


# The Impact of Trade Volume and Port Capacity in Southeast Asia Post-US-China Trade War: A Case Study of the Port of Singapore

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Article Info	ABSTRACT
<p><b>Keywords:</b> Trade War, Singapore Port, Trade Volume, Port Capacity, Global Value Chain</p>	<p>This study examines the impact of the US–China trade war on trade volume shifts and port capacity dynamics at Singapore Port, the leading transshipment hub in Southeast Asia. Escalating tariffs between the two major economies triggered supply chain restructuring, rerouting of shipping lines, and increased reliance on alternative logistics pathways within ASEAN. Using a descriptive qualitative method and secondary data from MPA, PSA International, UNCTAD, WTO, and related academic sources, the findings reveal that despite global uncertainty leading to overall trade slowdowns, Singapore maintained its operational resilience through digitalization, efficiency improvements, and the expansion of the Tuas Mega Port. Strong network connectivity and an integrated maritime ecosystem underpin Singapore's competitiveness amid global trade disruptions, even as high dependency on transshipment remains a long-term strategic vulnerability.</p>
<p>This is an open access article under the <a href="https://creativecommons.org/licenses/by-nc/4.0/">CC BY-NC</a> license</p> 	<p><b>Corresponding Author:</b> Tita Syafira. S University of Riau <a href="mailto:tita.syafira0152@student.unri.ac.id">tita.syafira0152@student.unri.ac.id</a></p>

## INTRODUCTION

The trade war between the United States (US) and China, which escalated in mid-2018, has become one of the biggest shocks to the modern global trade system. Mutual tariff increases, restrictions on technology access, and increased controls on the flow of goods and investment have reconfigured global supply chains, particularly for the manufacturing sector, which relies heavily on cross-border production networks (Bown & Zhang, 2019). Several experts emphasize that this trade war has disrupted the stability of the global trade architecture, which previously relied on global supply chain integration. According to Baldwin (2020), the tariff conflict has accelerated the decoupling process between the two major economic powers, with subsequent relocation of international production flows. A similar sentiment is expressed by Evenett (2019), who believes that the protectionist responses of both countries have increased market uncertainty and disrupted previously relatively stable global distribution patterns.

These protectionist dynamics have triggered a restructuring of international trade flows, including the relocation of production bases, diversification of logistics routes, and the diversion of container flows to Southeast Asian countries (Fajgelbaum et al., 2020). Logistics analysts assess that Southeast Asia has become the recipient of the most significant flow

spillovers due to multinational companies' efforts to reduce their dependence on traditional US-China routes. According to Kimura & Chen (2021), this phenomenon strengthens ASEAN's position as an alternative supply-chain base for the global manufacturing industry. As a region strategically located along the Indo-Pacific route, Southeast Asia has experienced a significant increase in trade activity as multinational companies choose to shift their logistics routes to ports in the ASEAN region. In this context, ports play a central role as global connectivity nodes linking the flow of goods across continents. The Port of Singapore, with its transshipment facilities and logistics network, serves as a crucial distribution hub to accommodate this shift in trade flows (Notteboom & Rodrigue, 2020). Rodrigue (2022) adds that hub ports like Singapore are highly responsive to geopolitical changes due to their dependence on dynamic and often unpredictable international trade flows.

The increased trade intensity resulting from the trade war not only impacts container volumes but also demands adaptations in physical capacity, digital infrastructure, logistics efficiency, and port terminal management. The Port of Singapore—as the world's second-largest transshipment port—is experiencing new pressures related to the need for expansion, logistics channel optimization, and maritime technology integration to maintain its position as a global hub (Liu & Hu, 2021). According to Merk (2019) of the OECD, competitive pressures on the world's major ports are increasingly driven by technological developments and changing trade patterns, requiring ports to accelerate operational modernization and digital innovations such as terminal automation and data-driven container management systems. More broadly, the increase in port activity in Southeast Asia demonstrates that the US–China trade war is not only impacting major countries but also creating structural opportunities and challenges for regional ports in the face of changes in the global trading system (Yap, Lam & Notteboom, 2021). Several maritime scholars, such as Pallis & de Langen (2020), also emphasize that regional ports require more flexible, adaptive strategies to maintain competitiveness amidst increasing container flows and intense inter-port competition.

Thus, analyzing the impact of the trade war on trade volume and capacity of the Port of Singapore is important, both for academic purposes and for formulating international logistics and trade policies in the region. Increasing the capacity and efficiency of ports in the region has the potential to strengthen regional connectivity, enhance competitiveness in attracting investment, and deepen regional supply chain integration. However, competition among ports in Southeast Asia is also intensifying, demanding more sophisticated differentiation and collaboration strategies. Several port experts have highlighted that regional logistics integration will only be optimal if ASEAN ports adopt uniform operational standards and strengthen cross-jurisdictional coordination (UNCTAD, 2020). This research aims to address the gap in the literature on the link between global trade conflicts and the transformation of regional logistics infrastructure. Focusing on the Port of Singapore as a case study, this research seeks to provide a comprehensive analysis of how international trade turmoil translates into concrete changes at the port operational level, as well as its long-term implications for economic integration and the competitiveness of the Southeast Asian region in an increasingly complex and competitive global trade arena.

