers can cause different outcomes. China, however, makes careful efforts to not provoke Taiwan or the U.S. into actual conflict, by opting to merely 'boil the frog'.

Phase 1: Increasing political tension – March 2025

For weeks, news in Taiwan has been dominated by a planned visit by a large U.S. congressional delegation by representative of both parties to Taipei.[172] Even though China's censors initially decide not to broadcast the visit in state media, three days before it takes place CGTN and the Global Times lead with scathing editorials on US "gross provocations". Vigorously opposed by Beijing as 'provocative' and 'irresponsible', China's authorities have prepared large military demonstrations as well as high-level consultations with the American representatives. The Chinese president has threatened 'serious reprisals' if any outside powers incentivise Taipei to take the 'dangerous path' of 'furthering Taiwan independence'.

Phase 2: The visit and China's response– April 2025

On the morning of 5 April, the plane carrying 30 U.S. representatives lands at Taipei's Taoyuan International Airport. When the delegation leaves four days later, China starts large-scale military exercises around Taiwan. Whereas the People's Liberation Army Navy contained the live-fire-drill exercises in 2022 and 2023 to specific zones around Taiwan, in April 2025 Beijing remains ambiguous about where the exercise ends.[173] Simultaneously, warnings are set to vessels in the region that any ships coming within a 100-nautical mile 'quarantine zone' will be boarded and inspected for 'suspicious materials'. The majority of passenger flights inbound to Taipei are quickly diverted to other regional airports, while several cargo planes are tailed by PLA Air Force jets and forced to change their course. Cargo ships, unsure whether it is safe to move in-between China's live-fire-drills, divert to nearby ports in Japan and the Philippines. It is assumed, both in Washington and Taipei, that this spasm of Chinese military action will cease.

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171 Peter Kornbluh and George Gelzer, 'Cuba Embargoed: U.S. Trade Sanctions Turn Sixty', George Washington University National Security Archive, 2 February 2022, https://nsarchive.gwu.edu/briefing-book/cuba/2022-02-02/cuba-embargoed-us-trade-sanctions-turn-sixty; William M. LeoGrande, "A Policy Long Past Its Expiration Date: US Economic Sanctions Against Cuba," *Social Research* 82, no. 4 (2015): 939–66; Fiona S. Cunningham, "The Maritime Rung on the Escalation Ladder: Naval Blockades in a US-China Conflict," *Security Studies* 29, no. 4 (7 August 2020): 730–68, https://doi.org/10.1080/09636412.2020.1811462.

172 Haenle and Sher, 'How Pelosi's Taiwan Visit Has Set a New Status Quo for U.S-China Tensions'.

173 Hutzler, 'China's Drills Around Taiwan Give Hint About Its Strategy'.

Phase 3: The PLA pulls back...mostly – 12 April to 18 April

By 12 April, almost all of the Chinese ships have left their positions. Passenger flights and freight deliveries resume under normal circumstances, though not without a certain tension.

Phase 4: The noose tightens again, and again...- 18 April to 2 May

On the morning of 18 April, the event surrounding the U.S. congressional delegation seem to have been repeated. This time, the Ministry of Defence does go one step further: it issues an official NOTAM (Notice to Air Missions) that it is closing the airspace around Taiwan. Chinese Coast Guard vessels and maritime militia start conducting 'customs' checks, ostensibly out to block the supply of weapons to Taiwan but the PLA also occasionally seizes fuel supplies. There is little communication from Beijing, other than an announcement of routine exercises coinciding with an increased 'law enforcement presence' in the area. Due to the uncertainty around Beijing's intentions, China coast guard use of a water cannon to chase away supply vessels from the Philippines and a stray-missile hitting a Japanese oil tanker, more and more freight ships refuse to sail through China's exercises.[174] Passenger flights are again cancelled en masse. Internet bandwidth slows on Taiwan, leading to speculation that several communication cables may have been cut. Emergency communication via satellites remains unaffected. The US National Security Council starts discussing the option to initiate an airlift to Taiwan, from Japan, on April 20. The airlift is scheduled for May 3.

