2026 Review of maritime transport

Chapter III

Freight rates and maritime transport costs

Freight rate volatility remained a defining feature of maritime transport in 2025 and 2026, reflecting supply and demand dynamics, shifting trade patterns, disruptions from geopolitical tensions and security threats, and fluctuations in available ship capacity. Against this backdrop, this chapter examines container, dry bulk and tanker freight rates from January 2025 to August 2026.

A headline development in 2026 was the disruption affecting the Strait of Hormuz. This contributed to fluctuations in freight rates, increased marine fuel prices and raised shipping costs well beyond routes serving the Persian Gulf. The impact varied across economies. Small island developing States and the least developed countries faced the greatest consequences because their imports often travel longer distances and pass through transshipment hubs, relying on multiple shipping legs before reaching their destination. As a result, fuel costs account for a larger share of total international transport costs and add to import prices. As of the third quarter of 2026, heightened security risks affecting shipping through the Bab el-Mandeb Strait and the Black Sea, alongside climate-related water constraints impeding operations in the Panama Canal, further amplified operational challenges and contributed to higher costs and freight rate volatility on affected routes.

Amid multiple disruptions and challenges, freight rate developments differed across shipping market segments. In 2025, container spot rates declined from their 2024 peaks, reflecting a combination of

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factors including the entry into service of new ship capacity, the fading away of inflated freight rate levels due to the Red Sea crisis. Nevertheless, freight rates remained volatile and above 2023 levels. Container freight rates varied significantly across routes, reflecting differences in demand, capacity and exposure to disruptions. Continued ship diversions around the Cape of Good Hope, in the absence of a broad return to the Suez Canal route, have increased TEU-mile demand and absorbed part of the available fleet capacity.

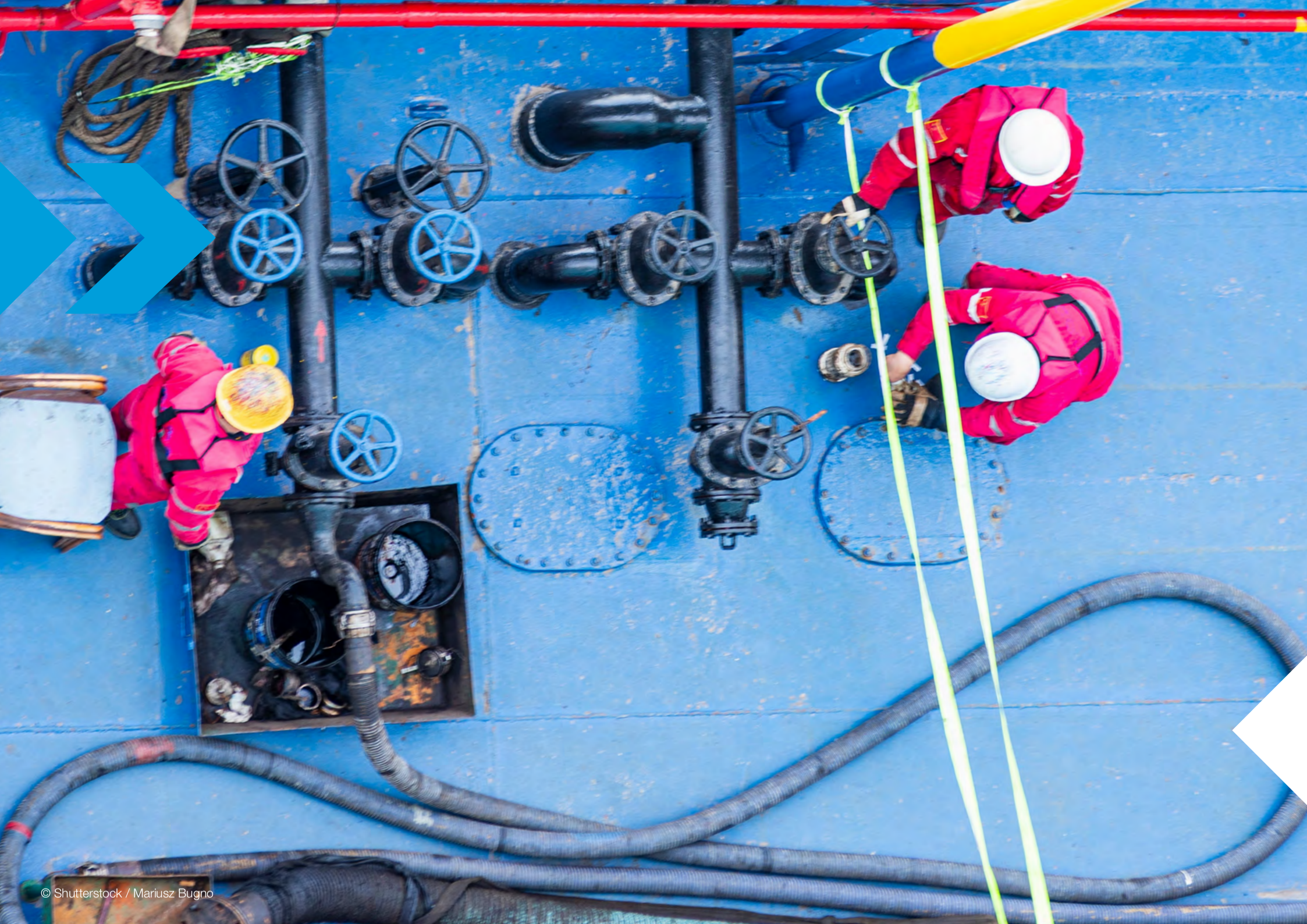
During the first three quarters of 2026, container spot rates increased again and remained volatile amid geopolitical disruptions, trade policy uncertainty, operational constraints and port congestion limiting effective ship capacity. The disruption affecting the Strait of Hormuz from late February 2026 raised bunker prices and surcharges across shipping routes, although direct operational effects were concentrated in the Persian Gulf and nearby services. Time charter rates remained elevated as vessel diversions, reconfigured liner networks and limited vessel availability sustained demand for charter vessels. Some container services returned through the Red Sea and Suez Canal in the summer of 2026, shortening sailing distances and potentially easing capacity pressures. A broader return, if sustained, could release additional effective ship capacity and exert downward pressure on freight rates. By contrast, Panama Canal draft restrictions, introduced in early July 2026, have imposed operational constraints on affected routes, potentially further tightening effective capacity and adding upward pressure and uncertainty to container freight rates.

In 2025, average dry bulk freight rates settled slightly below 2024 levels, with a weak first half followed by a strong second-half recovery. Seasonal weakness, weather-related disruptions to iron ore exports, slower industrial activity in China and lower coal imports, and increased vessel supply weighed on rates in the first half. Rates strengthened in the second half as iron ore and bauxite shipments rose, seasonal cargo demand recovered and longer voyage distances supported ton-mile demand and vessel utilization.

Rates climbed further in the first half of 2026, buoyed by higher iron ore exports from Australia and Brazil, growing bauxite and new iron ore exports from Guinea, and longer voyage distances. Disruption around the Strait of Hormuz had a mixed effect on the freight market: lower grain and fertilizer shipments reduced vessel demand on Persian Gulf routes, while vessel delays temporarily diminished effective vessel availability, and higher bunker and insurance costs raised voyage costs. By the third quarter, escalating security risks in the Black Sea had further disrupted grain and other dry bulk flows, constrained vessel operations, and increased freight and insurance costs on affected routes.

Tanker freight markets diverged in 2025. Crude tanker rates remained relatively strong. Earnings increased as demand for vessel capacity outpaced limited fleet growth, supported by higher crude exports, stronger Asian import demand, shifting crude export patterns, longer-haul trades and geopolitical developments. By contrast, refined product tanker rates and earnings declined as product trade growth slowed and fleet capacity expanded. The limited resumption of some product tanker transits through the Red Sea and Suez Canal shortened voyage distances on affected routes, reducing ton-mile demand. The movement of some product tankers into crude oil trades nevertheless reduced available product tanker capacity and provided some support to product tanker earnings later in the year.

Tanker freight rates rose sharply in 2026, particularly in the crude segment, following the disruption affecting the Strait of Hormuz. Vessel delays and disrupted movements in and around the Persian Gulf reduced effective carrying capacity, while higher insurance and bunker costs and increased longer-haul crude shipments from the Atlantic basin to Asia added further upward pressure on freight rates. Ongoing disruptions and longer and more complex crude trade routes and associated logistical challenges continued to constrain fleet efficiency, pushing crude tanker rates to record highs by August 2026. Refined product tanker rates remained comparatively weaker as subdued product exports limited transport demand and moderated upward pressure on rates.



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Key takeaways

- Disruptions and uncertainty in maritime transport are driving freight rate and transport cost volatility. Robust monitoring of maritime freight rates and cost developments, assessments of their impacts, and enhanced response capacities to anticipate and respond to shocks are increasingly important. Attention should be given to strengthening the capacity of developing countries, particularly the least developed countries, small island developing States and landlocked developing countries.

- **Route specific shipping costs and capacity monitoring:** Establish integrated monitoring systems that bring together, through a one-stop platform, relevant publicly available market intelligence information and data from varied sources, including the shipping industry, port sector, customs, transport authorities, shippers and other relevant stakeholders. Such information could be used to track and assess key indicators that shape and drive transport costs. These may include route-level freight rates, surcharges, service frequency, vessel capacity and deployment patterns, waiting times, delays, congestion, fuel prices, insurance premiums, voyage distances, shipment timing and cargo demand.

- **Exposure and impact assessment:** Support countries in assessing how maritime transport conditions, including route connectivity, cargo composition, limited gateway access and reliance on transshipment, could affect the delivered cost of imported essential goods across the transport chain. Any such assessment would consider, among other elements, the possible effects on inflation, public finances and supply reliability. Accessible analytical tools could be developed to translate policy questions into model-based assessments and support the interpretation of results, comparison of mitigation options and the formulation of measures tailored to match varying levels of national exposure, particularly in the least developed countries and small island developing States.

- **Strengthen response and mitigation capacities to contain increases in freight rates and transport costs:** Bolster national capacities to prepare for and respond to policy changes and disruptions, including to maritime chokepoints. Measures could include facilitating alternative routes and transport options, prioritizing essential goods, addressing temporary logistics bottlenecks, and targeted financial or other support where appropriate. Over the longer term, supporting the energy transition and more sustainable transport systems, including through greater energy efficiency and low-carbon transport solutions, could help reduce transport costs and exposure to fossil fuel price volatility. Where domestic policy measures are introduced, communicate their scope and implementation timelines clearly to reduce uncertainty and market disruptions. Responses should be time-bound, evidence-based and tailored to specific country exposure and circumstances.

- **Policy coordination and data sharing:** Strengthen coordination and data sharing among all relevant stakeholders and partners, including those from the trade, transport, port, customs, energy and insurance sectors; disaster-management organizations; competition authorities and other private sector actors. This process should aim to improve preparedness and responses to maritime transport disruptions. International and regional organizations should support common data standards, timely information sharing, and analytical capacity to strengthen evidence-based decision-making and coordination.

