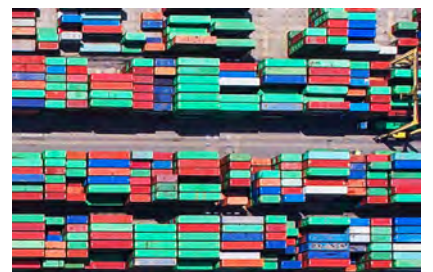


The Impact of Alliances in Container Shipping



Case-Specific Policy Analysis

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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

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Executive summary

What we did

This report assesses the impact of global alliances in container shipping. It sets out how alliances work, how they affect maritime transport systems and transport stakeholders, and how they are currently regulated. Based on this analysis, the report provides policy recommendations to governments. This report benefits from study visits to Spain, Italy and Germany and draws insights from interviews with a range of stakeholders within the maritime logistics chain, listed in Annex 2.

What we found

Global alliances have become a dominant feature of container shipping. They are cooperation agreements between container lines (carriers) on operational matters. Alliances usually consist of a series of agreements with global coverage on sharing vessels and slots on these vessels. The aim of such alliances is to achieve economies of scale and wider service coverage. Whereas the early generations of global alliances that emerged in the mid-1990s provided a vehicle for cooperation between smaller carriers, alliances are nowadays cooperation tools for the largest container lines: the three global alliances (2M, Ocean and THE Alliance) that are operational since April 2017 regroup the eight largest container carriers of the world. These three alliances represent around 80% of overall container trade and operate around 95% of the total ship capacity on East-West trade lanes, where the major containerised flows occur.

Alliances have allowed carriers to acquire and operate mega-ships, reducing unit costs. Without alliances certain carriers would not have been able to acquire mega-ships. As it is the ordering of mega-ships that has fuelled overcapacity, there is a link between alliances and overcapacity. Alliances have also made the maritime transport offer more uniform and limited the possibilities of carriers to differentiate themselves. Alliances have contributed to lower service frequencies, fewer direct port-to-port connections, declining schedule reliability and longer waiting times. This has increased total transport times and delivery uncertainty for various shippers, leading to higher inventory and buffer costs. Moreover, alliances have proved to be inherently instable: considering that all major carriers are in alliances, changes in one alliance can have an impact on the whole sector.

Several impacts of alliances on the transport system as a whole can be identified. They contribute to concentration of port networks and bigger cargo shifts from one port to another when alliances change port networks. Within ports, the buying power of the alliance carriers can create destructive competition between terminal operators and between other port service providers such as towage companies. This can lower the rates of return on investment for the port industry, results in the decline of smaller container ports and the disappearance of smaller independent terminal operators, as well as towage companies. A particular concern is that alliances and alliance carriers frequently exert strong pressure for publicly funded infrastructure upgrades to be undertaken to support the use of mega-ships, while these expenditures often prove to be uneconomic, either due to shifting demand for port services or the monopsony power exercised by the alliances.

Although overcapacity in the liner sector has lowered freight rates, these cost savings are partly offset by a number of additional costs for shippers. Moreover, by limiting shipping options, alliances have frustrated the risk diversification strategies of shippers and freight forwarders.

Alliances could raise competition concerns in what has become a concentrated market. The top four carriers accounted for 60% of the global container shipping market in 2018. The market share of the biggest carrier (19%) is larger than the market share of any global liner alliance before 2012, which signifies the different character of current alliances. Global alliances give more market power to carriers and have several implications. First, they represent barriers to entry on East-West trades:

only the largest companies would be able to compete on price for Asia-Europe services outside an alliance structure. Second, alliances could function as vehicles for collusion between carriers, as they provide carriers with in-depth insights on the cost structures of their competitors. Thirdly, alliances give very considerable bargaining power – “monopsony power” – to carriers in regard to ports and terminals. The result can be declining rates for port services, carriers requesting additional public infrastructure, and vertical integration by carriers, in particular in terminal operations. Consequently, the market share of carrier-dominated terminal operators has increased from 18% in 2001 to 38% in 2017. This could raise competition concerns if dedicated terminals exclude other carriers and if carriers’ terminal investments raise entry costs that make container shipping a less contestable market.

