International Transport Forum

Performance of Maritime Logistics

Case-Specific Policy Analysis

Performance of Maritime Logistics

Case-Specific Policy Analysis

The International Transport Forum

The International Transport Forum is an intergovernmental organisation with 64 member countries. It acts as a think tank for transport policy and organises the Annual Summit of transport ministers. ITF is the only global body that covers all transport modes. The ITF is politically autonomous and administratively integrated with the OECD.

The ITF works for transport policies that improve peoples' lives. Our mission is to foster a deeper understanding of the role of transport in economic growth, environmental sustainability and social inclusion and to raise the public profile of transport policy.

The ITF organises global dialogue for better transport. We act as a platform for discussion and pre-negotiation of policy issues across all transport modes. We analyse trends, share knowledge and promote exchange among transport decision makers and civil society. The ITF's Annual Summit is the world's largest gathering of transport ministers and the leading global platform for dialogue on transport policy.

The Members of the Forum are: Albania, Armenia, Argentina, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Cambodia, Canada, Chile, China (People's Republic of), Colombia, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Kazakhstan, Korea, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Mexico, Republic of Moldova, Mongolia, Montenegro, Morocco, the Netherlands, New Zealand, North Macedonia, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Tunisia, Türkiye, Ukraine, the United Arab Emirates, the United Kingdom, the United States and Uzbekistan.

International Transport Forum
2 rue André Pascal
F-75775 Paris Cedex 16
contact@itf-oecd.org
www.itf-oecd.org

Case-Specific Policy Analysis Reports

The ITF's Case-Specific Policy Analysis series presents topical studies on specific issues carried out by the ITF in agreement with local institutions. Any findings, interpretations and conclusions expressed herein are those of the authors and do not necessarily reflect the views of the International Transport Forum or the OECD. Neither the OECD, ITF nor the authors guarantee the accuracy of any data or other information contained in this publication and accept no responsibility whatsoever for any consequence of their use. This work is published under the responsibility of the Secretary-General of the ITF. This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Cite this work as: ITF (2022), "Performance of Maritime Logistics", *International Transport Forum Policy Papers,* No. 106, OECD Publishing, Paris.

Acknowledgements

This report was written by Olaf Merk of the International Transport Forum (ITF) and Antonella Teodoro (MDS Transmodal). It builds on discussions on maritime logistics performance within the framework of the ITF Global Maritime Logistics Dialogue. As such, it benefits from discussions with: Pyers Tucker (Hapag Lloyd), Henning Schleyerbach (Digital Container Shipping Association), Chong Meng Tan (PSA International), Ghim Siew Ho (PSA International), Lamia Kerdjoudj-Belkaid (Federation of European Private Port Companies and Terminals, Feport), Daniel Hosseus (Feport), Isabelle Ryckbost (European Seaports Organisation) Anne Stuhlmann (European Seaports Organisation), Nicolette van der Jagt (European Association for Forwarding, Transport, Logistics and Customs Services, CLECAT), Miglė Blusevičiūtė (CLECAT), Jens Roemer (International Federation of Freight Forwarders Associations, FIATA), Gene Seroka (Port of Los Angeles), Eric Caris (Port of Los Angeles), Iris Scheel (Port of Hamburg), Andrea Thiel (Port of Hamburg), Luc Arnouts (Port of Antwerp), Pieter de Waard (Port of Rotterdam), Katherine Bamford (Port of Vancouver), Jordi Espin (European Shippers Council) and James Hookham (Global Shippers Forum). It also benefits from data provided by container terminal operators.

The report was reviewed by Stephen Perkins (ITF), Ingrid Bocqué (Hamburg Port Authority) and representatives from the Danish Maritime Authority, the European Community Shipowners' Associations, the Global Shippers Forum, the European Association for Forwarding, Transport, Logistics and Customs Services, the International Federation of Freight Forwarders Associations and the Federation of European Private Port Companies and Terminals. The report was edited by Hilary Gaboriau (ITF). The report was made possible by a voluntary contribution from the Hamburg Port Authority.

Table of contents

Figures

Tables

Boxes

Executive summary

What we did

Liner shipping and container ports have repeatedly made headline news since 2020, as companies across supply chains were hit with price hikes and shipment delays. Predictability became a thing of the past. This report assesses these disruptions to containerised maritime transport and analyses their causes and impacts.

What we found

The price of container shipping has increased substantially since the beginning of 2020. Spot rates were around six times higher on average by the end of 2021 and contract rates 2.9 times higher. However, these numbers underestimate the cost increase of container transport. Shippers confront a range of additional surcharges and increased fees for demurrage and detention. During the same period, ship schedule reliability decreased from 65% to 34%, meaning that two out of three ships arrive in port at least one day behind schedule. Moreover, unscheduled port cancellations have also increased.

The ship turnaround time in ports in the People's Republic of China and the United States has doubled since the beginning of 2020, while in Europe it rose by less than 15%. Many countries in Europe, Latin America and sub-Saharan Africa saw fewer direct liner connections following reconfigurations of liner shipping networks. These challenges, plus the strain on port and inland logistics capacity as well as Covid-19-related labour shortages, have undermined just-in-time business and logistics models.

The globalised nature of container shipping has resulted in local supply chain problems spilling over to other regions and creating worldwide difficulties. Shippers and freight forwarders in Europe face exponential increases in ocean freight rates to and from Europe and increasing difficulties booking cargo space - even though in Europe demand for container shipping is essentially flat and port congestion is negligible.

Global container shipping companies have used capacity-management strategies to shift ship capacity to trans-Pacific trade routes in order to accommodate increased demand for consumer goods in the United States. Public policies have facilitated this situation. Regulators have allowed carriers to use co-operation arrangements to jointly manage fleet capacity. This option has become the main element of co-ordination between shipping lines following regulatory initiatives in the European Union and the United States in the early 2000s to prohibit joint price-fixing in shipping conferences. Expectations that this intervention would stimulate price competition and lower shipping prices were confounded, however, by the record-high freight rates since 2020. Thanks to these freight rates, the operational profit margin of the ten largest container shipping companies reached an estimated USD 160 billion in 2021, a substantial part of which has been used to fund acquisitions in the freight forwarding and logistics business to achieve vertical integration.

What we recommend

Improve competition monitoring in container shipping

Governments should build up their capacity to monitor competition in maritime transport. The role of specialised agencies should strengthened. Competition authorities should enhance cross-border co-operation, as their actions are interdependent.

Reconsider the competition arrangements for liner shipping

The current institutional arrangements for competition in liner shipping have not resulted in price stability, lower prices or more competition. A reconsideration is warranted to ensure a sufficiently wide choice of operators and reliable services. Competition arrangements for liner shipping could limit joint capacity management by carriers to foster more competition between them.

Focus regulatory attention on fair competition in door-to-door container transport

The ongoing vertical integration of the container shipping industry poses new challenges for competition regulation. Shipping companies can use their exemptions from competition law in many jurisdictions and their leverage as carriers to acquire competitive advantages in markets where they now directly compete with freight forwarders, port service providers or logistics operators that do not have such competition law exemptions. Regulators should ensure sufficient competition in the land-side port and logistics markets that the maritime container carriers have entered.

Increase transparency of container shipping rates and charges

Governments should put in place measures to make the various surcharges levied by maritime shipping companies more transparent. One measure could be making lists of accepted surcharges, and requirements on how these are calculated. The burden of proof for justifying surcharges should be on the carrier, rather than on the shippers, who now often have to prove that these lack justification. The demurrage and detention charges levied on shippers to smooth transport flows in ports should be made more effective by ensuring they are related to costs incurred. They should only be charged if shippers and freight forwarders can remedy the situation, not where others are responsible.

Collect performance on the containerised transport chain

Containerised transport will benefit from better information about its performance, notably by benchmarking the efficiency of the interfaces between the different actors in the logistic chain. Governments could adopt the comprehensive set of indicators developed by the International Transport Forum together with maritime transport stakeholders and collect relevant data to feed it.

Secure the strategic value of container shipping

Governments will need to clearly articulate their expectations for liner shipping and outline how to achieve them. Considering their substantial support to the shipping industry, governments are in a position to expect that shipping companies provide the strategic value that they are supposed to provide. Governments could make clear that their support hinged on the continued proof of this strategic value.

Charge users of public maritime infrastructure more to increase cost coverage

Cost coverage of public maritime infrastructure is currently low. In the European Union, carriers contribute only 4% of the cost of financing and maintaining infrastructure in ports and in inter-oceanic canals.

Generally, carriers only pay a fraction of these costs and less than in all other transport modes. Ports also cause considerable external costs (e.g. via air pollution from ships). For more efficient public policy outcomes, governments should recover a larger share of infrastructure costs via fees and charges.

Performance of containerised maritime transport

The performance of containerised transport can be described by four main criteria: price, reliability, speed and direct liner connectivity. These criteria have evolved over recent years. The price of container transport and transit times have increased, whereas reliability and connectivity have decreased.

The price of container shipping

Companies that want their goods to be moved – shippers – generally have two ways to directly procure shipping services: via a contract with a container shipping company (a carrier) for a certain period, or on a flexible, last-minute basis on the spot market. In the case of contracted shipping services, prices are negotiated between the shipper and the carrier, and fixed for a certain period, often one or more years. In the case of flexible, last-minute shipping services, prices are determined on what is called the spot market, which fluctuates on a daily basis. The prices for last-minute shipping services are called spot rates. Large shippers with predictable and steady containerised cargo flows engage in contracts with carriers, whereas companies with low and unpredictable container volumes more frequently use the container spot markets. Large shippers often use a combination of both methods: contracts for cargo that can be guaranteed and spot markets for additional or incidental cargo flows. Alternatively, shippers can outsource the procurement of shipping services to a logistics service provider or freight forwarder. Most small and medium-sized enterprises use freight forwarders who consolidate shipments and negotiate contract rates that they would likely not be able to acquire themselves.

The container shipping revenues are a mix of revenues from contract rates and spot rates. The advantage of contract rates for container carriers is that it locks in future revenues if spot rates fall. Should the spot rates rise, carriers will try to accommodate containers on the spot market as much as possible to increase their revenues. Container shipping companies have different strategies as to the share of trade from contract and spot markets. Unsurprisingly, the contract shares are different depending on the carrier, maritime route and period. A variety of indexes monitor contract and spot rates, some of which will be mentioned here.

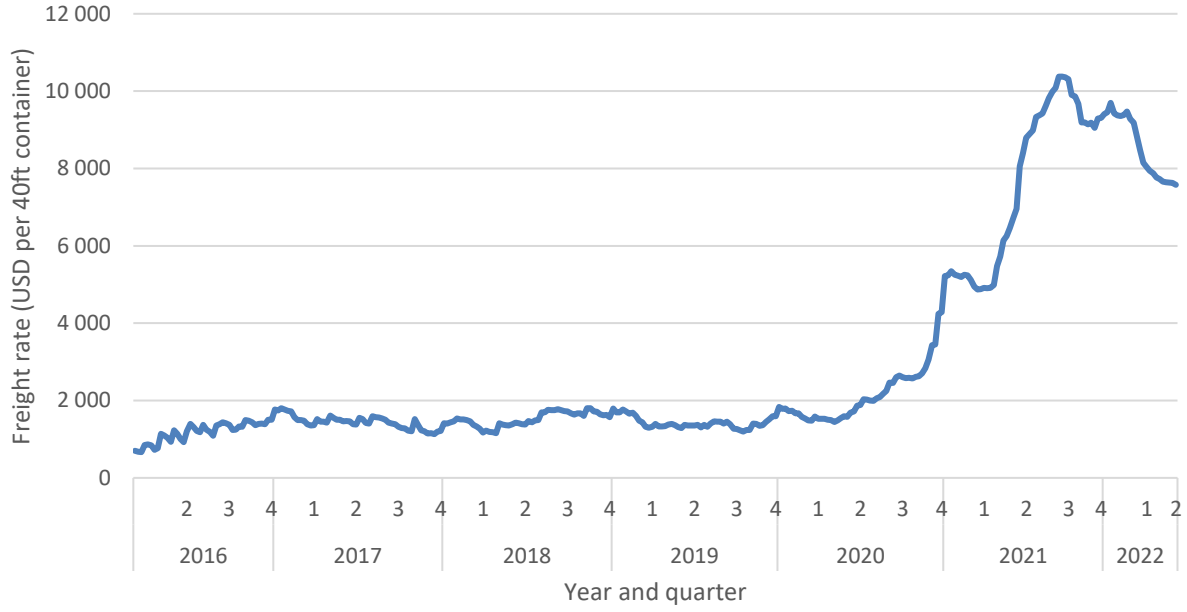
Spot rate developments

The Drewry World Container Index is frequently used to assess the increases of container spot rates. It is a composite of container freight rates on eight major routes to and from Asia, Europe and the United States in USD per 40-foot container per week.

The Drewry World Container Index shows that spot rates at the end of 2021 (week 47) were approximately six times higher than two years earlier. The Index started to rise in June 2020, first fairly gradually and then more abruptly during November-December 2020 and between May 2021 and September 2021 (Figure 1). Fluctuations in this index reflect the various price increases on different trade routes during different periods (Drewry n.d.).

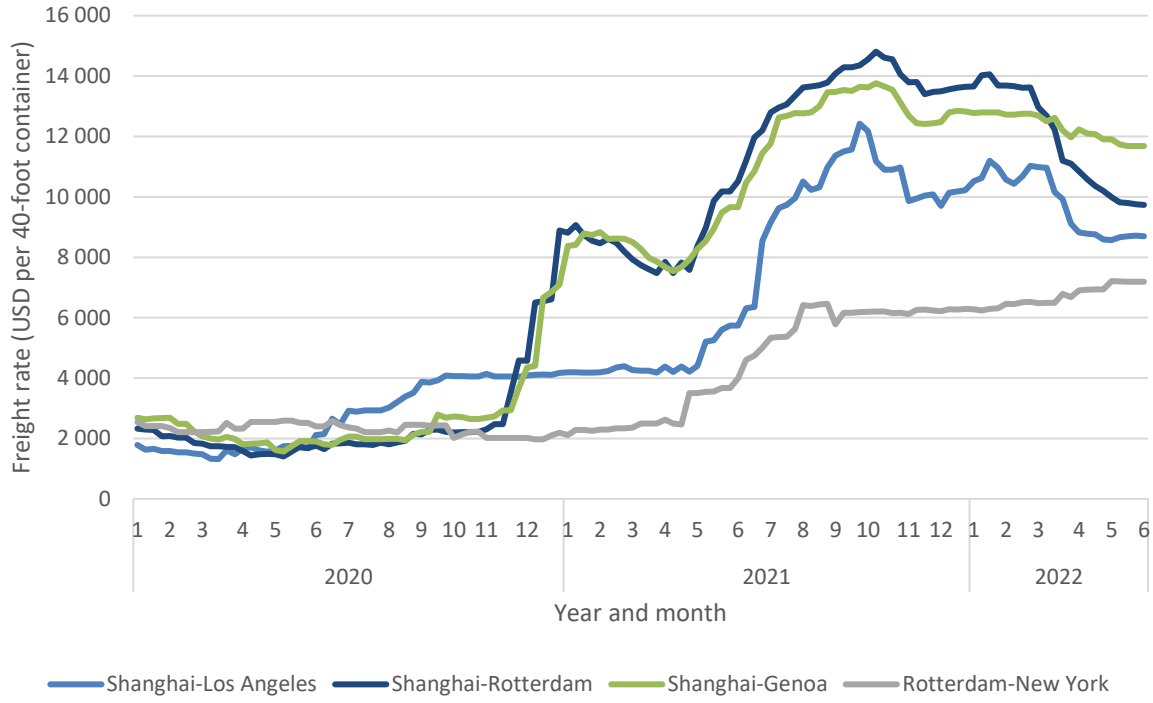
Asia-Europe spot rates rose by a factor 4.7 (Shanghai-Genoa) to 5.9 (Shanghai-Rotterdam) between the first week of 2020 and the end of 2021, trans-Pacific rates (Shanghai-Los Angeles) by a factor 5.5 and Transatlantic rates (Rotterdam-New York) by a factor 2.4 (Figure 2). The trans-Pacific rates were the first to rise substantially. This increase started in June 2020 and reached a plateau by November 2020 that lasted until May 2021. Over this same period, the Transatlantic rates remained more or less stable. The Asia-Europe rates started to move up very quickly between November and December 2020, after which they declined slightly until April 2021. From May 2021 onwards the spot rate developments on the two main East-West routes (Asia-Europe and trans-Pacific) moved in parallel and showed a more or less similar rapid upward swing until September 2021. The Transatlantic rate increase started at the same date (May 2021) but halted around July 2021 (Drewry n.d.).

Figure 1. Evolution of containerised spot rates, 2016-2022



Source: Drewry (n.d.).

Figure 2. Evolution of containerised spot rates by trade lane



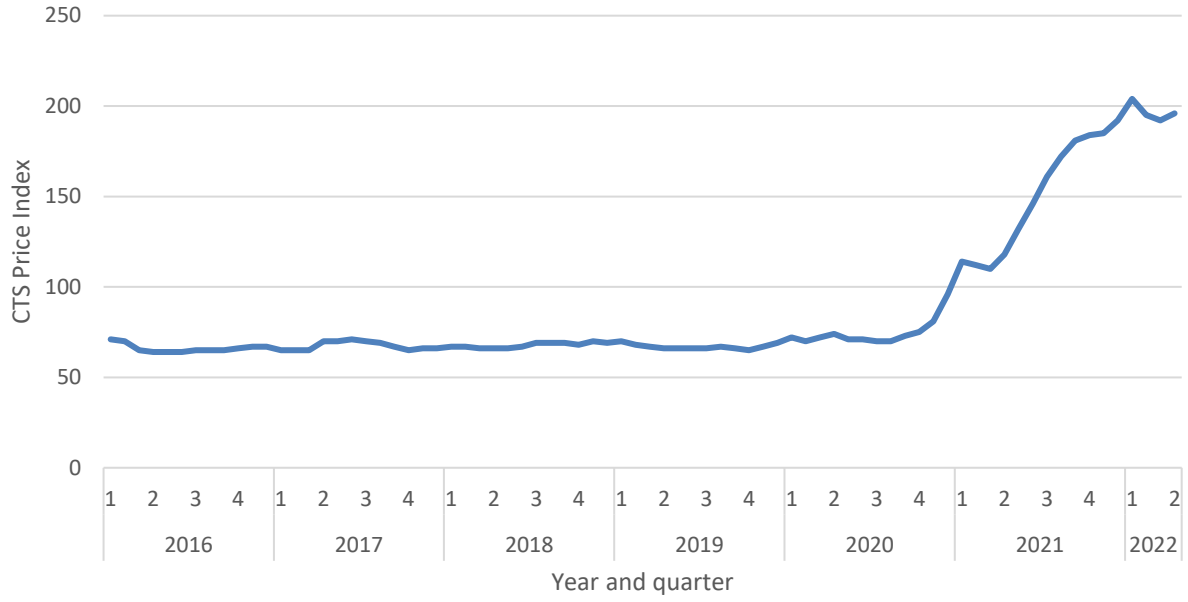
Source: Drewry (n.d.).

Contract rate developments

Contract rates are negotiated between shippers and carriers. For reasons of confidentiality, they are not publicly available. What are available are container trade price indexes, as communicated by Container Trade Statistics (CTS), the organisation that releases statistics derived from data supplied by major container shipping lines. CTS Price Indexes are based on the weighted average of the sea-freight rates including all surcharges and ancillary charges – with the exception of inland haulage. As such, the CTS Price Index includes both contract and spot rates.

The CTS Price Index multiplied by a factor of 2.9 between January 2020 and January 2022 (Figure 3). Similarly to the spot-rate developments, there is considerable variety between different trade routes, with increases ranging between a factor of 1.5 and 5.4 for the main trade lanes (Table 1). The largest observed increases took place on the Far East-Europe and Indian Subcontinent-Europe trades, whereas intra-Europe and intra-US trades showed relatively limited increases (CTS, n.d.).

Figure 3. Container Trade Price Index (CTS), 2016-22



Source: Container Trade Statistics (n.d.).

Table 1. CTS Price Index developments for main trade lanes, 2020-22

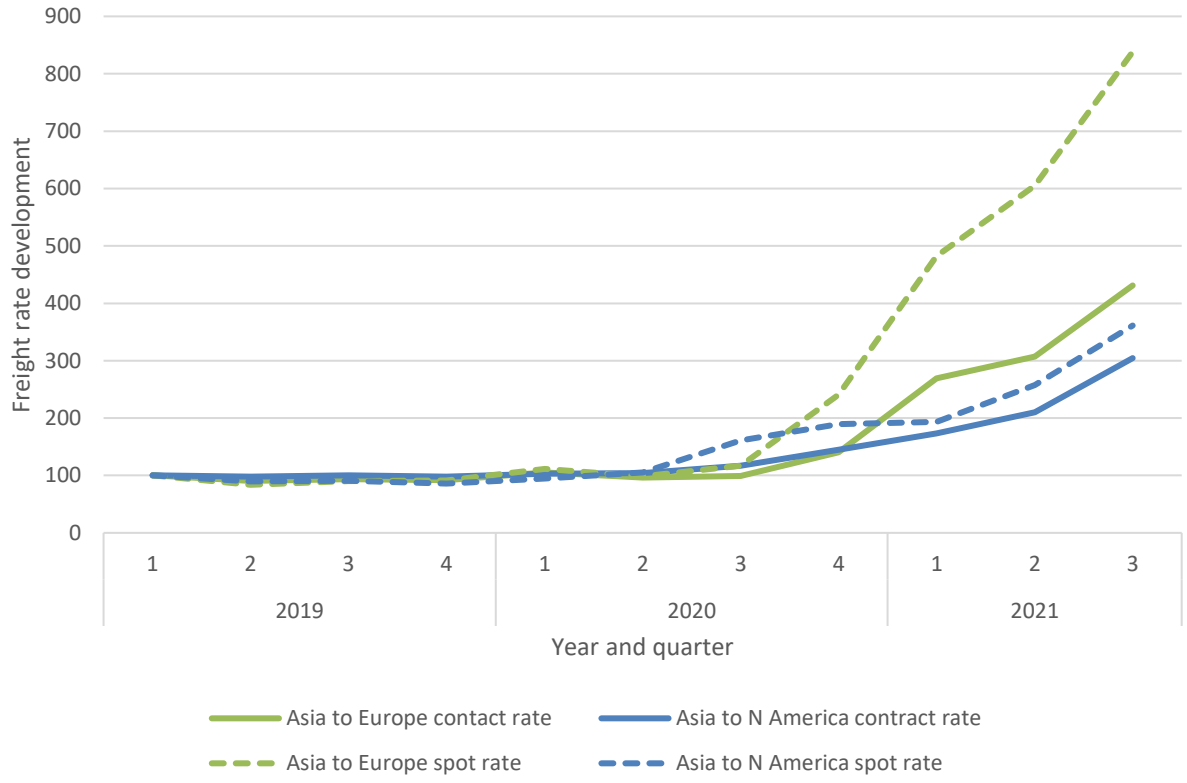
Trade route	Index value at January 2020	Index value at January 2022	Increase (in %)
Far East-Europe	61	331	443%
Indian Subcontinent and Middle East-Europe	47	207	340%
Far East-South and Central America	57	244	328%
Intra Far East	81	268	231%
Far East-North America	89	293	229%
Europe-South and Central America	56	165	195%
Europe-North America	84	231	175%
Indian Subcontinent and Middle East-sub-Saharan Africa	62	167	169%
Intra-North America	83	150	81%
Intra-Europe	76	128	68%
North America-South and Central America	60	89	48%

Source: Container Trade Statistics (n.d.).

