UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

2024

Review of maritime transport

Navigating maritime chokepoints

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Geneva, 2024

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Note

The *Review of Maritime Transport* is a recurrent publication prepared by the UNCTAD secretariat since 1968 with the aim of fostering the transparency of maritime markets and analysing relevant developments. Any factual or editorial corrections that may prove necessary, based on comments made by Governments, will be reflected in a corrigendum to be issued subsequently.

This edition of the report covers data and events from January 2023 until July 2024. Where possible, every effort has been made to reflect more recent developments.

All references to dollars ($) are to United States dollars, unless otherwise stated.

"Ton" means metric ton (1,000 kg) and "mile" means nautical mile, unless otherwise stated.

Because of rounding, details and percentages presented in tables do not necessarily add up to the totals.

Two dots (..) in a statistical table indicate that data are not available or are not reported separately.

The terms "countries" and "economies" refer to countries, territories or areas.

Since 2014, the Review of Maritime Transport does not include printed statistical annexes. UNCTAD maritime statistics are accessible via the following links:

All data sets (maritime statistics): https://stats.unctad.org/Maritime

Merchant fleet by flag of registration: https://stats.unctad.org/fleet

Share of world merchant fleet value by flag of registration: https://stats.unctad.org/vesselvalue_registration

Merchant fleet by country of ownership: https://stats.unctad.org/fleetownership

Share of world merchant fleet value by country of beneficial ownership: https://stats.unctad.org/vesselvalue_ownership

Ship recycling by country: https://stats.unctad.org/shiprecycling

Shipbuilding by country in which built: https://stats.unctad.org/shipbuilding

Seafarer supply: https://unctadstat.unctad.org/datacentre/dataviewer/US.Seafarers

Liner shipping connectivity index: https://stats.unctad.org/lsci

Liner shipping bilateral connectivity index: https://stats.unctad.org/lsbci

Container port throughput: https://stats.unctad.org/teu

Port liner shipping connectivity index: https://stats.unctad.org/PLSCI

Port call performance (time spent in ports, vessel age and size), annual: https://stats.unctad.org/portcalls_detail_a

Port call performance (time spent in ports, vessel age and size), semi-annual: https://stats.unctad.org/portcalls_detail_sa

Number of port calls, annual: https://stats.unctad.org/portcalls_number_a

Number of port calls, semi-annual: https://stats.unctad.org/portcalls_number_sa

Seaborne trade: https://unctadstat.unctad.org/datacentre/dataviewer/US.SeaborneTrade

National maritime profiles: https://unctadstat.unctad.org/CountryProfile/MaritimeProfile/en-GB/008/index.html

Vessel groupings used in the *Review of Maritime Transport*

Group	Constituent ship types
Oil tankers	Oil tankers
Bulk carriers	Bulk carriers, combination carriers
General cargo ships	Multi-purpose and project vessels, roll-on roll-off (ro-ro) cargo, general cargo
Container ships	Fully cellular container ships
Other ships	Liquefied petroleum gas carriers, liquefied natural gas carriers, parcel (chemical) tankers, specialized tankers, reefers, offshore supply vessels, tugboats, dredgers, cruise, ferries, other non-cargo ships
Total all ships	Includes all the above-mentioned vessel types

Approximate vessel-size groups according to commonly used shipping terminology

Crude oil tankers	
Ultra large crude carrier	320,000 dead-weight tons (dwt) and above
Very large crude carrier	200,000–319,999 dwt
Suezmax crude tanker	125,000–199,999 dwt
Aframax/long range 2 crude tanker	85,000–124,999 dwt
Panamax/long range 1 crude tanker	55,000–84,999 dwt
Medium range tanker	40,000–54,999 dwt
Short range/handy tanker	25,000–39,000 dwt
Dry bulk and ore carriers	
Capesize bulk carrier	100,000 dwt and above
Panamax bulk carrier	65,000–99,999 dwt
Handymax bulk carrier	40,000–64,999 dwt
Handysize bulk carrier	10,000–39,999 dwt
Container ships	
Neo Panamax	Ships that can transit the expanded locks of the Panama Canal with up to a maximum 49m beam and 366m length overall.
Panamax	Container ships above 3,000 20-foot equivalent units (TEUs) with a beam below 33.2 m, i.e. the largest size vessels that can transit the old locks of the Panama Canal.

Source: Clarksons Research Services.

Note: Unless otherwise indicated, the ships mentioned in the *Review of Maritime Transport* include all propelled seagoing merchant vessels of 100 gross tons and above, excluding inland waterway vessels, fishing vessels, military vessels, yachts and fixed and mobile offshore platforms and barges (with the exception of floating production storage and offloading units and drill-ships).

The 12,000–14,999 TEU Neo-Panamax fleet includes some ships that are too large to transit the expanded locks of the Panama Canal based on current official dimension restrictions; the 15,000+ TEU Post-Panamax fleet includes some ships that are able to transit the expanded locks.

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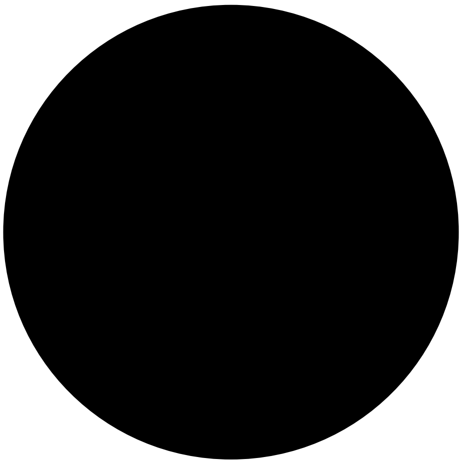


Maritime transport serves as the main artery of global trade. Intricate networks of shipping routes, ports and maritime chokepoints have enabled globalization and strengthened the interconnectedness of the world economy. However, the sector is facing numerous challenges that threaten the efficiency, reliability, resilience and sustainability of maritime transport.

A key feature of maritime transport is its reliance on chokepoints: strategic, narrow maritime passages such as the Suez Canal and the Panama Canal. These critical waterways provide shortcuts on lengthy intercontinental maritime journeys and reduce time and costs. Yet the essential role of these chokepoints makes them particularly vulnerable to disruptions – whether climatic, economic, geopolitical or operational – leading to severe consequences for global shipping.

For example, in 2021, the blockage of the Suez Canal by the *Ever Given*, a large container ship, underscored the grave implications of such disruptions for trade and the global economy. Delays, logistical hurdles, costs and financial losses arising from maritime disruptions are usually significant. Yet, just after recovering from the upheaval of the COVID-19 pandemic and having started to adjust to new shifts in trade patterns triggered by the war in Ukraine, global supply chains and trade are now grappling with an additional wave of disruptions.

Challenges faced in the Black Sea since the war in Ukraine and, since late 2023, disruptions in the Red Sea and the Suez Canal have added more complexity to the maritime operating landscape. The situation in the Red Sea has led vessels across most fleet segments to avoid the Suez Canal and to navigate around the Cape of Good Hope, resulting in extended distances and transit times and higher operational costs for shipping companies, ports and trade. Vessel rerouting onto longer shipping routes is compounding environmental challenges for the sector due to the additional carbon emissions generated from greater fuel consumption and the increased sailing speeds needed to maintain service schedules. Elsewhere, reduced water levels in the Panama Canal – a crucial connector of the Atlantic and Pacific Oceans – caused the number of daily ship transits to be reduced and maritime trade to divert onto longer routes.

The escalating costs arising from maritime chokepoint disruptions translate into higher shipping rates that are inevitably passed on to consumers. In addition to uncertainty and volatility, this situation exacerbates inflation and undermines economic growth, with small island developing States and the least developed countries hit the hardest.

Maritime transport is also facing the twin challenge of decarbonizing and the need to transition to cleaner energy sources. Shipping represents 3 per cent of all global greenhouse gas emissions, and the urgency to reduce them and overhaul the industry's reliance on traditional fossil fuels has never been more critical. Swift action is needed, and this will require significant operational shifts, innovation, investments in a new and younger fleet, paperless and digitalized procedures and, crucially, a transition to cleaner technologies and ships equipped to run on alternative fuels. While the bill for this transformation will be considerable, shying away from the sector's decarbonization and sustainability goals is not an option. It is important that this transition takes place with a whole-sector effort, guided by common International Maritime Organization standards, a mission that UNCTAD fully supports.

Building sustainable and resilient maritime transport is not just an option – it is a strategic necessity. Future-proofing global supply chains depends on strengthening maritime chokepoints, which are vital to the resilience of maritime trade. Achieving more robust, reliable and resilient maritime chokepoints requires maritime transport and logistics to embrace green technologies, digitalization and greater international cooperation. UNCTAD technical cooperation projects, such as the Automated System for Customs Data, and the sustainable and resilient transport, trade facilitation and Train for Trade programmes from our *UNCTAD Toolbox*, can play a key role in this future-proofing effort. Yet this also demands significant investment, particularly on adaptation finance, as adaptation costs in developing countries are 10–18 times greater than current finance flows and the leveraging of data and intelligence, as well as ensuring that all stakeholders – Governments, policymakers, shipping, ports, trade entities and supply chain managers – work together.

As the sector navigates these complexities in a world in which disruption is becoming part of the "new normal", prioritizing the energy transition and fostering agile, resilient transport and logistics will go a long way towards helping global trade and the world economy thrive, while withstanding and adapting to shocks and disruption.

UNCTAD, in *Review of Maritime Transport 2024*, discusses the current multifaceted challenges facing maritime transport. It provides insights into current trends and the outlook for maritime transport and trade and discusses how maritime trade is being upended by disruptions, including in maritime chokepoints. UNCTAD also examines the implications for the shipping fleet that delivers international trade and is at the front line of vessel rerouting and analyses the implications of soaring shipping rates on consumer prices, and how this particularly affects the gross domestic product of small island developing States and the least developed countries. In addition, UNCTAD outlines how port performance monitoring, measurement and reporting can gauge the pulse of the maritime sector and support the achievement of the Sustainable Development Goals, including those related to gender equality and women's empowerment. The importance of transport and trade facilitation across ports and hinterland connections for sustainability, efficiency and resilience is emphasized.

I am convinced that this edition of *Review of Maritime Transport* will help foster a deeper understanding of key developments and inform relevant debates to accelerate progress towards sustainability and resilience in maritime transport, with a sharp focus on the pivotal role of maritime chokepoints.

Rebeca Grynspan
Secretary-General of UNCTAD

Abbreviations

AEO	authorized economic operator
BCTI	Baltic Clean Tanker Index
BDI	Baltic Dry Index
BDTI	Baltic Dirty Tanker Index
BIMCO	Baltic and International Maritime Council
CCFI	China Containerized Freight Index
CIF	cost, insurance and freight
CII	carbon intensity indicator
CO_2	carbon dioxide
CPPI	Container Port Performance Index
EAC	East African Community
EBITDA	earnings before interest, taxes, depreciation and amortization
EEXI	Energy Efficiency Existing Ship Index
ETS	emissions trading system
FAL Convention	Convention on Facilitation of International Maritime Traffic
FEU	forty-foot equivalent unit
FOB	free on board
GDP	gross domestic product
GHG	greenhouse gas
GISIS	Global Integrated Shipping Information System
GT	gross tonnage
ICAO	International Civil Aviation Organization
ICD	inland container depot
ILO	International Labour Organization
IMO	International Maritime Organization
IMLI	International Maritime Law Institute
ITC	Inland Transport Committee
LDC	least developed country
LLMC	Convention on Limitation of Liability for Maritime Claims
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LSCI	liner shipping connectivity index

NTFC	national trade facilitation committee
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
OSBPs	one-stop border posts
PPS	port performance scorecard
SCFI	Shanghai Containerized Freight Index
SIDS	small island developing States
TEU	twenty-foot equivalent unit
TFA	Agreement on Trade Facilitation
ECE	Economic Commission for Europe
VLCC	very large crude carrier
WISTA	Women's International Shipping and Trading Association
WMU	World Maritime University
WTO	World Trade Organization

2024 Review of maritime transport

Chapter I

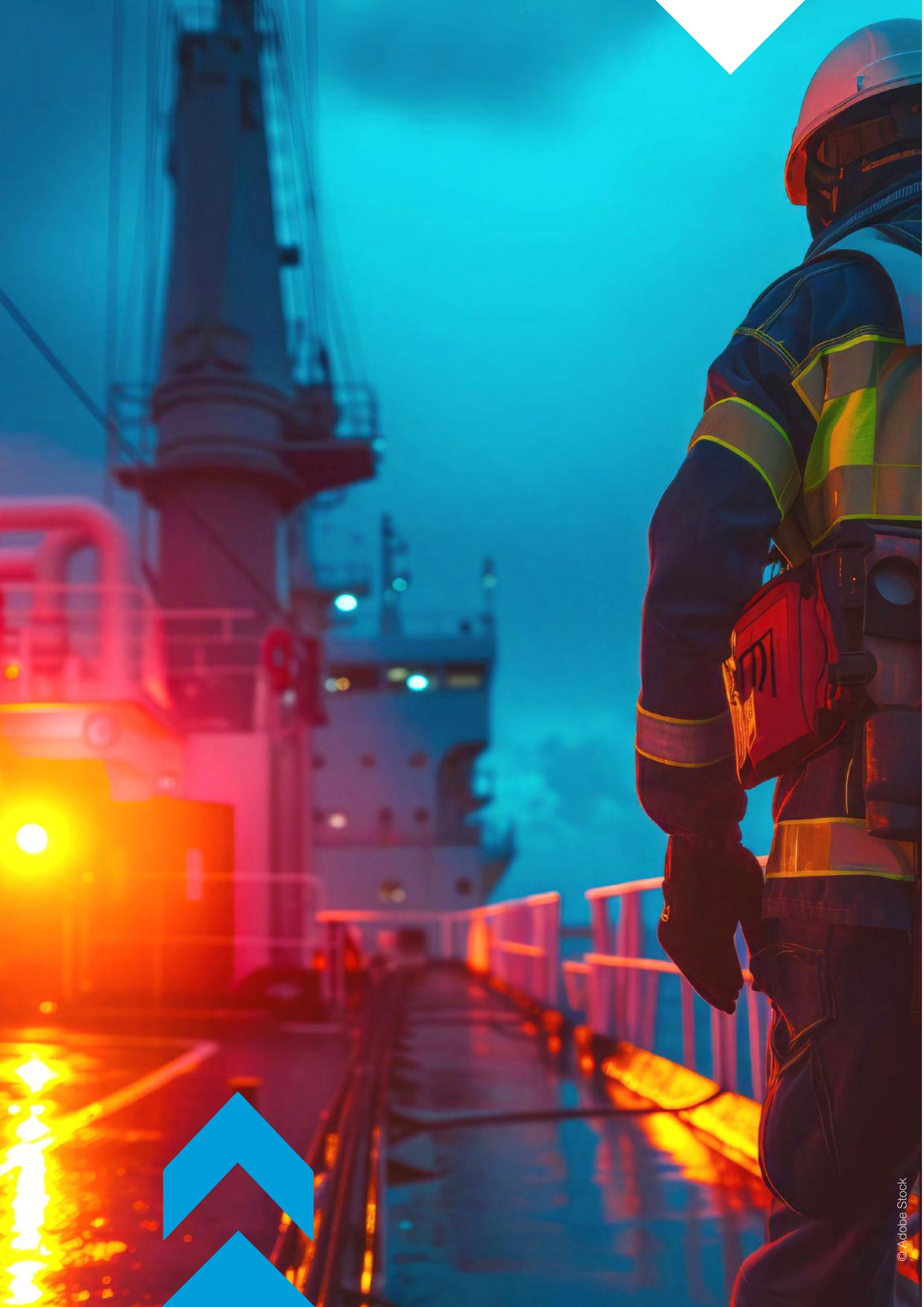
International maritime trade

UNCTAD forecasts maritime trade volume to expand by 2 per cent in 2024 and containerized trade volume by 3.5 per cent. In the period 2025–2029, UNCTAD projects that total seaborne trade will grow on average by 2.4 per cent and containerized trade by 2.7 per cent. This growth is driven by increased demand for major bulks such as bauxite, coal, containerized goods, grain, iron ore and oil. Infrastructure developments, technological advancements and the transition to cleaner energy are also expected to support continued trade growth. However, significant risks could still hinder a sustainable recovery in maritime trade. Geopolitical tensions and the growing severity and frequency of extreme weather events add to the underlying threats and vulnerabilities that could persist into 2025 and beyond.

Maritime trade volumes reached 12,292 million tons in 2023, an increase of 2.4 per cent, after contracting in 2022. Global maritime trade outperformed expectations in 2023 due to easing pressures on the global economy and better-than-expected economic performance in large economies.

Global maritime trade in terms of ton-miles is estimated to have grown by 4.2 per cent in 2023—faster than trade in tons—due to shifts in trade patterns from the ongoing impacts of the war in Ukraine, the disruptions in the Red Sea and reduced water levels in the Panama Canal, all of which extended ship journeys and distances. These shifting trade patterns remain in focus.

This chapter outlines trends in the demand for maritime transport services, providing an analysis of seaborne trade developments in the context of the world economy and global trade. A forecast and outlook for future trends are included. Specific developments impacting dry bulk trade, energy, and containerized trade are also examined. The chapter concludes with an analysis of the interruptions affecting major chokepoints and strategies for enhancing resilience in response to bottlenecks and supply chain disruptions.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A. Maritime trade flows: The big picture

Moderate volume growth and longer distances in 2023

Maritime trade volumes reached 12,292 million tons in 2023, marking a 2.4 per cent increase after contracting in 2022. This growth was driven by growth in the global economy, which averted a predicted recession and grew by 2.7 per cent despite the most significant monetary tightening in decades. Additionally, inflation eased significantly in 2023 (DESA, 2024).

In 2023, economic growth generally exceeded expectations in several developed and developing economies.

In China, economic recovery was slightly slower than predicted, yet the economy significantly bolstered overall global economic growth. The economy of the United States of America was resilient, avoiding an anticipated downturn (DESA, 2024).

Persistent economic uncertainties prevailed during the year, disrupting supply chains and amplifying market volatility. These included geopolitical tensions and extreme weather events such as unprecedented heatwaves, droughts, wildfires and floods.

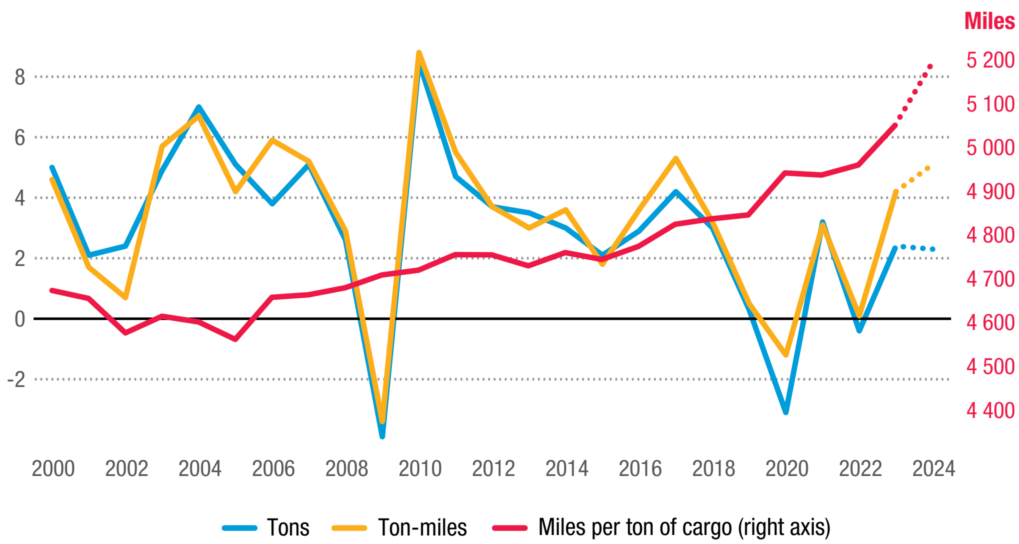
Seaborne trade growth in ton-miles, measuring distance-adjusted trade volumes, outpaced growth in tons in 2023, similar to in 2022 (figure I.1).

Maritime trade volumes reached **12,292 million tons** in 2023, marking a **+2.4%** increase after contracting in 2022

Figure I. 1

Seaborne trade growth, tons and ton-miles, and average distance travelled per ton of cargo: Trade gets a boost in 2023 and 2024 by shifting to longer shipping routes

(Annual percentage change)



Source: UNCTAD calculations, based on Clarksons Research Shipping Intelligence Network (time series, July 2024).
Note: Figures for 2024 are forecasts.

Total ton-miles reached 62,037 billion in 2023, representing a 4.2 per cent increase over 2022. Growth was driven by longer-haul voyages across all segments, prompted by disruptions due to the war in Ukraine, the disruptions in the Red Sea and reduced water levels in the Panama Canal, which led to longer ship journeys and distances. Average distances travelled per ton of cargo have been increasing since 2005, with the average voyage estimated at 4,675 miles in 2000 and 5,186 miles in 2024. This trend began even before recent disruptions (figure I.1).

Maritime trade in ton-miles measures "maritime transport work", that is, how far one unit of maritime cargo in tons travels from origin to destination. "Transport work intensity" (TWI) is a measure that considers the value of the trade carried and, at the same time, the distance travelled by a unit of maritime cargo. Box I.1 describes how the TWI for maritime trade varies between developed and developing countries.

Box I. 1

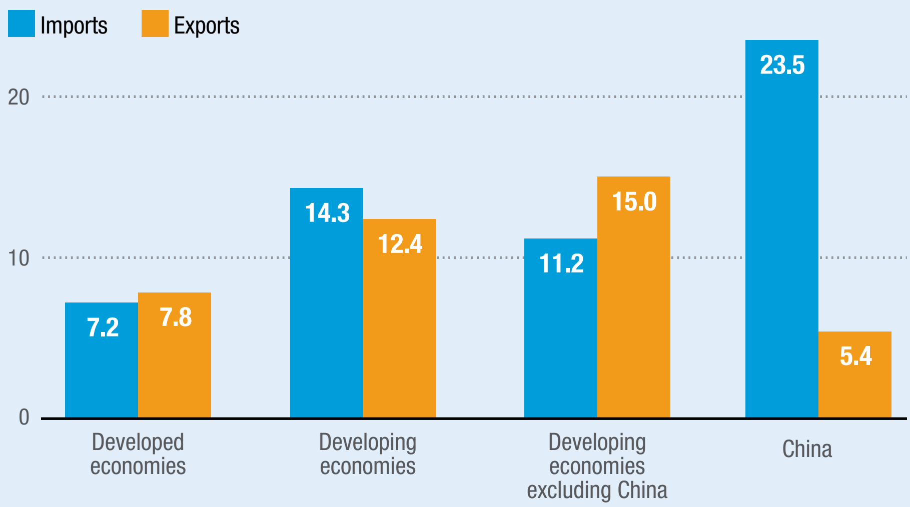
The transport work intensity per dollar of maritime trade in developing economies is double that of developed economies

As shown in figure I.2, TWI in developing economies is, on average, twice as high as TWI in developed economies. TWI for imports to developing economies as a group is 14.3, meaning that transporting goods worth one dollar requires an effort equivalent to moving 14.3 tons over 1 km—or 14.3 kg over 1,000 km; 7.2 ton-km per dollar of imports is required in developed countries. A similar trend is seen with regard to exports.

Figure I. 2

Transport work intensity of maritime trade, 2021

(Ton-km per dollar)



Source: UNCTAD and the World Bank Trade-and-Transport Dataset.
Note: Transport work intensity is calculated by multiplying the weight of the goods by the distance they need to be shipped and dividing by their value.

Among other factors, this reflects differences in the trade structure of developed and developing economies and their geographical position and proximity to the global marketplace. As a group, developing countries contribute larger shares of international maritime trade. They handle the majority of maritime trade by volume, accounting for over half of global goods loaded (exports) and nearly two thirds of goods discharged (imports).

Historically, as a group, developing countries have primarily exported raw materials to developed regions. Over the years, this pattern has changed as developing countries have increased manufacturing and consumption. Maritime trade in developing countries continues to be dominated by heavy and bulky raw commodities, such as dry bulks (iron ore, grains) or wet bulks (crude or refined oil). These commodities generally have lower unit values than high-value, low-volume containerized goods. In addition to being involved in global maritime trade, many developing countries are located far from supplier and export markets. The transport of iron ore to China from Brazil is an example of these patterns. China has TWI of 23.5 for imports and TWI of exports of 5.4. This implies that the transport intensity per dollar of imports is almost five times higher than the equivalent for exports. The average distance is nearly the same—13,330 km in imports versus 13,326 km in exports—indicating that imports to China generally involve heavier goods than exports (table I.1).

Average distances travelled per ton of cargo have been increasing since 2005, with the average voyage estimated at 4,675 miles in 2000 and **5,186 miles in 2024**

Table I. 1
Average transport work intensity

	Transport work intensity (ton-km/$)	Transport work (Trillion ton-km)	Free on Board (FOB) value (Trillion $)	Unit value ($/kg)	Average distance (km)
Imports					
Developing economies	14.31	34.31	2.40	0.74	10 517
Developing economies excluding China	11.17	19.97	1.79	0.82	9 137
China	23.51	14.34	0.61	0.57	13 330
Developed economies	7.20	30.48	4.23	1.22	8 791
Exports					
Developing economies	12.38	34.90	2.82	0.81	10 029
Developing economies excluding China	15.02	30.70	2.04	0.65	9 705
China	5.42	4.20	0.78	2.45	13 256
Developed economies	7.84	29.88	3.81	1.17	9 196

Source: UNCTAD and the World Bank Trade-and Transport Dataset.
Note: Transport work is calculated by multiplying the weight of the goods by the distance they need to be shipped. Transport work intensity is equivalent to the ratio between distance and unit value.
FOB or Free on Board is used to specify the point when the seller's responsibility for the goods ends and the buyer takes on ownership and any associated costs.

FORECAST

2024

Seaborne trade
+2%

containerized trade
+3.5%

2025–2029
annual averages

Seaborne trade
+2.4%

containerized trade
+2.7%

A positive outlook for seaborne trade amid increased risks for 2024 and beyond

UNCTAD forecasts that maritime trade volume will expand at an annual growth rate of 2 per cent in 2024, with containerized trade volume growing by 3.5 per cent. In the period 2025–2029, UNCTAD expects total seaborne trade to grow at an annual average of 2.4 per cent and containerized trade by 2.7 per cent (table I.2). This forecast is based on projected gross domestic product (GDP) and merchandise trade growth of 2.7 and 3 per cent, respectively (DESA, 2024).

Table I. 2

Forecasts for international maritime trade
(Annual percentage change)

Year	Total seaborne trade in tons	Containerized trade in TEU
2024	2.0	3.5
2025	2.5	2.9
2026	2.5	2.9
2027	2.4	2.6
2028	2.3	2.5
2029	2.3	2.5

Source: UNCTAD calculations and forecasts published by Clarksons Research Services (July 2024).
Note: UNCTAD projections are based on the estimated elasticities of maritime trade concerning GDP, export volumes and investment share in GDP, as well as monthly seaborne trade data published by Clarksons Research Services. They also build on the GDP forecast published in the IMF (2024).

Maritime trade volumes are expected to continue increasing into 2025 and beyond (table I.2), supported by demand in major bulks (iron ore, coal, grain and bauxite), gas, oil and containerized trade (Clarksons Research, 2024a). Although prospects for maritime trade remain positive, they are dependent on how several downside risks continue to unfold, including the war in Ukraine, heightened geopolitical tensions and economic uncertainties.

Increased geopolitical tensions may trigger new supply shocks in global commodity markets. Notably, oil and grain shipping routes in the Suez Canal, the Red Sea and the Black Sea may be affected, leading to potential spikes in energy and food prices. Food prices have decreased since the March 2022 peak, when the Food and Agriculture Organization of the United Nations Food Price Index reached 172 points, they have risen since February 2024, with the index increasing from 126 to 129 in June 2024 (UNCTAD, 2024a). In addition, technological supply chains involving chips and semiconductors in East Asia are vulnerable to escalating tensions (WEF, 2024).

The medium-term outlook for seaborne trade is influenced by downside and upside factors. Downside factors include developments in major global markets that could lead to a sluggish recovery (IMF, 2024). For instance, reduced consumer spending and negative net trade impacts in the United States have led to downgraded growth projections for 2025 due to tight fiscal policies and a slowing labour market. Persistent manufacturing weaknesses in Germany and economic policy uncertainties stemming from the 2024 elections in various countries, escalating trade tensions and inward-looking policies further contribute to these risks. High inflation in services and emerging markets could prompt central banks to maintain tight monetary policies, raising further concerns about the cost of living (IMF, 2024).

Upside factors include a projected recovery in global trade, with annual growth rates of 3.1 to 3.4 per cent, driven by a strong export performance in major Asian economies, particularly in the technology sector. Trade involving developing countries, including South–South trade, is experiencing robust growth, outpacing trade involving developed countries. Sectors such as green energy and artificial intelligence-related products are expanding, supporting trade growth (UNCTAD, 2024g).

Potential interest rate cuts in the United States and a depreciating dollar could enhance the competitiveness of United States exports, while a gradual moderation of global inflation and improving economic forecasts may provide a more stable environment for seaborne trade (IMF, 2024).

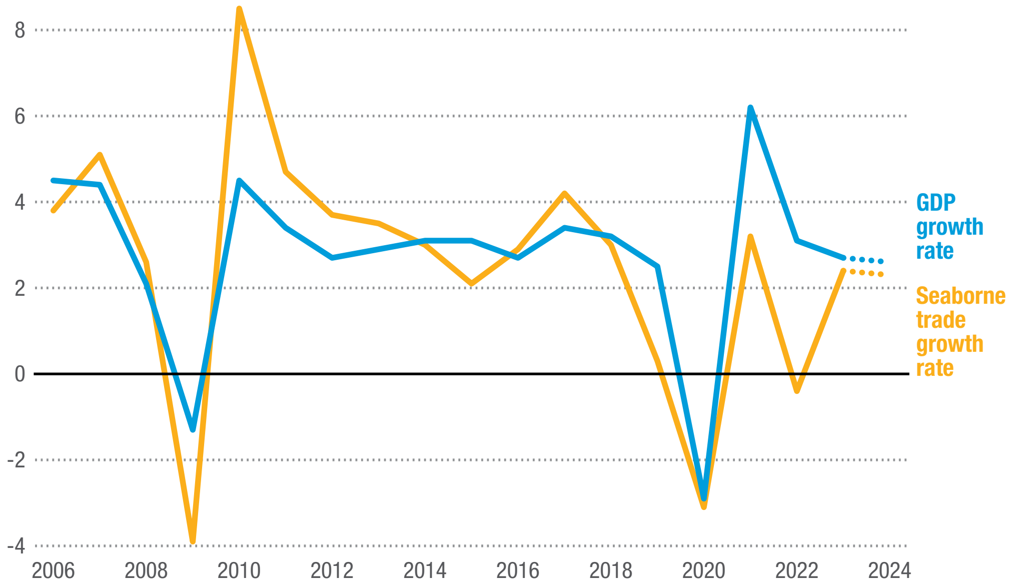
Maritime trade shaped by trends in the world economy, with notable shifts

Maritime trade is largely dictated by developments in the world economy, including with regard to GDP and merchandise trade. However, careful consideration is required of the established relationships between merchandise trade, maritime trade and global output. A confluence of cyclical and structural factors, explained below, has often influenced these relationships, raising the question of whether the correlation between maritime trade and economic output has changed. If these factors continue to diverge, it could potentially lead to a decoupling of maritime trade and GDP.

In 2023, maritime trade volumes grew by 2.4 per cent, and GDP output grew by 2.7 per cent. In contrast, the GDP growth rate significantly exceeded that of seaborne trade in 2021 and 2022, a different pattern than the one observed since 2006, when maritime trade generally expanded and declined at a faster rate than global GDP (figure I.3).

The trade-to-GDP ratio, that is, the responsiveness of merchandise trade to changes in GDP, has been declining since 2010 (WTO, 2024). The change in the trade-to-GDP ratio, with merchandise trade growing at a relatively slower rate than GDP, is also observed across maritime trade data, particularly since 2018 (figure I.3); in this year, the United States introduced tariffs on exports from China (WTO, 2024).

Figure I. 3
International maritime trade and world gross domestic product evolve in tandem but at a diverging pace
(Annual percentage change)



Source: UNCTAD calculations. Seaborne trade figures based on data from Clarksons Research Shipping Intelligence Network (time series, July 2024). GDP figures projections based on UNCTADstat data and, for 2023 and 2024, on table I (world output growth, 1991–2024) from UNCTAD *Trade and Development Report Update*, April 2024.

Other cyclical factors have impacted this relationship in recent years, including inflationary pressures, which negatively affected the consumption of trade-intensive goods, particularly in Europe and North America, constraining trade growth (WTO, 2024), as well as the COVID-19 pandemic and recent disruptions.

Structural factors may also be at play. The changing trade-to-GDP ratio is linked to a slower pace of globalization in trade in goods, in contrast with services trade (Baldwin, 2024; UNCTAD, 2024d). As global economic growth shifts towards the services sector, which relies less on seaborne trade, the global economy may continue to grow, but seaborne trade volumes may not keep pace. An offsetting factor could be seen in the transition to cleaner energy and the path towards sustainable development, which could drive up trade in commodities, such as the minerals used to manufacture green technologies.

Maritime trade may even decline, as production becomes more localized and supply chains are restructured to minimize emissions. This could bring about a scenario of slower trade volume growth with shifting trading patterns and reduced long-haul seaborne trade in favour of shorter, regional routes. This would impact shipping demand and fleet deployment (Danish Ship Finance, 2024).

Notwithstanding, some supply chain derisking strategies could also involve longer distances.

The changing trade-to-GDP ratio could also be influenced by trends in trade protectionism, regionalization and the reshoring of production (the process of returning manufacturing to a company's original country). There has been an increase in trade-restrictive and industrial policy measures since 2019 (UNCTAD, 2023; Ilyina et al., 2024). Such policies emphasize domestic resilience and highlight the role of the State in shaping products and markets, mainly through research and development initiatives (DESA, 2024).

Governments increasingly focus on protecting strategic trade sectors and manufacturing capabilities, with the aim of building supply chain resilience, by strengthening industrial bases and enhancing domestic production. One aspect of such inward-looking policies is heightened interest in securing supply sources that are more reliable and closer to home. This approach often combines industrial policies with efforts to support the green transition, as seen in increased investments in transport and renewable energy sectors. In addition, trade restrictions and tensions continue to play a role in this inward shift (box I.2).

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Box I. 2

Inward-looking policies impact trade and transport prospects for energy transition products

China is adopting policies that focus on self-reliance and domestic innovation. In the energy sector, China is expanding renewable energy capabilities, including wind, solar and hydroelectric power, to reduce dependence on foreign energy sources and enhance energy security. In this regard, China invests in green finance and developing renewable energy bases. In the transport sector, the Government of China is supporting the development and promotion of electric vehicles. The emphasis on domestic production and technology by the Government of China has led to increased export controls on critical materials such as graphite and technologies used in batteries for electric vehicles and wind turbines, and rare earth elements.

The United States and the European Union are increasingly prioritizing domestic resilience and self-sufficiency, particularly in energy transition products, to secure supply chains and enhance national security. The United States Inflation Reduction Act of 2022 offers subsidies and incentives for domestic clean energy production, to reduce reliance on imports. In the European Union, the European Union Green Deal and the “Fit for 55” package aim to boost renewable energy production and reduce fossil fuel imports.

Both the United States and the European Union have implemented various trade measures in line with these policies. The carbon border adjustment mechanisms in the European Union imposes tariffs on carbon-intensive imports, to protect local producers. The United States uses tariffs and subsidies to support domestic clean energy industries and to mitigate international competition. These measures are part of a broader strategy to strengthen local industries and reduce vulnerability to global market shifts.

Trade measures have been implemented with regard to exports from China. The United States has implemented tariffs on solar panels and wind turbines, for example. The European Union applies anti-dumping duties on solar panels from China.

Such regulations and trade policies can significantly impact the trade and maritime transport of energy transition products. They might result in more expensive shipping; divided international markets, with trade flows directed by regional coalitions; and delayed delivery of energy goods while supply networks adapt. These factors may change international commerce routes and require new logistics strategies.

Source: Widuto A (2023); Harrell P (2024); Meng Fang M (2024); Alvik S (2024); Denamiel T et al., (2024); WEF (2023); Rosen D and Lietzow L (2024); United States, 2024; and World Bank (2022).

B. Maritime trade flows: Sector-specific developments

In 2023 and the first half of 2024, geopolitical issues and the energy transition agenda affected maritime trade volumes across cargo types and routes. Table I.3 summarizes the performance of some key maritime trade sectors in 2023 and sets out the drivers underpinning the mixed performance that may be observed.

In 2023, disruptions to shipping networks caused average hauls (voyages) and distances to expand across most maritime cargo types, with trade in LPG, coal and oil products witnessing the highest ton-mile growth rates (10.7, 7.4 and 7.0 per cent, respectively). In 2023, global ton-mile trade outpaced volume growth for most cargo types, except forest products. The gap between both growth rates was particularly marked in the case of oil products (tons, 1.5; ton-miles, 7), LPG trade (tons 5.3; ton-miles, 10.7) and crude oil shipments (tons, 2.4; ton-miles, 5.8) (Clarksons Research 2024a).

A positive outlook for dry bulk trade

Dry bulk trade in tons and ton-miles increased by 3.4 per cent and 4.5 per cent respectively, reflecting a rebound in iron ore and coal imports into China in 2023. In 2024 and 2025, growth is expected to moderate to 2.3 and 1.1 per cent, respectively, and trade in ton-miles is projected to grow by 3.9 and 0.9 per cent (Clarksons Research, 2024a). The strong performance of China in 2023 is not likely to be replicated.

Table I. 3
Mixed performance in international seaborne trade, 2023

Commodity/sector	Growth (percentage)	Driving factors
Coal	(Highest volume growth rate) **7.1**	Global energy crisis and geopolitical tensions, particularly in Europe; increased reliance on coal as an alternative energy source boosting demand and trade volumes
Liquefied petroleum gas (LPG)	**5.3**	Higher demand for cleaner energy sources; increased industrial activity in Asia and other developing regions
Iron ore	**4.4**	Robust demand from steel manufacturing sector, particularly in China and other rapidly industrializing countries
Liquefied natural gas (LNG)	**2.4**	Weaker market conditions compared with recent years, due to softer gas markets and firm fleet growth
Minor bulk (excluding forest and steel products)	(Second lowest volume growth rate) **0.9**	Slowdown in construction and manufacturing activities in key markets, coupled with logistical challenges
Containerized trade	(Lowest volume growth rate) **0.4 (tons)** **-0.14 (TEU)**	Global economic uncertainties, supply chain disruptions and reduced consumer spending on goods

Source: UNCTAD calculations, based on data from Clarksons Research Services and MDS Transmodal for TEU data (see table I.7).

Dry bulk trade is less exposed to the disruptions in the Red Sea and the Suez Canal, with around 6 per cent of global maritime dry bulk trade passing through the Suez Canal. Nevertheless, the disruptions have particularly impacted grain exports from the United States and other dry bulk exports from the North Atlantic to Asia (Clarksons Research, 2024h). Iron ore trade and steel product shipments were also disrupted due to rerouting and increased transit times.

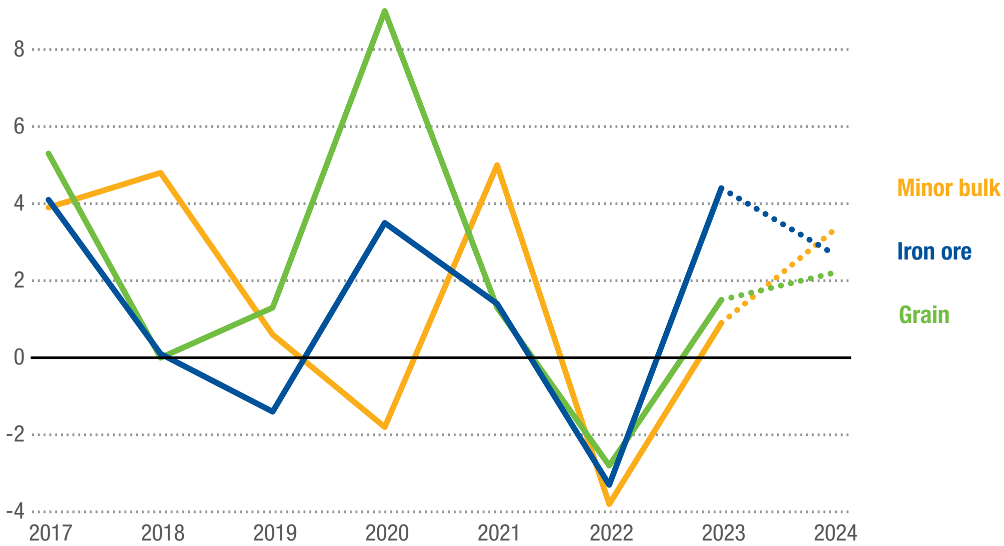
The situation in the Panama Canal in 2023 caused delays and increased shipment costs that affected the export of grains and minor bulk commodities from the Americas to Asia. The impacted routes saw a 31 per cent increase in sailing distances for completed journeys, a 25 per cent decrease in cargo volume and a 1 per cent increase in ton-mile demand (Hellenic Shipping News, 2024).

Some particular bulk trade segments (iron ore, grain and minor bulk commodities) are expected to show varying performances in 2024 and 2025 (figure I.4). Continued infrastructure development projects in developing countries and industrial expansion in emerging economies is expected to sustain the demand for bulk materials. Whether measured in tons or ton-miles, iron ore trade is likely to continue to grow, supported by firm demand from steel producers, particularly in Asia. Minor bulks, including steel and forest products, are expected to grow steadily, supported by construction and manufacturing activities in developing countries. Grain trade will likely see moderate growth, driven by increasing global food demand and population growth.

Iron ore trade and steel product shipments were disrupted in 2023 due to rerouting and increased transit times

Figure I. 4

Mixed performance in international seaborne trade, annual percentage growth rates



Source: UNCTAD calculations, based on Clarksons Research Shipping Intelligence Network (time series, July 2024).
Note: 2024 is a forecast; “minor bulk” encompasses metals, minerals, “agribulks and softs” (which encompasses fertilisers, sugar, soymeal, oilseeds, rice and other products that are “grown” rather than mined).

Energy trade remains robust

The global demand for coal, natural gas and oil is predicted to peak by 2030 (IEA, 2023). However, energy markets continue to be tense and unstable, with increased disruption risks. Energy security remains a top policy priority. Prospects for supply, demand and prices positively impact the outlook for oil and gas trade in 2024 and beyond (box I.3).

Box I. 3
Prospects for demand, supply, prices and trade of some fossil fuel commodities

Coal

- Coal supply is expected to decline in many regions due to regulatory pressures and reduced investment in coal mining. However, due to its cost-effectiveness, some developing countries will continue to produce and consume coal.
- Global coal demand is expected to decrease, particularly in advanced economies transitioning to cleaner energy sources. However, demand may remain stable or even grow in some Asian countries in the short term.
- Coal prices will likely be pressured downward due to decreasing demand and increased competition from cleaner energy sources. However, supply chain disruptions could cause short-term price spikes.
- Decreasing demand and regulatory pressures will reduce coal trade, particularly in Europe and North America. However, continued use in some developing countries will maintain a baseline level of trade.

Oil

- Global oil supply is expected to remain relatively stable, with modest increases driven by investments in new production capacity in the Organization of the Petroleum Exporting Countries (OPEC) and non-OPEC countries.
- Oil demand is projected to peak around 2028 as advancements in energy efficiency and the shift to electric vehicles accelerate. However, demand will continue to grow in the short term, particularly in developing economies.
- Oil prices are anticipated to experience volatility due to geopolitical tensions and market fluctuations but are expected to trend slightly upward due to increasing production costs and demand pressures. In addition, the recent OPEC+ extension of crude oil production cuts is expected to keep oil prices stable or on the rise.
- Increased production and stable demand will likely support steady trade volumes, yet geopolitical risks and market dynamics may create uncertainty in trading conditions.

Gas

- Natural gas supply is expected to expand, particularly from the Russian Federation, the United States and the Middle East. Investments in LNG infrastructure will support supply growth.
- Demand for natural gas is projected to grow steadily, driven by its role as a transition fuel in the shift from coal to cleaner energy sources.
- Regional market dynamics, infrastructure developments and geopolitical factors influence natural gas prices. However, prices will likely remain competitive, promoting its use as a bridge fuel.
- Expanding LNG infrastructure and rising demand may enhance global gas trade, with new markets emerging in Asia and Europe. Competitive pricing is expected to drive higher trading volumes.

Source: IEA (2023) and Russell C (2024).
Note: OPEC+ countries include non-OPEC oil exporters such as the Russian Federation, Mexico, Kazakhstan, Oman, Azerbaijan, Malaysia, Bahrain, South Sudan, Brunei and Sudan.

Table I. 4

Seaborne trade of energy products: Growth projections
(Percentage)

	2024		2025	
	Tons	Ton-miles	Tons	Ton-miles
Coal	0.3	-1.2	-1.0	-1.4
Oil	1.0	3.7	2.7	2.1
Crude oil	0.7	2.8	3.2	3.1
Oil products	1.6	6.4	1.9	-1.1
Gas	3.2	8.2	5.5	5.2
LNG	3.0	8.5	6.2	6.6
LPG	3.8	7.7	3.3	1.8

Source: UNCTAD calculations, based on Clarksons Research Shipping Intelligence Network (time series, July 2024).

In line with these developments, in 2024 and 2025, maritime gas trade is expected to demonstrate the most growth, while oil trade is set to grow moderately. In both cases, ton-mile growth will surpass growth in tons in 2024 (table I.4), reflecting the continued rerouting of oil and gas trades due to ongoing disruptions, including in the Panama Canal, the Red Sea and the Suez Canal.

Trade in oil and oil products is expected to witness stable market conditions in 2024 and 2025. Factors supporting moderate growth include increasing trade involving routes connecting regions across the Atlantic and Asia, as well as increasing demand in Asia, particularly in China and India. On the supply side, expanded refining capabilities in Asia and new sources of supply emerging in Latin America, such as in Brazil and Guyana (Clarksons Research, 2024b) are contributing to this trend. Gas trade will remain strong in 2024 and 2025, supported by the continued growth of imports to China and exports to the United States, with increased volumes heading towards Asia (Clarksons Research, 2024c).

After the historic levels in 2023, coal trade is expected to decline in tons in 2025 and in ton-miles in 2024 and 2025 (table I.4). Coal trade growth prospects remain highly sensitive to developments in China, the world's largest coal producer and buyer. Domestic policies, economic growth patterns and import needs all impact global coal demand and pricing. Recent trends indicate continuing high levels of imports due to energy security concerns and limits on domestic production (Bloomberg, 2024; IEA, 2024; Chen and Duquiatan, 2024).

Containerized trade: A strong performance amid efforts to build resilient supply chains

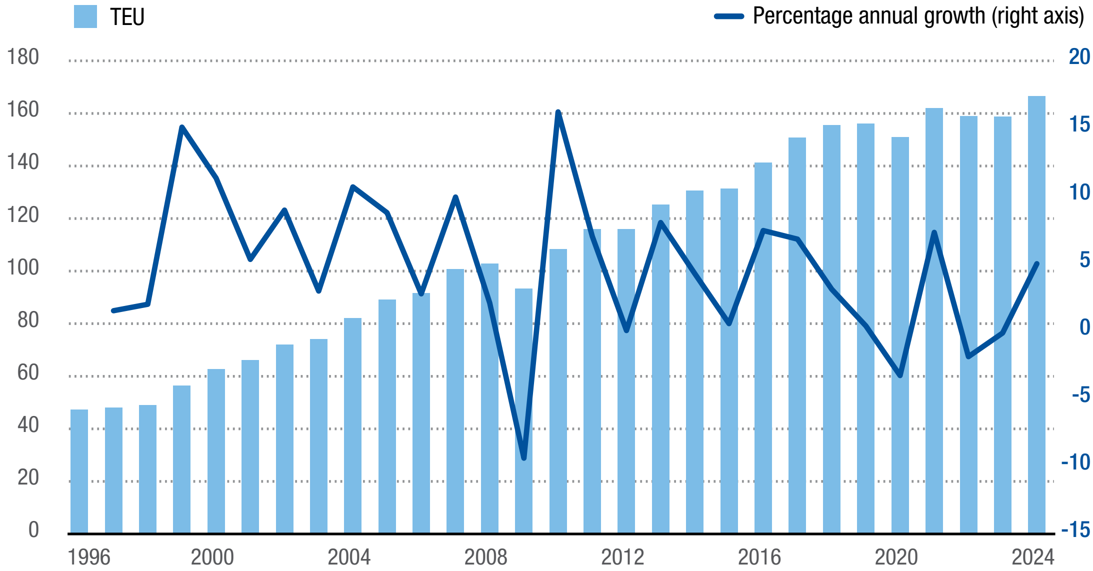
Improved economic prospects and ship rerouting away from the Red Sea are factors supporting the strong performance of containerized trade in 2024. This comes after declining volumes in 2022 and low growth in containerized trade in 2023 (figure I.5). Rerouting vessels has improved the balance between container shipping supply and demand, leading to improved earnings and profits for carriers and increased costs for shippers (see chapters II and III).

The main East–West routes generally handle the largest trade flows and, in 2023, represented over 36 per cent of global containerized trade volumes (table I.5). Trans-Pacific Eastbound (East Asia to North America) and Asia–Europe Westbound (East Asia to Northern Europe and the Mediterranean) are the most important routes (table I.6).

Figure I. 5

Global containerized trade

(Millions of 20-foot equivalent units and percentage annual change)



Source: MDS Transmodal, World Cargo Database, June 2024.

The Asia–Europe Westbound route was the only mainlane route to contract between 2023 and 2024 (table I.6).