A. Trends in freight rates

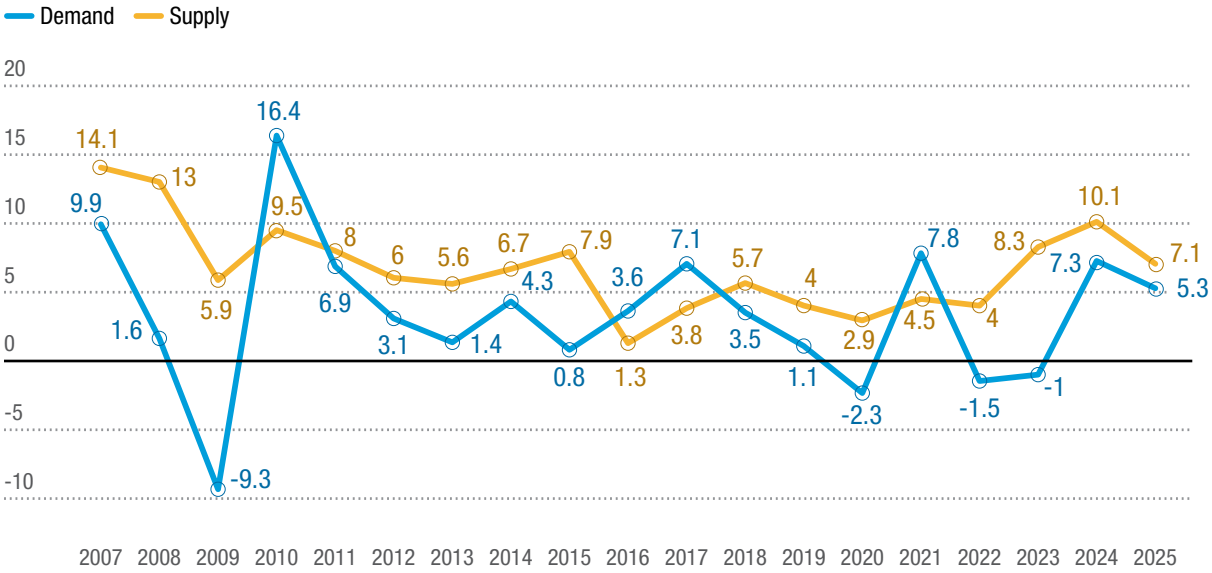
1. Container spot freight rates in 2025: Declining from 2024 peaks while remaining volatile and above levels before the Red Sea crisis

In 2025, container spot freight rates declined from their 2024 peaks but remained above 2023 levels, before the Red Sea crisis. Continued fleet expansion, trade policy shifts and the reorganization of carrier networks drove freight rate patterns and volatility.

As growth in container fleet capacity (7.1 per cent) continued to outpace trade growth (5.3 per cent) in 2025, the container shipping market remained oversupplied (figure III.1).

The Shanghai Containerized Freight Index (SCFI), a key benchmark of spot rates for containerized shipments from Shanghai to major global destinations, averaged 1,581 points in 2025, 37 per cent below its 2024 level but 57 per cent above its 2023 average and nearly twice its 2019 average (figure III.2).

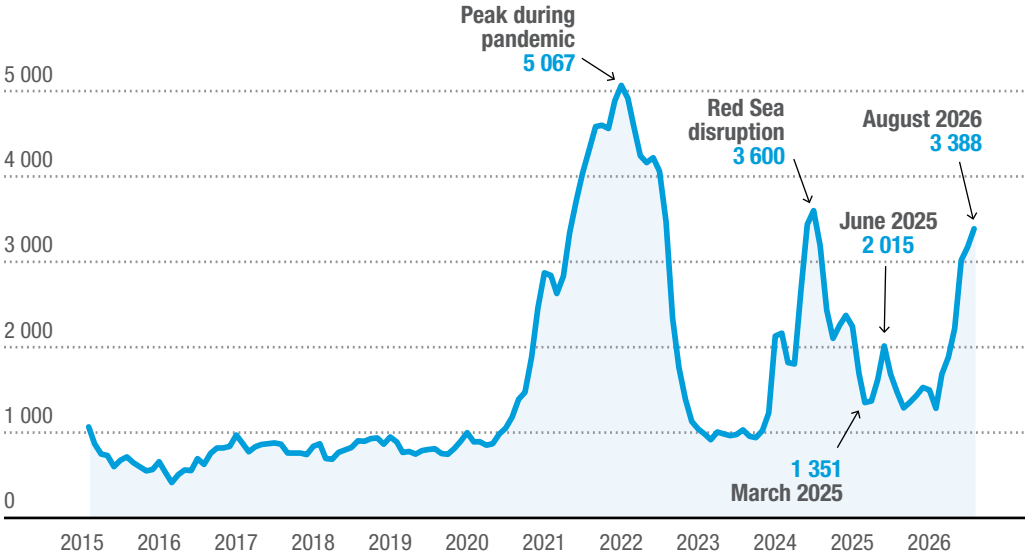
Figure III.1
Container demand and fleet capacity growth, 2007–2025
(Percentage change)



Source: UNCTAD calculations. Demand (TEU) is based on MDS Transmodal, World Cargo Database data from chapter I; supply is based on Clarksons Research, Shipping Intelligence Network, and Container Intelligence Monthly, various issues.

Note: Supply data refer to the 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, comprehensive index, January 2015 to August 2026
(Monthly averages, index)



Source: UNCTAD, based on data from the Shanghai Shipping Exchange Institute.

Note: The basis of the composite index is 1,000 points; the base period is 16 October 2009. Data are from January of each year.

SCFI data show that spot freight rates declined across most major trade lanes in 2025, although the scale varied (figure III.3). Average rates from Shanghai to Europe and the west coast of North America fell by about 49 per cent; those to the east coast of North America declined by 42 per cent. Rates to the east coast of South America dropped by 47 per cent compared to 36 per cent to the Mediterranean, 28 per cent to Australia and New Zealand, and 27 per cent to South Africa. The smallest decline was recorded on the route to West Africa, at about 4 per cent.

2. Geopolitical developments, trade policy shifts and supply side factors shaped container freight rates in 2025

During the first quarter of 2025, container freight rates declined amid continued fleet expansion, seasonal demand weakness and expectations of a gradual easing of Red Sea disruptions. The SCFI slipped from 2,505 points on 3 January to 1,357 at the end of March 2025, a decline of 46 per cent.



At the same time, the new East–West container shipping alliance networks, reflecting the reorganization of cooperation among major container shipping lines, began operating from February 2025 (Hapag-Lloyd, 2024; also see chapter II). The transition continued through mid-2025 as vessels and services were progressively phased into new configurations (Sea Intelligence, 2025a). During the transition period, some services operated with temporary schedule adjustments and overlapping network configurations before new service structures were fully established. These changes temporarily affected the distribution of capacity across some trade lanes and added strain to supply side adjustments at a time when expanding fleet capacity and seasonal demand weakness were already placing downward pressure on spot freight rates (Sea Intelligence, 2025a and 2025b). Longer-term freight rate impacts will depend on demand, effective capacity and carriers' capacity management.

From the second quarter of 2025, changes in the tariff policy of the United States contributed to greater volatility in trans-Pacific freight container rates. Following an initial decline in bookings after tariff increases in April 2025, the temporary reduction in China-United States tariffs agreed in May prompted the front-loading of shipments (Clarksons Research, 2025a) and a sharp but short-lived rebound in freight rates in June 2025 (see UNCTAD, 2025). Reflecting this temporary spike in demand, the SCFI comprehensive index rose from an average of 1,376 points in April 2025 to 2,015 in June 2025 before declining again.

From July through late September 2025, freight rates decreased as carriers restored capacity to trans-Pacific services, continued fleet deliveries added to vessel supply, and shipping demand weakened following earlier cargo front-loading during the temporary tariff reduction (Norton, 2025; MarketWatch, 2025). By September 2025, average SCFI rates on trans-Pacific routes had fallen to about $1,914 per FEU to the North American West Coast and $2,831 per FEU to the East Coast, around 57 per cent and 53 per cent below their January averages, respectively.

In the fourth quarter of 2025, spot rates remained volatile and under pressure amid continued fleet growth and weaker demand, before rebounding towards the end of the year. Cape of Good Hope ship diversions continued to absorb effective capacity, while trade policy uncertainty affected demand and capacity deployment. The SCFI averaged 1,528 points in December, reflecting a late-year rebound. Port fee measures in China and the United States also had implications. While measures increased expected operating costs for affected vessels, their direct impact on freight rates was difficult to distinguish from broader market developments across various routes (Ho-Him, 2025; United States, Office of the United States Trade Representative, 2025).

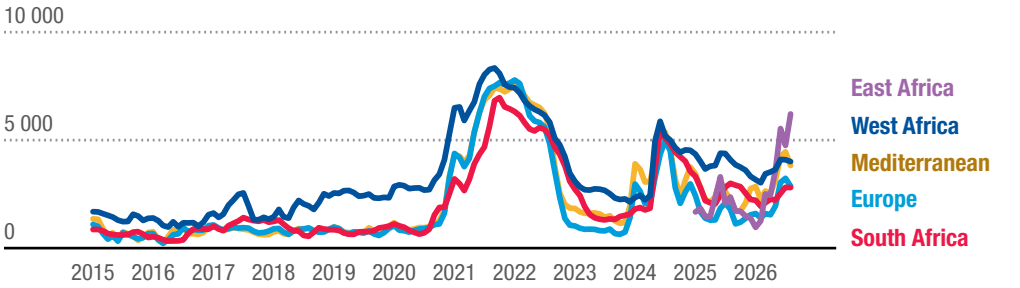
Cape of Good Hope diversions absorbed effective shipping capacity, while trade policy uncertainty influenced demand and capacity deployment



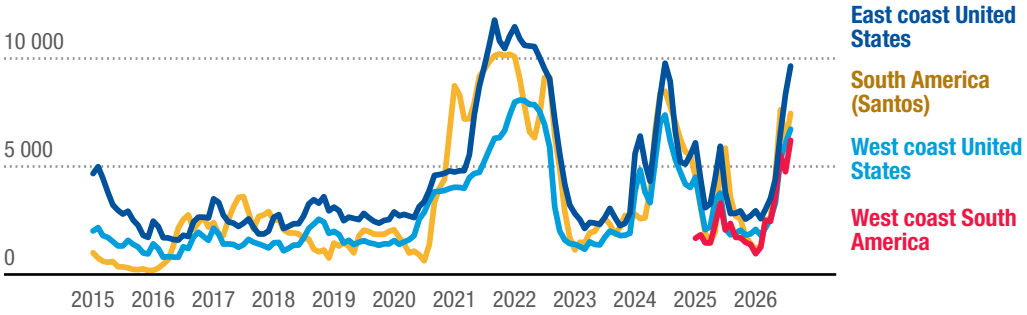
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Figure III.3
Shanghai Containerized Freight Index spot rates by route, January 2015 to August 2026
(Monthly averages, United States dollars per TEU)

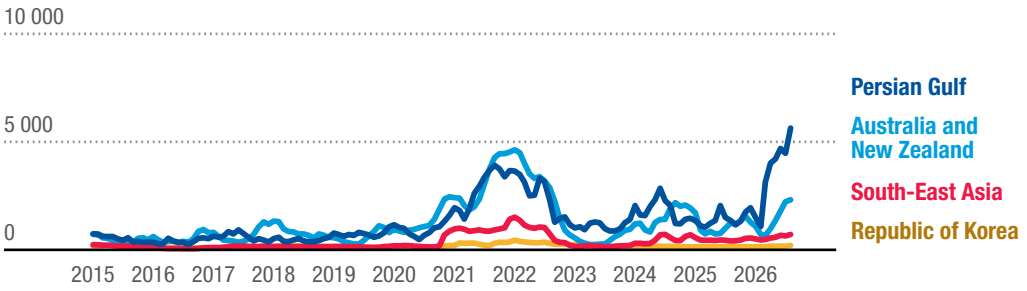
Africa and Europe



Americas



Asia and Oceania



Source: UNCTAD, based on data from the Shanghai Shipping Exchange Institute.