There is a clear link between spot rates and contract rates. Increases in spot rates generally lead to increases in contract rates but with a certain time lag, as contract rates are fixed for a certain pre-determined period. A comparison of the Shanghai Containerised Freight Index (SFCI), considered a proxy for spot rates, with the CTS Price Index, considered a proxy for contract rates, shows that the price increase in contract rates over 2020-21 occurred approximately a yearly quarter later than in spot rates. The price developments of spot rate and CTS index followed a remarkably parallel pattern on the Asia-North America

trade route, whereas the spot-rate increases on the Asia-Europe trade route in 2021 were significantly steeper than the increases of the CTS Price Index for that trade route (Figure 4). The differences between the two trade routes could be explained by differences in long-term contract shares on these trade routes, with Asia-Europe routes likely subject to more contracts than the Asia-North America route. The limited time lag between spot rate and contract rate could indicate that the majority of contracts have very short time spans or might suggest other phenomena.

Figure 4. Link between spot rates and contract rates on Asia-Europe and Asia-North America routes, 2019-21



Note: Index 2019 Q1 = 100. The Container Trade Statistics (CTS) Price index is used as a proxy for contract rates. The Shanghai Containerised Freight Index (SCFI) is used as a proxy for container spot rates.
Source: CTS (n.d.), Shanghai Shipping Exchange (n.d.)

Several carriers have managed to use the current situation to increase their share of contract business. In 2021, Maersk managed to secure 64% of the long-haul volumes on long-term contracts compared to 50% the year before (Maersk, 2021). COSCO is reported to have increased its contract share on the Asia-Europe routes to 45% in 2022 (Alphaliner, 2021a). This rise in contract business implies that the current high container transport prices are increasingly locked in, which means they will be sustained for at least another year, regardless of the development of the spot rates.

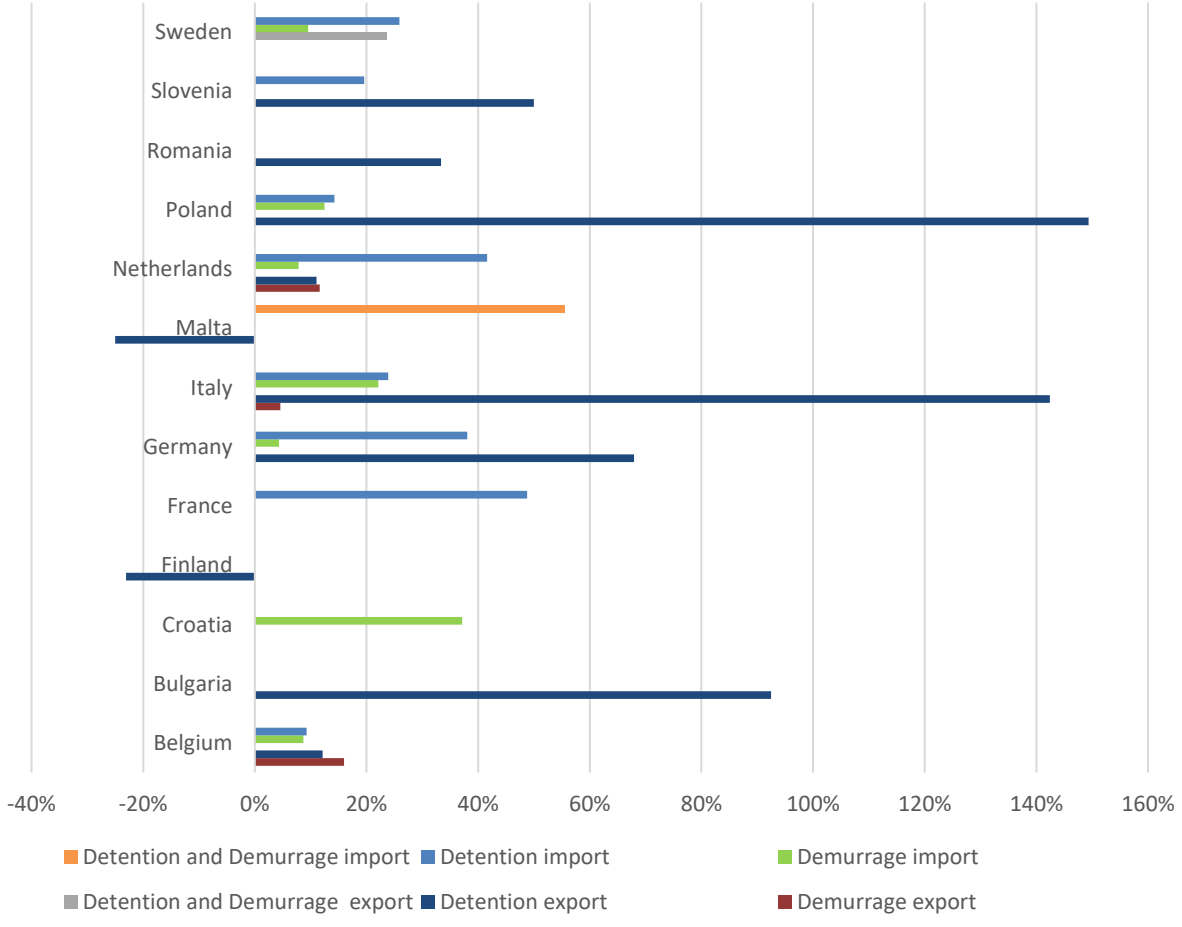
Two carriers announced in September 2021 that they would freeze spot rates: CMA CGM until February 2021 and Hapag Lloyd "for the time being" (Porter, 2021). Notably, this freeze does not apply to contract rates, nor to surcharges that carriers apply in addition to spot or contract rates.

Surcharges

Container shipping companies regularly apply demurrage and detention surcharges. Demurrage charges are applied when a container remains in the terminal beyond its allotted free days (e.g. because it has not been picked up by a truck or ship). The idea of demurrage charges is to minimise the dwell time of containers in terminals. Detention refers to the time outside the port. Detention charges are applied when a container has been picked up in a terminal but not returned to the carrier in the allotted free time. The purpose of the introduction of detention charges is to decrease the turnaround time of a container.

Information on demurrage and detention charges of carriers is not systematically collected. There is no overview of these surcharges and their development over time. Some carriers provide this kind of information on their websites, which makes it possible to assess the extent to which demurrage and detention charges have increased since January 2020. Assessment of these data on surcharges applied by the carrier Hapag Lloyd in EU countries shows that demurrage and detention charges in most EU countries with seaports have increased substantially, and by more than 100% in Italy and Poland (Figure 5).

Figure 5. Changes in detention and demurrage charges for container carriers since January 2020



Source: Based on data from Hapag Lloyd (n.d.).

Container shipping companies have applied additional charges since the Covid-19 crisis that are not included in the spot or contract rates. An example is a congestion surcharge levied by several carriers following the surge in container traffic to European ports (Knowler, 2021a). Another example is the premium that shippers are reportedly expected to pay to get an assured booking, with carriers charging premiums of up to USD 10 500 per container in addition to the regular rate (Knowler, 2021b). Carriers have also charged shippers with peak season surcharges and equipment imbalance surcharges. It is difficult to understand how such surcharges can be justified as covering additional costs for carriers, considering that congestion and equipment imbalance are also contributing to the scarcity of cargo space that is driving the increase in freight rates. Given the limited choice of carriers and the fact that most of them apply similar surcharges, most container shippers have no choice but to accept the surcharges.

Reliability

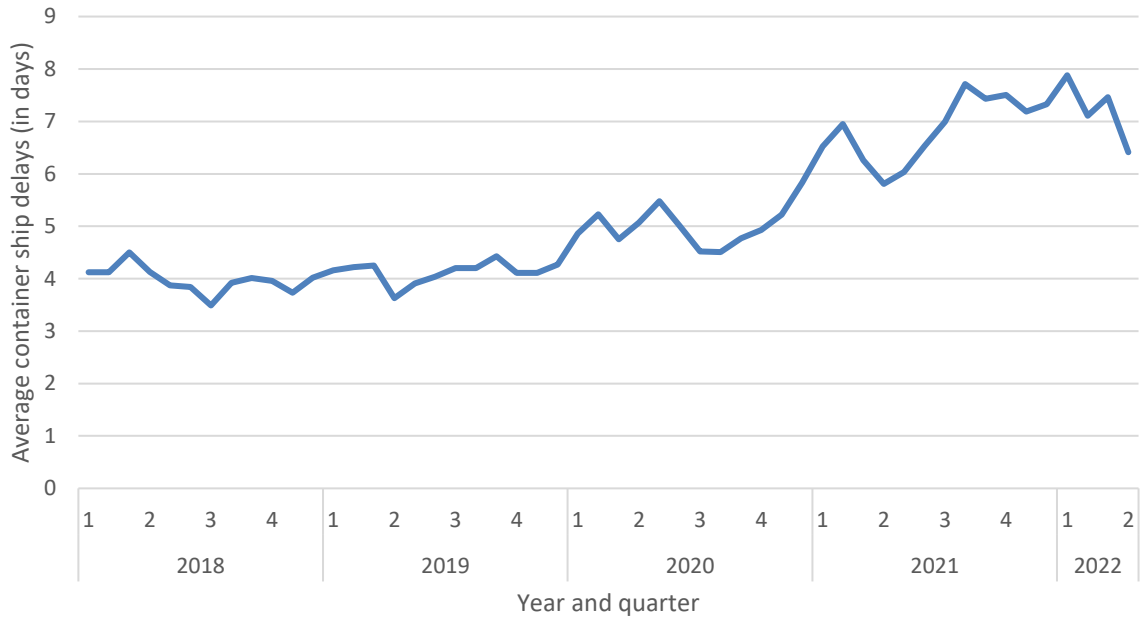
The schedule reliability of container carriers has worsened considerably since the pandemic, according to data from maritime consultancy firm Sea-Intelligence (2022). In February 2022, two out of three vessels arrived with a delay of one calendar day compared to the official schedule. Put differently, the global schedule reliability in that month was 34%, compared to average scores of 75% in the years prior to the outbreak of Covid-19 (Figure 6). The global schedule reliability went up at the beginning of the Covid-19 crisis, from 65% in February 2020 to 78% in June 2020, but deteriorated thereafter, dropping to 35% in January 2021. During the whole of 2021, schedule reliability improved slightly between March and June, but decreased again to 33-34% in August 2021. (Sea-Intelligence, 2022)

Figure 6. Container shipping schedule reliability, 2018-22

Source: Sea-Intelligence (2022).

The average delays of late container ships rose during that period, from 4.9 days in January 2020 to 7.3 days in December 2021 (Figure 7). The improvement in global schedule reliability in the second quarter of 2020 did not translate into shorter average delays of late vessels. A slight improvement in that respect occurred during July-August 2020, followed by a continuous increase in average delay times until February 2021, reaching an average global delay of seven days. After some fluctuations, the average delay time of late vessels reached 7.1 days in February 2022. (Sea-Intelligence, 2022)

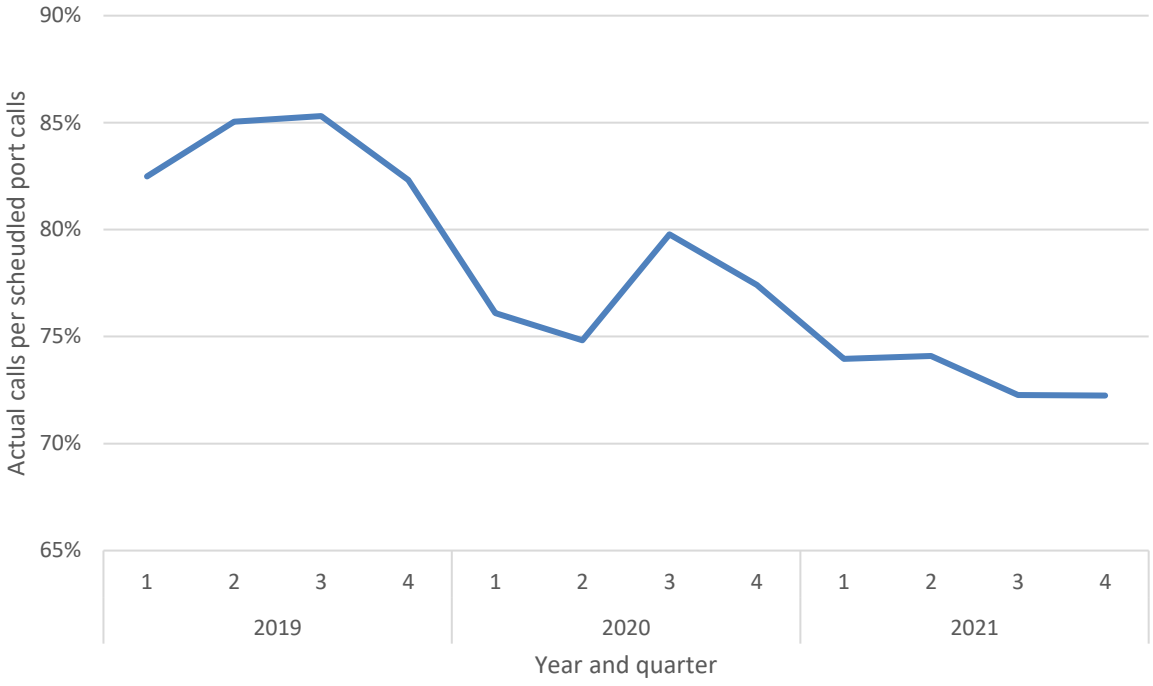
Figure 7. Global average arrival delays for container ships, 2018-22



Source: Sea-Intelligence (2022).

During the Covid-19 crisis, the number of cancellations of scheduled port calls also increased. Figure 8 shows that actual port calls (as a share of the scheduled calls) started declining in the third quarter of 2019. There was a temporary rise in the third quarter of 2020, when the number of actual calls reached 80% of the scheduled calls. That percentage fell again, though, to 72% in the third quarter of 2021.

Figure 8. Actual calls per scheduled port calls, 2019-21



Source: MDS Transmodal (n.d.).

Speed

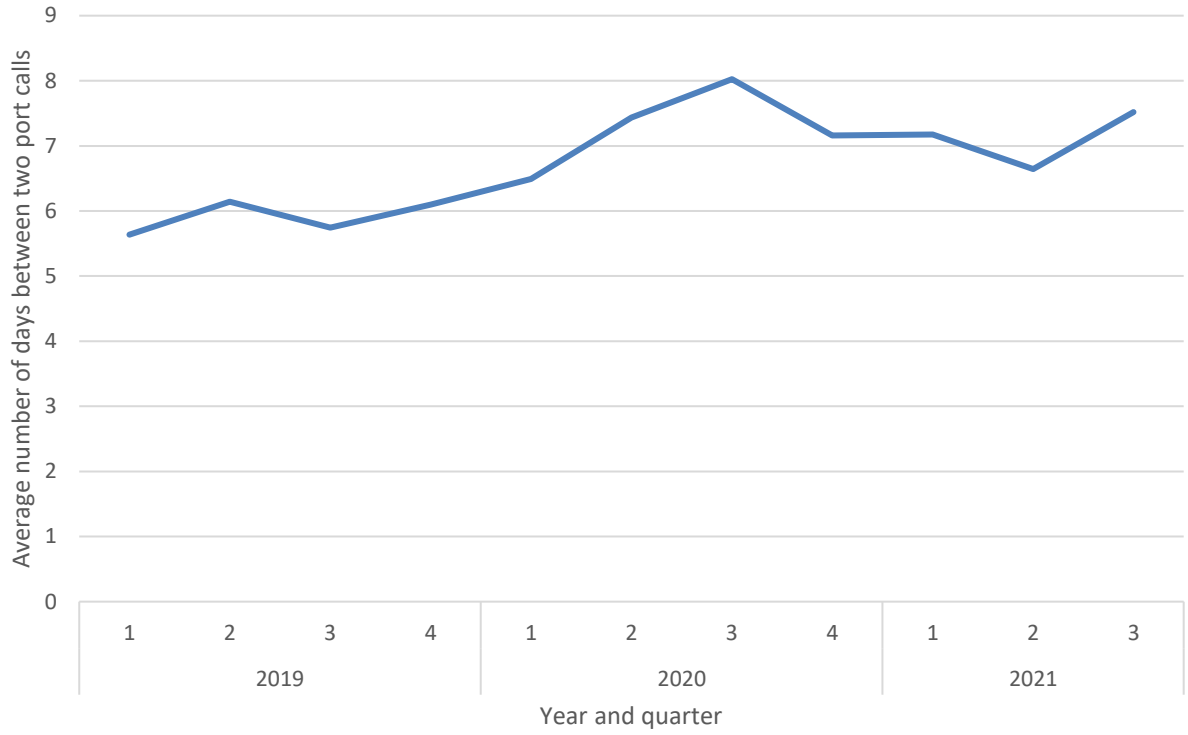
How quickly a container arrives at its destination depends on three different parts of the transport chain: the time at sea, the time in port (which, in turn, is divided into the time at anchor before entering the port and the time at berth in port) and the time in hinterland transport.

Time at sea

Ships' average time at sea between ports has increased since 2019. Figure 9 shows that ships spent 5.7 days at sea in the first quarter of 2019, compared to 7.5 days in the third quarter of 2021. The peak value – eight days – was reached in the third quarter of 2020.

This pattern of increased time at sea could be explained by two factors. First, average ship speed might have gone down since 2019. Lower ship speeds might have been a way to reduce the effective ship capacity during the Covid-19 lockdowns, as lower speed requires more ships to carry out the same weekly service rotation. This is a way to use ships that would have otherwise been inactive during the drop in demand for maritime transport. Second, it may also have been a strategy by carriers to reduce the number of port calls per shipping service, an issue that will be explored in more depth in the section on direct liner connectivity.

Figure 9. Evolution of time at sea between 2019 and 2021



Source: MDS Transmodal (n.d.).

Time at anchor

The time at anchor for container ships has increased globally since the beginning of 2020, coinciding with the economic lockdowns related to Covid-19 in the second quarter of 2020 and the associated drop in maritime transport demand. Time at anchor tripled at the same time that the number of active container ships declined from 4 725 to 4 542. Globally, time at anchor declined slightly after May 2020, but remained at a structurally higher level than before the Covid-19 crisis. (MDS Transmodal, n.d.)

These higher times at anchor have frequently been interpreted as increased waiting times before entering ports. This could be true in port regions that experienced surges in demand and port congestion due to physical constraints, and to a lack of transport workers who were suffering from Covid-19. However, it may also give testimony to the direct collation between time at anchor and the extent of idle container ships: in case of cancelled services, ships are idled at anchor until services resume.

Changes in time at anchor have varied considerably in the different world regions. Time at anchor in Chinese ports in October 2021 was seven times higher than in January 2019; in October 2021 time at anchor was more than five times higher in US ports, but less than two times higher in European ports, compared to January 2019. Since May 2020, the development of time at anchor in these three regions has followed different patterns. The United States saw volatile movement in time at anchor, which fell sharply after May 2020 to pre-Covid-19 levels, rose again in October that same year to peak in January 2021, only to decline again until May 2021. After that, there was a steep rise in time at anchor that reached new peaks in August and October 2021. In the People's Republic of China, time at anchor remained more or less at the level reached in May 2020, starting a continuous rise in May 2021 that reached a new peak in

August 2021, declining since then. In Europe, time at anchor has gone down since May 2020, subject to fluctuations. (MDS Transmodal, n.d.)

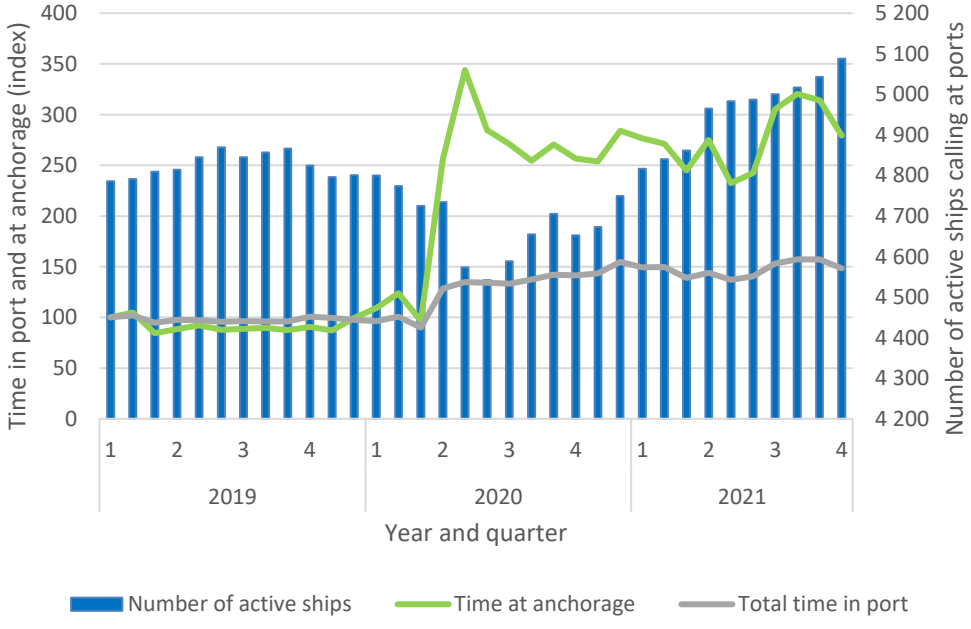
The differences in time at anchor might be explained by the following factors. First, US ports generally perform fewer transhipment functions than the main Chinese and European ports, leading to fewer opportunities for idling ships due to service cancellations. Second, there is a link between time at anchor and time in port. The increase in time in port has been very limited in European ports, which might have resulted in the relatively limited increase of time at anchor, in contrast to US and Chinese ports.