In contrast, mainlane routes with the most dynamic performance in 2023–2024 included Trans-Pacific Westbound (North America to East Asia) and Transatlantic Westbound (Northern Europe and Mediterranean to North America) (table I.6). Reduced consumer inflation and the drop in previously high retail inventories in the United States are the main drivers of this growth (Clarksons Research, 2024e).

Table I. 5

Market shares of global containerized trade by route

(Percentage)

	2021	2022	Annual change	2023	Annual change
Main East–West	36.3	37.3	0.93	36.1	**-1.20**
Non-mainlane routes:					
Intraregional	27.1	28.4	**1.28**	28.2	-0.16
Non-mainlane East–West	15.4	13.2	**-2.27**	13.9	0.77
South–South	11.8	11.9	0.09	13.0	**1.12**
North–South	9.3	9.3	-0.02	8.8	-0.54

Source: UNCTAD calculations, based on data from MDS Transmodal, World Cargo Database, June 2024.
Note: Non-mainlane East—West denotes trade involving East Asia, Europe, North America, Western Asia and the Indian subcontinent; North—South denotes trade involving Europe, Latin America, North America, Oceania and sub-Saharan Africa; and South—South denotes trade involving East Asia, Latin America, Oceania, sub-Saharan Africa and Western Asia.

Table I. 6
Containerized trade on major East–West trade routes

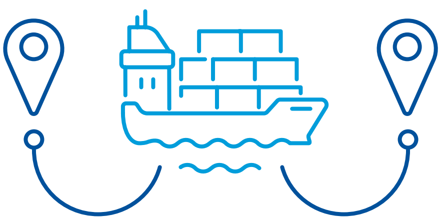
	Trans-Pacific			Asia–Europe			Transatlantic		
	Eastbound East Asia–North America	**Westbound** North America– East Asia	**Total Trans-Pacific**	**Eastbound** Northern Europe and Mediterranean to East Asia	**Westbound** East Asia to Northern Europe and Mediterranean	**Total Asia–Europe**	**Eastbound** North America to Northern Europe and Mediterranean	**Westbound** Northern Europe and Mediterranean to North America	**Total Transatlantic**
TEU (million)									
2017	18.8	8.0	**26.8**	8.2	15.1	**23.3**	3.2	4.7	**7.9**
2018	20.1	8.1	**28.2**	8.3	15.9	**24.2**	3.3	5.0	**8.3**
2019	19.5	7.6	**27.0**	8.5	16.1	**24.6**	3.2	5.2	**8.3**
2020	20.0	7.4	**27.4**	8.2	15.5	**23.7**	2.7	5.0	**7.7**
2021	23.8	6.4	**30.2**	7.8	17.0	**24.8**	2.7	5.6	**8.4**
2022	22.6	6.0	**28.6**	6.7	15.8	**22.5**	2.6	5.5	**8.1**
2023	20.8	6.2	**27.0**	6.5	16.3	**22.8**	2.5	4.9	**7.5**
2024	21.7	6.9	**28.5**	6.9	16.1	**23.0**	2.6	5.3	**7.9**
Percentage annual change									
2017–2018	6.7	1.8	**5.3**	1.7	4.9	**3.8**	2.7	5.8	**4.5**
2018–2019	-3.1	-6.8	**-4.1**	1.9	1.4	**1.6**	-4.6	3.0	**0.0**
2019–2020	2.8	-2.4	**1.3**	-2.9	-3.7	**-3.4**	-14.9	-2.5	**-7.2**
2020–2021	19.0	-13.1	**10.4**	-5.5	9.7	**4.4**	1.0	12.3	**8.4**
2021–2022	-5.2	-6.5	**-5.5**	-13.3	-7.2	**-9.1**	-4.2	-2.2	**-2.8**
2022–2023	-8.0	3.6	**-5.6**	-3.9	3.4	**1.2**	-2.4	-10.8	**-8.1**
2023–2024	4.3	10.3	**5.7**	6.5	-1.6	**0.7**	1.6	7.7	**5.7**

Source: UNCTAD calculations, based on MDS Transmodal, World Cargo Database, June 2024.

Among non-mainlane routes, the East–West route and intraregional had the highest shares of global containerized trade in 2023 (table I.7).

Non mainlane routes with the most dynamic performance in 2023–2024 included South–South and East–West routes.

The performance of South-South routes in 2023 is worth noting, witnessing the highest share increase, 9.3 per cent, during a year characterized by weak overall performance in global containerized trade (table I.5).



Trans-Pacific Eastbound and Asia–Europe Westbound are the most important routes in terms of containerized trade volumes

Table I. 7

Containerized trade on main East–West and other containerized trade routes

	2017	2018	2019	2020	2021	2022	2023	2024 (Forecast)
TEU								
Main East–West routes	**58 049 757**	**60 710 347**	**59 927 666**	**58 848 055**	**63 386 461**	**59 217 514**	**57 239 257**	**59 356 900**
Other (non-mainlane) routes:	**92 692 874**	**94 704 355**	**96 100 208**	**92 059 993**	**98 558 383**	**99 678 120**	**101 440 917**	**107 238 194**
Non-mainlane East–West	19 750 705	19 698 925	20 315 076	18 883 032	20 463 577	20 922 284	22 122 302	23 317 206
North–South	13 791 676	14 229 398	14 208 896	13 995 311	15 109 999	14 786 021	13 916 884	14 584 037
South–South	16 709 459	17 123 449	17 992 786	17 741 223	19 069 128	18 853 529	20 600 375	22 859 351
Intraregional	42 441 034	43 652 582	43 583 450	41 440 427	43 915 679	45 116 286	44 801 356	46 477 600
World total	**150 742 631**	**155 414 702**	**156 027 874**	**150 908 048**	**161 944 844**	**158 895 633**	**158 680 173**	**166 595 093**
Percentage change	**6.81**	**3.10**	**0.39**	**-3.28**	**7.31**	**-1.88**	**-0.14**	**4.99**
Main East–West routes	**6.0**	**4.6**	**-1.3**	**-1.8**	**7.7**	**-6.6**	**-3.3**	**3.7**
Other (non-mainlane) routes:	**7.3**	**2.2**	**1.5**	**-4.2**	**7.1**	**1.1**	**1.8**	**5.7**
Non-mainlane East–West	6.9	-0.3	3.1	-7.0	8.4	2.2	5.7	5.4
North–South	5.2	3.2	-0.1	-1.5	8.0	-2.1	-5.9	4.8
South–South	10.3	2.5	5.1	-1.4	7.5	-1.1	9.3	11.0
Intraregional	7.0	2.9	-0.2	-4.9	6.0	2.7	-0.7	3.7

Source: MDS Transmodal, World Cargo Database, June 2024.

The most dynamic trade routes in 2024 are expected to be those connected to emerging markets (table I.7), driven by increasing trends to secure reliable supply chains and by trade and industrial policies. Trade data already shows diversification shifts. For instance, since late 2022, the political proximity (e.g. having similar geopolitical stances) of trade has been on the rise. Increasing trade concentration is visible along four major bilateral trade relations, namely, Brazil–China; Russian Federation–China; United Kingdom–European Union; and Viet Nam–China (UNCTAD, 2024g). In this context, key containerized routes are those that link the following:

- China with emerging markets such as Brazil, India and the Russian Federation. The strong export performance of China is a primary driver of growth along these routes and to these regions.
- Other intraregional and South–South routes, reflecting a broader diversification of trade connections beyond traditional North–South links.

Trade from the Far East to developing economies has been a major contributor to containerized trade volume growth in 2024. In May 2024, the Far East–Latin America and Far East–Middle East and Indian subcontinent volumes increased by 20 and 15 per cent, respectively (14 and 20 per cent between January and May 2024), driven by positive economic trends in these regions and firm exports from Chinese (Clarksons Research, 2024f).

Current projections for growth (in tons) in 2025 are 3.0 per cent (Clarksons Research, 2024a), assuming a continued easing of economic headwinds. Containerized trade sector performance will depend on geopolitical developments, an easing of disruptions in key chokepoints and trends in supply chain reconfiguration.

In recent years, supply chain reconfiguration has moved into sharp focus, driven by the COVID-19 pandemic, the 2021–2022 crunch in global logistics, heightened geopolitical tensions, rapid technological advancements and growing sustainability demands. Geopolitical tensions have led to a strategic emphasis on national resilience, prompting countries to reconsider their dependencies on foreign suppliers and to seek regional trade relationships. Technological advancements, such as automation and digitalization, are reshaping production processes, reducing the need for labour-intensive operations and enabling manufacturing to be located closer to end markets. Sustainability demands are behind the push for greener supply chains, encouraging shifts towards renewable energy and environmentally friendly production methods (UNCTAD, 2024h).

This reconfiguration also changes trade patterns, as global value chains become less complex and more regionally focused, reducing the reliance on production facilities abroad. Trade flows are increasingly moving towards regional hubs, creating new trade routes and networks that prioritize trading closer to home and with "friends" over traditional, cost-driven offshoring models. As a result, trade patterns are becoming more fragmented, with regions such as Asia and North America seeing increased intraregional trade at the expense of long-established global trade connections (UNCTAD, 2024h). This shift could influence containerized trade routes and volumes, potentially reducing long-distance shipping needs and increasing regional trade.

C. Concurrent disruptions in the Panama Canal, the Red Sea and the Suez Canal upend trade patterns

Shipping is the backbone of globalized trade and smooth navigation through maritime chokepoints is crucial for trade

As discussed in the previous sections, the new wave of disruptions has upended shipping routes, distances and transit times across the Panama Canal, the Red Sea, and the Suez Canal. The combination of climate change and geopolitical tensions is probably one of the greatest risks to global maritime trade in decades. These factors threaten the reliability of crucial trade routes and put pressure on global supply chains.

Maritime chokepoints are defined as critical points along transport routes that facilitate the passage of substantial trade volumes (Bailey et al., 2017), which serve as vital arteries for global commerce, connecting important regions worldwide. Due to limited alternative routes, disruptions can lead to negative impacts in supply chains and to systemic consequences that affect food security, energy supply and the global economy. For example, in 2021, when the container ship *Ever Given* ran aground and blocked the Suez Canal for six days, causing around $10 billion in goods per day to be stranded and delayed due to severe congestion (Goodman, 2024b).

Disruptions to international shipping routes and maritime chokepoints create a daunting operating landscape for shipping and trade. They can lead to changes in network configurations and trade patterns.

For example, disruptions in the Black Sea have led Egypt to source grain from Brazil or the United States instead of Ukraine. Oil shipments from the Russian Federation were directed towards China and India instead of Europe (UNCTAD, 2024f). Current events are anticipated to reinforce this trend.

Of the eight primary chokepoints, the Turkish Straits passage continued to experience disruption in 2023 and 2024 due to geopolitical tensions, increased maritime traffic, environmental concerns and infrastructure challenges. Türkiye implemented regulations in September 2023 involving enhanced environmental standards, safety measures, traffic management and security protocols. Delays and congestion have been experienced in the period of adaptation to these regulations (Ciger, 2023, and United States, Energy Information Administration, 2024).

Since January 2024, the Panama Canal situation has **improved due to the onset of the rainy season, combined with water-saving measures** implemented by the Panama Canal Authority

At the same time, three chokepoints (at Panama Canal, Red Sea and Suez Canal) faced new challenges in 2023 and 2024. Recent geopolitical tensions have heightened the risk of disruptions at other key chokepoints such as the Strait of Hormuz and the Strait of Malacca (table I.8).

Recent developments

The effects of climate change in the Panama Canal

As a key artery for global trade, the Panama Canal is dealing with a severe drought caused by climate change. To save on water, the Panama Canal Authority restricted the number of vessels transiting the Canal (UNCTAD, 2024f). The number of total transits recorded in May 2024 decreased by 19.2 per cent compared with in May 2023 and by 24.3 per cent compared with in May 2022 (Panama Canal Authority, 2024).

The United States is the primary user of the Panama Canal, accounting for 72.2 per cent of cargo by volume transiting through the Canal in fiscal year 2023 (Panama Canal Authority, 2024).

In 2023, the Canal facilitated about 127.5 million tons of cargo exports from East Coast ports, mostly to Asia, and around 62.1 million tons of imports, mostly from Asia. Gulf Coast ports exported around $8.9 billion worth of agricultural products to Asia through the Canal in 2023; and West Coast ports exported around 3.1 million tons of cargo, mainly to Europe, and imported approximately 6.5 million tons of cargo from Europe. The Panama Canal also facilitated trade between ports in the United States, with 3.8 million tons of cargo transiting from East Coast to West Coast ports and 0.5 million tons of cargo travelling from West Coast to East Coast ports (United States, Department of Transportation, 2024).

China is the second most important user of the Panama Canal, accounting for 22.5 per cent of cargo by volume. This equates to 3 per cent of exports from China, 1.5 per cent of imports and 1.7 per cent of all foreign trade in tons (UNCTAD, 2024e). Several developing economies that rely on this waterway have also been impacted by the disruptions (figure I.6).

Since January 2024, the Panama Canal situation has improved due to the onset of the rainy season, combined with water-saving measures implemented by the Panama Canal Authority, and this has enabled a gradual increase in daily transits. The Authority announced plans to reinstate a number of daily transits, as water levels begin to rise in the artificial lake that supplies water to the Panama Canal). Conditions are expected to further improve with the projected La Niña weather phenomenon later in 2024. The average number of daily crossings increased from a low of 27 ships in January 2024 to 32 ships in April 2024, although this is still below the long-term average of 38 ships per day. The Authority is projected to need the rest of the year to fully recover from the 2023 drought (Nightingale, 2024; Maritime Executive, 2024).

Table I. 8

Primary maritime chokepoints: Connections and importance in terms of share of seaborne trade and particular goods

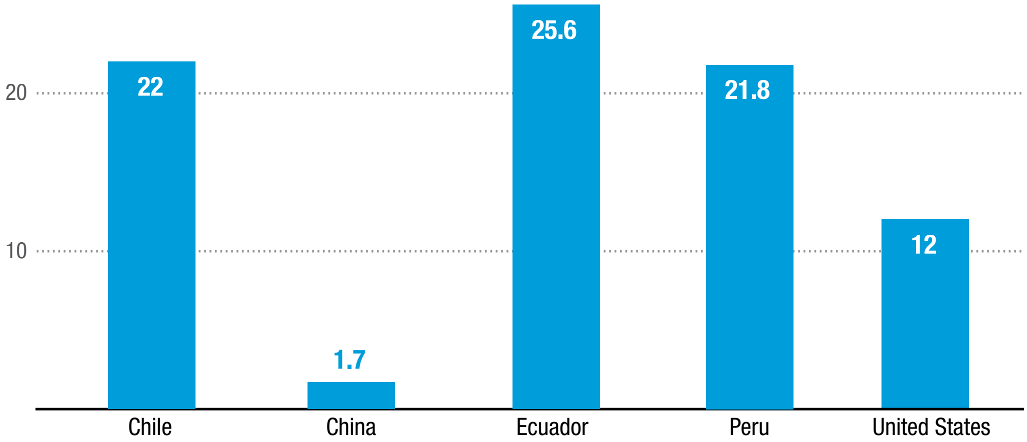
1.	**Bab al-Mandeb Strait (Red Sea)**	• Connects the Red Sea to the Gulf of Aden and the Indian Ocean • Crucial for oil and natural gas from the Middle East • Share of total global seaborne trade volume (2023): 8.7 per cent • Share of global seaborne trade volume per commodity (2023): cars and containers (20 per cent each); oil products (15 per cent); and crude oil (13 per cent)
2.	**Cape of Good Hope**	• Connects the Indian Ocean with the Atlantic Ocean • Main commodities passing around this chokepoint include containerized cargo, crude oil and dry bulks (iron ore and coal) • Share of all seaborne-traded oil (2023): 8 per cent
3.	**Panama Canal**	• Connects the Atlantic Ocean with the Pacific Ocean • Key for containerized trade and trades in cars, grain and LPG • Share of global seaborne trade volume (2023): 2.16 per cent (tons)
4.	**Strait of Gibraltar**	• Links the Mediterranean Sea with the Atlantic Ocean and connects major economies worldwide • Hosts critical infrastructure, including gas pipelines and Europe–Africa electrical connections • Crucial for flow of crude oil and LNG, mainly to European markets
5.	**Strait of Hormuz**	• Connects the Persian Gulf with the Gulf of Oman and the Arabian Sea • Crucial for global energy security, with a significant portion of the world's petroleum passing through this chokepoint • Share of global seaborne trade volume (2023): 11.1 per cent (Nightingale 2024, based on Clarksons Research Services) • Share of global seaborne trade volume per commodity (2023): Crude oil (39 per cent); propane (31 per cent); oil products (20 per cent) and natural gas (19 per cent)
6.	**Strait of Malacca**	• Connects the Indian Ocean with the South China Sea • Crucial for trade between Africa, Asia, Europe and the Middle East and for Asia energy imports and exports to the rest of the world • Share of global seaborne trade volume (2023): 23.7 per cent • Share of global seaborne trade volume per commodity (2023): crude oil (45 per cent); propane (42 per cent); cars (26 per cent); and dry bulk (23 per cent)
7.	**Suez Canal**	• Connects the Mediterranean Sea with the Red Sea • Crucial for trade between Europe and Asia • Reduces travel time for ships by eliminating the need to navigate around Cape of Good Hope • Share of global trade volume: Around 10 per cent (tons) • Share of all global container traffic (TEU): 22 per cent • Top three commodities (2023 volumes): cars and containers (20 per cent each); oil products (15 per cent); and crude oil (10 per cent)
8.	**Turkish Straits (Bosporus and Dardanelles)**	• Connects the Black Sea with the Mediterranean Sea • Crucial for transport of oil and grain from the Black Sea region • Share of global seaborne trade volume (2023): 3.1 per cent

Source: S and P Global Commodity Insights (2023); Nightingale A (2024); Clarksons Research (2024g); and United States Energy Information Administration (2024).

Figure I. 6

Importance of Panama Canal for selected countries

(Share of trade volume, in tons, transiting the Panama Canal, 2021)



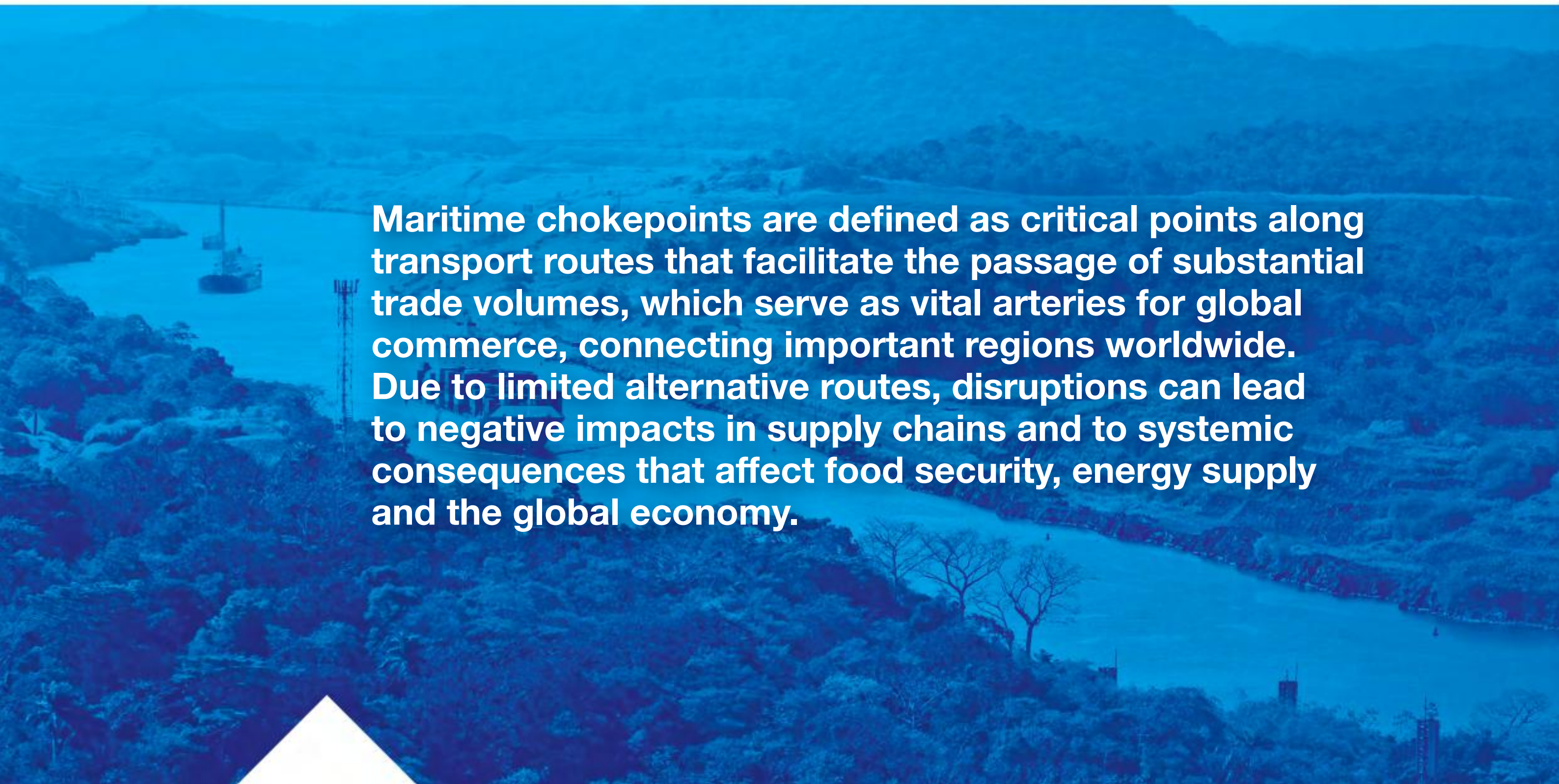
Source: UNCTAD calculations, based on data from the Panama Canal Authority and UNCTAD trade volume statistics.

Disruptions in the Red Sea and the Suez Canal

Since mid-November 2023, disruptions along the shipping route in the Red Sea have led major players in the shipping industry to suspend transits through the Suez Canal.

The number of monthly transits through the Suez Canal across all ship segments has declined since the onset of the disruptions (see chapter II). Significant shares of ships across all shipping segments on the Asia–Europe and Asia–Atlantic[1] trade lanes have diverted trajectories and begun to sail around the Cape of Good Hope (UNCTAD, 2024e).

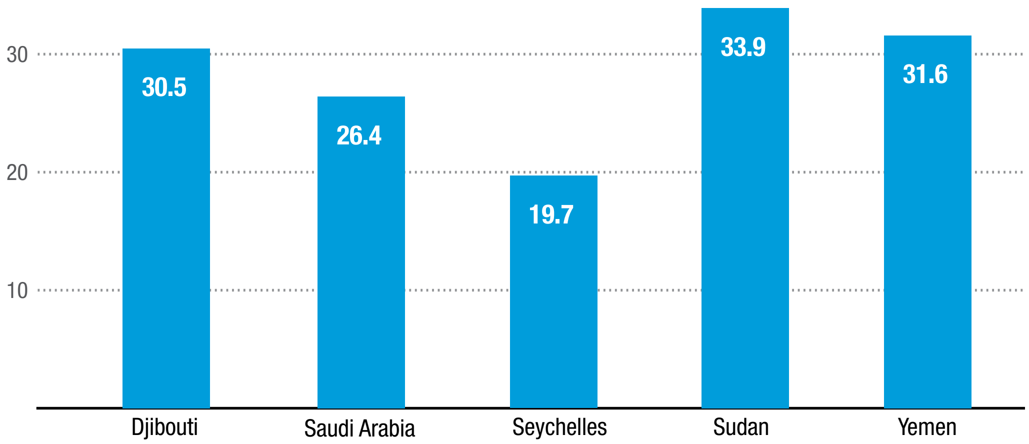
[1] Asia-Atlantic maritime trade routes connect regions in Asia with those across the Atlantic, typically involving countries in East Asia, Southeast Asia, and South Asia on one end and regions in North and South America, as well as the Caribbean on the other.



Maritime chokepoints are defined as critical points along transport routes that facilitate the passage of substantial trade volumes, which serve as vital arteries for global commerce, connecting important regions worldwide. Due to limited alternative routes, disruptions can lead to negative impacts in supply chains and to systemic consequences that affect food security, energy supply and the global economy.

Figure I. 7

Reliance on the Suez Canal for maritime trade, share in tons, 2022
(Percentage)



Source: UNCTAD calculations, based on data from MDS Transmodal.
Note: Shares of foreign trade volumes transiting the Suez Canal based on origin and destination trade data (by volume) in source; shares are for total foreign trade, not only maritime trade, based on countries of origin or destination.

These changes mean Europe is exposed to escalating costs, given its reliance on imports from Asia. The foreign trade of many developing countries is also highly dependent on the Suez Canal (figure I.7). The effects of the disruption are also resonating in other developing regions. For instance, in East Africa, disruptions have led to a shortage of perishable goods and standard containers due to increased cargo delivery times impacting avocado, tea and coffee supply chains, among others (UNCTAD, 2024i).

Declines in transits and ship arrivals in the disrupted chokepoints have pushed some trade flows onto longer-haul routes, boosting the average distance travelled. This is the case for bulkers and oil tankers (figure I.8) and has led to additional transit times and has impacted freight rates (see chapter II and chapter III).

Maritime trade chokepoints map

Source: Ang, C. (2021). Mapping the World's Key Maritime Choke Points.
Available at https://www.visualcapitalist.com/mapping-the-worlds-key-maritime-choke-points/.

For example, redirecting oil tankers from the port of Ras Tanura, Saudi Arabia, to Rotterdam, Kingdom of the Netherlands, via the Cape of Good Hope, has resulted in a 42 per cent increase in travel time. A ship travelling from Asia to Europe takes an additional 12 days to reroute around Africa (UNCTAD, 2024f; UNCTAD, 2024i).

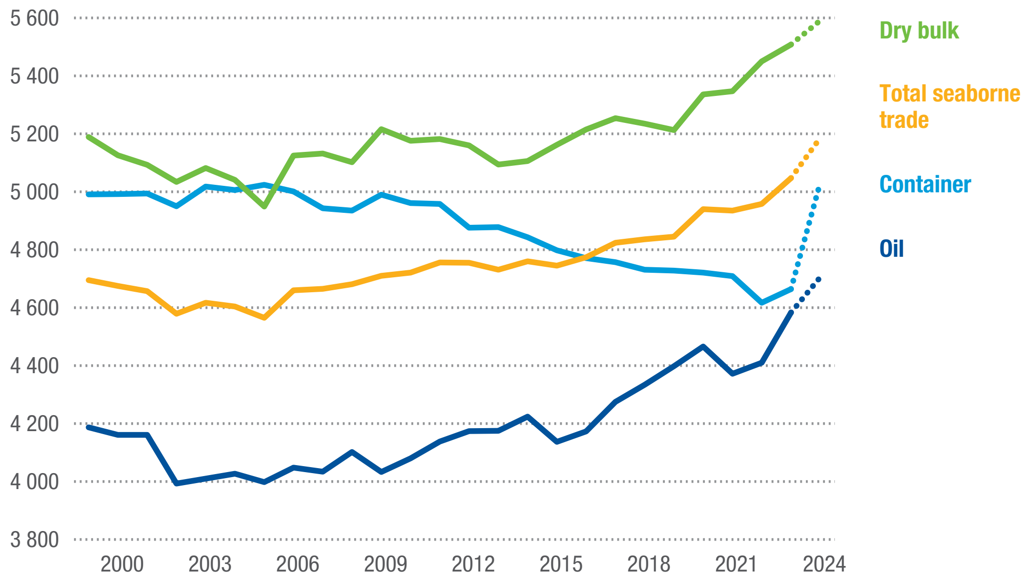
In contrast, different patterns may be observed in containerized trade due to shifting trade dynamics and the use of the United States intermodal system. While most disruptions at major chokepoints result in longer distances, the experience in the Panama Canal has been an exception; disruptions had less of an impact due to the availability of the North American landbridge, a rail and truck transport route that connects the East Coast and West Coast. The landbridge provides an effective alternative route and is a significant competitor for containerized trade. When exports from Asia to the East Coast of North America cannot use the Panama Canal (and when capacity at the Suez Canal is limited), carriers are more likely to call at ports on the West Coast, then connect to, for example, Chicago or New York using intermodal transport services. This leads to slightly lower demand for TEU miles yet increases costs and emissions, since transport by land is less energy efficient than transport by sea.

Current geopolitical events—particularly those in the Red Sea—present grave concerns. Increased security risks pose a danger to international trade and to energy supply chains in particular. Energy trade is facing significant uncertainty due to supply chain inefficiencies, causing tighter supplies and increased costs for consumers. Box I.4 illustrates national and cooperative approaches to building resilience in response to the challenges and opportunities arising from maritime trade disruptions in the Indian Ocean.

Figure I. 8

Increase in average distance travelled due to disruptions in the Black Sea, the Panama Canal and the Red Sea

(Nautical miles)



Source: UNCTAD calculations, based on data from Clarksons Research Services.
Note: Figures for 2024 are forecasts.

Box I. 4

Maritime trade impacts of disruptions in the Red Sea on the Indian Ocean and increasing resilience

The Indian Ocean is divided between three different geographical regions (Africa, South Asia and the Middle East) and has three critical energy trade chokepoints and a backup route in case of disruptions, namely, the Mozambique Channel. Security risks in the area include various geopolitical tensions, piracy and illicit trafficking. The Indian Ocean is strategically significant due to its role in maritime routes and the presence of undersea communications cables. From a trade perspective, the Indian Ocean is crucial for energy imports from Australia, China, India, Japan and the Republic of Korea. Countries in this area have important trade ties with China, France, India, Qatar, Türkiye, the United Arab Emirates and the United States.

Disruptions in the Red Sea have impacted developing countries in the Indian Ocean, raising consumer costs for goods due to higher freight costs, creating uncertainty over energy flows and hindering the delivery of food aid.

In Mauritius, for example, building resilience to such threats has entailed coupling national development policies with strengthened cooperation with partners within and outside the region, to enhance maritime security. Mauritius is taking part in various initiatives involving capacity-building, regional training and information-sharing, to combat piracy risks and guarantee the safety of maritime lanes. Mauritius is also undertaking steps to increase resilience, through connectivity and sustainability port reforms.

The rerouting of cargo around the Cape of Good Hope led to increased congestion in South African ports, which presented opportunities for other African ports, such as those strategically located on the East–West route connecting Asia with Europe (Toamasina, Madagascar; Port Louis, Mauritius; Walvis Bay, Namibia), as well as East African ports (Mombasa, Kenya; Beira, Mozambique; Dar es Salaam, United Republic of Tanzania). While deciding where else to berth for replenishment, shipping companies take into account deep water ports along the Cape Route, which offer an ecosystem of additional services. The increased congestion in African ports emphasizes the importance of increasing capacity and efficiency in the near future to improve connectivity both within and between Africa and extraregional partners.

Source: Natstrat (2024); Baruah D and Duckworth C (2022); Very F and Blaine M (2024); Reilly B and Dean P (2024); and EIU (2024).

Addressing supply chain disruptions

The pandemic served to show the risks of relying heavily on extended supply chains and distant manufacturing, particularly from Asia, to fulfil consumer demands in North America and Europe (Goodman, 2024a; Telling, 2024). This overreliance not only led to major challenges when international trade routes were disrupted but revealed the limitations of trade logistics in managing sudden surges in demand (Pratson, 2023). Given this context, the need to build more resilient and reliable supply chains has prompted a rethink of efficiency-driven models that prioritize cost-cutting over systemic stability and reliability (Goodman, 2024b).

Supply-side measures aimed at building more resilient supply chains require greater investments in infrastructure and labour, for example by:

- Expanding and combining modes of transport; using air, rail and land freight to reduce dependence on chokepoints, bypass disruptions and ensure a steady supply of cargo (Gunathilake, 2021).
- Enhancing infrastructure facilities, including port capacity, storage facilities, pipelines and bunkering facilities, to reduce congestion, increase buffers and minimize fuel shortages or delays caused by disruptions (Gunathilake, 2021; Goodman, 2024b; BCG, 2024).
- Using technology to optimize the capacity of chokepoints (Gunathilake, 2021; Lind et al., 2021).
- Recognizing the value of supply chain workers (railway workers, dockworkers, truckers, seafarers) who are essential for overcoming workforce shortages during critical times; such shortages can exacerbate supply chain disruptions (Goodman, 2024a).

In addition to supply-side measures, building resilient supply chains for maritime trade includes measures such as:

- Reducing the risk of relying on a single input source by diversifying sourcing and manufacturing locations (Telling, 2024; Goodman, 2024a) or diversifying fuel types and sources (Kennedy et al., 2024). While reshoring may offer potential benefits such as increased resilience, reduced environmental impact and local economic gains, it presents challenges in terms of costs and increased supply chain complexity due to potential disruptive changes associated with new processes, technology and workforce training.
- Increasing inventory levels to increase the capacity to absorb supply chain shocks (Goodman, 2024a; BCG, 2024).

The disruption to chokepoints seen in the past two years suggests the need for action in three areas to enhance the resilience of supply chains and ensure unhindered global maritime trade flows:

- Diversifying shipping routes to avoid overreliance on major hub ports and developing contingency plans that include alternative routes and ports (BCG, 2024; Gunathilake, 2021).
- Enhancing cooperation among shippers, logistics providers and ports, to optimize supply chain efficiency, reduce transit times and decrease transport costs (BCG, 2024).
- Improving international collaboration, strengthening trade pacts and alliances (to ensure smoother and more predictable maritime trade flows) and engaging in collaborative efforts to manage risks and disruptions in supply chains (Kennedy et al., 2024).
- Using technology, data, demand-forecasting and early warning systems, to enhance preparedness and optimize capacity at chokepoints.

D. Outlook and policy considerations

The landscape of international maritime trade has undergone significant transformations, particularly in the light of recent global disruptions and evolving geopolitical dynamics. Global maritime trade recovered and demonstrated resilience in 2023 amid increased supply chain vulnerability caused by disruptions in two leading international maritime chokepoints. Shifts in trade patterns remain pronounced, driven by geopolitical tensions and climate-related disruptions. The war in Ukraine, disruptions in the Red Sea and environmental challenges in the Panama Canal underscore the need for resilience-building strategies for maritime chokepoints and global supply chains. These trends and challenges are shaping the outlook for international maritime trade. There are variations across cargo segments influenced by underlying factors such as energy security concerns, supply chain resilience, consumer spending, inflation and economic growth prospects.

UNCTAD forecasts that in 2024, global maritime trade is expected to expand by 2 per cent, while containerized trade is anticipated to grow by 3.5 per cent. This growth will be fuelled by a robust demand for major bulks, such as iron ore, coal, grain and oil, as well as containerized goods. Despite these positive indicators, underlying challenges such as geopolitical tensions, extreme weather events and economic uncertainties continue to pose significant risks.

Looking beyond 2024, UNCTAD projects global maritime trade to grow at an average annual rate of 2.4 per cent between 2025 and 2029, with containerized trade expected to increase by 2.7 per cent during the same period. This growth will be supported by technological advancements, the transition to cleaner energy and infrastructure developments.

However, downside risks persist, including potential disruptions from geopolitical tensions, economic uncertainties, trade-related tensions and environmental challenges. The global economy faces numerous challenges that could impact medium-term growth prospects. Persistent inflation, particularly in the services sector, makes it more difficult to normalize monetary policies, with central banks cautious about easing too quickly. Inflationary pressures are expected to remain high in several regions. Furthermore, geopolitical tensions, such as those involving trade-related and regional tensions, add complexity to the economic landscape. The potential for significant swings in economic policy, driven by elections and fiscal constraints, increases the uncertainty around global growth projections. High public debt levels in many economies, combined with elevated borrowing costs, constrain fiscal space and limit the ability of Governments to respond to economic shocks.

Conversely, upside opportunities include the expansion of green energy and artificial intelligence-related product sectors, as well as potential interest rate cuts in major economies that could boost trade. Maintaining a balance between immediate priorities and long-term sustainability and resilience goals will be essential for the continued growth and stability of international maritime trade.

Policy implications and recommendations

As the world deals with these challenges, safeguarding maritime lifelines becomes critical. Doing so requires international cooperation, strategic foresight and resilience-planning, to ensure that the arteries of global trade remain open, secure and efficient. A multifaceted policy approach is essential to address these challenges and harness opportunities. Policymakers should focus on the following:

- Enhancing supply chain resilience by investing in infrastructure and technology, diversifying supply sources and reducing reliance on chokepoints. This involves evaluating country and port reliance on chokepoints and trade and consistently monitoring alternative routes, to ensure preparedness for disruptions.
- Strengthening international cooperation and trade pacts, to help mitigate geopolitical risks and ensure smoother trade flows.
- Supporting free trade through a rules-based system and encouraging regional and South–South trade, to provide a buffer against global disruptions.
- Implementing sustainable practices and investing in green technologies, to support environmental goals and create new trade opportunities.
- Continuously monitoring market trends and trade patterns, to adapt strategies, and identifying opportunities for alternative supply from other regions and emerging sectors, disruptions in routes and impacts on distances and trading costs, to ensure long-term growth and stability in global maritime trade.

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Chapter II

World shipping fleet and services

In 2023 and the first half of 2024, the shipping industry faced significant disruptions and volatility. The global fleet grew at an annual rate of 3.4 per cent in 2023, up from 3.2 per cent in 2022 and below the average 5.2 per cent of 2005–2023. Total fleet capacity reached about 2.4 billion dead weight tons.

In 2023, the global fleet and container ship capacity grew faster than trade volumes, and this trend is expected to continue in 2024. Concerns over excess capacity in container shipping have eased for now, due to disruptions in shipping routes boosting demand. Once vessel rerouting slows down, overcapacity issues are likely to return.

The global fleet is getting older, and there is an urgent need to shift to low-carbon technologies and fuels. However, together, ongoing uncertainty about future fuels and technology, trends in global shipyard capacity, newbuild prices, construction costs, demolition rates and increased distance–adjusted demand for ships could delay fleet renewal decisions.

Key global fleet developments for 2023 and the first half of 2024 are set out in section A. Factors influencing shipowners' decisions on fleet renewal and how they might green their fleets are examined in section B. Policy recommendations are provided in section C.

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A. Developments in the global shipping fleet

Shipping continues to navigate a complex operating landscape

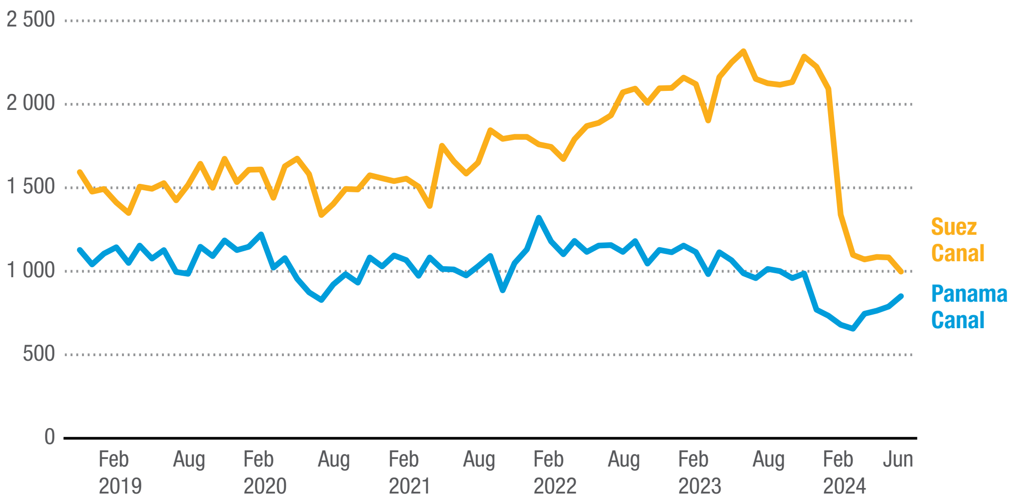
Complexity, volatility and uncertainty were the hallmarks of the shipping industry's operating landscape in 2023 and the first half of 2024. Shipping faced a new wave of supply chain disruptions, reconfigured shipping routes, restructuring in the liner shipping market, new regulatory requirements, further decarbonization efforts, heightened geopolitical tensions and intensified climate change impacts. While economic factors continued to shape shipping supply, the added complexity arising from the interplay of the above cited factors has also influenced global fleet dynamics, impacting trends in ship carrying capacity, deployment patterns, orderbook, construction, demolition, and shipbuilding.

Shipping seems to have found a "new normal" as it continued to cope with the disruptions caused by the war in Ukraine and the legacies of the COVID-19 pandemic. However, increased geopolitical instability and climate-related factors upended shipping in 2023 as ships transiting the Suez and Panama Canals had to be diverted onto longer routes. Attacks on vessels in the Red Sea prompted most shipping lines to reroute around the Cape of Good Hope. At the same time, the Panama Canal had to cut daily ship transits due to drought and low water levels. The Suez Canal handles about 10 per cent of the world maritime trade volume and 22 per cent of world container trade. The Panama Canal handles approximately 3 per cent of global maritime trade volume (see chapter I). By June 2024, the number of ship transits through the Panama Canal and the Suez Canal were down by over half compared to previous peaks (December 2021 and May 2023, respectively). Most of the decline in the Suez Canal has happened since December 2023 due to the onset of the Red Sea crisis, while the number of transits through the Panama Canal have been decreasing over the last two years due to reduced water levels (figure II.1).

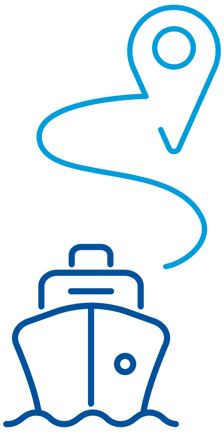
Complexity, volatility and uncertainty were the hallmarks of the shipping industry's operating landscape in 2023 and the first half of 2024

Figure II. 1

Panama and Suez Canals: Number of monthly ship transits



Source: UNCTAD calculations, based on data from Clarksons Research Shipping Intelligence Network.



Geopolitical instability and climate-related factors upended shipping in 2023 as **ships transiting the Suez and Panama Canals had to be diverted onto longer routes**

In 2023, container ships made up 43 per cent of the number of transits through the Suez Canal, with bulkers accounting for 19 per cent, followed by tankers transporting refined petroleum products, chemicals and crude oil. In June 2024, compared to the average in mid-December 2023, the total carrying capacity of ships (ship tonnage) arriving at the Gulf of Aden had dropped by 76 per cent, and the number of transits through the Suez Canal were down 70 per cent. Ship capacity arrivals by gas carriers, car carriers, container ships, bulkers, product tankers and crude tankers fell by 100 per cent, 96 per cent, 92 per cent, 64 per cent, 60 per cent and 50 per cent, respectively. Arrivals at the Cape of Good Hope increased by 89 per cent.

Rerouting vessels around Africa adds distance and extends transit times. A ship travelling from Shenzhen, China, to Rotterdam, Kingdom of the Netherlands, through the Suez Canal travels 10,000 nautical miles in about 31 days. By going around the Cape of Good Hope, the distance increases to 13,000 nautical miles and takes about 41 days (Coyne, 2024). Diverting tonnage around the Cape of Good Hope increases global vessel demand by 3 per cent and container ship demand by 12 per cent (Clarksons Research, 2024a). This reflects the uplift in ton-mile demand for global vessels and container ships in June 2024 compared to the demand if there had been no rerouting away from the Red Sea and the Suez Canal. The additional demand and increased ton-miles have altered global ship capacity, affected supply and demand balance, supported charter markets, boosted ship sales and purchases and lowered ship demolition levels.

However, rerouting ships onto longer routes is triggering market inefficiencies, such as port congestion and higher costs. Rerouting vessels around the Cape of Good Hope due to the disruption in the Red Sea has overwhelmed many ports. Off-schedule arrivals, for example, cause logistical issues such as having to reposition empty containers (Shipfinex, 2024). Recent bottlenecks at the Port of Singapore, caused by ships being diverted around the Cape of Good Hope, illustrate the ripple effects on other ports from the increased loads (Li, 2024 and Dom, 2024). Longer routes also hike up costs for crew wages, chartering, insurance and fuel. For instance, additional costs for an Asia–Europe round trip by a median-sized container ship average $1 million through the Suez Canal compared to $1.7 million around the Cape of Good Hope. This represents an additional cost of $160 per forty-foot equivalent unit (FEU) container arriving in Europe through the Suez Canal, or $272 of additional costs for a FEU around the Cape of Good Hope (ITF, 2024). Ultimately, these additional costs translate into higher freight rates and shipping expenses (see chapter III).

Other concerns include threats to seafarers' safety, greater exposure to piracy incidents, challenges in capacity management, a heavier carbon footprint, and difficulties in complying with environmental rules. Rerouting has increased ship sailing speeds, as operators try to stick to schedules. This generates additional fuel consumption and carbon emissions, which undermine ships' environmental performance and regulatory compliance. For example, the speed of container ships of 17,000 TEU and beyond increased 5 per cent in the first quarter of 2024 compared to 2023 (Clarksons Research, 2024a).

The increased additional costs faced by ships travelling to and from Europe due to vessel rerouting coincide with the introduction of the European Union Emissions Trading System (ETS). Since January 2024, the ETS was extended to the shipping industry, making ships accountable for 50 per cent of emissions on voyages to and from the European Union and 100 per cent of emissions for port calls and transits within the European Union.[1]

[1] European Commission (n.d.), Reducing emissions from the shipping sector, see https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-shipping-sector_en.

According to estimates by OceanScore, the additional ETS-related expenses for shipping companies could triple; rerouting around the Cape of Good Hope has caused bunker consumption to increase three-fold due to extended distances and higher speeds (up from 16 to 20 knots) (World Cargo News, 2024).

In 2023, fleet capacity grew faster than maritime trade volumes; longer routes helped absorb surplus capacity

At the start of 2024, the global fleet was made up of around 109,000 vessels (including cargo and non-cargo ships), each weighing at least 100 gross tons. Global fleet capacity grew by 3.4 per cent (table II.1 and figure II.2), slightly up from 3.2 per cent in 2022. However, this growth rate is lower than the average of 5.2 per cent recorded over 2005–2023, which was driven by rapid fleet expansion during 2005–2012.

Fleet growth was uneven in 2023 with container ship capacity jumping by nearly 8 per cent and that of liquified gas carriers growing by 6.4 per cent. Tanker growth remained low, expanding by less than 2 per cent. The world's total fleet capacity reached about 2.4 billion dead weight tons, with bulkers making up 42.7 per cent and oil tankers 28.3 per cent of the total.

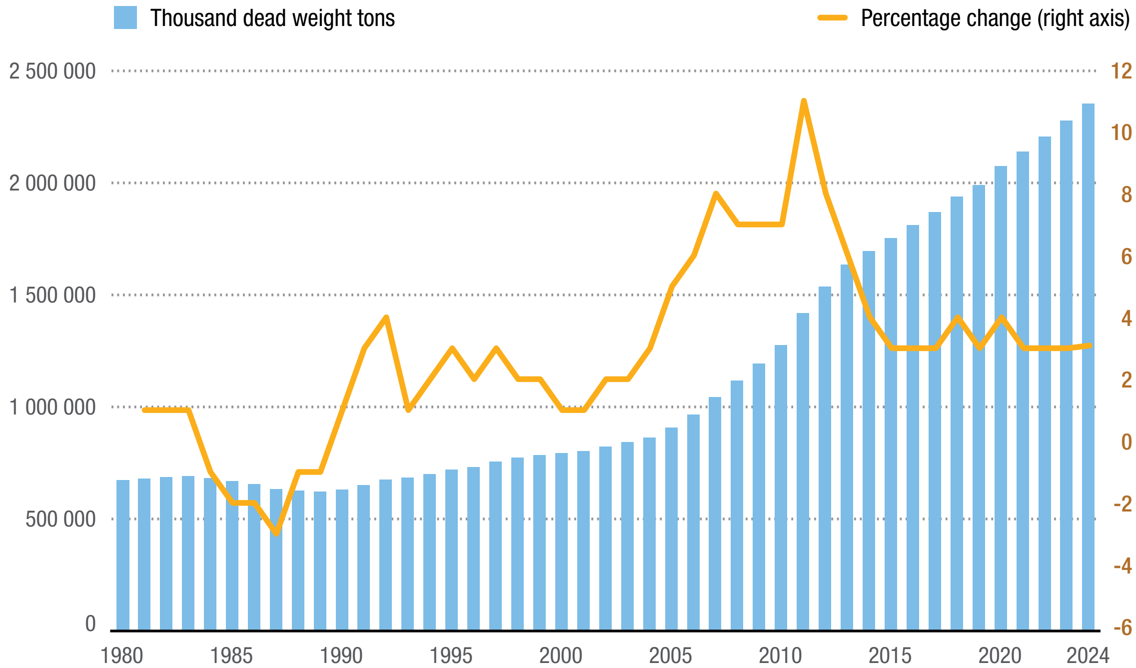
Table II. 1
Developments in the world fleet capacity by vessel types

Fleet composition by vessel type	Indicator[a]	2023	2024	Percentage change
Bulk carriers	Thousand dead weight tons	974 452	1 004 281	3.1
	Percentage share	42.8	42.7	
Oil tankers	Thousand dead weight tons	652 850	665 424	1.9
	Percentage share	28.7	28.3	
Container ships	Thousand dead weight tons	305 844	329 490	7.7
	Percentage share	13.4	14.0	
Other types of ships	Thousand dead weight tons	261 525	270 657	3.5
	Percentage share	11.5	11.5	
Offshore supply	Thousand dead weight tons	87 055	89 093	2.3
	Percentage share	3.8	3.8	
Liquefied gas carriers	Thousand dead weight tons	88 221	93 882	6.4
	Percentage share	3.9	4.0	
Chemical tankers	Thousand dead weight tons	51 535	52 582	2.0
	Percentage share	2.3	2.2	
Other/n.a.	Thousand dead weight tons	26 177	26 316	0.5
	Percentage share	1.1	1.1	
Ferries and passenger ships	Thousand dead weight tons	8 537	8 784	2.9
	Percentage share	0.4	0.4	
General cargo	Thousand dead weight tons	82 708	84 047	1.6
	Percentage share	3.6	3.6	
World total	Thousand dead weight tons	**2 277 379**	**2 353 899**	3.4

Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
[a] Propelled seagoing merchant vessels of 100 gross tons and above, as of 1 January 2024. Dead weight tons for some individual vessels estimated.