The first generations of alliances allowed smaller carriers to achieve economies of scale, based on complementarity between them, and as such increased shipping options. The current three alliances are not serving the smaller carriers but each brings together two to three very large carriers that would be able to offer most of their services outside an alliance. Contrary to some transport sectors – e.g. aviation - economies of scale in container shipping can also be achieved via mergers and acquisitions – or via the organic growth of carriers increasing market shares.

Over the last decades, the EU has acted to remove the sectoral exemption from competition policy long enjoyed by liner conferences. However, the remaining block exemptions for alliances have enabled a rapid evolution of these arrangements and the industry has, as a result, recently reached a position of high concentration when assessed on key measures. One could wonder if there are still welfare benefits from maintaining block exemptions.

What we recommend

Adopt a presumption toward repeal of shipping-specific block exemptions from competition law

Liner shipping does not have unique characteristics that justify exemptions from competition law, either for conferences or for alliances. In line with the global long-term trend to dismantle sector-specific exemptions from competition law and in line with OECD regulatory principles, generic antitrust rules should apply to all agreements between liner shipping companies, as for any other industry, with regard to the cooperation that is allowed. Countries where “conferences” are still allowed should reconsider their position. In light of the longer-term trend toward the removal of block exemptions in the shipping industry, the European Commission should carefully consider allowing the EU Consortia Block Exemption Regulation to expire in April 2020, as currently scheduled, rather than extending it. A repeal of block exemptions is unlikely to result in the termination of current and future alliances, as these could still be authorised under competition law on a case by case basis. However, it would ensure greater scrutiny of individual alliances and thus more effectively deter any anticompetitive conduct in the sector. In order to maintain legal certainty, the European Commission could provide temporary guidelines on how to treat liner shipping in EU antitrust law. If the block exemption is extended, its scope should be limited, in particular by introducing a provision to consult maritime transport stakeholders and by excluding joint purchasing by alliances.

Improve project appraisal for port and hinterland infrastructure and adopt common principles for port pricing

Much of the investment required to upgrade ports to handle mega-ships is publicly funded, either directly or indirectly. It is essential that these public expenditures be based on sound economic assessments and that risk-minimisation strategies are in place. New port and hinterland transport projects should be based on sound projections of cargo flows, particularly from shippers. Demands from carriers for new facilities should be supported by enforceable commitments from their side to actually use these, to minimise the risk that publicly financed ports will be underused. In the European Union, this could be achieved by imposing stricter conditions on funding for port projects using EU-funds and those of the European Investment Bank. This could form part of the conditions governing EU member states’ state aid for port infrastructure. The adoption of common principles for port pricing – ideally at a global level but at least at regional level - could help to offset the monopsony

power of alliances and support sound project analysis in cases where new facilities are proposed to accommodate mega-ships.

Establish more coherent ports policies to clarify roles and reduce risk of creating over-capacity

Governments should define clearly which ports are expected to service mega-ships and which ports have different roles. A reduction in the number of EU “core ports” in the Trans-European Network as part of the elaboration of a clearer and more detailed port strategy would also reduce over-capacity risks in respect of container ports for mega-ships. Cooperation between ports also provides a potentially significant source of countervailing power in a context of the rapidly increasing concentration of the shipping industry resulting from the growth of liner shipping alliances. Various governments, such as those of the US, Japan and China, have facilitated such cooperation by stimulating mergers of public port authorities and allowing port alliances. Within ports, collaboration between terminals could improve the efficiency of the maritime supply chain, subject to the constraints of competition policy. Governments could consider how – and under which circumstances – they could allow facility sharing in ports, without introducing new sector-specific block exemptions from competition law. The potential role of such co-operation arrangements is likely to be greater in contexts where block exemptions for liner shipping have not been eliminated. More collaboration between the different stakeholders in the maritime logistics chain could also help to reduce the inefficiencies in the whole chain.

What is an alliance?