Time in ports

The time that container ships spend in ports has increased since March 2020: in October 2021, the average time in port was approximately 50% longer than in January 2019. There are various explanations for this. Port terminals plan for the arrival of a ship by, for example, positioning containers in the yard in such a way that the loading and unloading of the ship takes the least amount of time. As a result, the fewer the ships that respect their announced arrival time, the more difficult terminal planning becomes, lowering the terminal's efficiency. The link between ship schedule reliability and port terminal congestion can turn in a vicious circle whereby lower ship reliability leads to port congestion, leading to even lower ship reliability. In various ports, Covid-19 affected port workers and protocols to minimise the spread of Covid-19 slowed cargo handling operations. Some ports – none of them in Europe – were confronted with closures.

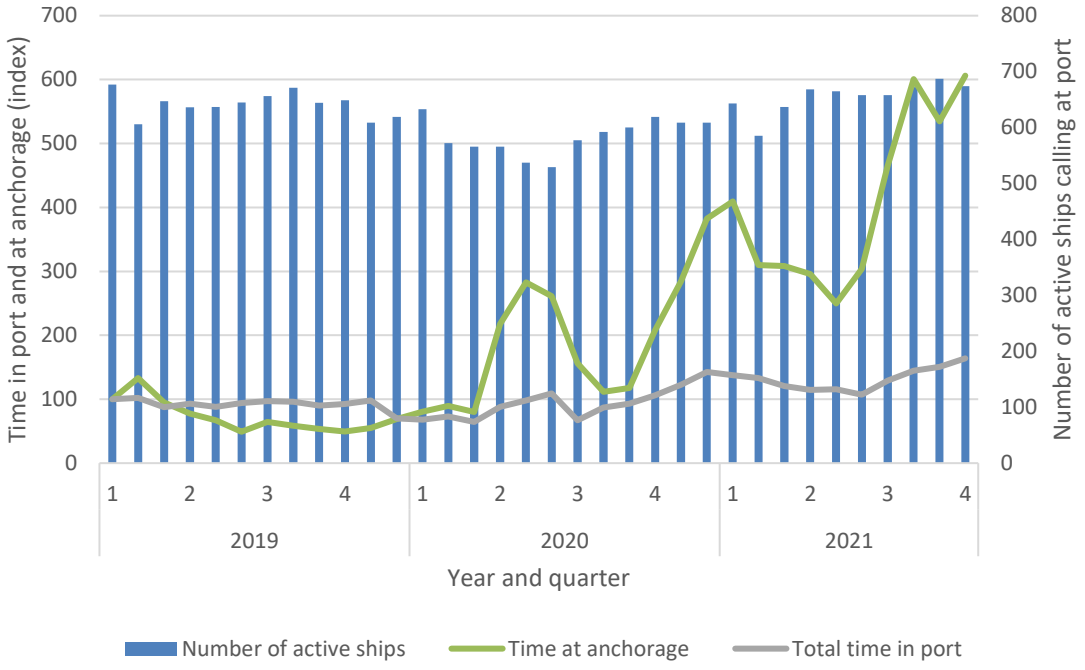
Border closures also affected maritime trade flows and had a large impact on seafarers. They complicated the process of crew changes, contributing to a large number of seafarers staying aboard ships much longer than what is customary. Few governments facilitated crew changes effectively and the situation was not helped by the decisions of market players, including shipping companies, registries, charterers and ports.

Figure 10. Time in port and time at anchorage in container ports globally, 2019-21



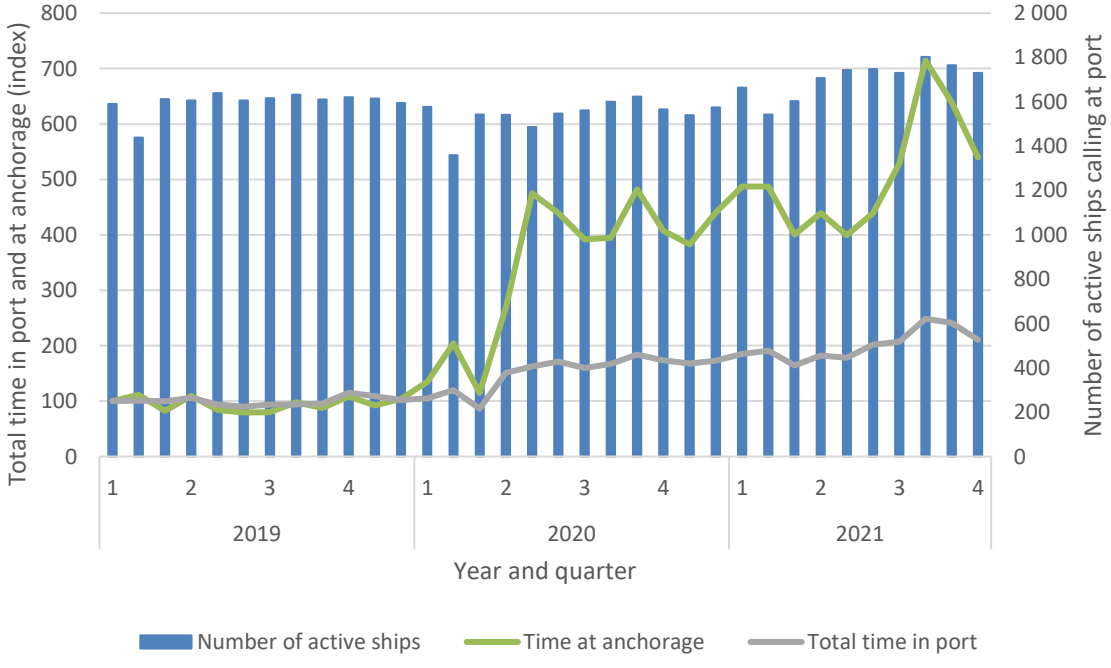
Note: Index 2019 Q1 = 100
Source: Based on MDS Transmodal (n.d.).

Figure 11. Time in port and time at anchorage in United States container ports, 2019-21



Note: Index 2019 Q1 = 100
Source: Based on MDS Transmodal (n.d.).

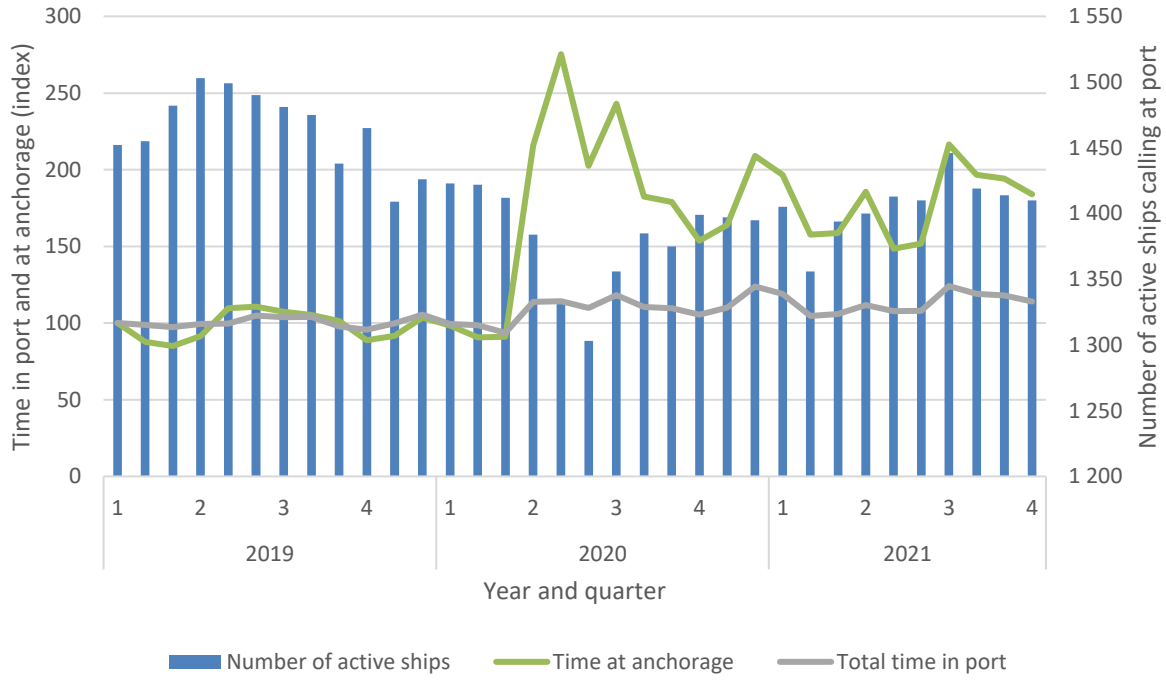
Figure 12. Time in port and time at anchorage in Chinese container ports, 2019-21



Note: Index 2019 Q1 = 100
Source: Based on MDS Transmodal (n.d.).

A ship's time in port varies considerably among port regions. In China and the United States, the time in port in October 2021 was twice as high as in January 2020, whereas port time in Europe over that same period increased by less than 15% (Figure 13). The time in port in China consistently and gradually increased since March 2020, whereas the development in US ports was subject to more fluctuations. Another difference was the more significant decrease of active ships calling European ports since March 2020, compared to US and Chinese ports, where the decrease was more moderate. (MDS Transmodal n.d.)

Figure 13. Time in port and time at anchorage in European container ports, 2019-21



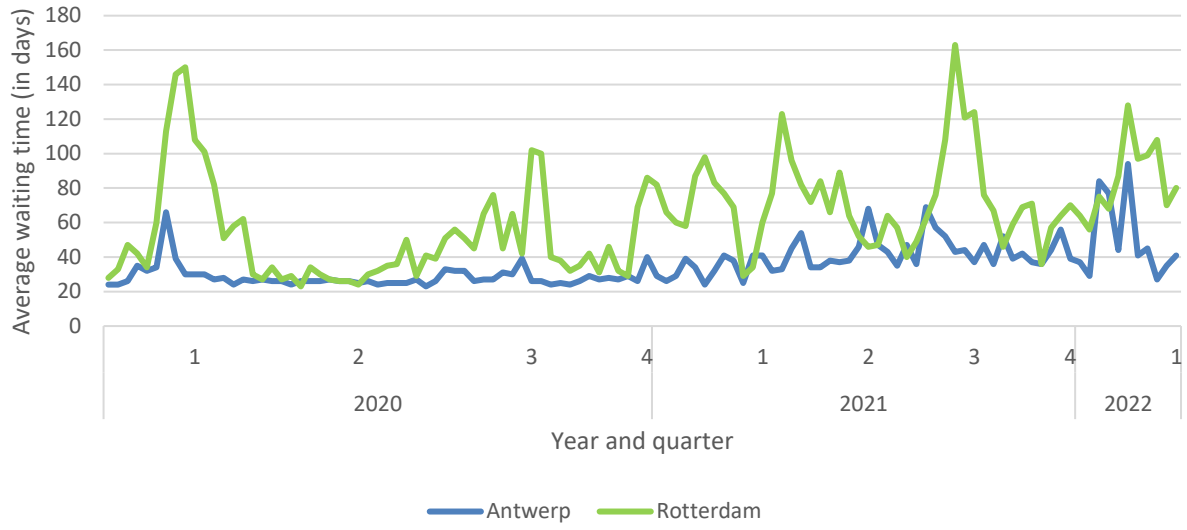
Note: Index 2019 Q1 = 100
Source: Based on MDS Transmodal (n.d.).

Time in hinterland transport

Limited information exists on time in hinterland transport modes (ie. transport modes in areas beyond sea ports) or waiting time for hinterland transport modes in ports. Some ports collect such information and provide these on a regular basis on their website, but this is generally rare. Unsurprisingly, there are no publicly available data aggregated for port regions.

The data at the level of individual ports show certain patterns, but it is difficult to say if these are place-specific or illustrative of a wider tendency. Data on average waiting times for inland barges – from the barge company Contargo – in the ports of Antwerp and Rotterdam show a slight increase in waiting times, but also many fluctuations, with peaks in March 2020, September 2021 and February 2022 (Figure 14).

Figure 14. Average waiting time for inland barges in the ports of Antwerp and Rotterdam, 2020-22

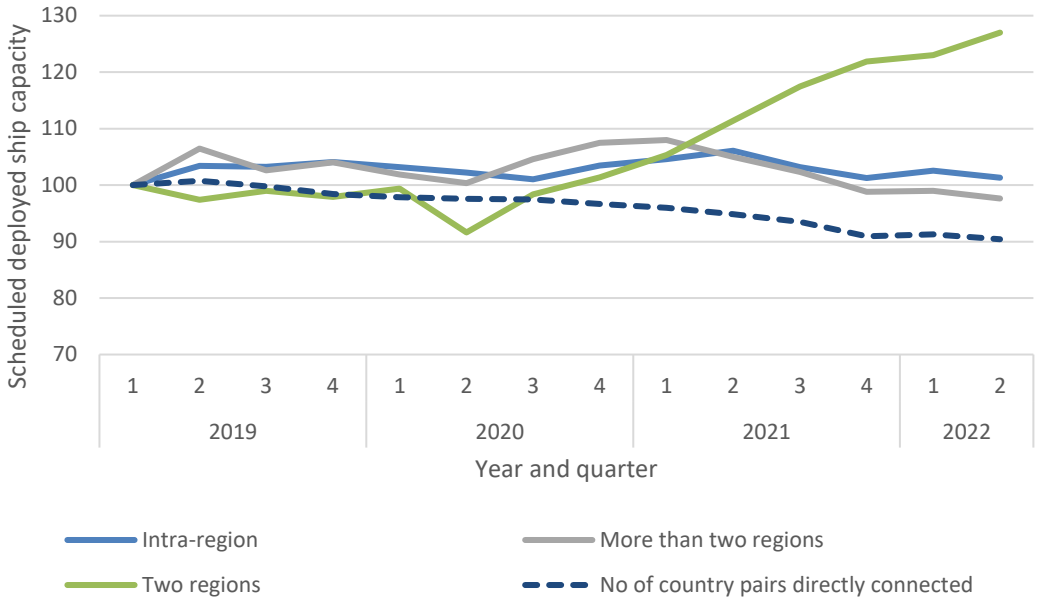


Source: Contargo (n.d.).

Direct liner connectivity

Since the third quarter of 2020, shipping lines have been adjusting their networks, shifting capacity from services serving more than two regions in favour of those serving only two. In doing so, shipping lines have been reducing port calls, thus increasing the number of country pairs (countries that can be reached directly – without transhipment – via container shipping from another country) without direct connections. Based on capacity scheduled to be deployed in May 2022, this report estimates that the number of countries directly connected has now reached its lowest level since the first quarter of 2006, the start of the MDS Transmodal (n.d.) dataset. The deterioration in direct connectivity has only been accelerated by the Covid-19 pandemic, as the downward trend was already occurring in 2019 (Figure 15).

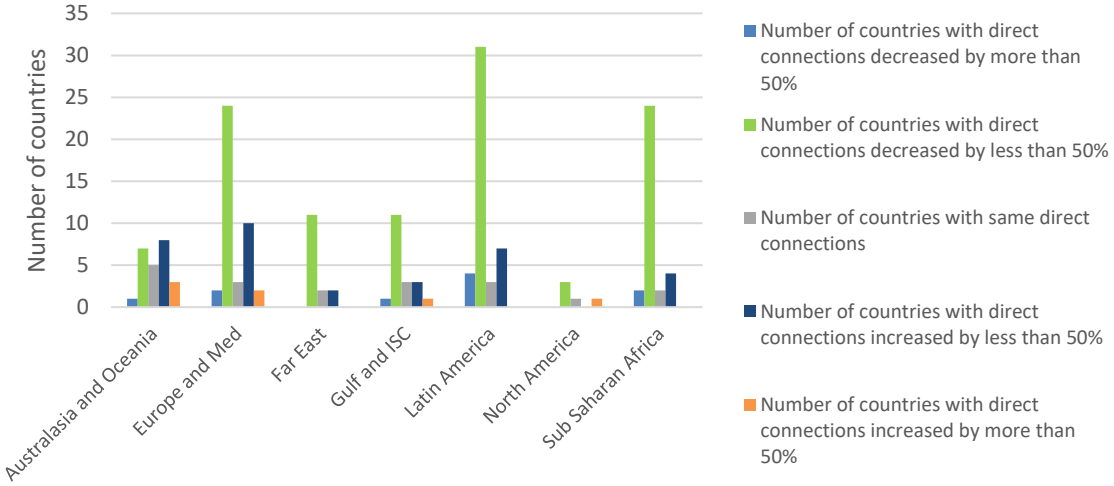
Figure 15. Scheduled deployed capacity by regions served and number of direct connections, 2019-21



Note: Index 2019 Q1 = 100
Source: MDS Transmodal (n.d.).

An assessment of the development of container shipping schedules shows that this direct liner connectivity has decreased in particular in Latin America (where 35 countries were confronted with drops in direct connections), in Europe (reductions for 26 countries) and sub-Saharan Africa (reductions for 26 countries). France and Italy are among the countries with particularly large drops in direct connectivity. The region that showed the lowest drop in direct liner connectivity was Australasia and Oceania (Figure 16).

Figure 16. Development of direct liner connectivity
from the second quarter of 2019 to the second quarter of 2022



Source: MDS Transmodal.

Causes and effects of maritime performance

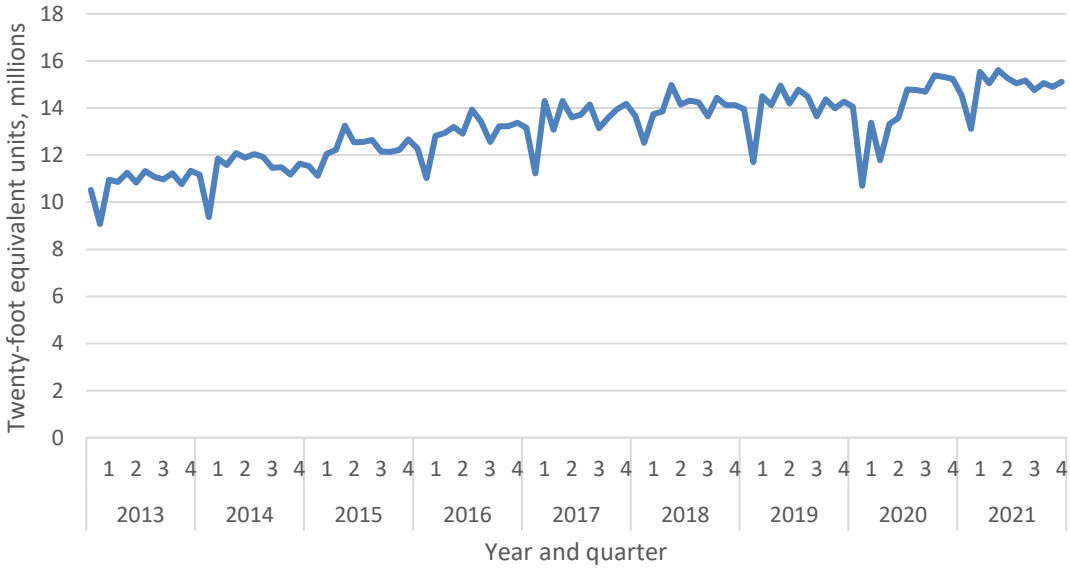
The maritime transport chain consists of many different, interconnected parts. It is not always easy to distinguish between the causes and effects of certain phenomena. This section focuses on three possible causes for the current situation in the containerised maritime transport chain: development in demand for containerised transport, ship capacity management by carriers and port congestion.

Demand for containerised transport

The rapid increase in container freight rates could be explained by the combination of pent-up demand during economic lockdowns and government fiscal stimulus policies at the start of the Covid-19 pandemic. The combination of the two arguably created a situation of unprecedented demand for containerised transport for which container shipping companies could not have prepared. However, when looking at the actual container transport volumes and the utilisation rates of ships, this explanation does not hold.

The volume of containers transported by the major container shipping companies continues to increase steadily, albeit with many seasonal fluctuations (including, for example, reductions at the time of the Chinese New Year). The effect of the Covid-19 lockdowns shows up in a protracted slump in container volumes during February-June 2020. Although volumes rebounded after June 2020, growth rates are in line with trend growth (Figure 17).