Figure II. 2

Trends in yearly world fleet growth: Capacity continues to expand in 2023 and 2024 but below the long term average



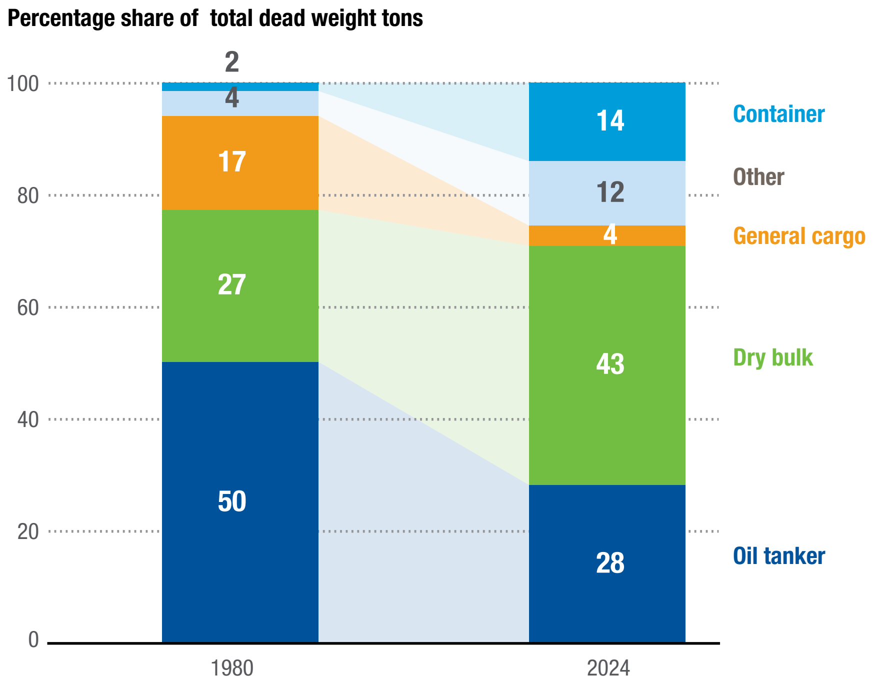
Source: UNCTAD calculations, based on data from Clarksons Research Shipping Intelligence Network.

Over the years, the structure of the world shipping fleet evolved in tandem with shifts in the structure of maritime trade. Dry cargo, particularly bulk commodities such as iron ore, coal and grain, increased their share in maritime trade, overtaking oil cargo. Containerization has reduced the need for general cargo ships, with breakbulk cargo increasingly transported in containers. As result, over the years, the share of dry bulk carriers increased and outpaced the share of oil tankers. Meanwhile, the share of container ships and other specialized vessels continues to overtake that of general cargo ships (figure II.3).

In 2023, ship capacity grew faster than maritime trade but lagged behind the demand measured in ton-miles (see chapter I). Fleet capacity growth is projected to grow at a similar rate in 2024 (by 3.4 per cent) and decelerate to 2.7 per cent in 2025 (Clarksons Research, 2024b). This slowdown reinforces the trend of recent years while also reflecting a low orderbook, long lead times at shipyards, higher newbuilding prices, and a strong second-hand market. Despite prevailing challenges and increased operating expenses (up 8 per cent year-on-year) and reduced earnings compared to the record levels seen in 2021 and 2022, most ship segments experienced solid cash flow and continued asset price increases (see chapter III) (Clarksons Research, 2024c).

In 2023 and the first half of 2024, the supply of ship capacity and vessel utilization were shaped by system inefficiencies and new opportunities to deploy fleet capacity arising from ongoing supply chain disruptions and rerouting. An example is the use of "shadow" fleets (particularly in tankers) amplified by the continued war in Ukraine and reinforced by latest disruptions. This trend has extended the service life for existing ships, boosted ship sales and purchases, increased second-hand prices, slashed ship demolition levels and motivated some investments in newbuilt vessels.

Figure II. 3
The shares of various ship types in the world fleet capacity, 1980 and 2024



Source: UNCTAD calculations, based on data from table II.1 of this report and UNCTAD statistics.

More ships were delivered in 2023 due to orders placed during the post-pandemic boom

In 2023, 1,665 vessels were delivered, adding 64.8 million gross tonnage capacity to the active fleet, that is, 3 per cent of the total fleet. Reversing the downward trend of 2022, ship gross tonnage delivered went up (16 per cent) in 2023, with container ships accounting for 35.3 per cent of the total, followed by bulkers (30.7 per cent), oil tankers (12.1 per cent) and liquified gas carriers. The distribution of gross tonnage across these vessel types is detailed in table II.2. In 2024, most new deliveries will be container ships and gas carriers, while most new orders are for tankers and bulkers.

In 2023, China, the Republic of Korea and Japan continued to dominate the shipbuilding market with these three countries accounting for about 95 per cent of the global output. This was the first time that China delivered more than 50 per cent of the world's new ship capacity. The Republic of Korea contributed 28.2 per cent and Japan contributed 14.9 per cent. China dominated all ship segments, except for oil tankers and liquified gas carriers, which were led by shipbuilders in the Republic of Korea. The decline in contributions from Japan and the Republic of Korea in recent years have enabled Chinese shipyards to take the lead. In addition to entering the liquified natural gas (LNG) carrier segment in 2022, China overtook the Republic of Korea in container shipping in 2023. Shipyard output in the Republic of Korea peaked at around 35 per cent in 2016. Historically, the output from Japan in the 1970s and 1980s hovered at around 50 per cent (BRS Shipbrokers, 2024).

For the fist time ever, **China delivered more than 50% of the global new ship capacity**

Table II. 2
Deliveries of newbuilt vessels, 2023

Newbuild vessels	China	Japan	Republic of Korea	Philippines	Viet Nam	Europe	Rest of the world	World total	Percentage share
(By type)	Gross tons and percentage share								
Oil tankers	1 844 222	350 537	4 988 816	2 232	425 986	130 282	90 014	7 832 089	**12.1**
Bulk carriers	12 473 399	6 352 971	195 148	790 002	46 011			19 857 531	**30.7**
General cargo ships	644 605	270 809	269 391		818	146 927	95 291	1 427 841	**2.2**
Container ships	13 512 628	2 231 385	7 100 704				42 600	22 887 317	**35.3**
Liquefied gas carriers	1 280 996	351 535	4 952 060			2 999	12 123	6 599 713	**10.2**
Chemical tankers	524 528	207 459	45 930			9 797	9 376	797 090	**1.2**
Offshore supply	1 517 788	3 922	740 491		31 352	50 903	149 790	2 494 246	**3.9**
Ferries and passenger ships	564 993	39 132	24 161	13 488	8 400	1 263 319	74 068	1 987 561	**3.1**
Other/n.a.	684 261	157 432	1 185	216	513	19 699	28 075	891 381	**1.4**
Total	**33 047 420**	**9 965 182**	**18 317 886**	**805 938**	**513 080**	**1 623 926**	**501 337**	**64 774 769**	**100**
Percentage share	**51.0**	**15.4**	**28.3**	**1.2**	**0.8**	**2.5**	**0.8**	**100.0**	

Source: UNCTAD calculations, based on data from Clarksons Research Services.
Note: Propelled seagoing merchant vessels of 100 gross tons and above.

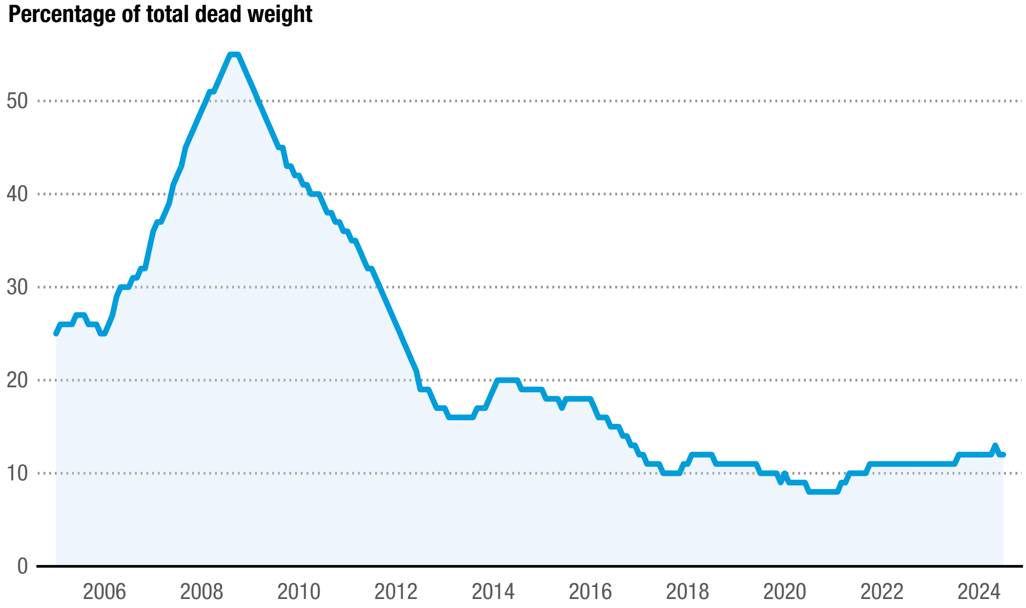
Fleet growth was moderate in 2023, with the ship orderbook remaining limited but greener

In 2023, the global ship orderbook increased by 9.8 per cent in terms of vessels and by 9.1 per cent in terms of capacity; this is less than three times the increase in 2022. Limited availability of berths at shipyards and high prices for newbuilds contributed to moderating growth. Despite the continued flow of fresh orders, the global orderbook remained relatively low, standing at 11 per cent of the active capacity, similar to level seen in 2019 (figure II.4).

At the start of 2024, the global ship orderbook represented 12 per cent of dead weight tonnage, totalling 4,870 vessels and 283 million tons. In terms of value, the orderbook reached 405.5 billion in June 2024, marking a 20.7 per cent increase from the same period in 2023. The size of the current orderbook does not closely follow traditional shipping cycle patterns, whereby more orders are typically placed during good times. For perspective, at the height of the global downturn in 2009, the orderbook as a percentage of dead weight tonnage of the active fleet was more than four times the size of the orderbook in 2023 and the first half of 2024. The relatively larger ship orderbook in 2009 and 2010 reflects the prevailing order cancellation trends and the fact that orders were made before the downturn.

Figure II. 4

Global ship capacity ordered as a percentage of the active fleet tonnage



Source: UNCTAD calculations, based on data from Clarksons Research Intelligence Network.
Note: Propelled seagoing merchant vessels of 100 gross tons and above.

In 2023, the composition of the orderbook shifted due to some fleet renewal plans and shipyards having a greater focus on building tankers and bulkers and as opportunities from the container shipping highs of 2021–2022 waned. At the start of 2024, the LNG carriers orderbook accounted for over 50 per cent of active capacity while container ships, bulkers, and tankers accounted for 25 per cent, 9.7 per cent and 7.5 per cent, respectively (Clarksons Research, 2024b).

In 2023, the oil tanker orderbook dropped to its lowest rate in three decades (4.4 per cent of the fleet capacity) before recovering to 7.5 per cent in the first quarter of 2024. The rise in orders for crude tankers can be put down to increased shipments from the United States and Brazil, rerouting trends due to the war in Ukraine and shipowners' ambitions to renew ageing crude tankers and align with environmental regulations. As regulations tighten up in the second-hand market, with a stronger focus on "know your customer" requirements (the need to verify clients), newbuilds become more appealing – they come with a clean ownership record and put owners in a better position for future transactions (Jallal, 2024). In 2023, the orderbook for bulkers grew marginally from 8.3 per cent of capacity in 2022 to 8.6 per cent before reaching 9.7 per cent in the first quarter of 2024, a share overshadowed by the 78 per cent recorded during the 2009 downturn.

Growing interest in LNG, including for fuelling ships, has boosted the orderbook for these vessels. LNG carriers averaged 27 per cent of fleet capacity in 2022, nearly 50 per cent in 2023 and over 51 per cent in the first quarter of 2024. While impressive, the highest LNG carriers orderbook-to-fleet-capacity ratio was recorded in 2006 (88 per cent). Liquified petroleum gas (LPG) carriers have also attracted more orders, with a share of approximately 23 per cent in 2023. This reflects expectations that LPG carriers and vessels designed to run on ammonia (NH_3 vessels) will be capable of transporting ammonia as an alternative fuel (BRS Shipbrokers, 2024).

Growing interest in LNG, including for fuelling ships, has boosted the orderbook for these vessels

Despite the relative weakening of the container freight market compared to 2021–2022 and the capacity influx of 2023, new orders remained surprisingly firm in 2023. Container ships continued to claim a large share of ship capacity on order in 2022 (24.1 per cent), in 2023 (29.5 per cent) and the first quarter of 2024 (24.5 per cent).

Ordering was boosted by dual-fuel vessels, which accounted for most of the container ship capacity on order at the start of 2024 (MDS Transmodal, 2024). In recent years, much of the container ship capacity ordered is alternative fuel-capable. Meanwhile, orders for ships that carry cars remain high, driven by car manufacturers in China (BRS Shipbrokers, 2024).

Ordering was boosted by dual-fuel vessels, which accounted for most of the container ship capacity on order at the start of 2024

Although the fuels of the future remain uncertain, the greening of the global orderbook is under way. This includes orders for ships that can use multiple types of fuel and those equipped with dual fuel capabilities, allowing them to use more than a single fuel type. At the start of 2024, uptake of energy saving technologies continued. Around 50 per cent of the gross tonnage of vessels on order was designed to use alternative fuels, and over 14 per cent was classified as alternative fuel-ready. LNG accounted for 36.1 per cent of the alternative fuel-capable orderbook while the methanol-capable orderbook, driven by container ships, increased its share to 9.3 per cent, up from 4 per cent at the start of 2023 (Clarksons Research, 2024b). Twelve orders for ammonia-capable ships were placed for the first time in 2023, while wind-assisted propulsion attracted more interest. Ports are also expanding their green infrastructure, with 195 ports currently offering LNG bunkering, 77 developing this capability and 28 providing bunkering for at least one other alternative fuel. At least 205 ports provide some shore-side power, with around 2,500 ships currently being fitted with shore power connections (Clarksons Research, 2024c). Shore-side power allows ships to shoreside electrical power at berth while their main and auxiliary engines are shut down.

The world fleet is ageing; environmental targets are hardening but progress towards fleet renewal remains slow

Regulatory measures to combat climate change increased in 2023. The European Union introduced the ETS scheme and compliance with the requirements of the International Maritime Organization (IMO) relating to the Energy Efficiency Existing Ship Index (EEXI) and the Carbon Intensity Indicator (CII) became mandatory. IMO also adopted its 2023 IMO Strategy on Reduction of GHG Emissions from Ships, which strengthened targets for shipping by aiming for net-zero emissions by 2050. Meanwhile, international efforts to decarbonize other modes of transport are also ongoing (box II.1).

In the context of growing decarbonization commitments, as well as a relatively moderate orderbook and restrained investment in newbuilds, global fleet renewal is emerging as a key theme. The global shipping fleet is ageing, with many ships soon due to reach the end of their service. The age of the global fleet by dead weight tonnage at the start of 2024 was 12.5 years; the age by vessel counts averaged 22.4 years, an increase of 2 per cent over the same period in 2023. Smaller, older ships are contributing to the higher average age. The fleet matured by more than three years compared to the previous decade (table II.3, figure II.5 and figure II.6), and more than half of the fleet by vessel count is now over 15 years old. Average ages of ships went up across all fleet segments, except for container ships, which saw an influx of new vessels in 2023.

The growing age of the global fleet and implications for fleet renewal could emerge as a concern given the stringent GHG emission reduction targets introduced by IMO in 2023, as well as continued uncertainty about the outcome of current negotiations at IMO that aim to adopt a basket of midterm measures (fuel standard and price mechanism);

Box II. 1

"Avoid", "shift" and "improve": strategies to reduce greenhouse gas emissions from inland transport

In February 2024, the Inland Transport Committee of the Economic Commission for Europe of the United Nations adopted its landmark ITC Strategy on Reducing Greenhouse Gas Emissions from Inland Transport (ECE 2024). The Strategy provides integrated solutions for the reduction of GHG emissions from the inland transport sector with an aspirational goal of net-zero by 2050. The Strategy complements the IMO Strategy on Reduction of GHG Emissions from Ships and the long-term aspirational goal of the International Civil Aviation Organization (ICAO) for net-zero carbon emissions from aviation by 2050 (ICAO, 2022).

GHG emissions from global transport have continuously risen over the past decades across most world regions. The transport sector accounts for roughly 15 per cent of total GHG emissions and about 23 per cent of global energy-related carbon dioxide (CO_2) emissions (IPCC, 2022). Inland transport contributed more than 72 per cent of these emissions in the transport sector, with 69 per cent stemming from road transport (IPCC, 2022), which remained one of the fastest growing (1.7 per cent per year) among all global energy-using sectors (IPCC, 2022). These figures highlight the critical role of transport, particularly inland transport, in combating climate change, and the great potential it has to help countries meet their climate change mitigation goals.

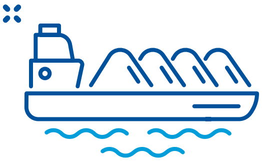
While many United Nations Member States are already taking action to decarbonize transport, current transport policies and measures are insufficient to put transport on a decarbonization pathway in line with the 1.5°C target of the Paris Agreement. It is clear that further ambitious innovative action is needed (ECE, 2024a and 2024b). Meeting the 1.5°C goal and progressing towards achieving the Sustainable Development Goals implies a radical transformation of mobility and transport systems and for these to be prioritized in policy, regulatory and fiscal frameworks. The decarbonization strategy from the Inland Transport Committee greatly contributes to these efforts. It includes an initial climate action plan, with 33 coordinated actions for the Committee and its 21 subsidiary bodies, and it also recommends further actions for the inland transport sector of individual countries. The strategy follows a broad decarbonization framework based on "avoid", "shift" and "improve" measures, which are defined as follows:

- Avoid: Reduce unnecessary vehicle kilometres by promoting compact development, increasing accessibility to services and minimizing the need to travel.
- Shift: Transition to low- and zero-carbon sustainable transport modes and operations.
- Improve: Enhance vehicles, infrastructure and operations to be more environmentally friendly.

The framework provides guidance for countries and the Inland Transport Committee and its subsidiary bodies to take concrete steps. With the adoption of this strategy, the ambitious goal of decarbonizing transport can be achieved across all modes of transport (air, inland and maritime transport) within the United Nations family.

Source: ECE, 2024.

Although the fuels of the future remain uncertain, **the greening of the global orderbook is under way**



Bulk carriers are relatively young, ~11.1 years in 2024, while general cargo vessels are the oldest (28 years)

the need to ensure the availability at scale of safe alternative fuels and related bunkering infrastructure; and current market trends discouraging fleet demolition and investment in newbuilds. By delaying fleet renewal decisions, these considerations mean that the global fleet will continue to age, and the shipping industry will not be operating a younger, more efficient and environmentally sustainable fleet.

Retrofitting older vessels is one solution, as this helps extend a vessel's economic life and ensures the ship remains competitive while compliant with environmental regulations. That said, retrofitting means downtime for ships, as the vessel is taken out of operation for extended periods, which reduces available capacity. Retrofits also mean that older vessels could still lag behind newbuilds in terms of performance and efficiency (Ship Universe, 2024).

Bulk carriers are relatively young, averaging 11.1 years in 2024, while general cargo vessels are the oldest (28 years). Average ages for fleets by number of vessels across developed and developing country flags were comparable and hovered at around 22 years at the start of 2024 (table II.3).

Although, currently, over 30 per cent of fleet tonnage is made up of "eco" ships, which are typically at least 20 per cent more efficient at present-day speeds, a rapid transition to more sustainable shipping is necessary. The industry must renew its fleet and adopt newer, greener and more efficient vessels.

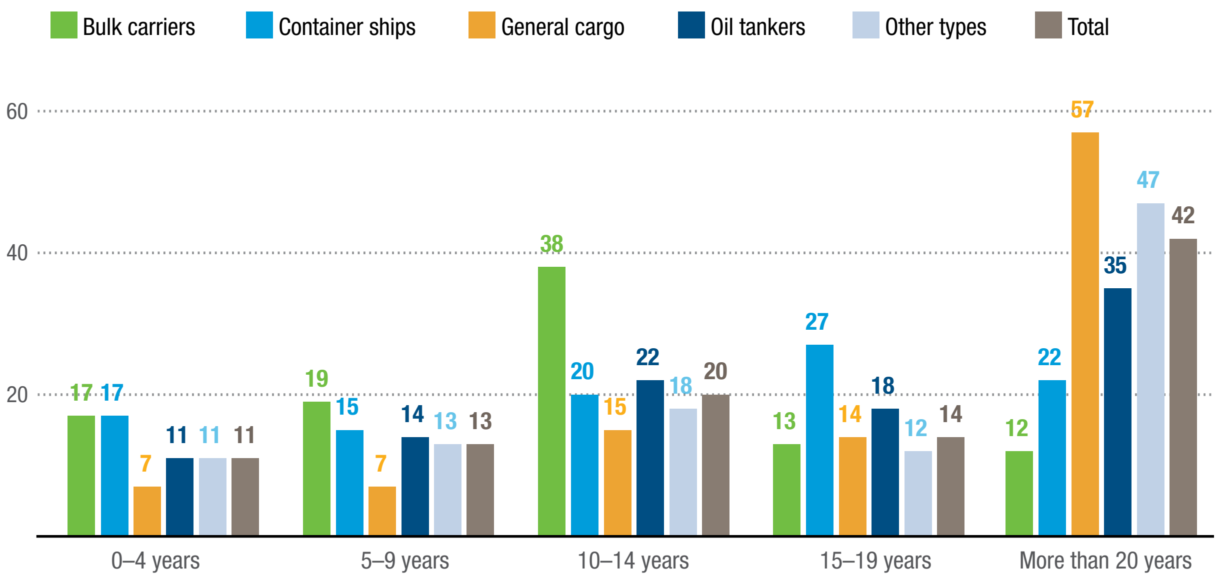
Table II. 3

The age profile of the merchant fleet: average ship sizes of the world fleet and fleet capacity in developed and developing economies

		Age group						
		0–4	5–9	10–14	15–19	More than 20		
Ship type	*World average ship sizes in dead weight tons*							
Bulk carriers		83 752	80 858	75 558	68 374	50 202		
Container ships		68 382	81 065	63 231	42 856	28 566		
General cargo		6 246	5 777	6 673	4 715	2 743		
Oil tankers		88 519	74 244	66 393	63 151	20 977		
Other ship types		7 942	7 144	4 554	6 764	3 109		
All ships		36 893	34 007	32 488	25 415	7 213		
		Age group					Average age	
	Developing economies	0–4	5–9	10–14	15–19	More than 20	2023	2024
All ships	Percentage of total ships	11.6	12.5	21.3	14.7	39.8	20.9	21.3
	Percentage of dead weight tons	17.9	17.0	27.6	17.5	20.1	13.2	13.6
	Average ship size (dead weight tons)	25 930	22 763	21 772	19 929	8 464		
	Developed economies							
All ships	Percentage total ships	12.3	13.8	20.0	13.8	40.1	21.3	21.8
	Percentage of dead weight tons	21.5	22.5	33.3	15.3	7.5	10.8	11.1
	Average ship size (dead weight tons)	54 417	50 640	51 745	34 487	5 801		

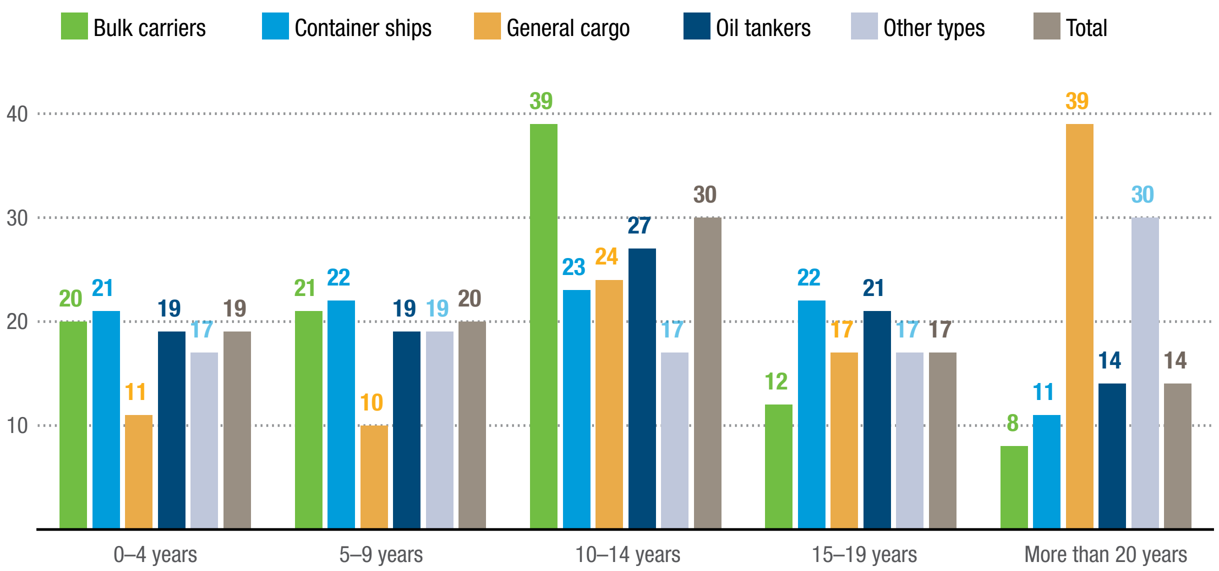
Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
Note: Propelled seagoing vessels of 100 gross tons and above, as of 1 January 2024. Dead weight tons for some individual vessels have been estimated. The average age of a dead weight ton is calculated as the sum of all products of the age and dead weight tonnage of a ship, divided by the sum of the dead weight tonnage of all ships.

Figure II. 5
Average age of world fleet, percentage number of vessels, 2024



Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
Note: Propelled seagoing vessels of 100 gross tons and above, as of 1 January 2024.

Figure II. 6
Average age of world fleet, percentage of dead weight tons, 2024



Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
Note: Propelled seagoing vessels of 100 gross tons and above, as of 1 January 2024.

The industry must renew its fleet and adopt newer, greener and more efficient vessels

A newer fleet would replace outdated older ships, meet environmental goals and deliver on future demand for shipping capacity and services. This demand could be driven by market conditions or other factors, such as disruptions, as seen in the past four years.

Fleet renewal will require investing in newbuilt ships, retrofitting existing ones and scrapping older tonnage. However, limited ship demolition activity due to factors such as strong charter markets and demand for shipping capacity arising from disruptions and increased distances, is extending the lifespan of older vessels and delaying their removal. The need to transition to low-carbon fuels and comply with more stringent environmental regulations means the fleet must be renewed in a timely manner. However, uncertainty about the fuels of the future makes this more complicated. At the same time, the current orderbook is uneven. The largest shipping segments (dry bulk, crude, product and chemical tankers) are seeing limited renewal and seem less prepared to meet environmental goals. A concern in this respect is the low contracting activity in these segments and an orderbook that does not currently favour dual-fuel capabilities (Danish Ship Finance, 2023).

When a younger, greener fleet will be ready and available is uncertain. A greener fleet will depend on progress made in retrofitting the existing global fleet and shipyard capacity. While some shipyards may be able to build the ships of the future, others may need to invest in upgrades with regard to infrastructure, equipment, worker skills and technology. Going forward, it will be important to assess whether global shipyards have an adequate grasp of technology to ensure that ships are built to high-quality standards and can meet new efficiency and environmental standards in a smarter and faster way, without disrupting production lines (Dassault Systèmes, 2024).

There is also uncertainty around how fleet dynamics will develop in the longer term in tandem with the global energy transition. Some ship types are more likely to experience shortages or increased demand. For example, demand for oil and coal is likely to decline, and iron ore demand is unlikely to increase materially. Meanwhile, other bulk commodities, such as minerals used for clean energy technologies, containers and chemicals, are likely to increase. The energy transition will boost demand for bulk carriers to deliver raw materials, such as metals and minerals (for example, chromium and cobalt) required for renewable energy projects. LNG bunkering vessels and specialized ships transporting captured CO_2 or hydrogen will also be in demand (BRS Shipbrokers, 2024).

Low demolition rates and strong second-hand markets are influencing investment in newbuilds and fleet renewal

In 2023 and during the first half of 2024, ship scrapping or recycling activity was subdued. Older ships were employed fulfilling opportunities that arose due to disruptions to shipping routes and benefiting from high freight rates. Continued uncertainty about the future regulatory framework and low-carbon ship technologies and fuels has also contributed to keeping ship demolition levels low.

A total of 431 vessels were sent for scrapping in 2023, 11 vessels less than the previous year. Demolition sales by tonnage increased 4.3 per cent over the previous year and reached 7.5 million gross tons or 0.5 per cent of the total active fleet (table 2.4). Volumes sold for scrapping in 2022 and 2023 were the lowest in over a decade. Following a 50 per cent reduction in 2022, volumes increased by only 4 per cent in 2023 (figure II.7).

Most of the tonnage sold for demolition was made up of bulk carriers (40.7 per cent), container ships (24.8 per cent) and offshore supply vessels (10.6 per cent). Although more bulkers were scrapped in 2023, demolition levels remained limited. Following a near halt in 2021–2022, container ship demolitions resumed in 2023 although the need to reroute around the Cape of Good

Hope slowed some of the scrapping activity. A strong charter market meant that fewer tankers were scrapped during the year. Strong demand encouraged key players to either keep their vessels or sell them to third parties to be employed under the "shadow" fleet which, at the start of 2024, amounted to 7.4 per cent of the global active tanker fleet, and averaged 21 years of age (BRS Shipbrokers, 2024), that is, older than the general tanker fleet. Improved tanker market conditions, high freight rates, increased earnings, more employment for existing ships and higher value for older tonnage all contributed to limiting tanker scrapping.

A key development in ship demolition activity is the upcoming entry into force of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships. Set to enter into force on 26 June 2025, compliance will mean additional expenditure and costs for ship demolition yards. For example, all facilities in India, which accounted for 7.1 per cent of total gross tonnage sold for scrapping in 2023, are currently compliant. In Bangladesh, which accounted for about 46 per cent of tonnage sold for demolition, one third of the facilities are reportedly compliant or in the process of becoming certified. There remains uncertainty regarding Pakistan, another key player, as it currently lacks compliant facilities. The European Union is also lacking compliant recycling capacity and is reviewing its Ship Recycling Regulation (SRR). Since 2020, this regulation has required European Union-flagged ships to be recycled at an approved European Union facility (Allen, 2023). The SRR requires all large sea-going vessels sailing under the flag of a European Union member State to use an approved ship recycling facility included in the European List of Ship Recycling Facilities (European Commission, 2023a).

Although ship demolition activity is currently low, the pace of scrapping is expected to rise in the coming years as the pressure to renew the global fleet intensifies. The fleet of 240 steam turbine LNG vessels offers candidate ships for scrapping (Clarksons Research, 2024d), while an end to rerouting around the Cape of Good Hope (the precise timing of which is uncertain) is expected to send more container ships to scrapping yards.

Fleet renewal will require **investing in newbuilt ships, retrofitting existing ones and scrapping older tonnage**

Table II. 4
Ship tonnage sold for scrapping, 2023

Vessel type	Bangladesh	Pakistan	India	Türkiye	Brazil	Rest of the world	World total	Percentage share
By type			*Thousand of gross tons and percentage share*					
Bulk carriers	2 185.9	582.9	0.0	254.6	0.0	18	3 041.5	40.7
Container ships	444.7	1 132.9	130.6	30.4	0.0	115	1 853.8	24.8
Offshore supply	110.2	93.7	140.5	11.4	273.3	163	792.2	10.6
Liquefied gas carriers	213.8	295.1	109.7	0.0	0.0	5	623.4	8.3
Oil tankers	201.4	102.7	1.8	74.4	0.0	35	415.6	5.6
General cargo ships	158.7	56.1	45.3	0.0	0.0	44	303.8	4.1
Ferries and passenger ships	26.2	15.5	83.8	0.0	0.0	11	136.7	1.8
Chemical tankers	3.2	98.2	0.0	0.4	0.0	7	109.1	1.5
Other/n.a.	74.9	88.5	18.1	0.0	0.0	17	198.4	2.7
Total gross tons	**3 419**	**2 466**	**530**	**371**	**273**	**416**	**7 474**	**100.0**
Percentage share	**45.7**	**33.0**	**7.1**	**5.0**	**3.7**	**5.6**	**100**	

Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
Note: Propelled seagoing vessels of 100 gross tons and above.

The pace of demolition will also accelerate if more ship scrapping yards get approved; the European Union could approve some ship scrapping facilities in India, while Brazil and Egypt are considering entering the ship demolition business (Chambers, 2024a).

In 2023, the second-hand market, especially for bulkers, tankers and LPG carriers, remained firm, albeit slightly weaker than in 2022. This was driven by improved supply–demand factors in the dry bulk trade, disruptions to shipping routes and continued use of a shadow fleet. A moderate orderbook, the motivation to renew the fleet and higher newbuilding prices also supported the market. Sales and purchases of LNG carriers normalized following a period of strong activity and container ship transactions returned to pre-2021 levels. Underscoring the ageing profile of the global fleet, around 60 per cent of the second-hand ships sold in 2023 were above 15 years of age, a share well above the 45 per cent recorded in 2016–2019.

Beyond supply and demand, other factors may be influencing the shipping cycle

Although trade and fleet capacity remain the key drivers of the shipping cycle, other factors can impact the boom and bust cycle. Such factors include, as observed in recent years, an increase in distances travelled caused by ship rerouting onto longer routes. Extended ship journeys and longer distances result in increased ton-mile demand which, in turn, alters the actual supply of ships' carrying capacity. Continued regulatory uncertainty around the fuels of the future, together with underlying overcapacity are also at play and are affecting how the cycle operates.

Shipbuilding cycles typically follow patterns of expansion and contraction. Freight and charter rates serve as market signals that drive decisions about ordering new ships, putting ships in "idle" or "layup" status, buying or selling ships, as well as demolition. In the short term, the supply of shipping capacity is inelastic and cannot quickly adjust to changes in demand as it takes several years to build new ships.

This creates a time lag that is inherent to the shipping cycle and prevents supply and demand being aligned. For example, while orders of new ships may increase during boom periods, delivery takes place years later and might coincide with a weaker market.

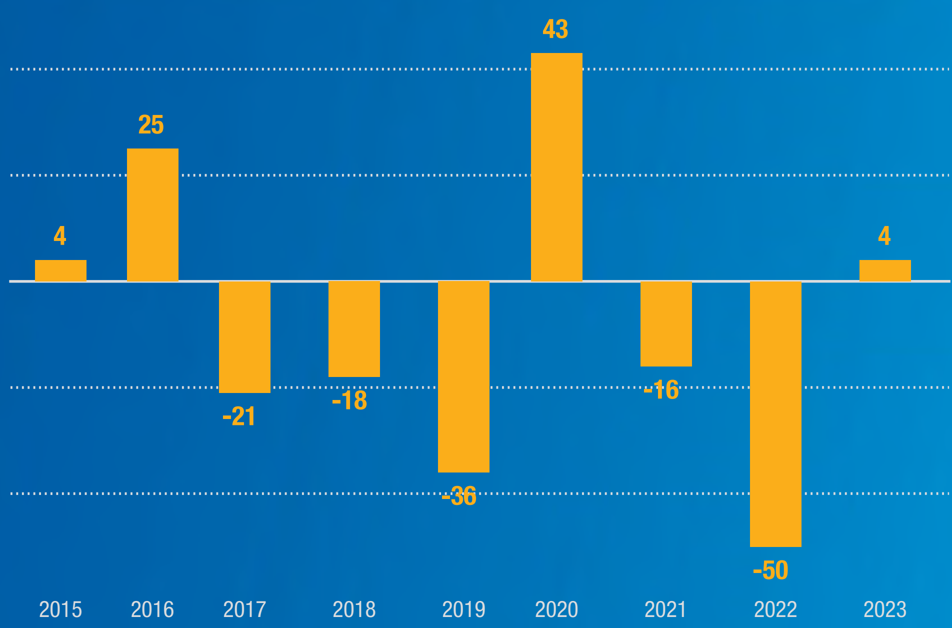
Trends observed since the end of 2023 suggest some diversion from these usual patterns. There seems to be a new set of conditions affecting the shipping cycle since some disturbances in its functioning have been observed in recent years. For example, while container shipping conditions improved in the first half of 2024, the sector also grappled with volatile freight rates, underlying overcapacity, an ageing fleet, a need to plan for fleet renewal and to decarbonize. Together, these factors would normally mean an increase in the contracting activity of younger, greener vessels and higher levels of demolition, especially given the large deliveries of container ships in 2023 and 2024. However, as shown in figure figure II.8, during the first half of 2024, the market saw historically low ship demolition levels. The market also faced firm charter rates, largely supported by increased distance-adjusted demand. Furthermore, new container ships are still being ordered, although at a slower pace than in 2021, which saw a flurry of orders and contracts due to the global logistics crunch of 2020–2021.

Figure II.8 illustrates the time lag between ship deliveries and new contracts. Demolitions and charter rates move in opposite directions as shipowners hold on to older tonnage expecting to take advantage of ship employment opportunities during good market conditions. New contracts typically rise in tandem with increases in ship earnings and charter rates. However, the figure shows that some deviation away from established patterns can also occur, as is the case in 2024. For example, while charter rates are currently surging and deliveries are growing, new contracts and demolitions remain relatively low.

Overall, the four variables (demolitions, deliveries, new contracts and charter rates) featured in figure II.8 are behaving according to established patterns. For example, as charter rates and new contracts increase, ship demolition declines. At the same time, the magnitude of the change between charter rates and new contracts seems to have changed since the COVID-19 pandemic. Historically, new contracts and charter rates tend to increase and decrease in tandem, with new contracts typically recording larger changes. However, since the pandemic, the scale of these changes has noticeably altered, with charter rates now showing more significant fluctuations than new contracts.

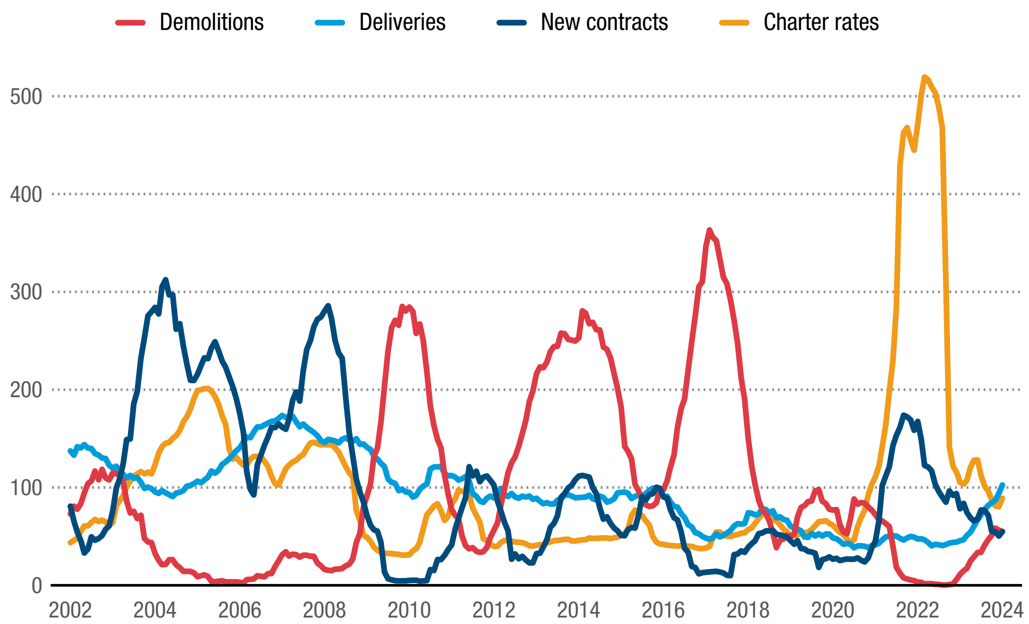
Although trade and fleet capacity remain the key drivers of the shipping cycle, **other factors can impact the boom and bust cycle**

Figure II. 7
Ship tonnage sold for scrapping, 2015–2023



Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
Note: Propelled seagoing vessels of 100 gross tons and above.

Figure II. 8
Container shipping cycle patterns



Source: UNCTAD calculations, based on data from Clarksons Research Services.
Note: Index average = 100; deliveries, new contracts, and demolitions are 12 monthly averages; deliveries, new contracts, and demolitions are in per cent of the world container shipping fleet in TEU. Charter rates are in dollars per day.
While freight rates and charter rates are correlated, using charter rates is more relevant to capture the cyclical nature of shipping and better reflect the cost and revenue structure of shipowners and operators who make the overall decisions relating to the shipping fleet.

These trends suggest that factors other than supply and demand are also shaping shipowners' decisions. These include shipowners' strategies aimed at gaining market share by, for example, holding on to older tonnage and delaying fleet renewal and demolition decisions. The age of the fleet (for example, whether the fleet is old and ready for scrapping or too young to demolish), disruptions that alter supply and demand ship carrying capacity (such as the Red Sea disruption) as well as uncertainty (for example, future fuels and green technologies) all affect shipowners' behaviour and influence their decisions. This in turn determines the shipping cycle patterns. In this context, further research is needed to assess whether the traditional shipping cycle is undergoing a fundamental shift and to identify the key factors driving this change (Perrotti et al., 2024).

In 2023, the top 35 flag registers accounted **for 94 of the world fleet**

Global fleet capacity is predominantly owned by developed economies but mainly flies the flags of developing economies

In 2023, the top 35 flag registers accounted for 94 of the world fleet. Eighteen of the leading registers were from developing economies and accounted for 76 per cent of the world fleet capacity. The top 10 flags of registration accounted for over 78 per cent of the world capacity (table II.5) and featured both open – that is, registers allowing registration of foreign-owned ships – and national (domestic) registers. These were, in order, Liberia, Panama, the Marshall Islands, Hong Kong (China), Singapore, China, Malta, the Bahamas, Greece and Japan.

Table II. 5
Leading flags of registration by dead weight tons, as of 1 January 2024

Rank	Flag of registration	Number of vessels	Share of world total vessels (percentage)	Dead weight tons	Share of world total dead weight tons (percentage)	Average vessel size (dead weight tons)	Growth in dead weight tons 2023 to 2024 (percentage)
1	**Liberia**	5 215	4.8	408 369	17.3	78 307	7.9
2	**Panama**	8 338	7.7	379 833	16.1	45 554	3.8
3	**Marshall Islands**	4 273	3.9	308 501	13.1	72 198	2.9
4	**Hong Kong, China**	2 487	2.3	200 378	8.5	80 570	0.0
5	**Singapore**	3 245	3.0	141 013	6.0	43 455	4.3
6	**China**	9 530	8.8	133 647	5.7	14 024	4.8
7	**Malta**	1 867	1.7	102 467	4.4	54 883	-6.0
8	**Bahamas**	1 266	1.2	72 438	3.1	57 218	0.5
9	**Greece**	1 211	1.1	56 279	2.4	46 473	-4.5
10	**Japan**	5 265	4.8	43 007	1.8	8 168	3.1
11	**Indonesia**	12 226	11.2	32 741	1.4	2 678	8.2
12	**Cyprus**	993	0.9	30 646	1.3	30 862	-3.0
13	**International Shipping Register of Madeira**	814	0.7	29 290	1.2	35 982	9.2
14	**Danish International Register of Shipping**	580	0.5	24 887	1.1	42 909	-1.4
15	**Republic of Korea**	2 162	2.0	21 221	0.9	9 816	12.0
16	**Islamic Republic of Iran**	984	0.9	20 779	0.9	21 117	0.3
17	**Norwegian International Ship Register**	690	0.6	20 139	0.9	29 187	-5.3
18	**Isle of Man**	262	0.2	19 355	0.8	73 873	-3.6
19	**India**	1 900	1.7	18 421	0.8	9 695	1.6
20	**Saudi Arabia**	443	0.4	14 287	0.6	32 250	6.6
21	**Viet Nam**	1 953	1.8	13 236	0.6	6 777	6.6
22	**United States of America**	3 501	3.2	13 215	0.6	3 775	4.7
23	**Russian Federation**	2 902	2.7	11 867	0.5	4 089	5.7
24	**United Kingdom**	843	0.8	11 135	0.5	13 209	4.2
25	**Malaysia**	1 778	1.6	9 440	0.4	5 309	-0.2
26	**Germany**	593	0.5	8 056	0.3	13 585	10.8
27	**Cameroon**	295	0.3	8 050	0.3	27 290	11.0
28	**Belgium**	191	0.2	7 974	0.3	41 751	-12.9
29	**Palau**	536	0.5	7 892	0.3	14 723	49.2
30	**Italy**	1 240	1.1	7 670	0.3	6 185	-15.8
31	**France**	492	0.5	7 512	0.3	15 269	28.2
32	**Türkiye**	1 203	1.1	7 230	0.3	6 010	8.4
33	**Nigeria**	945	0.9	6 866	0.3	7 266	16.2
34	**Kingdom of the Netherlands**	1 191	1.1	6 714	0.3	5 637	1.7
35	**Bermuda**	110	0.1	6 541	0.3	59 461	-7.1
	Top 35	**81 524**	**74.9**	**2 211 094**	**93.9**	**27 122**	**3.2**
	World total	**108 789**	**100**	**2 353 899**	**100.0**	**21 537**	**3.4**

Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
Note: Propelled seagoing merchant vessels of 100 gross tons and above, as of 1 January 2024. Dead weight tons for some individual vessels have been estimated.

Over half of the world ship capacity is owned by owners in developed economies **while most of the capacity is registered under flags of developing economies**

The Liberian register, which surpassed Panama's register in terms of dead weight capacity in 2022 maintained the top position in 2023 (17.3 per cent) followed by Panama (16.1 per cent) and the Marshall Islands (13.1 per cent). In 2023, the registry of Liberia increased capacity nearly 8 per cent year-on-year, more than double the growth in the registers of Panama and the Marshall Islands. In terms of number of vessels, among these three economies, Panama held the largest share with over 8,300 vessels, followed by Liberia, and the Marshall Islands. Combined, the three leading flags accounted for 46.5 per cent of the global ship carrying capacity in 2023. Meanwhile, China (9,530) and Indonesia (12,226) had more vessels.

In 2023, except for 10 flags, capacity registered in the remaining top 33 registers increased but at varying growth rates. Palau, France and Nigeria saw particularly significant jumps, at 49.2 per cent, 28.2 per cent and 16.2 per cent, respectively. Consequently, these three registers moved up the ranks to feature in the top 35. The registers of Antigua and Barbuda, the Philippines, and Taiwan Province of China moved down and dropped out of the top 35 ranking.

Owners have direct control over their fleet and investment decisions, such as the size and type of ships, the board technology, the fuels, the engines and the propulsion systems to adopt. Global fleet ownership by vessel counts and capacity remains concentrated in developed economies, although some developing economies have made the top 10 list.

In 2024, over 70 per cent of the global ship capacity in dead weight tons and more than half of all vessels were registered under a foreign flag. This underscores a distinct feature of international shipping, where owners and flags of registration are generally two separate entities.

The proportion varies across economies. Some economies, such as Germany, Greece and Japan have over 80 per cent of their fleet capacity registered under a foreign flag. Bermuda, Monaco and Oman, have all their tonnage flagged out. At the other end of the spectrum, capacity in the Islamic Republic of Iran, Bangladesh, Indonesia and Saudi Arabia, is predominantly nationally flagged. For Indonesia, the nationally flagged capacity is mainly deployed in inter-island shipping, while in Saudi Arabia it largely reflects the nationally controlled oil tanker fleet.

In 2023, 17 developed and 18 developing economies, respectively made up the top 35 ship owning nations accounting for 52.3 per cent and 42.1 per cent tonnage, respectively (table II.6). Over half of the world ship capacity is owned by owners in developed economies while most of the capacity (76 per cent) is registered under flags of developing economies.

The contribution of developing economies to the ownership list is largely driven by China, Singapore, Hong Kong China, and Taiwan Province of China, all of which ranked among the top 10 ship owning nations. Fleet ownership is concentrated in Asia, Europe and North America, with a small share of owners from Nigeria (0.4 per cent) and Brazil (0.6 per cent) appearing in the top 35. While its share remained limited, Bangladesh (0.2 per cent) entered the top 35 list in 2023, while Kuwait dropped out of the ranking.

In terms of monetary value, the global fleet reached $1.37 trillion in 2024 with the top 10 owners accounting for about two-thirds of the total value. Greece ranked first, followed by China and Japan (table II.7). The top 35 registers accounted for over 93 per cent of the global fleet value with the fleet of Panama concentrating close to 13 per cent of the total, followed by Liberia (12.6 per cent) and the Marshall Islands (11.9 per cent).