Note: Freight rates from Shanghai to selected destinations. Rates are expressed in United States dollars per TEU, except for rates to the east and west coasts of the United States, which are expressed in United States dollars per FEU.

3. Container freight rates in 2026 and outlook: Geopolitical tensions, chokepoint disruptions, trade policy implications and fuel costs drive higher rates

Container spot rates increased during the first eight months of 2026, with the SCFI rising above 3,000 points by June and reaching about 3,400 points in August, compared with approximately 1,500 points in January 2026. The initial increase reflected disruption around the Strait of Hormuz, higher bunker prices and constraints on effective vessel capacity. In August, rates remained elevated amid strong demand on trans-Pacific routes and continued operational disruptions, while emerging Panama Canal restrictions added uncertainty to Asia–North America services.

From late February 2026, disruption affecting the Strait of Hormuz sharply reduced vessel traffic and energy exports from the Persian Gulf (Anderson, 2026). The resulting increase in oil prices raised bunker prices and fuel-related surcharges across shipping markets, while the direct operational effects were concentrated on services serving the Persian Gulf and nearby regional markets (Bouissou and Angrand, 2026). Container spot freight rates on routes connecting Shanghai with the Persian Gulf and the Red Sea increased sharply, rising from an average of $1,075 per TEU in February to record highs of $4,694 in June 2026 and $5,637 in August 2026. Service suspensions and rerouting reduced effective capacity; higher fuel and war-risk insurance costs and congestion at alternative gateways compounded operating costs and volatility while increasing freight rates in the region (Popova and Stolyarov, 2026).

At the same time, tariffs that would apply after the temporary 10 per cent United States import/customs duty expired on 24 July 2026 encouraged earlier shipments, concentrating some seasonal import demand in May and June 2026 and adding pressure on available capacity on major East–West routes (Berger, 2026). On trans-Pacific routes, average SCFI rates increased from $1,815 per FEU in February to $5,351 in June and $6,726 in August 2026 to the west coast of North America, and from $2,582 to $6,580 and $9,651, respectively, to the east coast. Higher bunker costs, continued rerouting around the Cape of Good Hope, slower speeds and port congestion also influenced effective capacity (Clarksons Research, 2026b). Panama Canal draught restrictions, introduced in early July, have caused operational constraints, particularly for Asia–North America east coast services, contributing to tighter effective capacity, amplifying uncertainty and potentially increasing freight rates on affected routes. Concurrently, a limited return of container services to the Red Sea–Suez Canal route was observed from July 2026. Several major carriers expanded the use of the Suez route on selected services, signalling a gradual return (Suez Canal Authority, 2026; Egypt Today, 2026), although traffic remained well below pre-crisis levels (see chapter II).

The outlook for container freight rates depends largely on two main developments: whether regular vessel traffic resumes through the Strait of Hormuz and whether carriers return to routes through the Red Sea and Suez Canal. Both will depend on broader geopolitical developments in the region. In August 2026, the SCFI rate covering Shanghai–Persian Gulf and Red Sea services had increased to more than five times its February 2026 average. Vessel transits through the Strait remained far below predisruption levels, and congestion persisted at alternative gateways. Continued or increased disruptions would maintain higher congestion, impacting shipping routes and transshipment costs on Persian Gulf and nearby routes, while bunker prices and fuel-related surcharges could continue to affect freight rates more broadly.

Container spot freight rates rose sharply on major routes in the first eight months of 2026 amid disruptions and higher costs, but fleet expansion and a potential return to shorter routes could ease rates

A broader influence on global container freight markets will be the extent to which carriers resume transits through the Red Sea and Suez Canal as well as developments around the Bab el-Mandeb Strait. A general shift away from the Cape of Good Hope route to the shorter Suez Canal lane would increase effective vessel capacity, and, together with continued fleet deliveries (see chapter II), would place downward pressure on container freight rates. If carriers continue to avoid the Red Sea, capacity constraints and longer voyage distances would continue to support higher freight rates.

4. Containership time charter rates have remained elevated in 2025 and into 2026, but easing capacity constraints could lower rates

Containership time charter rates have remained elevated despite volatile spot rates, driven by tight vessel availability and sustained demand for tonnage

Containership time charter rates, which reflect the cost of hiring a containership for an agreed period, remained elevated in 2025 and the first eight months of 2026, despite volatility in spot freight rates. Spot rates, which reflect prices to move containers on a particular route at a particular time, responded quickly to cargo demand, tariff changes and shipment front-loading. Charter rates, meanwhile, were supported by tight vessel availability and operators' efforts to secure tonnage for several months or years. The Strait of Hormuz disruption added further demand for containership capacity serving regional and feeder services.

The New ConTex Index, a benchmark for assessing time charter rates for containerships across selected vessel classes, averaged around 1,500 points in 2025, about 40 per cent above 2024 (figure III.4). It averaged around 1,530 points from January to August 2026 and reached 1,629 on 27 August 2026, above its 2025 peak (Hamburg and Bremen Shipbrokers' Association, 2026b and 2026c).

Longer Cape of Good Hope voyages required additional vessels throughout 2025 and into 2026 (compared with the shorter Red Sea–Suez Canal route), while uncertainty over a return to the Suez Canal route discouraged carriers from releasing chartered capacity. This contributed to tight charter market conditions and supported time charter rates. New alliance networks in early 2025 also created temporary vessel requirements during schedule changes (Hapag-Lloyd, 2024). From late February 2026, the Strait of Hormuz disruption temporarily increased regional charter demand for container vessel capacity as service disruptions, rerouting and congestion at alternative ports absorbed capacity. Yet their effect on global container ship charter markets was more limited than that of the Red Sea crisis (Bouissou and Angrand, 2026; Anderson, 2026; Partridge, 2026).

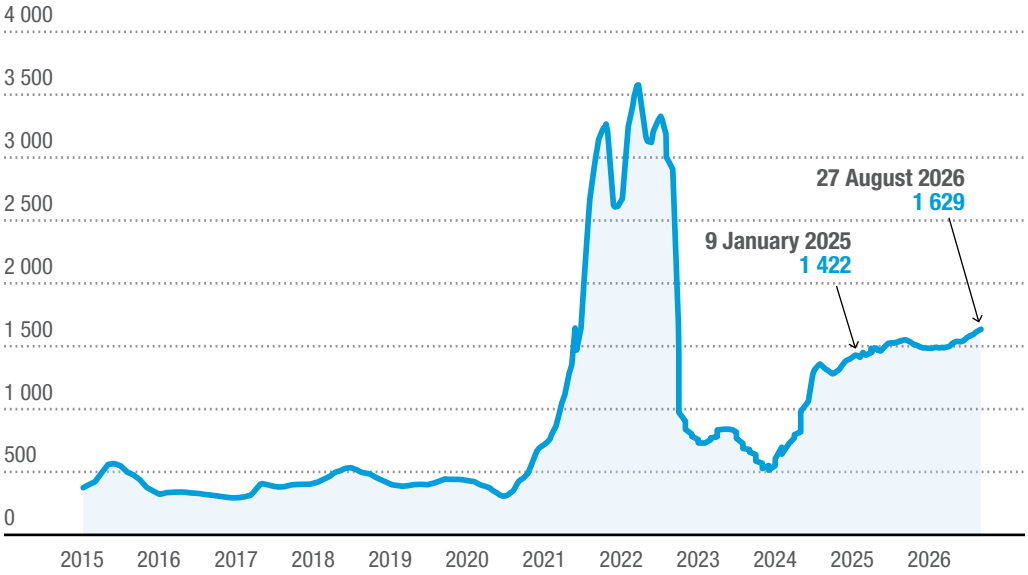
Vessels available for immediate charter remained limited throughout 2025 and into 2026. Operators therefore extended existing charter agreements or secured vessels available at later dates (Hamburg and Bremen Shipbrokers' Association, 2025a, 2025b and 2025c). Average charter duration reached about 21 months in April 2026, compared to 9 months in 2023, indicating that operators were securing both current and future capacity (Clarksons Research, 2026a).

Charter rate increases were not limited to large vessels. In 2025, average 12-month rates rose by about 40 per cent for 1,100 and 2,500 TEU vessels, 35 per cent for 2,700 TEU and 4,250 TEU vessels, and 20 per cent for 6,500 TEU vessels. By 27 August 2026, daily 12-month charter rates ranged from about $17,250 for 1,100 TEU vessels to around $71,100 for 6,500 TEU vessels, largely reflecting differences in vessel size and carrying capacity. Demand for smaller and medium-sized ships reflected their use in regional services, transshipment connections and temporary network changes, while longer voyages increased requirements for larger

chartered vessels (Hamburg and Bremen Shipbrokers' Association, 2025d, 2026b and 2026c; Bouissou and Angrand, 2026).

The charter rate outlook depends primarily on the pace of ship deliveries and disruptions affecting shipping routes and demand. A broader return to the Red Sea and Suez Canal route would shorten distances, release effective ship carrying capacity and reduce charter demand, although possible congestion during the transition could delay these effects (Hancock, 2026). By contrast, continued disruptions affecting major shipping routes could sustain demand for chartered capacity. The Strait of Hormuz disruption would mainly sustain demand for smaller and intermediate vessels serving alternative ports and routes in the Persian Gulf region (Anderson, 2026; Partridge, 2026).

Figure III.4
New ConTex Index, January 2015 to August 2026
(Index: 1,000 points in October 2007)



Source: UNCTAD calculations, based on data from the New ConTex Index for container ship chartering produced by the Hamburg and Bremen Shipbrokers Association (2026a).

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: types 1,100 TEU and 1,700 TEU, with a charter period of one year, and types 2,500, 2,700, 3,500 and 4,250 TEU, with a charter period of two years.

As shown in 2025 and the first three quarters of 2026, geopolitical developments, trade policy shifts, energy markets, carrier responses and market fundamentals clearly interact to shape container freight rates.

Although new ship deliveries will increase the supply of ship capacity, freight rates will remain highly sensitive to changes in these factors overall.

5. Dry bulk shipping rates in 2025: A lower first half followed by substantial increases in the second half

Seasonal and industrial weakness weighed on dry bulk freight rates in early 2025, partly offset by longer-distance cargo movements

Dry bulk freight rates for commodities such as iron ore, coal, grains and several minor bulks averaged slightly below 2024 levels in 2025. Rates remained significantly volatile during the year, with a weak first half and a strong recovery in the second half. The Baltic Dry Index, which tracks spot freight rates across major dry bulk routes, averaged 1,681 points in 2025, 4 per cent below its 2024 average but 22 per cent above its 2023 average (figure III.5). Average bulk carrier earnings were about $13,900 per day for the year, slightly above the 10-year average.