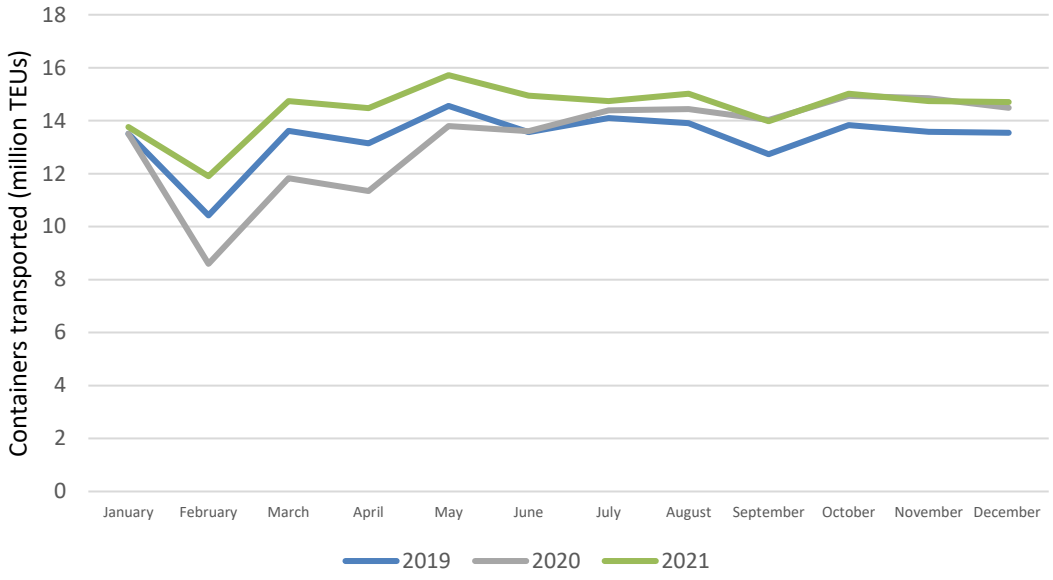
Figure 17. Global container volumes transported per month, 2013-21



Source: Based on Container Trade Statistics (n.d.).

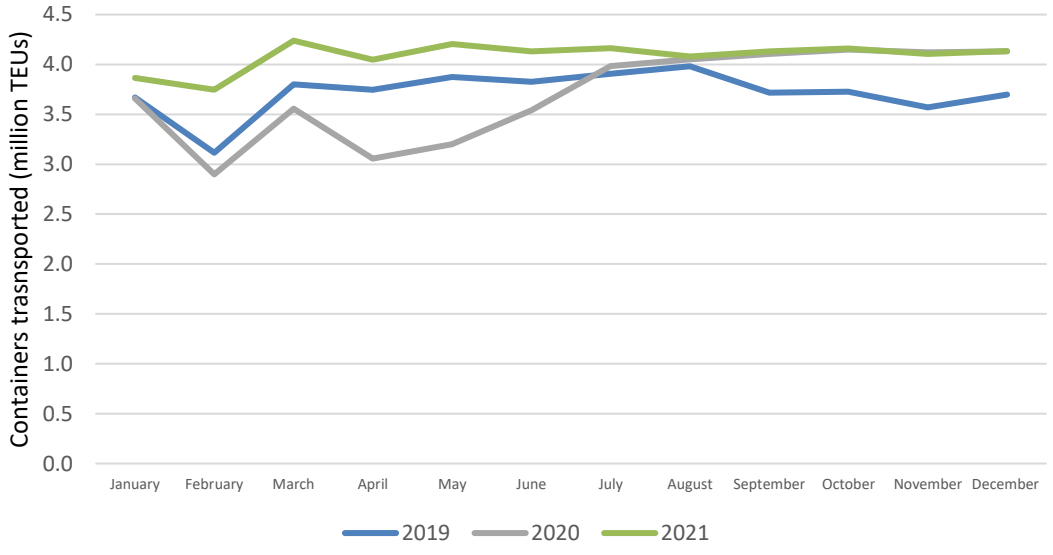
There is a remarkable difference between regions in the development of demand for containerised transport. In the Far East and North America (Figures 18 and 19), there appears to have been a rebound in demand for containerised goods in the second half of 2020 and the first half of 2021. However, the volumes in container transport to and from Europe remained more or less flat, with the volumes in the first eight months in 2021 almost the same as those in 2019 (Figure 20).

Figure 18. Container volumes transported to and from the Far East per month, 2019-21



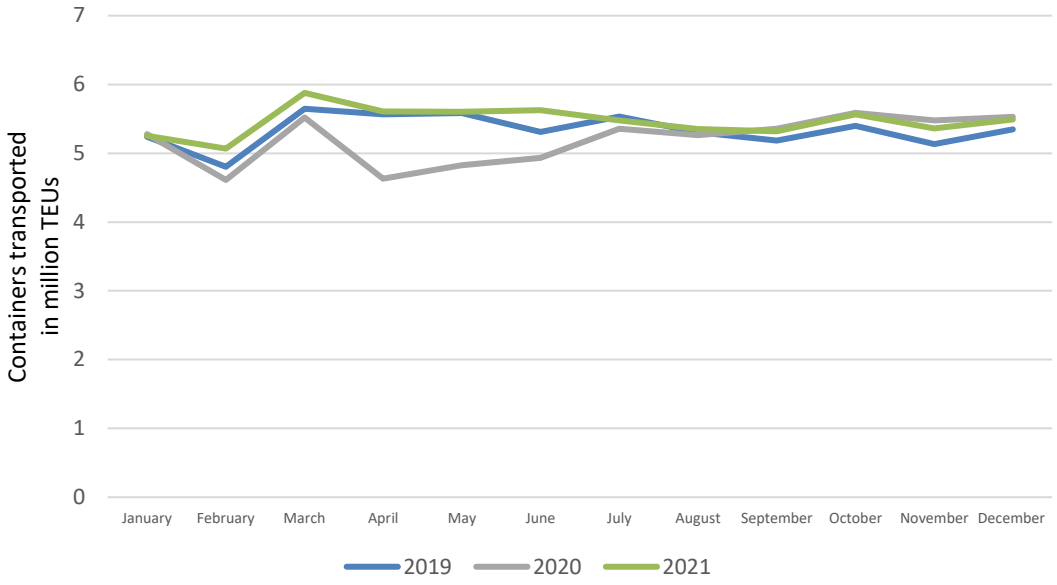
Note: TEU = twenty-foot equivalent unit
Source: Based on Container Trade Statistics (n.d.).

Figure 19. Container volumes transported to from North America per month, 2019-21



Note: TEU = twenty-foot equivalent unit
Source: Based on Container Trade Statistics (n.d.).

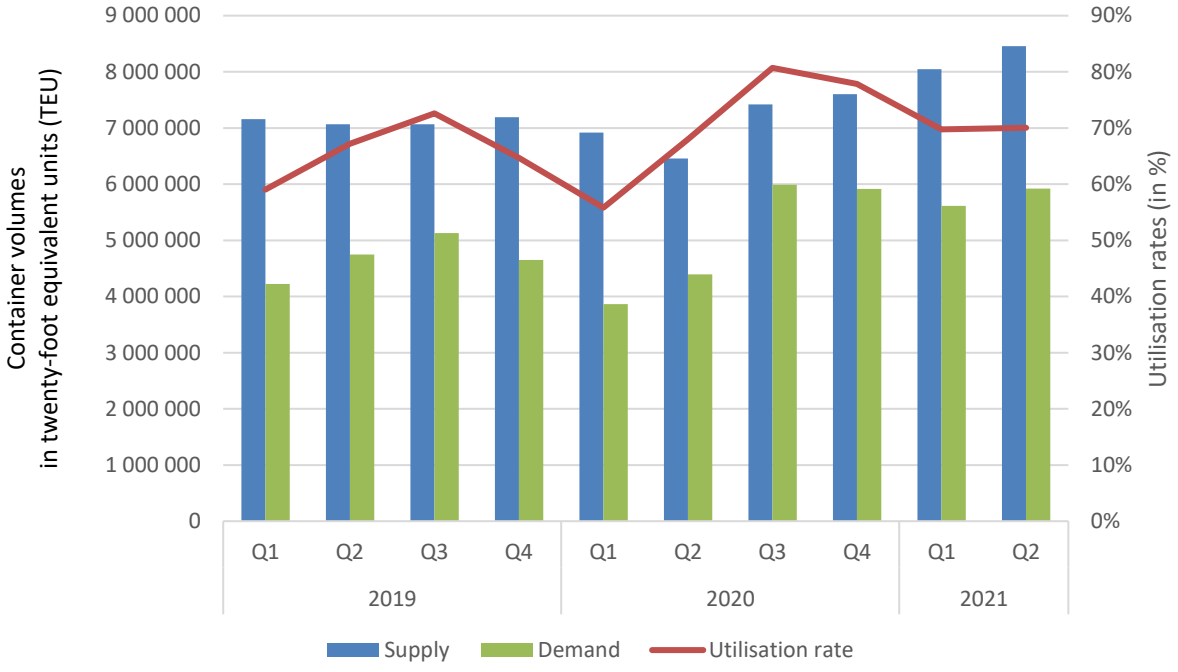
Figure 20. Freight container volumes transported to and from Europe per month, 2019-21



Note: TEU = twenty-foot equivalent unit
Source: Based on Container Trade Statistics (n.d.).

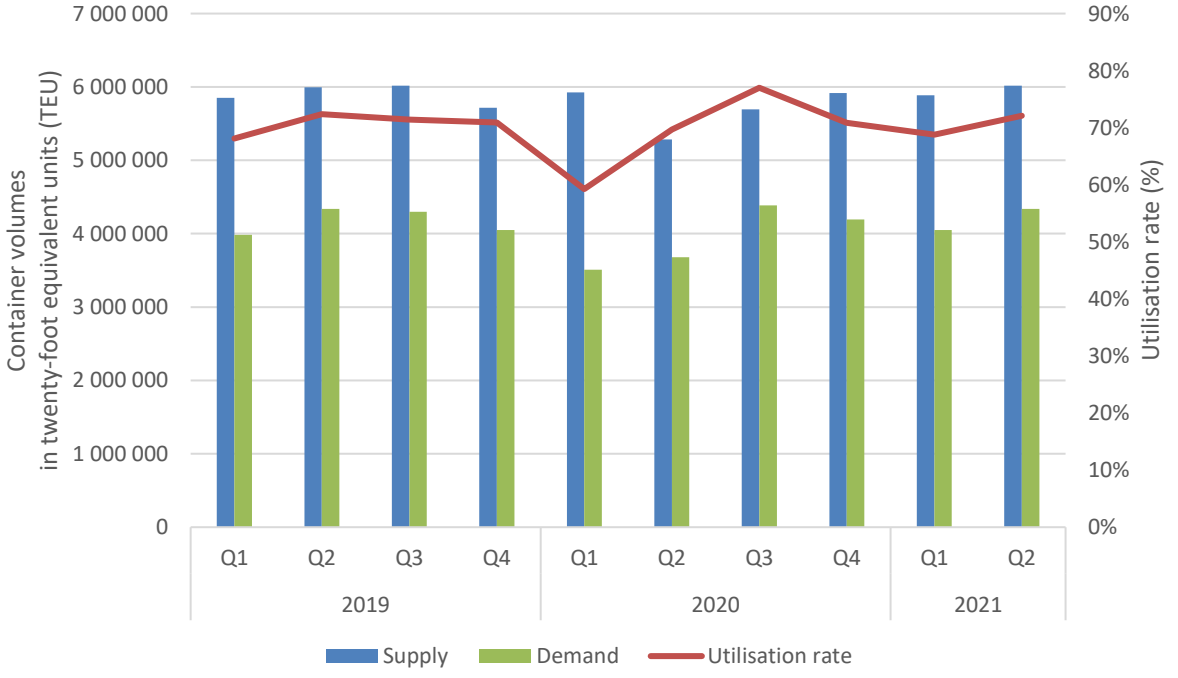
The figures on containers transported could reflect a situation of unfulfilled demand: there might be demand for container transport that cannot be serviced due to a lack of ship capacity. If this were the case, it would normally show up in very high ship utilisation rates. However, utilisation rates are *not* extremely high. On both the Far East-North America and Far East-Europe trades, the ship utilisation rate reached a low during the first quarter 2020, after which it increased until the third quarter of 2020, followed by a gradual decline of utilisation rates at around 70% for both trade routes at the time of the writing of this report (figures 21 and 22). On the Far East-North America route, capacity has been growing at a faster rate than demand since the third quarter of 2020.

Figure 21. Ship utilisation rate, Far East-North America, 2019-21



Source: MDS Transmodal (n.d.).

Figure 22. Ship utilisation rate, Far East-Europe, 2019-21

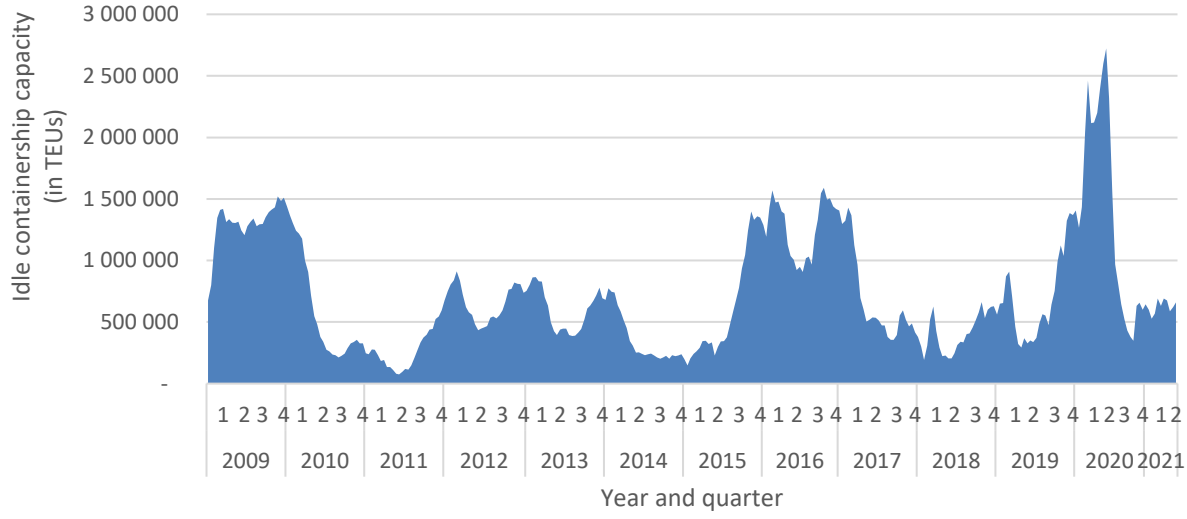


Source: MDS Transmodal (n.d.).

Container shipping capacity

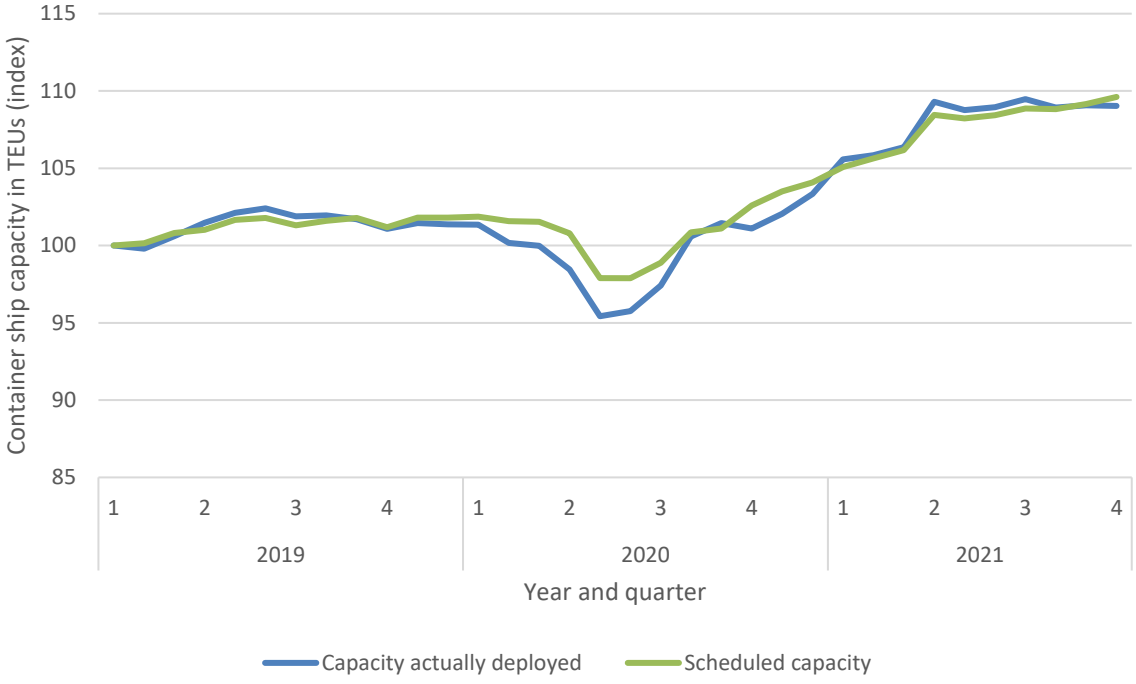
Container carriers have been able to adapt to the economic realities of the Covid-19 lockdowns via their management of container ship capacity. More precisely: carriers collectively idled a considerable part of their fleet during the economic lockdowns when demand for containerised maritime transport declined. A large part of this took the form of cancelled services or cancelled port calls. At the peak of these cancellations in June 2020, idle container ship capacity was at 12% of the total container ship fleet, representing approximately 2.7 million twenty-foot equivalent units (TEU) in container ship capacity (Figure 23). Idling capacity continued until September 2020, when most of the container ship capacity was active again. The timing of this phasing in of active capacity is remarkable, considering that container spot rates had already begun to increase in June 2020, reflecting a rebound in demand for containerised transport. In a fully competitive market, such a strategy would not have been feasible, as there would always be companies that would have provided more capacity or lower prices in order to gain market share.

Figure 23. Idle container ship capacity in twenty-foot equivalent units (TEU), 2009-21



Note: TEU = twenty-foot equivalent units
Source: Alphaliner (n.d.).

Figure 24. Scheduled and actually deployed capacity, 2019-21

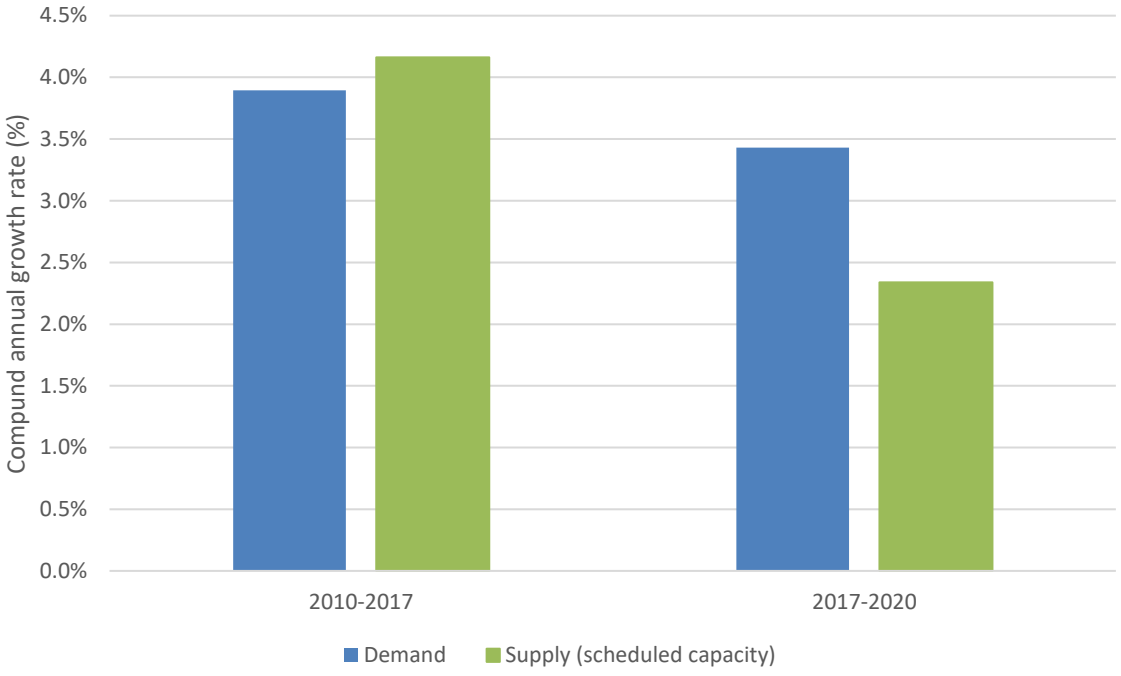


Note: TEU = twenty-foot equivalent units
Source: MDS Transmodal (n.d.).

Container shipping companies attempted to accommodate the surge in demand for maritime transport in in the second half of 2020 in the Far East and North America. However, they were constrained by their decisions on capacity deployment prior to the crisis: whereas supply of deployed container ships outstripped demand during 2010-17, the inverse was the case for 2017-20. During this period, compound annual growth rates for container transport demand reached 3.5%, but only 2.3% for the supply of deployed container ships (Figure 25). The scarcity of container ship capacity in the second half of 2020 was born of the previous restraining of capacity since 2017. At the time of writing of this report, this scarcity is projected to continue until at least 2024, with projected demand at around 3.2% – that is, higher than the projected ship capacity (including ship orders, net of scrapping) estimated to be in the order of 2.5% over 2021-24.

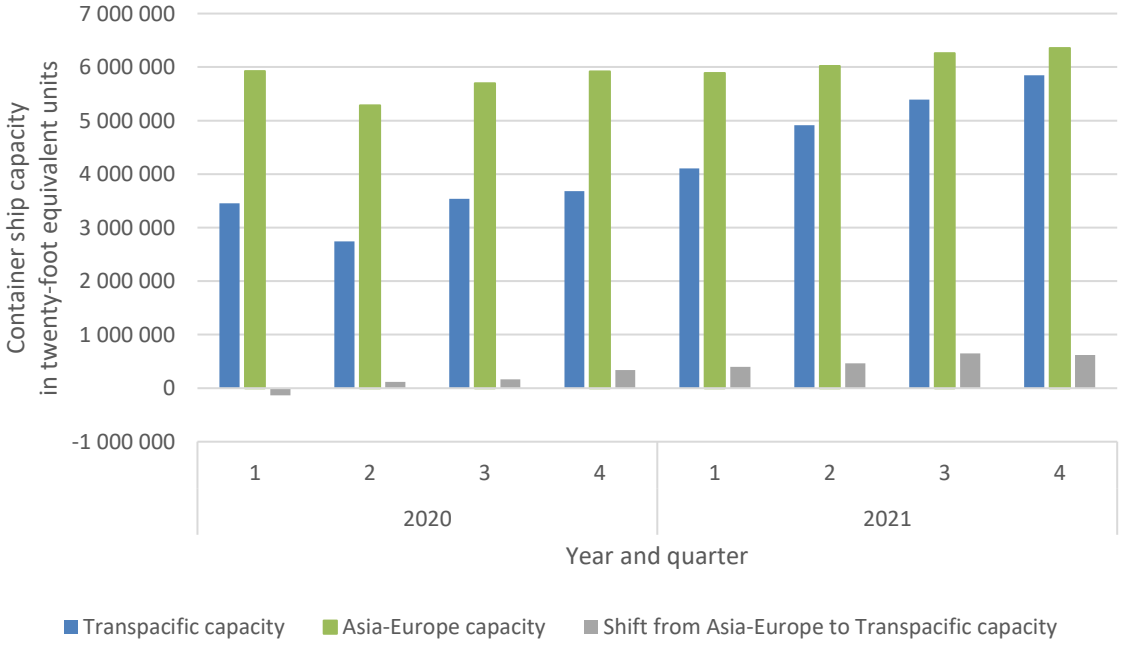
Carriers reacted to the demand surge in the Far East and North America by shifting capacity to the trans-Pacific trade from other routes, such as East-West round-the-world-services that touch Asia-Europe-North America and Asia. As a result, a net shift of capacity from Asia-Europe to the trans-Pacific route occurred in the second quarter of 2020. Asia-Europe capacity in the first quarter of 2021 was at a slightly lower level than in the first quarter of 2020. This scarcity of capacity could have been one of the causes of the increase in Asia-Europe freight rates (Figure 26). After the first quarter of 2021, Asia-Europe capacity increased.