Table II. 6

World fleet ownership by capacity in dead weight tons and flag of registration, as of 1 January 2024

	Country or territory of ownerhip	Number of vessels			Dead weight tons				
		National flag	Foreign flag	Total	National flag	Foreign flag	Total	Foreign flag as a percentage of total	Total as a percentage of world dead weight
1	**Greece**	580	4 406	4 992	49 985 667	344 971 148	394 977 181	87.3	16.9
2	**China**	6 600	2 772	9 418	130 737 555	178 336 427	309 870 897	57.6	13.3
3	**Japan**	959	3 142	4 104	38 689 931	203 666 970	242 366 672	84.0	10.4
4	**Singapore**	1 350	1 445	2 824	67 827 285	78 156 951	146 047 319	53.5	6.3
5	**Hong Kong, China**	869	1 104	2 000	76 961 461	57 939 090	135 586 887	42.7	5.8
6	**Republic of Korea**	826	852	1 688	19 896 324	77 045 438	97 020 891	79.4	4.2
7	**Germany**	172	1 918	2 091	7 492 926	66 931 088	74 427 230	89.9	3.2
8	**Taiwan Province of China**	144	890	1 043	5 826 691	54 846 644	60 735 889	90.3	2.6
9	**United Kingdom including Isle of Man**	334	928	1 267	9 070 489	47 538 877	56 980 416	83.4	2.4
10	**Norway**	936	898	1 836	17 331 399	36 441 844	53 903 936	67.6	2.3
11	**Bermuda**	0	420	420	-	52 293 715	52 293 715	100.0	2.2
12	**United Arab Emirates**	130	1 291	1 427	596 404	50 624 996	51 247 355	98.8	2.2
13	**United States including Puerto Rico**	770	1'010	1 788	10 477 424	39 245 905	50 416 065	77.8	2.2
14	**Türkiye**	401	1 619	2 030	6 623 393	40 174 680	46 849 025	85.8	2.0
15	**Switzerland**	14	647	661	835 748	40 293 135	41 128 883	98.0	1.8
16	**India**	926	345	1 275	17 670 993	23 006 477	40 697 051	56.5	1.7
17	**Denmark**	399	373	772	20 313 094	18 447 451	38 760 545	47.6	1.7
18	**Indonesia**	2 398	132	2 540	28 277 194	3 430 913	31 980 209	10.7	1.4
19	**Monaco**	0	337	337	-	31 699 502	31 699 502	100.0	1.4
20	**Cyprus**	113	311	424	3 939 325	25 272 183	29 211 508	86.5	1.3
21	**Belgium**	81	211	292	7 038 164	17 182 252	24 220 416	70.9	1.0
22	**Russian Federation**	1 551	269	1 828	10 708 028	10 997 997	21 726 655	50.6	0.9
23	**Islamic Republic of Iran**	240	13	254	18 340 397	679 712	19 021 661	3.6	0.8
24	**France**	144	309	453	4 145 965	14 162 666	18 308 631	77.4	0.8
25	**Kingdom of the Netherlands**	650	536	1 186	5 437 806	12 600 744	18 038 550	69.9	0.8
26	**Viet Nam**	938	212	1 158	12 097 561	5 446 178	17 561 034	31.0	0.8
27	**Saudi Arabia**	176	122	300	14 023 679	2 555 698	16 583 171	15.4	0.7
28	**Brazil**	297	86	384	4 687 509	9 423 957	14 116 966	66.8	0.6
29	**Italy**	420	163	583	6 789 366	6 762 515	13 551 881	49.9	0.6
30	**Malaysia**	442	164	618	6 435 077	3 539 337	10 016 263	35.3	0.4
31	**Canada**	216	158	375	2 645 448	7 351 057	9 996 989	73.5	0.4
32	**Nigeria**	218	72	298	5 341 412	3 371 996	9 344 789	36.1	0.4
33	**Oman**	3	69	72	518	7 727 130	7 727 648	100.0	0.3
34	**Qatar**	47	88	135	608 178	7 006 679	7 614 857	92.0	0.3
35	**Bangladesh**	276	6	282	5 107 202	190 469	5 297 671	3.6	0.2
	Top 35	**23 620**	**27 318**	**51 155**	**615 959 613**	**1 579 361 821**	**2 199 328 358**	**71.8**	**94.2**
	World	**26 692**	**30 135**	**58 173**	**650 553 871**	**1 650 129 315**	**2 334 036 650**	**70.7**	**100.0**

Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
Note: Propelled seagoing vessels of 1,000 gross tons and above, as of 1 January 2024. The totals include vessels for which the flag is unknown. Thus, the sum of national and foreign flags equals the total. Foreign flag as a percentage of total is calculated as share of vessels with known flag.

Table II. 7
World fleet ranked by commercial value, as of 1 January 2024

	Country or territory of ownership	Percentage share of total value		Flag of Registration	Percentage share of total value
1	Greece	11.8	1	Panama	12.8
2	China	11.6	2	Liberia	12.6
3	Japan	10.7	3	Marshall Islands	11.9
4	United States	7.7	4	Bahamas	7.2
5	Singapore	5.4	5	Singapore	6.2
6	Norway	4.5	6	China	6.1
7	United Kingdom	4.1	7	Malta	6.0
8	Hong Kong, China	3.9	8	Hong Kong, China	6.0
9	Republic of Korea	3.5	9	Greece	2.1
10	Germany	3.2	10	Japan	1.8
11	Switzerland	2.3	11	Norwegian International Ship Register	1.7
12	Bermuda	2.2	12	Italy	1.5
13	Taiwan Province of China	2.0	13	Cyprus	1.3
14	Kingdom of the Netherlands	1.8	14	Danish International Register of Shipping	1.2
15	Denmark	1.7	15	International Shipping Register of Madeira	1.2
16	United Arab Emirates	1.7	16	Bermuda	1.1
17	Italy	1.6	17	Indonesia	1.1
18	Brazil	1.4	18	United States	1.0
19	Türkiye	1.4	19	United Kingdom	0.9
20	Russian Federation	1.2	20	Russian Federation	0.9
21	India	1.2	21	Kingdom of the Netherlands	0.9
22	France	1.1	22	Republic of Korea	0.8
23	Indonesia	1.1	23	France	0.8
24	Monaco	0.9	24	Isle of Man	0.8
25	Cyprus	0.9	25	Norway	0.7
26	Malaysia	0.8	26	Malaysia	0.6
27	Belgium	0.8	27	India	0.6
28	Nigeria	0.8	28	Brazil	0.6
29	Saudi Arabia	0.5	29	Nigeria	0.6
30	Canada	0.5	30	Australia	0.5
31	Viet Nam	0.5	31	Viet Nam	0.4
32	Qatar	0.5	32	Türkiye	0.4
33	Sweden	0.5	33	Germany	0.4
34	Australia	0.5	34	Saudi Arabia	0.3
35	Angola	0.4	35	Antigua and Barbuda	0.3
	Top 35 countries or territories	**94.7**		**Top 35 flags**	**93.2**
	Rest of the World	**5.3**		**Rest of the World**	**6.8**
	Total	**100.0**		**Total**	**100.0**

Source: UNCTAD calculations, based on data provided by Clarksons Research Services.
Note: Vessels of 1,000 gross tons and above.

B. Some factors currently shaping fleet renewal and greening trends

Asymmetrical and tiered global shipyard capacity and cost pressures have implications for renewing and greening the global fleet

Pressure on the shipbuilding sector and on shipyard capacity can influence the timely renewal of the global fleet and the pace at which it becomes greener. One estimate suggests that, at the current rate, it would take decades to build the green fleet required for the future (BRS Shipbrokers, 2024).

Global shipyard capacity faces a situation involving a capacity mismatch, with some yards being overbooked with limited yard slots, while others are underutilized and may even cease operating. Since 2010, shipyards have undergone restructuring, mergers and consolidation that have led to reduced global building capacity. Currently, there are around 314 active yards compared to 290 yards in 2022 and 700 in 2007 (BRS Shipbrokers, 2024). These facilities are tiered (tiers 1 and 2) and contribute uneven shares to the global shipbuilding output. Only 188 yards received new orders in 2023. This has led to constraints on yard slot availability in the overutilized facilities, with waiting times now about four years instead of two. It has also affected prices, with the costs of newbuilt ships over 40 per cent higher than in 2020 and 10 per cent higher than in 2022.

Tier 1 yards are in high demand, while tier 2 yards are underused. Around 100 yards in tier 1 control 65 per cent of global yard capacity and 90 per cent of the orderbook. Tier 2 yards control 35 per cent of the global yard capacity but attract only 10 per cent of the orderbook. The two tiers differ based on capabilities, expertise, market position, size, technological sophistication, reputation and financial stability. Many of the tier 2 yards have been inactive since 2010; reactivating these would take time and will not necessarily mean that these yards are able to build the modern, low carbon-fuel vessels that are needed. Reactivating shipyard capacity has been incremental, and no new facilities have been reported. China successfully reactivated some facilities in 2023 (BRS Shipbrokers, 2024). Shipbuilding costs, including a shortage of skilled labour (Gordon, 2024), creates additional constraints. For example, to counter a shortage of workers, the Republic of Korea agreed with Thailand to have 3,000 welders and mechanics work in the five largest shipyards in the Republic of Korea (Drewry Maritime Research, 2024).

China has increased its contribution to the global shipbuilding output, contributing more than half. To date, shipyards in China are fully occupied for the next three to four years. This growing market concentration is driving a debate in the United States and the European Union about reviving their own shipbuilding sectors to reduce overreliance on a limited number of yards and countries. The Shipyards and Equipment Association called on European policymakers to devise a comprehensive European maritime industrial strategy (Chambers, 2024b). That said, yards in the European Union are less specialized in sectors such as container shipbuilding, and would need support to catch up with yards in Asia. Furthermore, building alternatively fuelled vessels requires sophisticated expertise and know-how.

Ship financing is also crucial. This usually comes in the form of government-backed loans, commercial banks, export credit agencies, private equity firms, shipbuilding consortiums or leasing and asset financing (Chambers, 2024c).

Global ship finance totalled around $600 billion in 2023 (Petropoulos, 2024). Like shipyards, ship financing has also been downsized since 2010 and divided into tiers. Large lenders and signatories of the Poseidon Principles, which establish a framework for assessing and disclosing the climate alignment of ship finance portfolios, primarily focus on large clients involved in newbuilds, green ships and sustainability-focused projects. In 2023, the Poseidon Principles provided more than half of all global shipping finance. Banks outside the Poseidon framework have, for the moment, greater flexibility to finance older vessels or projects less focused on sustainability (Clarksons Research, 2024d). While ship finance has come under pressure, there is currently competition between lenders to provide finance to top tier clients. Smaller clients generally have limited capital availability and often struggle to acquire modern vessels (Lowry, 2023).

Shipping needs to manage an oversupplied container freight market

Another current theme in the shipping sector is overcapacity: too much ship capacity supplied for the demand. Once the current disruptions that are temporarily inflating the distance-adjusted demand fade away, overcapacity is likely to surface as a problem. For now, rerouting ships around the Cape of Good Hope has helped counteract the issue of surplus capacity by extending the distances travelled and boosting demand.

Overcapacity in container shipping was masked by **increases in the distance-adjusted demand**

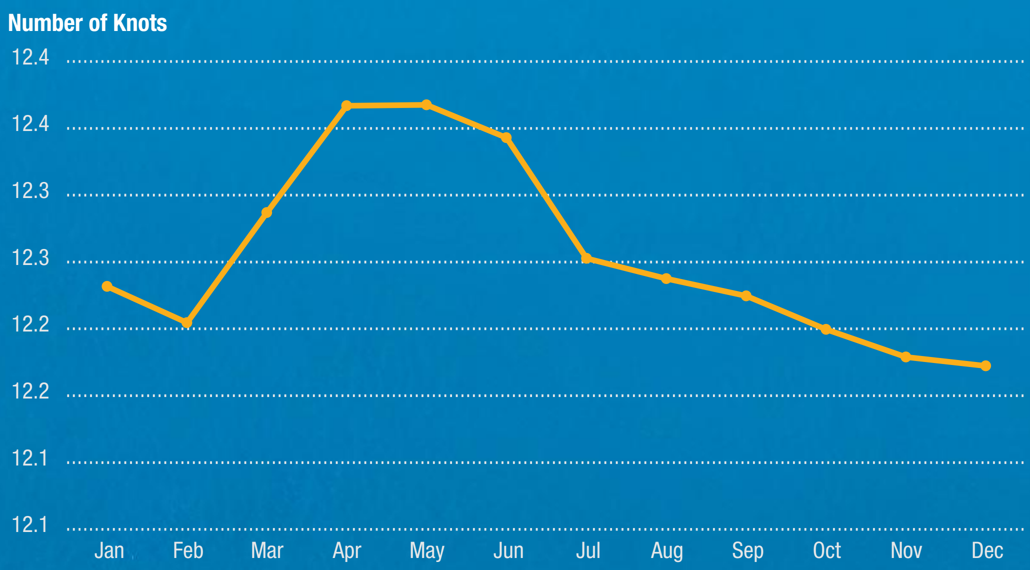
This issue is not new. The global fleet capacity growth has exceeded trade volume growth for several years. In container shipping specifically, growth in supply has consistently surpassed growth in demand for a large part of the past three decades. From 2010 to 2023, world fleet capacity increased by 78.5 per cent, while demand only increased by 34 per cent. During the same period, container fleet capacity almost doubled while trade volumes grew by 49 per cent. At the beginning of 2024, the cellular container ship fleet, consisting of ships designed with specific compartments (cells) to carry containers, stood at 6,159 ships with a total capacity of 28 million TEU (Clarksons Research, 2024b). Capacity increased 8.2 per cent at the start of 2024 compared to the previous year and is projected to exceed the 30 million TEU mark in 2025 (Clarksons Research, 2024b).

Despite the large number of container capacity delivered in 2023 and low demolition levels, the container market coped surprisingly well in market conditions that were relatively subdued compared to the post-pandemic boom of the last two years. Capacity growth was moderated by the longer journeys associated with ship rerouting and compliance with the new IMO CII requirements. Increased distances and altered speed patterns have helped to manage capacity and mitigate capacity surplus. As of July 2024, overcapacity in container shipping continued to be masked by increases in the distance-adjusted demand. Meanwhile, reduced steaming speeds in compliance with the new EEXI and the CII regulations has also probably helped absorb capacity. However, 2023 data from AIS, the automated ship tracking system, shows a drop in sailing speed in 2023 but it not clear whether the speed reduction is directly attributable to the new IMO CII requirement. Figure II.9 and figure II.10 suggest that the speed of the global fleet may have dropped slightly in 2023 regardless of whether the vessels are covered by the CII rules or not.

Reflecting capacity management strategies by carriers, the deployed capacity and the number of services operating between two maritime regions (for example, the Far East and North America) during the fourth quarter of 2023 compared to the same quarter in 2022, have declined. In contrast, allocated capacity increased on routes covering multiple maritime regions. For instance, routes connecting Europe and the Mediterranean with the Gulf and the Indian Subcontinent as well as with the Far East, have seen increased capacity over the same period (MDS Transmodal, 2024).

Figure II. 9

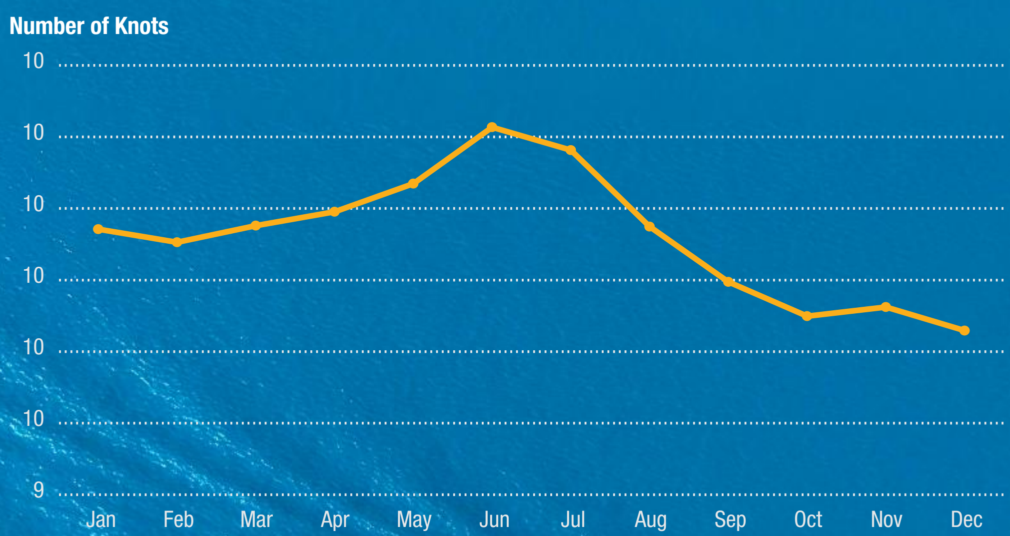
Trends in sailing speeds of ships covered by the Carbon Intensity Indicator, 2023



Source: UNCTAD calculations, based on data from Marine Benchmark, 2024.

Figure II. 10

Trends in sailing speeds of ships not covered by the Carbon Intensity Indicator, 2023



Source: UNCTAD calculations, based on data from Marine Benchmark, 2024.

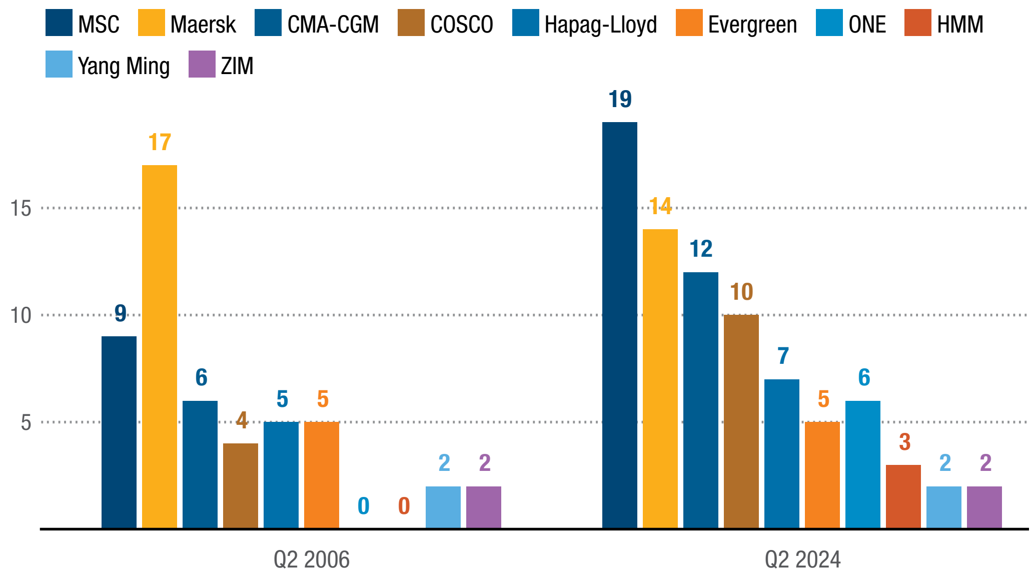
As rerouting trends eventually start to slow down – although the exact timing of this remains uncertain – overcapacity challenges are expected to resurface, and capacity management will become increasingly important. An unsustainable overcapacity in the industry will affect the re-employment of chartered ships as operators are now owners of most of the orderbook, and carriers will likely return the chartered ships. Increased cascading of capacity onto secondary routes arising from larger vessels is also likely. Market concentration could increase too, given that the top 10 container shipping lines own most of the ships being ordered (Danish Ship Finance, 2023).

Effective capacity management will be a priority for the shipping industry. Liners will have to make strategic decisions regarding their fleet and operations. In addition to temporarily taking ships out of service ("laying up"), more ships will need to be demolished, particularly as many container ships are suitable for scrapping. Slower steaming speeds will also help absorb overcapacity, because carriers will need to add more vessels to service loops in order to maintain their schedules. The exact impact of the new IMO CII rules on speed is still uncertain. However, compliance with these regulations means that less energy-efficient ships will probably operate at lower speeds and more ships may be needed to meet demand. The EEXI rules has lowered the maximum speed of many ships that have installed engine power limitation, reducing the buffer between their maximum and service speed.

Elsewhere, the liner shipping market is undergoing new developments that could alter market competition levels and shares. The decisions by the Mediterranean Shipping Company (MSC) and Maersk to terminate their 2M alliance in 2025 has caused some market shifts. As the two carriers top the list of global liner operators by capacity (figure II.11) this decision is impacting the liner shipping market by changing how both these companies choose to operate and compete.

Figure II. 11

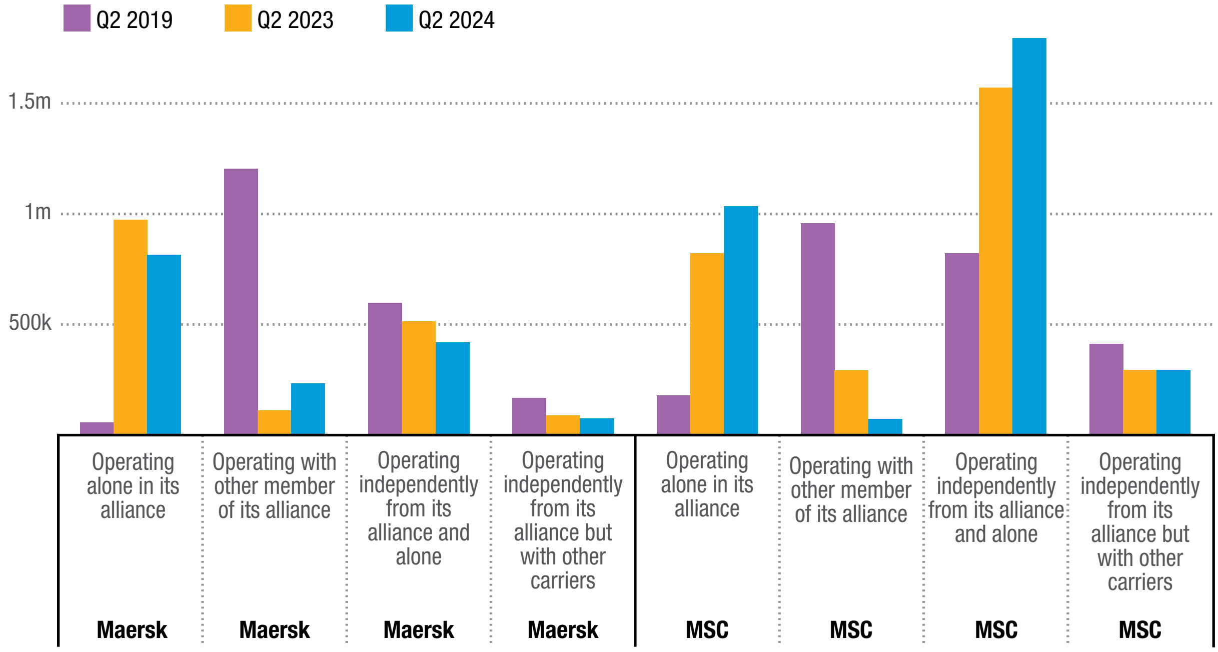
The share of the top 10 liner operators in the total container fleet capacity



Source: UNCTAD calculations, based on MDS Transmodal data, accessed May 2024.

Figure II. 12

Container capacity scheduled to be deployed on services calling at ports in the United Kingdom and European Union



Source: UNCTAD calculations, based on MDS Transmodal data, accessed May 2024.

New patterns are emerging in how liner services are organized and how capacity is used. Members of the 2M alliance seem to have begun separating their operations ahead of this planned split, although this trend has recently reversed. This recent shift may well reflect renewed collaboration, possibly triggered by disruption in the Red Sea and resulting capacity shortages. As shown in figure II.12, MSC and Maersk have recently increased their capacity independently of each other.

In early 2024, Maersk and Hapag-Lloyd announced "Gemini", a new cooperation agreement (Maersk, 2024). Starting in February 2025, the plan is to improve reliability to 90 per cent through efficient services, fewer mainliner stops combined with a strong shuttle network connected to their inland operations through their hub terminals (Baker, 2024). It will be important to monitor how these developments affect trade, freight rates, terminals and competition, as well as the connections between ports using the hub and spoke network.

Table II.8 sets out the market shares of major alliances, MSC, the Gemini cooperation agreement and other carriers, for key container routes covered by Gemini in the second quarters of 2022–2024. Ocean Alliance features in the leading position, followed by Gemini, MSC, "THE Alliance" and "other" carriers. Not every vessel operated by an alliance is necessarily operated as part of the alliance of which the carrier is a member. Additionally, alliances do not usually extend services beyond the main trading routes. As the market shares reported in table II.8 are estimated based on scheduled services during the second quarter of 2024, these estimates will overstate the actual market shares.

Another relevant development is the announcement by the European Commission in October 2023 not to extend the European Union legal framework which exempts liner shipping consortia from the European Union antitrust laws, known as "Consortia Block Exemption Regulation" or the CBER.

Table II. 8

Estimated market shares in percentages across the trade lanes to be covered by the new Gemini cooperation agreement

	Ocean Alliance			Gemini Cooperation			MSC			THE Alliance			Other		
	Q2 2022	Q2 2023	2024 Q2	Q2 2022	Q2 2023	2024 Q2	Q2 2022	Q2 2023	2024 Q2	Q2 2022	Q2 2023	2024 Q2	Q2 2022	Q2 2023	2024 Q2
Europe and Mediterranean - Far East	40	40	39	26	22	25	12	14	18	19	19	14	4	5	3
Europe and Mediterranean Med - Gulf and Indian Sub-Continent	20	20	18	46	41	36	26	30	35	2	2	3	6	7	8
Europe and Mediterranean - Gulf and Indian Sub-Continent - Far East	37	36	28	24	20	10	30	25	35	8	16	18	1	3	9
Europe and Mediterranean - North America	19	22	24	35	34	40	30	24	20	2	2	3	14	18	14
Far East - North America	40	43	45	15	13	13	14	7	6	17	29	25	14	9	11
Far East - North America - Latin America	34	35	32	26	23	26	10	12	16	15	13	9	16	16	17
Gulf and Indian Sub-Continent - Far East	32	33	26	10	8	8	5	5	7	12	13	11	41	41	49
Gulf and Indian Sub-Continent - Far East - North America	38	19	25	34	29	27	0	20	14	28	32	26	0	0	7

Source: UNCTAD calculations, based on MDS Transmodal data, Containership Databank, Q2, 2024.

At its peak, the CBER covered around 60 consortia serving the European Union trades, compared to the current 43. The expiry of the CBER does not mean that cooperation between shipping lines becomes unlawful under European Union anti-trust rules. Instead, carriers operating to or from the European Union will assess the compatibility of their cooperation agreements with European Union anti-trust rules based on the guidance provided in the Horizontal Block Exemption Regulation and Specialization Block Exemption Regulation (European Commission, 2023b). It is not clear yet how this development will impact on the liner shipping market and trade. As CBER did not cover major alliances but covered instead consortiums involving companies with combined market shares not exceeding 30 per cent, the impact can be expected to be limited. Nevertheless, there will be some legal uncertainty for carriers in the short term (Drewry Maritime Research, 2023).

C. Policy considerations

The shipping industry is facing a complex environment characterized by uneven and unbalanced capacity across different segments and a slow but ongoing transition to low carbon shipping. Geopolitics, vessel rerouting, an ageing fleet, a relatively moderate global orderbook, shipbuilding constraints, underlying container ship overcapacity and restructuring in the liner shipping market are factors currently driving the industry's outlook. The interplay of these wide-ranging factors is influencing decisions by shipowners and operators. Shipping will likely be dealing with excess container ship capacity when the distance factor subsides and probably experience more market shifts. There is also uncertainty about the impact of environmental compliance on steaming speed, availability of capacity and compliance costs.

Leveraging potential opportunities and addressing challenges while navigating a highly disrupted maritime transport ecosystem requires collaboration among all stakeholders, including shipping, related industries, ports, traders, shippers, as well as policymakers, regulators and Government.

Concerted action should focus on the following priorities:

1. **Planning and collaboration**. Promote strategic planning, risk management and stakeholder collaboration to address emerging trends, regulatory requirements and shifts in market dynamics amid the evolving landscape for operations.
2. **Monitoring and analysis**. Monitor shipping markets and improve understanding of factors affecting the shipping cycle and their influence on market behaviour and strategic decisions by key industry players. UNCTAD has established analytical capabilities in maritime transport and trade, as well as extensive maritime statistics and data that can be leveraged to inform efforts in this field.
3. **Regulation**. Improve regulatory certainty to support rapid shift to low carbon shipping and investment in fleet renewal. This includes supporting GHG reduction targets set out in the 2023 IMO Strategy. UNCTAD is currently collaborating with IMO by conducting a comprehensive impact assessment of the basket of candidate midterm GHG reduction measures.[1]
4. **Investment and partnerships**. Tackle the constraints undermining shipbuilding capacity by investing in shipyard infrastructure, services, technology upgrades and workforce development, as well as enhanced collaboration and partnerships between shipbuilders, shipowners, suppliers, financiers and lenders, research institutions and government agencies.
5. **Monitoring, reporting and assessment**. Monitor ship carrying capacity trends, particularly in the container shipping segment, and ensure the excess in ship capacity is effectively managed to prevent an unstainable overcapacity burden. UNCTAD will continue to monitor relevant developments and report on key trends and assess implications for the transport and trade of developing countries.

[1] IMO, available at https://www.imo.org/en/OurWork/Environment/Pages/Assessment-of-impacts-on-States.aspx/.

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Chapter III

Freight rates, maritime transport costs and their impact on consumer prices and economic activity

At the end of 2023 and into 2024, disruptions in the Red Sea, the Suez Canal and the Panama Canal caused container shipping rates to rise and become more unpredictable. This surge in prices followed a period of relative stability in 2023, which came after several years of extreme fluctuations, including record highs. The performance of the container shipping market was mixed across different trade routes, influenced by changes in supply and demand throughout 2023.

Similar to the container market, in the dry bulk sector, disruptions led to higher freight rates from late 2023 into 2024. This was a change from 2023 when rates were generally low and unstable due to issues with ship supply. In 2024, tanker freight rates for both crude (unrefined oil) and product tankers (which carry refined oil such as petrol and diesel) stayed high and unpredictable, much as in 2023. This was driven by the disruptions and limited supply caused by geopolitical and other key factors.

The disruptions to the Suez Canal, the Red Sea and the Panama Canal significantly impacted freight rates. In time, this could lead to a rise in global consumer prices and a decline in real GDP, with a disproportionate impact on SIDS and LDCs. Higher prices would also present a significant food security risk.

Evidence from a new Trade-and-Transport Dataset developed by UNCTAD and the World Bank (2024) shows that developing countries, particularly SIDS and LDCs, have higher maritime transport costs than developed countries. However, investments in transport infrastructure, including ports, can reduce maritime transport costs.

To mitigate the impact of higher freight rates, it is important to adopt a comprehensive approach. This involves closely monitoring and analysing freight rates and disruptions and their impact, including effectively managing the supply of ship capacity, supporting the shift to more energy-efficient vessels, and improving the resilience and efficiency of ports.

In this chapter, key developments in the freight market from 2023 to mid-2024 are examined, taking into account supply and demand trends discussed in earlier chapters. The container, dry bulk and tanker segments are analysed, covering both spot freight rates and long-term contracts, as well as the impact of recent disruptions and environmental regulations on freight rate markets. More specifically, a quantitative analysis is provided of how recent disruptions to the Red Sea, Suez Canal and Panama Canal have affected freight rates, and the broader implications for consumer prices and global economic output. Policy considerations based on these findings close out the chapter.


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A. Trends in freight markets

Container freight rates in 2023: A return to normalcy

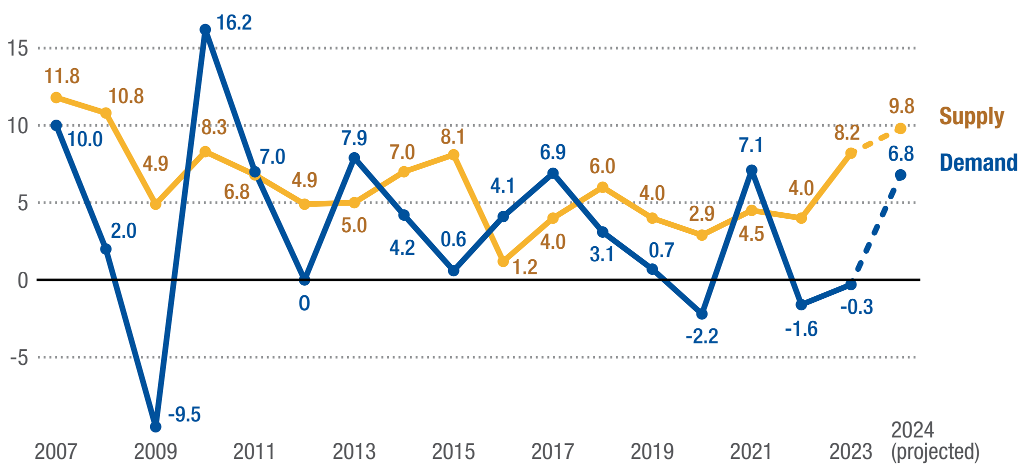
In 2023, container shipping freight rates entered a period of relative stability following the exceptional highs of 2021 and the significant fluctuations of 2022. Overall in 2023, container freight rates began a gradual return to pre-pandemic levels. However, these rates varied significantly across different trade routes. Rates on the East–West trade lanes declined, due to lower trade volumes and an influx of new vessel capacity. In contrast, rates increased on the North–South trade lanes, which includes routes serving Africa, South America, India, the Middle East and inter-Asia, mainly due to heightened activity on these routes.

An analysis of the supply and demand dynamics of the container shipping market in 2023, measured in terms of container capacity (TEU), shows a marked growth rate in the global supply of shipping capacity of 8.2 per cent (see chapter I). During the year, the growth rate for demand declined slightly by 0.3 per cent, compared to a larger decline of 1.6 per cent in 2022 (see chapter I) (figure III.1). Projections for 2024 indicate that both supply and demand will keep growing, but the gap between these growth rates will narrow, with the market remaining oversupplied. These trends are discussed in the following section and in more detail in chapters I and II.

The Shanghai Containerized Freight Index (SCFI), a key metric used to track the spot rates for shipping containers from Shanghai to various major ports around the world, remained relatively stable during 2023, averaging around 1,000 points. This was in stark contrast to its peak of about 5,067 points in January 2022. The Index did spike again in late 2023 due to the Red Sea and Suez Canal disruptions and vessels having to be diverted away from this area, which significantly impacted the supply–demand balance (figure III.2).

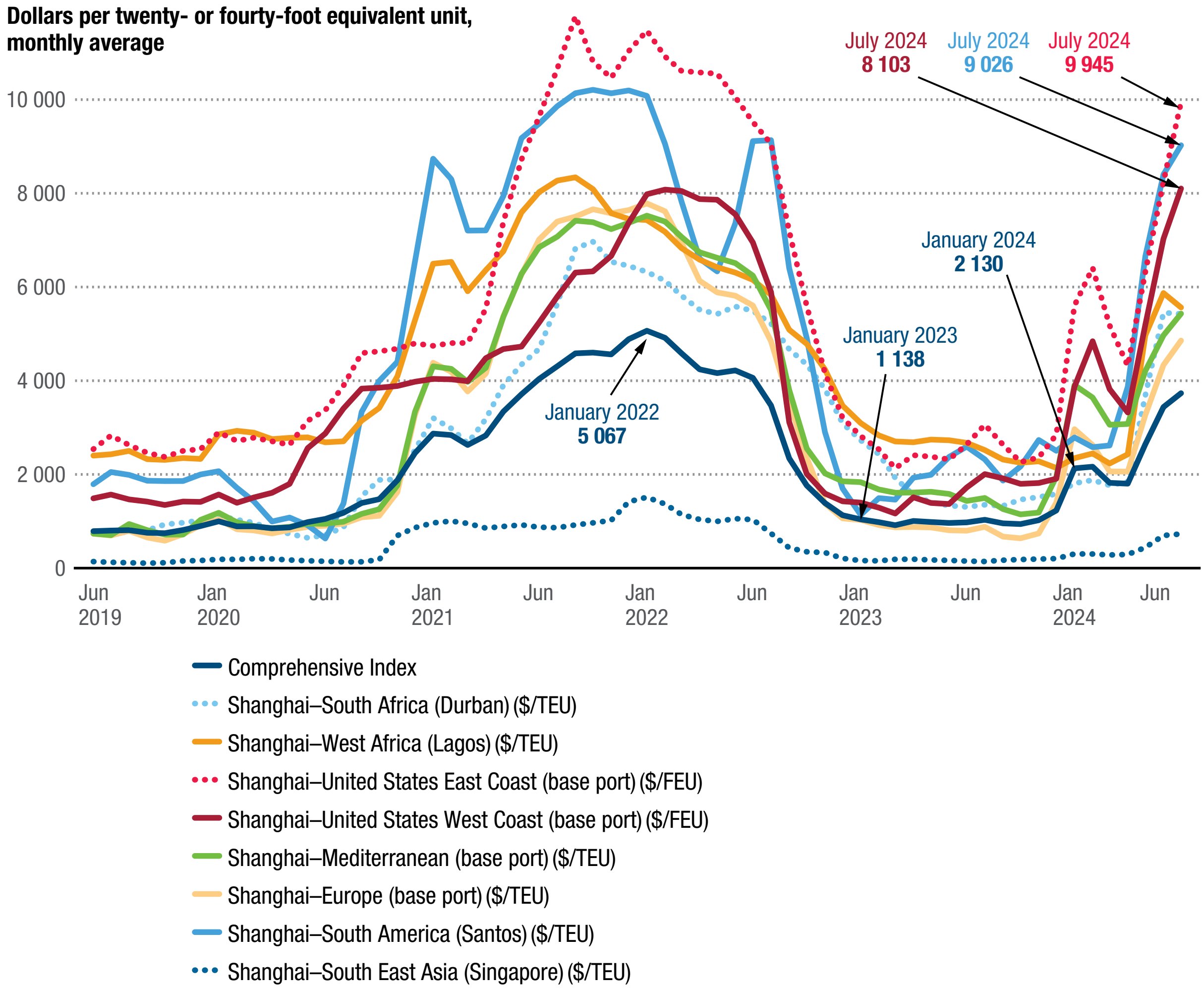
Projections for 2024 indicate that both supply and demand will keep growing, but the gap between these growth rates will narrow, with the market remaining oversupplied

Figure III. 1
Demand and supply in container shipping
(Percentage change)



Source: UNCTAD calculations. Demand is based on data from MDS Transmodal, World Cargo Database from chapter I (TEU), and supply is based on data from Clarksons Research, Container Intelligence Monthly, various issues.
Note: Supply data refer to total capacity of the container-carrying fleet (TEU), including multipurpose and other vessels with some container-carrying capacity.

Figure III. 2
Shanghai Containerized Freight Index spot rates



Source: UNCTAD calculations, based on data from Clarksons Shipping Intelligence Network.

Since December 2023, disruptions in the Red Sea, the Suez Canal and the Panama Canal **caused freight rates to increase and fluctuate**

Container freight rates surged in 2024 due to global disruptions and longer distances

Since December 2023, disruptions in the Red Sea, the Suez Canal and the Panama Canal caused freight rates to increase and fluctuate. Ships had to be diverted onto longer routes, reducing the availability of shipping capacity and affecting demand. With vessels being diverted away from the Red Sea, ships on the most affected East–West routes took longer routes, either around the Cape of Good Hope or by switching to trans-Pacific routes in the case of Asia–North America trade. Consequently, from mid-December 2023 to June 2024, the demand for additional capacity increased by around 12 per cent to accommodate for these increased distances (see also chapters I and II) (Clarksons Research, 2024a). In addition to absorbing excess capacity, these diversions led to a need for increased vessel speeds to meet delivery schedules.

Sailing speeds increased by approximately 25 per cent, from 16 to 20 knots. This tripled bunker consumption (Offshore Energy, 2024), increased freight rates and shipping costs, and generated higher risk insurance premiums.

At the same time, external factors such as climate change also contributed to fluctuating rates. An El Niño-driven drought reduced shipping capacity through the Panama Canal, forcing carriers to reroute through the Suez Canal and the Strait of Magellan and around the Cape of Good Hope. In the case of container shipping, vessels had to use the North American land bridge, an overland route that uses intermodal transport services to connect ports on the west coast of North America by land with Chicago or New York.

In January 2024, the SCFI averaged 2,130 points, more than double its December 2023 level, but still more than 50 per cent below its COVID-19 pandemic peak, as shown in figure 3.2. Rates eased through April 2024 as operators managed the initial disruption. However, rates remained elevated, averaging 1,820 points in March 2024, 15 per cent below the January peak. Rates spiked again in May 2024, averaging approximately 2,644 points, due to general rate increases coinciding with the peak season for container trade (Clarksons Research, 2024b) together with various additional surcharges, including those related to the European Union ETS (see box III.1), Panama Canal tolls and increased war risk insurance premiums, among other factors. Spot freight rates on most routes were affected.

Container freight rates on the Asia–Pacific to Europe routes rose sharply in November 2023. A record weekly spike of $500 was observed in the last week of December 2023 (UNCTAD, 2024).

The trans-Pacific routes which connect Asia with North America, also saw a surge in freight rates. By January 2024, the SCFI Shanghai–United States West Coast and SCFI Shanghai–United States East Coast routes more than doubled their December 2023 levels, which continued to fluctuate and increase, reaching a shipping cost of $8,103/FEU on the West Coast routes and $9,945/FEU on the East Coast routes in July 2024, the highest levels since the COVID-19 pandemic.

Freight rates on other routes also surged. The average rate on the SCFI Shanghai–South America route climbed by approximately 224 per cent from January 2024, reaching $9,026/TEU in July 2024, the highest level since September 2022. The average rate on the SCFI Shanghai–South Africa route increased by around 199.6 per cent from January 2024 to $5,426/TEU in July 2024, the highest level since July 2022. The SCFI Shanghai–West Africa route increased by 137 per cent from January to $5,563/TEU by July 2024, the highest level since August 2022.

Disruptions in the Red Sea and the Suez Canal exacerbated congestion at major ports in Asia and the Middle East, increasing charges and freight rates. For instance, waiting times at Jebel Ali Port in the United Arab Emirates rose from an average of 54 hours in March 2024 to 65 hours in May 2024. Similarly, in Singapore, waiting times nearly doubled, from 24 hours to 40 hours during the same period. Port Klang in Malaysia experienced an increase from 20 hours to 26 hours (Drewry, 2024) (see also chapter IV). Hub ports in the Western Mediterranean also faced increased demand and congestion.[1] By mid-June 2024, port congestion meant that vessel capacity of 2.5 million TEU were waiting at anchorages (deep water areas where ships can wait, usually off the coast) around the world. This represented 8.4 per cent of the global fleet (Linerlytica, 2024) and also contributed to the increase in freight rates.

In January 2024, the **SCFI** averaged 2,130 points, more than double its December 2023 level, **but still more than 50% below its COVID-19 pandemic peak**

Disruptions exacerbated **congestion at major ports, increasing charges and freight rates**

[1] MDS Transmodal.

Furthermore, the **impact on empty containers** has been evident

Furthermore, the impact on empty containers has been evident, with carriers prioritizing shipments to high-paying markets, such as the United States and Europe, potentially at the expense of regions such as Africa, a trend reminiscent of the challenges observed during the COVID-19 pandemic (Business Day Africa, 2024).

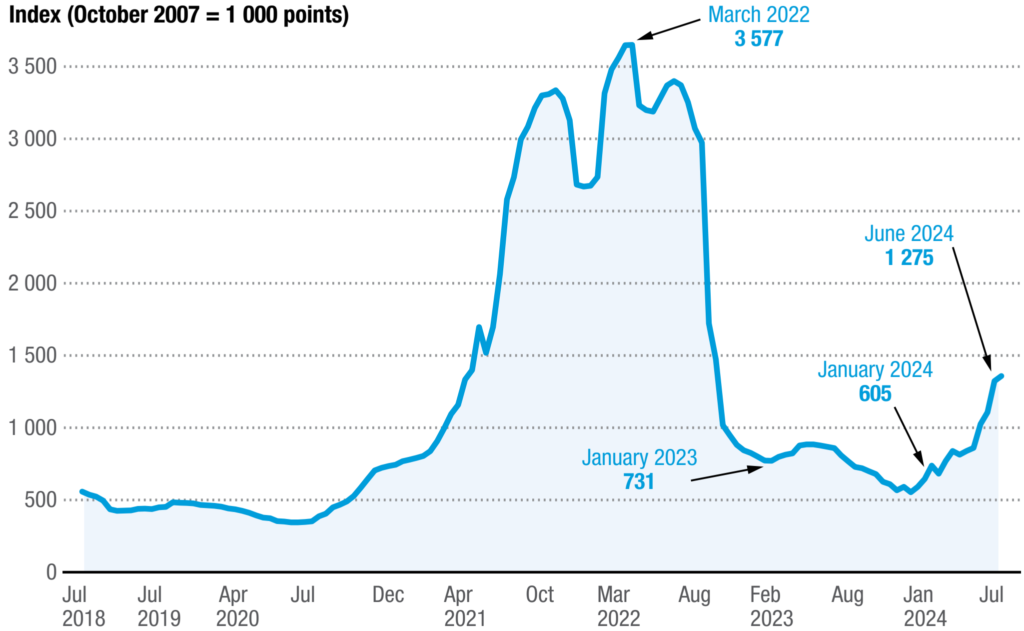
Charter container ship rates stabilized in 2023, are rebounding in 2024, yet still facing disruptions

In 2023, container ship charter rates moderated and were significantly lower than in 2022, a year marked by exceptionally high rates driven by the post-COVID-19 demand boom. Rates remained relatively stable throughout the year, with some fluctuations toward the end of the year due to disruptions in the Red Sea, similar to the trends in container spot freight rates.

The cost of chartering a container ship – known as charter rates – is tracked by the New ConTex Index, a benchmark for assessing time charter rates for container ships. The Index averaged 2,566 points in 2022 compared to 714 points in 2023 (figure III.3). In January 2023, the New ConTex Index stood at 731 points, well below its historical peaks of 3,577 points in March 2022.

Charter rates initially responded slowly to the disruptions in the Red Sea but began to surge from January 2024 onwards. Rates increased across different vessel sizes, driven by higher demand for larger charter vessels (needed for rerouting), while smaller vessels saw an increase in rates due to the cascading effects of the disruption. By June 2024, the Index showed a significant increase, standing at around 1,275 points (end of June), a strong sign of a market rebound.

Figure III. 3
New ConTex Index shows fluctuations in charter rates



Source: UNCTAD calculations, based on data from the New ConTex Index for container ship chartering produced by the Hamburg Shipbrokers Association. See http://www.vhss.de (accessed on 5 June 2024).
Note: The New ConTex Index is based on assessments of the current day charter rates of six selected container ship types, which are representative of their size categories: Type 1,100 TEUs and Type 1,700 TEUs with a charter period of one year, and Types 2,500, 2,700, 3,500 and 4,250 TEUs with a charter period of two years.

There is a shortage of vessels in the charter market, particularly larger or more energy-efficient ships; there are signs that charter rates will continue to increase through 2024, driven by continued disruption in the Red Sea.

Contracted freight rates and associated costs dropped in 2023

In 2023, "contracted" freight rates (which include the costs of the rate of shipping plus additional charges such as terminal handling fees) dropped sharply. This decline is consistent with the general trend in spot freight rates and was influenced by factors such as demand–supply imbalances, an oversupplied market which intensified competition among carriers and trade imbalances.

Table III.1 shows the actual base freight rates (in United States dollars per FEU) on various routes, including intraregional routes, and how they have changed over time.

The "unweighted" average rate decreased by 39 per cent from 2022 to 2023, dropping from $4,716 to $2,857 (an unweighted average means that each rate is treated equally, without considering any extra factors or importance). A significant decrease in rates can be seen on routes from Asia, such as Asia to Oceania (78 per cent), Asia to Europe (76 per cent), and Asia to North America (61 per cent). The substantial decreases in rates from Asia may reflect a change in trade flows and reduced demand for shipping capacity. Ports have also played a critical role in this dynamic, with reduced congestion contributing to lower rates. Moderate declines in rates were seen on routes such as Europe to North America (40 per cent), Europe to Oceania (44 per cent) and Europe to South America (36 per cent). However, some routes, such as Africa to South America, saw an increase of 20 per cent, while North America to North America increased by 8 per cent.

Despite the significant decreases, the rates in 2023 remained higher than those recorded in 2018 and 2019, suggesting that the market is adjusting to a new post-pandemic equilibrium and coping with an operating landscape where disruptions have become a key feature.

2024 and beyond: Managing container fleet capacity and enhancing efficiency for a resilient future

As the shipping sector navigates 2024, the landscape for trade and economic development remains challenging. Geopolitical complexities and climate change continue to exacerbate the operating environment and drive container freight rate dynamics. Freight container rates will keep changing, due to ongoing imbalances in supply and demand, disruptions in trade and fleet deployment, regulatory requirements and the growing need for ports and ships to go green.

Over the past few years, there has been a greater supply of shipping capacity than demand. The supply of container shipping capacity has consistently outpaced demand in TEU, the standard measurement for ship cargo capacity. However, recent disruptions caused by the COVID-19 pandemic, drought in the Panama Canal and geopolitical tensions, including the war in Ukraine and the Red Sea crisis, have intermittently reduced supply capacity, driving up freight rates.

In 2024, the demand for container shipping is expected to grow by around 7 per cent. At the same time, a significant number of new ships will be added to the global fleet, increasing total shipping capacity by 9.8 per cent (figure III.1). These dynamics will continue to be impacted by disruptions, which will affect rerouting, operations and capacity, resulting in high and volatile freight rates.