## METHOD

This study uses a descriptive qualitative approach to analyze the impact of the US-China trade war on trade volume and capacity at the Port of Singapore. This descriptive qualitative approach provides a comprehensive phenomenological explanation using documentary data and literature, consistent with research methodologies in the field of modern ports and supply chains (Yap & Lam, 2021; Notteboom & Rodrigue, 2020). The data used for this study are secondary sources from reports from the Maritime and Port Authority of Singapore (MPA), PSA International, the World Bank, as well as statistical publications from UNCTAD and the WTO. Furthermore, this research is presented using the latest scientific journal articles from 2019 to 2024 that discuss the global value chain, international trade, and port operations in the post-trade war period. This research is also supported by industry reports, economic news from Reuters, and Maritime Executive. These sources are expected to provide insights for a more in-depth empirical context.

In this study, data collection was conducted through documentation, such as a review of academic literature, port reports, and international trade data. This will then be analyzed through a thematic analysis, focusing on identifying patterns in changes in trade volume, port capacity, and Singapore's mitigation strategies for global change. This analysis draws on approaches applied in contemporary port research. To support the findings, this study employs source triangulation, examining differences in findings from scientific articles, statistical data, and industry reports, which will then be used for comparison. However, this study also has limitations, namely its reliance on secondary data and the lack of an econometric model; as a result, causal relationships cannot be tested quantitatively.

## RESULTS AND DISCUSSION

### The Port of Singapore as a Global Transshipment Hub

The Port of Singapore is one of the most important maritime hubs in Southeast Asia and the world. As a global transshipment hub, it plays a vital role in facilitating the flow of international trade and maintaining the stability of regional supply chains. The growth in Singapore's container volume in recent years demonstrates that the port is not merely a transit port, but a strategic node in the global logistics network. According to data from the Maritime and Port Authority of Singapore (MPA), the Port of Singapore's container throughput reached 41.12 million TEUs in 2024, a significant increase from the previous year (MPA, 2024). This increase reinforces Singapore's position as the world's second-largest port in terms of container volume, with approximately 90% of its activity being transshipment, or the transfer of containers from one vessel to another (Marinelink, 2024).

Singapore's role as a transshipment hub is evident in the increase in transit volume, which in some month-on-month periods can reach double-digit increases, including reports of approximately 12% increases in certain transit volume categories (MPA, 2024). Although official annual figures indicate an increase of around 5–6% for overall throughput, some transshipment segments have recorded higher growth, primarily due to turmoil in global shipping lanes such as the Red Sea crisis (Pambudi, 2025). These geopolitical conditions have

prompted most vessels to reroute through Southeast Asia, increasing pressure and demand for services in Singapore (Ji, Y., et al., 2025).

Singapore's advantages stem not only from its strategic location but also from long-term investments in port infrastructure and maritime policies. Singapore's geographic position along international shipping lanes, namely the Strait of Malacca and the East-West route, provides a strategic advantage because the port is central to global freight routes (Notteboom & Rodrigue, 2024). This location reduces ship route deviations, allowing shipping lines to achieve fuel and time efficiencies. Infrastructure-wise, Singapore boasts modern terminals such as the Tuas Mega Port, designed to accommodate over 60 million TEUs when all phases are completed (MPA, 2023). Crane automation technology and advanced container management systems make Singapore's stevedoring productivity among the highest in the world (Hawari et al., 2024). This productivity is a key factor in why shipping lines choose Singapore over other ASEAN competitors. In addition to infrastructure, pro-business government policies and regulatory stability play a crucial role. The Singaporean government provides incentives to shipping companies, develops an integrated maritime industry ecosystem, and ensures expedited bureaucratic processes (Woo, 2021). This maritime ecosystem encompasses ship repair, bunker services, maritime insurance, and maritime financial services, a comprehensive range rarely found in other regional ports.

Despite its significant strengths, Singapore still faces structural risks due to its reliance on transshipment. Hub models like Singapore's are highly sensitive to changes in global routes, shipping alliance decisions, and the competitive dynamics of other ports (Kavirathna et al., 2018). If shipping alliances decide to shift transshipment to competing ports like Tanjung Pelepas or Port Klang, the impact could be significant. Congestion also poses a challenge. When volumes suddenly increase due to rerouting, the efficiency of dock and yard management is tested. Several studies have shown that ports with a high transshipment dependency are more vulnerable to the "shock effect" of global disruptions (Rodrigue, 2020). However, Singapore is working to address this challenge through capacity investment and operational digitalization.