Figure 25. Global container transport demand versus scheduled liner service capacity, 2010-20



Source: MDS Transmodal (n.d.).

Figure 26. Net shift of Asia-Europe capacity to trans-Pacific routes



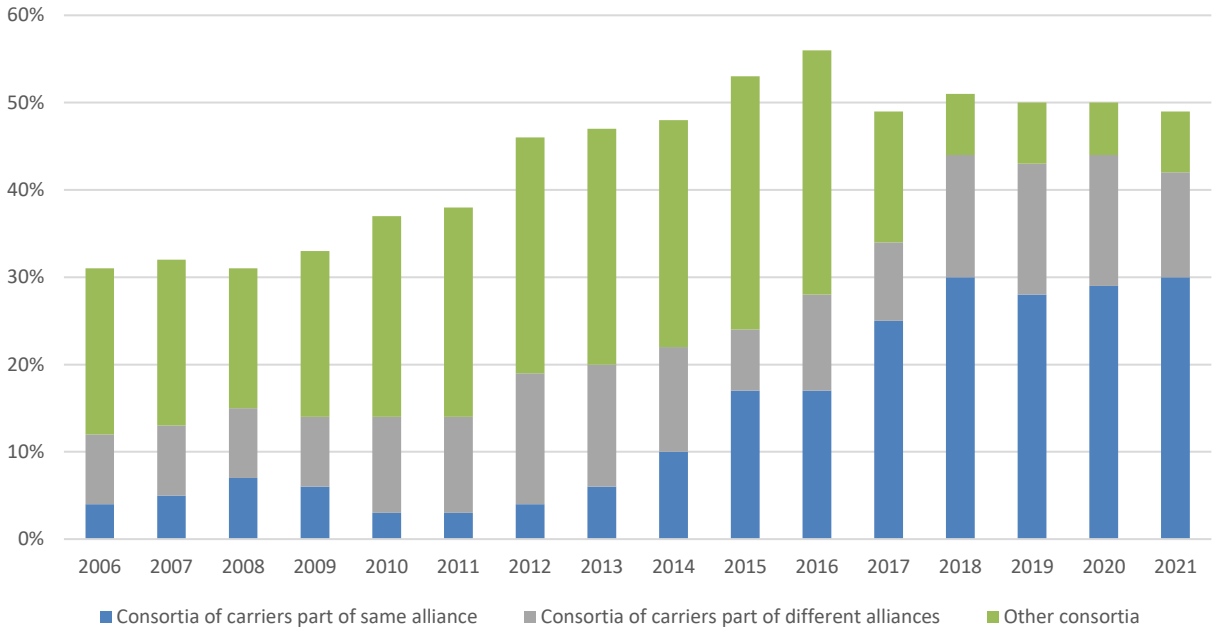
Source: MDS Transmodal (n.d.).

Alliances and consortia

Container carriers have been able to withdraw and reposition ship capacity thanks to consortia and alliances. Consortia are co-operative arrangements between one or more container carriers to share vessels on a specific trade route. Alliances can be considered a bundle of consortia, operating on the main East-West trade routes (Asia-Europe, trans-Pacific, and Transatlantic). The main nine container carriers are all part of three alliances; the capacity of the nine carriers represents around 85% of total global container ship capacity. There are hundreds of consortia, operating on almost all global trade routes.

Since 2006, the competitive environment for container shipping has changed in three fundamental ways. First is the emergence of alliances as an inevitable vehicle to share information and resources for all major carriers. Second is the transformation of consortia as a tool for alliances: in 2006, around 12% of container ship capacity was operated by consortia with members that were part of an alliance; by 2021, that percentage had risen to 42%. Third is the growing importance of consortia as "bridges" between alliances. A considerable part of the consortia (13% in 2021) consists of members from different alliances (Figure 27). In this way, carriers are inter-related via interlinked consortia (Table 2 and Figure 28). This provides carriers with the mechanisms to co-ordinate, withdraw and expand ship capacities, and reposition ships on different trade lanes depending on changing demand and evolving perspectives for profits.

Figure 27. Share of container ship capacity operated via consortia, 2006-21



Source: Merk and Teodoro (2022).

The reality of alliances and consortia is not taken into account in traditional market concentration indicators applied to the shipping sector. The Herfindahl-Hirschman Index (HHI) is a frequently used indicator for estimating industry concentration. The HHI is calculated by squaring the market share of each competing firm in an industry and then adding up the resulting numbers. Consortia can be considered as vehicles for what has been referred to in the competition literature as "common ownership", applied to container shipping. Common ownership refers to situations in which one or more owners of a company also owns shares in one or more competing companies in the same industry (OECD, 2017). Consortia could

be thus be seen as joint ventures of two or more container carriers that pool ships to provide a jointly operated shipping service (Merk and Teodoro, 2022).

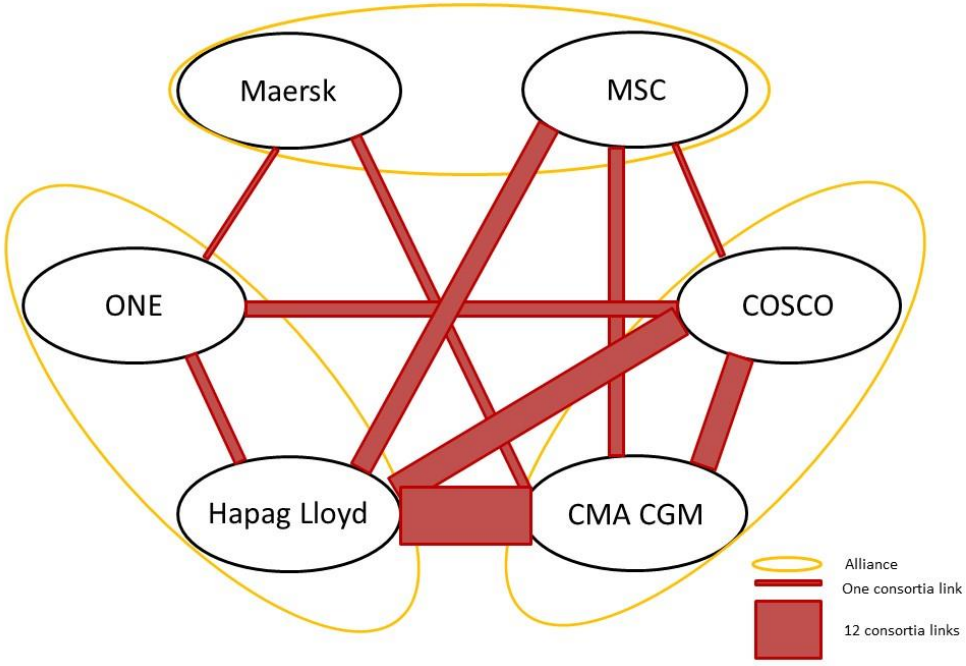
In order to measure market concentration in the presence of common ownership, Bresnahan and Salop (1986) developed a so-called modified Herfindahl-Hirschman Index (MHHI) to take account such cross-company ownership in competing companies. O'Brien and Salop (2000) generalised this modification, while Merk and Teodoro (2022) applied the MHHI to container shipping. Their analysis shows the increased relevance of consortia when determining industry market concentration of liner shipping. For example, on the trade route between North Europe and the east coast of North America, there was a difference of approximately 250 points between the HHI and MHHI between 2006-14; this difference increased significantly after 2014 to around 900 points due to changes in consortia and the emergence of new alliances. The MHHI on this trade corridor has reached the threshold of 2 500 points, despite an HHI score of around 1 500 (Figure 29). Based on such an MHHI score, the Transatlantic trade could be considered as "highly concentrated", rather than "moderately concentrated" when the traditional HHI is applied, as is the case in FMC (2022).

Table 2. Number of links between the top ten carriers via consortia in 2021

		2M		Ocean Alliance			THE Alliance					Total
		Maersk	MSC	CMA CGM	COSCO	Evergreen	Hapag Lloyd	HMM	ONE	Yang Ming	ZIM	
2M	Maersk		2	4	3		4		4		2	19
	MSC	2		1	2		4	1	3		1	14
Ocean Alliance	CMA CGM	4	1		10	5	8		2	1	2	33
	COSCO	3	2	10		12	6		10	5	3	51
	Evergreen			5	12		3	1	5	3	2	31
THE Alliance	Hapag Lloyd	4	4	8	6	3		5	11	6	1	48
	HMM		1			1	5		6	4		17
	ONE	4	3	2	10	5	11	6		7	3	51
	Yang Ming			1	5	3	6	4	7			26
	ZIM	2	1	2	3	2	1		3			14
Total		19	14	33	51	31	48	17	51	26	14	

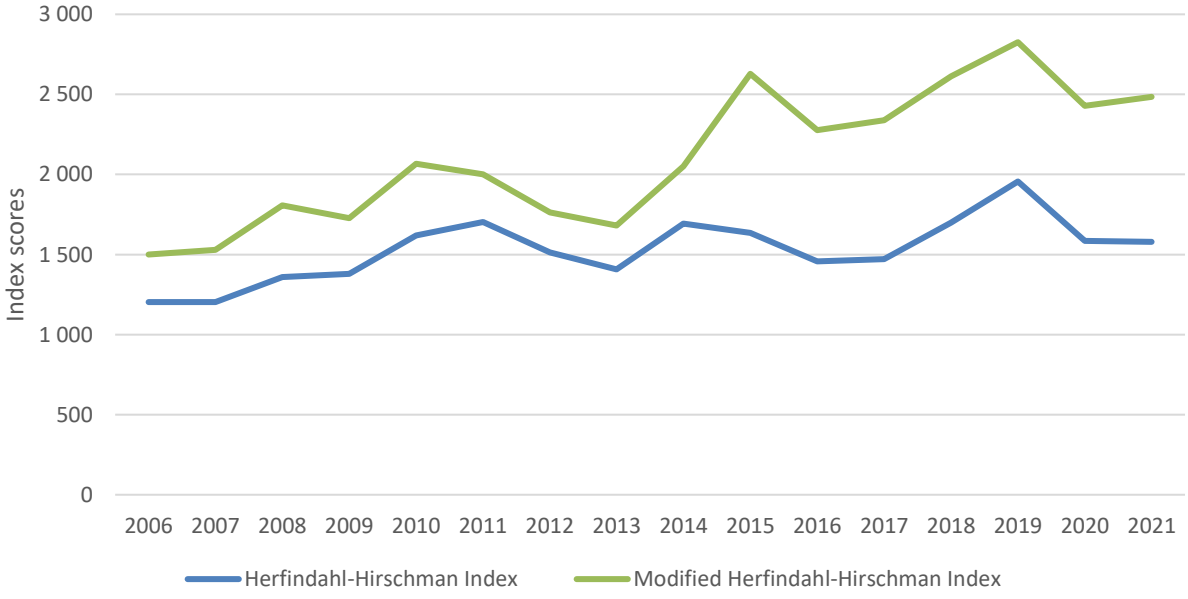
Source: Merk and Teodoro (2022).

Figure 28. Interlinkages between carriers via alliances and consortia



Source: Merk (17 December 2019).

Figure 29. Industry concentration on the trade route between North Europe and the east coast of North America, 2006–21



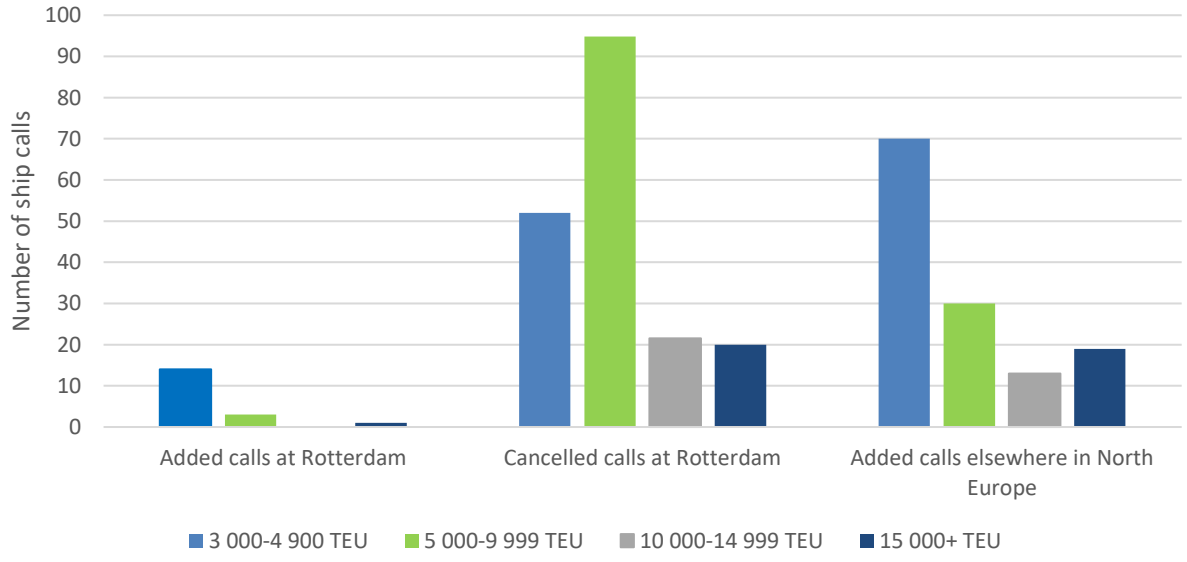
Source: Merk and Teodoro (2022).

Ship reliability and port congestion

Container carriers have frequently claimed that port congestion is one of the reasons ship capacity has become less effective, thus increasing freight rates. Any discussion on port congestion should consider the interlinkages between ship schedule reliability and port congestion. When port terminals run at 100% schedule reliability, they can fully anticipate the arrival of vessels and prepare the sequence of port services so that waiting time and time at berth are as short as possible. When ships arrive late, their planned slots at port are no longer available. They must then wait for docking space to become available. Longer waiting times in ports could, in turn, have a knock-on effect on ship reliability: ships delayed by port congestion will likely arrive late at the next port in their service loop, even if they increase their ship speed between the two ports.

Ship reliability and port congestion in the Los Angeles and Long Beach ports in 2020 and 2021 provide more clarity on the sequence of both. Ship schedule reliability on the Shanghai-Los Angeles trade route started to decrease in June 2020, dropping from almost 90% in that month to just over 10% in the first quarter of 2021. The decreasing schedule reliability did not seem to affect port congestion in the Los Angeles and Long Beach ports until November 2020, when container waiting times – estimated by counting the number of ships at anchor – started to rise. From November 2020 to February 2021, ship waiting time increased as ship schedule reliability decreased. However, the second quarter of 2021 saw a decrease in ship waiting times and an increase in ship schedule reliability (Sea Intelligence n.d.).

Figure 30. Added, cancelled and diverted calls in the port of Rotterdam according to ship size, January to March 2021



Note: TEU = twenty-foot equivalent units
Source: Based on MDS Transmodal (n.d.).

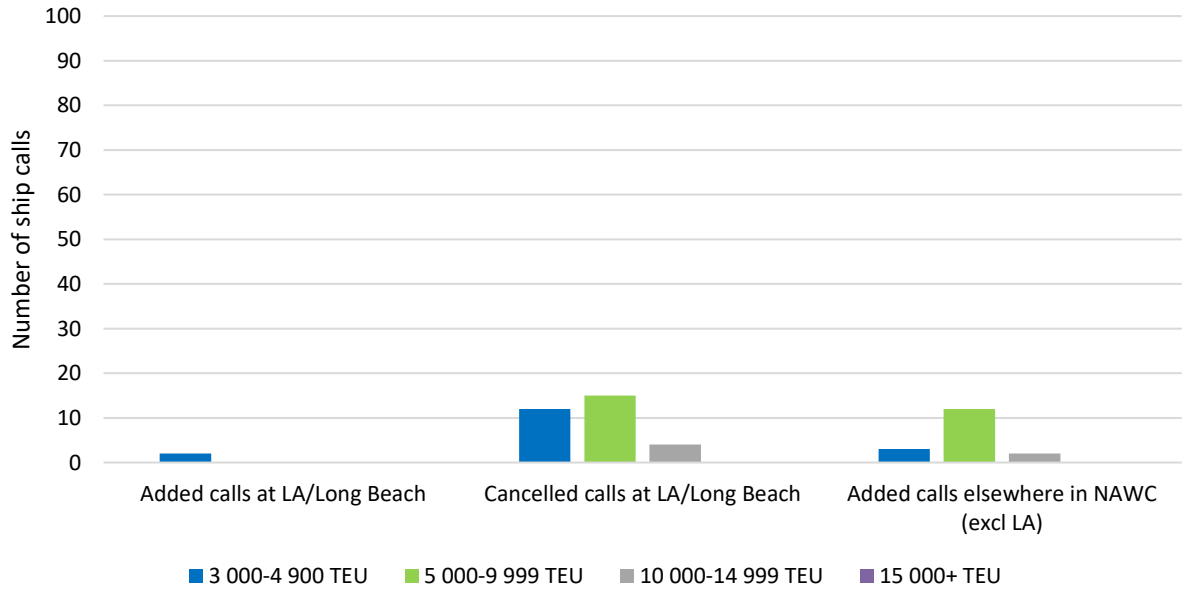
Port congestion can have disruptive spillover effects on the global transport chain if the congested ports cannot be replaced by other container ports. Some parts of the world have a system in which ships can be diverted from a congested port to another port nearby. This was arguably the case in northern Europe in the first quarter of 2021. When a substantial number of calls at the port of Rotterdam were cancelled, they were replaced by added calls elsewhere in the region (Figure 30). This was true for large ships (with a

capacity over 10 000 TEU) and small ships (with capacities of between 3 000 and 5 000 TEU) alike, suggesting that not only calls from ocean carriers could be shifted but feeder calls as well.

In other parts of the world, the regional port system is less flexible. The port complex of Los Angeles/Long Beach handles more volumes than the port of Rotterdam. It was considerably more congested over the same period yet had far fewer diverted calls to other ports in North America West Coast (NAWC) (Figure 31) than Rotterdam and northern Europe. Even more strikingly, the difference between expected and actual port calls (lost calls) in Oakland since 2019 increased significantly (Figure 32) when the Oakland container port could have functioned as an alternative to Los Angeles/Long Beach.

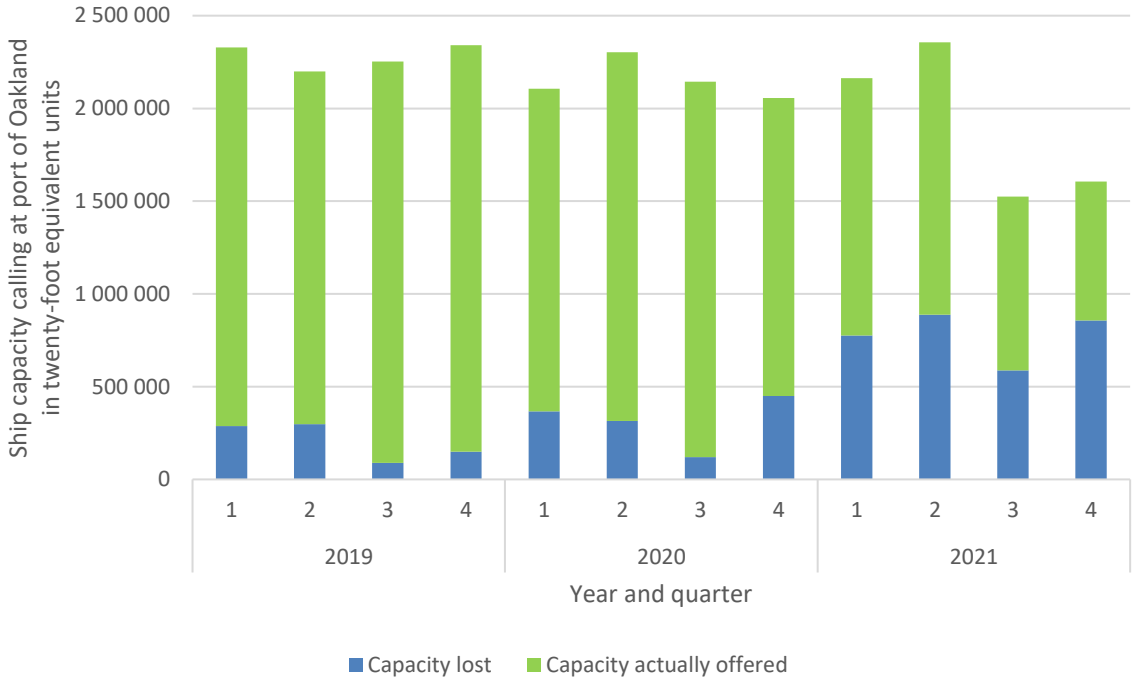
There are various possible reasons for this. It may be that carriers find that the advantages of the Los Angeles and Long Beach ports to other NAWC ports outweigh the long waits. Some carriers have terminal subsidiaries that operate in Los Angeles/Long Beach, so they might want to generate cargo flows to these terminals. It is also worth noting that carriers have benefitted from the situation, as port congestion generates scarcity in ship capacity that can sustain high freight rates.