In 2023, "contracted" freight rates (which include the costs of the rate of shipping plus additional charges such as terminal handling fees) **dropped sharply**

Table III. 1
Annual full container load gate-in, gate-out rates

From	To	2018	2019	2020	2021	2022	2023	Change 2023 vs. 2022	Change 2023 vs. 2018
		(United States dollars per fourty-foot container)						(percentages)	
Africa	Africa	1 812	1 849	1 924	2 013	3 382	2 880	-15	59
Africa	Asia	748	750	775	664	2 313	1 459	-37	95
Africa	Europe	1 431	1 643	1 747	1 487	2 463	1 753	-29	23
Africa	South America	2 010	1 860	1 979	1 616	2 388	2 870	20	43
Asia	Africa	1 800	1 927	2 112	2 733	7 094	3 565	-50	98
Asia	Asia	737	747	821	1 194	2 214	1 043	-53	42
Asia	Europe	1 782	1 847	1 916	3 285	8 880	2 136	-76	20
Asia	North America	2 426	2 603	2 711	3 820	9 610	3 761	-61	55
Asia	Oceania	1 770	1 790	1 850	2 800	8 241	1 824	-78	3
Asia	South America	2 290	2 075	2 230	3 589	10 154	4 117	-59	80
Europe	Africa	1 595	1 650	1 858	1 727	2 907	2 240	-23	40
Europe	Asia	967	870	1 004	1 225	2 109	1 312	-38	36
Europe	Europe	804	881	976	1 077	1 757	1 471	-16	83
Europe	North America	1 518	1 742	2 256	2 304	6 340	3 801	-40	150
Europe	Oceania	1 996	1 933	2 077	2 319	6 795	3 839	-44	92
Europe	South America	1 019	1 302	1 376	1 465	4 026	2 591	-36	154
North America	Africa	2 890	3 112	2 981	2 639	3 972	3 444	-13	19
North America	Asia	1 009	1 111	1 269	1 385	2 646	1 575	-40	56
North America	Europe	858	1 109	1 323	1 053	1 742	1 638	-6	91
North America	North America	1 534	1 429	1 584	1 362	2 589	2 784	8	81
North America	Oceania	2 538	2 634	2 996	2 475	6 060	5 888	-3	132
North America	South America	1 254	1 318	1 486	1 064	2 153	2 017	-6	61
South America	Africa	1 778	1 951	2 000	2 187	5 432	4 926	-9	177
South America	Asia	1 623	1 963	1 802	1 841	4 106	3 817	-7	135
South America	Europe	1 313	1 977	1 961	1 767	4 369	2 770	-37	111
South America	North America	1 521	1 882	1 745	1 969	7 397	3 881	-48	155
South America	South America	1 349	1 699	1 539	1 243	6 179	3 741	-39	177
Unweighted average		**1 569**	**1 691**	**1 789**	**1 937**	**4 716**	**2 857**	**-39**	**82**

Source: UNCTAD, based on data provided by Transporeon - A Trimble Company.
Note: The data provides unique insights into routes that are not normally covered by publicly available data on exports from China, building on anonymized contract freight rates from shippers on most major routes. The data set provides regional averages for 40-foot container dry cargo freight, as negotiated for routes on representative main ports. All rates are "gate-in, gate-out", that is, including terminal handling charges and all charges and surcharges of ocean transport. The rates also include (temporal) surcharges or adders for contract rates during the reporting year to represent paid rates. Not included are pre- and on-carriage or classical administrative services of forwarders (customs clearance, booking and freight audit fees, etc.).

Compliance with new environmental regulations is also expected to increase operating costs for shipping companies (see box III.1). These costs are likely to be passed on to shippers through higher transport costs and freight rates.

The recent surges in freight rates are becoming a critical concern in the global supply chain. Forecasts suggest that ocean cargo prices could soar to $20,000 per FEU on the Transpacific route – possibly even approaching the peaks of $30,000 per FEU seen during the time of the COVID-19 pandemic – and that these rates may persist at elevated levels through 2025 (CNBC, 2024).

When the Red Sea crisis began, there was sufficient container capacity in the market to handle the additional tonnage required to divert around the Cape of Good Hope. However, any further disruptions could severely strain supply chains, potentially leading to additional increases in freight rates (Sea Intelligence, 2024a). If there is a sudden and sustained rise in demand for container ships, as seen in the unexpected growth in United States container demand in the second quarter of 2024, this could lead to much higher freight rates, even with the addition of extra ships (Sea Intelligence, 2024b). Meanwhile, if the disruption in the Red Sea eases or ends, this could reveal a risk of overcapacity in the global fleet.

Effective supply management and strategic vessel recycling decisions will be critical for balancing supply and demand and managing freight rates.

Effective supply management and strategic vessel recycling decisions will be critical for balancing supply and demand and managing freight rates

Box III. 1
Impact of the green transition on shipping cost and freight rates

The new environmental regulations introduced by the IMO and the European Union have an impact on shipping operating costs and freight rates and are expected to continue influencing industry dynamics.

Compliance with short-term measures from IMO, such as the Carbon Intensity Indicator, means slower vessel speeds, especially for less energy-efficient vessels (World Cargo News, 2024), and longer retrofit times for energy-saving technologies. If prolonged, this could lead to further supply-side constraints, thereby impacting freight rates.

In early 2024, shipping was included in the European Union ETS, which, for the first time, imposed a cost on maritime carbon emissions. This inclusion has led operators to introduce surcharges to cover the additional CO_2 costs charged to shippers. These costs can vary significantly depending on specific port call rotations. With route diversions due to disruptions in the Red Sea, this will result in higher costs. For example, a 20,000–24,000 TEU vessel on a Far East–Europe route around the Cape of Good Hope will incur an estimated additional cost of $0.4 million per voyage at current CO_2 prices (Clarksons Research, 2024b).

Under the ETS, ships will have to pay for 40 per cent of their emissions in 2024, rising to 70 per cent in 2025 and 100 per cent in 2026. These rising ETS costs will have an impact on the shipping industry, including ports, likely leading to higher freight rates and charges, which operators will continue to pass on to shippers and, ultimately, consumers (Transport and Environment, 2024).

Dry bulk freight rates 2023 were low, then volatile due to supply issues

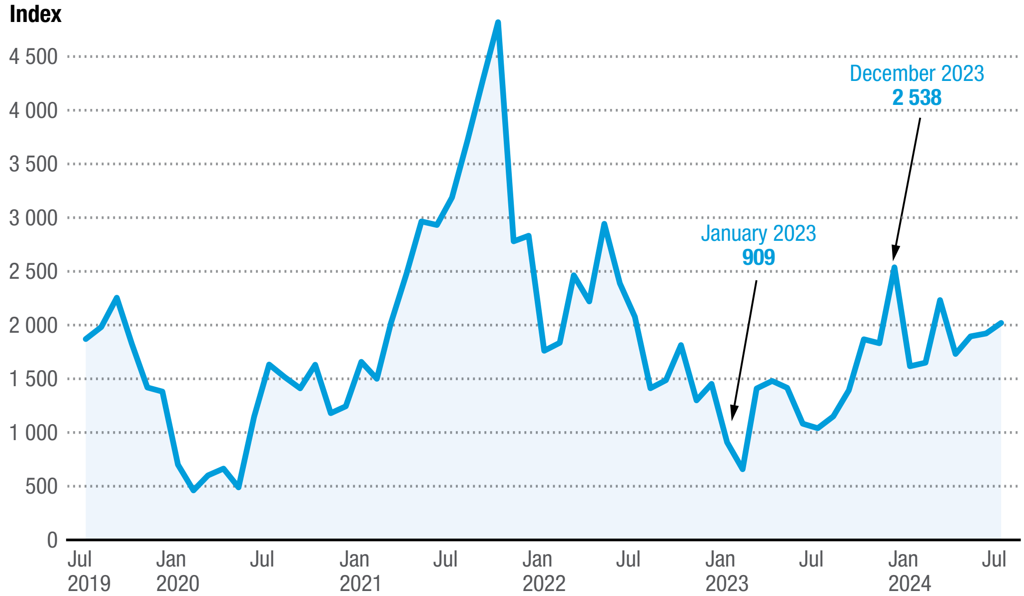
Dry bulk fleet growth has led to **lower fleet utilization and freight rates in 2023**

In 2023, the dry bulk freight market saw significant volatility and lower rates. The Baltic Dry Index, which tracks shipping costs for commodities such as coal, iron ore and grain, averaged 1,398, down from 1,930 in 2022, close to the 10-year average of 1,318 (figure III.4).

In 2023, even though global demand for dry bulk commodities grew by 4 per cent (or 5 per cent in terms of ton miles, i.e. taking into account the distance shipped), mainly due to increased imports by China (see chapter I), the total shipping capacity grew by 3.1 per cent, reaching about 1,004 billion tons (see chapter II). This dry bulk fleet growth has led to lower fleet utilization and freight rates. Also, as port congestion from the COVID-19 pandemic has eased and more ships have become available, freight and charter rates have dropped even further.

Throughout 2023, the Baltic Dry Index fluctuated significantly, starting at 909 in January, dropping to 658 in February, varying between 1,000 and 1,480 until September, and rising steadily to peak at 2,538 in December. These fluctuations were influenced by several factors, including increased supply in bulk carrier capacity, shifting trade dynamics across regions and commodities, developments in port congestion, and disruptions in the Panama Canal, the Suez Canal and the Red Sea, which resulted in increased ton-mile demand and pushed freight rates up. For example, disruptions at the Panama Canal forced United States grain shipments to be rerouted through the Suez Canal, and increased Chinese imports of iron ore and soybeans from Brazil contributed to the overall increase in ton-miles (Danish Ship Finance, 2023). Moreover, record loading congestion at ports in Brazil due to low river levels also led to a shortage of available vessels and caused freight rates to increase (BRS Group, 2024).

Figure III. 4
Highs and lows of the Baltic Exchange Dry Index



Source: UNCTAD calculations, based on data from Clarksons Shipping Intelligence Network.

Time charter rates also showed significant declines in 2023. Supramax vessels, which are medium-sized ships used for bulk cargo, saw their rates fall by 49 per cent. Kamsarmax vessels, slightly larger ships used for similar purposes, experienced a 38 per cent drop in their rates. However rates for Capesize vessels, the largest dry bulk ships that carry very large amounts of cargo, remained relatively stable (BRS Group, 2024).

The decline in Supramax and Kamsarmax rates was primarily due to excess capacity and reduced demand in key trade areas such as the Atlantic and eastern coast of South America. The closure of the Black Sea grain corridor in July 2023 led to an oversupply of Handysize (small bulk cargo ships) and Supramax vessels in the Mediterranean, keeping rates low on conventional routes. In contrast, Capesize vessels, mainly used for iron ore and coal, benefited from a particular set of trade conditions, such as increased bauxite shipments to Asia and logistical challenges of ports in Brazil.

Economic uncertainties and cautious market sentiment led charterers to favour shorter-term contracts for Supramax and Kamsarmax vessels, causing greater rate volatility. In contrast, the Capesize market remained relatively stable due to consistent demand for iron ore and coal. In 2023, one-year time charter rates fluctuated significantly: Supramaxes ranged from $6,874 to $17,213/day, Kamsarmaxes from $7,277 to $21,966/day and Capesizes from $2,246 to $54,584/day. These wide variations highlight the importance of timing in securing contracts (BRS Group, 2024).

The dry bulk freight rate landscape in 2024 and beyond: Disruptions, fleet changes and demand play a role

Dry bulk freight rates have been impacted by the disruptions in the Red Sea, leading many shipowners to reroute around the Cape of Good Hope. As a result, the number of bulk vessels transiting the Suez Canal dropped by 22.3 per cent in the first quarter of 2024 and by 97.8 per cent in the second quarter of 2024 compared to the same periods last year (Clarksons Research, 2024c). The situation particularly affected Ultramaxes, medium-sized cargo ships used for transporting various bulk materials. Ultramaxes often use the Suez Canal for their routes and the disruption affected their operations and rates.

Drought at the Panama Canal also limited transits, which were down by about 20 per cent in the first quarter of 2024 compared to the same period in 2023. These disruptions contributed to higher freight rates, particularly in the larger ship segments (Danish Ship Finance, 2024).

Looking ahead, several factors will shape dry bulk freight rates beyond 2024. Disruptions due to the situation in the Middle East and drought in the Panama Canal may continue to affect routes and transit times, keeping rates high if conditions are sustained or worsen. At the same time, changes in demand, supply and fleet profiles, influenced by environmental compliance, will also affect the outlook for dry bulk freight rates in different ways for the different segments.

Fleet growth is expected to shift towards Kamsarmax and Ultramax vessels to meet the demand for more versatile and energy-efficient vessels. This could help stabilize rates by aligning fleet growth with market needs (Danish Ship Finance, 2024) (see also chapter I). However, the demand outlook is mixed. Larger ship segments may struggle due to declining demand for iron ore and coal, influenced by the economic context in China and the weakening of its real estate sector. Conversely, smaller ship segments could benefit from an increase in grain trade.

Key factors to watch are geopolitical events, changes in fleet structure and trends in commodity demand. These factors will influence dry bulk shipping rates in the coming years.

Geopolitical events, changes in fleet structure and trends in commodity demand will influence dry bulk shipping rates in the coming years

Tanker freight rates: 2023 volatility and 2024 highs amid strong demand and disruptions

In 2023, freight rates in the crude oil tanker market dropped, but remained high and unstable. This volatility was driven by a range of factors affecting the market. The global crude oil landscape saw significant changes, including strong growth in oil supply from the Atlantic Basin, which boosted demand for tankers to transport this new oil. Refinery expansions in Asia and a greater number of long-haul voyages, partly due to economic restrictions on the Russian Federation, also played a role. Additionally, OPEC+ supply cuts, disruptions in key transit routes such as the Red Sea, Suez Canal and Panama Canal, low growth in the tanker fleet and new environmental regulations all contributed to the fluctuating rates and market conditions (see chapters I and II).

In early 2024, crude and product tanker market spot rates **remained high and volatile**

The Baltic indices for tankers transporting crude oil ("dirty" index) and tankers transporting refined oil products ("clean" index) declined in 2023 from the highs of 2022 but remained high with significant fluctuations. The Baltic Dirty Tanker Index averaged 1,149, dipping to 756 in September, while the Baltic Clean Tanker Index averaged 803, dropping to 610 in June 2023 (figure III.5).

Crude tanker spot earnings are the earnings that tankers make from transporting crude oil on short-term contracts or single voyages. These spot earnings outperformed those of product tankers. The higher earnings for crude tankers were due to increased cargo movement, including the redirection of crude oil exports from the Russian Federation to Asia, an increase in west to east crude oil trade, and record exports from the United States and South America. Average spot earnings for crude tankers rose by 21 per cent to $53,541 per day in 2023 compared to 2022, while product tanker earnings decreased by 14 per cent to $32,181 per day, although they remained well above the 10-year average due to longer travel distances and limited fleet growth (figure III.6).

Very Large Crude Carrier (VLCC) freight rates reached record highs, mainly due to the west to east shipping routes and strong oil demand from China. This surge in demand for VLCCs was also driven by rising crude oil exports from the United States (Tankers International, 2024).

High volatility in the tanker market in 2023 led to significant increases in time charter rates, especially for long periods. Companies increased these long periods to secure capacity and buffer uncertainty in the market. Time charter rates rose by about 50 per cent for crude tankers and 30 per cent for clean tankers, with the highest charter rates matching those of 2022. Average time charter rates for eco-tankers, including Aframax (medium-sized tankers), Suezmax (tankers designed to fit the Suez Canal) and VLCC, reached new highs (BRS Group, 2024). This reflects expectations of higher spot freight rates for larger tankers, increased asset values, and a shortage of eco-friendly vessels.

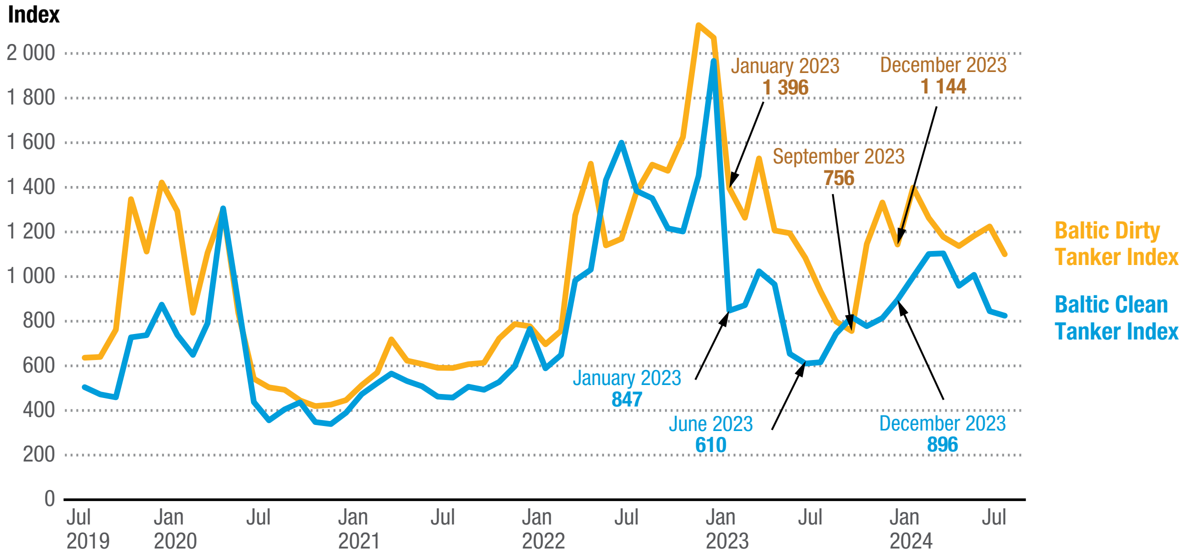
In early 2024, crude and product tanker market spot rates remained high and volatile largely due to disruptions in the Red Sea, Suez Canal and Panama Canal. This meant tankers had to divert to longer routes, increase tanker ton-miles, exacerbate regional fleet imbalances or increase transit times (as in the case of disruption in the Panama Canal), all of which sustained the high rates (Clarksons Research, 2024d).

Tanker freight rates are expected to remain strong in 2024, driven by continued demand and limited fleet growth in 2024 (less than one per cent) (Clarksons Research, 2024d). Ongoing disruptions, increased Chinese import and refinery capacity expansion, combined with limited fleet growth are key factors. Furthermore, new environmental regulations like the ETS, which may reduce available capacity, are likely to keep tanker freight rates high.

Despite current expectations of a limited number of new tanker orders, there is still a risk of an oversupply in the market. If there are more tankers than needed and demand does not grow fast enough, it could lead to lower spot and charter tanker rates. There is a possibility that demand for crude oil and oil products could decrease more than anticipated, influenced by the development and adoption of renewable energy. Meanwhile, the need to comply with growing environmental regulation and to shift towards green or eco-friendly tanker vessels will also shape the dynamics of the tanker freight market (both the demand for these vessels and operations).

Figure III. 5

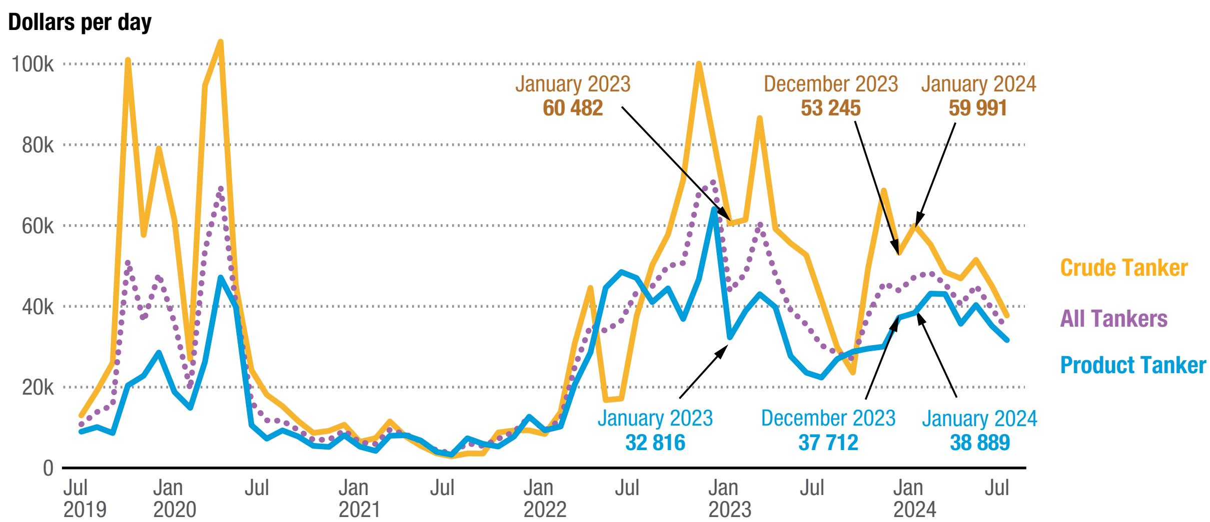
From COVID-19 lows to 2022 peaks, Baltic Dirty Tanker Index and Baltic Clean Tanker Index in 2023 and 2024 remain high with large fluctuations



Source: UNCTAD calculations, based on data from Clarksons Shipping Intelligence Network.

Figure III. 6

Average earnings, crude and product tankers, highly volatile in 2023 and 2024



Source: UNCTAD, based on data from Clarksons Shipping Intelligence Network.
Note: Average earnings across range of tanker sizes, weighted by the number of ships in each sector.

B. Impacts of the disruptions in the Red Sea, Suez Canal and Panama Canal on freight rates, consumer prices and economic activity

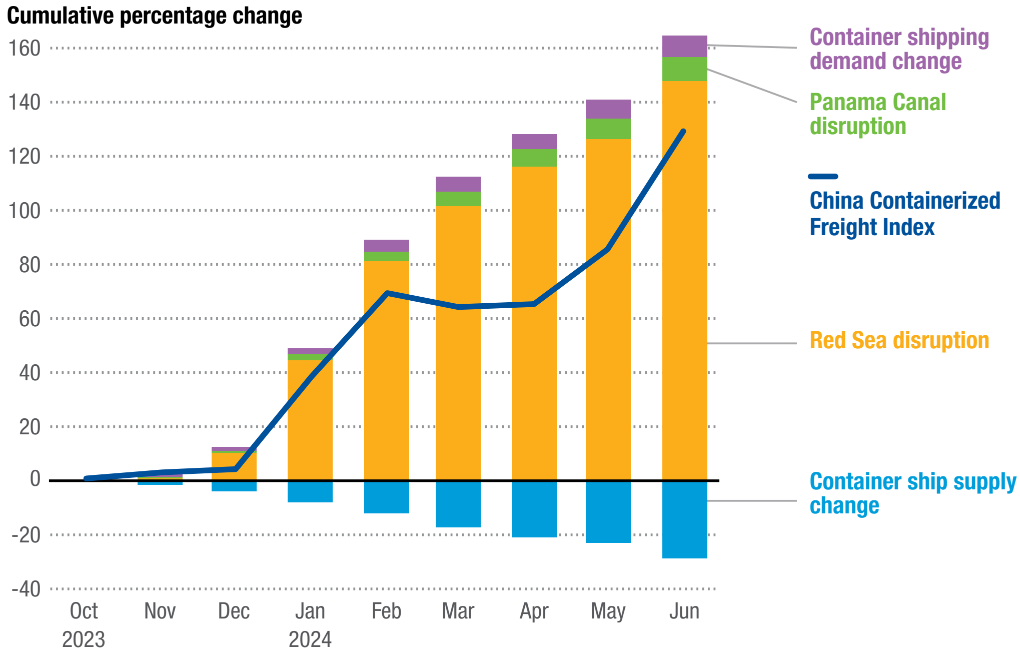
This section provides quantitative analysis of the underlying forces driving the recent freight rate increases due to disruptions in the Red Sea, Suez Canal and Panama Canal and simulates their impact on consumer prices and economic activity. As geopolitical- and climate-related disruptions may well be recurring issues, the present analysis will serve as a sound basis for predicting and forecasting future developments and formulating policy recommendations to mitigate the adverse impact of logistics disruptions on economies.

Evaluating key shocks causing maritime freight rate hikes in 2024

Red Sea disruption has significant impact on container shipping freight rates

As previously discussed in this chapter, freight rates, especially for container shipping, have been rising rapidly since the end of 2023.

Figure III. 7
China Containerized Freight Index and breakdown



Source: UNCTAD calculations, based on data provided by Clarksons Research Shipping Intelligence Network and Maritech Services Limited, Sea.
Notes: Cumulative changes from October 2023. Seasonally adjusted. The sum of the four presented components does not fully add up to the combined impact because "other" logistics shocks is not included in the figure. See technical note 1, for the estimation methodology.

The China Containerized Freight Index, a key indicator of freight rates for container shipping, grew approximately 120 per cent from October 2023 to June 2024.[2]

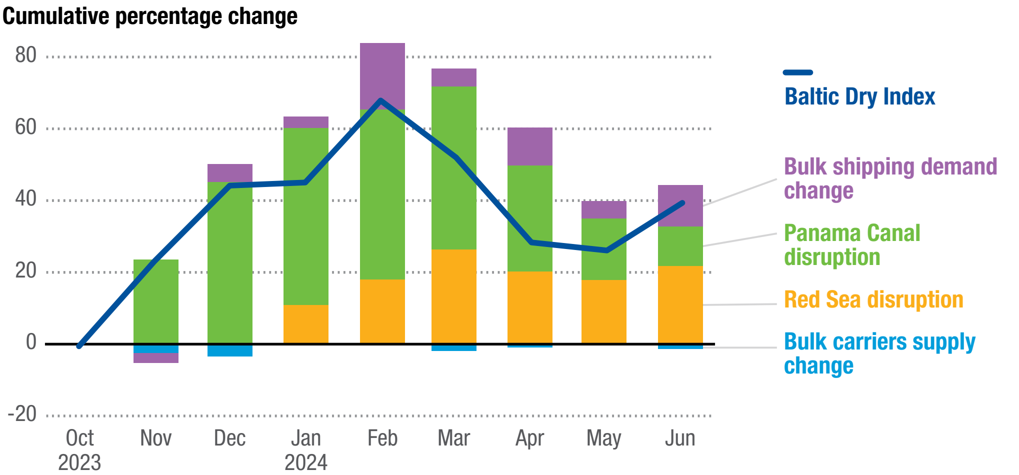
UNCTAD estimated the magnitude of several key shocks (factors) affecting container shipping freight rates, including the disruptions in the Red Sea, Suez Canal and Panama Canal, and an oversupplied ship capacity. It was found that the Red Sea crisis and disruptions to the Suez Canal was the most substantial factor, contributing 148-percentage points to the cumulative increase (120 per cent) in the China Containerized Freight Index (figure III.7). The Panama Canal disruption also contributed to the increase in the China Containerized Freight Index, but to a lesser extent, accounting for 9 percentage points. The impacts of these two shocks were partly offset by the growth in container ship supply capacity, which accelerated in 2023. When the demand for ships went up due to longer shipping routes caused by the Red Sea crisis, the market absorbed this by using available extra ship capacity (see section A. 2024 and beyond: Managing container fleet capacity and enhancing efficiency for a resilient future).

Dry bulk freight rates were affected by the Panama Canal disruption; limited effect of the Red Sea and Panama Canal disruptions on tanker freight rates

Using a similar approach, UNCTAD estimated the impacts on dry bulk and tanker freight rates, captured by the Baltic Dry Index and the Baltic Dirty Tanker Index.

In the dry bulk shipping market, the effect of the Panama Canal disruption became clear starting in November 2023 (figure III.8), when the Canal authority cut back on ship passages. The impact reached its peak in January 2024, contributing 49 percentage points to the cumulative 45 per cent increase in the Baltic Dry Index over this period.

Figure III. 8
Baltic Dry Index and breakdown



Source: UNCTAD calculations, based on data provided by Clarksons Research Shipping Intelligence Network, and Maritech Services Limited, Sea.
Notes: Cumulative changes from October 2023. Seasonally adjusted. The sum of the four presented components does not fully add up to the combined impact because "other" logistic shocks is not included in the figure. See technical note 1, for the estimation methodology.

[2] For the purpose of this analysis, all time series data in this section have been seasonally adjusted by UNCTAD.

However, the rise in shipping rates slowed significantly from April 2024 to June 2024, as restrictions on canal sailings gradually eased.

The impact of the Red Sea crisis and the Suez Canal disruption was more modest than the Panama Canal disruption, with a peak impact of 26 percentage points on the Baltic Dry Index increase by March 2024, indicating a different pattern compared to container shipping freight rates. One reason for this difference is that container cargo could be transported using the landbridge in North America to circumvent the Panama Canal, but this is less feasible for dry bulk cargo, such as coal or grain. It is not as efficient or cost-effective to transport large quantities of bulk materials by land compared to shipping them by sea. Similarly, the Suez Canal accounts for a higher share of container shipping compared to dry bulk cargo. However, the impact of the Red Sea and Suez Canal crisis worsened in June 2024, becoming the main reason for the increase in dry bulk shipping rates.

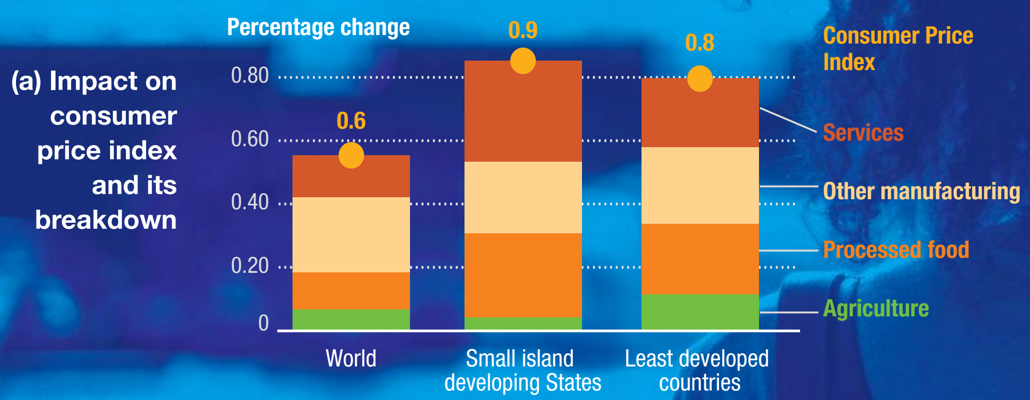
In the case of the crude tanker shipping market, the Baltic Dirty Tanker Index was on the rise again from October 2023, mainly driven by strong oil shipping demand and increased ton-miles (see section A. Tanker freight rates: 2023 volatility and 2024 highs amid strong demand and disruptions). The impact of the two chokepoint disruptions on the crude oil tanker market was less significant than their impact on container and dry bulk shipping sectors.[3]

Simulating economic impact of freight rate increases: Higher impact on consumer prices and on gross domestic product in small island developing States

A simulation exercise was conducted to assess the impact of the freight rate increases (from October 2023–June 2024) on prices and economic activity. The simulation concluded that global consumer price levels will increase by 0.6 per cent by around the end of 2025 due to the Red Sea crisis and the Panama Canal disruption

[3] Crude oil tanker routes passing through the Suez Canal and the Panama Canal are not included in the Baltic Dirty Tanker Index (Baltic Exchange, 2024).

Figure III. 9
Impact of increased shipping rates due to disruptions in the Red Sea and Panama Canal on consumer price levels and real gross domestic product

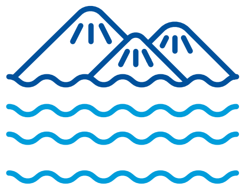


(figure III.9, panel (a)).[4] The simulation assumes that the combined impact of the two chokepoint disruptions on the freight rates, that is, 157-percentage points and 33-percentage points contributions to the China Containerized Freight Index and the Baltic Dry Index, respectively between October 2023 and June 2024, will be sustained over the simulation period. This is a conservative assumption as freight rates already continued to climb in June 2024. If freight rates were to increase beyond the current assumption, their impact on global consumer prices would be greater than projected in this analysis, with a possibility of reaching a 1.5 per cent increase, as simulated in chapter 3 of the *Review of Maritime Transport 2021* (UNCTAD, 2021).

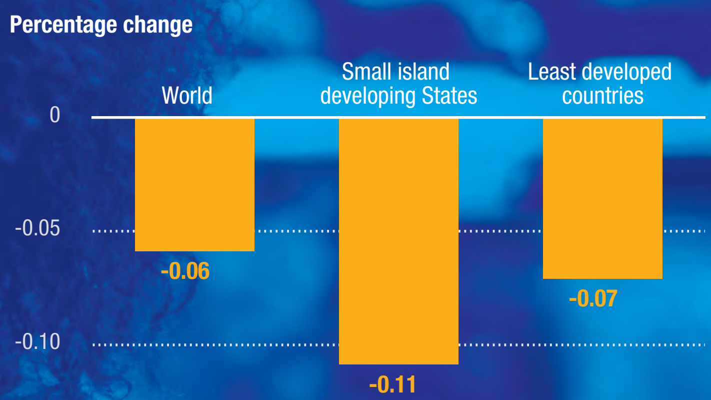
In this simulation, SIDS would be the most affected economic group, with a simulated consumer price impact of 0.9 per cent, due to their heavy reliance on maritime shipping for their economic activities. Specifically, processed food prices are expected to rise by 1.3 per cent in SIDS, contributing 0.26 percentage points to the overall consumer price increase, as SIDS depend heavily on processed food imports by sea. LDCs are expected to face a 0.8 per cent rise in consumer prices, a higher impact than the world average. Of this total increase, food prices alone will add 0.34 percentage points. This result highlights the significant food security risk in SIDS and LDCs from the global chokepoint disruptions.

The simulation also shows that real GDP will be reduced by 0.06 per cent globally (figure III.9, panel (b)). The negative impact on SIDS is double the world average, underscoring their heavy economic reliance on seaborne trade and their limited ability to replace imported goods with domestic production.

The negative economic impact on SIDS **is double the world average**



[4] The simulation was conducted using the standard Global Trade Analysis Project (GTAP), version 7 model (Corong et al., 2017) and the GTAP version 11 database (Aguiar et al., 2023). The simulation result compares changes from an initial equilibrium to a new equilibrium (see technical note 1, for details of the methodology). To specify a time horizon for these changes, an estimation result reported in UNCTAD, 2021, and indicating a one-year lag for the passthrough from freight rates to consumer prices, was used.



(b) Impact on real gross domestic product

Source: UNCTAD calculations, based on the GTAP version 11 Data Base and other data provided by Clarksons Research Shipping Intelligence Network and Maritech Services Limited, Sea.
Notes: Median of the impact across economies in respective economic group. See technical note 1, for the simulation methodology.

C. Impact of transport infrastructure on maritime costs: Insights from the Trade-and-Transport Dataset

LDCs experienced 30–70% higher transport costs for their imported goods than other groups

Maritime freight rates have been vulnerable to logistical disruptions caused by pandemics, geopolitical tensions and climate-related factors. However, the impact of these factors on maritime transport costs can be alleviated with a robust and resilient transportation infrastructure.

For a thorough investigation of transport costs and their determinant factors, UNCTAD and the World Bank developed the Trade-and-Transport Dataset.[5] The following summarized analysis of trends in the Trade-and-Transport Dataset focuses on maritime transport costs across four major economic groups: developed economies, developing economies (excluding SIDS and LDCs), SIDS and LDCs. SIDS and LDCs face high maritime transport costs.

- From 2016 to 2021, developed economies enjoyed the lowest maritime transport costs, which averaged 8.1 per cent of the FOB value (the costs of goods plus shipping to the departure port) and $86 per ton (figure III.10).
- Developing economies, excluding SIDS and LDCs, faced higher maritime transport costs averaging 10.6 per cent of the FOB value and $89 per ton.
- SIDS bore transport costs that were 15–20 per cent higher per ton ($103 per ton) compared to other regions. However their transport costs as a percentage of the FOB value (9.8 per cent) were slightly lower than other developing economies. This can be explained by the fact that SIDS import more containerized goods, which are worth more per ton, making the percentage of transport costs lower in comparison to the high value of these goods.
- LDCs experienced 30–70 per cent higher transport costs for their imported goods than other groups, averaging a substantial 13.7 per cent of the FOB value. Eight of the top ten economies with the highest transport costs in the world are LDCs, including Mozambique, Sierra Leone and Togo.

This data underscores the significant economic burden of transport costs on these particularly vulnerable economies.

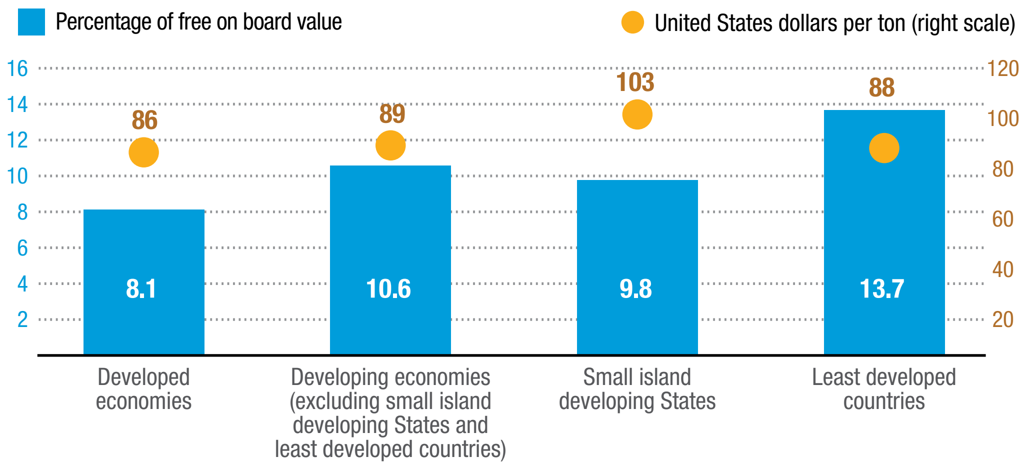
Transport infrastructure has a critical role in reducing maritime transport costs. Maritime transport costs are influenced by many factors including geographic distance,[6] the number of transits between origin and destination, the absence of economies of scale, trade imbalances and, critically, the quality of transport infrastructure. It is well established that efficient transport infrastructure is key to reducing these costs and facilitating streamlined trade.

5 This detailed dataset breaks down transport costs by type of goods, using a specific identifying code (known as the "Harmonized System code" or "HS code"). This dataset is more comprehensive than a previous 2021 dataset on transport costs, the Global Transport Costs Dataset for International Trade. Transport costs are measured as the difference between "cost, insurance and freight" values (which include the cost of the goods, insurance, and shipping to the destination port) and "free on board" (FOB) values (the cost of the goods and shipping up to the departure port only, not insurance or shipping to the final destination). As of July 2024, the data published cover the years 2016–2021. While the Trade-and-Transport Dataset includes transport costs for four modes of transport (air, sea, rail and road), the current analysis focuses on sea transport.

6 As a related point, developing economies must exert more transport work than developed countries to move their imports and exports by sea per dollar of maritime trade (see chapter I).

Figure III. 10

Median maritime transport costs for imported goods by economic group, 2016–2021: Least developed countries pay the most

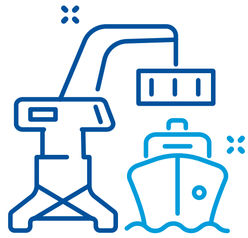


Source: UNCTAD and the World Bank, Trade-and-Transport Dataset.
Note: Transport costs (percentage of free on board value and United States dollars per ton) are calculated by the following two steps: (a) transport costs for each destination economy in a specific year are calculated by weighted average across all commodities and all trading partners (origin economies); (b) transport costs are aggregated by taking medians across all years and destination economies within respective economic groups.

As such, UNCTAD analysed the impact of investment in maritime transport infrastructure on maritime transport costs using a panel structure of the new Trade-and-Transport Dataset,[7] while controlling for various other factors.

The finding reveals that investments in maritime infrastructure significantly reduce transport costs. Specifically, if a country's investment-to-export ratio in maritime transport infrastructure were to improve from the bottom 20th percentile group in the world (that is around 0.09 per cent of exports) to the 20th–40th percentile group in the world (that is about 0.19 per cent of exports), maritime transport costs would decrease by 4.7 per cent (figure III.11). Furthermore, increasing the investment-to-export ratio to the 60th–80th percentile group (that is around 0.60 per cent of exports) would reduce maritime transport costs by 11.6 per cent. In simple terms, spending more on improving ports and shipping facilities leads to lower shipping costs.

In other words, if a country's initial level of transport costs was 10.6 per cent of the FOB value (a typical figure for developing economies, excluding SIDS or LDCs), increasing its maritime transport infrastructure investment-to-export ratio from the lowest 20th percentile range to the 60–80th percentile range would reduce the transport costs by 1.2 percentage points. So instead of paying 10.6 per cent of the value of the goods for shipping, the costs would drop to 9.4 per cent.



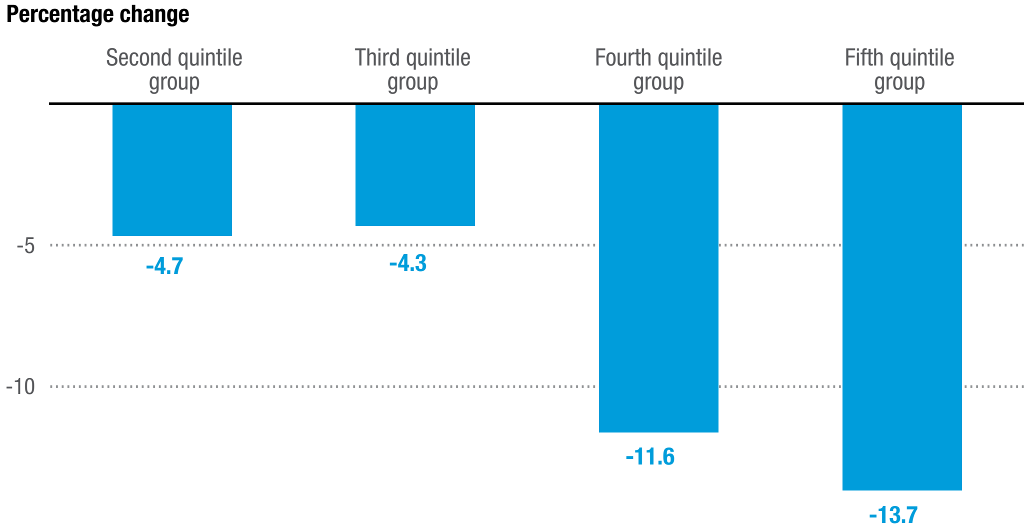
The finding reveals that **investments in maritime infrastructure significantly reduce transport costs**

[7] Due to the limitation of data availability, impact of exporter's investment was analysed (see technical note 2, for details of the methodology).

These results underscore that better investment in ports and shipping facilities can lead to noticeable savings in transport costs. This could be done through various channels, such as investing in efficient cargo handling and for ports to accommodate larger vessels, but also enabling a higher frequency of shipping services at ports.

Additional analysis shows that investment in road infrastructure can also lower maritime transport costs, highlighting how spillover effects from better hinterland transport – land areas including countries connected to the port – can positively impact port operations (see technical note 2, for analysis of how road infrastructure investment affects maritime transport costs).

Figure III. 11
How investing in maritime infrastructure affects maritime transport costs



Source: UNCTAD and the World Bank, Trade-and-Transport Dataset and the International Transport Forum, Transport infrastructure investment and maintenance spending.
Notes: Y-axis indicates impact of increasing investment/export ratio from the first quintile group (0–20 per cent) to the respective quintile groups in x-axis on maritime transport costs for goods exported. The impacts are represented in terms of percentage changes (not percentage point changes). Imputed values in the Trade-and-Transport Dataset are removed in the estimation. Due to the limitation in data availability, the estimation mainly covers developed economies and developing economies with relatively large economic sizes. See technical note 2, for the details of the methodology.

D. Policy considerations

Main issues

Freight rates in 2023 and the first half of 2024 were characterized by significant volatility and fluctuations, influenced by a variety of factors including supply and demand dynamics, geopolitical tensions, climate-related events and environmental regulations.

The persistent supply–demand imbalance across all segments has a direct impact on how freight rates are developing.

Congestion at major ports, exacerbated by the disruptions and increased demand, also contributed to higher freight rates and charges. Additionally, the shortage of empty containers is becoming a challenge.

Economic and trade uncertainties, geopolitical factors, changes in trade patterns, trends in the supply of ship carrying capacity along with the ongoing shift to cleaner energy and the rise of environmental regulations, will continue to significantly influence future shipping freight rates.

In addition, new environmental regulations, such as IMO CII as well as the European Union ETS, are expected to raise operating costs for shipping companies and affect future freight rates dynamics and pushing rates higher.

Analysis by UNCTAD shows that the Red Sea crisis is the main driver of the current rise in container freight rates, and its impact has increased from November 2023. The disruption of the Panama Canal due to low water levels had a significant impact on dry bulk freight rates between November 2023 and March 2024, but the effect of the drought in driving up rates had diminished by June 2024. However, in the absence of the two chokepoint disruptions, an increasing supply of container ships would have outstripped demand, leading to lower container freight rates and pointing to a potential overcapacity in the container shipping market. In addition, these shocks disrupting chokepoints could raise global consumer price levels by 0.6 per cent by around the end of 2025, with the risk of higher impacts. SIDS and LDCs could face higher food price increases due to their heavy dependence on maritime transport, which is a food security risk. Global real GDP is projected to be negatively impacted, with SIDS being the most affected.

The new Trade-and-Transport Dataset shows that developing economies, particularly SIDS and LDCs, experience higher transport costs compared to developed economies. However, investment in transport infrastructure, both at ports and in their hinterland, can reduce maritime transport costs.

Policy recommendations:

1. **Monitor and collect data on freight rates and disruptions**. International organizations and agencies, such as UNCTAD and IMO, and stakeholders in the shipping industry, including the International Chamber of Shipping (ICS) and policymakers, should engage in continuous monitoring, data collection and analysis to anticipate and mitigate the impact of disruptions on freight rates.
2. **Enhance capacity management**. Shipping companies should closely monitor market developments and manage ship carrying capacity to address the supply–demand imbalance. This includes strategic vessel recycling and optimizing fleet composition to align with market needs.
3. **Improve port efficiency**. Improving port operations including through upgraded port infrastructure and the adoption of new and green technologies can help reduce congestion and improve overall supply chain efficiency. This is key for mitigating the impact of disruptions on freight rates and reducing additional charges.
4. **Support the green transition**. Policymakers should implement clear and consistent regulations to address the impact of environmental standards on freight rates. Providing incentives for energy-efficient technologies and green vessels will encourage compliance and promote sustainability in the shipping industry, which will also influence market dynamics and freight rates.
5. **Assistance**. As deemed appropriate, technical assistance and support (financing, guarantees, etc.) should be provided to assist developing economies, specifically SIDS and LDCs, in enhancing maritime transport sector and help implementing measures to mitigate the impacts of global logistics shocks on their economies and people.

Technical notes

Technical note 1
Methodology to assess the impact of the Red Sea and Panama Canal disruptions on freight rates, consumer prices and gross domestic product (section B)

The analysis in section B estimated and simulated the impact of the Red Sea and the Panama Canal disruptions on freight rates, consumer prices, and real GDP at the global level, and in SIDS and LDCs. The estimation process is divided into four steps:

1. Estimating the impact on number of ship passages in the Suez Canal and the Panama Canal.
2. Estimating the impact on freight rates.
3. Converting the impact on freight rates into maritime transport costs.
4. Simulating the impacts on consumer prices and GDP.

First step: Impacts on number of ship passages in the Suez Canal and Panama Canal

The first step is the estimation of the impact of the Red Sea crisis and the Panama Canal disruptions on the number of ship passages in these "chokepoints". UNCTAD has estimated the following Poisson regression models in the event study-design using Poisson Pseudo-Maximum Likelihood estimator:[8]

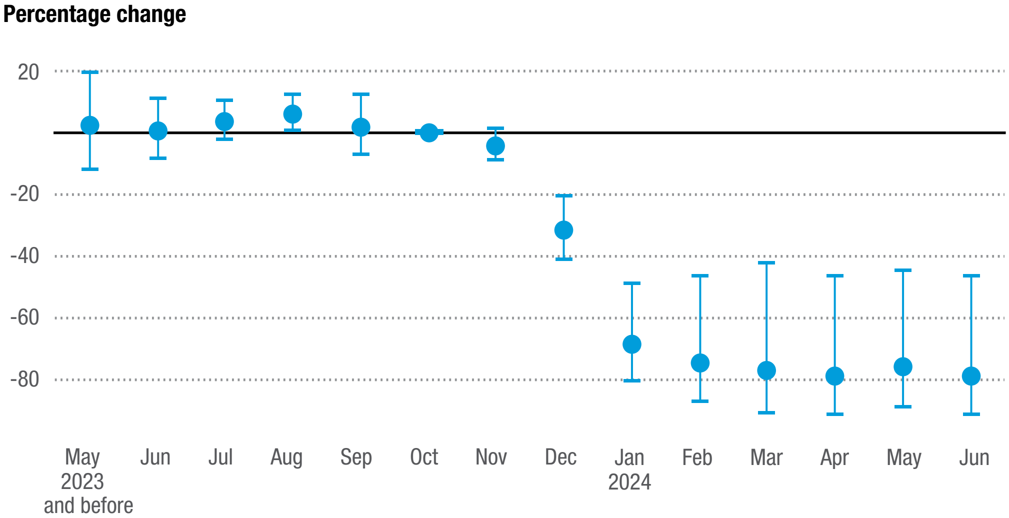
$$y_{ilt} = \exp\left(\sum_{\substack{k=-5 \\ k\neq -1}}^{7} \delta_k z_{il,t-k} + \delta_{-6}^{terminal} z_{il,t+6}^{terminal} + \alpha_{il} + \alpha_t + q_{ilt}\psi + \epsilon_{ilt}\right),$$

where y_{ilt} is the number of ship passages for vessel type i (such as intermediate size container ship and neo-Panamax container ship) at location l in time t, $z_{il,t}$ is the treatment variable that takes 1 in November 2023 in the Suez Canal (in June 2023 in the Panama Canal for Panama Canal regression) and 0 otherwise, and $z_{il,t+6}^{terminal}$ is the terminal treatment variable that takes 1 in May 2023 and before in the Suez Canal (in December 2022 and before in the Panama Canal for Panama Canal regression). Consequently, the terms $\sum_{\substack{k=-5 \\ k\neq -1}}^{7} \delta_k z_{il,t-k} + \delta_{-6}^{terminal} z_{il,t+6}^{terminal}$ capture the dynamic effects of the Red Sea crisis and the Panama Canal drought on the ship passages. Further, α_{il} means fixed effects for vessel type i and location l, α_t is a time fixed effect, q_{ilt} indicates other controls (different time trends were used in regressions for dry bulk ships), and ϵ_{ilt} is error term.