Global alliances – also called strategic alliances - are cooperation agreements on a global scale between liner shipping companies (Box 1). Established in the mid-1990s, these agreements involve ocean carriers operating on major global routes, in particular on the main East-West trade lanes that concentrate the largest share of the containerised cargo flows: Asia-Europe, Asia-US and US-Europe. Strategic alliances were guided and pushed by the Asian carriers, in contrast to the consortia that were mostly regional in scope and controlled by the European carriers between 1960s-1980s (Lu et al., 2006).

Global alliances have become a dominant feature of container shipping over the last few years. Whereas cooperation between liner shipping companies in the past took the form of coordination of prices and capacity, the last two decades have seen the emergence of these global alliances of competing firms that share vessels, in order to generate operational efficiencies and broader service coverage. The character of these alliances has changed over this period, as this Chapter will illustrate. We have entered a stage where only three global alliances exist consisting of two to three very large companies of about the same size, which is fundamentally different from practice less than ten years ago, when alliances mainly served a limited group of mid-size and small carriers to reach economies of scale.

Box 1. What is liner shipping?

Liner shipping services are provided as a commercial service by carriers to shippers on fixed routes with regular schedules between ports, mostly via the operation of container ships. Liner shipping is one of the three main shipping categories; the other two are industrial shipping and tramp shipping. An industrial operator owns the cargo and controls the ships, aiming to minimise the cost of cargo delivery. They are mostly active in bulk trades, such as crude oil and other commodities. In tramp operations, the routing and scheduling of vessels is not fixed, but dependent on where cargo is available. Most tramp operations are in bulk trades.

Containerised transport currently represents the largest share of liner shipping activity; other liner shipping activities include car carriers and cruise ships. This report focuses on alliances in the container shipping industry. The major goods transported via container shipping include manufactured goods, machinery, paper, textiles, beverages and tobacco, frozen food, fruit and certain commodities such as cotton.

The cooperation in global alliances covers utilisation of ships, sailing schedules and itineraries, containers and use of joint terminals. In short, the cooperation covers full integration of service capabilities. Cooperation via global alliances does not cover joint sales, marketing, pricing, joint ownership of assets, pooling of revenues, profit or loss sharing or joint management. These characteristics distinguish it from other forms of cooperation in liner shipping. The following forms can be identified:

- Slot charter agreements (SCA) require a fixed percentage of vessel capacity to be exchanged between carriers over a given time period. There is one carrier that operates the vessel, but other carriers use a share of the vessel capacity, so that they can widen their coverage.
- Vessel sharing agreements (VSA) are more cooperative and entail cooperation between companies to fulfil demand on particular trade routes through sharing of vessels owned and/or operated by different carriers, and joint optimisation of ship scheduling and assignment of ships to routes (Panayides and Wiedmer, 2011). Global alliances could be considered a bundle of vessel sharing agreements between the same carriers on a global scale. Whereas slot charter agreements are basically contractual agreements, strategic alliances are mainly operational agreements (Ryoo and Thanopoulou, 1999).
- Consortia are cost-reducing forms of cooperation that focus on a single maritime service. Each consortium is internally regulated by a number of specific agreements among the

partners in the consortium (Panayides and Wiedmer, 2011). These internal agreements can take the form of slot charter agreements and vessel sharing agreements, described above.

- Conferences are cooperation agreements in which shipping firms set common freight rates and regulate their capacity. As such they could be considered liner shipping's form of cartel agreements. Liner shipping conferences have been in operation since 1875 and have long been exempted from anti-trust legislation. This practice has changed over the last decades, most notably as a result of the 1998 Ocean Shipping Reform Act in the United States and the repeal of the EU Block Exemption to liner shipping conferences in 2006. Although conferences in liner shipping still exist in some parts of the world, their relevance has significantly decreased. Related to conferences are voluntary discussion agreements, in which carriers exchange commercially-sensitive information and discuss voluntary guidelines on freight rates, without collectively setting prices.
- Joint ventures arise where there is a change of control on a lasting basis: joint ventures are vehicles that perform all the functions of an autonomous economic entity. In this sense, it goes beyond the cooperation of a regular global liner alliance where decision making power is still considered to be part of the partnering institutions.
- Mergers and acquisitions could be considered the most cohesive form of cooperation as these lead to full or almost full integration of corporate activities. Several "brands" may continue to exist even if they have been integrated in a larger company, e.g. shippers can be clients of APL even if it is now part of CMA CGM Group.

