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► **To cite this version:**

Gilles Paché. DO TENSIONS IN THE SOUTH CHINA SEA HERALD THE COLLAPSE OF GLOBAL SUPPLY CHAINS?. *International Journal of Managing Value and Supply Chains*, 2024, 15 (3), pp.1-12. 10.5121/ijmvsc.2024.15301 . hal-04683314

HAL Id: hal-04683314

<https://hal.science/hal-04683314>

Submitted on 2 Sep 2024

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DO TENSIONS IN THE SOUTH CHINA SEA HERALD THE COLLAPSE OF GLOBAL SUPPLY CHAINS?

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ABSTRACT

It is now widely recognized that geopolitical tensions disrupt global supply chains, complicating trade flows and increasing the risk associated with logistics operations. The South China Sea, a strategic and disputed region of the world, is a perfect illustration of the stakes involved in these disruptions. Situated between several Asian countries, the region is crucial to world trade, but is subject to territorial conflicts, notably between China and Taiwan. Its increasing militarization and abundance of natural resources exacerbate geopolitical tensions, given that the South China Sea is vital for the transportation of goods, linking Asian, European and American markets. My speculative paper looks at the possible collapse of certain global value chains under the pressure of geopolitical tensions, leading to the emergence of a logistically multipolar planet.

KEYWORDS

Economic history, Geopolitics, Global supply chains, Logistical disruptions, South China Sea, Territorial disputes

1. INTRODUCTION

As the war in Ukraine reminded us [6, 11, 25], armed conflicts profoundly disrupt procurement systems when they lead to a suspension of production activity (factories bombed or shut down), or an inability to export goods (blocking of ports and communication routes, destruction of infrastructure). Disruptions to global supply chains caused by conflict can also occur with a hysteresis effect, or indirectly, for example when economic sanctions are imposed against one of the belligerents. The European Union, for example, makes regular use of “restrictive measures,” the aim of which is to influence the behavior of belligerents, but which can also have consequences for its own economic stakeholders. Whether direct or indirect, supply chain disruptions can affect the very possibility of obtaining supplies, as well as supply conditions (lead times, prices, quantities). The question is how all stakeholders react in a context of geopolitical tensions, of which armed conflict is the most extreme manifestation.

On the state side, geopolitical tensions raise the question of national sovereignty (economic, industrial, technological, etc.), and can give rise to proactive strategies to develop production capacity, on a national or regional scale. An interesting example is the CHIPS Acts initiated by the United States and the European Union, designed to strengthen their self-sufficiency in the semiconductor sector, on a national (United States) or regional (European Union) scale, while isolating China in the electronics industry [14]. The disruptions to global supply chains are thus prompting governments to question their multiple dependencies in the globalization process, and to identify goods considered too strategic –or essential– to risk shortages and/or sudden cost increases [2]. As for companies, geopolitical tensions force them to reorient their own supply chains, interrupted or disrupted, by diversifying and/or relocating supplies [3], or even their production, as is the case with the Rossignol company, which has relocated the design and manufacture of skis from Taiwan to the French Alps, where the 2030 Winter Olympics will be held.

The major difficulty is that global supply chains do not operate in a “fluent space,” without any roughness or friction, in which it is easy to foresee the occurrence of low-intensity geopolitical tensions. It is now accepted that certain areas are particularly strategic, but also vulnerable, whether for topographical, political, climatic or even criminal reasons. Such is the case of the South China Sea, a stretch of sea that is hotly contested by several countries, and a major transit route for international trade. China plays a central role in this area, particularly in its desire to control the flows passing through it, notably to guarantee its energy security. However, China does not recognize the Montego Bay Convention of December 1982, according to which a coastal state holds the rights to exploit the resources present only in the zone between 24 and 200 nautical miles from its baseline [30]. The risk of maritime conflict between neighboring countries is thus permanent, with the epicenter of tension lying in relations between mainland China and Taiwan.