Six versions of the above regressions were estimated to separately assess the impacts of the Red Sea crisis and the Panama Canal drought on container ships, dry bulk ships and tankers. For instance, the estimated result for the impact of the Red Sea crisis on the container ship passages is indicated in figure 1. It indicates that the parallel trend assumption is mostly satisfied, implying that the result can be interpreted as a causal impact.

[8] The explanation follows Freyaldenhoven et al. (2021), but some notations are adjusted.

Figure 1
Event study estimation result for the impact of the Red Sea disruption on the number of container ship passages



Source: UNCTAD calculations, based on data provided by Maritech Services Limited, Sea.
Notes: The estimation result is originally represented in logarithmic scale. It is converted into percentage change in this figure. The vertical lines indicate 95 per cent confidence intervals. The confidence intervals are based on standard errors clustered at location and vessel type.

Second step: Impacts on freight rates

In the second step, UNCTAD has estimated Structural Vector Autoregression models, separately for container shipping, dry bulk shipping, and tanker shipping. These models are based on monthly data for $\Delta \ln z_t = (\Delta \ln fleet_t, \Delta \ln trade_t, \Delta \ln frate_t)'$, where $\Delta \ln fleet_t$ represents the first difference in natural logarithm of fleet supply after seasonal adjustment. $\Delta \ln trade_t$ and $\Delta \ln frate_t$ are similarly defined for shipping trade demand and freight rate. The external variables are $\Delta \ln x_t = \left(\Delta \ln x_t^{Red\ Sea}, \Delta \ln x_t^{Panama}\right)$, representing the difference in natural logarithm of the Red Sea shock and the Panama Canal shock estimated in the first step.[9] The Structural Vector Autoregression representation is given by:

$$A_0 \Delta \ln z_t = \alpha + \sum_{i=1}^{s} A_i \Delta \ln z_{t-i} + C \Delta \ln x_t + \epsilon_t,$$

where $\epsilon_t = \left(\epsilon_t^{fleet\ supply\ shock}, \epsilon_t^{shipping\ demand\ shock}, \epsilon_t^{other\ logistics\ shocks}\right)'$ denotes the vector of structural shocks. It is assumed that A_0 has a recursive structure, allowing the reduced form errors e_t to be decomposed as follows:

$$e_t \stackrel{\text{def}}{=} \begin{pmatrix} e_t^{\Delta \ln fleet} \\ e_t^{\Delta \ln trade} \\ e_t^{\Delta \ln frate} \end{pmatrix} = \underbrace{\begin{pmatrix} b_{11} & 0 & 0 \\ b_{21} & b_{22} & 0 \\ b_{31} & b_{32} & b_{33} \end{pmatrix}}_{B = A_0^{-1}} \epsilon_t,$$

After estimating the above Structural Vector Autoregression models, historical decomposition was conducted to break down the freight rate changes into the three structural shocks and the two external variables. The contributions of these two external variables represent the impacts of the Red Sea shock and the Panama Canal shock on the freight rates.

[9] The methodology is similar to the one used in an early version of Kilian (2009), but the two chokepoint shocks are treated as exogenous variables rather than as endogenous variables.

The contribution of the other logistics shocks is intentionally omitted in figure III.7 and figure III.8 as the interpretation of the shocks is not straightforward and it is not a focus of the analysis. The decomposition result, in terms of first differences of natural logarithms, was converted to cumulative percentage changes for the visualization purpose.

Third step: Converting impacts on freight rates into transport costs

In the third step, the impacts of the Red Sea shock and the Panama Canal shock on freight rates were transformed into changes in maritime transport costs based on the following regression model:

$$\Delta \ln tcost_{cdt} = \beta \Delta \ln frate_t + \alpha_c + \alpha_d + u_{ilt},$$

where $\Delta \ln tcost_{cdt}$ is maritime transport cost for commodity c and destination economy d in year t, $\Delta \ln frate_t = (\Delta \ln frate_t^{container}, \Delta \ln frate_t^{dry\ bulk}, \Delta \ln frate_t^{tanker})$ is the vector of freight rates (in terms of first difference of natural logarithm) for container shipping, dry bulk shipping and crude oil tanker shipping sectors, and the α's are respective fixed effects.[10] Data for the maritime transport costs are derived from the Trade-and-Transport Dataset from UNCTAD and the World Bank. After estimating the regression model, the freight rate shocks due to the Red Sea crisis and the Panama Canal drought, estimated in the second step, were incorporated into $\Delta \ln frate_t$ to form predictions for $\Delta \ln tcost_{cdt}$. The predicted values for $\Delta \ln tcost_{cdt}$ were converted to percentage changes and used as inputs in the fourth step below.

Fourth step: Impacts on consumer prices and GDP

The final step used the GTAP version 7 model (Corong et al., 2017) and the GTAP version 11 Data Base (Aguiar et al., 2023) to simulate the impacts of the Red Sea crisis and the Panama Canal disruption on consumer prices and GDP. The simulation was based on a standard closure of the GTAP model, except a change to allow for an exogenous change in transport costs. The endogenous variable for transport costs ($ptrans$) was swapped with an exogenous variable for maritime shipping technology ($atall("wtp", COMM, REG, REG)$). The predicted values for maritime transport costs ($\Delta \ln tcost_{cdt}$) in the third step, after being converted into percentage changes, were used as shocks to the transport costs in the GTAP model (the variable $ptrans$).

The magnitude of the shocks is too large for the GTAP simulation to converge. To address this problem, the original shocks are scaled down by some factor and the simulated impacts are scaled back. It is confirmed that any scaling numbers can produce almost identical simulation impacts as long as the model simulation converges.

[10] In the actual conversion, tanker freight rate was omitted as it was not statistically significant.

Technical note 2
Methodology to assess the impact of transport infrastructure investment on maritime transport costs (section C)

A baseline regression for the analysis in section C is the following fixed-effects model:

$$\ln y_{odct} = \beta \ln z_{ot} + \gamma \ln x_{odct} + \alpha_{odc} + \alpha_{ct} + \epsilon_{odct} \, ,$$

where y_{odct} is maritime transport costs (in terms of percentage of the FOB value) for origin-destination-commodity pair (odc) at time t, z_{ot} is investment/export ratio in maritime transport infrastructure (a variable of interest) in origin economy o at time t, x_{odct} is a vector of control variables for origin-destination-commodity pair (odc) at time t (some control variables are observed only at origin or destination level), α_{odc} means fixed effects for origin-destination-commodity pair (odc), α_{ct} is fixed effects for commodity (c) at time t, and ϵ_{odct} is an error term. The vector of control variables (x_{odct}) include GDP, value of total imports, unit value of commodity, and trade imbalances. Further, the fixed effects control for any fixed features of all origin-destination-commodity pairs and commodity-wide time effects. There are 63,654 fixed effect dummies for α_{odc} and 6,711 dummies for α_{ct}. The number of observations used in the estimation is 162,606.

The maritime transport costs (y_{odct}) are based on the UNCTAD and the World Bank, Trade-and-Transport Dataset. As several data entries in the dataset are imputed values, these observations are removed for the estimation. Investment in maritime transport infrastructure is sourced from the International Transport Forum, Transport infrastructure investment and maintenance spending. It is converted to investment/export ratio by using export values in the Trade-and-Transport Dataset (export values are aggregated at origin economy level. As the investment is expressed in domestic currency, it is converted into United States dollars by using exchange rates). Control variables (x_{odct}) are calculated from the Trade-and-Transport Dataset, except real GDP data from the United Nations, National Accounts Main Aggregates Database.

For the visualization purpose in the main text, the variable of interest (z_{ot}) is replaced by its quintile group dummies (z^q_{ot}'s):

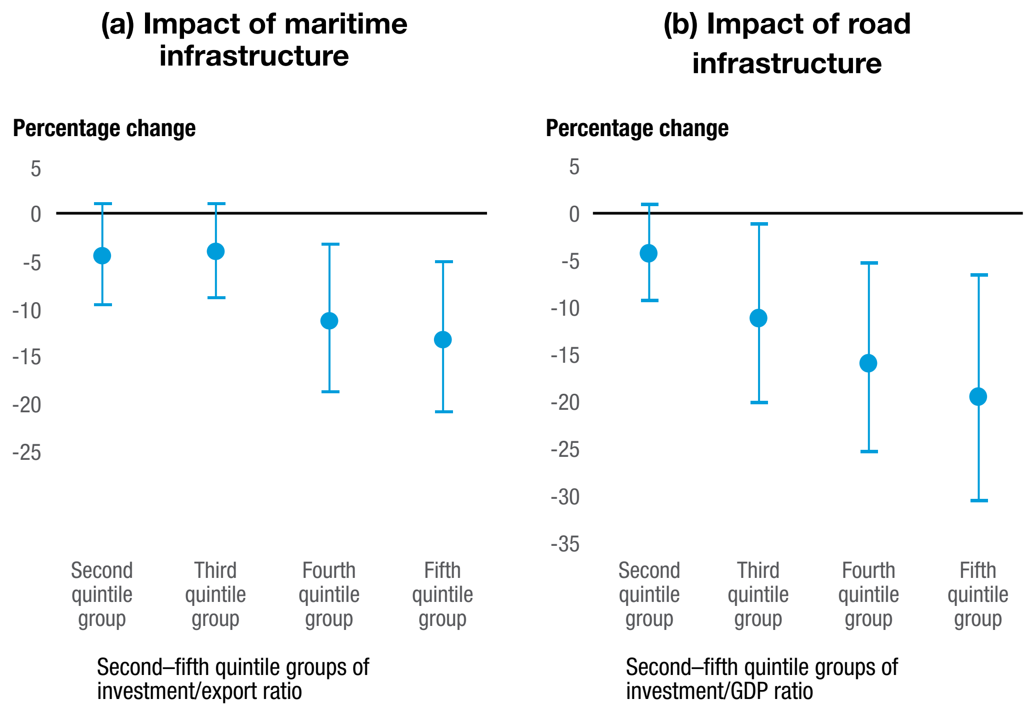
$$\ln y_{odct} = \sum_{q=2}^{5} \beta^q z^q_{ot} + \gamma \ln x_{odct} + \alpha_{odc} + \alpha_{ct} + \epsilon_{odct} \, ,$$

where z^q_{ot} is a q-th quintile group dummy for investment/export ratio in maritime transport infrastructure. The first quintile group dummy is omitted as it is set as a base category.

The coefficients on the quintile group dummies, β^q's, indicate the impacts of improving the investment/export ratio from the first quintile group to the q-th quintile group in terms of log-differences. The estimated values of β^q's are converted to percentage changes for the visualization purpose.

Additionally, impact of the road infrastructure investment was also estimated, by replacing z_{ot} and z^q_{ot}'s by its road version. For road infrastructure investment, investment/GDP ratio was used as a variable of interest, because it is more relevant for transport costs than investment/export ratio. The estimated impacts of maritime and road infrastructure investment on maritime transport costs are summarized in figure 2.

Figure 2
Impact of exporters' maritime and road transport infrastructure investment on maritime transport costs



Source: UNCTAD and the World Bank, Trade-and-Transport Dataset and the International Transport Forum, Transport infrastructure investment and maintenance spending.
Notes: Y-axis indicates impact of increasing investment/export (or investment/GDP) ratio from the first quintile group (0–20 per cent) to the respective quintile groups in x-axis on maritime transport costs for goods exported. The impacts are represented in terms of percentage changes (not percentage point changes). *Imputed* values in the Trade-and-Transport Dataset are removed in the estimation. Due to the limitation in data availability, the estimation mainly covers developed economies and developing economies with relatively large economic sizes. The vertical lines indicate 95 per cent confidence intervals. As the investment data are observed at origin economy level, the confidence intervals are based on standard errors clustered at origin economy level.

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2024 Review of maritime transport

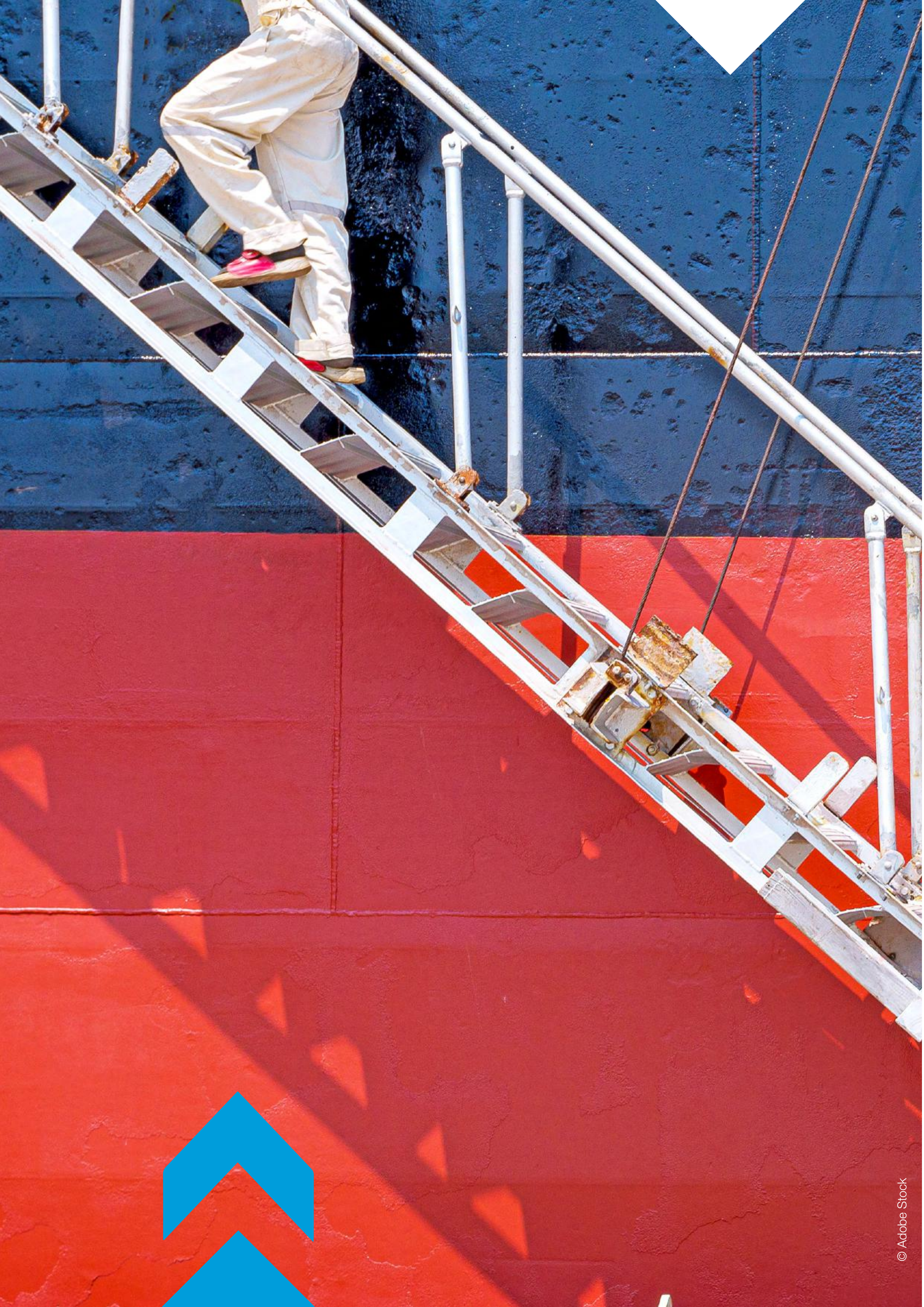
Chapter IV

Port performance and maritime trade and transport facilitation

In 2023 and early 2024, port performance worldwide showed positive trends, with an increase in port calls, better connectivity and improved cargo handling. After experiencing congestion and slowdowns during the COVID-19 pandemic, ports are now recovering and stabilizing, thanks to trade facilitation and investments in infrastructure. However, this stability may be short-lived, as mid-2024 is showing signs of renewed congestion due to deviations and disruptions resulting from the disruptions in the Red Sea and reduced capacity in the Panama Canal.

When evaluating seaport performance, it is important to look at how well the port is connected to nearby areas and beyond, a factor known as hinterland connectivity. This includes how well the port links with different types of transport, such as trains, truck, or barges, to move goods quickly and efficiently. Good transport links to and from ports, including connections to neighbouring landlocked countries as well as optimized trade facilitation measures, can help reduce congestion at ports and enhance overall port operations. In addition to improving port management, these strong transport connections play a key role in the efficiency of global supply chains.

This chapter is divided into three sections, as follows: section A presents trends in port performance with regard to port calls, liner shipping connectivity and cargo-handling; section B provides insights from the TrainForTrade Port Performance Scorecard (PPS); and section C examines the links between improved hinterland connectivity, trade facilitation and port performance.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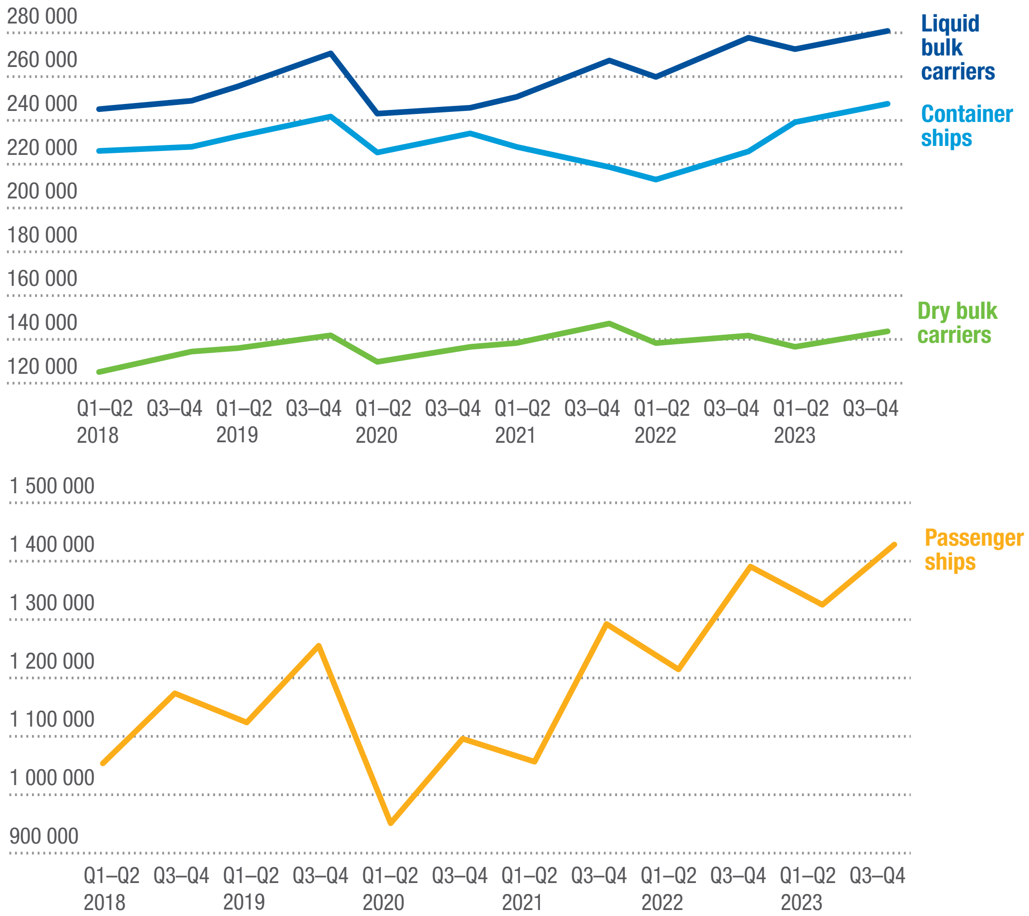
A. Port performance

Increasing port calls

Port calls by container ships saw a strong rebound in 2023, reaching record levels. Calls by tankers and passenger ships also increased. After a decline during 2021 and in the first half of 2022, port calls by container ships surged to almost 250,000 calls during the second half of 2023. Year-on-year, this represents a 12 and 9 per cent increase in the first and second halves of 2023 (figure IV.1). Similarly, tanker port calls continued to grow throughout 2023, increasing by 5 per cent in the first two quarters, and by 1 per cent in the last two quarters compared to the same periods in 2022. Port calls for dry bulk carriers remained at levels similar to 2022. Port calls by passenger ships continued to rise, with 9 and 3 per cent year-on-year increases in the first and second halves of 2023. In 2023, container shipping lines increased the number of ships on routes covering multiple regions, such as East Asia to Europe via South Asia and the Middle East, to handle excess capacity. Meanwhile, ships often skipped port calls on the East Asia to Europe route to manage demand.

Figure IV. 1
Port calls per half year, world total



Source: UNCTAD calculations, based on data provided by Marine Traffic.
Note: Ships of 1,000 GT and above. For the underlying data see http://stats.unctad.org/maritime.

Port calls by **container ships** surged to almost **250,000 calls during the second half of 2023**

By late 2023, changes in shipping routes and longer distances began to play a more significant role. This led to more port calls to meet operational needs, seize economic opportunities and improve logistics.

Tanker and container ship port calls increasing in Africa and Asia

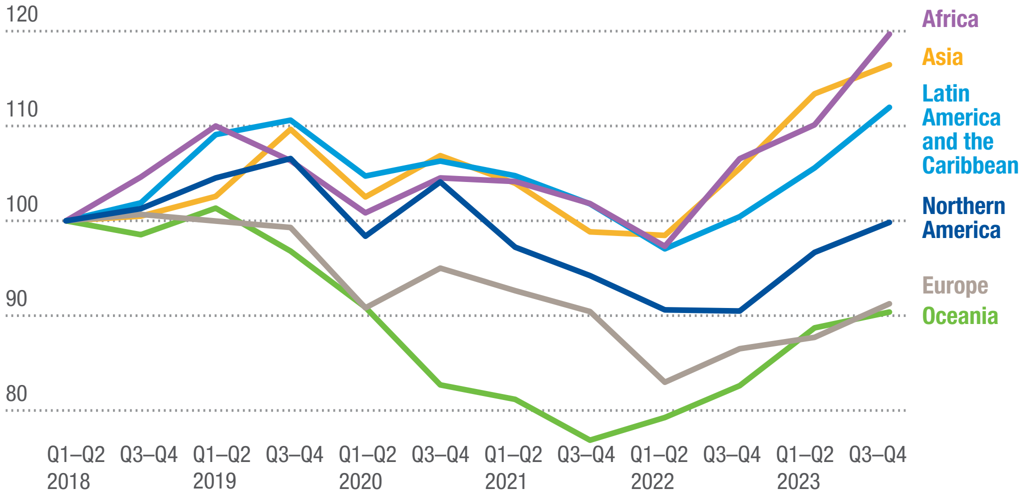
Since 2018, Africa and Asia have recorded the largest increases in port calls by container ships and tankers.

Until the second half of 2023, port calls by container ships increased by 20 per cent in Africa and by 16 per cent in Asia. For tankers, the difference was even higher, with port calls in Africa rising by 38 per cent and by 23 per cent in Asia over the same period (figure IV.2).

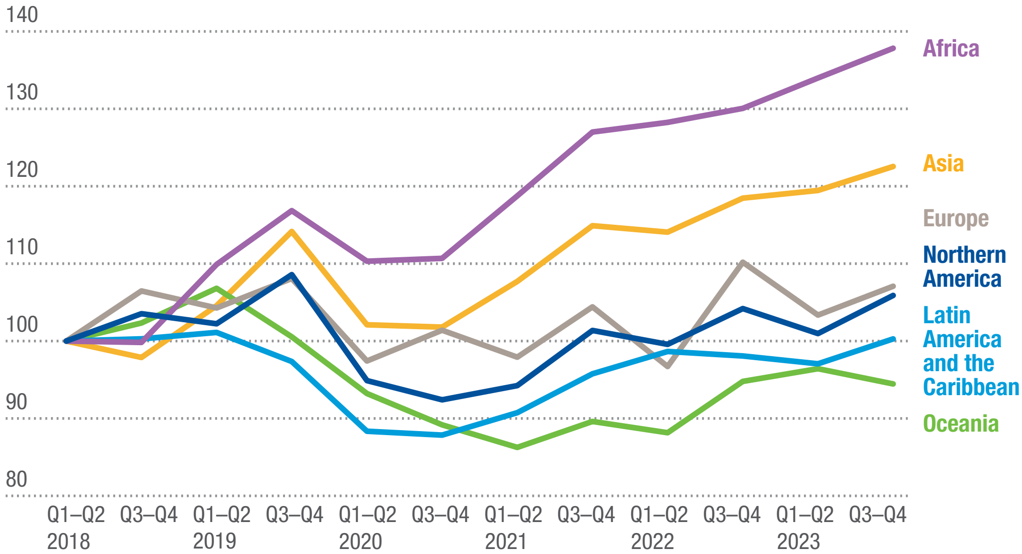
Figure IV. 2

Port calls by container ships and tankers per half year, by region, index value (2018 Q1–Q2 = 100)

Container ships



Tankers



Source: UNCTAD calculations, based on data provided by MarineTraffic.
Note: Ships of 1,000 GT and above. For the underlying data see http://stats.unctad.org/maritime.

Liner shipping connectivity

The Liner Shipping Connectivity Index (LSCI) is a global index used in the maritime industry that measures how well different countries and ports are connected to the global container shipping network. Better connectivity usually leads to reduced costs, improved times and greater reliability thanks to a wider variety of connections, companies and service providers. In turn, this benefits shippers and trade as a whole.

In 2024, the LSCI methodology was revised to adjust the weight and importance of its six components.[1] Previously, the calculation emphasized the size of the largest ship and total deployed carrying capacity, since these two indicators have increased over the last two decades, reflecting trends in the liner shipping market. However, maximum vessel size shows a weaker correlation with other connectivity measures. Maximum ship size was also found to be less relevant to trade or transport costs compared to other LSCI components (UNCTAD, 2024a).

The updated methodology for calculating the LSCI closely resembles the original, with two key differences concerning the way the six components and the Index itself are normalized. Firstly, the components are now standardized using the average rather than the maximum for each component. Secondly, the reference time point has changed from Q1 2006 to Q1 2023. Details of the revised methodology are shown in table IV.1.

The revisions lead to a more balanced distribution across the six components. In practice, it means that countries and ports receiving fewer but larger ships would potentially be ranked lower than before, while countries and ports that do not receive large ships but are served by many carriers and have more connections and services could see their ranking increase (UNCTAD, 2024a).

Asian countries are at the top of the LSCI ranking; Viet Nam has the largest long-term increase in connectivity

In the second quarter of 2024, Asian countries continued to feature among the top 10 best-connected countries on the LSCI scale, with China ranking first, followed by the Republic of Korea and Singapore. Other Asian countries in the top 10 were Malaysia, Japan, and Viet Nam. The United States ranked fourth, while the most connected European countries were Spain, the United Kingdom and the Kingdom of the Netherlands.

Table IV. 1
Changes to the updated Liner Shipping Connectivity Index: Main differences

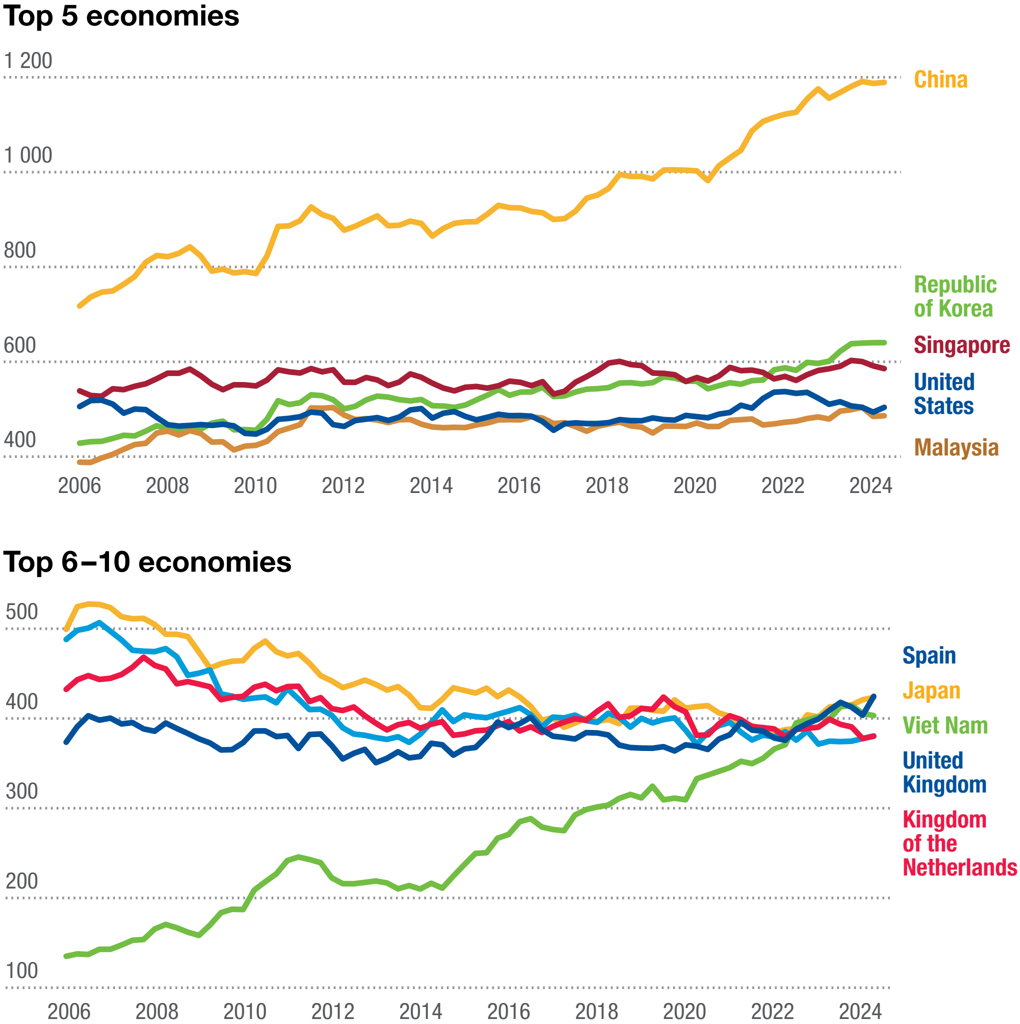
2016 LSCI	Updated 2024 LSCI
1. Normalize each component's individual value by dividing its value by the **maximum** value of this component in **Q1 2006**.	1. Normalize each component's individual value by dividing its value by the **average** value of this component in **Q1 2023**.
2. Calculate the index as the average of all six components.	2. Calculate the index as the average of all six components.
3. Normalize the index by dividing its value by the **maximum** value of the index in **Q1 2006** and multiplying it by 100.	3. Normalize the index by dividing its value by the **average** value of the index in **Q1 2023** and multiplying it by 100.

[1] The six components of the LSCI (port and country level) are:
(a) The number of scheduled ship calls per week in the country or port.
(b) Deployed annual capacity in TEU.
(c) The number of regular liner shipping services.
(d) The number of liner shipping companies.
(e) The size, in TEU, of the largest ships deployed on a scheduled service.
(f) The number of other countries (or ports) that are connected to the country (or port) through direct liner shipping services.

During the second quarter of 2023 and the second quarter of 2024, Spain recorded the largest increase in its LSCI score (3.8 per cent) among countries in the top 10. This was driven by increases in weekly calls and deployed capacity. Spanish ports such as Algeciras and Valencia serve as trans-shipment centres for containers that were previously shipped through the Suez Canal, yet now require feedering services from the Western to the Eastern Mediterranean Sea. LSCI for the Republic of Korea increased by 2.9 per cent, following the rise in the number of operators, while for Japan, the LSCI went up by 2.6 per cent, reflecting an increase in the maximum vessel size.

Examining the long-term trend since 2006, the highest LSCI increases among the top 10 countries were observed in Viet Nam (199 per cent), China (66 per cent) and the Republic of Korea (50 per cent). In all three cases, improved LSCI ranking was mainly due to increases in ship sizes and deployed capacity, as well as an increased number of service providers and weekly calls (figure IV.3).

Figure IV. 3
Top 10 economies in the Liner Shipping Connectivity Index



Source: UNCTAD calculations, based on data provided by MDS Transmodal.
Note: Index is set at 100 for the average value of country connectivity in the first quarter of 2023.

Small island developing States aiming to increase connectivity

Many SIDS face the challenges of remoteness, small trade volumes and trade imbalances. The average connectivity of SIDS (excluding "big hub" SIDS, namely the Dominican Republic, Jamaica, Mauritius and Singapore) is over 10 times less than non-SIDS (including the four big hub SIDS). The long-term trend for SIDS is volatile, with the index for these countries not yet recovered after a 7 per cent drop between the third and fourth quarters of 2021.

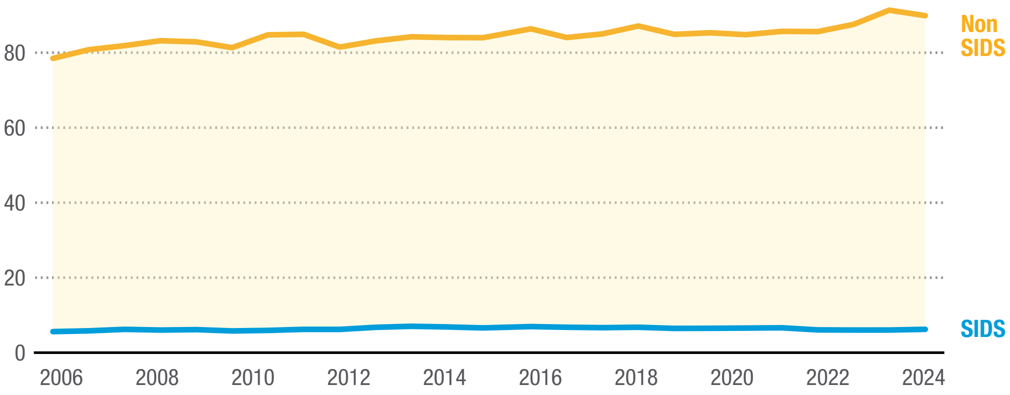
In contrast, steady growth has continued in other groups of countries. Over the last 10 years, the average LSCI of SIDS (excluding the four big hub SIDS) has decreased by 9 per cent, while the average LSCI of non-SIDS (including the four big hub SIDS) rose by 7 per cent over the same period (figure IV.4).

Many SIDS face a vicious cycle whereby lower trade volumes discourage more frequent services and larger ships visiting their ports. This leads to higher freight rates, which reduces trade competitiveness (box IV.1).

The average connectivity of SIDS is over **10 times less than non-SIDS**

Figure IV. 4

Average Liner Shipping Connectivity Index of small island developing States excluding the four big hubs Dominican Republic, Jamaica, Mauritius and Singapore compared to the rest of the world



Source: UNCTAD calculations, based on data provided by MDS Transmodal.
Note: Index is set at 100 for the average value of country connectivity in the first quarter of 2023 (UNCTAD, 2024a). SIDS exclude the four big hub SIDS (the Dominican Republic, Jamaica, Mauritius and Singapore). Non-SIDS include the four big hub SIDS. For countries with no liner shipping connections, values are assumed to be zero, to better reflect lost connectivity. Countries with no liner shipping connections for the entire period are excluded from the averages.

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Box IV. 1
Connectivity challenges in the Caribbean

Maritime connectivity for freight in the Caribbean operates within a dual hub and spoke system. This means there are central hubs and smaller connecting routes. The intraregional network is centred on Trinidad and Tobago, which serves as the main hub. From this central port, smaller feeder routes (spokes), connect to other regional hubs and islands. This setup allows large ships to deliver cargo to Trinidad and Tobago, from which smaller ships transport goods to various ports and islands, managing the flow of cargo across the region. The extraregional network (hubs: Kingston, Jamaica; Panama; Miami, United States), provides connectivity for international trade. This dual structure results in two distinct route networks, each playing a crucial role in regional and global trade dynamics (Briceño-Garmendia et al., 2015).

Identifying connectivity challenges

At the Global Supply Chain Forum organized by UNCTAD and held in Bridgetown from 21 to 24 May 2024, several critical connectivity challenges in the Caribbean were highlighted. One issue is the high cost of freight. This is driven by ineffective liner routes, limited carrier competition and diseconomies of scale. The small sizes of regional ports contribute to the issue, as does the imbalance in trade flows; liner services often travel fully loaded southward but return northward empty, which inflates costs. Dependence on the routing decisions of major shipping lines (Edwards, 2024) and a high market concentration among a handful of liners (Briceño-Garmendia et al., 2015) further inflates these expenses. Shipping a 40-foot container from Miami, United States, to SIDS in the Caribbean can be up to four times more expensive than shipping the same container to China or Argentina (box table IV.1.1).

Box table IV. 1. 1
Shipping costs from Miami, United States to small island developing States and to other international ports, selected destinations

Destination	Cost (United States dollars)	Distance (km)
Roseau, Dominica	5 750	2 298
Bridgetown, Barbados	4 559	2 611
Freeport, Bahamas	3 164	144
Kingston, Jamaica	2 897	1 413
Port of Spain, Trinidad and Tobago	2 870	2 677
Buenos Aires, Argentina	1 200	10 350
Shanghai, China	985	18 199

Source: ESCAP calculations, based on data from iContainers and sea-distance.org.
Note: Rates for 40-foot containers, full container load as of 27 June 2024. Costs include loading onto the ship, customs clearance and transport.

Another pressing issue is insufficient inter-island connectivity, partly due to the high cost of port services and a tax structure that hinders regional integration and short sea shipping. Port handling charges in the Caribbean are two to three times higher than in similar ports elsewhere. For instance, shipping a container from Shanghai to Miami can be cheaper than shipping it to a neighbouring island 100 miles away. These high costs are often linked to procedural inefficiencies and poor port management (Telemaque, 2022).

Inadequate infrastructure further compounds these challenges. Many Caribbean ports are ill-equipped to handle modern vessels or large volumes of cargo (Edwards, 2024). The scarcity of berths often means prioritizing cruise vessels over cargo vessels. Despite the clear need for investment, small cargo volumes and high service costs lead port management to continually assess whether the volume justifies further investment or whether alternative solutions should be explored (Telemaque, 2022).

Strategic recommendations

Experts at the Global Supply Chain Forum provided several strategic recommendations to address these connectivity challenges, as summarized in box figure IV.1.1.

Box figure IV. 1. 1
Recommendations to improve connectivity among small island developing States

Adressing diseconomies of scale to reduce costs

- Consolidating cargo volume with other ports to reduce freight costs and inefficiencies along the logistics chain.
- Facilitating bulk shipping for SMEs: Encourage collaboration among SMEs to consolidate shipments and reduce individual shipping costs.

Infrastructure Development

- Enhance port infrastructure through private investment to handle new-Panamax ships of 13,500 TEUs, fostering substantial growth in transshipment activities in the Caribbean.
- Develop Third-Party Logistics plan and commission a regional approach to logistics.
- Take advantage of services value chains to enhance connectivity.

Improving Logistics Performance

- Improve customs clearance processes.
- Enhance transport infrastructure through ports and improve internal connections.
- Develop local logistics competencies through partnerships with abroad investors.

Addressing these challenges and implementing these recommendations can significantly enhance maritime connectivity in the Caribbean, fostering regional economic growth and integration into the global economy.

Source: ESCAP, based on cited sources.

The global liner shipping network **grows again**

Global liner shipping network returns to an increasing trend

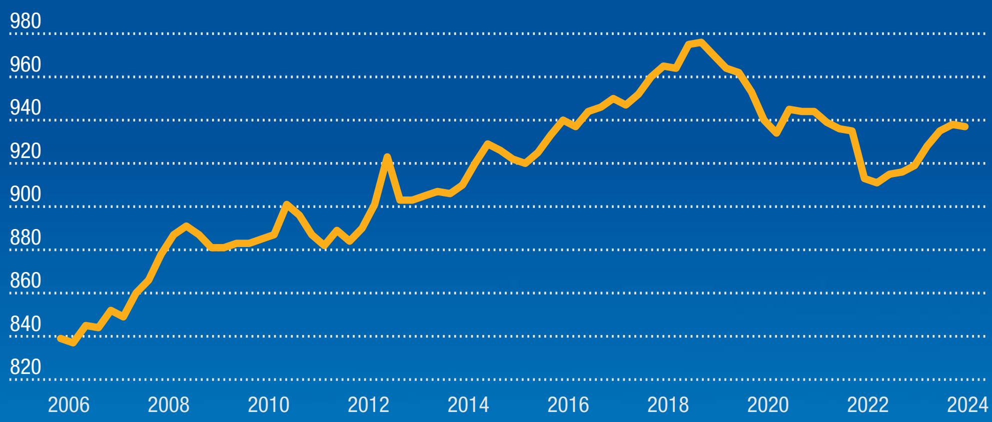
After a steep decline from 2019 to 2022, the global liner shipping network is growing again. In the second quarter of 2024, 937 ports were connected to at least one regular liner shipping service, an increase of 2 per cent compared to the second quarter of 2023. This observed rise in the number of active ports was evenly spread across global regions (figure IV.5).

Over the last 10 years, Asia has recorded an increase of 12 per cent, exceeding growth in other regions. There is an even more notable difference when comparing growth since 2006, with Asia experiencing a 35 per cent rise.

Time in port, waiting time and cargo handling performance

Port congestion and logistical disruptions eased in 2023, leading to improvements in the amount of time ships spent in port and enhanced cargo-handling performance. While consolidated data is not yet available for 2024, there are concerns that the service deviations resulting from the disruptions in the Red Sea and the Panama Canal may trigger a new wave of congestion. Ports such as Singapore and those in the Western Mediterranean are facing growing demand for trans-shipment services.

Figure IV. 5
Number of active container ports, world total



Source: UNCTAD calculations, based on data provided by MDS Transmodal.

Improved turnaround times

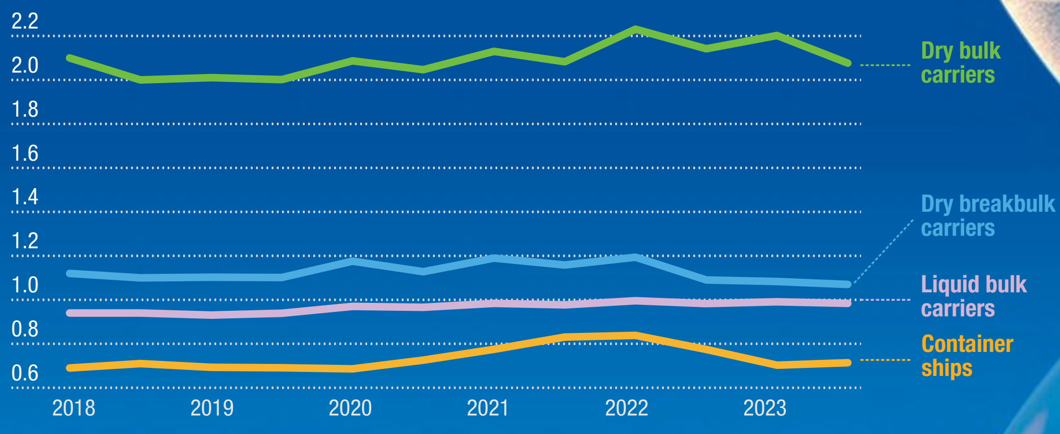
In 2023, the median time that container ships and dry breakbulk ships spent in ports was back to pre-pandemic levels of 0.7 days in the first half of the year and 1.1 days in the second half of the year. The trend for tankers was also stable, remaining at the level of just below 1 day, similar to the median in the last three years. Turnaround times for dry bulk carriers improved in both halves of 2023, reaching 2.2 and 2.1 days, although these have yet to return to the faster turnaround times observed in 2019 (figure IV.6).

Congestion building up in developing countries

Congestion can be measured as the time needed to enter a berth from the moment a vessel first anchors in the port area. Developed countries were more affected by industry disruptions in 2021 and 2022 but were able to reduce the waiting time in early 2023 to over 4 days, slightly higher than times observed in 2020 and in earlier years. The impact in developing countries was weaker, as was later improvement.

Disruptions in the Red Sea and the Panama Canal may trigger **a new wave of congestion in ports**

Figure IV. 6
Time in port, world median
(Days)



Source: UNCTAD calculations, based on data provided by MarineTraffic.
Note: Ships of 1,000 GT and above.

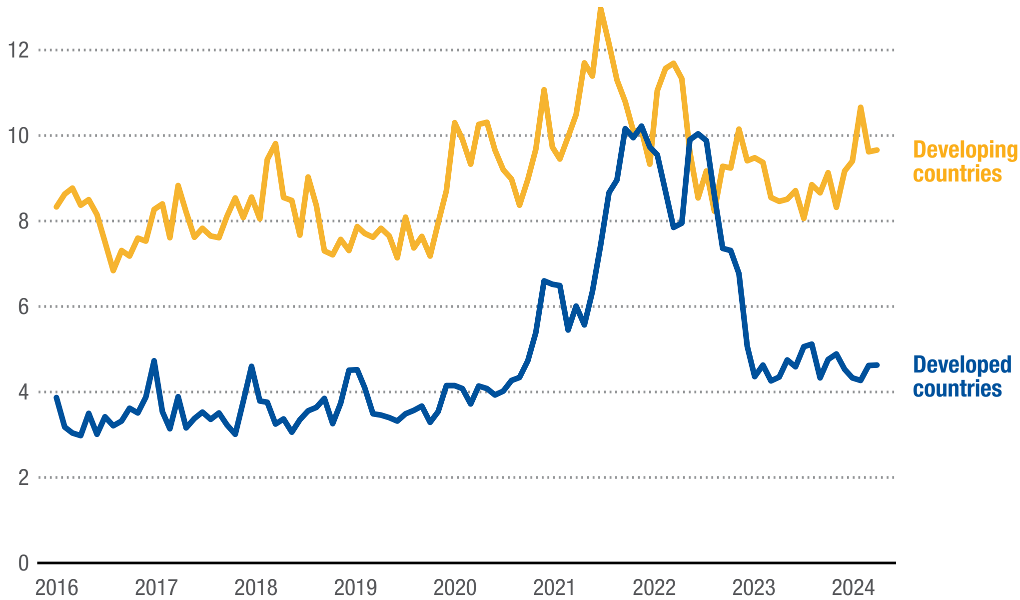
The first few months of 2024 showed another jump in waiting times, which reached nearly 10 days in July 2024 (figure IV.7).

Container ships waiting time for developing countries up to almost

Figure IV. 7

Average waiting times that container ships spent at port

(Hours per month)



Source: UNCTAD calculations, based on data provided by Clarksons Research.
Notes: Waiting time estimates based on time between vessel first entering an anchorage associated with a port group (or a port where the vessel has not been seen in an anchorage shape) and vessel first entering a berth in the port.

Many Asian ports among the best in terms of cargo-handling performance

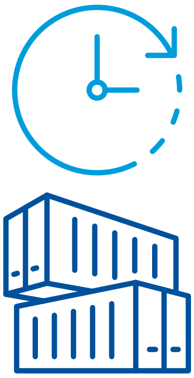
The Container Port Performance Index (CPPI) is calculated based on the time a vessel spends in port in relation to the number of container moves, or how fast cargo is loaded and unloaded. The Index provides insights into port performance (World Bank, 2024). In 2023, Asian ports dominated the global CPPI ranking, with 21 of the ports in Asia featured among the top 25. Among these top 25 ports, Chiwan (China), Dalian (China), Visakhapatnam (India), Tanjung Priok (Indonesia), Lianyungang (China), Mundra (India) and Yantian (China) recorded the largest improvements in their CPPI ranking in 2023 compared to 2022 (table IV.2).

Asian ports dominated the global CPPI ranking

Table IV. 2
Top 25 ports in Container Port Performance Index

Port	2023 rank	Index points	2022 rank	Change in rank 2023 compared to 2022
Yangshan, China	1	177.9	1	0
Salalah, Oman	2	164.7	2	0
Tanger-Mediterranean, Morocco	3	159.6	5	2
Tanjung Pelepas, Malaysia	4	158.3	6	2
Chiwan, China	5	158.2	23	18
Cartagena, Colombia	6	158.0	4	-2
Guangzhou, China	7	153.7	9	2
Cai Mep, Viet Nam	8	150.8	13	5
Yokohama, Japan	9	150.5	12	3
Hamad Port, Qatar	10	149.8	8	-2
Ningbo, China	11	145.4	7	-4
Algeciras, Spain	12	142.3	18	6
Mawan, China	13	142.2	15	2
Dalian, China	14	139.0	44	30
Hong Kong, China	15	134.1	10	-5
Port Said, Egypt	16	131.2	11	-5
Yeosu, Republic of Korea	17	130.7	21	4
Visakhapatnam, India	18	129.6	112	94
Singapore, Singapore	19	127.9	19	0
Tanjung Priok, Indonesia	20	127.3	282	262
Lianyungang, China	21	126.5	77	56
Mundra, India	22	124.8	50	28
Kaohsiung, Taiwan Province of China	23	123.1	26	3
Yantian, China	24	121.6	51	27
Shekou, China	25	121.1	14	-11

Source: UNCTAD calculations, based on data provided by World Bank and S and P Global Port Performance Programme.
Note: Index points correspond to administrative approach.



-24% decrease in **container move time** down to **36 seconds for calls over 6 000 moves**

Better performing ports are called more often

In cargo-handling, there is a direct link between how busy ports are and how well they perform. The relationship works both ways: improved port performance makes the port more attractive for carriers, leading to more frequent calls. Additionally, if there are more containers per call, this encourages the use of larger and specialized container port cranes, which allows for greater economies of scale. For ports that received over 300 calls in 2023, the CPPI median was higher (28 index points) compared to ports that received fewer calls (2 index points for those in the category of "less than 100 calls" and in the category of "between 100 and 300" calls). Ports with fewer than 100 calls performed similarly in terms of cargo-handling performance, with half of these ports recording CPPI values ranging between -8 and 11 index points (figure IV.8).