In practice, ocean carriers use many of these cooperation tools simultaneously. Carriers that are in the same global alliance can have vessel sharing agreements with carriers from different alliances, for example for some of the North-South trade lanes. Carriers have been part of global alliances and at the same time pursued mergers and acquisitions. Each carrier makes strategic choices about the mix of these cooperative tools, which results in different corporate strategies. For example, the strategy of the Italian-Swiss carrier MSC is based on organic growth, that is: acquiring ships rather than shipping firms, and did not engage in alliances until 2015. In contrast, the German carrier Hapag-Lloyd has been part of global alliances since 1989 and acquired various carriers – such as CSAV and UASC – whilst being one of the rare global carriers that never bought mega-ships.

Cooperation has in many cases extended far beyond liner shipping. In other words, cooperation within the container shipping sector (horizontal collaboration) is often complemented with cooperation with other parts of the maritime transport chain (vertical collaboration), in particular container terminal operations and – to some extent – hinterland transport and logistics activities. Similar cooperation tools as those mentioned above are deployed in such vertical links, including joint ventures and acquisitions. Some global alliances cover terminal operations.

Global alliances also exist in other transport sectors, in particular in the aviation industry. Global alliances between airlines emerged at the end of the 1990s; they now cover a large share of the world's airlines in order to share planes and landing slots at airports. As in container shipping, aviation now has three large global alliances: SkyTeam, Star Alliance and Oneworld. Alliances are used to some extent in other shipping sectors e.g. liquid bulk shipping companies in Sweden formed the Gothia Tanker alliance in order to gain operational efficiencies via vessel sharing and other forms of cooperation (OECD/ITF, 2018). Alliances are more or less absent from land transport modes, such as trucking and rail transport. In the case of rail transport, this could be explained by lack of interoperability of systems across borders, which has limited global competition. Yet, alliances in freight rail start to emerge; an example is Holding Exploris, an alliance between eleven firms, seven of which are rail freight operators (Laroche et al. 2017). In non-transportation sectors, strategic alliances are very frequently used in a wide variety of industrial sectors, ranging from the automotive to the pharmaceutical industry.

The rationale of alliances

Global alliances have become essential tools for corporate strategies of carriers because they can help achieve economies of scale and economies of scope. Put differently, alliances are perceived to facilitate the two elements that ocean carriers compete on: low prices and broad service coverage. Although the literature on alliances in liner shipping identifies a variety of possible reasons (Agarwal, 2007; Cariou, 2002), it basically boils down to these two (price and service coverage). One of the main arguments for cooperation of carriers with other carriers is the high fixed-cost structure of the liner shipping industry (Haralambides, 2007): the provision of a weekly liner service between different continents requires investment in a set of ships that will sail irrespective of their utilisation rates. Collaboration between carriers in global alliances can mitigate this problem and can generate economies of scale and scope.

Economies of scale

Containerisation has standardised liner shipping, which has propelled a business model characterised by scale. The standardisation brought about by the deployment of containers has brought down transport costs, but it has also made liner shipping a more uniform product, which made cost savings via economies of scale the dominant business strategy in liner shipping. This took shape via very significant increases of ship size in the container sector, the most substantial increase of all ship types over the last two decades (OECD/ITF, 2015). The motivation behind the deployment of ever larger ships is to generate lower costs per transported container.

Alliances are considered tools to optimise the potentials of these economies of scale. They make it possible to carriers to acquire new bigger ships together, to share vessels to guarantee utilisation rates of ships that would be needed to reap the benefits of economies of scale. In other words, large cost savings could potentially be achieved if partner carriers are willing to collaborate (Lei et al., 2008).

Economies of scope

Alliances could also help carriers to improve service offerings to their customers. Most importantly, alliances could help them offer a more comprehensive global shipping network. Extending coverage and providing more services is the single most important motivation of participating in strategic alliances, according to a survey study carried out among representatives of container carriers (Lu et al., 2006). Many shipping firms are stronger in certain regions as a result of long experience and loyal customers; alliances between carriers with strengths in complementary regions could be useful for providing services with a broader network to customers (Mitsubishi and Greve, 2009). Large shippers prefer to have contracts with a few shipping firms with highly interconnected route networks. Alliances allow shipping firms to build networks of sufficient size to participate in bids for such contracts (Mitsubishi and Greve, 2009).