In short, geopolitics plays a central –yet under-explored– role in supply chain management, directly influencing the way product flows are organized on a global scale. Political decisions, international alliances and armed conflicts sometimes force changes to trade routes, directly affecting delivery times and costs. Geopolitical tensions can also generate economic sanctions, blocking access to certain markets or making certain logistical routes less secure. Finally, geopolitics affects logistical infrastructures such as ports and airports, whose efficiency can be compromised in the event of major political instability. Provocatively, I suggest the possibility of the eventual *general collapse* of the global supply chains that have resulted from the triumph of neo-liberal dogma for over 40 years, and a possible contraction of trade in confined geographical areas. The case of the South China Sea is an excellent illustration of this potential occurrence, insofar as it is historically at the heart of the globalization process, but also of struggles for influence that are likely to intensify in the coming years.

This paper is speculative in nature, insofar as it deals with a topic beyond the reach of experience. It is impossible to assess the real logistical effects of an armed conflict between China and the United States, for example, in the event of a Chinese invasion of Taiwan. Speculation only allows us to imagine a hypothetical future situation [36]. It is indispensable for a better understanding of business contexts but is often criticized by researchers for two main reasons. On the one hand, a speculative approach attempts to project an inherently uncertain future; sudden changes and unforeseen events, such as natural disasters or technological revolutions, can render speculation obsolete. On the other hand, a speculative approach must consider many variables and their interactions, which is often too complex to model accurately, even with the help of artificial intelligence. Despite these criticisms, the speculative exercise has the advantage of asking key questions to shed light on issues that are sometimes underestimated. Such is the case in a region of the world at the heart of geopolitical tensions, the exacerbation of which could call into question several decades of globalization.

The speculative –and not deductive– nature of the paper leads to the choice of an unconventional organization of my argumentation. Rather than successively presenting a literature review, a series of proposals and the results of a field study, several works are presented throughout the text using the suggested framework. These works are considered relevant insofar as the authors behind them offer in-depth analyses of various aspects of geopolitical tensions in the South China Sea, but without linking them to the threat to global supply chains. It is specifically this issue that is addressed in the paper, which is organized as follows. In the second section, the geopolitical dimensions are identified with reference to history, to avoid the common misconception that the South China Sea is a recent issue, no more than a few decades old. On the contrary, this region has for centuries been the scene of struggles for influence to control numerous resources. Furthermore, as the third section shows, it is indisputable that the neo-liberal order that emerged in the 1980s is profoundly transforming the rules of the game, insofar as a significant number of supply chains depend on regular transit via the South China Sea, with any interruption impacting hundreds of industries worldwide. The

fourth section concludes with a discussion of the importance of taking geopolitical dimensions into account to better understand logistical issues in a world that is more unstable, complex and turbulent than ever.

2. FROM HISTORY TO GEOPOLITICS

The South China Sea is a vast maritime expanse of some 3.5 million square kilometers, located between mainland China, Taiwan, the Philippines, Malaysia, Brunei, Indonesia and Vietnam (see Figure 1). Its history is marked by a succession of events, geopolitical struggles and violent territorial claims. As Tønnesson [33] points out, the history of the South China Sea is indeed a veritable *saga of fluctuating rivalries between great superpowers*, insofar as the geographical zone is at the crossroads of civilizations and commercial stakes that are most often antagonistic, leading it to position itself as a neuralgic point of international tensions. Even today, and more than ever, the South China Sea remains a major point of tension, for example between mainland China and Taiwan, with major implications for global stability, particularly in both military and economic terms.



Figure 1. The South China Sea
Source: U.S. Energy Information Administration (2022).

Even before the arrival of European colonizers in the 16th century, the South China Sea was already a hub of trade and a crossroads for various maritime civilizations [21]. The region's

early inhabitants, particularly the Austronesians, were skilled navigators who established commercial and logistical maritime networks stretching to the Philippines, Indonesia, and Malaysia. The Champa Kingdoms in Vietnam and Srivijaya in Indonesia played a crucial role in connecting Southeast Asia with India and China, prior to the gradual emergence of the maritime Silk Road as a key route for trading silk, spices, porcelain, and other valuable goods [38]. Chinese, Indian, and Arab ships sailed the waters of the South China Sea, facilitating cultural and economic exchanges between Asia, the Middle East, and Africa. Starting in the 16th century, European exploration began with the arrival of the Portuguese, followed by the Spanish, Dutch, British, and French, all driven by the desire to exploit local resources through the establishment of trading posts, notably in Macao and the Philippines.