By 20 April, a Chinese Ministry of Commerce spokesperson announces an embargo of Taiwanese goods from the mainland and hints at possible sanctions against states that deliver 'certain categories of goods' to the island. The justification: Taipei's authorities are 'acting in accordance with foreign powers to pursue independence from China'. In a subsequent Q&A session at the Ministry of Foreign Affairs, the spokesperson notes that unless more permanent solutions to these 'gross provocations' can be found in closer cross-strait ties, it is unlikely that Beijing can allow uninterrupted maritime and aerial traffic to Taiwan. On May 2 China eases the quarantine once again, yet no one is still convinced that the People's Liberation Army Navy will be gone for good.

Snapshots of Taiwan's accessibility during a naval quarantine

China's imposition of an on-and-off blockade causes fluctuating disruptions, aimed at pressuring Taiwan's government into reunification talks (see Table 8 for a summary and Table 9 for a legend). Initially, this has a limited effect on Taiwan's aerial lines of communication, as only some passenger flights are cancelled. Maritime routes for fuel, industrial goods, and food remain open, despite a high level of disruption in weapons and ammunition supplies (Snapshot 1: Day 2). Internet connectivity remains unaffected, with no impact on subsea cables or satellite communications. The exercise ends after seven days, as almost all PLAN vessels leave the areas around Taiwan for six days. However, at the two week mark (Snapshot 2: day 15), the PLAN is back and the situation is more severe than during the first round of exercises: aerial disruptions become more serious, with increased military activity leading to more frequent diversions and cancellations of flights. The maritime transport of essential commodities like fuel, industrial goods, and food, which were initially unaffected, now face medium

[174] Henley, 'Beyond the First Battle: Overcoming a Protracted Blockade of Taiwan'; Pedrozo, 'Russia-Ukraine War at Sea'; Cunningham, 'The Maritime Rung on the Escalation Ladder'.

disruptions due to an increasing number of 'customs' checks including arbitrary seizures, creating problems for Taiwan's economy and society. Meanwhile, internet traffic starts to show strain, with limited -but growing- damage to subsea cables, signaling an expansion in the scope of the blockade to all lines of communication. Emergency communication remains intact, as satellite communication issues are limited. Electricity is prioritised for vital sectors. TSMC engineers worry that even when energy supply is restored, permanent damage to the fabs has been done, shutting them off indefinitely (see Table 5 for a full overview of probable disruption during an on-and-off blockade).

The intermittent easing of restrictions, however, ensures that outright conflict between Taiwan and its quasi-allies and China is avoided. Yet, the slow boiling of the frog ensures that Taiwan remains under a cloud of indefinite uncertainty, leaving business and government leaders in the West to reconsider their long-term investment commitments to the island.

Table 8. Impact on access to Taiwan's approaches and points of entry of a PLA on-and-off blockade

Taiwan's approaches and points of entry		Impact on access to Taiwan's approaches and points of entry	
		Snapshot 1 Day 2	Snapshot 2 Day 15
Aerial	Passenger flights	Limited	Medium
	Aerial Freight		
	Military re-supply		
Internet traffic	Subsea-Cables	None	Limited
	Civilian and military: Low Earth Orbit (LEO) Satellite Constellation	None	Very limited
Maritime	Fuel (oil, gas, coal)	Unaffected	Medium
	Industrial goods	Unaffected	Medium
	Food	Unaffected	Medium
	Weapons and ammunitions	High	Very high