### **Comparison of the Port of Singapore and Ports in Other ASEAN Countries**

To emphasize Singapore's position as a major hub, a comparison is necessary with other major ports in the ASEAN region. Port Klang and Tanjung Pelepas are two of Singapore's largest competitors in the region. Both ports have substantial capacity and frequently attract shipping alliances for some transshipment activities (Kavirathna, Kawasaki & Hanaoka, 2018). However, a comparative study shows that Singapore demonstrates significant advantages in several key indicators, including shipping line network connectivity, crane operational speed, schedule reliability, and value-added maritime services. Kavirathna (2018) emphasized that Singapore's dominance as a port hub stems primarily from its unrivaled network connectivity, indicating that despite Malaysia's continued growth, Singapore still maintains a substantial advantage in the global shipping network. Furthermore, Tanjung Priok Port is Indonesia's largest port and serves as a major gateway for national exports and imports. However, in the context of a regional transshipment hub, Tanjung Priok does not yet have the infrastructure capacity and operational efficiency to

match Singapore's (Tentowi et al., 2016). The transformation through digitalization and improved dock facilities has shown significant progress, but limitations in feeder service connectivity and operational congestion have caused Tanjung Priok to function more as a gateway port than a global hub. Transportation analysis studies indicate that the Tanjung Priok–Singapore route remains more efficient than direct routes to other ASEAN ports, given that Singapore has become the default relay point in the region's trade network (Gunawan & Yahya, 2018).

### **The Impact of the Trade War on Tariff Increases in Singapore**

Singapore has experienced a decline in exports as a result of the trade war, particularly in the electronics and semiconductor sectors, which are a crucial part of the US and China global supply chains. When the US imposed high tariffs on Chinese imports, this led to a decline in Singapore's exports to China (Paszak, 2021; Wong & Koty, 2021). Singapore has chosen to remain neutral in this conflict. It has been a strong US partner in trade and security cooperation, and is a supporter of a strong US role in the Indo-Pacific. At the same time, Singapore's leaders aim to strike a balance between power and maintain close ties with China (Vaughn, B. 2023). As a heavily export-dependent country, Singapore is estimated to lose up to \$2.2 billion in a full-scale trade war, which could disrupt financial markets and impact the country's domestic manufacturing sector. The US and other countries may believe that Singapore is supporting China because Singapore is a majority Chinese country and could potentially join forces with China if Singapore does so. If so, the US could initiate joint combat against Singapore and could lead to a decline in the chip industry, which accounted for more than a third of Singapore's industrial production in 2018, raising concerns that this export-dependent economy could soon experience a downturn. Singapore's economic success has long been largely attributed to its chip manufacturing industry, which produces microchips used in everything from mobile phones to vehicles (Lin, H., 2023). While there are potential negative impacts on Singapore, there are also potential positives for Singapore in this trade war. Singapore could be one of the countries affected by trade relocation, where Singapore could become an import diversion country as US companies seeking to avoid Chinese tariffs begin to source imports from third-party countries (including Southeast Asian countries like Singapore) for certain products that are not subject to tariffs. Furthermore, China and the US also perceive Singapore as a potential recipient of investment transfers (factory relocations) from China and the US, particularly in the advanced manufacturing sector, as Singapore offers stability and superior logistics infrastructure. (Fajgelbaum, P.D., et al., 2021).

### **Analysis of the Increase or Decline in Trade Volume at the Port of Singapore During the Trade War**

When tariffs began to rise and fall between the United States and China, the Port of Singapore, as the transshipment hub of Southeast Asia, felt the impact directly, although the impact was far from trivial. Analysis of trade volume at this port during the peak of the trade war reveals a struggle between negative flows and some small opportunities. Overall, there was a marked slowdown in aggregate trade volume, driven by crippling global uncertainty. (Chen, R., 2024). Interestingly, amid this slowdown, an opportunity emerged as multinational companies seeking to avoid high US tariffs began to seek alternative routes and production

bases. Singapore and other ASEAN countries became potential beneficiaries of this shift. Studies on global reallocation highlight how Singapore may attract some of the diverted trade volume, both as a new export destination to the US and as a hub for diverted components (Fajgelbaum, P. D., et al., 2021). However, it is important to note that scholars agree that the positive boost from this diversion is insufficient to offset the substantial losses caused by the overall contraction in global demand. Thus, while the Port of Singapore may see some volume increases from newly emerging routes, the impact of the massive decline in global trade remains dominant, resulting in a net decline in total trade activity.

## CONCLUSION

The US–China trade war has brought significant changes to global trade flows and directly impacted the operations of the Port of Singapore, a major transshipment hub. While Singapore maintains a neutral stance and seeks to balance its relations with both major economies, global uncertainty and the potential for escalation in the trade war pose risks of an economic slowdown and reduced trade activity. On the other hand, Singapore benefits from supply chain shifts and shipping route relocations. The Port of Singapore, as a transshipment hub in Southeast Asia, despite experiencing a decline in total trade volume due to contracting global demand, has partially benefited from trade rerouting and the reallocation of advanced manufacturing plants to its territory due to its stability and superior infrastructure. However, these benefits cannot fully offset the significant losses due to the global slowdown. While its heavy reliance on transshipment activities makes it vulnerable to changes in shipping alliance decisions and global trade shocks, Singapore's advantages in connectivity, service reliability, and integrated maritime ecosystem have enabled the port to remain stable amidst the global economic slowdown. Overall, the research findings confirm that Singapore has been able to leverage the momentum of the global crisis to strengthen its position as an international logistics hub through innovation, capacity expansion, and adaptive maritime policies.

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