For two centuries, the European powers shared resources while avoiding direct confrontation, before the situation changed radically in the 19th century, with the South China Sea becoming the site of incessant colonial rivalries [17]. The British took control of Hong Kong in 1842, after the first Opium War, while the French colonized Indochina, including Vietnam, Laos and Cambodia. These colonies were strategically important for controlling maritime routes and coveted local raw material resources. WW II exacerbated tensions as the South China Sea became the scene of major military operations, with imperialist Japan occupying most of the islands in the region to secure its supply lines. Japan's defeat in 1945 led to a redistribution of territories, but conflicts over sovereignty persisted. China claims almost the entire South China Sea based on the "nine-dash line," [9] which appeared on its maps in 1948, but whose claim was rejected by the Permanent Court of Arbitration in The Hague in 2016, while the other riparian countries assert their claims to parts of the islands and reefs.

Admittedly, since the end of the 20th century, territorial conflicts in the South China Sea have intensified due to the discovery of undersea natural resources and the strategic importance of the region. In the 1970s, clashes between China, Vietnam and the Philippines multiplied, with China taking control of the Paracels Islands in 1974 after a conflict with South Vietnam [8]. International tensions are exacerbated by the involvement of countries outside the area. The United States regularly conducts "freedom of navigation" operations to challenge Chinese claims and ensure the free passage of container ships through the South China Sea. These operations aim to demonstrate that the waters claimed by China are international maritime zones, in accordance with the U.N. Convention on the Law of the Sea. In response, in the early 21st century, China embarked on a vast campaign to build militarized artificial islands, complete with naval bases, airstrips and defense facilities [31]. This militarization intensifies tensions with neighboring countries and Western superpowers, leading to escalating diplomatic confrontations.

China's territorial ambitions, and the resistance shown by neighboring countries, can be explained not only by the presence of significant natural resources, but also by the control of logistical corridors essential to world trade by container. The South China Sea is one of the richest fishing grounds in the world, and its halieutic resources are crucial to food security. Several hundred million people depend directly on fishing for their livelihoods, while overfishing threatens these resources. The result is frequent incidents between fishing vessels from different countries [39]. It should be added that the seabed of the South China Sea is believed to contain significant reserves of oil and natural gas (up to 11 billion barrels of oil according to some energy experts). These reserves are a major factor in territorial claims. Finally, the South China Sea is a crucial passageway for world trade, since around a third of global maritime trade transits through it [40].

As Figure 2 shows, territorial claims in the South China Sea are complex and mostly overlapping. China claims almost the entire region via the aforementioned "nine-dash line" (10 dashes since 2016, with the integration of Taiwan), recognized by no other country, while the Philippines, Vietnam, Malaysia, Brunei and Taiwan also have claims based on different principles of international law, notably the U.N. Convention on the Law of the Sea. As a result,

the South China Sea has become a flashpoint of tension that could potentially escalate into broader conflicts involving major superpowers. The region’s growing militarization and the ongoing rivalry between China and the United States for global dominance heighten the risk of escalation, with potentially severe consequences for numerous global supply chains. In short, the stability of the South China Sea is crucial not only for the bordering countries, but also for the global economic and security balance [19].