Stronger shipments and longer-distance iron ore and bauxite trades supported a recovery in dry bulk freight rates in the second half of 2025

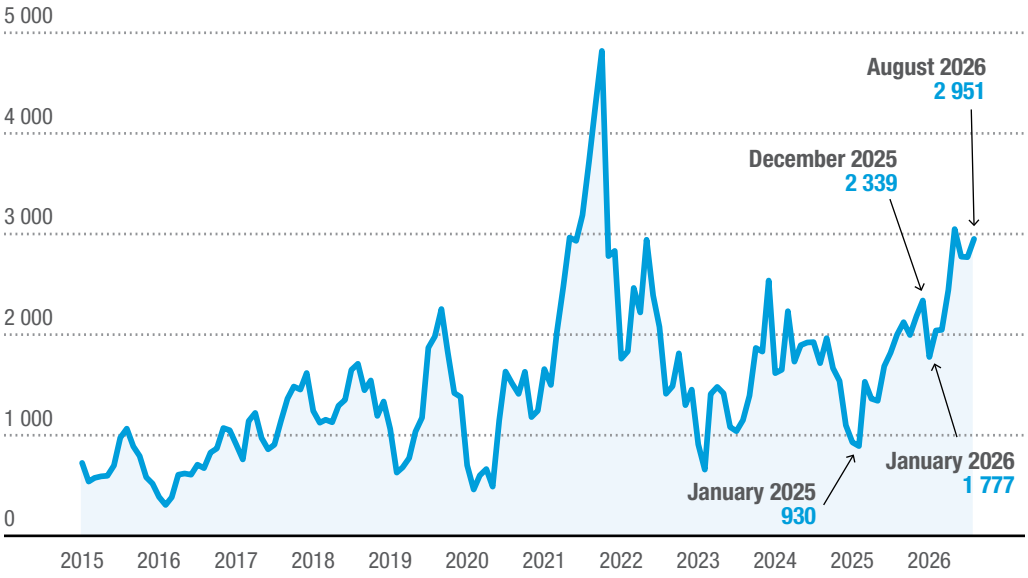
Market conditions were particularly weak at the beginning of the year. The Baltic Dry Index fell to an average of 930 points in January 2025, while bulk carrier earnings averaged about $7,800 per day that month and approximately $10,900 in the first half of the year, around 30 per cent below the same period in 2024 (Clarksons Research, 2025c and 2025d).

The drop in freight rates during the first half of the year reflected the seasonal reduction in cargo demand around the Lunar New Year, combined with adverse weather that disrupted iron ore production and exports from Australia in the first quarter of 2025. More broadly, lower rates reflected slower industrial activity in China, weaker steel production in several economies and lower Chinese coal imports, which softened dry bulk trade and vessel demand. Long-distance bauxite exports from Guinea, Brazilian iron ore exports and grain cargoes, however, partly offset these declines by increasing voyage distances (ton-miles) and supporting the use of Capesize vessels[1] (Clarksons Research, 2025d).

Freight rates and earnings increased in the second half of the year as weather-related disruptions eased, iron ore and bauxite shipments increased, and seasonal cargo demand rose. Longer-distance iron ore and bauxite trades also increased ton-mile demand, tightening the balance between vessel demand and available capacity and supporting higher vessel utilization and freight rates. Earnings rose across all major vessel classes, with Supramax[2] and Capesize vessels recording the largest increases, compared with first-half averages, of about 60 per cent. Coal shipments in 2025 remained below 2024 levels, however, while grain shipments varied by region and season and fleet growth limited the overall increase. By the end of 2025, the Baltic Dry Index briefly reached 2,845 points on 3 December. Average bulk carrier earnings touched about $19,500 per day in early December, the highest level in two years (Clarksons Research, 2025b and 2026c).

[1] These large dry bulk carriers are primarily used to transport iron ore and coal.
[2] These medium-sized bulk carriers transport a variety of commodities, including grains, fertilizers and coal.

Figure III.5
Baltic Dry Index, January 2015 to August 2026
(Index, monthly average)



Source: UNCTAD calculations, based on data from the Baltic Exchange.

6. Dry bulk shipping rates in 2026 and outlook: Higher commodity exports and longer voyages have raised freight rates; fleet growth may limit further increases while geopolitical factors add volatility

Dry bulk freight rates increased in the first eight months of 2026. The Baltic Dry Index averaged 2,482 points, 47 per cent above 2025, and reached 2,951 in August 2026. Bulk carrier earnings averaged about $18,200 per day, 31 per cent above 2025. Higher iron ore exports from Australia and Brazil, longer Atlantic-Asia voyages, and the start-up of iron ore exports alongside continued growth in bauxite exports from Guinea supported demand for Capesize vessels and freight rates. Higher grain and minor bulk shipments increased demand for Kamsarmax[3] and Ultramax vessels,[4] while coal shipments declined, partly offsetting those gains.

The situation in the Strait of Hormuz affected dry bulk freight rates through two channels: directly by reducing cargo volumes and ship carrying capacity on routes serving the Persian Gulf, and indirectly through higher bunker prices across the wider dry bulk market. Bulk carrier transits through the Strait fell sharply, interrupting grain imports and fertilizer shipments,[5] and reducing cargo and vessel demand on routes serving the Persian Gulf. Vessel delays in or near the Persian Gulf temporarily reduced effective ship capacity, while higher bunker prices raised voyage costs across the wider dry bulk market. As Persian Gulf trades represent about 4 per cent of global dry bulk volumes, the direct operational effects were largely concentrated on routes serving the

Strait of Hormuz disruptions had mixed effects on dry bulk freight rates, weakening regional cargo demand while raising global bunker costs

[3] These large dry bulk carriers are mainly used to transport coal, grains and iron ore.
[4] These medium-sized dry bulk carriers transport a variety of commodities, including grains, coal, fertilizers and other dry bulk cargoes.
[5] Dry bulk carriers carry fertilizers in solid form such as urea, sulfur and phosphate, while ammonia is carried on specialized liquefied gas carriers.

Fleet growth outpacing demand could weigh on dry bulk freight rates, while geopolitical disruptions sustain volatility

region, whereas the effect of fuel costs was broader (Clarksons Research, 2026d, 2026e and 2026f). Escalating security risks in the Black Sea from July 2026 added another source of disruption in grain shipments, reduced vessel availability, and increased freight and insurance costs on affected routes (Lloyd's List, 2026a; S&P Global, 2026a). Some grain flows were redirected towards alternative export gateways, including Baltic and other European ports (Popova and Stolyarov, 2026).

The outlook for dry bulk freight rates remains uncertain and volatile, depending on Asian imports of bulk commodities, voyage distances, vessel availability, fleet growth and fuel costs. Although China is expected to remain the dominant seaborne iron ore importer and a major coal importer, slower steel demand, expanding renewable energy capacity, and a greater domestic and land-borne coal supply may reduce its demand for seaborne coal (Clarksons Research, 2026f). This would weaken cargo and vessel demand for dry bulk commodities, putting downward pressure on freight rates. While growth in steel production and related raw material demand in India and South-East Asia could gradually increase dry bulk cargo volumes and vessel demand, it is unlikely to match the scale or pace of China's past construction-led expansion (Chatterjee, 2026) or to boost freight rates. Fleet capacity is projected to grow faster than ton-mile demand, which could limit further freight rate hikes.

Crude tanker earnings rose in 2025, while weaker demand and fleet growth weighed on product tanker markets

Geopolitical disruptions remain an important source of uncertainty. Volatility in dry bulk freight markets is likely to continue, depending on developments in the Strait of Hormuz and the Black Sea, and whether current disruptions are short or prolonged. In all cases, dry bulk freight rates will continue to be shaped by the interaction between commodity trade growth, voyage distances, fleet expansion and effective vessel availability, geopolitical factors and transport costs.

7. Tanker freight rates and earnings in 2025: Crude tanker earnings strengthened amid heightened geopolitical tensions, while product tanker markets weakened

Tanker freight markets remained volatile in 2025, with a clear divergence between crude and product tanker segments. Crude tanker earnings strengthened, supported by heightened geopolitical tensions, changing crude trade patterns, stronger late-year exports and limited fleet growth, although average crude tanker freight indices remained slightly below 2024 levels. Product tanker rates weakened, reflecting reduced demand for transport, fleet growth, shorter voyage distances, and lower ton-mile demand. The Baltic Dirty Tanker Index, which tracks crude oil tanker spot rates, averaged 1,069 points in 2025, 2 per cent below the 2024 average (figure III.6). The Baltic Clean Tanker Index, covering product tanker spot rates, averaged 667 points, 18 per cent below 2024. Average tanker earnings were broadly unchanged at around $34,900 per day, as a 22 per cent increase in crude tanker earnings, to about $52,600 per day, was largely offset by a 23 per cent decline in refined product tanker earnings, to around $23,300 per day (figure III.7).

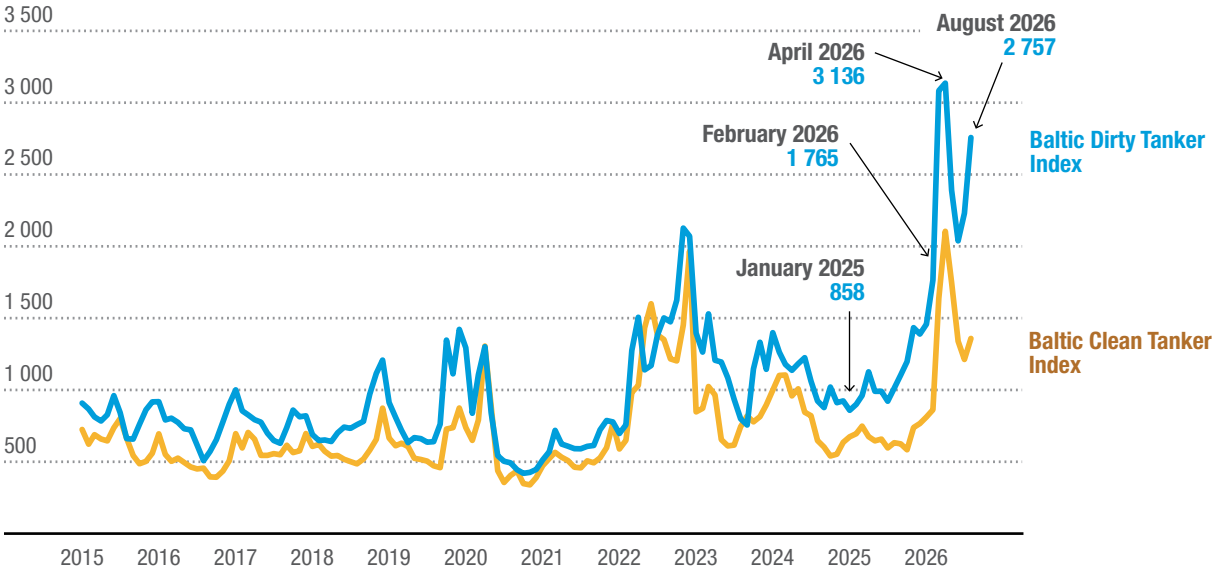
At the start of 2025, crude tanker rates and earnings remained relatively firm, reflecting limited fleet growth, changes in crude trade patterns and tighter ship carrying capacity availability. This followed additional restrictions announced on 10 January covering two oil producers and 183 vessels, including many oil tankers (United States, Department of the Treasury, 2025), combined with expectations that the planned easing of Organization of Petroleum Exporting Countries Plus (OPEC+) production cuts would increase crude exports (Clarksons Research, 2025e).

Refined product tanker rates fell as trade growth remained slow and fleet capacity expanded. The partial return of tanker traffic to shorter routes through the Red Sea and Gulf of Aden reduced the additional ton-mile demand that supported higher rates in 2024 (Clarksons Research, 2025e).

Geopolitical tensions and associated concerns about the security of maritime traffic in the Strait of Hormuz mounted in June 2025. Higher war-risk insurance premiums increased voyage costs, while greater operational risks reduced the number of vessels offered for regional voyages. Average tanker earnings reached $40,845 per day on 23 June 2025, with very large crude carrier earnings on the Middle East–China route exceeding $75,000 per day, their highest level in more than two years. Long-range 2 (LR2) product tankers[6] saw their daily earnings on the Middle East–Japan route rise from about $20,000 earlier in June to around $55,000 by 23 June 2025 (Clarksons Research, 2025h).