Figure 31. Added, cancelled and diverted calls in the ports of Los Angeles and Long Beach according to ship size, January to March 2021



Note: TEU = twenty-foot equivalent units
Source: Based on MDS Transmodal (n.d.).

Figure 32. Expected and actual port calls in the port of Oakland, 2019-21



Source: Based on MDS Transmodal (n.d.).

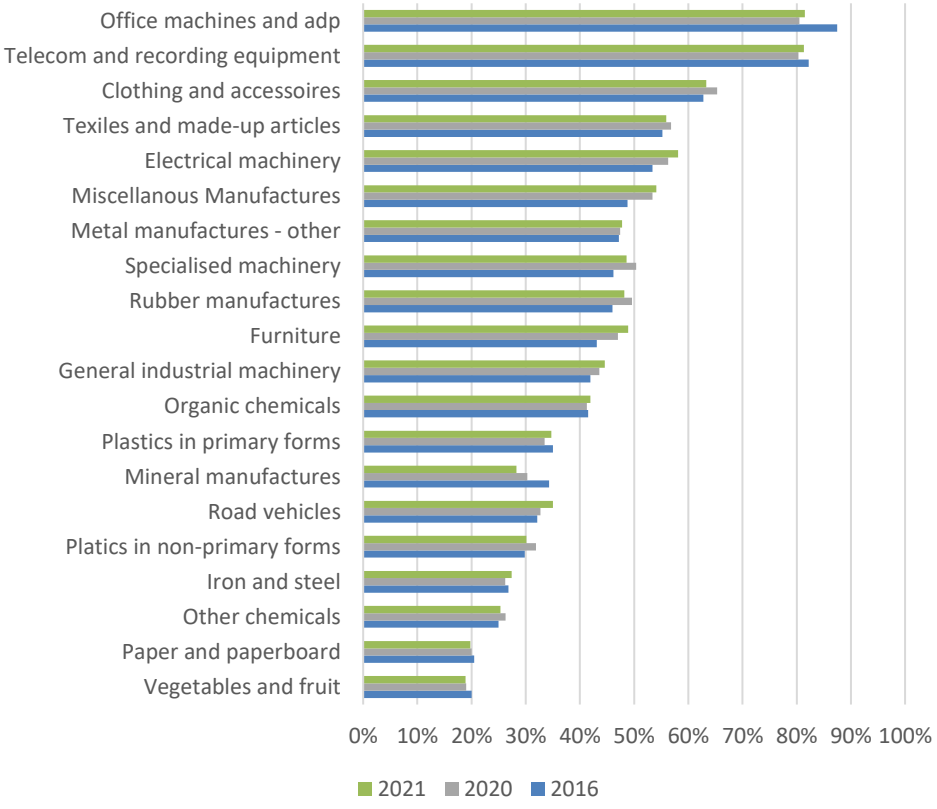
Maritime performance's impact on trade, modal shift and vertical integration

The current developments in the containerised maritime transport chain may have repercussions for other transport sectors and the wider economy. This section assesses the first impacts in terms of trade patterns, modal shift and vertical integration.

Trade patterns

The sharp increase in container freight rates, especially along the main East-West routes, has driven up the price of imports and exports compared to locally traded goods. Sourcing from far away has become more expensive, especially for low-value goods. The question now is whether manufacturers will start to source more regionally rather than globally. An attempt at answering this question may be made by assessing changes in export market shares of the Far East in the main exporting sectors. Figure 33 illustrates the evolution of export shares in several sectors between 2016, 2020 and 2021. It shows significant drops in export shares between 2020 and 2021 in the clothing and accessories, specialised machinery, rubber manufactures and mineral manufactures sectors.

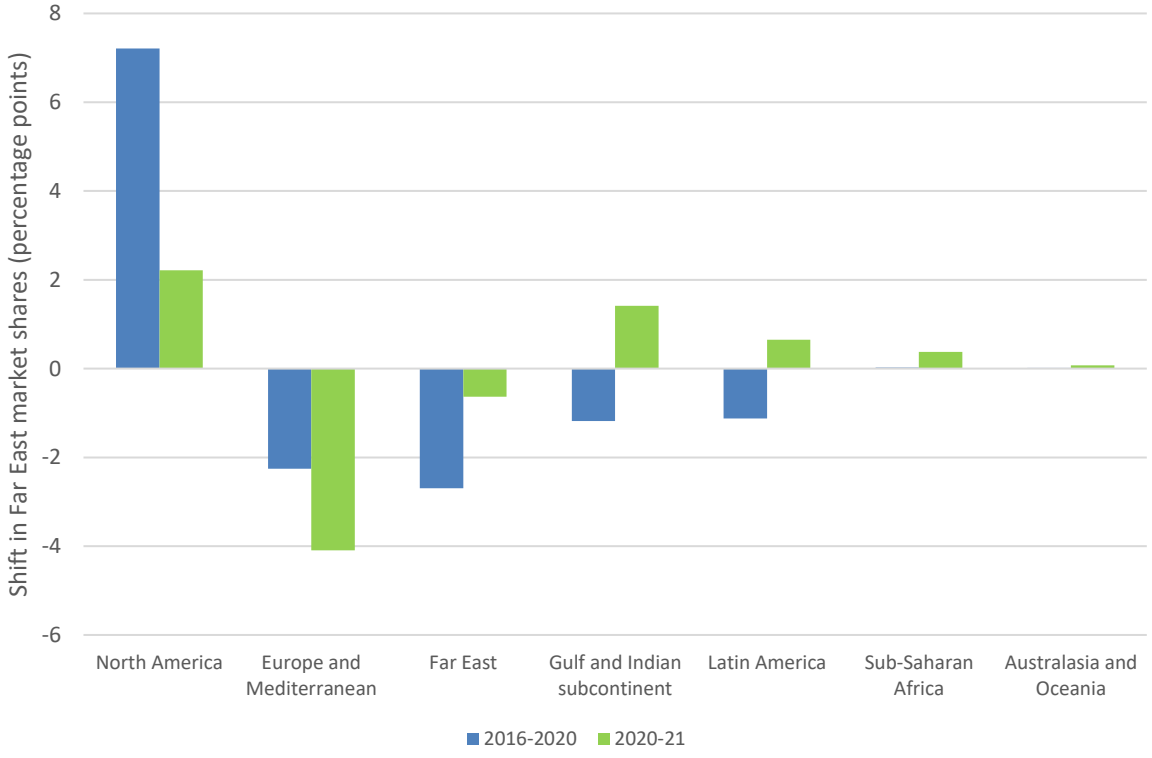
Figure 33. Far-East market share in global exports per industry sector, 2016, 2020 and 2021



Source: MDS Transmodal (n.d.).

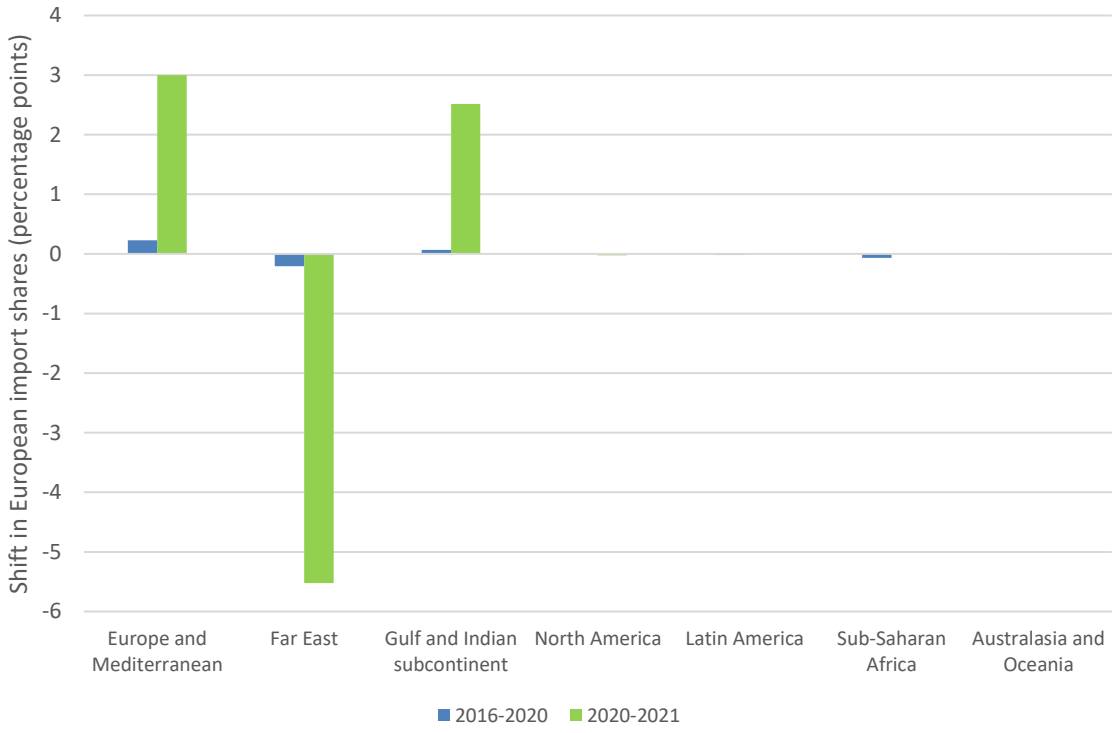
The Far East's export market share in clothing and accessories plummeted by two percentage points between 2020 and 2021, after having steadily grown by 2.5 percentage points in the previous four-year period (2016-20). This may suggest that a new external factor influenced the drop, rather than a decline in competitiveness. Figure 34 illustrates the Far-East market shares in clothing and accessories by importing region. It shows that the main cause for the region's market share drop is a four percentage point decline in imports from Europe and the Mediterranean. When looking at the European import shares in clothing and accessories in Figure 35, the declining imports from the Far East can be identified but so can a simultaneous increase in imports from the Gulf and the Indian subcontinent as well as from Europe and the Mediterranean. In other words, there was a near-shoring tendency in Europe and the Mediterranean in the clothing and accessories sector over 2020-21. That said, it is too early to tell if this tendency will last.

Figure 34. Shifts in Far East market shares in the clothing and accessories sector by importing region



Source: MDS Transmodal (n.d.)

Figure 35. Shifts in European import shares for the clothing and accessories sector by exporting region



Source: MDS Transmodal (n.d.)

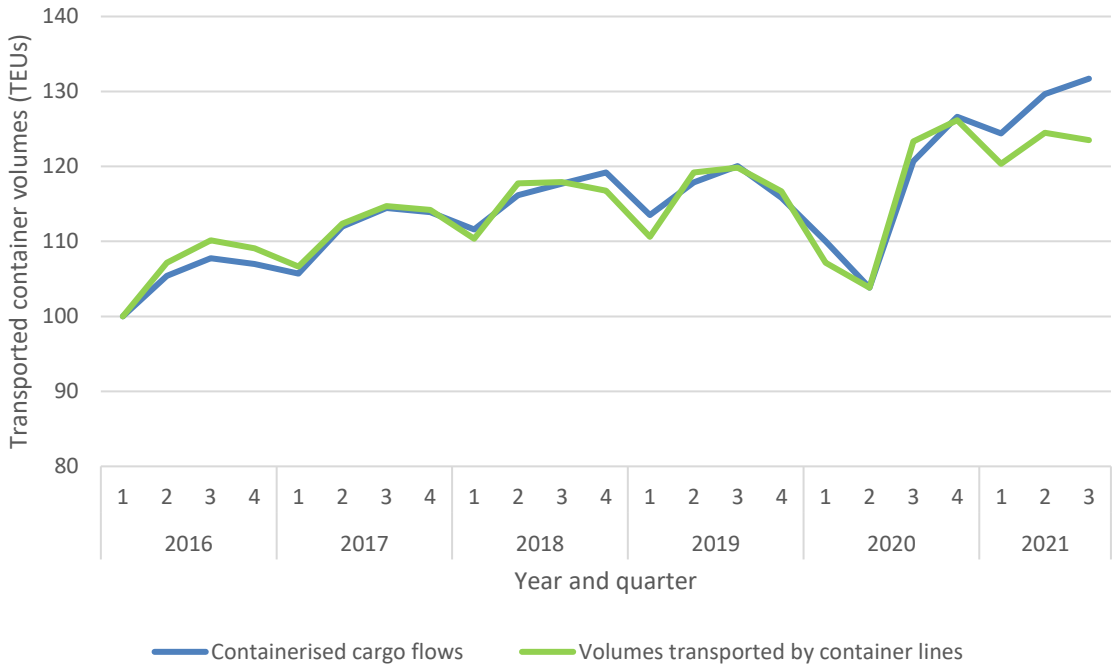
Modal shifts

The substantial increase in containerised freight rates has eroded container shipping's cost competitiveness compared to other transport modes, in particular that of rail freight transport. Almost all long-range containerised cargo used to be transported by the principal container shipping companies. However, a shift began in 2021. As the demand for containerised cargo grew, other actors stepped in to fill those needs. Figure 36 illustrates this shift by charting the evolution of total containerised cargo flows compared to that of container freight transported by the principal container shipping companies.

At least part of the additional container cargo volumes have been accommodated by freight rail. Figure 37 shows that the rail freight company United Transport and Logistics Company – Eurasian Rail Alliance (UTLC ERA), which handles 90% of the containers transported via rail between Asia and Europe, transported considerably more containers in 2020 and 2021 than in the four previous years (UTLC ERA, n.d.). It is difficult to establish to what extent the higher ocean-freight rates have played a determining role in this development, as the Asia-Europe rail freight market started expanding as early as 2016. However, it is clear that the rising costs of container shipping have increased the relative attractiveness of Asia-Europe rail freight.

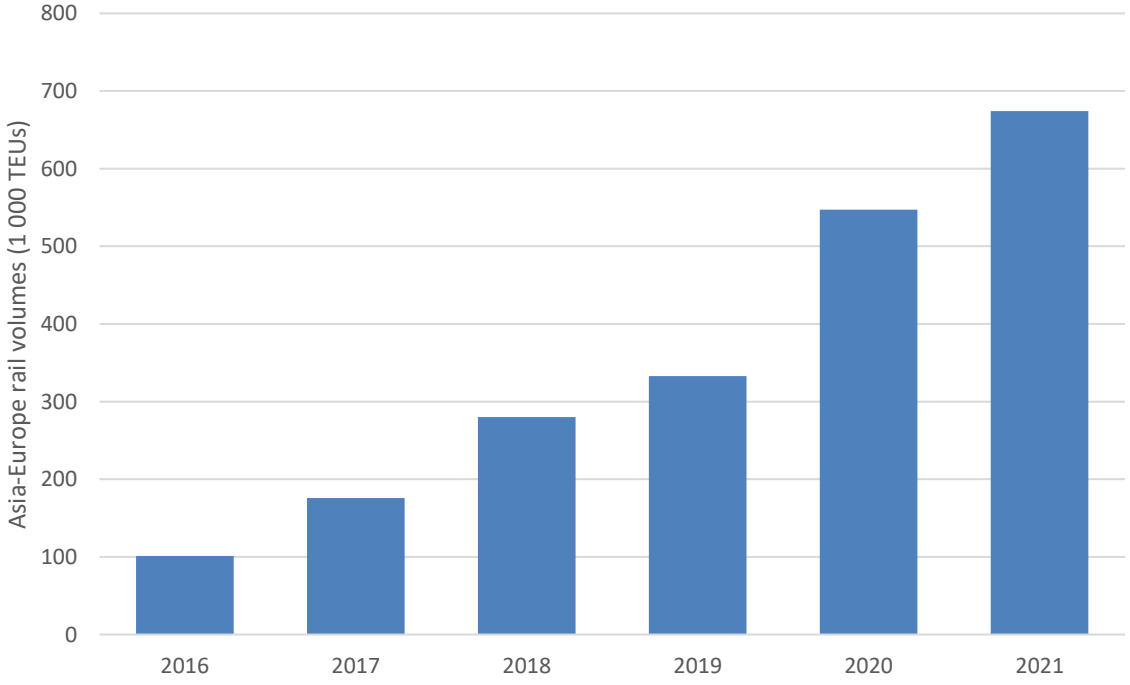
Ocean-freight rates have increased so much that air cargo has become a cost-competitive alternative. Some shippers have decided to shift to air cargo in light of the problems with schedule reliability and the difficulties in securing containers on container vessels. This modal shift resulted in substantial increases in air freight rates in 2021 (Georgiadis, 2021).

Figure 36. Containerised deep-sea cargo flows and volumes transported by container shipping lines, 2016-21



Note: Index: 2016 Q1 = 100. TEU = twenty-foot equivalent units
Source: MDS Transmodal (n.d.), Container Trade Statistics (n.d.)

Figure 37. Asia-Europe containerised rail transport, 2016-21



Note: TEU = twenty-foot equivalent unit, which is a standard container.
Source: Adapted from UTLC Eurasian Rail Alliance (n.d.).

New entrants

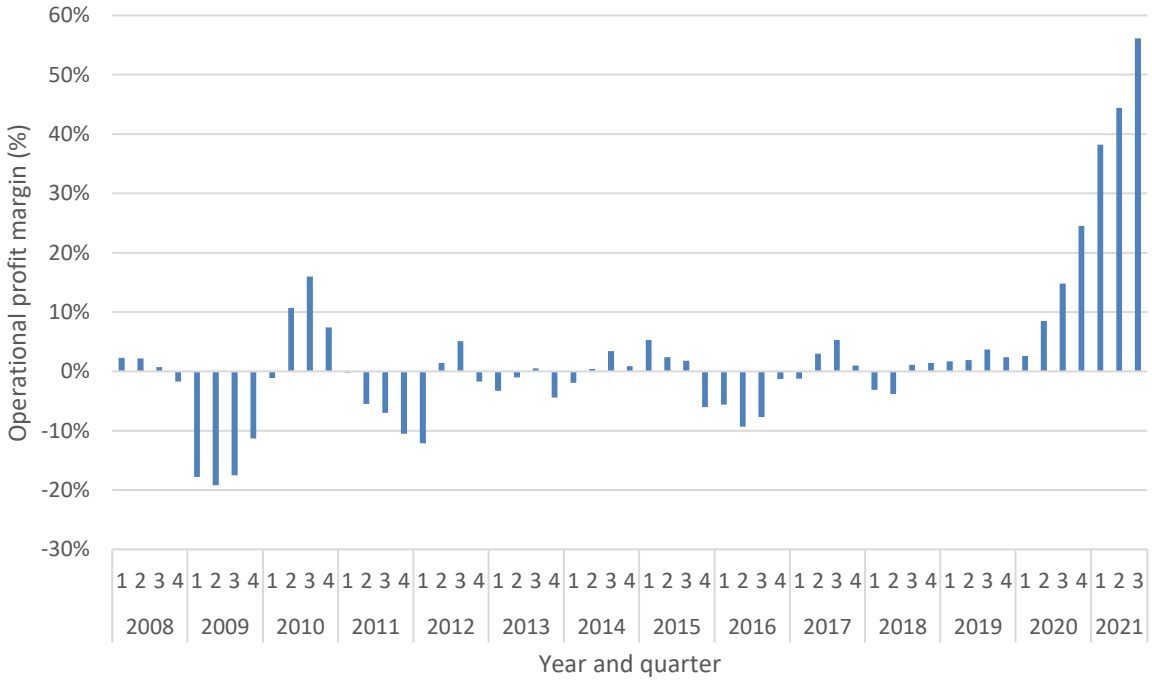
High prices, inadequate services and limited availability of container shipping space have led some large shippers, including retailers like Walmart, Home Depot, Alibaba and Costco, to charter their own ships. Other shippers, like Amazon and Ikea, not only charter their own ships but started to purchase their shipping containers. Estimates put the number of Amazon-owned and manufactured containers at 5 000 to 10 000 (Schoolov, 2021). The largest shippers can afford the cost of charting vessels and moving their own cargo, but this is not an option for most shippers.

Although these new entrants show that it is possible to enter into the container shipping market, their market shares are, for the moment, marginal, not exceeding 0.2% of scheduled capacity and not substantially increasing since 2019. It is likely that most of these initiatives are temporary, with most shippers probably shifting back to container shipping when prices and reliability have improved.

Vertical integration

Container shipping companies were highly profitable in 2020 and 2021. The ten largest container shipping companies recorded a profit of USD 17 billion in 2020 and an estimated USD 160 billion over 2021 (Alphaliner, 2022). Since the beginning of 2020, the operational profit margins have increased each quarter to levels never before observed (Figure 38).

Figure 38. Operational profit margins of the ten largest container carriers, 2008-21



Note: The ten largest container carriers are Maersk, MSC, CMA CGM, COSCO, Hapag Lloyd, ONE, Evergreen, HMM, Yang Ming and ZIM.
Source: Alphaliner (2021b).

Carriers use the funds provided by these profits to acquire port terminals, forwarders and freight airlines and to achieve their ambition of becoming vertically integrated providers of door-to-door logistics solutions. These ambitions were articulated and operationalised well in advance of the Covid-19 crisis, the high profits recorded in 2020 and 2021 provide an even greater impetus for expansion.

Many of the largest container shipping companies have recently acquired companies that will help them achieve their goal of becoming integrated logistics companies (Table 3). As such, they are competing with freight forwarders traditionally in the business of providing transport and logistics solutions for shippers.

Various container shipping companies also consolidated their position in the air-freight business. Maersk ordered five freight airplanes and acquired the freight forwarder Senator International (which has an air-freight fleet). CMA CGM launched its airline in February 2021 with the acquisition of four freighters to be operated by Air Belgium, and the order of two additional freighters in September 2021.