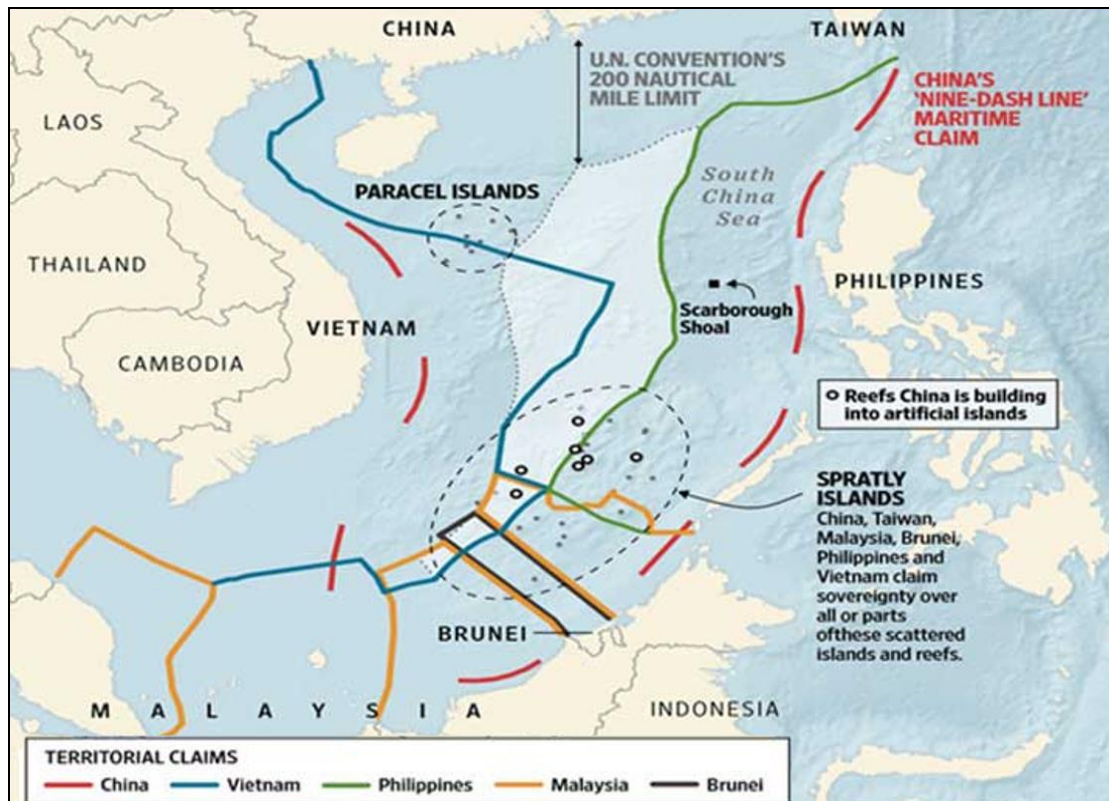


Figure 2. Maritime boundary disputes in the South China Sea
Source: International Institute for Law of the Sea Studies (2021).

3. LOGISTICAL ISSUES

The South China Sea is a maritime region of exceptional strategic importance for global supply chains. On the one hand, it connects the Pacific Ocean to the Indian Ocean via the Strait of Malacca. On the other hand, the region is believed to contain large reserves of oil and natural gas, which are vital not only for the countries bordering it, but also for the world’s energy supply. Finally, the South China Sea is one of the world’s richest fishing grounds. With the world’s historical “center of gravity” shifting towards East Asia [29], this vast expanse of water is now a major axis of world trade. It plays a crucial role in the transport of goods, especially raw materials and manufactured products, linking Asian, European and American markets. The evolution of U.N. Trade & Development’s liner shipping connectivity index for the five main Asian ports shows a significant growth between 2006 and 2020 (see Figure 3). As a result, 6 of the world’s 10 best-connected economies are in Asia (including 5 in the South China Sea), compared with just one in North America. At the same time, this hyper-connectivity is a source of vulnerability, since any disruption to an axis, for example because of a serious diplomatic crisis, will have the effect of interrupting the flow of commercial exchanges.