Crude tanker rates and earnings rose sharply in the final quarter of 2025, peaking in late November and remaining high in December 2025. Average tanker earnings were around $50,800 per day in December 2025, including about $84,600 per day for crude tankers and $28,500 per day for refined product tankers. Rising crude exports from the Middle East and South America, particularly Brazil and Guyana; stronger Asian import demand and stock building; limited fleet growth and seasonally stronger winter demand supported rates (Clarksons Research, 2025f and 2025g). Further oil trade restrictions announced on 22 October 2025 by a major economy prompted some importers to change crude sourcing, adding demand for vessels able to carry affected cargoes, particularly very large crude carriers (Clarksons Research, 2025f; United States, Office of Foreign Assets Control, 2025). Longer voyages and the switching of some refined product tankers to crude oil transport also supported refined product tanker earnings (Clarksons Research, 2025f).

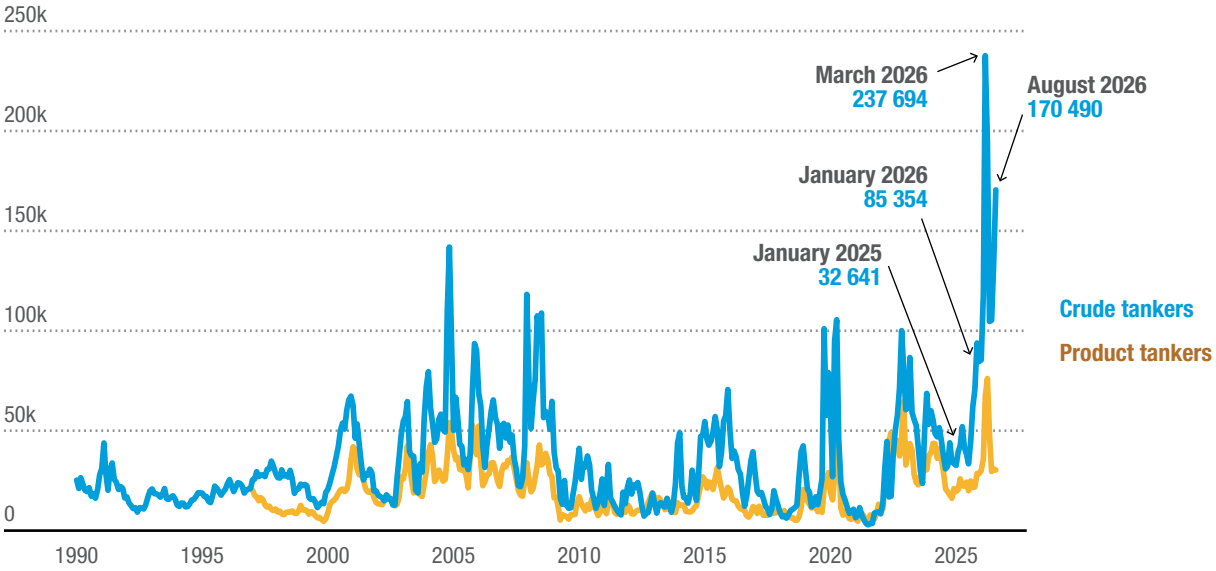
Figure III.6
Baltic Dirty Tanker Index and Baltic Clean Tanker Index, January 2015 to August 2026
(Index, monthly average)



Source: UNCTAD calculations, based on data from Baltic Exchange.

[6] These large vessels are typically used to transport refined petroleum products such as diesel and jet fuel.

Figure III.7
Weighted average earnings, crude and product tankers, January 1990 to August 2026
(United States dollars per day, monthly average)



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

8. Tanker freight rates and earnings in 2026 and outlook: The Strait of Hormuz disruption has driven tanker rates to exceptionally high levels

Tanker freight rates and earnings remained exceptionally high in the first eight months of 2026, reflecting constrained effective vessel capacity amid the disruption in the Strait of Hormuz. The Baltic Dirty and Clean Tanker Indices averaged 2,357 and 1,384 points, respectively, more than twice their 2025 averages. From January to August 2026, crude oil tanker earnings averaged about $143,700 per day and refined product tanker earnings about $43,500 per day.

Tanker earnings were already high at the start of 2026 and increased further following the disruption in the Strait of Hormuz. Crude oil tanker earnings shot up from $85,354 in January to $118,448 in February 2026, reflecting trade restrictions in late 2025, higher exports from the Middle East and Latin America, and stronger Chinese imports (Clarksons Research, 2026g and 2026h). Refined product tanker earnings rose from $30,064 in January to $35,778 in February 2026, supported by increased longer-distance trade from the Persian Gulf to East Asia, vessel relocation to higher-earning crude oil trades and weather-related disruptions to vessel operations in north-west Europe (Affinity Research LLP, 2026; Clarksons Research, 2025f, 2026g and 2026h).

The tanker market tightened further in March and April 2026 as the effective supply of ship carrying capacity reduced, and voyage costs increased owing to the disruption and the rise in war-risk insurance premiums (Mohindru, 2026). The Baltic Dirty and Clean Tanker Indices, respectively, peaked at 3,727 on 27 March and 2,202 on 21 April 2026. Crude oil tanker earnings soared to $237,694 per day in March 2026 (a 178 per cent increase from January levels) and refined product tanker earnings reached $76,115 per day in April.

Crude oil tanker rates and earnings eased from their March and April peaks through early June 2026 as lower Persian Gulf exports and weaker Chinese imports outweighed the effects of constrained vessel availability. Following the agreement reached in June, aimed at resolving the conflict, tanker transits through the Strait of Hormuz partially resumed, although traffic remained well below pre-conflict levels. Crude oil tanker freight rates remained elevated and volatile, however, particularly for very large crude carriers. The recovery was short-lived as renewed disruptions prevented the sustained normalization of transit through the Strait of Hormuz. Crude tanker rates subsequently increased to record highs in July and August 2026, supported by constrained vessel availability, longer and more complex trading patterns and associated logistics operations, and elevated risk-related costs (Lloyd's List, 2026b; S&P Global, 2026b). Refined product tanker markets remained comparatively weaker as constrained exports continued to limit transport demand (Chopping, 2026), although rates remained high.

Tanker rates are expected to remain high and volatile relative to the period before the 2022 war in Ukraine, which affected energy markets. Rates continue to be shaped by the interactions among geopolitical developments, oil trade patterns, fleet expansion and energy market conditions. A gradual resumption of vessel transits through the Strait of Hormuz could temporarily keep rates elevated as delayed crude oil shipments are transported and vessels return to Persian Gulf loading areas, potentially reducing vessel availability on other routes. Longer-distance crude shipments from Atlantic exporters to Asia and the rebuilding of commercial and emergency oil stocks could further increase demand and push freight rates up.

Alternatively, continued disruption in the Strait of Hormuz could depress rates by reducing Persian Gulf exports and causing vessels waiting outside the region to move to other loading areas. Developments around the Bab el-Mandeb Strait and Red Sea could add further volatility to tanker freight rates, with longer or diverted voyages increasing ton-mile demand and boosting rates. Disruptions that constrain Saudi crude oil exports could reduce cargo availability and tanker demand, putting downward pressure on rates.

Continued Strait of Hormuz disruptions pushed crude tanker rates to record highs, while refined product tanker markets remained comparatively weaker but high by historical levels. The outlook continues to be volatile

B. Fuel costs as a transport cost determinant

Maritime fuel costs on routes serving the Persian Gulf and others increased because of disruptions to operations in the Strait of Hormuz. Higher fuel costs drive up import costs for food, energy, fertilizers and manufactured goods, potentially inflating consumer prices and reducing real income. Economies that depend heavily on imports or a limited number of gateways are more exposed to freight rate and surcharge increases and their impacts. The following section examines how increased bunker fuel prices are transmitted through shipping networks and affect transport costs across economies. The analysis includes a simulation of the impacts on consumer prices and real income through higher transport costs for imported goods.

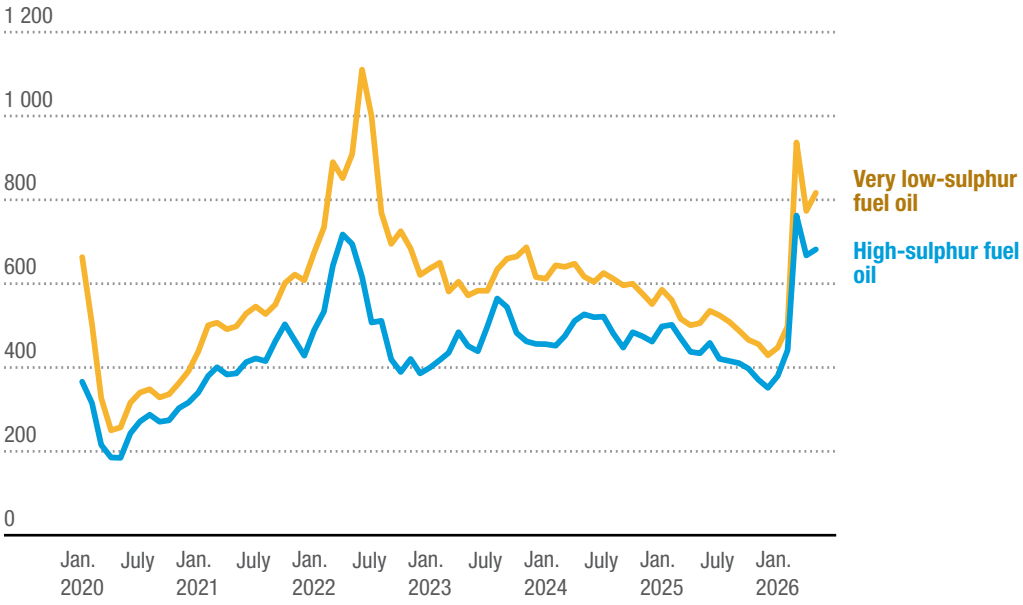
1. Bunker prices increased sharply after security conditions deteriorated in the Persian Gulf area

Consistent with other key fuel price indices, Singapore bunker prices, a global reference for marine fuel, declined during 2025 and

early 2026. High-sulphur fuel oil averaged $484 per ton in 2024, $431 in 2025 and $411 in January–February 2026. Very low-sulphur fuel oil averaged $610, $506 and $473 per ton, respectively (figure III.8). With escalating conflict in the Middle East, maritime transport operations in the Strait of Hormuz came under pressure, causing March fuel price averages to jump sharply.

High-sulphur fuel prices increased by 86 per cent to $763 per ton, the highest monthly average since the data series began in 1990. Very low-sulphur fuel prices rose by 98 per cent to $937, the highest monthly average since July 2022. Prices eased slightly in April and May but remained above 2025 and early 2026 levels.