Table 3. Acquisitions by selected container carriers in maritime logistics, 2020-21

Container shipping company	Acquisition	Type of activity
Maersk	HUUB	E-commerce logistics
Maersk	Visible Supply Management	E-commerce logistics
Maersk	B2C Europe	E-commerce logistics
Maersk	Senator International	Freight forwarding
Maersk	KGH Customs Services	Customs brokerage
Maersk	Performance Team	Warehousing
CMA CGM	Ingram Micro CLS	E-commerce logistics
CMA CGM	FMS Terminal Los Angeles	Container terminal
CMA CGM	Continental Rail	Freight rail operations
CMA CGM	Oxatis	E-commerce logistics
CMA CGM	ASTI	Logistics
COSCO	Container Terminal Tollerort Hamburg	Container terminal
COSCO	RSGT Terminal, Jeddah, Saudi Arabia	Container terminal
Hapag Lloyd	Jade Weser Port Terminals	Container terminal

Policy implications

The current situation in the containerised maritime transport chain creates huge challenges for importers and exporters. The extreme rises in ocean transport costs present costs to shippers that are translated into higher prices for consumers that could either fuel inflation (OECD, 2021), or threaten the profitability of shippers, in particular small and medium enterprises that have less negotiating power vis-à-vis carriers and are often more dependent on spot markets. The average global spot rate for transporting a container in the third quarter of 2021 represented 19% of the mean value of the goods transported in that container. This rate was only 3% in the first quarter of 2020 (MDS Transmodal, n.d.). The record-low ship schedule reliability, related port waiting times and unpredictability of cargo arrival times has undermined "just-in-time" business and logistics models. The challenges related to securing cargo space on container ships has introduced so much uncertainty that shippers who are large enough and can afford it have chartered their own ships.

The global character of container shipping means that local supply chain problems – in particular poor performance of the transport chain in the United States – spill over to other places and have become global problems. European shippers are right to wonder why the ocean freight rates to and from Europe have risen exponentially and why it has become increasingly difficult to book cargo space, considering that the European demand for container shipping is essentially flat and port congestion in Europe is negligible. One principal reason could be capacity management of a globalised container shipping industry that shifted ship capacity to trans-Pacific trade lanes in order to accommodate increased demand for consumer goods in the United States. In this way, European shippers are paying the price for a US-driven demand boom for consumer goods, US port congestion and the ability of the global container shipping industry to shift capacity to where profits are highest.

Policies have facilitated this situation. Many jurisdictions have regulations in place that are supportive of alliances and consortia that have allowed carriers to do two things that are essential ingredients of the current supply chain crisis. First, the largest carriers have co-operated to create integrated shipping networks that span the globe. This might have been justified by expectations of increased efficiencies from integrated supply chains, but the integration has also created a situation in which local problems can easily become global. A few decades ago, liner shipping consisted of a multitude of regional shipping companies specialised in specific trades. This regional specialisation would have acted as a buffer and guaranteed that local problems remain local.

Second, regulators have allowed carriers to use these co-operation arrangements to jointly manage fleet capacity. Governments and other jurisdictions have facilitated the rise of ocean freight rates by creating a supportive legal framework for alliances and consortia. However, doing so made it possible for carriers to withdraw ship capacity between January and September 2020 to such an extent that it had an upward effect on freight rates. In addition, by repositioning ship capacity since then towards the trans-Pacific trade lane, freight rates on other trade lanes, such as Asia-Europe, also rose rapidly. Other explanations for the relative scarcity of capacity relate to limited investment in containers and ship capacity since 2017.

Policy responses by governments and public authorities have been diverse. They have focused both on resolving immediate short-term operational challenges and more structural challenges that can only be resolved in the medium-term and could require legislative changes. Policy measures have covered port

bottlenecks, transparency of freight rates, monitoring of competition and securing strategic value in return for support to container shipping.

Improve competition monitoring in container shipping

Competition in liner shipping goes largely unchecked due to the lack of specialised government agencies in this area. Competition authorities in most countries only occasionally review the competitive conditions of the liner shipping industry, often in response to official complaints. Existing maritime authorities in most countries do not deal with economic regulation. There are a few exceptions to this general tendency, including agencies such as the US Federal Maritime Commission (Box 1).

Box 1. Federal Maritime Commission: Functions and responsibilities

The Federal Maritime Commission (FMC) is an independent federal agency in the United States responsible for the regulation of the US ocean-borne international transport. Its mission is to "ensure a competitive and reliable international ocean transportation supply system that supports the US economy and protects the public from unfair and deceptive practices" (FMC, n.d.). The FMC has an annual budget of approximately USD 30 million and a staff of around 115 people.

The FMC has extensive responsibilities for the review and monitoring of shipping rates, including confidential service contracts, rates and rules of government-owned or controlled carriers, and agreements between carriers and terminal operators. It ensures that tariff rates and charges of common carriers are published in automated tariff systems and electronically available to the public. It can investigate and rule on complaints regarding rates, charges and practices of carriers, terminal operators and forwarders. The FMC can also help resolve disputes.

In July 2021, the Antitrust Division of the Department of Justice (DoJ) and the FMC signed a Memorandum of Understanding (MOU) to foster co-operation and communication between the agencies to enhance competition in the maritime industry. Key provisions of the MOU facilitate communication and co-operation between the agencies. In particular, the MOU establishes a framework for the Antitrust Division and the FMC to continue regular discussions and review law enforcement and regulatory matters affecting competition in the maritime industry. The MOU includes provisions to establish periodic meetings among the respective agencies' officials. It also provides for the exchange of information and expertise that may be relevant and useful to the agencies' oversight and enforcement responsibilities, as appropriate and consistent with applicable legal and confidentiality restrictions (US DoJ, 2021). A second MOU signed by the same organisations on 28 February 2022 gives the DOJ lead responsibility on competition law compliance matters affecting the shipping industry, and commits the DOJ to providing lawyers and staff support to the FMC for enforcement of violations of the Shipping Act (US DoJ, 2022).

In 2021, the US Congress created a 24-member shipper advisory committee composed of US importers and exporters to advise the FMC on "policies relating to the competitiveness, reliability, integrity, and fairness of the international ocean freight delivery system" (Gillis, 2020).

Source: www.fmc.gov

Competitive liner shipping is of strategic importance for global supply chains. As such, countries should monitor competition in maritime transport and enhance the functions of specialised agencies in this area. Certain information is necessary to monitor competition in liner shipping, for example, ocean carrier service contracts and co-operation agreements between carriers, which carriers need to file in some jurisdictions (e.g. the United States) but not in others (such as the European Union). In some countries, some form of monitoring is carried out by government bodies. For example, Australia asked its Productivity Commission to conduct "an independent review into the long-term structural issues affecting the productivity of Australia's maritime logistics system", foreseen for publication by August 2022 (Productivity Commission, 2021).

Considering the regulators' role in facilitating the current supply chain crisis, they are responsible for ensuring that carriers' behaviour is in line with the relevant competition regulation. It is essential that carrier actions respect the conditions set out in the regulations and exemptions that are specific to container shipping.

For example, the EU Consortia Block Exemption Regulation (CBER), extended in April 2020 until 2024, allows carrier consortia to jointly manage capacity "to adapt to fluctuations of demand and supply" (EC, 2009). However, these privileges only apply to consortia that do not exceed a threshold of 30% market share on a particular trade corridor. As it happens, consortia with market shares above 30% operate on all 20 trade corridors to and from Europe (Merk, 2021). On many of these trade corridors, consortia with market shares over 30% have been common for a long time: they started to emerge in the 2010s, well before the prolongations of the CBER were decided in 2014 and 2020 (Merk and Teodoro, 2022). The European Commission itself considers that the CBER no longer applies to two of the three global alliances (EC, 2019). This raises the question of the legality of joint capacity management carried out by alliances and consortia that exceeded the 30% market share threshold in 2020 and 2021.

Regulators in various countries have interacted with carriers on the development of freight rates. In November 2020, the Korean Ministry of Oceans and Fisheries met with nine lines and the Korea Shipowners' Association. The Ministry warned that shippers were airing grievances that they were unable to export their goods and indicated that any reported unjust contract violation or unilateral change in contract terms would be scrutinised and punished if necessary (Szakonyi and Wallis, 2020). The Chinese Ministry of Transport convoked carriers to a meeting in September 2020, demanding to normalise pricing and deploy more capacity in the trade routes to North America (Jiang, 2020).

Some of these regulatory interventions seem to have been effective in a sense. In the wake of the discussion with Chinese regulators, several carriers cancelled their announced general rate increases and shifted capacity to the trans-Pacific trade route. However, the shift of resources from the Asia-Europe routes to the trans-Pacific trade route was itself not without consequences. It resulted in reduced capacity on the Asia-Europe trade route and rapid increases in freight rates on that route (AJOT, 2021). This underlines the interdependence of liner trades and the domino effect that regulators' interventions have on different jurisdictions.

Considering this interconnectedness, co-operation between the main competition authorities should be enhanced. Monitoring container shipping competition can only be comprehensive when carried out at a global level, for example by examining the impact of shifting capacity between different trade corridors. Small steps have been taken in this direction: the US Federal Maritime Commission, the Directorate-General for Competition of the European Commission and the Chinese Ministry of Transportation meet once every two years to discuss competition in the shipping sector. This enhanced co-operation could take the form of continuous information exchanges between agencies and more regular high-level meetings, possibly supported by a permanent and dedicated support function. There should also be a wider

international monitoring of competition in liner shipping. In fact, competition authorities Australia, Canada, New Zealand, the United Kingdom and the United States recently announced exactly this. In light of the disruption in supply chains, a working group comprised of specialists from these countries will monitor shipowners worldwide and share intelligence to identify behaviour that restricts or distorts competition (Dixon, 2022). Such co-operation is needed, as several countries are reluctant to act in isolation for fear of carriers' backlash (e.g. fewer direct calls). International organisations could help developing countries build capacity within their competition authorities to assess competition issues in the container shipping industry.

Reconsider competition arrangements for liner shipping

For a large part of its history, the liner shipping industry has been allowed to fix prices in shipping conferences. Such shipping conferences represented an inherent trade-off: they provided price stability, but restrained competition. In order to increase competition in liner shipping, the United States, the European Union and other jurisdictions have prohibited shipping conferences since the 2000s.

The trade-off between price stability and competition continued to exist but prohibiting conferences signalled policy makers' priority for more competition. The policy makers took away regulatory privileges related to price fixing, but strengthened privileges for co-ordination of capacity. This had two consequences. First, competition increased, mostly in the form of price competition that was destructive for considerable periods during the 2000s and 2010s. This meant that the dominant business strategy became saving costs via economies of scale (larger ships) and industry consolidation (increasing market share). Second, the possibilities for capacity co-ordination were exploited via the creation of large global alliances and a multitude of consortia to an extent – and of a character – not anticipated by the policy makers in the 2000s, even if the risks were already highlighted by some far-sighted academics (Haralambides et al. 2003).

The logical outcome of this process is a select group of highly interconnected liner companies that are able to sustain high freight rates via co-ordination, withdrawing and repositioning their ship capacities at will. Shifting the policy from allowing price co-ordination to allowing capacity co-ordination seems to have deteriorated rather than increased competition in liner shipping. The current institutional arrangements have not resulted in price stability, lower prices or more competition. A reconsideration of these arrangements seems warranted to ensure that public interests are served, such as reasonable and stable freight rates, a sufficiently wide choice of operators, direct liner connectivity and reliable services. The evaluation of the EU Consortia Block Exemption Regulation, undertaken by the European Commission in 2019, fell short of such a fundamental reconsideration, in part because of the narrow range of criteria used in the evaluation.

There are three conceptual ways in which competition arrangements for liner shipping could be reformed to increase the public interest: 1) by limiting the possibilities for joint capacity management; 2) by introducing a form of price regulation or 3) a combination of the two. The preferred option would be to limit the possibilities of joint capacity management in order to introduce more real competition between carriers. There are different ways in which this could be achieved. For example, competition authorities and regulators could require their prior consent for joint withdrawal by alliances or consortia of ship capacity on relevant trade routes. They could restrict the possibilities of carriers active in alliances to form consortia with carriers active in different alliances. Alternatively, they could require the dissolution of a consortium if the combined market share of its members reaches a certain threshold.

If restraining joint capacity management is not possible, governments could consider intervening on pricing. Although regulators apply price regulation for network industries and also sometimes in the port industry, increasing intervention in the market may have unintended consequences and erode efficiency further. As such, limiting joint capacity management (which is illegal under competition law as applied to most sectors of the economy) is probably preferable to price controls.

Some clarity would also be warranted on the limits within which data exchanges along the containerised transport chain are permitted. Ideally, regulators from different jurisdictions could align their policy measures via the sort of global inter-agency co-ordination described earlier.

Focus regulatory attention on fair door-to-door container transport

Vertical integration can be economically beneficial. It eliminates transaction costs and improves the interfaces between different parts of the transport chain, including the integration of digital data. That said, it could also reduce the flexibility and resilience of the same chain. Moreover, vertical integration may create dominant market positions the minute a pivotal component of the supply chain (i.e. the carrier) controls upstream and/or downstream activities of the chain, thus reducing competition with non-integrated competitors (Merk, Hoffmann and Haralambides, 2022).

The ongoing vertical integration by the container shipping industry poses new challenges to competition regulation. This is especially the case if shipping companies can use their antitrust immunity and their leverage as carriers to acquire competitive advantages in markets where they compete with freight forwarders, port service providers or logistics operators that do not have antitrust immunity. A recent example is the reported ceasing of contracts with forwarders as of 1 January 2022 by Hamburg Süd, part of the Maersk Group, leaving them to reserve cargo space via the less attractive spot market. Freight forwarders suffer from these practices but so do shippers and end-consumers due to the lack of service options. Another example is carriers waiving demurrage and detention charges for clients for which they operate as integrators (carrier haulage), disadvantaging merchant haulage (door-to-door transport organised by shippers or forwarders). Carriers have also set up a mandatory supply chain database, TradeLens, that strengthens their ability to control the end-to-end movement of cargo throughout the entire transport chain via anti-trust-exempt agreements among carriers.

Competition authorities will need to pay special attention to the vertical integration in the carrier industry, and regulators will need to make sure that there is fair competition in the markets where carriers have started to compete. Regulators may choose to target demurrage and detention charges that limit the possibilities of discrimination between merchant and carrier haulage.

Governments will also need to ensure that the special shipping-related privileges, such as competition exemptions and favourable tax treatment, are exclusively applied to shipping activities and cannot be used to skew competition in freight forwarding, logistics and port services. The OECD/G20 Inclusive Framework on Base Erosion and Profit Shifting (OECD, 2021) provides a relevant development in this respect. The Framework includes model rules for the global minimum tax. Pillar 2 of the Framework and its accompanying Commentary do not consider logistics, forwarding and inland transport to be qualifying ancillary activities that could benefit from the exclusion of a global minimum tax as international shipping does (OECD, 2021; OECD, 2022). Governments will need to make sure that transpositions in national and supra-national legislation – including for shipping-specific schemes such as tonnages taxes – and regulations like the EU Maritime State Aid Guidelines are in line with the OECD/G20 model regulation and the Commentary.

Increase transparency of container shipping rates and charges

Over the last two years, changes in ocean freight rates and surcharges have become increasingly unpredictable and unjustified. While this is not a new challenge, it has become strikingly evident in light of the current supply chain crisis.

Demurrage and detention charges are often a contentious part of freight transport costs. The charges are intended to give incentives to shippers to return empty containers quickly to carriers. These charges can improve the efficiency of supply chains if, for example, they result in the speedier return of empty containers to carriers, provided that shippers actually have influence over the return process. However, it is not reasonable to charge shippers for the late return of containers if ports are saturated or on strike; nor does it make sense to charge for longer dwell times if they are due to the late arrival of ships. In order to increase the effectiveness of demurrage and detention charges in improving transport flows in ports and terminals, these charges would need to be restricted to circumstances where shippers have levers for action, but not to situations caused by other stakeholders than the shippers. The current free time in several ports is not conducive to developing sustainable hinterland transport modes, such as trains and barges, as their turnaround times are much longer than for trucks. The US Federal Maritime Commission has, in recent years, carried out investigations on demurrage and detention practices and issued guidance on how demurrage and detention charges could be improved, which could be used as a good practice in other countries. In March 2022, the US Senate and House of Representatives approved the *Ocean Shipping Reform Act*, part of which focuses on improving the transparency and fairness of demurrage and detention charges (Box 2).

Box 2. Merchant shipping reform in the United States

The main components of the *Ocean Shipping Reform Act* of 2022, signed into law in June 2022, cover demurrage and detention and the role of the US Federal Maritime Commission (FMC).

The Act directs the FMC to establish rules prohibiting ocean carriers and marine terminal operators from adopting and applying unjust and unreasonable demurrage and detention fees. In doing so, the Act shifts the burden of proof for imposing detention and demurrage charges from shippers to carriers.

The Act authorises the FMC to initiate investigations of an ocean carrier's fees or charges – rather than waiting for formal complaints – and apply enforcement measures. In addition, the Act prohibits ocean carriers from unreasonably declining shipping opportunities for US exports; this would need to be defined by the FMC.

Source: US Congress (2022).

Recently, several governments have intensified efforts to create more transparent, predictable and effective freight rates. For example, a recent bill in the Philippines' House of Representatives suggests restricting surcharges and obliging operators to file rates (Box 3). The House Bill also prohibits demurrage and detention charges when shipping lines are responsible for the late return of empty containers. In India, the government presented a draft Merchant Shipping Bill in which it prescribes an all-inclusive freight rate that cannot be complemented with additional charges (Box 4).

Box 3. Merchant shipping reform in the Philippines

House Bill No. 10575 aims to enhance the competitiveness of Philippine maritime trade by strengthening the oversight functions of relevant government agencies over the imposition of shipping charges by international shipping lines. First, the Bill requires operators to file their regular shipping charges and fees with the Maritime Industry Authority (MARINA) and publish them in newspapers of general circulation. Second, no new rate or change in rate may become effective earlier than 30 days after filing with the MARINA. The Bill prohibits shipping charges except for "internationally-accepted surcharges", such as fees for value-added services, late payment and insurance, but the parameters of these accepted surcharges must be clearly defined in the contract of carriage and subscribed to by the shipper or consignee. Third, the Bill prohibits demurrage and detention charges when shipping lines are responsible for the late return of empty containers. Fourth, the Bill sets out the division of responsibilities of government agencies, including MARINA.

Source: Republic of the Philippines House of Representatives (2021).

Box 4. Merchant shipping reform in India

India is updating its merchant shipping regulations and has outlined plans to regulate freight charges. There are two notable provisions in the draft Merchant Shipping Bill, posted online in December 2020 for public consultation. The first provision stipulates that operators will have to specify the all-inclusive freight in the bill of lading or any other transport document. The second provision states that no operator may levy freight charges other than the all-inclusive freight specified in the bill of lading or other transport document. These provisions are an attempt to protect shippers from unexpected surcharges that do not form part of the agreement between shippers and carriers.

Shipping company representatives have had mixed reactions to the proposal. The International Chamber of Shipping argues that the Bill would interfere with the freedom of commercial contracts, reduce transparency and understanding of costs for shippers and undermine the cost-recovery principle of surcharges. The Indian National Shipowners' Association does not see the difficulty of establishing an all-inclusive freight rate and charging the shipper just that.

Source: ICS (2020), Mathew (2020).

Obliging carriers to impose a standard, all-in tariff is probably not the most effective way to resolve the unpredictability of surcharges for shippers, although it is understandable that governments may want to provide more visibility to shippers as to what they can expect to pay.

Some surcharges are problematic. They seem to function as an additional revenue source rather than a way to recover costs incurred by carriers. When shippers pay a premium for services, a record-high spot rate, a congestion surcharge and an equipment imbalance surcharge, they may be left wondering if they are not paying four times for the same circumstance, namely scarcity of cargo space. Moreover, shippers and freight forwarders generally have no choice but to accept, as any refusal to pay or complaint logged may mean the carrier will refuse to service them next time.

Transparency with respect to surcharges could be increased if governments established lists of accepted surcharges in their country. Surcharges would seem less arbitrary if they were applied to costs incurred, if

their calculation was transparent and if the carrier wore the burden of proof for the need (currently in many countries, it falls on shippers to refute the need for charges).

Recent developments in possible decarbonisation surcharges reiterate the need for increased transparency. When the International Maritime Organization (IMO) announced its impending "IMO 2020" sulphur emission regulation at the end of 2019, many shipping companies introduced low-sulphur surcharges associated with using low-sulphur fuel. It has been argued that the link between the surcharge and the actual additional costs for shipping companies is not clear, a relation further obscured by the fact that a substantial share of shipping companies have chosen to install scrubbers instead of using low-sulphur fuel (Sigalas, 2022). The potential introduction of new energy efficiency measures for existing ships provides carriers with the possibility of benefiting further from decarbonisation surcharges in a way that might not be proportionate to the actual costs of decarbonising.

Collect comprehensive indicators on performance

The containerised transport chain could benefit from better performance information. Maritime stakeholders (including carriers, shippers, forwarders, ports and terminals) are dependent on each other. However, their interactions are often not efficient, which weakens the maritime logistics chain. The different stakeholders need to collaborate to identify the under-performing interactions and discuss ways to improve them. This discussion does not take place often enough, due to a lack of maritime logistics indicators.

Table 4. Maritime logistics performance indicators

Indicator	Definition
Interface between all stakeholders	
Schedule reliability (ships)	% of ships arriving within two, four, eight, etc. hours of pro forma arrival time
Schedule reliability (trains, barges)	% of trains/barges arriving/departing at scheduled slot at terminal
Shipper-/forwarder-carrier interface	
No shows	Missed slots as % of total volume shipped
Rolled containers	Roll-over to next ship as % of total volume shipped
Cancelled services	Cancelled services as % of total capacity on service
Container rejection rate	Unacceptable containers as % of total containers provided
Time window for container delivery	Average time available between demurrage-free period and export cut-off time (last time a container may be delivered to a terminal for loading) (in days)
Carrier-port/terminal interface	
Average ship waiting times	Average waiting time for ship arriving within time window at port before pilot arrival (in hours)
Dwell times	Average number of days containers (export, import, transhipment) stay at terminal

Note: this set of performance indicators was developed with members of the ITF Global Maritime Logistics Dialogue: Hapag Lloyd, Digital Container Shipping Association (DSCA), Global Shippers Forum, European Shippers Council, the International Federation of Freight Forwarders Associations, the European Association for Forwarding, Transport, Logistics and Customs Services, the Federation of European Private Port Companies and Terminals, European Seaports Organisation, PSA International, the port of Hamburg, the port of Antwerp, the port of Rotterdam and the port of Los Angeles.