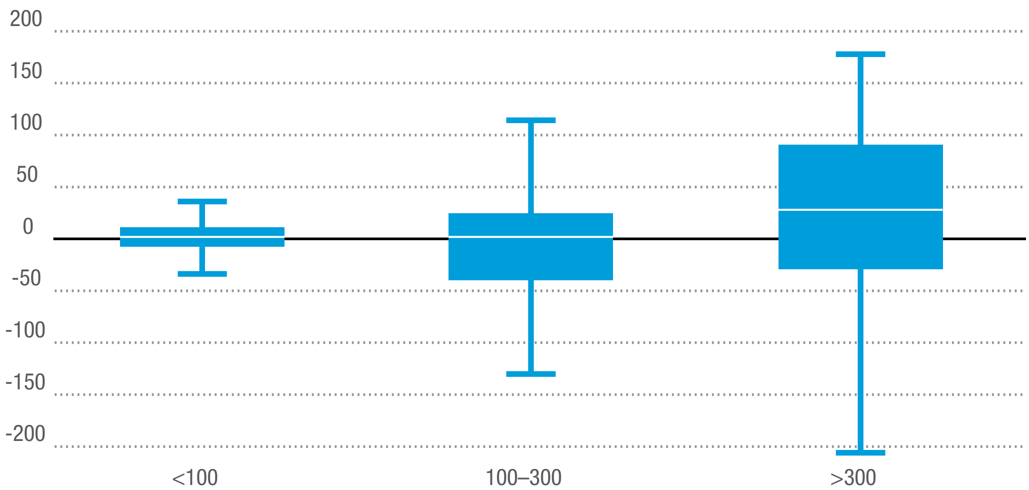
Increased container-handling performance in ports

Across the 25 economies to receive the largest number of port calls in 2023, it is evident that containers are moved more quickly when handled by larger vessels. These ships often benefit from parallel crane operations and automation in larger ports, where they are also more regularly involved in trans-shipments.

As shown in table IV.4, in 2023, among these 25 economies, Japan performed the best across four call size categories, with up to 2,000 container moves per call. Hong Kong, China, also recorded the fastest container move times in four categories (covering call sizes from 1,001 to 2,000 and between 2,500 and 4,000 moves). These were followed by Malaysia, reaching top speeds in three categories, and Spain and Viet Nam, both recording the fastest container-handling speed in two categories. China, the Republic of Korea, Singapore, Brazil and India recorded the highest performance in one category each.

Figure IV. 8

Container Port Performance Index 2023: Distribution of ports by number of calls



Source: UNCTAD calculations, based on data provided by World Bank and S and P Global Port Performance Programme.
Note: Index based on the administrative approach. The middle line represents the median, the top and bottom lines of the boxes represent the first and third quartile and the top and bottom lines (whiskers) represent the minimum and maximum values (excluding outliers).

In 2023, the same 25 economies handled their containers more quickly compared to the previous year, with faster speeds for all port calls with more than 500 container movements. The bigger the ships, the bigger the gain. Time required to handle containers fell by 24 per cent for calls of over 6,000 moves, decreasing from 47 seconds per container move in 2022 to 36 seconds in 2023. In contrast, the container handling time in the case of the smallest calls, less than 500 moves, increased by 15 per cent, reaching an average of over four minutes per container move in 2023 (table IV.3 and figure IV.9).

Table IV. 3

Time taken to move a container per port call by call size, top 25 economies, 2023

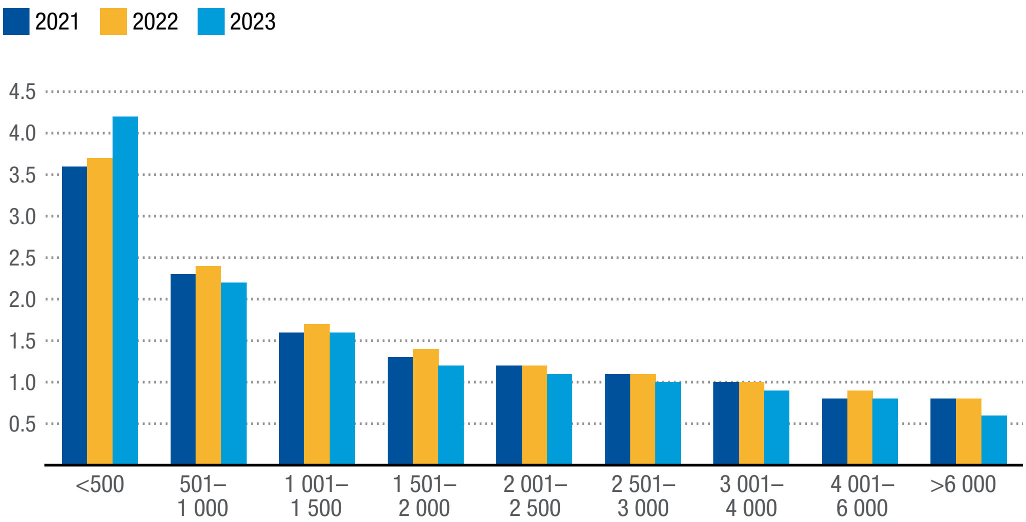
(Minutes)

Economy	<500	501–1000	1001–1500	1501–2000	2001–2500	2501–3000	3001–4000	4001–6000	>6000
China	3.4	1.8	1.2	0.9	0.8	0.7	0.6	0.5	0.4
United States	4.2	2.4	1.8	1.6	1.6	1.5	1.3	1.1	0.9
Republic of Korea	2.7	1.7	1.2	0.9	0.8	0.7	0.7	0.6	0.5
Singapore	3.3	1.7	1.2	0.9	0.8	0.7	0.6	0.5	0.4
Malaysia	3.0	1.9	1.2	0.9	0.8	0.6	0.6	0.4	0.3
Brazil	4.3	2.4	1.8	1.6	1.3	1.2	1.3	0.9	0.0
Spain	3.9	2.0	1.3	0.9	0.7	0.7	0.6	0.7	0.6
Germany	5.8	2.2	1.6	1.3	1.2	1.0	0.9	0.8	0.7
United Arab Emirates	5.0	2.1	1.5	1.0	0.9	0.8	0.6	0.6	0.5
Japan	2.5	1.3	1.0	0.9	0.9	0.9	0.9	-	-
Belgium	4.9	2.4	1.5	1.2	1.1	1.1	0.9	0.8	0.6
Hong Kong, China	2.6	1.5	1.0	0.9	0.8	0.6	0.5	0.6	-
United Kingdom	4.3	2.2	1.4	1.2	1.2	1.1	0.8	0.8	0.7
Panama	5.3	2.3	1.5	1.3	1.0	0.9	0.7	1.1	0.7
Kingdom of the Netherlands	7.8	2.6	1.7	1.3	1.0	0.9	0.8	0.7	0.5
Taiwan Province of China	2.7	1.5	1.1	1.1	0.8	0.9	0.6	0.5	-
Türkiye	5.4	3.4	2.7	1.9	1.9	1.9	1.5	1.1	-
Viet Nam	2.7	1.5	1.1	1.0	0.8	0.6	0.5	0.6	0.4
India	3.7	2.4	1.2	0.9	0.8	0.8	0.7	0.5	0.4
Italy	4.9	2.8	2.0	1.6	1.5	1.4	1.2	1.4	1.9
Australia	6.4	3.1	2.3	1.8	1.5	1.4	1.2	1.1	-
France	4.7	2.9	2.1	1.8	1.7	1.5	1.4	0.9	0.6
Thailand	3.2	2.7	1.3	1.1	0.9	0.9	0.7	0.7	0.6
Indonesia	3.7	2.2	1.7	1.3	1.0	0.9	0.8	0.7	-
Philippines	4.5	3.2	2.5	1.9	1.4	2.2	-	-	-
Average	**4.2**	**2.2**	**1.6**	**1.2**	**1.1**	**1.0**	**0.9**	**0.8**	**0.6**

Source: S and P Global Port Performance Programme.
Note: Nine call-size categories based on total number of containers moved during a port call, regardless of container size, ranging from <500 moves (first category) to >6,000 moves (last category).

Figure IV. 9

Average time taken to move a container per port call by call size, top 25 economies



Source: UNCTAD calculations, based on data from S and P Global Port Performance Programme.
Note: Nine call-size categories based on total number of containers moved during a port call, regardless of container size, ranging from <500 moves (first category) to >6,000 moves (last category).

B. TrainForTrade Port Performance Scorecard

Importance of measuring port performance

The future of the international port industry is shaped by the ongoing paradigm shift in the shipping sector and in the global economy, as decarbonization becomes a global objective. With vessels converting to alternative fuels, the port sector needs to respond to the associated challenges and opportunities.

Over the past three decades, the UNCTAD TrainForTrade Port Management Programme has developed a strong reputation as a global training and capacity-building network for ports (UNCTAD, 2024b).

In 2012, an initiative to chart and measure port management performance was launched under the PPS. This builds on an annual survey of data points agreed upon by PPS port members (UNCTAD, 2024c).

The members vary in size and ownership. A typical port handles 8 million tons of cargo each year. The largest ports often operate under a “landlord” model—whereby they manage port facilities but private companies handle operations—or a “mixed model” depending on the type of cargo. Many of these ports are publicly owned, although the port services are largely provided by the private sector.

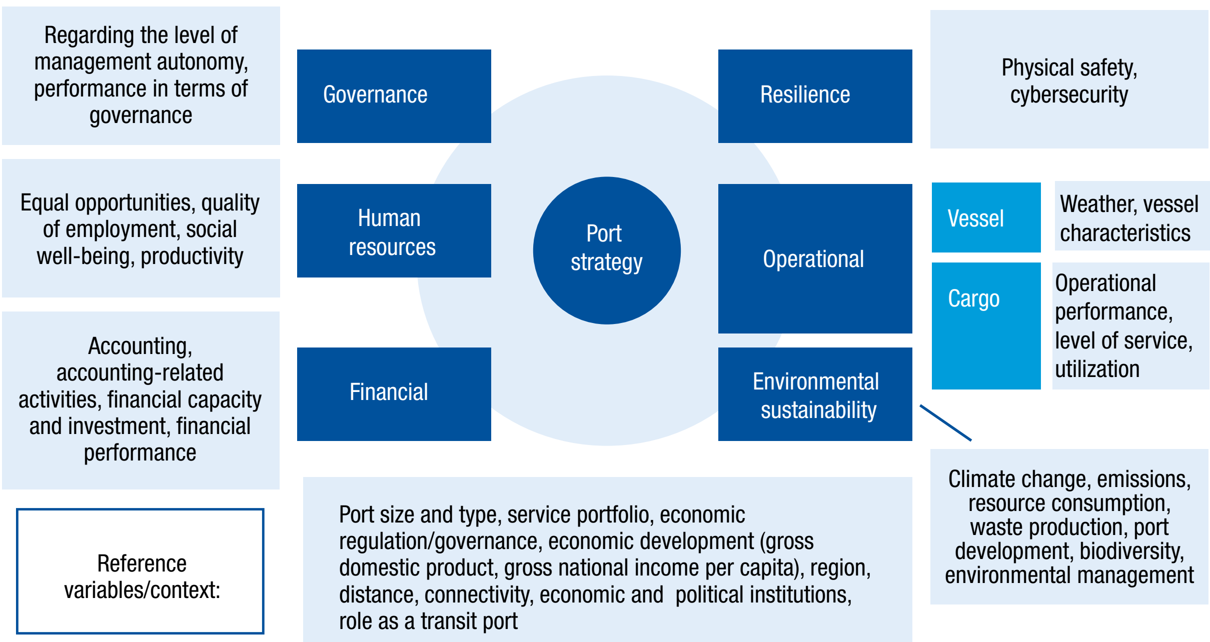
A new era for measuring port performance

In 2023, TrainForTrade reviewed the range of indicators and measures used to evaluate port performance worldwide. This review was inspired by work carried out by UNCTAD in the 1980s and the Monographs on Port Management series, namely, Monograph No. 6, Measuring and Evaluating Port Performance and Productivity (UNCTAD, 1987), which offers a comprehensive review of international port performance indicators. The 2023 review, conducted in partnership with the Port Authority of Valencia and Fundación Valenciaport, Spain, has resulted in an exhaustive list of indicators, including three new categories on governance, resilience and environmental sustainability (UNCTAD, 2024d). The addition of a governance index is a significant innovation that draws on data points to measure transparency and accountability, levels of cooperation between ports, support to industrial and port clusters and port–city and citizen relations. The human resource category has been improved, with measures that chart employment quality and social welfare indicators. Finance indicators address the scale and form of capital investment in ports at a time when port managers are responding to capacity constraints, demands for resilience in supply chains and a transition to sustainable operations. A colour-coding system (green, orange and red) has been proposed to define the level of comparability for each indicator.

One challenge ports face is the need to tailor the proposed set of international port performance indicators (UNCTAD, 2024d) to fit their specific requirements and circumstances—perhaps selecting a subset of indicators that are most relevant and feasible—while maintaining the highest possible levels of international comparability (figure IV.10). The new methodology also introduces practical metrics on how these indicators can be measured and their linkages with the Sustainable Development Goals.

Port performance indicators **link the SDGs directly to daily port operations**

Figure IV. 10
Adopted set of international port performance indicators example



Source: UNCTAD, 2024d.

The last decade showed the **volatility in port growth**

The challenge with any international benchmarking process is how to agree on definitions of data points and which tools to use to collect data. The following may also be addressed:

- The large number of parameters
- A lack of updated, objective and reliable published data
- Difficulty convincing entities to provide sensitive data
- An absence of generally agreed and accepted definitions
- The strong influence of local factors on the data obtained
- Divergent interpretations of identical results by different stakeholders

It is difficult to compare ports, as each port is unique and has characteristics that stem from various local, historical and social contexts. Therefore, the following analysis relies on the longitudinal nature of the data as evidence of steady and reliable trends. While the analysis does not necessarily point to causality between the variables, it does provide useful baseline information for port planners and managers.

TrainForTrade port management network collaborative approach to measuring port performance

Based on a series of annual conferences organized with participating members across three linguistic networks (French, English and Spanish-speaking), TrainForTrade focused on specific indicators that have a high degree of comparability. PPS is divided into six core categories comprising finance, human resources, gender, cargo operations, vessel operations and environment (table IV.4).

It is useful to reflect on the main scorecard in terms of primary and secondary data. The primary data are comparable globally (finance and gender). The secondary data relate to ports in terms of scale, region and cargo mix.

Some ports have stable operating margins yet unpredictable growth

Finance data between ports is comparable at a global level when expressed as ratios and reported by scale and region. The finance indicators capture economic sustainability and are common to all ports, given that most of the reporting entities are managed and report in accounting terms as corporate entities.

Over the past decade, the growth of ports—measured by the amount of cargo they handle and the revenue they generate—has been highly unpredictable. This unpredictability is due to major global events that have profoundly impacted worldwide trade and shipping. One example is the COVID-19 pandemic, which caused sudden and severe disruptions.

In the case of ports, the pandemic led to lockdowns and restrictions that halted or slowed down shipping operations, leading to fluctuations in the amount of cargo being handled and affecting the revenue of ports worldwide. Such events highlight the vulnerability and volatility of port growth in the face of global crises.

Additional critical risk factors that influence the economic performance of ports include major conflicts or climate change. These issues can interrupt supply chains and pose challenges to environmental sustainability. For example, wars or geopolitical tensions can interfere with shipping routes and cargo movement, while climate change can lead to rising sea levels and extreme weather, also affecting port operations. This has been seen in the drought conditions affecting the Panama Canal since 2023. In 2023, these risks were reflected in port performance data, as cargo volume growth continued to decline for the second year in a row, and revenue growth was barely above 1 per cent.

The main comparator in the finance data is the primary operating margin, namely, earnings before interest, tax, depreciation and amortization.

Table IV. 4
Port Performance Scorecard

	Indicator	2016	2017	2018	2019	2020	2021	2022	2023
		Median Values							
Finance	EBITDA/revenue (operating margin) (percentage)	34.4	36.7	42.7	40.8	34.2	42.0	43.4	49.8
	Labour/revenue (percentage)	17.3	19.0	17.8	18.0	21.7	17.1	19.0	16.2
	Vessel dues/revenue (percentage)	15.4	16.4	19.9	15.1	15.7	14.8	13.3	13.6
	Cargo dues/revenue (percentage)	36.3	34.1	26.4	31.4	35.2	31.8	27.6	27.7
	Concession fees/revenue (percentage)	2.0	6.6	14.7	14.0	14.0	21.2	17.0	7.8
	Rents/revenue (percentage)	3.1	2.7	3.4	2.8	3.3	2.7	3.5	2.3
Human resources	Tons/employee (tons)	14 091	15 500	32 889	34 237	26 805	34 008	32 128	26 572
	Revenue/employee (United States dollars)	129 813	112 527	132 904	162 492	147 258	222 382	246 596	245 679
	EBITDA/employee (United States dollars)	46 600	41 851	57 573	68 510	48 447	60 745	107 123	81 210
	Labour cost/employee (United States dollars)	23 231	21 753	21 771	33 176	25 294	29 027	36 145	18 060
	Training cost/wages (percentage)	0.8	1.0	1.1	0.8	0.3	0.5	0.4	0.5
Gender (women participation rate)	All categories (percentage)	13.7	14.5	15.7	15.2	15.9	15.4	14.5	17.7
	Management (percentage)	33.9	35.0	39.3	38.8	42.3	39.4	40.2	40.5
	Operations (percentage)	23.8	21.1	7.0	9.1	11.2	7.7	8.4	7.1
	Cargo handling (percentage)	0.0	3.1	5.9	1.3	0.0	2.3	0.6	1.2
	Other employees (percentage)	28.6	24.8	26.6	29.3	27.4	26.3	22.3	28.2
Vessel operations	Average waiting time (hours)	4	8	11	7	6	7	9	7
	Average gross tonnage per vessel (tons)	16 375	15 431	16 817	16 994	17 607	17 428	22 065	23 529
	Oil tankers arrivals (percentage)	7.2	8.2	9.0	7.7	8.6	6.7	7.0	7.1
	Bulk carrier arrivals (percentage)	6.8	13.2	12.1	9.8	12.0	11.7	7.5	5.1
	Container ship arrivals (percentage)	24.5	33.7	21.7	24.6	24.9	24.2	26.2	18.1
	Cruise ship arrivals (percentage)	1.2	0.9	1.1	1.0	0.0	0.0	0.6	0.5
	General cargo ship arrivals (percentage)	21.6	14.7	18.4	19.3	20.5	21.9	26.2	9.4
	Average of other ship arrivals (percentage)	16.3	10.7	17.5	7.9	14.7	6.6	13.7	14.6
Cargo operations	Average tonnage per arrival (all ships) (tons)	6 379	9 419	8 618	10 230	8 110	6 689	6 324	5 572
	Tons per working hour, dry or solid bulk	244	219	261	176	238	179	99	92
	Tons per hour, liquid bulk	737	222	186	171	158	143	173	94
	Containers lift per ship hour at berth	22	26	18	20	19	20	18	16
	Average container dwell time (days)	5	4	5	5	5	5	5	3
	Tons per hectare (all cargo)	136 449	102 683	91 325	88 454	86 171	90 568	88 200	83 002
	Tons per berth meter (all cargo)	2 703	3 043	3 203	2 980	2 771	2 891	2 795	2 620
	Total passengers on ferries	1 159 902	1 278 558	1 190 458	1 216 646	335 505	181 758	940 778	1 535 348
	Total passengers on cruises	63 614	26 071	34 420	28 244	1 275	0	10 891	18 822
Environment	Investment in environmental projects/total CAPEX (percentage)	0.0	1.3	1.2	0.3	0.1	0.4	0.2	0.5
	Environmental expenditures/revenue (percentage)	0.0	0.2	0.2	0.7	0.3	0.2	0.5	0.2
	Number of entities reporting	24	29	32	33	31	30	28	22

Source: UNCTAD calculations, based on data from port entities reporting to PPS.
Note: Data summarized without applying any methodologies for handling missing data.
Abbreviations: EBITDA = earnings before interest, taxes, depreciation and amortization, CAPEX = capital expenditure.

This levels the basis for comparison by removing local factors and the balance sheet structure of the port entity in terms of debt and age of assets. In 2023, such earnings as a proportion of total revenue was 50 per cent, with a median return per ton of $3.50. Port dues (cargo and vessel income from infrastructure charges) remained within a consistent range, at 48 per cent of total income, compared to 44 per cent in 2022. The balance of income comes from the provision of services by the port entity and from property charges, including concession fees.

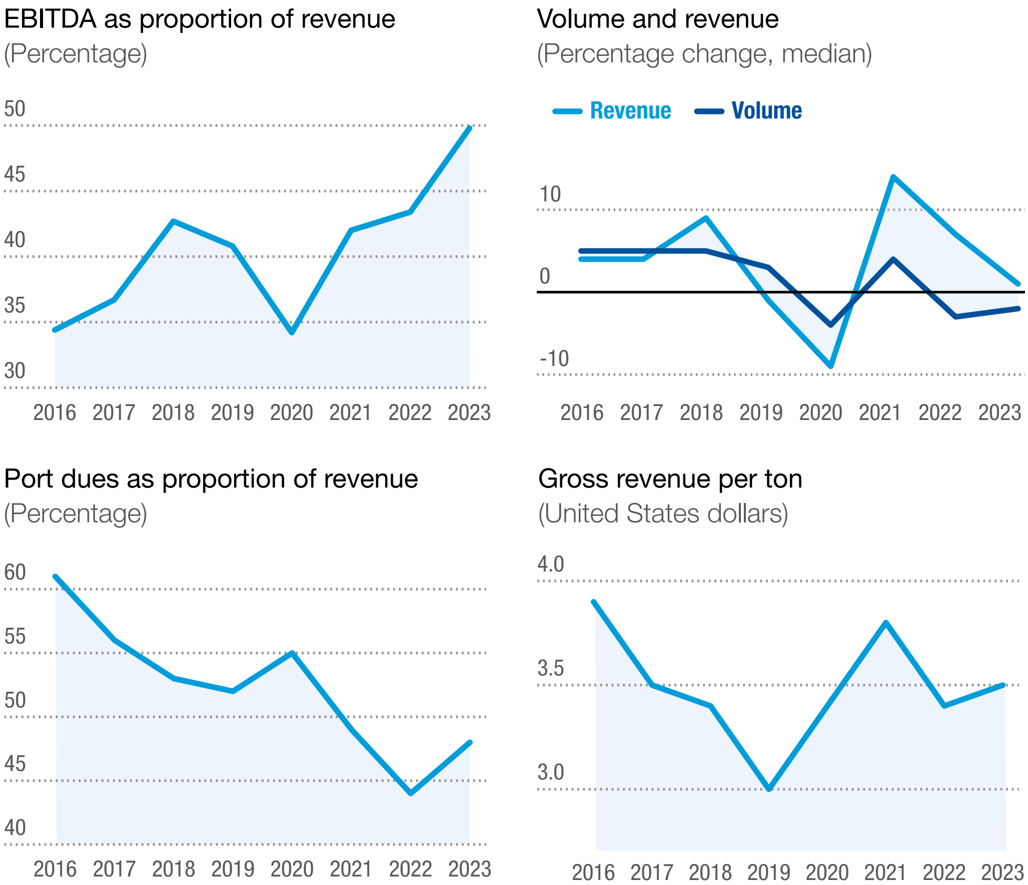
The delivery of port services and property activity tend to have a lower profit margin than asset management; therefore, combining the two income streams will lower the weighted average for the port entity (figure IV.11).

Importance of employing women in the maritime industry

Gender-related statistics in ports are tracked in PPS as part of considering alignment with social sustainability goals,

Figure IV. 11

Selected port performance indicators of the Port Performance Scorecard, median value across all reporting entities

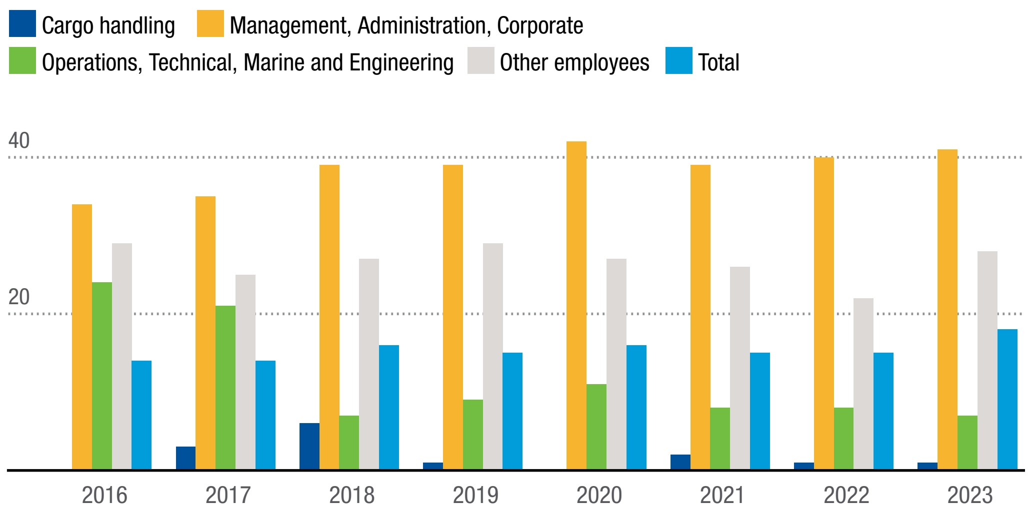


Source: UNCTAD calculations, based on data from port entities reporting to PPS.
Note: Volume and revenue values calculated as median year-to-year percentage change across all ports, to minimize bias due to data availability from reporting port entities. Data summarized without applying any methodologies for handling missing data.
Abbreviations: EBITDA = earnings before interest, taxes, depreciation and amortization.

with ratios used in order to facilitate global comparisons. In 2023, the average share of women employed in ports was 18 per cent. However, in management and administrative roles—where women often have a greater presence—the share was 41 per cent. Many job categories, such as cargo-handling and operations, still require improved strategies to attract more women into these roles (figure IV.12 and box IV.2).

The average share of **women employed in ports was 18%**

Figure IV. 12
Women's participation in port workforces, median across all ports



Source: UNCTAD calculations, based on data from port entities reporting to PPS.
Note: Data summarized without applying any methodology for handling missing data.

Box IV. 2
Status of women in shipping

Only 5% of highest management positions **held by women**

The year 2024 marked the third IMO International Women in Maritime Day. During the event, the IMO Secretary-General stressed the importance of investing in women's education and professional development, to help create a sustainable future, and the IMO Gender Equality Award was launched, to recognize individuals, irrespective of gender, who have made significant contributions to advancing gender equality and empowering women in the maritime sector.

The Women's International Shipping and Trading Association (WISTA) states that over the past three years, efforts to address the gender gap in the sector have become more apparent (WISTA, 2024). In 2021, IMO and WISTA launched the women in maritime survey (IMO, WISTA, 2021); a second survey is scheduled for 2024. Both IMO member States and the private sector have shown increased interest in gathering robust data for women in shipping. The 2021 survey showed that women accounted for only 29 per cent of the overall workforce, with seafarers making up 2 per cent of the crewing workforce. In the over 500 companies that participated in the survey, only 5 per cent of senior management positions were held by women. The results of the second survey will act as a benchmark to monitor any changes in these patterns and identify areas of opportunity, and the survey has been enhanced to cover aspects such as roles in sustainability, chartering, academia and facilities for women on board ships. Obtaining more data will be critical in formulating better gender representation.

One of the limiting factors in attracting women to seafaring careers is the presence of sexual harassment and assault in the maritime sector, an issue identified in a study by the Global Maritime Forum (2023). The joint ILO–IMO Special Tripartite Committee of the 2006 Maritime Labour Convention discusses the adoption of regulations, mechanisms and policies for reporting and addressing bullying and harassment, including sexual assault and harassment. WISTA is actively participating in the discussions, as gender-focused policy and regulation are paramount for increasing the share of women seafarers.

Over the past 50 years, both internationally and through its 59 national associations, WISTA has participated in initiatives aimed at supporting and training women to enter the sector and to accelerate their maritime careers, both onboard and ashore. Initiatives include the United Nations Global Compact Maritime Just Transition Task Force, the IMO–WISTA Maritime Speakers Bureau (IMO, WISTA, 2024), showcasing women as maritime experts, as well as collaborating with other organizations, training providers and IMO to support capacity-building projects for women in maritime and trade globally, with a particular focus on developing nations.

Source: Women's International Shipping and Trading Association, based on cited sources.

Improved times for container-handling

PPS secondary (or "sectoral") data on cargo and vessel operations can also be a valuable source of information. For example, container data reveals annual growth in handling rates and dwell times. In 2023, the average time that containers spent in a port was three days, down from five days in 2022. This type of cargo is easy to compare internationally given its high levels of standardization. In general, vessel and cargo metrics can be analysed by scale or region. When examining port performance, it is also important to consider both estate income (money earned from leasing or using port land and property) and cargo volume per hectare (amount of cargo handled per unit of land). Larger port areas often handle less cargo per hectare because the space is bigger. Additionally, when analysing cargo volumes per berth (the amount of cargo handled at each docking area), it is assumed that all berths are always available for any type of cargo.

Performance measurement informing port decision makers

TrainForTrade supports more detailed casework on port performance, including data reported in PPS, as part of the programme's dissertation process, that is, the business reports focused on improving the ports that participate in the Modern Port Management course. These reports are a source of analysis and augment the questions raised by the data in the PPS, and offer examples of South–South cooperation (UNCTAD, 2024e).

The PPS project continues to accumulate data and the casework informs network members. Primary-level data supports performance appraisal and scenario modelling for strategic planning. In addition, challenges related to measuring port performance are taken into account; the common caveat to benchmarking ports is that there will always be issues with comparisons and data definition due to local conditions and priorities. However, use of PPS shows that if ports work together on definitions and data collection and use digitalization, advanced data collection methods and nuanced analysis, it is highly beneficial for ports to get involved in this initiative.

The TrainForTrade programme brings together strong examples of **South–South cooperation across ports and port stakeholders**

Box IV. 3
How ports can support the development of green hydrogen in Africa

Transitioning from the use of fossil fuels to renewable energy sources is on the agenda of African leaders and policymakers. In this context, countries across the continent are exploring the potential to harness green hydrogen to meet energy needs and broaden the energy mix. Green hydrogen requires substantial renewable energy and hydropower resources. The interplay of these resources, as well as land availability and quality of port infrastructure, defines the geography of the hydrogen economy in Africa. Coastal countries possess significant potential in this regard, not only due to water and energy availability, but also due to the existence of port infrastructure. The energy requirements of industries as well as the shipping sector in particular, are expected to lead to a substantial demand for hydrogen in the vicinity of ports. Ports could play a variety of roles in the hydrogen economy, such as acting as landlords by providing land for the hydrogen economy and investing in infrastructure, including pipelines, terminals and fuel stations, among others.

African countries have a range of opportunities along the value chain of green hydrogen development. These include generating renewable energy and producing green hydrogen and handling its transportation, storage and application. Ports could be involved in the different stages of this value chain. For instance, when conceived as industrial zones, ports could be used not only to generate renewable energy but to produce and store green hydrogen. Green hydrogen could be produced from onshore and offshore wind farms and could be imported or exported through ports. In this regard, Europe is expected to be a main importer of green hydrogen from Africa, particularly from North Africa, by 2050 (European Commission, 2023). For imports of green hydrogen to Africa, ports are expected to play a key role in facilitating hydrogen supply to the wider port community and hinterlands, due to their role as energy hubs.

The potential to export green hydrogen to international markets has led some African countries to become involved in production. African countries nearer to Europe—which offers a market for green hydrogen—and those with good port infrastructure are well placed to take advantage of this opportunity. According to mapping carried out by the African Hydrogen Partnership, Djibouti, Egypt, Ethiopia, Ghana, Kenya, Mauritania, Morocco, Nigeria, Rwanda, South Africa and the United Republic of Tanzania are potential landing zones or hubs for storing and distributing green hydrogen (AbouSeada and Hatem, 2022). Countries such as Namibia and South Africa are considered hubs due to their well-established international shipping routes.

In 2023, Namibia and Hyphen Hydrogen Energy agreed on a deal to produce and export up to 300,000 tons of green hydrogen per year (Voice of America, 2023). Similar projects are expected in Angola, Egypt, Mauritania, Morocco, Tunisia and other countries. Most hydrogen is imported or exported on ships. Countries that aspire to harness ports to develop a green hydrogen economy need to invest in import and export terminals, port equipment such as refuelling stations and bunkering infrastructure and pipelines to transport hydrogen. International trade in green hydrogen also requires market development and promotional activities. It entails developing policies to market green hydrogen and creating regional alliances to encourage its use, as well as trade within and between countries. An example of one such partnership is the African Green Hydrogen Alliance, formed by six coastal countries, namely, Egypt, Kenya, Mauritania, Morocco, Namibia and South Africa (Green Hydrogen Organisation, 2024).

In terms of hydrogen-related applications, the transport sector, particularly the shipping industry, is attracting investment in research and development. Ports are envisaged to play an important role in fuelling maritime vessels with hydrogen. The ongoing disruptions in the Red Sea have demonstrated the importance of ports in Southern Africa in servicing vessels passing the Cape of Good Hope on an alternative route from Asia to Europe. Ports in this region have provided bunkering and other services to vessels. Globally, the maritime industry is already embracing green hydrogen as an alternative fuel in marine engines. The World Bank has assisted South Africa in exploring the requirements for establishing green marine bunker fuel value chains at the ports of Boegoebaai and Saldanha. Both ports have the potential to develop into green hydrogen hubs, each offering a unique value proposition (World Bank, 2023).

Source: ECA based on cited sources.

C. Facilitating maritime trade and transport: Seaport performance and hinterland connectivity

Global container port traffic has increased by over 50 per cent over the past decade. This highlights the need to quickly and efficiently transfer cargo and containers through ports to hinterland destinations and along transit routes to final destinations. As noted in the previous section, port calls have been increasing and the number of active container ports further increased in 2023.

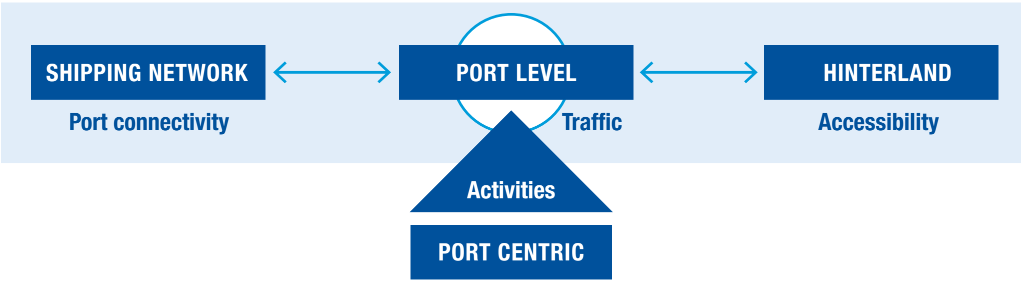
More frequent port calls, together with larger vessel sizes, drive the need for efficient cargo-handling in ports. Recent disruptions to shipping and supply chains have underscored the difficulties in ensuring efficient transport and logistics connections to hinterland destinations. Congestion and inefficiencies in ports when unloading and reloading cargo leads to long dwell times and increased costs. Speeding up the transfer of cargo between ports and hinterland destinations can alleviate the pressure on ports and reduce congestion and delays.

Port cargo dwell time (the time cargo waits in port to be processed) is a key performance indicator for ships and ports. However, dwell time also occurs along inland transport routes, including at dry ports, warehouses, corridors and transit points, and when clearing cargo. Relatively high cargo dwell time is associated with less efficient transport networks and facilities. In many ports in developing countries, there are extended delays at ports. In 2010, a comparative analysis of transport costs along the Northern Corridor (a key transport route in East Africa, linking the port of Mombasa, Kenya, to landlocked countries such as Burundi, Rwanda and Uganda) showed that 44 per cent of the total transport cost on the Mombasa–Kigali route was linked to the cost of various delays (CPCS, 2010). These considerations underline the importance of efficient hinterland connections, including for landlocked developing countries, which face disproportionately higher transport and trade costs.

The hinterland of an international port is the region in which goods are conveyed through the port to and from international markets, and is usually served by road, rail and inland waterways, as well as airports and pipelines in some cases (figure IV.13). The volumes of cargo flows originating or destined to the hinterland, the number and capacity of modes of transport to and from the seaport and the frequency of services are some indicators that define the connectivity level of the hinterland to a port (Arvis F, et al., 2018).

Links to hinterland destinations face difficulties as shipping and supply chain connections are disrupted

Figure IV. 13
Transport supply chain, from ports to surrounding areas



Source: UNCTAD. See https://resilientmaritimelogistics.unctad.org/guidebook/31-port-interface.

Good port hinterland connections improve access and **facilitate the movements of goods** between a seaport and the hinterland

Enhanced port–hinterland connectivity is generally associated with rapid and efficient transfer of cargo, in particular containers, from ports to final destinations by way of various transport modes, including intermodal options. Access to the hinterland is often handled along transport and transit corridors and involves transport networks such as rail and road, as well as facilities such as dry ports and inland container depots (dry ports specialized in handling containerized cargo). Improved hinterland connections are key to reducing overall logistics costs. It has been estimated that inland transport costs can vary between 40 and 80 per cent of the total transport cost of a container (Notteboom and Winkelmans, 2001).

Port–hinterland connectivity is crucial for port competitiveness and can be a key parameter in decision-making processes, including selecting a port of call. Good port hinterland connections improve access and facilitate the movements of goods between a seaport and the hinterland. They also increase market and business opportunities for ports and stakeholders. Furthermore, the availability of customs and other clearance services at hinterland locations is an important factor when deciding on logistics strategies.

Efficient trade and transit facilitation is essential for the competitiveness of seaports, the hinterland **and landlocked countries**

An example from the East African Community (EAC) serves to illustrate the positive correlation between port performance, the quality and efficiency of hinterland connections and trade facilitation measures applied at ports and at transport and logistical facilities in hinterlands. For example, in 2021, the port of Mombasa, Kenya, handled 28 per cent of cargo sent to the EAC hinterland. Kenya supports logistics facilities along the Northern Corridor, with 76 per cent of this cargo going to Uganda in 2021 (Northern Corridor Transport Observatory, Annual report 2021). Kenya is part of the EAC transit system and has five inland container depots and one inland port, which facilitates the efficient movement of cargo from the port to other destinations along the Northern Corridor and into the hinterlands.

Decreasing the time cargo spends at ports and reducing delays along corridors and transit routes and at dry ports is crucial for lowering costs. Efficiencies can be achieved by applying trade and transport facilitation measures, such as those outlined in the WTO Agreement on Trade Facilitation (TFA), which make the movement of cargo faster, more efficient and less expensive. Doing so, combined with infrastructure solutions such as improving physical connections to reduce bottlenecks or relocating administrative functions such as customs clearance and trade compliance to dry ports and inland container depots, can improve port connectivity with the hinterland.

In the following subsections, measures that can improve hinterland connectivity are outlined, namely, trade and transit facilitation measures and infrastructure, regulatory framework and market structure-related measures.

Trade and transit facilitation

Efficient trade and transit facilitation is essential for the competitiveness of seaports, the hinterland and landlocked countries. Improvements can involve measures to streamline customs and trade compliance processes, reduce cargo dwell time and enhance the overall efficiency of supply chains. Key strategies can include those detailed in this section.

Automating customs and trade compliance

Implementing automated clearance for customs and trade compliance can reduce paperwork, processing times, and costs for trade and government agencies. The TFA emphasizes the importance of measures such as single windows (article 10.4), which consolidate the automatic submission of documents and data through a single-entry point, thereby speeding up clearance processes.

The UNCTAD Automated System for Customs Data (ASYCUDA) is an example of how customs clearance processes may be automated and the UNCTAD approach to establishing single window solutions is an example of best practices in bespoke implementation that serves the needs of user countries (UNCTAD, 2024f). Digital platforms such as Port Community Systems and Maritime Single Windows, which are mandatory under the International Convention on Facilitation of International Maritime Traffic (FAL Convention, 1965), are examples of how digitalization can be implemented in the maritime sector to facilitate better coordination among stakeholders.

Authorized Operators

An Authorized Operators programme (TFA article 7.7) can provide benefits such as reduced inspections and faster clearance for compliant businesses, enhancing the flow of goods through ports and into the hinterland. Authorized economic operators can manage customs procedures at their premises, further reducing port congestion. Within a regional context, mutual recognition of Authorized Operators among neighbouring countries can further strengthen the benefits of such a programme.

Transit systems

Implementing simplified transit procedures, including portable regional or international guarantee schemes, can improve efficiency and reduce the financial burden of moving goods in transit across borders (TFA article 11) or to hinterland destinations (TFA article 9). This is particularly significant for traders from landlocked countries that depend on smooth transits through neighbouring coastal nations. In this context, the exchange of data across borders is equally important, although this provision is not included in article 11. A good example of how cross-border transit data are implemented is the SIGMAT system operated with ASYCUDA, which is the interconnected system for the management of goods in transit and is widely used for exchanging transit data between several West African countries (UNCTAD, 2022).

Reducing cargo dwell time and cargo clearance

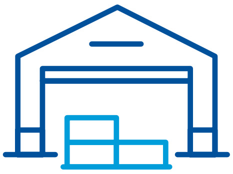
Reducing the time that cargo spends in ports and transit points due to clearance procedures is vital. Trade facilitation measures such as pre-arrival processing (TFA Article 7.1), risk management (TFA Article 7.7) and border agency coordination (TFA Article 8) can help achieve this. Establishing and publishing average release times (TFA Article 7.6) can be instrumental in identifying bottlenecks in the clearance process. Average release times refer to the typical time taken for cargo to be cleared through customs and by other compliance authorities before being officially released for onward transport.

Coordination between the public and private sectors

Coordination between public and private sector stakeholders is crucial for simplifying cross-border clearance processes. Without such cooperation, efforts may be fragmented, making it more difficult to achieve intended efficiency improvements. National trade facilitation committees (NTFCs) (TFA article 23.2) can help ensure effective consultation and coordination and facilitate decisions on most trade and transport facilitation reforms. UNCTAD provides capacity-building and technical assistance for such committees (UNCTAD, 2024g). Border-level coordination and transit coordination are equally important. UNCTAD also offers capacity-building on these issues, including training for transit coordinators (UNCTAD, 2024h).

The UNCTAD approach to establishing **single window solutions** is an example of best practices

Coordination between public and private sector stakeholders is crucial for **simplifying cross-border clearance processes**



Inland container depots help in decentralizing and relocating customs and regulatory functions **away from congested ports**

Regional cooperation

Initiatives such as the East African Community (EAC) Customs Union and the Single Customs Territory have demonstrated the benefits of regional cooperation in trade facilitation to significantly reduce transit times and costs. The development of one-stop border posts in the EAC region is a successful example of a solution reducing trade costs.

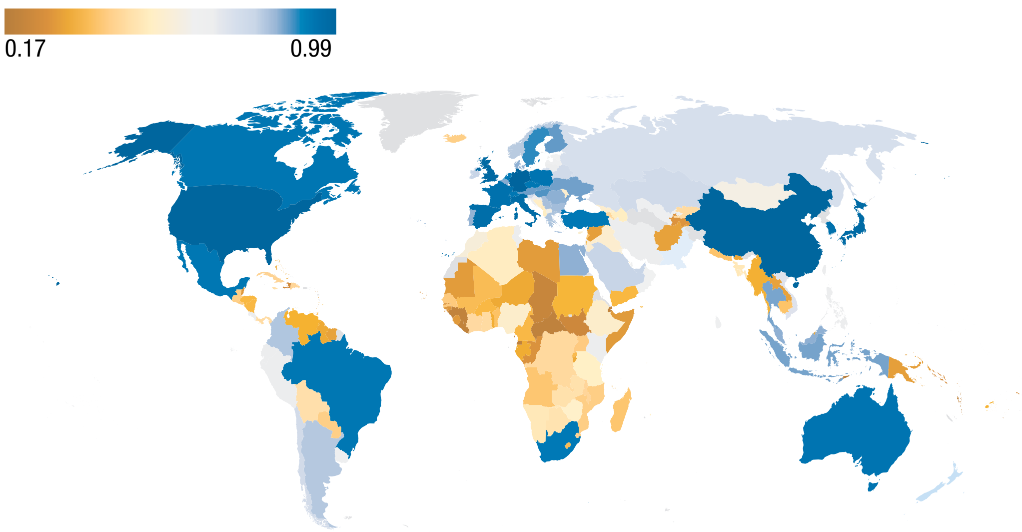
Infrastructure, regulatory framework and market structures

Effective trade facilitation is underpinned by robust infrastructure. Investment in transport corridors, dry ports, and inland container depots helps to relocate customs and regulatory functions away from congested ports. The physical infrastructure connecting seaports to hinterlands is crucial for improving port performance. Developing and maintaining efficient road and rail networks is essential for the smooth movement of goods. The quality of transport infrastructure in many developing countries, particularly many LLDCs in Africa, as well as many transit countries in Africa, ranges between 20 and 50 per cent of the quality benchmark set by the best performing jurisdictions globally (map IV.1).

Public–private partnerships are instrumental for developing quality infrastructure. Such partnerships foster private investment and expertise and help close infrastructure gaps. However, private sector participation brings challenges for regulators, who need to ensure competitive markets.

More attention should be paid to the aspects detailed in this subsection, since they have a direct impact on the flow of goods to and from hinterlands.

Map IV. 1
Quality of global infrastructure, 2023: Leading jurisdictions (China, Europe, North America) and areas for development (Africa, Caribbean, Central America)



Source: Global Quality Infrastructure Index Programme 2023.
Note: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the United Nations concerning the legal status of any country, territory or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

Regulatory framework

Effective regulatory frameworks are essential to support hinterland connectivity. Governments should ensure that regulations are transparent and harmonized and promote smooth operations. This includes aligning national policies with international standards (TFA Article 10.3). Adhering to rules and regulations for infrastructure use, for instance observing weights and dimensions for trucks, and driving and rest-hour standards for drivers, are crucial not only for safety but for maintaining efficient infrastructure and fair market conditions.

Intermodal transport solutions

Due to containerization, integrating different modes of transport such as rail, road and inland waterways can facilitate the seamless movement of goods. Containerization reduces congestion at ports and enables quicker transit times. However, the through-transport of containers to final destinations is often lacking, even for full container loads, particularly since the COVID-19 pandemic. A number of container operators restrict the movement of containers to inland destinations due to concerns about long turn-around times for empty containers, which can disrupt logistics operations and increase costs. This impacts the overall efficiency of supply chains, as reloading in ports and delays in moving cargo inland can lead to bottlenecks and reduced throughput at ports. Unloading containers and transferring cargo to different modes of transport at ports causes congestion, which increases transport times and costs and can lead to the deterioration of cargo.

Efficient transport corridors

Transport corridors support the connection between ports and hinterlands. They enhance transport connectivity and support market and supply chain integration, often with a particular focus on landlocked countries. Involving all stakeholders along transport corridors and measuring performance are key objectives to ensure that everyone is on board and committed to a more efficient process.

Market structure

The efficiency of hinterland connectivity can be influenced by market structures and competition. For instance, "cargo reservation" regimes (policies that allocate or reserve cargo space) for trucking companies and quantitative restrictions and price schemes for inland transport can restrict competition and increase costs, while open market conditions can enhance efficiency.

This is particularly the case with road transport, whereby limiting licences for national and international carriage can trigger cost increases.

Dry ports

Dry ports act as inland extensions of seaports at which customs and other regulatory processes can be completed. They provide facilities for cargo-handling and storage and regulatory inspections away from seaports. Such decentralization is particularly beneficial for landlocked countries since it ensures efficient access to international trade routes. Dry ports also enhance multimodal transport capabilities, linking road, rail and waterways. Their efficiency depends on the collaboration between various stakeholders, including shipping lines, logistics providers, shippers and regulatory agencies. The effective management of dry ports can reduce costs, enhance service quality and improve overall supply chain performance. For example, the network of dry ports in China and the numerous inland container depots in India have proven effective in improving the flow of trade.

In conclusion, improving the performance of seaports involves several key steps, namely, improving connections to inland areas, integrating different types of transport more effectively and ensuring transport markets are competitive but well-regulated. By focusing on these areas, ports can operate more efficiently, lower costs and better meet the needs of their surrounding regions.

Efficient corridors are needed to support landlocked countries

Quantitative restrictions and price schemes for inland transport **can restrict competition and increase costs**

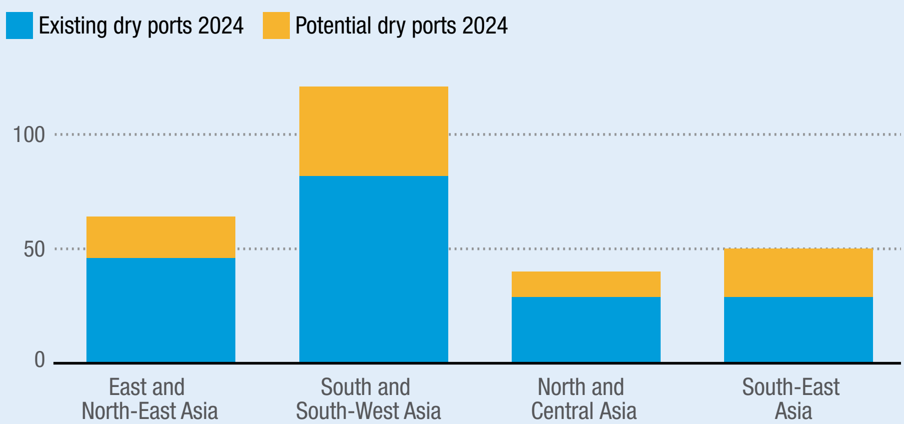
Box IV. 4
Dry ports and landlocked developing countries in Asia and the Pacific

In recent years, intermodal facilities and dry ports have attracted significant attention because of their potential to improve transport efficiency. By combining access to highways and railways with customs processing, warehousing, consolidation, distribution, manufacturing and economic clustering, dry ports are an integral support for supply chains along domestic and cross-border economic corridors. The dry port concept initially emerged from the idea of a seaport directly connected by rail to inland intermodal terminals, where shippers can deliver or collect standardized units as if they were at a seaport. Dry ports were developed in response to the challenges posed by the growth of containerized transport, including limited space at seaport terminals and increasing congestion on access routes.