Figure III.8
Bunker prices in Singapore of high-sulphur and very low-sulphur fuel oil, January 2020 to May 2026



(United States dollars per ton, monthly average)

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

2. Fuel costs remain a large and volatile component of shipping costs

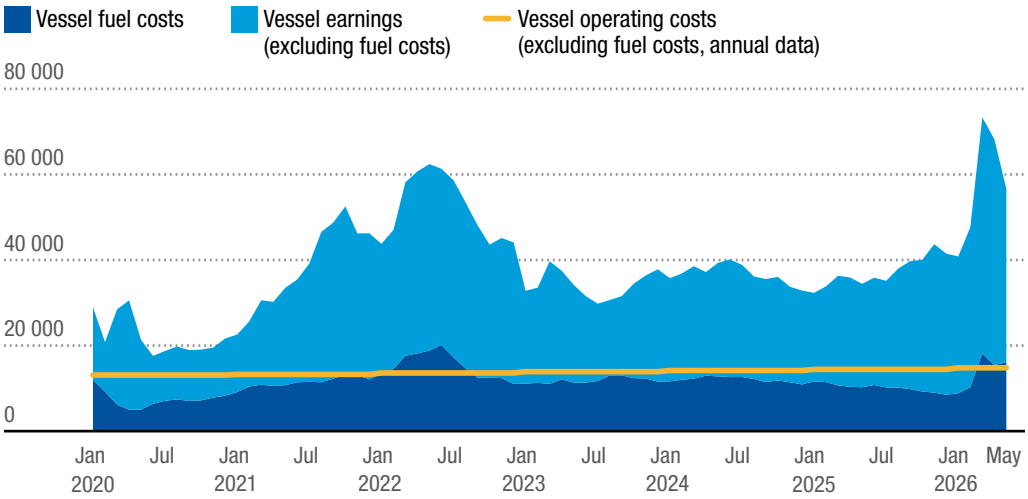
Higher bunker prices increase voyage costs and may therefore raise the maritime transport costs paid by shippers through freight rates, bunker adjustment mechanisms and other fuel-related charges. At the ship level, fuel is a major voyage expense, distinct from recurring operating costs for crew, maintenance, insurance, management and registration. Carrier-reported costs cover broader activities, including fuel, vessel operation and chartering, container leasing, port and terminal services, and cargo handling.

At the ship level, estimated fuel costs across containerships, bulk carriers and tankers averaged about $11,300 per ship per day in 2020–2025, exceeding recurring non-fuel operating costs[7] of about $6,200 and equalling about 45 per cent of average

[7] Ship-level operating costs comprise recurring expenses for crew, stores, spares, repairs and maintenance, insurance, registration, management and administration, but exclude fuel, voyage specific charges and dry-docking costs (Clarksons Research, 2026j).

vessel earnings[8] of $25,400 (figure III.9).[9] In January–May 2026, fuel costs increased to $13,800, while vessel earnings averaged $43,600 per ship per day. During March–May, when bunker prices were highest, averages reached $16,600 and $49,500, respectively. These comparisons illustrate the scale of fuel costs and not changes in profitability. Vessel earnings are calculated after deducting fuel and specified voyage costs but before company-level costs. The figures therefore do not indicate whether shipping companies benefited from the gap between increases in fuel costs and earnings.

Figure III.9
Average vessel fuel costs, earnings and operating costs, weighted average of the containership, bulk carrier and tanker sectors, January 2020 to May 2026
(United States dollars per ship per day)



Source: UNCTAD calculations, based on Clarksons Research Shipping Intelligence Network and IMO (2020).

Note: Average fuel cost per vessel is estimated by multiplying average fuel consumption by fuel prices. Fuel consumption estimates extend IMO (2020) baseline data to account for changes in average vessel speed and fleet composition by ship type. Fuel costs are estimated by ship type and size category. Earnings by ship type and operating costs by ship type and size category are from Clarksons Research. UNCTAD aggregates these estimates using the number of fleets in each category as weights.

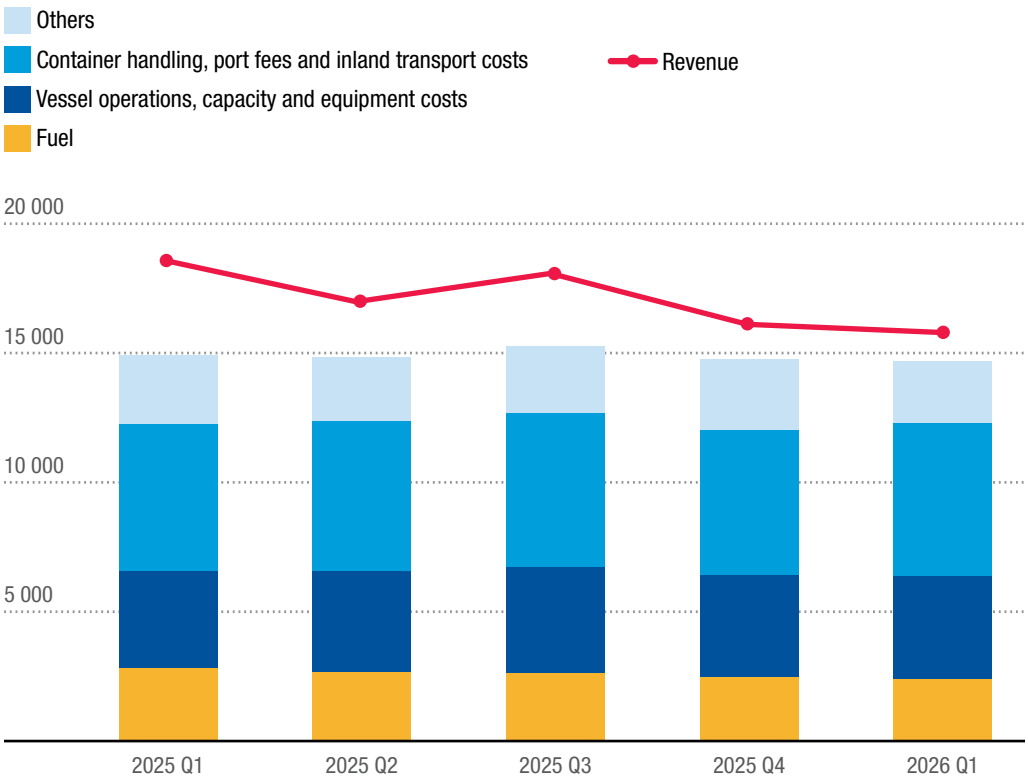
At the carrier level, fuel costs represented 16 to 20 per cent of reported costs for providing container shipping services in 2025 and the first quarter of 2026 (figure III.10).[10] The denominator includes expenses for vessel operation and chartering, container leasing, container handling and haulage, and administration. These are aggregate carrier-level expenses, not costs for an individual vessel or voyage, which vary by vessel characteristics and operating profile. Aggregate fuel expenses declined from $2.85 billion in the first quarter of 2025 to $2.48 billion in the fourth quarter and $2.39 billion in the first quarter of 2026. The figure for the first quarter of 2026 did not capture the full bunker price increase from March because carriers consumed fuel from inventories purchased earlier at lower prices.

[8] Voyage earnings equal freight revenue net of commission and voyage costs, divided by voyage days. Voyage costs comprise fuel, port and canal costs, and applicable EU ETS and FuelEU Maritime costs (Clarksons Research, 2026j).

[9] The comparison does not allocate total shipping costs among components because operating costs, fuel costs and earnings are measured on different bases. It shows the scale of the fuel cost channel.

[10] The compiled sample includes Maersk, Hapag-Lloyd, HMM and Yang Ming.

Figure III.10
Total quarterly revenue and cost of shipping services of selected liner shipping companies, first quarter of 2025 to first quarter of 2026
(Millions of United States dollars)



Source: UNCTAD calculations, based on the financial statements of Maersk, Hapag-Lloyd, HMM and Yang Ming. For Maersk and Hapag-Lloyd, only the ocean and liner shipping segments, respectively, are included. HMM and Yang Ming are included on a consolidated basis because container shipping is their principal business.

Note: Cost definitions and terminology differ among carriers. UNCTAD mapped reported items to the closest common categories. Revenue comprises mainly ocean freight. Vessel operations, capacity and equipment costs include vessel operation and cargo space costs, including charter hire, purchased vessel slots, crew, repairs, ship stores and insurance, as well as container equipment leasing, repositioning and storage. Container handling, port fees and inland transport costs include container handling, loading and unloading, stevedoring, feeder services, inland transport, and port and canal charges. Other costs comprise depreciation and direct operating costs not assigned to these categories.

3. Fuel cost exposure has been uneven across economies

Higher bunker prices increase fuel costs on each maritime voyage. For goods passing through transshipment ports, these costs accumulate across successive maritime legs and can be passed on to shippers through freight rates and fuel-related surcharges (UNCTAD, 2010). UNCTAD therefore estimates maritime fuel costs in ad valorem terms using last-leg and all-leg measures (see technical annex, sections 1 and 2). The last-leg measure covers only the maritime voyage delivering goods to the importing economy, whether directly from the economy of origin or an intermediary transshipment port. The all-leg measure also includes preceding maritime voyages from the origin. The two measures are identical for direct shipping but differ for transshipped goods, showing the additional fuel costs accumulated through transshipment and indirect maritime connections.

Figure III.11 separates fuel costs based on average bunker prices from 1 January to 27 February 2026, before disruption around the Strait of Hormuz intensified, from additional costs resulting from higher average bunker prices from 28 February to 30 June. For the last maritime leg, initial fuel cost shares were 0.8 per cent of the imported goods value globally, 0.7 per cent for small island developing States and 1.5 per cent for the least developed countries. Higher bunker prices added 0.6, 0.5 and 1.1 percentage points, respectively, raising the shares to 1.3,[11] 1.2 and 2.6 per cent. When all maritime legs were included, initial fuel cost shares were 1.9 per cent globally, 2.0 per cent for small island developing States and 2.8 per cent for the least developed countries. Higher bunker prices from 28 February to 30 June added 1.4, 1.5 and 2.0 percentage points, respectively, raising the shares to 3.2, 3.5 and 4.8 per cent.

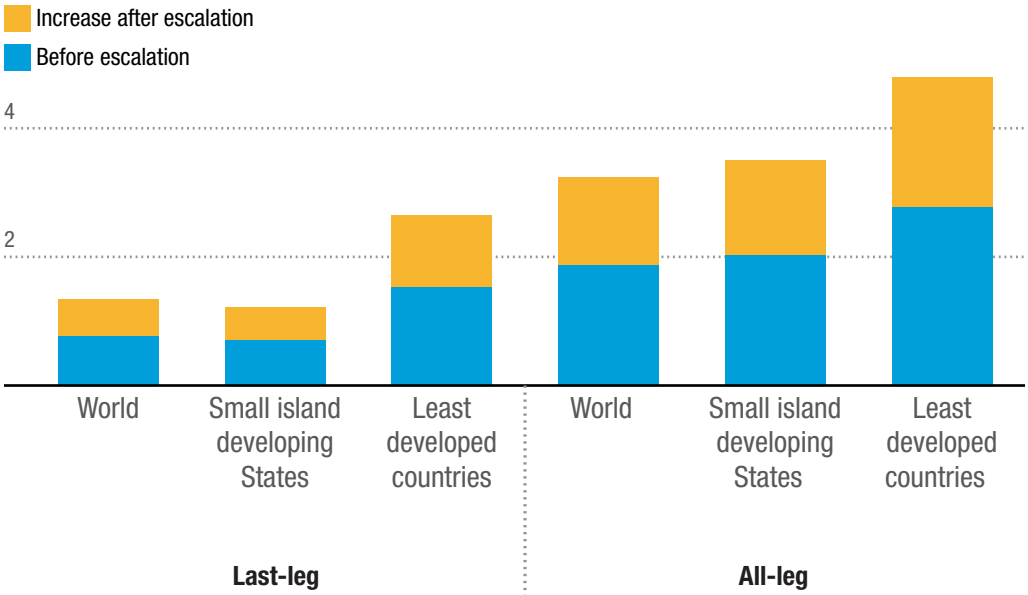
The 1.4 percentage point global increase across all maritime legs (figure III.11) is substantial relative to total international maritime transport costs, estimated in ad valorem terms at 11.1 per cent of traded goods value globally in 2021 (UNCTAD, 2026b). Adding the fuel cost increase to this benchmark would raise total ad valorem maritime transport costs to about 12.5 per cent. The magnitude of the fuel cost increase is comparable with recent tariff changes because both are expressed as shares of goods value. Between 2024 and February 2026, changes in United States tariffs increased average tariffs on global trade by 1–2 percentage points in many product groups and by 3–4 percentage points in several manufacturing sectors (UNCTAD, 2026c). This comparison indicates relative scale rather than economic effects because tariff rates differ by product, while the maritime fuel cost estimate is a global average across seaborne traded goods.