Table 9. Legend Taiwan crisis storyline impact assessment tables

Taiwan's lines of communication and traffic means		Level of disruption for Taiwan's lines of communication					
		None	**Very limited**	**Limited**	**Medium**	**High**	**Very high**
Aerial	*Passenger flights*	Unaffected	Several passenger flights cancelled; freight flights unaffected; no US-airlift needed	Some passenger, but no freight flights cancelled; no US-airlift needed	Majority of passenger and some freight flights cancelled; US military airlift for essential goods under consideration/ initiated	All passenger and freight flights cancelled; Haphazard success of resupply by airlift US military	All passenger and freight flights cancelled; No airlift to resupply by US military possible
	Aerial Freight						
	Military re-supply (airlift)						
Communications (e.g., internet)	*Subsea-Cables (98% of communications)*	Unaffected	One subsea cable severed; no disruption to civil and military communication.	Several subsea cables severed; minor disruption to civilian communications (less bandwidth)	Half of sub-sea cables severed; disruption to civilian communications	Majority of sub-sea cables severed; civil communication largely disrupted	All subsea-cables severed; civil communications entirely disrupted
	Satellites (2%> of communications): Civilian and military Low Earth Orbit (LEO) Satellite Constellation	Unaffected	Emergency communication barely disrupted; LEO constellation hit by minor cyber attack and occasional blinding of satellites with laser	Emergency communications sporadically unavailable, but still possible; Major cyber attack on LEO constellation	Emergency communications severely disrupted on Taiwan; Major cyber attack on LEO constellation as well as use of one anti-satellite weapon	Emergency communications severely disrupted on and in the seas around Taiwan; Major and constant cyber-attacks against LEO constellation and use of several anti-satellite weapons	Emergency communications' entirely disrupted on Taiwan and severely disrupted from Southern-Japan to Northern-Philippines; Major and constant cyber-attacks against LEO constellation and regular use of anti-satellite weapons
Maritime	*Fuel (oil, gas, coal)*	Unaffected	Very minor disruption in supplies of fossil fuels.	Minor disruptions to fossil fuel supplies; periodic rationing needed.	Substantial disruptions to oil, gas and coal supplies. Due to military prioritisation, there are substantial shortages for civilians and business entities.	Minor amounts of fossil fuels reach Taiwan; extreme shortages for non-military ends.	No fossil fuels can reach Taiwan; disastrous impact on energy supplies.
	Industrial goods	Unaffected	Very minor disruption to industrial goods. supplies	Minor disruption to the supply of specific industrial goods, primarily those that are perceived as 'strategic' or 'dual-use'.	Substantial disruptions to industrial goods supplies. Major disruptions to goods deemed 'strategic' or 'dual-use.	Highly significant disruption to all industrial goods. No 'strategic' or 'dual-use' goods able to reach Taiwan.	No industrial goods can reach Taiwan.
	Food	Unaffected	Very minor disruption in food supplies	Limited disruption to food supplies. Minor implications due to domestic production.	Substantial disruptions to food supplies. Civilian rationing needed, as military is prioritised.	Very significant food supply disruptions. Substantial disruptions.	International food supplies completely halted. Highly severe shortages.
	Weapons and ammunitions	Unaffected	Very minor disruption in deliveries of weapons and ammunitions	Weapon and ammunition deliveries to Taiwan checked by Chinese customs; minor disruptions in supply.	All weapon and ammunition deliveries checked by China. Regular disruptions to supply.	All military deliveries checked, and a vast majority disallowed by China. Highly limited amount of weapons and ammunitions able to reach Taiwan.	Weapons and ammunitions completely unable to reach Taiwan.

Appendix B. **Expert interviews, attended round tables, participants of the internal scenario workshop**

The authors express their gratitude to the individuals that provided input during expert interviews, some of whom are mentioned below:

1. Zsuzsa Ferenczy, Assistant Professor, Dong Hwa University
2. Sense Hofstede, Research Fellow at the Clingendael China Centre
3. Linda Lengowski, Vice-President Strategy, Geopolitics and ESG at NXP Semiconductors
4. June Park, Political Economist and Schmidt Futures Fellow
5. Rob de Wijk, Professor of International Relations at Leiden University and Founder at The Hague Centre for Strategic Studies

In addition, during a 2023 study trip to Taipei Han ten Broeke and Joris Teer spoke to Taiwan scholars, journalists and policy-makers on the topics of this report. Gratitude goes out to them as well.

Finally, the report was informed by round table discussions that (one of) the author(s) attended. These include:

1. Round Table discussion with Chris Miller, author of Chip War, at The Hague Centre for Strategic Studies, 2023 June
2. Chung-Hua Institution for Economic Research (CIER) and HCSS joint roundtable on maritime and economic security in Taipei, 2023 June
3. Round Table discussion with ASML CEO Peter Wennink at the European Parliament, Brussels, organised by Renew Europe Member of the European Parliament (MEP), Bart Groothuis, 2023 September
4. Round Table discussion with semiconductor executives in Munich, organised by DHL on the sidelines of SEMICON Europe, 2023 November

The internal scenario workshop was attended by the authors, Joris Teer, Davis Ellison and Abe de Ruijter.

The Hague Centre
for Strategic Studies

HCSS
Lange Voorhout 1
2514 EA The Hague

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