The ITF collaborated with members of the ITF Global Maritime Logistics Dialogue to develop a set of indicators that could increase the visibility – and arguably the performance – of containerised transport chains (Table 4). These indicators – and the comparison of indicators between trade lanes and regions – should help the stakeholder organisations and their members engage in constructive dialogue to improve maritime logistics along these trade lanes or in these regions. Governments could collect such comprehensive data on the maritime transport chain at the aggregation level of maritime trade lanes (e.g. Far East-North Europe) and regions (e.g. North Europe).

Collecting comprehensive sets of performance information can enhance the initiatives of various stakeholders in the maritime logistics chain to improve information exchange, resulting in better-performing logistics chains. Examples of these initiatives include the following:

- The port of Vancouver has a publicly available "port dashboard" on which it provides daily updates on supply chain performance related to container terminal rail performance, truck turnaround times in the port and vessel on-time performance (Port of Vancouver, n.d.).
- The port of Los Angeles partnered with GE Transportation to develop the Port Optimizer. This cloud-based software solution enhances supply chain performance and predictability by delivering real-time data-driven insights through a single portal to partners across the supply chain. Its aim is to help "the supply chain monitor and respond to dynamic conditions, align people and resources, and proactively communicate across functions – enabling maximum port throughput and delivery performance". (Port of Los Angeles, n.d.)
- PSA, the global terminal operator, monitors the performance of its terminals on a range of indicators related to vessel operations, wharf operations, horizontal transport, yard operations and gate operations. It has rolled out a variety of projects to improve performance on the different KPIs. (Tan, 2019)
- Various port community systems generate information on a number of relevant performance indicators that can be used to improve the efficiency of maritime logistics.
- Several stakeholders in maritime transport have launched digitalisation initiatives to generate information exchanges that provide visibility of logistics chain performance and the potential to resolve bottlenecks (Tradelens 2019; DCSA 2019). For example, the Digital Container Shipping Association initiated the Just-in-Time Port Call Programme to establish digital standards for the port call process (Bagge, Zuesongdham and Hirt, 2022). The Port of Hamburg cluster, consisting of Hamburg Port Authority, the Hamburg Vessel Coordination Center, CMA CGM, Evergreen and Hapag Lloyd, has implemented the Programme's first proof of concept (Bagge, Zuesongdham and Hirt, 2022).

Secure the strategic value of container shipping

Container shipping could be considered a strategic activity, as it enables exports and imports, especially of consumer goods and manufactured products. Much of shippers' and regulators' current dissatisfaction with carriers is related to the fact that recent carrier choices and behaviour have not always helped countries' external trade. While the short-term effects can be identified, it remains unclear how current circumstances in the containerised transport chain will affect countries' strategic economic sectors in the medium and long term. Governments could assess the medium- and long-term impacts of current developments in container shipping and identify the changes in supply chains that will result from this. At

the same time, governments will also need to clearly articulate their expectations for liner shipping and outline how to achieve them.

Many governments currently provide substantial support to the container shipping industry. They do so through exemptions from competition law, favourable tax treatment, subsidies, loan guarantees and other means. Governments justify many of these privileges by invoking the strategic character of global shipping (e.g. in terms of promoting external trade) but also in terms of national security. For example, in the case of the US Maritime Security Program, some of the main beneficiaries are container shipping companies, including Maersk, CMA CGM and Hapag Lloyd (MARAD, n.d.).

Considering their substantial support, governments are indeed in a position to expect that shipping companies provide the strategic value that they are supposed to provide. Governments could make clear that their support hinged on the continued proof of this strategic value by linking it to the satisfactory completion of service requirements, as proposed in the ITF report *Maritime Subsidies: Do They Provide Value for Money?* (ITF, 2019). Governments that support the shipping industry could also expect that those who benefit from that support re-invest part of their profits into the decarbonisation of their fleets.

Reconsider port networks

Some parts of the world have ample port infrastructure and alternative container terminal capacity that allow for smooth running in times of unexpected trade flows. However, in other parts of the world, most terminal capacity is concentrated in one port gateway. Governments can seek to increase the port capacity to deal with increased cargo flows. This makes particular sense in places where a lack of port and hinterland transport infrastructure constrains effective logistics capacity. The United States, for example, where port congestion is of urgent concern, has put in place a variety of measures to mitigate that congestion.

The US *Infrastructure Investment and Jobs Act*, signed into law in November 2021, earmarked USD 17 billion for ports and inland waterways. Related to this, US ports received more than USD 241 million in government grants in 2021 through the US Maritime Administration's Port Infrastructure Development Program to fund 25 projects aimed at improving facilities and addressing supply chain challenges. Moreover, several US state governments have also reserved funds for port infrastructure and port-related initiatives in addition to the federal funds. For example, the California budget proposal for 2022-23 includes USD 2.3 billion for port projects. As part of the investment programme, the US Government has allowed ports, most notably the Georgia Ports Authority, to redirect grants toward additional storage yards. Along similar lines, the Port of Oakland has opened a 25-acre paved, off-terminal container yard equipped to move containers off chassis and store them for rapid pick-up so that trucks do not have to wait for space in terminals.

Other measures aim to increase the productivity of existing facilities. An example is the container stacking rules of the city of Long Beach. These rules limit container stacking to no more than two containers in order to reduce the port's visual impact on the surrounding urban areas. In order to reduce the backlog of ships waiting at anchor, the city of Long Beach decided in October 2021 to waive the enforcement of these restrictions for at least 90 days, allowing for stacking of up to four containers high, with a potential for five, if a request is approved by fire officials (Kulisch, 2021). The US government has also advocated for 24/7 operations at the Los Angeles and Long Beach port complex, without giving a specific timeframe.

Although consolidated port networks might be efficient, they could also be vulnerable in times of supply chain crises, as the bottlenecks at the port complex of Los Angeles and Long Beach have shown. Governments could benefit from the development of port strategies that find the right balance between

consolidation and sufficient alternatives in case of shocks. Such national or federal port strategies have been recommended for a variety of countries, including for the United States (OECD, 2014).

Increase cost coverage of public maritime infrastructure

Governments need to make sure that they recover a larger share of infrastructure costs via fees and charges. Public maritime infrastructure cost coverage is notoriously low: carriers pay a fraction of the costs that public authorities incur for financing and maintaining infrastructure such as ports and inter-oceanic canals. The cost coverage for freight transport infrastructure is generally low, but particularly so for seaports. A study on EU countries found cost coverage rates of 25% for diesel freight trains, 17% for electric freight trains, 13% for heavy-duty vehicles and 12% for inland waterway transport but the cost coverage ratio found for seaports was 4% (CE Delft et al., 2019). This is problematic for two reasons. One is that these infrastructure costs could, in principle, be fully recovered by fees and charges. Another is because public port infrastructure generates substantial negative externalities (e.g. air pollution from ships in ports, congestion related to port traffic) but only limited positive externalities. The limited cost coverage also decreases the efficiency of public spending on port infrastructure. Private port and terminal operators end up paying to upscale port superstructure (equipment) in order to accommodate mega-vessels.

Shipping companies have increasingly been able to offload the infrastructure costs to governments via their dominant market power: they can threaten to use other ports where tariffs are lower. Ports lower tariffs to compete for business. They may, for example, offer lower tariffs to companies that make multiple port calls or to “green” ships. Port adaptations required to accommodate ever-larger container ships are often financed by other means than port tariffs; most ports have tariff structures that cross-subsidise the largest ships (ITF, 2015). Infrastructure costs have arguably only increased during the Covid-19 crisis, as more buffer capacity was needed to deal with supply chain bottlenecks. Governments need to recover those costs through fees and charges to the carriers.

References

AJOT (2021), "FBX Weekly: Carriers roll back transpac increases, but Asia-EU and Mediterranean hit $7,000/FEU", *American Journal of Transportation*, https://ajot.com/news/article/fbx-weekly-carriers-roll-back-transpac-increases-but-asia-eu-and-mediterranean-hit-7000-feu (accessed 15 June 2022).

Alphaliner (n.d.), Idle containership database (available by paid subscription), https://public.alphaliner.com/.

Alphaliner (2021a), "COSCO to lift Asia-Europe contract biz above 45%", *Alphaliner Weekly Newsletter*, 2021-49.

Alphaliner (2021b), "Profit margins accelerate as 2021 EBIT set to beat all records", *Alphaliner Weekly Newsletter*, 2021-48.

Bagge, T., P. Zuesongdham and G. Hirt (2022), "The Just-in-Time Port Call: Making Vision a Reality", *Port Technology International*, 117, pp. 24-26, https://dcsa.org/wp-content/uploads/2022/02/THE-JUST-IN-TIME-PORT-CALL-MAKING-VISION-A-REALITY.pdf (accessed 7 June 2022).

Bresnahan, T. and S. Salop (1986), "Quantifying the Competitive Effects of Production Joint Ventures", *International Journal of Industrial Organization*, Vol. 4/2, pp. 155-175, https://doi.org/10.1016/0167-7187(86)90028-7.

CE Delft et al. (2019), "Overview of transport infrastructure expenditures and costs", CE Delft, https://cedelft.eu/wp-content/uploads/sites/2/2021/03/CE_Delft_4K83_Overview_transport_infrastructure_expenditures_costs_Final.pdf.

Contargo (n.d.), "Update congestion in Antwerp and Rotterdam", webpage, https://www.contargo.net/en/news/2022-06-21_congestion_update/ (accessed 15 June 2022).

CTS (n.d.), "Container Trade Statistics Index", website, Container Trade Statistics, Ltd., Woking, https://www.containerstatistics.com/ (subscription only, accessed 15 June 2022).

DCSA (2019), "Digital Container Shipping Association established", Press release, 16 April 2019, Digital Container Shipping Association, https://www.hapag-lloyd.com/en/company/press/releases/2019/04/digital-container-shipping-association-established.html (accessed 15 June 2022).

Dixon, G. (2022), "'Five Eyes' nations watching container lines' pricing in record markets", *TradeWinds*, https://www.tradewindsnews.com/news/-five-eyes-nations-watching-container-lines-pricing-in-record-markets/2-1-1171777 (accessed on 07 June 2022).

Drewry (n.d.), World Container Index, website, https://www.drewry.co.uk/supply-chain-advisors/supply-chain-expertise/world-container-index-assessed-by-drewry (accessed 15 June 2022).

EC (2019), "Commission Staff Working Document: Evaluation of the Commission Regulation (EC) No 906/2009 of 28 September 2009 on the application of Article 81(3) of the Treaty to certain categories of agreements, decisions and concerted practices between liner shipping companies (consortia)", European

Commission, Brussels, https://ec.europa.eu/competition/consultations/2018_consortia/1_en_dts_evaluation.pdf.

EC (2009), "Commission Regulation (EC) No 906/2009 of 28 September 2009 on the application of Article 81(3) of the Treaty to certain categories of agreements, decisions and concerted practices between liner shipping companies (consortia)", European Commission, Brussels, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009R0906.

FMC (n.d.), "About the Federal Maritime Commission: Mission Statement", US Federal Maritime Commission, Washington, D.C., https://www.fmc.gov/about-the-fmc/ (accessed 15 June 2022).

FMC (2022), "Fact Finding 29: International Ocean Transportation Supply Chain Engagement", US Federal Maritime Commission, Washington, D.C., https://www.fmc.gov/fact-finding-29/ (accessed 15 June 2022).

Georgiadis, P. (2021), "Air freight costs soar to record high", *Financial Times*, https://www.ft.com/content/15b44fc9-5f86-4b28-ae05-a3233db13977 (subscription only, accessed 7 June 2022).

Gillis, C. (2020), "National Shipper Advisory Committee for FMC gets Senate push", *American Shipper*, 21 May 2020, https://www.freightwaves.com/news/national-shipper-advisory-committee-for-fmc-gets-senate-push (accessed 15 June 2022).

Hapag Lloyd (n.d.), "Detention and Demurrage", website, https://www.hapag-lloyd.com/en/online-business/quotation/detention-demurrage.html (accessed 15 June 2022).

Haralambides, H. et al. (2003), "The 'Erasmus Report': Global Logistics and the Future of Liner Shipping Conferences", Erasmus University, Rotterdam, https://www.researchgate.net/publication/294427101_The_Erasmus_Report_Global_Logistics_and_the_Future_of_Liner_Shipping_Conferences (accessed 7 June 2022).

ICS (2020), "Submission to Consultation by India Ministry of Ports, Shipping and Waterways", International Chamber of Shipping, https://www.ics-shipping.org/wp-content/uploads/2021/03/2020-11-22-ICS-Submission-to-Consultation-by-India-Ministry-of-Ports-Shipping-and-Waterways.pdf (accessed 15 June 2022).

ITF (2019), "Maritime Subsidies: Do They Provide Value for Money?", *International Transport Forum Policy Papers*, No. 70, OECD Publishing, Paris, https://www.itf-oecd.org/impact-mega-ships.

ITF (2015), "The Impact of Mega-Ships", International Transport Forum, Paris, https://doi.org/10.1787/24108871.

Jiang, J. (2020), "Chinese authorities move to regulate transpacific pricing", *Splash 24/7*, https://splash247.com/chinese-authorities-move-to-regulate-transpacific-pricing/ (accessed 15 June 2022).

Knowler, G. (2021a), "Congestion surcharges add to soaring Asia-Europe rates", *Journal of Commerce*, https://www.joc.com/maritime-news/congestion-surcharges-add-soaring-asia%E2%80%93europe-rates_20210507.html (subscription only, accessed 8 June 2022).

Knowler, G. (2021b), "'Desperation,' disruption behind wider high-low container spot rate spread", *Journal of Commerce*, https://www.joc.com/maritime-news/%E2%80%98desperation%E2%80%99-disruption-behind-wider-high-low-container-spot-rate-spread_20210924.html (accessed 8 June 2022).

Kulisch, E. (2021), "City of Long Beach allows logistics companies to stack containers higher", *Freightwaves*, https://www.freightwaves.com/news/city-of-long-beach-allows-logistics-companies-to-stack-containers-higher (accessed 15 June 2022).

Lee, D. (2021), "Shipping market outlook 2022 Container vs Dry Bulk", S&P Global Market Intelligence, https://ihsmarkit.com/research-analysis/shipping-market-outlook-2022-container-vs-dry-bulk-.html (accessed 8 June 2022).

Maersk (2021), "Interim report Q3 2021", AP Moller Maersk A/S, Copenhagen, https://ml-eu.globenewswire.com/Resource/Download/d5a9bc05-946c-4703-8a46-41370901c00c (accessed 8 June 2022).

MARAD (n.d.), "Maritime Security Program", US Department of Transportation, Maritime Administration, https://maritime.dot.gov/national-security/strategic-sealift/maritime-security-program-msp (accessed 15 June 2022).

Marine Exchange (n.d.), Twitter profile (@MXSOCAL), https://twitter.com/mxsocal (accessed 15 June 2022).

Mathew, B. (2020), "Proposed India law pushes carrier rate transparency", *Journal of Commerce*, https://www.joc.com/maritime-news/container-lines/proposed-india-law-pushes-carriers-rate-transparency_20201204.html (subscription only, accessed 8 June 2022).

MDS Transmodal (n.d.), *Containership Databank* (database), https://www.mdst.co.uk/, (subscription only, accessed throughout 2022).

Merk, O. (17 December 2019), "No Big Bang on the High Seas", *Transport Policy Matters*, https://transportpolicymatters.org/2019/12/17/no-big-bang-high-seas/.

Merk, O. (2021), "Is there still competition in liner shipping", *Lloyds List*, https://lloydslist.maritimeintelligence.informa.com/LL1135476/Is-there-still-competition-in-liner-shipping (subscription only, accessed 8 June 2022).

Merk, O., J. Hoffmann and H. Haralambides (2022), "Post-COVID-19 scenarios for the governance of maritime transport and ports", *Maritime Economics & Logistics,* https://doi.org/10.1057/s41278-022-00228-8.

Merk, O. and A. Teodoro (2022), "Alternative approaches to measuring concentration in liner shipping", *Maritime Economics & Logistics,* https://doi.org/10.1057/s41278-022-00225-x.

O'Brien, D. and S. Salop (2000), "Competitive Effects of Partial Ownership: Financial Interest and Corporate Control", *Antitrust Law Journal*, Vol. 67/3, pp. 559-614, http://www.jstor.org/stable/40843443 (accessed 24 June 2022).

OECD (2022), *Tax Challenges Arising from the Digitalisation of the Economy – Commentary to the Global Anti-Base Erosion Model Rules (Pillar Two)*, OECD Publishing, Paris, https://www.oecd.org/tax/beps/tax-challenges-arising-from-the-digitalisation-of-the-economy-global-anti-base-erosion-model-rules-pillar-two-commentary.pdf.

OECD (2021), *Tax Challenges Arising from the Digitalisation of the Economy Global Anti-Base Erosion Model Rules (Pillar Two): Inclusive Framework on BEPS*, OECD Publishing, Paris, https://www.oecd.org/tax/beps/tax-challenges-arising-from-the-digitalisation-of-the-economy-global-anti-base-erosion-model-rules-pillar-two.pdf.

OECD (2017), "Common Ownership by Institutional Investors and its Impact on Competition", Background Note by the Secretariat, OECD Publishing, Paris, https://one.oecd.org/document/DAF/COMP(2017)10/en/pdf.

OECD (2014), *The Competitiveness of Global Port-Cities*, OECD Publishing, Paris, https://doi.org/10.1787/9789264205277-en.

Port of Los Angeles (n.d.), "Port Optimizer", webpage, https://www.portoflosangeles.org/business/supply-chain/port-optimizer%E2%84%A2 (accessed 15 June 2022).

Port of Vancouver (n.d.), "Port Dashboard", https://www.portvancouver.com/port-dashboard/ (accessed 15 June 2022).

Porter, J. (2021), "Hapag-Lloyd joins CMA CGM in freezing spot rates", *Lloyds List*, https://lloydslist.maritimeintelligence.informa.com/LL1138159/Hapag-Lloyd-joins-CMA-CGM-in-freezing-spot-rates (accessed 8 June 2022).

Productivity Commission (2021), "Australia's Maritime Logistics System: Terms of Reference", Australian Government, https://www.pc.gov.au/inquiries/current/maritime-logistics/terms-of-reference (accessed 15 June 2022).

Republic of the Philippines House of Representatives (2021), House Bill No. 10575, Eighteenth Congress, Third Regular Session, Quezon City, https://hrep-website.s3.ap-southeast-1.amazonaws.com/legisdocs/third_18/HBT10575.pdf (accessed 5 July 2022).

Schoolov, K. (2021), "Amazon is making its own containers and bypassing supply chain chaos with chartered ships and long-haul planes", *CNBC*, https://www.cnbc.com/2021/12/04/how-amazon-beats-supply-chain-chaos-with-ships-and-long-haul-planes.html (accessed 8 June 2022).

Sea-Intelligence (2022), "Schedule reliability improvement reversed in April 2022", Press release, https://sea-intelligence.com/press-room/142-schedule-reliability-improvement-reversed-in-april-2022 (accessed 15 June 2022).

Shanghai Shipping Exchange (n.d.), Shanghai Containerized Freight Index, https://en.sse.net.cn/indices/scfinew.jsp (accessed 5 July 2022).

Sigalas, C. (2022), "Financial impact of the IMO 2020 regulation on dry bulk shipping", *Maritime Transport Research*, Vol. 3, https://doi.org/10.1016/j.martra.2022.100064.

Szakonyi, M. and K. Wallis (2020), "South Korean regulators warn carriers to maintain 'market order'", *Journal of Commerce*, https://www.joc.com/port-news/international-ports/south-korean-regulators-warn-carriers-maintain-%E2%80%98market-order%E2%80%99_20201113.html (subscription only, accessed 15 June 2022).

Tan, C., "Global Maritime Logistics", Presentation by Tan Chong Meng at International Transport Forum Annual Summit, 24 May 2019, https://2019.itf-oecd.org/event/global-maritime-logistics-dialogue.

TradeLens (2019), "An Overview: Tradelens", https://www.tradelens.com/audio-and-video/tradelens-overview (accessed 8 June 2022).

US Congress (2022), "S.3580 Ocean Shipping Reform Act of 2022", 117th Congress, https://www.congress.gov/bill/117th-congress/senate-bill/3580 (accessed 15 June 2022).

US DoJ (2021), "Justice Department and Federal Maritime Commission Sign Memorandum of Understanding to Support Interagency Collaboration", Press release, US Department of Justice, https://www.justice.gov/opa/pr/justice-department-and-federal-maritime-commission-sign-memorandum-understanding-support (accessed 15 June 2022).

US DoJ (2022), "Justice Department and Federal Maritime Commission Reaffirm and Strengthen Partnership to Promote Fair Competition in the Shipping Industry", Press release, US Department of

Justice, https://www.justice.gov/opa/pr/justice-department-and-federal-maritime-commission-reaffirm-and-strengthen-partnership (accessed 15 June 2022).

UTLC Eurasian Rail Alliance (n.d.), "Services", webpage, United Transport and Logistics Company – Eurasian Rail Alliance, https://utlc.com/en/ (accessed 15 June 2022).

WSC (2022), "Liner shipping defines the six critical pathways to zero carbon shipping", Media release, World Shipping Council, Washington DC, https://static1.squarespace.com/static/5ff6c5336c885a268148bdcc/t/62050f7be342e930937428ea/1644498811837/WSC_zero+carbon+pathways_release_FINAL.pdf (accessed 5 July 2022).

International Transport Forum

Performance of Maritime Logistics

Liner shipping and container ports have repeatedly made headline news since 2020 as companies across supply chains were hit with price hikes and shipment delays. Predictability became a thing of the past. This report assesses these disruptions to containerised maritime transport and analyses their causes and impacts.

International Transport Forum
2 rue André Pascal
F-75775 Paris Cedex 16
+33 (0)1 73 31 25 00
contact@itf-oecd.org
www.itf-oecd.org

OECD

Published: 07/2022 | Photo credit: Matt Gush/Shutterstock