The comparison between last-leg and all-leg measures shows that the higher estimates for small island developing States and least developed countries reflect import and route characteristics. For the former, the last-leg fuel cost share (1.2 per cent, including the impact of higher bunker prices) was slightly below the global average (1.3 per cent), but the all-leg share was higher (3.5 per cent for small island developing States compared to 3.2 per cent on average globally), indicating the importance of preceding voyages. For the latter, both shares exceeded the corresponding global averages, with the difference widening when all maritime legs were included. Longer routes, fewer direct maritime services and greater reliance on transshipment increase cumulative fuel use, while heavier or lower-value imported goods raise fuel costs relative to goods value. Larger all-leg fuel cost shares indicate greater vulnerability to transport cost increases from higher bunker prices and the need to assess fuel-related charges across the complete maritime route, rather than only the last leg.

Small island developing States and least developed countries face greater fuel cost vulnerability across complete maritime routes

[11] The total figure does not correspond to the sum of its components due to rounding.

Figure III.11
Average maritime fuel cost before and after the Strait of Hormuz disruption, by economy grouping
(Percentage of goods value)



Source: UNCTAD calculations, based on AIS-derived voyage data provided by Marine Benchmark; IMO (2020); Clarksons Research Shipping Intelligence Network; UNCTAD seaborne trade data; and UNCTAD trade and transport data.

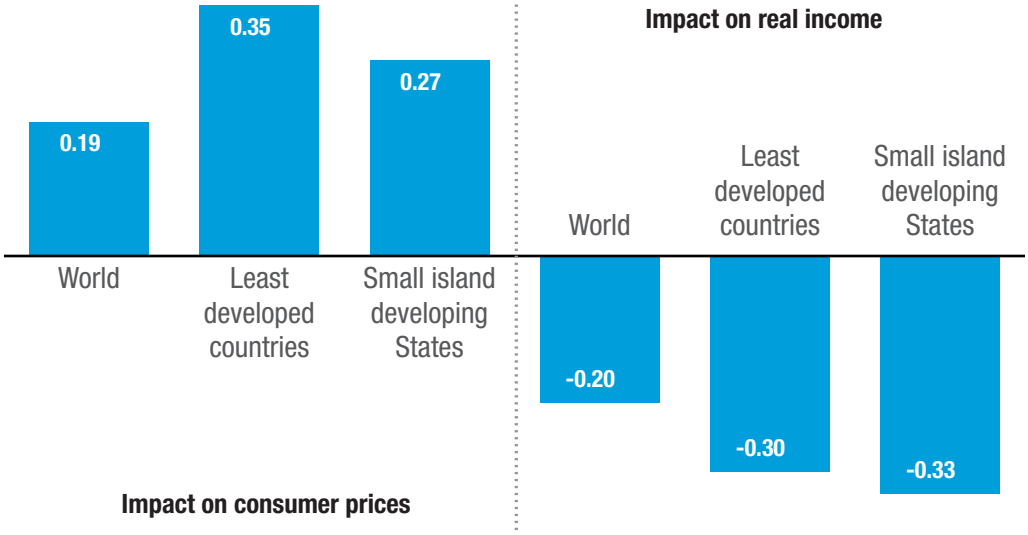
Note: The last-leg measure covers only the maritime voyage delivering goods to the importing economy, directly from the economy of origin or through a transshipment port. The all-leg measure also includes preceding maritime voyages from the origin. The two measures are identical for direct shipping but differ for transshipped goods. See the technical annex, sections 1 and 2, for the estimation methodology.

4. Higher maritime transport costs have impacts on consumer prices and real income, with greater impacts on the least developed countries and small island developing States

By increasing ship operating costs, which are passed to shippers and reflected in the higher delivered prices of imported goods, including production inputs, higher maritime fuel costs can raise consumer prices and reduce real income. To estimate these effects, the increase in maritime fuel costs across all maritime legs, from 1 January to 27 February 2026 (two-month average) to 28 February to 30 June 2026 (four-month average), was applied to bilateral maritime transport costs in a quantitative trade and transport network model (see technical annex, section 3). The transport network component allows vessels to shift between routes in response to fuel cost changes on individual voyage legs. Assuming that the increase is sustained until around the end of 2027, the global consumer price level is simulated to increase by 0.19 per cent (figure III.12). The simulation isolates the maritime fuel cost channel and does not apply higher oil prices directly to household energy use, domestic transport, electricity generation or other production activities. Changes in household expenditure and production costs arise only through increased maritime transport costs for imported goods.

Consumer prices are estimated to increase by 0.27 per cent in small island developing States and 0.35 per cent in the least developed countries.[12] Real income is estimated to decline by 0.20 per cent globally, 0.33 per cent in small island developing States and 0.30 per cent in the least developed countries. The larger estimated effects in these economy groups reflect their greater reliance on imported goods for consumption and domestic production, together with higher maritime fuel costs across all voyage legs relative to imported goods value.

Figure III.12
Simulated impact of the maritime fuel cost increase on consumer prices and real income, selected economic groupings
(Percentage)



Source: UNCTAD calculations, based on AIS-derived voyage data provided by Marine Benchmark; IMO (2020); Clarksons Research Shipping Intelligence Network; UNCTAD seaborne trade data; UNCTAD trade and transport data; and the GTAP Data Base (Aguiar et al., 2023).

Note: For this analysis, the small island developing States exclude Singapore. Real income refers to model-based welfare, measured as real income available for final expenditure. Results are percentage changes from the baseline. See the technical annex for the estimation methodology.

Another simulation exercise assesses the impact of observed freight rate changes, instead of only increased maritime fuel costs. Observed freight rates incorporate fuel cost changes through bunker adjustment factors, other applicable surcharges and voyage rate calculations. The simulation compares average container, dry bulk, crude oil tanker and refined product tanker freight rates for specific routes based on the two-month average from 1 January to 27 February 2026 and the four-month average from 28 February to 30 June 2026.[13] Each voyage leg is matched to the most representative freight rate series. Freight rate changes are assumed to be sustained until around the end of 2027.

[12] A separate UNCTAD assessment estimates that a 50 per cent oil price increase, with import quantities held at 2024 levels, would raise the annual net oil import bill of 65 net oil-importing least developed countries and small island developing States by $20.4 billion (UNCTAD, 2026a). Other studies examine broader inflation effects. An analysis of 72 developed and developing economies associates a 10 per cent global oil price increase with an average 0.4 percentage point increase in domestic inflation during the same year, with no statistically significant effect after two years (Choi et al., 2017). These broader oil price effects are excluded from the simulation, which covers maritime fuel costs incurred in transporting imported goods.

[13] Between the two periods, the average SCFI comprehensive, Baltic Dry, Baltic Dirty Tanker and Baltic Clean Tanker indices increased by 55, 35, 71, and 107 per cent, respectively. The simulation uses a route specific series rather than applying these aggregate changes uniformly.

Around the end of 2027, consumer prices are simulated to increase by 0.87 per cent globally, 1.67 per cent in the least developed countries and 1.39 per cent in small island developing States. As imported goods account for a larger share of consumption in both economy groupings,[14] transport cost increases have a larger impact on consumer prices and raise domestic production costs through imported inputs.

[14] In the model calibration, directly imported goods account for about 14 per cent of consumption expenditure in the least developed countries and 16 per cent in small island developing States, excluding Singapore, compared with 8 per cent globally.



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Technical annex
Potential implications of higher maritime fuel costs for transport costs and the economy

This annex explains methods used in sections B.3 and B.4 to estimate last-leg and all-leg fuel costs and assess the effects of higher maritime fuel and freight costs on consumer prices and real income.

The methodology proceeds in four steps. First, voyage-level fuel costs and freight rate changes are estimated or matched to individual voyage legs. Second, bilateral trade is allocated across direct and transshipment routes. Third, fuel costs are summed within each route and averaged using estimated route shares to obtain bilateral all-leg fuel costs. Fourth, voyage-leg fuel cost changes and matched freight rate changes are applied separately to the transport network, and the resulting bilateral transport cost changes are introduced into the quantitative trade model to estimate effects on consumer prices and real income.

1. Estimating voyage-level fuel costs and the last-leg measure

Voyage-level fuel costs were estimated using baseline voyage data derived from the Automatic Identification System (AIS) and provided by Marine Benchmark, covering vessel specifications, voyage duration, distance and estimated cargo volume, together with ship type fuel consumption parameters from IMO (2020).

Relevant ship type parameters were applied to the voyage data to estimate fuel consumption, which was then multiplied by the applicable bunker price. The resulting costs were aggregated by destination economy using cargo volumes as weights to estimate last-leg fuel costs. To express these costs in ad valorem terms, cargo volumes were converted into goods values using bilateral unit value data from UNCTAD trade and transport data. Estimated fuel costs were then divided by the value of the goods carried.

2. Allocating bilateral trade across maritime routes

Voyage-level estimates identify cargo volumes and fuel costs by leg, while UNCTAD seaborne trade data identify volumes between origin and destination economies. These data sets are combined by allocating bilateral trade to the voyage legs on which it is carried, enabling an estimation of fuel costs for the complete route.

Estimating route shares, voyage-leg traffic and transport costs

An explicit shipping network model allocates bilateral trade among possible routes. It follows the frameworks of Ganapati et al. (2024) and Ludwig (2025), which extended Allen and Arkolakis (2022) and the quantitative trade model of Eaton and Kortum (2002). The share of route r in trade from economy i to economy j is:

$$\frac{\pi_{ij,r}}{\sum_{r' \in R_{ij}} \pi_{ij,r'}} = \frac{\prod_{l=1}^{K_r} t_{r_{l-1},r_l}^{-\theta}}{\sum_{r' \in R_{ij}} \prod_{l=1}^{K_{r'}} t_{r'_{l-1},r'_l}^{-\theta}} \quad (1)$$

where, t_{r_{l-1},r_l} is the voyage-leg transport cost from location r_{l-1} to r_l, $\pi_{ij,r}$ is the share of economy j's total imports originating in economy i and carried on route r, and R_{ij} is the set of routes between the two economies. K_r is the number of legs in route r and θ is the trade elasticity.

When voyage-leg fuel costs change, the network model recalculates route shares, allowing vessel traffic to shift between direct and transshipment routes.

Voyage-leg transport costs t_{r_{l-1},r_l} are estimated by the generalized method of moments using the following moment conditions:

$$\log(\hat{\Xi}_{kl}(\hat{A}(\rho)|\mathrm{X},\mathrm{Y},\theta)) - \log(\Xi_{kl}^{data}) \tag{2}$$

where, $\hat{\Xi}_{kl}$ and Ξ_{kl}^{data} denote estimated and observed traffic on the voyage leg from k to l. Matrix X contains bilateral seaborne trade, and Y contains the explanatory variables used to estimate t_{r_{l-1},r_l}.