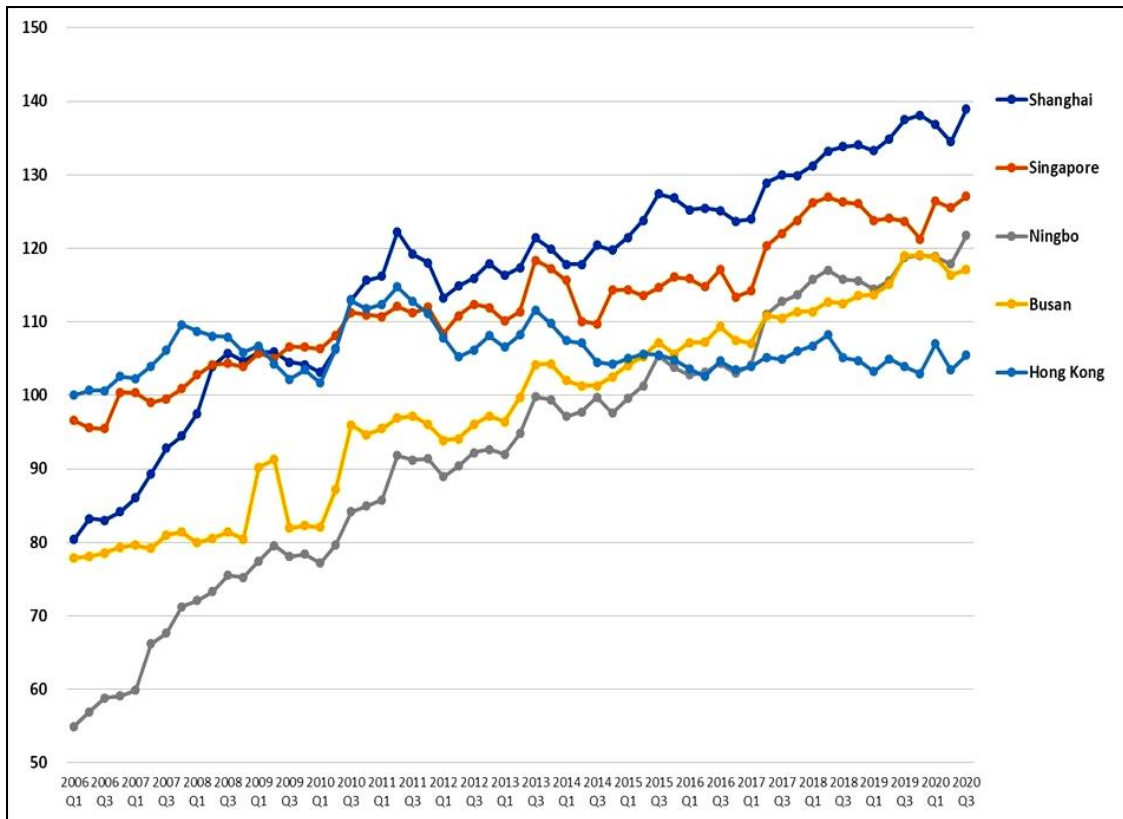


Figure 3. Top 5 Asian ports: evolution of the shipping connectivity index (2006-2020)
 Source: U.N. Trade & Development (2021).

The logistical importance of the South China Sea is well established. It is traversed by some of the world’s busiest shipping lanes, with about one-third of global trade passing through its waters, making it a crucial artery not only for Western economies but also for many African nations. The products transported include a wide range of manufactured goods, from electronics to clothing and automobiles, which are shipped by sea from production hubs in China, Japan, South Korea, and Southeast Asia to markets worldwide. The ports surrounding the South China Sea are vital to these global supply chains, acting as key transshipment points. Additionally, the South China Sea is a critical route for the transport of crude oil and liquefied natural gas, essential for Asian countries such as China, Japan, and South Korea, which rely heavily on imports from the Middle East (see Figure 4).

Cargoes primarily transit through the Strait of Malacca, then cross the South China Sea to reach their destinations, with about 80% of China’s oil imports passing through this area. This underscores the significance of the ports around the South China Sea, which rank among the most important in the world. Notably, Singapore stands out as one of the busiest ports and a key hub due to its strategic location at the entrance to the Strait of Malacca [1]. Similarly, Hong Kong and Shanghai serve as major hubs, facilitating trade between Asia and global markets. These ports are equipped with state-of-the-art infrastructure, including transshipment facilities, extensive storage capacities, and intermodal connections that enhance the efficiency of global supply chains. Furthermore, they are increasingly incorporating advanced technologies, such as terminal automation, the Internet of Things (IoT), and sophisticated data management systems, to improve coordination and reduce transit times within a “smart port” framework [22].