Seaports can achieve economies of scale by operating with cost-effective and high-frequency intermodal transport to destinations beyond their traditional hinterlands, for example by using rail connections to expand hinterlands and stimulate intermodal transport. Seaports are integral links between maritime and land transport systems and dry ports are an essential part of inland trade distribution systems, providing an intermodal link between inland transport modes, such as between road and rail or between rail and inland waterways.

Regional cooperation in Asia and the Pacific to develop dry ports has intensified since the Intergovernmental Agreement on Dry Ports, 2013 was adopted as key components of the Asian Highway Network and the Trans-Asian Railway Network. This effort supports the broader goal of creating an integrated intermodal transport and logistics system for the region, with dry ports playing a crucial role in improving connectivity and efficiency. Currently, there are 275 dry ports in the region, formally designated as such by the Parties to the Intergovernmental Agreement on Dry Ports, 2013. The majority of existing and potential dry ports are located in South Asia and South-West Asia, mainly in India followed by countries in Central Asia (box figure IV.4.1).

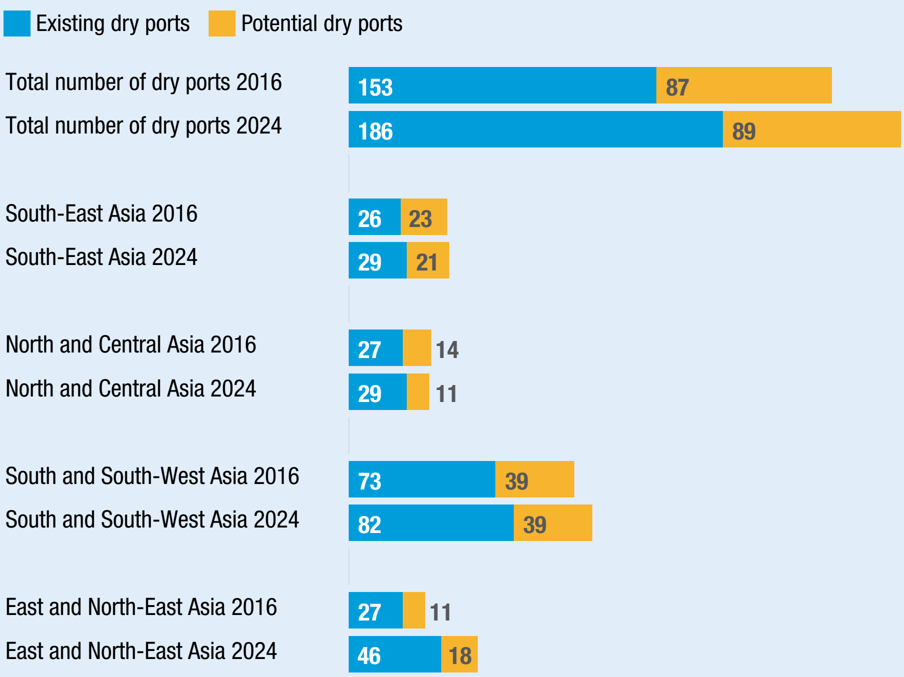
Box figure IV. 4. 1
Number of dry ports in Asia and the Pacific by subregion



Source: ESCAP, 2024.

Azerbaijan, China India, the Russian Federation and Türkiye host the largest number of dry ports in Asia and Eastern Europe. Dry port development is significant in several landlocked developing countries, including Azerbaijan, the Lao People's Democratic Republic and Mongolia. The number of dry ports has increased by 12 per cent since 2016 (from 240 to 275) with the share of potential (not yet operational) ports decreasing from 36 to 32 per cent (box figure IV.4.2). The most dynamic dry port development has taken place in India and the Russian Federation.

Box figure IV. 4. 2
Evolution of dry ports in Asia and the Pacific



Source: ESCAP, based on cited sources.

D. Policy considerations

Port performance

- **Monitor performance**: Ports should continue to monitor performance and adapt globally recommended sets of indicators to their needs, strategies and local conditions, while maintaining international comparability as much as possible. This will allow for meaningful internal comparisons overtime and benchmarking within countries, regions and globally, to inform of strategic targets and focus areas.
- **Modernize**: Ports need to be upgraded and modernized to become more resilient against external risks related to climate change, geopolitical conflicts and future pandemics and to protect ports and port communities, including hinterlands. Ports should minimize the impact on their surroundings and the environment through appropriate legislation and regulations, such as adequate due and fee policies to promote decarbonization and the use of green energy among shipping lines, operators and other members of the port community.
- **Human capital**: Ports should invest in human capital to ensure that they can improve and maintain performance over time. Training at all levels will boost efficiency and deliver long-term benefits for ports by improving quality and reducing personnel turnover. Increasing competencies of port workers, together with innovation and modernization, can help mitigate the impacts of potential labour shortages.

Women in ports

- **Promote all job roles**: The participation of women in ports should be further promoted and encouraged, particularly in areas that are still strongly underrepresented, such as cargo-handling, operations, technical, marine and engineering.

Trade facilitation and hinterland connectivity

- **Efficiencies**: Efficiency in hinterland connectivity is important for port performance and should be considered a crucial factor when measuring the performance of supply chains. Essential criteria in evaluating the efficiency of hinterland regions include connectivity, coordination and digitalization.
- **Streamlining**: Onward conveyance of cargo to hinterlands, including in LLDCs, should be facilitated through liberalized transport regulations, implementation of the WTO Agreement of Trade Facilitation, efficient port operations and streamlined intermodal operations.
- **Public–private partnerships**: To enhance connectivity, authorities and ports should encourage public–private partnerships in the development of dry ports, inland container depots and other facilities along corridors. National Trade Facilitation Committees are mandatory under the WTO Agreement on Trade Facilitation, to assist the implementation of trade facilitation reforms.
- **Through-transport**: Solutions for the through-transport of containers to final destinations, inland container stations and dry ports should be encouraged.
- **Digital**: Digitalization is key to improving hinterland connectivity and interoperability between the respective systems of public agencies and private stakeholders. This includes customs automation, digital exchanges of cross-border and transit data and single digital platforms such as single window solutions and the maritime single windows.

- **Regulation**: Regulatory frameworks, whether regional or national, enhance the harmonization of infrastructure, laws and trade development along transport corridors.
- **Sustainability**: Sustainability through green corridors should be included in policymaking decision processes when expanding hinterlands and building new terminals.
- **Transit**: Harmonizing customs transit systems and reducing border-crossing costs is crucial in successfully integrating developing countries into international trade, including cross-border exchanges of data and transit guarantee schemes.

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Chapter V

Making the legal and regulatory environment fit for purpose

It is essential that legal and regulatory frameworks in the maritime industry remain fit for purpose in the face of changing circumstances and growing challenges. This chapter draws inspiration from the theme of World Maritime Day 2024, "Navigating the future: Safety first!" and examines legal considerations regarding two distinct sets of risks for maritime transport: a) the safety of ship and port operations in the light of changing weather- and climate-related risks, and b) fraudulent ship registration and registries.

More specifically, the chapter analyses some of the commercial law implications arising from weather- and climate-related risks for different types of contracts that work in tandem with each other and offers considerations for policymakers and traders on addressing related challenges. The analysis is based on English law, the law that most commonly applies to international contracts by agreement of the parties.

Additionally, this chapter also provides an analytical overview of developments at the IMO Legal Committee to tackle fraudulent ship registration and ship registries. It highlights the findings of a recent IMO study group report on this subject prepared by the World Maritime University, the IMO International Maritime Law Institute and UNCTAD. The chapter also presents key related outcomes of the 111th IMO Legal Committee, together with relevant considerations for policymakers.

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A. Commercial law implications of weather- and climate-related risks

Recent trends and projections suggest that extreme weather events are expected to increase in frequency or severity due to climate change (IPCC, 2023; WMO, 2023). Ports and shipping will increasingly be exposed to extreme sea levels, coastal floods and storms (UNCTAD, 2020a; UNCTAD 2020b; UNCTAD, 2021a; UNCTAD, 2022). Other hazards, such as extreme heatwaves, fog, changes in wave energy and direction, long waves and swell, and changes to estuarine water levels during flash floods and droughts, also pose increased risks for ports and the safety of ship operations.

Failure to take action to avert and mitigate impacts is likely to result in extensive damage, operational disruptions and delays, with significant implications for transport and trade, global supply chains, contractual obligations and liabilities, as well as insurance matters such as coverage, premiums and risk disclosure obligations. This section explores some of the issues arising for key commercial contracts in international seaborne trade. It highlights relevant considerations for commercial parties and examines how maritime law might evolve in the light of growing weather-related risks.

Potential implications for contractual rights and obligations

Increased climate- and weather-related risks may lead to the greater incidence of cargo loss or damage and heightened risks for the carriage of deck cargo and pose challenges for the safety of berthing, loading and discharge operations. Climate risks may increase the possibility of maritime accidents and related general average incidents, as well as environmental pollution (Tsimplis, 2021), groundings and bunker oil spills.[1] Bunker oil spills can give rise to extensive losses, as illustrated by the *Wakashio* oil spill off the coast of Mauritius in 2020 (UNCTAD, 2020c). These risks will have implications for commercial contracts, including in terms of performance, liability, compensation and related disputes.

The impacts of climate change may give rise to significant commercial risks and these need to be borne by commercial parties. Examples of commercial rights and obligations that may be affected by weather- and climate-related delays and disruptions differ, depending on the type and terms of the contract[2] and its governing law. Relevant risks are not new in nature, but their significance amplifies with the increased likelihood and frequency of climate-related weather events. As these risks increase, the established commercial risk allocation between the parties under a range of contracts that work in tandem—including carriage of goods by sea under charterparties and bills of lading and international sale of goods on shipment terms—may become inadequate and need to be revised. A brief analysis of some of the potential contractual implications is provided below, based on English law. English law is frequently applicable (by agreement of the parties) to contracts for the international carriage of goods by sea and the sale of goods on shipment terms CIF and FOB.

Recent trends and projections suggest that **extreme weather events are expected to increase in frequency or severity** due to climate change

[1] Bunker oil spills by ships other than oil tankers are covered by the Bunker Pollution Convention 2001, but liability may be limited in accordance with the Convention on Limitation of Liability for Maritime Claims (LLMC), 1976, or the 1996 LLMC Protocol or a national limitation regime. On some of the related problems, including in the light of recent developments, see Gaskell, 2022, and UNCTAD, 2023a.

[2] For details regarding legal rights and obligations under different types of commercial contracts reference is made to standard practitioner texts, such as Coghlin et al., 2014; Cooke et al., 2022; Foxton et al., 2024; Gaskell et al., 2000; Lorenzon and Baatz, 2020; Reynolds and Rose, 2022; and Baughen, 2023.

In the context of charterparties, the risk of weather- and climate-related delays can among others **affect the duration of voyages and the time of the vessel's arrival**

Charterparties

In the context of charterparties, the risk of weather- and climate-related delays can among others affect the duration of voyages and the time of the vessel's arrival, the tender of notice of readiness and the start, duration and safety of key operations at the beginning and end of a voyage.

For time charters (contracts for hire of a vessel for a period of time), the commercial risk of delays affecting the duration and number of voyages under the charterparty typically lies with the charterer. Extreme weather (such as intensity and direction of wind and waves) may also have implications for the shipowner's key obligations regarding vessel speed and fuel consumption. Weather-related delays may affect the vessel's final voyage under the charter and the charterer's ability to redeliver the vessel by the "final terminal date".[3] This has knock-on effects for the use of the vessel under subsequent charters and potential liability for damages.

In the context of voyage charters (contracts for hire of a vessel for a specific voyage or series of voyages), the commercial risks associated with longer voyages and delay in the vessel's arrival typically fall on the carrier, i.e. the shipowner. However, subsequent delays following the tender of a valid notice of readiness, and affecting the start and duration of loading and discharge operations, as well as laytime (the period contractually allowed for loading and unloading) and demurrage (agreed liquidated damages for exceeding the laytime), falls on the charterer, and/or potentially on any holder of a charterparty bill of lading who may have inherited the charterer's related liabilities through contractual incorporation of charterparty terms.

Bills of lading and related cargo claims

In the context of bills of lading (which are used in the liner trade and for the sale of manufactured cargo and good shipped in bulk) and related cargo claims, growing climate- and weather-related risks may impact the carrier's liability, including under international cargo liability regimes.[4] In many cases, a carrier may for instance be exempt from liability for losses that could be attributed to "perils of the sea"; "act of God"; "any reasonable deviation"; or "any other cause… without the actual fault and privity" of the carrier or their servants and agents; or for losses that arise in the course of saving or attempting to "save life or property at sea" (Hague-Visby Rules, arts. IV r. 2(c), (d), (l), (q) and IV r. 4). Relevant losses would often have to be borne by cargo interests and their insurers.

Growing climate- and weather-related risks may also have implications for seaworthiness— the vessel's fitness for carriage and its ability to withstand the voyage—and related obligations, such as actions needed for the exercise of due diligence (see Hague-Visby Rules, arts. III r. 1 and IV r. 1); including in the context of losses due to a combination of causes, where unseaworthiness may be a contributory factor, e.g. bad stowage amounting to unseaworthiness and dangerous cargo. Under English law, as well as under current United States law, in cases where unseaworthiness for which the carrier is responsible has contributed to a loss, the carrier will be liable, except to the extent that they can establish another cause for which they are not responsible. The burden of proof is firmly on the carrier.

[3] Although this may be qualified by contractual wording, such as "weather permitting" or "unforeseen circumstances always excepted", see, for example, https://www.bimco.org/contracts-and-clauses/bimco-clauses/current/redelivery-clause-for-time-charter-parties_2017.

[4] These regimes include the International Convention for the Unification of Certain Rules of Law Relating to Bills of Lading, 1924 (Hague Rules), as amended by the Visby and SDR (Special Drawing Right) protocols 1968 and 1979 (Hague–Visby Rules), and the United Nations Conventions on Contracts for the Carriage of Goods by Sea, 1978 (Hamburg Rules).

In the absence of evidence on the proportion of loss due to the different causes, the carrier is liable for the entire loss.[5] In many cases, the related liability exposure of the carrier may increase. Climate-related extreme weather events may also potentially lead to an increase in deviations and associated disputes, for instance about whether a deviation was necessary to "save life or property at sea" or was otherwise "reasonable" (Hague-Visby Rules, art. IV r. 4), or contractually permissible,[6] in which case the carrier may be exempt from liability for any resulting losses.

International sale of goods on shipment terms

Rights, obligations and commercial risks under contracts that entail the carriage of goods by sea, such as the international sale of goods on CIF and FOB terms, may also be affected by changing climate and weather conditions. Under English law, time stipulations in commercial contracts are "conditions". A breach of these, however slight, entitles the innocent party to terminate the contract, and—in cases where a loss has been sustained—claim damages. Similarly, the contractual port of discharge under CIF terms or the port of loading under FOB terms is a "condition" of the contract. If the charterer is (also) a CIF seller, delays in starting and completing loading within the contractual shipment period under the sales contract may make the shipment in question unsuitable for tender to the intended buyer and/or lead to the goods or documents being rejected and the contract terminated. This leaves the seller exposed to a potential claim for damages (by the buyer) and having to make alternative arrangements for the disposal of the cargo and/or pursuing a cargo claim against the carrier. At the same time, a potential increase in the incidence of cargo loss or damage would be of particular concern to a final consignee, such as a CIF or FOB buyer, who bears the risk of loss or damage of the goods in transit.[7] They would have to pay the seller in full, while being left to pursue a claim against the carrier (or cargo insurer). In cases where the carrier could rely on an exemption from liability, or where the loss was not covered by insurance, the final consignee would have to bear the additional risks to the cargo arising from extreme weather events and bear the related losses. Costs associated with disruptions to or delays in loading and unloading, such as demurrage, may also fall on the final consignee under a "merchant's responsibility clause" in the bill of lading (Gaskell et al., 2000, chapter 15).

Contractual approaches to commercial risk allocation of weather-related risks

While the above considerations make a case for developing bespoke contractual clauses to deal with commercial risk allocation between e.g. charterers and owners, to date, only a few standard form clauses (pre-drafted provisions for incorporation into contracts) appear to deal with weather-related risks. None of these contain any reference to climate risk assessments by ports or to climate risk disclosure requirements (Task Force on Climate Related Financial Disclosures, 2017; United States Security and Exchange Commission, 2024) as material. Examples include the BIMCO[8] weather routing clause for time charter

Rights, obligations and commercial risks under contracts for the international sale of goods on CIF and FOB terms **may also be affected by changing climate and weather conditions**

[5] The Kapitan Sakharov [2000] 2 Lloyd's Rep. 255 [Court of Appeal, England and Wales]; Schnell and Co. v. The Vallescura, 293 U.S. 296 (1934); (1934) AMC 1573 [United States, Supreme Court]; The OOCL Inspiration [1998] AMC 1327 (United States Court of Appeals Second Circuit). For analysis of the case law, see Asariotis, 2009, and Gaskell et al., 2000.

[6] Where goods are shipped on board a chartered vessel, some redirection may be possible based on a contractual clause that qualifies the discharge port nominated in the charter with the words "or so near thereto as she may safely get and lie always afloat".

[7] In international sales on shipment terms CIF or FOB, both under English common law and under INCOTERMS, the widely used set of international commercial terms published and revised periodically by the International Chamber of Commerce, the risk of loss or damage of the goods in transit is always on the buyer.

[8] Baltic International Maritime Council.

parties (2006)[9] and the INTERTANKO[10] open sea berth clause (2011).[11]

Contracting parties and industry organizations may wish to give some thought to the further development of relevant clauses or consider whether adjustments to the wording of existing clauses would be warranted, to ensure a balanced and commercially sensible risk allocation in the light of future weather- and climate-related risks. Related risks and implications for contractual rights and obligations should be addressed explicitly as part of the contract and associated costs should be apportioned in a balanced manner, in order that performance disruptions may be kept to a minimum and contracting parties can factor relevant risk exposure into their overall commercial decision-making.

Standard form clauses developed by industry associations for use in individually negotiated contracts, such as charterparties and contracts for the international sale of goods on shipment terms, can play an important role in devising and facilitating the use of appropriately tailored contractual provisions. However, all stakeholders need to be actively involved in this process, in order that the legitimate commercial expectations of different parties may be appropriately reflected. This is particularly important for small entities from developing countries, whose bargaining power and specialist expertise may be limited.

In the context of bills of lading, which are used for container transport and play a key role in the sale of manufactured goods and commodities shipped in bulk, the situation is more complex. Bills of lading are not individually negotiated but are "contracts of adhesion", meaning that terms are unilaterally set by the contracting carrier and typically favour the carrier. In the case of charterparty bills of lading, incorporated charterparty terms and conditions may become material in the context of a cargo claim by a third-party consignee, such as a CIF buyer. The mandatory application of one of the international cargo liability conventions—the Hague Rules, Hague–Visby Rules or Hamburg Rules—often ensures some protection for cargo claimants against potentially unfair contract terms, but their substantive scope of application is limited. Moreover, under each of these conventions, the carrier is exempt from liability in cases of force majeure type events that are beyond the carrier's control and, as noted above, would in many cases be free from liability for cargo loss or damage due to extreme weather. Thus, relevant commercial risks would often be borne by cargo interests and their insurers—again, of particular concern for small traders, especially in developing countries.

Dialogue should be encouraged between shippers' associations and carrier industry associations such as the World Shipping Council, which represents global liner carriers. However, in the absence of regulatory action, buyers may seek to protect their interests by ensuring that tender of bills of lading that contain unduly owner- or carrier-friendly (charterparty) clauses is expressly prohibited under the sale contract.

To inform the development of contractual approaches to risk allocation, it is important to ensure a better understanding among all contracting parties—as well as insurers and banks facilitating transactions by way of letter of credit—of both the specific risks associated with weather- and climate-related impacts on shipping and ports and related contractual implications. This requires further research, training and capacity-building, in particular for small traders in developing countries. Insights gained from understanding the commercial law implications of disruptions caused by the pandemic and the response measures it triggered can offer valuable lessons.

9 See https://www.bimco.org/contracts-and-clauses/bimco-clauses/current/weather_routeing_clause_for_time_charter_parties_2006.
10 International Association of Independent Tanker Owners.
11 See https://intertanko.com/info-centre/model-clauses-library.

Relevant considerations, reflected in analytical reports and training materials developed by UNCTAD,[12] can be useful when developing appropriate contractual risk allocation clauses (UNCTAD, 2023b).

Safe port warranty

Weather- and climate-related operational disruptions, delays and risks to cargo may give rise to considerable losses that affect the commercial risk allocation between two contracting parties. However, the losses arising in cases of a vessel being damaged or lost as a result of extreme weather events may be even greater, amounting to tens of millions of dollars. In this context, the interpretation and application of a charterer's contractual safe port undertaking is of particular relevance and merits special consideration, particularly in the light of recent jurisprudence at the highest level.

Whenever a charterer has the right to nominate a port, whether under a time or voyage charterparty, it is typically under express obligation to nominate a "safe port". The classic definition of a "safe port" under English law was provided in the Court of Appeal decision *The Eastern City*, a landmark case.[13] According to this definition, "a port will not be safe unless, in the relevant period of time, the particular ship can reach it, use it and return from it without, in the absence of some abnormal occurrence, being exposed to danger which cannot be avoided by good navigation and seamanship".

Whether or not a port is "safe" is a question of fact and depends on the circumstances of each case,[14] but the criteria used to determine whether a port is a safe port are matters of law.[15] Risks that can be avoided by "good navigation and competent seamanship" will not normally render a port unsafe. Thus, a port will not necessarily be deemed "unsafe" if it is liable to the occasional storm, even though vessels may be required to leave it in the event of bad weather. Temporary hazards, such as high winds, neap tides or silting do not make a port unsafe if the master can wait a reasonable time until the danger has passed, unless the delay was inordinate, such as to frustrate the object of the charterparty.[16] However, adequate weather forecasts must be available,[17] as well as pilots, tugs and adequate sea room to manoeuvre, and conditions in the port must enable a competent master to take necessary action to avoid danger.[18]

Regarding the scope and nature of the "safe port" undertaking, the established view is that the obligation is "limited to a warranty that the nominated port… is safe at the time of nomination and may be expected to remain safe from the moment of a vessel's arrival until her departure".[19] This approach links the undertaking to the inherent characteristics of the port at the time of nomination, applying an objective test, irrespective of the charterer's knowledge. However, the undertaking does not extend to "abnormal occurrences" that were not within the reasonable expectations of the parties at the relevant time.

Thus, while the undertaking is considered to be strict (i.e. independent of the charterer's fault), it is neither absolute, nor continuing. The charterer will not be in breach of obligation if the port, at the time of its nomination, is prospectively safe and expected to remain so, "in the absence of an abnormal occurrence", during the time of

> Contracting parties should review their contracts and consider adjustments, **to ensure a balanced and commercially sensible risk allocation in the light of future weather- and climate-related risks**

[12] See https://unttc.org/stream/key-international-commercial-law-implications.
[13] [1958] 2 Lloyd's Rep 127, 131, per Lord Justice Sellers.
[14] *The Apiliotis* [1985] 1 Lloyd's Rep. 255.
[15] *The Polyglory* [1977] 2 Lloyd's Rep. 353.
[16] *The Hermine* [1979] 1 Lloyd's Rep. 212.
[17] *The Universal Monarch* [1988] 2 Lloyd's Rep. 483.
[18] *The Khian Sea* [1979] 1 Lloyd's Rep. 545 at 547.
[19] *The Evaggelos Th* [1971] 2 Lloyd's Rep. 200, at 205, per Judge Donaldson. See also the House of Lords decision in *The Evia (No.2)* [1982] 2 Lloyd's Rep. 307.

Extreme weather events posing **a danger to vessels in port** are increasingly likely to become more frequent or severe due to climate change than they have been in the past

its intended use.[20] If the port subsequently becomes unsafe due to an abnormal occurrence and the vessel sustains damage or is lost as a result, the shipowner cannot recover the loss from the charterer, as there is no causality between a breach of the charterer's obligation and the loss sustained. The relevant commercial risk associated with an abnormal occurrence, therefore, falls on the shipowner and their insurers.

A key question in the current context is what constitutes an abnormal occurrence in the case of weather- and climate-related hazards and risks, which are expected to increase significantly unless ports can adapt quickly and effectively. That is, under which circumstances are losses incurred by a vessel in approaching, entering, using or leaving a port as a result of extreme weather events and other climate-driven factors[21] attributable to the owner or need to be borne by the charterer? Which of the two contracting parties is to bear the relevant risk and costs?

The issue of what constitutes an abnormal occurrence in the context of a loss due to a combination of extreme weather events was considered in some detail in the recent *Ocean Victory* litigation, including by the Supreme Court of the United Kingdom.[22]

The litigation concerned a capesize bulk carrier that grounded while attempting to leave the port of Kashima, Japan, during a storm in October 2006. The casualty, resulting in a claim of close to $140 million,[23] was caused by two factors: long waves and severe swell in the port—which made it unsafe for the vessel to stay at the berth—together with a northerly gale that rendered the vessel's only exit route unsafe. The port had not conducted a risk assessment for these combined conditions. The vessel eventually broke in two and became a wreck.

Litigation ensued between those in the charterparty chain. The claim for damages against the time charterer succeeded at first instance but the decision was overturned by the Court of Appeal and a further appeal on specific issues was subsequently dismissed by the Supreme Court of the United Kingdom.

The central reasoning of the judge's decision at first instance was that "the danger facing Ocean Victory was one which was related to the prevailing characteristics of Kashima. The danger flowed from two characteristics of the port, the vulnerability of the raw materials quay to long swell and the vulnerability of the Kashima fairway to northerly gales caused by a local depression... Neither long waves nor northerly gales can be described as rare. Even if the concurrent occurrence of those events is a rare event in the history of the port, such an event flows from characteristics or features of the port".[24]

This approach was rejected by the Court of Appeal, which overturned the decision.[25]

In contrast to the judgement at first instance, the Court of Appeal considered the "past frequency" of the critical combination of extreme weather events leading to the loss in question material and "the likelihood of it occurring again". Considering the

[20] The shipowner is entitled to refuse a nomination if they are aware that the port is inherently unsafe. However, if the port is prospectively safe at the time of nomination, the shipowner must comply with the charterer's orders. If the circumstances change and the port becomes actually or prospectively unsafe to the knowledge of the charterer, a secondary obligation may arise for a time charterer to cancel the original nomination and order the vessel out of danger (provided this is still possible), but the question of how diligent the charterer is required to be in discovering any subsequent unexpected threat to the safety of the nominated port is not clear (Wilson, 2004).

[21] Such as long waves and associated swell, high winds, storm surges, fog, flash floods and drought.

[22] *Gard Marine and Energy Limited v. China National Chartering Company Limited and others (The Ocean Victory)* [2017] UKSC [United Kingdom, Supreme Court] 35.

[23] In addition to the market value of the vessel ($88.5 million), this included the cost of salvage services, wreck removal and loss of earnings.

[24] *The Ocean Victory* [2013] EWHC [High Court of Justice in London] 2199 (Comm), paras. 127 and 128.

[25] *The Ocean Victory* [2015] EWCA [Court of Appeal, England and Wales] Civ 16, see particularly para. 63 per Lord Justice Longmore.

"exceptional nature of the storm" in terms of its rapid development, duration and severity and given that "the concurrent occurrence" of the storm and long waves was "rare", the critical combination was to be regarded as an "abnormal occurrence".

The issue of whether there was a breach of the safe port undertaking finally came up for decision before the Supreme Court. In particular, the following questions were agreed: "(1) was the port unsafe within the meaning of the safe port undertaking, so that the charterers were in breach; or (2) was there an 'abnormal occurrence' within the context of the safe port undertaking, which was no breach of the undertaking?"[26]

The Supreme Court expressly agreed with the conclusion of the Court of Appeal and held that the key was whether the "critical combination" was abnormal, even if both its constituent elements were, separately, characteristics of the port. The failure of the port to conduct a risk assessment and put in place a proper safety system to deal with the risk of that combination did not affect the answer to that question.[27] While not necessarily unforeseeable, the "critical combination" of long waves (and swell) and gale force winds in the case in question was "rare and unexpected", i.e. abnormal for the particular port and for the particular ship at the relevant time. Accordingly, the charterers were not in breach of the safe port warranty and the loss sustained was not recoverable from the charterers.

The decision will be welcomed by charterers and may make commercial sense in terms of confirming the established risk allocation between charterers and shipowners; charterers will not be held responsible for potentially extensive damage or loss of a vessel due to "rare and unexpected" extreme weather events, as these are considered abnormal. Relevant risks will instead have to be borne by shipowners and their mutual insurers, the protection and indemnity clubs.

At the same time, the decision's approach to the relevancy of risk assessment and the absence of any clear (legal) expectation in this respect[28] appear out of step with the changing risk landscape and seem to promote a collective "wait and see" approach that is not desirable in the light of significantly growing climate- and weather-related risks. As highlighted above, extreme weather events posing a danger to vessels in port, on their own or in combination, are increasingly likely to become more frequent or severe due to climate change than they have been in the past. Therefore, past experience (such as the baseline 1-in-100 extreme sea level event)[29] no longer serves to predict future exposure and risk. The reasoning of the judge at first instance reflects this consideration, whereas that of the Court of Appeal and Supreme Court does not.

Past experience no longer serves to **predict future exposure and risk**

While future exposure is subject to uncertainty, it is in everyone's interest to assess relevant risks and mitigate future dangers, and associated losses (as well as related disputes), which may be extensive and could eventually become uninsurable. Rather than waiting for future risks and losses to materialize before being considered the new "normal" (ex post facto), commercial parties—and commercial law—should be proactive in trying to guard against such risks and losses. Multi-hazard risk assessments at the port level, informed by the best available science and in line

[26] *The Ocean Victory* [2017] UKSC [United Kingdom, Supreme Court] 35, para. 8.
[27] Ibid, para. 43 and 44, per Lord Clarke.
[28] Charterers appear to be under no particular obligation to exercise due diligence, that is, reasonable care in respect of the basis upon which to form a view about the prospective safety of a port. While known weather-related risks that have led to danger in the past are clearly material, the question of whether a port has carried out an assessment to determine the future risk of previously rare or unprecedented weather events occurring is not considered particularly relevant. Therefore, the decision does not provide an incentive that would help promote comprehensive risk assessments and adaptation action by ports.
[29] See UNCTAD, 2021a, figure 1, which illustrates that even at 1.5°C global warming, expected as soon as in the 2030s, ports in some regions may face, as often as every 1 to 10 years, extreme sea levels of a magnitude to date expected to occur once per century.

with the latest best practice and guidance, along with targeted adaptation measures, play a crucial role in reducing uncertainty and preventing or mitigating future losses (UNCTAD, 2020a; UNCTAD, 2020b). As highlighted in a previous edition of *Review of Maritime Transport* (UNCTAD, 2022), relevant legal requirements for climate-proofing in accordance with technical guidance are already in place for port infrastructure projects in the European Union and in European Union-funded projects in other countries. Reporting requirements on climate risk and vulnerability assessments, as well as adaptation, also apply to ports in some countries, such as the United Kingdom.[30]

The Supreme Court decision in *The Ocean Victory* is binding under English law and relevant for all contracts of carriage governed by English law globally. According to current law, only extreme weather events which are "normal" and "not rare" for the port in question (considering the relevant time of year and the vessel concerned), that is, occurrences that could be expected based on past experience as posing a danger, will be considered "characteristics" of the port, making it potentially unsafe. Thus, in many instances, the growing risks of weather-related physical damage or loss of a vessel are likely to fall on shipowners and hull insurers. To avoid or mitigate relevant losses arising, and to ensure a fair and balanced distribution of related commercial risks, industry associations and contracting parties should consider ways to promote the conduct of port risk assessments and effective adaptation action. This could include developing contractual clauses that require nominated ports to have carried out multi-hazard risk assessments, thereby helping to ensure the best possible knowledge base upon which decisions about fast-growing weather-related risks may be made.

[30] See https://www.gov.uk/government/collections/climate-change-adaptation-reporting-third-round-reports#harbour-authorities.

B. Combating fraudulent ship registration and registries: State of play and a way forward

Background and overview of discussions at the International Maritime Organization Legal Committee

Fraudulent ship registration and fraudulent ship registries are a matter of global concern given their far-reaching implications for maritime safety and security, pollution, seafarer welfare and ocean governance. Concerns have grown in recent years, with recorded incidents rising, the emergence of a "dark fleet" or "shadow fleet"[31] and "an increase in the frequency of ship-to-ship crude oil transfers in international waters by ships using "dark operations" to circumvent sanctions and high insurance costs" (IMO, 2023a).[32] A number of recommended measures are outlined in the report of the 110th session of the IMO Legal Committee (IMO, 2023b). In December 2023, the IMO Assembly also considered information about such ships and adopted a resolution urging "Member States and all relevant stakeholders to promote actions to prevent illegal operations in the maritime sector by the dark fleet or shadow fleet" (IMO, 2023c).

[31] Described as "a fleet of between 300 to 600 tankers, primarily comprised of older ships, including some not inspected recently, having substandard maintenance, unclear ownership and a severe lack of insurance, operating "as a 'dark fleet' or 'shadow fleet' to circumvent sanctions and high insurance costs" (IMO, 2023b, para. 5.10).

[32] As noted at the 110th session of the IMO Legal Committee (IMO, 2023b), tankers in a dark fleet posed a real and high risk of incidents, particularly when engaged in ship-to-ship transfers, as they disguised the cargo destinations or origins, or avoided oversight or regulation by flag or coastal States. This practice, in many cases, transferred the risk of oil pollution damage to coastal States that were not involved in, or benefiting from, the oil being transferred, and could increase the risk of shipowners evading liability under the 1992 Civil Liability Convention and the 2001 Bunkers Convention, with implications for affected coastal States and the exposure of the International Oil Pollution Compensation (IOPC) funds.

There is currently **no binding international framework to regulate the ship registration process** itself

Given this context and the work that the IMO Legal Committee has been doing since 2018 to combat fraudulent ship registration and fraudulent ship registries (UNCTAD, 2019; UNCTAD 2022; UNCTAD 2023a), at its 111th session in 2024, the Legal Committee examined reports of recent incidents and developments by delegations and the IMO secretariat. This included data that 36 member States and one associate member had provided to the secretariat information regarding their registries of ships, pursuant to the resolution on measures to prevent the fraudulent registration and fraudulent registries of ships (IMO, 2019). A dedicated function on ship registry in the "contact points" module of the Global Integrated Shipping Information System (GISIS) had been created pursuant to the resolution. This is kept up to date by the secretariat and is available to the public.

The Committee also considered the report of a correspondence group on due diligence and IMO identification number schemes that, as part of its ongoing work, had highlighted the importance of information exchange in relation to the registration process of ships and companies (IMO, 2024a). While the correspondence group needed more time to complete its work, the report noted that, based on a limited number of responses to a questionnaire, the main source of information used to verify the registration and identity of a ship was through IMO resources available in GISIS. Likewise, GISIS provided the point of contact for the authority responsible for the flag State registry, which can be consulted in the event of any doubts regarding a ship's registration.

Relevant discussions of the Committee focused in some detail on the final report of the study group on fraudulent registration and fraudulent registries of ships, prepared by the World Maritime University, the IMO International Maritime Law Institute and UNCTAD (IMO, 2024b).[33] The report presented the final results of a questionnaire, together with some statistical analysis, a section on the impacts of fraudulent ship registration and a detailed overview of the relevant international legal framework, as well as related conclusions and recommendations.[34]

Key issues highlighted in the report summary include the following:

- There is currently no single dedicated international instrument or treaty that contains a standardized and universally accepted definition of "fraudulent ship registration". Instead, the concept is addressed through a combination of multiple international maritime conventions focused on disparate subject matter and other legal instruments, domestic laws and industry best practices. Importantly, there is currently no binding international framework to regulate the ship registration process itself. There is no well-developed jurisprudence in this area.
- Various international conventions and agreements (including those adopted under the auspices of the United Nations, IMO and International Labour Organization (ILO)) could be considered as indirectly addressing fraudulent ship registration.
- Flag States play a central role in ensuring that ships registered under their flags comply with international standards and regulations. Under international instruments, they are responsible for ship registration and the monitoring of training and certification. Ensuring that flag States adequately assume jurisdiction and control over shipowners and ships flying their flags and holding flag States accountable for failure to enforce proper ship registration and certification are

[33] The agreed terms of reference of the study group are set out in annex 1 of the report. An interim report of the study group (IMO, 2023d) had previously been considered by the Legal Committee at its 110th session (IMO, 2023b, paras. 6.4 to 6.12).

[34] At the request of the Committee, the report has also been made available on the public IMO website. See https://www.imo.org/en/MediaCentre/MeetingSummaries/Pages/LEG-111th-session.aspx.

important steps in ensuring that they take their responsibilities seriously. At the same time, port State authorities can make an important contribution to identifying instances of fraudulent ship registrations, including by increasing relevant inspections.

- Encouraging transparency in ship registration and ownership records is essential for verifying ship legitimacy and detecting fraudulent activities. Implementing stricter penalties, including financial fines, and other legal consequences may be a deterrent against fraudulent ship registration practices. The use of technology, databases and data analysis is key to identifying patterns and trends associated with fraudulent ship registration and enhancing detection and prevention.
- Collaboration among countries and relevant agencies is vital in addressing fraudulent ship registration. This involves sharing information, conducting joint inspections and establishing effective enforcement mechanisms. The situation is dynamic – international regulations and agreements need regular reviews and updates to address evolving challenges associated with fraudulent ship registration effectively. Collaborating and exchanging information with relevant private sector and industry stakeholders can also play an important role in identifying and preventing fraudulent ship registration and should be encouraged.
- The overwhelming consensus among those responding to the questionnaire was that an investigation was necessary into loopholes in the existing system of international ship registration, which are currently exploited by perpetrators of fraudulent acts.

A range of measures was highlighted in the report for further consideration, along with suggested improvements to the GISIS module related to the fraudulent registration of ships (IMO, 2024b, annex 4). In addition, the Legal Committee was invited to "take steps for the development of guidelines or best practices on registration of ships, which could eventually be the basis for the development of a treaty on registration of ships to ensure the effective implementation of IMO treaties, taking into consideration, as appropriate, the provisions of the United Nations Convention on Conditions for Registration of Ships, 1986" (IMO, 2024b, para. 4.2).

As noted in the report, the United Nations Convention on Conditions for Registration of Ships, adopted in 1986, under the auspices of UNCTAD,[35] aimed at "strengthening the genuine link between a State and ships flying its flag, and in order to exercise effectively its jurisdiction and control over such ships with regard to identification and accountability of shipowners and operators as well as with regard to administrative, technical, economic and social matters" (article 1). Although the Convention did not attract the number of ratifications required for its entry into force (40), its provisions have nevertheless significantly influenced a number of national laws on ship registration.

Encouraging transparency in ship registration and ownership records is essential for verifying ship legitimacy and detecting fraudulent activities

Legal Committee decisions and a way forward

Following discussions, with 45 IMO Member States and observers highlighting relevant experiences and expressing support for the report and some of its key recommendations, the Committee reiterated that the proliferation of fraudulent registration practices posed a serious threat. These practices not only endanger maritime safety and security and the marine environment but also the well-being of seafarers. Seafarers are particularly vulnerable if they are working on a fraudulently registered ship, as they risk being abandoned.

In line with one of the study group's recommendations, the Committee "strongly

[35] In accordance with resolution 37/209 of the General Assembly of the United Nations dated 20 December 1982; see https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XII-7&chapter=12&clang=_en.

encouraged Member States to act on their commitments as reflected in Assembly resolution A.1162(32) [IMO, 2021] and, in collaboration with all relevant stakeholders, take the necessary measures, individually and collectively, to promote effective actions for the prevention and suppression of fraudulent registration and fraudulent registries and other fraudulent acts in the maritime sector" (IMO, 2024c, para. 6.17). The Committee also agreed to give further consideration to proposed measures identified in the study group report (IMO, 2024b, para. 4.3, and annex, para. 100) and other recommendations suggested by several delegations, including the following (IMO, 2024c, para. 6.18):

Fraudulent registration practices not only endanger maritime safety and security and the marine environment but also the **well-being of seafarers**

1. Utilization or the enhancement of the existing tools developed by IMO, such as port State control, continuous synopsis record, and long-range identification and tracking system;
2. Need to continue to communicate and report to IMO cases of fraudulent registration and fraudulent registries of ships and of ships no longer on a flag State registry, for dissemination of such data;
3. Development of harmonized procedures, including to address challenges with provisional registration;
4. Need to reinforce port State control measures;
5. Need to define the element of due diligence for the registration of ships and for their deletion from a registry, as well as the consideration of changes in ownership;
6. Need for further research into current registration loopholes that facilitate fraudulent registration;
7. Need to collaborate and share information and for Member States to act on their commitments as reflected in IMO Assembly resolution A.1162(32);
8. Need to enhance capacity on identifying maritime fraud with respect to human resources and technological skills, which may be further considered by the Technical Cooperation Committee;
9. Need to carry out awareness campaigns on the impact of fraudulent registration on the shipping industry and seafarers;
10. Need for the information on GISIS to be more easily searchable by port State control regimes;
11. Port State control memorandums of understanding could develop a common list of flags used by fraudulent actors and enhance inspections for these ships;
12. Publication of the study report on the IMO website to draw further attention to the problem of fraudulent registration;
13. Improvements to GISIS (IMO, 2024b, para. 4.4).

Regarding the last issue, the Committee requested that the IMO secretariat study the suggested improvements to GISIS, assess their feasibility and report at a future session (IMO, 2024c, para. 6.24).

In an important development, the Committee also agreed to take steps to develop guidelines or best practices on ship registration. Referring to the broad support for the proposal by the United Kingdom, that guidelines or best practices on ship registration should be developed and include safety, security, environmental protection and the well-being of seafarers, the Committee agreed that work on a proposal for a new output should be undertaken intersessionally by the correspondence group on matters of due diligence. To this end, the correspondence group was re-established, coordinated by the United Kingdom. It was tasked with continuing to define and develop the elements of "due diligence" to be exercised in the process of registration of vessels in the IMO unique company and registered owner identification number scheme; considering additional factors with regard to the abuse of IMO identification number schemes, how widespread the issue is and possible loopholes in the system; and developing a draft proposal for a new output on guidelines or best practices on the registration of ships for consideration by the Committee at its next session in 2025 (IMO, 2024c, paras. 6.20 and 6.29).

However, the Committee also noted "views expressed that since the United Nations Convention on Conditions for Registration of Ships had been adopted in 1986, the business world had progressed and that the requirement of a genuine link between the ship and the flag State or the requirement for the owner to have a residence in the flag State served no practical purpose, also given the advances in banking, insurance and the shipping business in general in the past 40 years. Therefore, the Committee also noted that the guidelines to be developed should take these factors into account, including the comments on the genuine link" (IMO, 2024c, para. 6.21).

It is therefore not clear to what extent work towards the development of guidelines or best practices for ship registration will take into account provisions in the 1986 United Nations Convention on Conditions for Registration of Ships[36] or the need for "a genuine link between the State and the ship", as required under article 91 of the United Nations Convention on the Law of the Sea (UNCLOS), 1982, the overarching international legal framework for maritime activities.

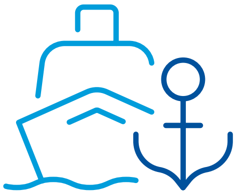
While there is widespread consensus that an internationally agreed framework for ship registration is desirable, including as part of efforts to combat the growing risks of fraudulent ship registration, it appears there is at present little support for an approach based on the provisions of the 1986 Convention on Conditions for Registration of Ships. This was evident from the latest discussion at the Legal Committee and may be due to the fact that the need for a "genuine link", as enshrined in UN Convention on the Law of the Sea, has proved to be problematic to implement. At its core, the need for a genuine link entails some restrictions on the choice of flag for global shipowners and relevant business opportunities related to establishing and operating major ship registries, including in developing countries. Whether the future work on guidelines or best practices on ship registration will be able to reconcile potentially diverging views on the need for a genuine link and result in an outcome that is commercially acceptable, fit for purpose and in line with the provisions of UN Convention on the Law of the Sea remains to be seen.

All United Nations Member States are encouraged to actively participate in this work, under the auspices of the IMO Legal Committee, towards the development of guidelines on ship registration and of measures to combat fraudulent ship registrations and registries.

Seafarers are particularly vulnerable if they are working on a fraudulently registered ship, as they risk being abandoned

[36] At the 110th session of the Committee, the delegation of the United Kingdom "informed the Committee that the United Kingdom planned to submit a request for a new planned output to review [the 1986 Convention on Conditions for Registration of Ships] and to determine what changes were required for it to best reflect global ship registry today – including topics about links between a vessel and the State in which they are registered" (IMO, 2023b, paras. 6.33 and 34). Such a request was, however, not submitted at the 111th session.

C. Policy considerations



Timely and effective adaptation **action for ports should be an urgent priority** for Governments and for all public and private entities with a stake in international transport and trade

Commercial parties, law and contracts need to adapt to better prepare for the future under climate change

Ports are key hubs in global supply chains and essential for global trade and sustainable development. They face a high and growing level of risk of climate- and weather-related impacts. In the absence of effective action on port adaptation, the associated risks will increasingly materialize and jeopardize the integrity of transport networks across supply chains. Relevant impacts may lead to significant damage, disruption and delay, extensive economic losses, business failures and costly and protracted legal disputes. This has implications for the performance of commercial contracts, as well as the rights, obligations and liabilities of contracting parties engaged in international transport and trade, and for insurance coverage and premiums and the insurability of losses.

Considerations for contractual parties and policymakers include the following:

- The risks of climate-related damage, disruption and delay to port infrastructure, port and ship-operations and their safety, as well as the implications for contractual rights and obligations, need to be fully understood to be effectively addressed before such risks and losses materialize. Related issues should be given increased attention and require further research to minimize losses and legal disputes, keep trade flowing, keep insurance affordable and ensure the development of appropriate and balanced contractual approaches to risk allocation.
- Judicial approaches to established legal concepts and their interpretation may need to develop further, to reflect the "new normal" brought about by a changing climate and weather conditions.
- To mitigate their exposure to potentially extensive commercial losses arising from climate- and weather-related damage, delay and disruption, and to avoid lengthy and costly disputes and litigation, contracting parties should review their contracts and, as appropriate, consider carefully worded specialist clauses that accommodate future risks and provide for a balanced commercial risk allocation given changing circumstances. Similar considerations may arise in connection with other issues causing disruptions and delays, such as the pandemic and related response measures. Relevant analytical reports and training materials developed by UNCTAD can provide useful insights and guidance in this regard.
- When developing relevant standard form clauses, the involvement of all stakeholders is important to ensure that their respective legitimate interests are appropriately reflected. This is vital for small traders in developing countries, whose bargaining power and specialist legal expertise may be limited. As part of its mandated work in support of the development and implementation of appropriate legal and regulatory frameworks that reduce trade transaction costs (UNCTAD, 2021b, para. 127(n)), UNCTAD can play a role in this context by providing related analysis and advice, as well as training and capacity-building.
- Addressing and mitigating risks to ship and port operations is in the interests of both private and public stakeholders across global supply chains that

depend on safe and reliable maritime transport, and should be promoted by all. Contractual clauses can play an important role in this context, beyond apportioning relevant risks. When drafting charterparty clauses that require the nomination of a safe port, consideration should also be given to express wording that could improve the knowledge base upon which decisions on escalating weather-related risks are made. This would help promote effective action on port climate risk assessment and adaptation.

- Given long infrastructure planning horizons and lifespans, worsening climate projections and the cost of inaction, timely and effective adaptation action for ports should be an urgent priority for Governments and for all public and private entities with a stake in international transport and trade. To this end, more targeted policy action, together with legal requirements and effective technical guidance, is needed to enhance the climate resilience of ports across supply chains, reduce risks for port and ship operations and mitigate losses.

Combating fraudulent ship registration and registries

As a matter of public policy, developing and enforcing measures to prevent and combat crime, including all forms of fraudulent practices, is in the interests of the global community as a whole. This is reflected in some of the Sustainable Development Goals of the 2030 Agenda for Sustainable Development, which are "integrated and indivisible, global in nature and universally applicable", notably Goal 16 (promote peaceful and inclusive societies) and Goal 14 (conserve and sustainably use the oceans, seas and marine resources for sustainable development), of particular relevance in the context of maritime transport, ship-source pollution control and ship safety. Target 14.c is aimed at enhancing "the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources".

Considerations for policymakers and industry stakeholders include the following:

- Fraudulent ship registration poses a growing threat to maritime safety and security and the marine environment, as well as the well-being of seafarers, who are particularly vulnerable if they are working on a fraudulently registered ship and risk being abandoned. Against this background, recent and ongoing efforts under the auspices of the IMO Legal Committee to take measures to combat fraudulent practices should be given active support from all United Nations Member States and industry stakeholders. Relevant IMO initiatives also include working towards developing guidance or best practices on ship registration, which can play an important role in this context, provided the guidance is well designed, fit for purpose, commercially acceptable and in line with UN Convention on the Law of the Sea and customary international law. Although an international legal instrument (potentially drawing on the provisions of the 1986 Convention on Conditions for Registration of Ships) would be the most effective tool to ensure internationally uniform rules on the registration of ships, this approach has not been favoured by the IMO Legal Committee. Ultimately, the success of any measures and their enforcement depends on the commitment and political will of flag States, port States and industry actors.
- In the short term, to increase transparency and assist authorities and industry stakeholders in identifying the fraudulent registration of vessels, all United Nations member States are urged, through their representatives

The success of any measures and their enforcement depends on the **commitment and political will of flag States, port States and industry actors**

at IMO, to regularly provide updated information on relevant national contact points and on fraudulent ship registration, to be included as part of the dedicated GISIS module.

- Further improvements to GISIS could play an important role in facilitating sharing and access to relevant information. For additional recommendations, United Nations member States and industry stakeholders may consult the final report of the IMO study group on fraudulent ship registration and fraudulent ship registries (IMO, 2024b).

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