Estimated traffic $\hat{\Xi}_{kl}$ is:

$$\hat{\Xi}_{kl} = \sum_i \sum_j \pi_{ij}^{kl} X_{ij} = \sum_i \sum_j \frac{b_{ik} a_{kl} b_{lj}}{b_{ij}} X_{ij} = \mathrm{A} \odot (\mathrm{B}' \cdot (\mathrm{X} \odot \mathrm{B}^{\circ -1}) \cdot \mathrm{B}') \tag{3}$$

Matrix A has elements $a_{kl} \equiv t_{kl}^{-\theta}$, while $\mathrm{B} \equiv \sum_{K=0}^{\infty} \mathrm{A}^K = (\mathrm{I} - \mathrm{A})^{-1}$ is the Leontief inverse. Its element $b_{ij} = \tau_{ij}^{-\theta}$ represents average transport costs across possible routes from economy i to j, accumulated over all voyage legs within each route, raised to the power of $-\theta$.[15] The operators $\odot$, $^{\circ -1}$ and $\cdot$ denote element-wise multiplication, element-wise inverse and matrix multiplication, respectively.

Voyage-leg transport costs t_{kl} are estimated as:

$$t_{kl}^{-\theta} = \frac{1}{1 + \exp(\mathrm{Y}\rho)} \tag{4}$$

Matrix elements $\mathrm{Y}\rho$ are fitted values from an auxiliary regression resembling a gravity equation:

$$\mathrm{Y}\rho = \rho_0 + \rho_1 \cdot \ln d_{kl} + \rho_2 \cdot \ln \Xi_{kl} + \rho_3 \cdot \ln \Xi_k + \rho_4 \cdot \ln \Xi_l + \rho_5 \cdot 1_{\text{backhaul}} + \rho_6 \cdot 1_{\{k,l \in \text{land border}\}} + \rho_7 \cdot 1_{\{k,l \in \text{landlocked}\}} \tag{5}$$

In equation 5, the explanatory variables are average sea distance, $\ln d_{kl}$, voyage-leg traffic, $\ln \Xi_{kl}$, outgoing and incoming traffic, $\ln \Xi_k$ and $\ln \Xi_l$, and indicators for reverse direction traffic imbalance, a shared land border and landlocked status. Parameters $\rho_1 - \rho_7$, with ρ_0 as the intercept, are estimated by the generalized method of moments by minimizing the weighted quadratic form of the moment conditions in equation 2.

Linking port-level voyages to economy-level trade

Equation 3 assumes that both traffic and trade are observed at the level of the economy. This report extends the equation to combine port-level voyage traffic with economy-level bilateral trade:

$$\hat{\Xi}_{kl} = \mathrm{A} \odot ((\mathrm{D} \cdot \mathrm{B})' \cdot (\mathrm{X} \odot (\mathrm{D} \cdot \mathrm{B} \cdot \mathrm{D}')^{\circ -1}) \cdot (\mathrm{B} \cdot \mathrm{D}')') \tag{6}$$

Matrix D maps n_p ports to n_e economies and aggregates elements of B for ports in the same economy. Matrices A and B are defined at the port level with dimensions $n_p \times n_p$, while X is defined at the economy level with dimensions $n_e \times n_e$. The extended model retains the moment conditions in equation 2 but calculates the estimated traffic entering those conditions using equation 6 instead of equation 3.[16]

[15] This measure is proportional to the expected value of bilateral transport costs accumulated over all voyage legs before route specific productivity shocks are realized.

[16] The correlation between estimated and observed log-transformed port-to-port traffic was 0.89.

Extending the route share calculation to additive voyage-leg costs

The original model assumes multiplicative transport costs. This report applied and extended the additive formulation developed in online appendix D.1 of Allen and Arkolakis (2022), allowing fuel costs on successive voyage legs to be summed across a complete route.[17] Equation 6 remains unchanged, but $\mathrm{A} = [a_{kl} \equiv \exp(-\theta t'_{kl})]$ and $\mathrm{B} = [b_{kl} = \exp(-\theta \tau'_{kl})]$, where t'_{kl} and τ'_{kl} correspond to $t_{kl} - 1$ and $\tau_{kl} - 1$, respectively, in the multiplicative formulation (the left hand side of equation 4 is replaced by $\exp(-\theta t'_{kl})$). The route share is:

$$\frac{\pi_{ij,r}}{\sum_{r' \in R_{ij}} \pi_{ij,r'}} = \frac{\prod_{l=1}^{K_r} \exp(-\theta t'_{r_{l-1},r_l})}{\sum_{r' \in R_{ij}} \prod_{l=1}^{K_{r'}} \exp(-\theta t'_{r'_{l-1},r'_l})} = \frac{a_{i,r_1} \times \ldots \times a_{r_{l-1},r_l} \times \ldots \times a_{r_{K_r-1},j}}{b'_{ij}}$$

where b'_{ij} is the (i,j) element of $\mathrm{D} \cdot \mathrm{B} \cdot \mathrm{D}'$. The unchanged matrix representation allows the same computational procedure.

3. Estimating route share-weighted cumulative fuel costs

Fuel or freight costs are summed across the voyage legs of each route and averaged across routes using the shares estimated above. The resulting route share-weighted average ad valorem fuel cost from economy i to economy j is:[18]

$$\tau'^{fuel}_{i,j} = \sum_{r \in R_{ij}} \frac{\pi_{ij,r}}{\sum_{r' \in R_{ij}} \pi_{ij,r'}} \sum_{m=1}^{K_r} t'^{fuel}_{r_{m-1},r_m} = \frac{1}{b'_{ij}} \sum_{i_p \in N_p^i} \sum_{j_p \in N_p^j} \sum_{K=0}^{\infty} \sum_{L=0}^{K-1} \sum_{k \in N_p} \sum_{l \in N_p} (\mathrm{A}^L)_{i_p,k} c_{kl} (\mathrm{A}^{K-L-1})_{l,j_p} \quad (7)$$

$$\Leftrightarrow \quad \mathrm{T}'^{fuel} = (\mathrm{D} \cdot \mathrm{B} \cdot \mathrm{D}')^{\circ -1} \odot [\mathrm{D} \cdot (\mathrm{B} \cdot \mathrm{C} \cdot \mathrm{B}) \cdot \mathrm{D}']$$

The term $t'^{fuel}_{r_{m-1},r_m}$ denotes the ad valorem fuel cost on the voyage leg from port r_{m-1} to port r_m. Its sum from $m = 1$ to K_r gives the cumulative fuel cost along route $r \in R_{ij}$.

N_p^i is the set of ports in economy i, i_p is a port in that set and N_p is the set of all ports. In the route decomposition on the right-hand side of the first line of equation 7, K is the total number of voyage legs and L is the number preceding the selected leg from port k to port l. The element $(\mathrm{A}^L)_{i_p,k}$ combines the weights of all L-leg routes from port i_p to port k, while $(\mathrm{A}^{K-L-1})_{l,j_p}$ does the same for the remaining legs from port l to port j_p. Each element $c_{kl} \equiv a_{kl} t'^{fuel}_{kl}$ combines the route weight and fuel cost of a voyage leg and forms matrix $\mathrm{C} \equiv [c_{kl}]$. Matrix T'^{fuel} contains the resulting weighted average fuel cost for each origin-destination economy pair. Because $\mathrm{B} = \sum_{h=0}^{\infty} \mathrm{A}^h$, $\mathrm{B} \cdot \mathrm{C} \cdot \mathrm{B}$ incorporates route weights of preceding and following each selected leg.

Equation 7 is evaluated based on the two-month average from 1 January to 27 February 2026 and the four-month average from 28 February to 30 June 2026 to estimate cumulative fuel costs across all maritime legs in each period and the resulting change, as presented in figure III.11. It sums fuel costs across voyage legs and averages them using baseline route shares, which remain fixed between the two periods. Allowing route shares to adjust would produce a slightly smaller estimated fuel cost increase, but the difference is small under the additive transport cost formulation.

[17] Online appendix D.1 of Allen and Arkolakis (2022) derives the expected value of origin–destination transport costs with additive transport costs. This report extended the formulation by making the implied route shares explicit and using them to sum fuel or freight costs across the legs of each route and average them across routes.

[18] The derivation follows that of link intensity, π_{ij}^{kl}, in appendix A.2 of Allen and Arkolakis (2022).

4. Estimating impacts on the economy

Changes in consumer prices and real income were estimated using the quantitative trade model with a transport mode choice developed for the *Review of Maritime Transport 2025*. Technical annex 2 in chapter III presents the equations, baseline data and exact-hat solution method (UNCTAD, 2025). The model distinguishes maritime from non-maritime transport and allows delivered import prices to affect sourcing, input costs, domestic production, prices and income.

The bilateral change in maritime transport costs estimated by the transport network model was introduced into the trade model. For trade from origin economy (*i*) to destination economy (*j*), the proportional change is:

$$\hat{\tau}_{ij} = \frac{1 + \tau_{ij}^{'1}}{1 + \tau_{ij}^{'0}} = \frac{1 + \tau_{ij}^{'0} + \Delta\tau_{ij}^{'}}{1 + \tau_{ij}^{'0}}$$

where $\tau_{ij}^{'0}$ is the baseline expected ad valorem cost of the complete maritime journey, derived from the corresponding element of D·B·D' using voyage-leg costs from equations 4 and 5. The counterfactual is $\tau_{ij}^{'1} = \tau_{ij}^{'0} + \Delta\tau_{ij}^{'}$. A value of $\hat{\tau}_{ij}$ greater than one indicates an increase from the baseline.

The fuel cost and freight rate simulations use the same baseline transport cost, $\tau_{ij}^{'0}$, but calculate $\Delta\tau_{ij}^{'}$ differently. In the fuel cost simulation, non-fuel components of voyage-leg transport costs remain at the baseline. For a voyage leg from port k to port l, the counterfactual transport cost is: $t_{kl}^{',new} = t_{kl}^{',base} + \Delta t_{kl}^{',fuel}$ where $t_{kl}^{',base}$ is the baseline voyage-leg transport cost from equations 4 and 5 and $\Delta t_{kl}^{',fuel}$ is the increase in ad valorem fuel costs calculated using average bunker prices from 1 January to 27 February 2026 and 28 February to 30 June 2026. Recalculating the transport network matrix using $t_{kl}^{',new}$ gives the bilateral change in maritime transport costs: $\Delta\tau_{ij}^{',fuel} = \tau_{ij}^{',new} - \tau_{ij}^{',base} = -\frac{1}{\theta}\left[\log\left(b_{ij}^{',new}\right) - \log\left(b_{ij}^{',base}\right)\right]$ where $b_{ij}^{',base}$ and $b_{ij}^{',new}$ are the corresponding origin–destination elements of the transport network matrices calculated using baseline and counterfactual voyage-leg costs. This recalculation allows route shares and estimated vessel traffic to adjust to differences in fuel cost increases across voyage legs.

For the freight rate simulation, $\Delta t_{kl}^{',fuel}$ is replaced by $\Delta t_{kl}^{',freight}$. The transport network matrix is recalculated using the adjusted voyage-leg costs, and $\Delta\tau_{ij}^{',freight}$ is obtained from the same logarithmic difference between the baseline and counterfactual matrices used for the fuel cost simulation.

Where the quantitative trade model groups several economies into one region, bilateral values of $\hat{\tau}_{ij}$ are aggregated using geometric means weighted by baseline seaborne trade. The changes apply only to the international maritime transport of goods. Transport costs for domestic trade, non-maritime transport and services, together with tariffs, productivity and other exogenous variables, remain at the baseline. The model determines changes in bilateral trade and transport mode shares, sectoral prices, production, nominal income and tax revenue.

The consumer price result is the change in the expenditure-weighted price index, while real income is nominal income available for final expenditure divided by this index. The model compares baseline and counterfactual equilibria after trade, production, prices and income have been adjusted, without estimating the transition path or duration. The end of 2027 is the scenario horizon if higher transport costs persist. The fuel cost and freight rate simulations should not be added because observed freight rate changes already incorporate part of the fuel cost increase.

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