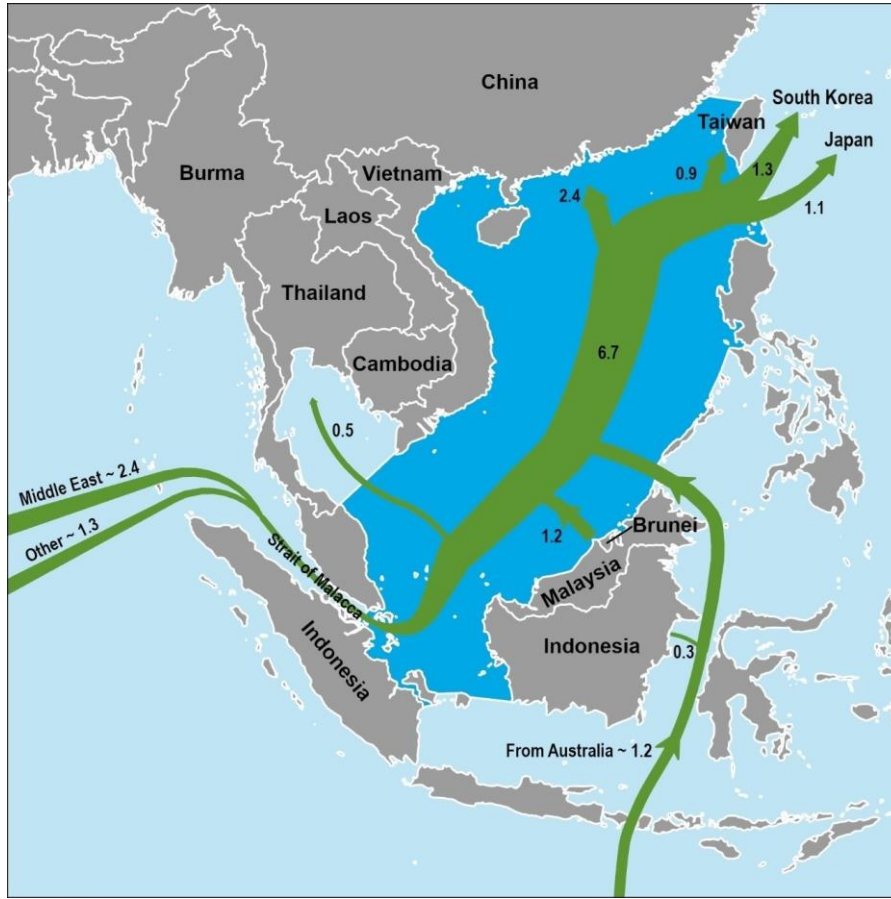


Figure 4. South China Sea liquefied natural gas trade flows in trillion cubic feet (2023)
 Source: U.S. Energy Information Administration (2024).

While the substantial improvement in the organization of global supply chains over recent decades is undeniable, it would be a grave mistake to underestimate the challenges posed by geopolitical tensions, maritime safety, and environmental impacts in the South China Sea, which require ongoing vigilance to maintain resilience. Environmental concerns are sparking increasingly intense debates about the degradation of coral reefs, marine pollution –especially from plastic waste– and the risk of oil spills. More broadly, territorial disputes in the South China Sea create a climate of uncertainty that negatively impacts global supply chains. Tensions between China and neighboring countries, along with the involvement of external superpowers like the United States [32], heighten the risk of conflict. Military incidents and exercises in the region further disrupt shipping routes, leading to delays in the transport of goods. Additionally, the South China Sea continues to grapple with recurring issues of piracy and maritime crime [28]. Although piracy incidents have decreased in recent years due to cooperative efforts, ship safety remains a significant concern, as attacks on vessels can lead to substantial economic losses for shippers.

Finally, climate-related risks such as tropical storms and typhoons are frequent in the South China Sea, and can seriously disrupt logistical operations, although they do not have a geopolitical dimension (even if they are the result of industrial choices made by polluting countries). Climate change is increasing the frequency, intensity and severity of meteorological events, and against the backdrop of the Anthropocene, the situation is unlikely to improve in the coming years. A worsening of the situation is even highly probable if we add marine pollution [16], as indicated above, which represents a real danger to the ecosystem, and could ultimately affect fish resources essential to certain global supply chains. In short, the idea of their alteration to a greater or lesser extent cannot be ruled out in the event of a geopolitical crisis, and as the

Covid-19 pandemic underlined, a sudden interruption of supply systems appears to be a possible situation (and one that could likely recur). This vulnerability is widely studied in the case of bottlenecks such as the Suez Canal [10, 35, 37], but more rarely in the case of vast stretches of sea such as the South China Sea.

4. DISCUSSION AND CONCLUSION

The growing geopolitical tensions between the United States and China are sufficiently important and well-documented not to have to return to them [12]. They are only one facet of a wide range of political risks, including: ongoing territorial conflicts based on historical, geographical and legal arguments; growing militarization, increasing the risk of accidental or intentional confrontations between the military forces of different countries; claims to ownership of natural resources, notably hydrocarbons and fish. These risks pose a significant threat to global supply chains; even more so as further disruptions are likely over the next decade. The most problematic place for political risks is undoubtedly Taiwan, a major manufacturing hub and the world's largest supplier of semiconductors. Tensions over Taiwan are leading to growing concern over assets and global supply chains, whose complexity and interconnectivity have reached levels never seen before [23]. The war in Ukraine is particularly instructive from this point of view, highlighting how logistical restrictions in one confined space can have massive implications for global markets of consumption. This is particularly true for Asia, considered the "linchpin" of global supply chains, and home to the world's busiest transshipment hubs.

The paradox is that the world is now simultaneously dependent on China and Taiwan for industrial capacity, and the flow of their finished products and components always requires logistical excellence, as the Covid-19 pandemic dramatically reminded us with the shutdown of numerous assembly lines. China accounts for up to 50% of the world's production of electronic and pharmaceutical products, while over 50% of the world's chip manufacturing capacity is concentrated in a single Taiwanese company: the Taiwan Semi-Conductor Manufacturing Company [26]. It is therefore logical that 60% of world shipping transits the South China Sea. However, several events are threatening global supply chains linked to China and Taiwan, including China's Foreign Sanctions Act (June 2021), the U.S. Uyghur Forced Labor Prevention Act (December 2021), not to mention China's regular military exercises in the Taiwan Strait. These have the effect of increasingly harassing ships sailing in the South China Sea, as well as cargo planes using Taiwan's airspace to handle certain emergency exports.

Even if a total blockade of Taiwan or a Chinese invasion of the island is unlikely in the medium term [34], the mere fact that the threat exists is disruptive for global supply chains, as it increases the level of uncertainty. Any blockade, and even more so any invasion, would effectively lead to major disruptions in shipping between Northeast Asia, the United States and Europe, necessitating costly rerouting. Indeed, the United States has been strongly committed to supporting Taiwan since 1979 and the passage by Congress of the Taiwan Relation Act, which guarantees protection for the island as well as supplies of American military equipment. Above all, it clearly implies that the United States would respond with force to an occupation of the island [5]. However, nothing is written in the Taiwan Relation Act at this level, since the current status quo and opposition to a declaration of independence by Taiwan is the political position chosen by the United States. Few observers doubt that a conflict between the United States and China would lead to a major disruption of global supply chains, and an economic depression comparable to that of 1929.

The case of semiconductors is symptomatic of the negative impact of geopolitics on logistical issues [13]. Semiconductors are vital to many sectors, including the automotive, telecommunications, electronics, health, energy and defense industries. Taiwanese companies are the main manufacturers, while Chinese companies play a key role in testing and packaging.

China also dominates the industry for rare earth minerals, essential for semiconductor manufacturing [18]. In other words, value chains between China and Taiwan are highly intertwined, and the slightest break in one part of the logistical exchange blocks the entire global supply chain. It is therefore virtually impossible to take China and Taiwan out of the semiconductor value chain. Chip manufacturing will continue to be concentrated in a small number of companies in South-East Asia, and it will take decades for the diversification efforts undertaken by the United States to bear fruit. During this period, tensions in the South China Sea will continue to pose a threat to vulnerable supply systems, with a credible risk of shortages by 2030.

Piracy remains a persistent challenge impacting global supply chains. This issue in the South China Sea is not a recent development; its origins can be traced back to the Ming dynasty [20]. Two primary factors are often cited: the poverty of coastal populations and the high intensity of trade in the area. Although piracy incidents have decreased since the Covid-19 pandemic, they continue to occur. Pirates typically target towed barges moving westward or large vessels heading eastward, with attacks generally happening at night or in the early morning hours. These pirates are often armed with bladed weapons. High-risk or very high-risk areas include the Straits of Malacca and Singapore, the waters west of Peninsular Malaysia and along the coasts of Borneo (Sarawak, Sabah, and Brunei), the waters separating the Philippines from the Malaysian state of Sabah (particularly the Sulu and Sulawesi seas), the Gulf of Thailand, and the waters between Vietnam, the Philippines, and northern Borneo. Although China's coasts are not directly threatened, it conducts escort operations as part of its naval diplomacy, both to safeguard its interests and to assert its maritime power in a region it largely claims as its own.

In conclusion, the title of this speculative paper, which adopts an interrogative form, calls for a nuanced response: the tensions in the South China Sea are not the harbinger of an inevitable collapse of global supply chains, but they do highlight the significant impact that geopolitics can have on logistical issues. This topic has not really given rise to in-depth reflection to date, as supply chain management researchers and practitioners prefer to emphasize the importance of new supply chain technologies as facilitators of globalized, unhindered trade. This is particularly the case with blockchain, which has given rise to the publication of thousands of academic articles over the past decade (for a literature review, see [15]). The key point highlighted is blockchain's (idealized) ability to create the trust needed for companies to collaborate harmoniously, while guaranteeing data security, traceability and confidentiality. In short, the reality constructed would be that of a business world based on total informational transparency, without conflict or confrontation between partners, but also without the presence of predatory political wills that can disrupt global supply chains.

This represents a significant analytical misinterpretation. As illustrated by the situation in the South China Sea, geopolitical issues often disrupt the management of global supply chains. It is conceivable that recurring tensions could eventually lead to a substantial reduction in logistical relations, confined to countries that share similar "humanist" values. This concept forms one of the pillars of friendshoring, a strategy highlighted by Treasury Secretary Janet Yellen in April 2022 during a speech to the Atlantic Council think tank. Friendshoring envisions the creation of a "bloc" of allied nations, potentially leading to a multipolar world composed of distinct "blocs" that no longer interact with one another [27]. However, it is impossible to predict with certainty whether a country that shares common values with another today might not become hostile tomorrow, following a radical shift in its political regime. In other words, we have entered a period of profound instability, a world that, as noted in a report by the U.S. National Intelligence Council [24], is likely to be "more contested" by 2040.

As long-distance sourcing is no longer fully perceived as reliable and low risk, a reorganization of supply chains could soon be the order of the day in many sectors. Reorganization would put the hindrances on the limitless development of global value chains, made possible by low transport costs, thanks to the use of mega-container ships. Are regional relocations, widely

evoked in Europe by many politicians and top managers, with the fresh idea of “*slowbalisation*” [7], not ultimately the option for a totally reconfigured logistics universe? If so, we will be tomorrow in the presence of a mosaic of world-economies, to use Braudel’s [4] famous analysis. A world-economy is a dynamic polarized territory, an economically autonomous part of the planet, capable for the most part of standing on its own, and to which its internal exchanges confer a strong *organic unity*. Throughout history, numerous world-economies have emerged, such as the Carthaginian Empire, Ming Dynasty China, and the Mediterranean during the reign of Philip II of Spain. It would therefore not be surprising if this trend of dominant economic regions continues into the 21st century.

ACKNOWLEDGEMENTS

The author sincerely thanks Jacques Colin, Huu Tuyen Duong, Yuan Hao and two anonymous reviewers of the *International Journal on Managing Value & Supply Chains* for their insightful comments and suggestions on previous versions of the manuscript.

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