Some carriers have engaged in cooperation in order to gain know-how and technological transfers via exchange with competitors (Kale and Singh, 2007). Sharing of operational information within alliances is a necessity to ensure the smooth running of operations, which requires significant amounts of joint planning and action. Exchange of market-related information, including freight rates, customer-related information and other related commercial issues, is no longer allowed in various jurisdictions, including in the European Union. Alliances could also be used for the sharing of useful non-market and non-pricing related knowledge and information. The great interest of carriers in information sharing can be illustrated by the proposal of the former European Liner Affairs Association (ELAA) in 2006 to create a regulatory instrument for an information exchange system between carriers after the repeal of the EU Block Exemption for liner conferences in 2006 (Marlow and Nair, 2006). The sharing of knowledge and information within liner shipping alliance networks could confer both common and private benefits.

Economies of scope could be reached via alliances of carriers that are complementary to each other. When small firms enter alliances to operate cross-ocean routes with larger firms, they often have a feeder network in one of the route nodes. This market complementarity is matched by a size difference in the ships of the firms in the alliance (Mitsuhashi and Greve, 2009). However, alliances between carriers with very different design speeds or age of ships might be more difficult to realise, as these differences would be difficult to bridge on similar trade lanes.

The rationale for alliances can vary depending on the profile of the carrier. Carrier size used to be a determinant for criterion, with smaller global carriers participating more in alliances. In 2010 only one of the top five carriers was part of an alliance, whereas most of the smaller companies in the top 20 were in an alliance. It was generally understood that the largest companies were capable of covering most geographic areas with their own fleet, and that big and smaller companies were less prone to demand uncertainty than medium-sized companies (Ferrari et al., 2008). This logic no longer seems to hold. Since 2015, virtually all large carriers form part of a global alliance. Firms that have competitive and operational interdependencies that are too complex to resolve for multiple routes in global alliances may still be able to operate on a single route (Song and Panayides, 2002), which has led to cooperation in single routes among firms that operate competing routes elsewhere.

The crucial question is: are the theoretical benefits of alliances being realised in practice? Various studies indicate that benefits could be attained if partner carriers are willing to work out full collaboration, namely joint optimisation of vessel departure times, shipping-order assignment to the vessels, sharing of profits, demand information and operating costs (Lei et al., 2008). Yet, one could still wonder if the alliances are achieving their assumed benefits. As remarked by Bergantino and Veenstra (2002), liner companies may be taking decisions on the basis of potential cost savings which might never be achieved in practice. This report aims to answer the following question: what are the impacts of alliances in container shipping: for the liner industry itself, but also for other transport stakeholders and the whole transport system?

Four generations of global alliances in container shipping

All major container carriers are now involved in one of the three global alliances: 2M, Ocean Alliance and THE Alliance (Table 1). These bring together the largest eight container carriers into groups of more or less equivalent market share. 2M consists of the two largest container carriers, the Danish Maersk and the Italian-Swiss MSC, and has been operational since 2015.¹

The two other alliances, Ocean Alliance and THE Alliance, consist of three large carriers each. They have been operational since April 2017, formed from carriers that were active in three other alliances operating prior to April 2017.² The reshuffling of these alliances became necessary because of cross-alliance mergers, something quite typical to the history of alliances in liner shipping.

Alliances have become a dominant feature of container shipping. Since global alliances in container shipping emerged around two decades ago, with the creation of Global Alliance and the Grand Alliance in 1996, the market shares covered by carriers in global alliances have increased steadily, particularly during the last few years. In 2011, there were three alliances (CKHY, Grand Alliance and New World Alliance) like now, but their combined market share was 29%, whereas in 2018 the current three alliances (2M, Ocean, THE) have around 80% market share of the global ship capacity (Figure 1). Global market shares are actually fairly imprecise indicators in this respect, as global alliances mainly operate on East-West trade lanes, where the combined market share of the three alliances is around 95%.³

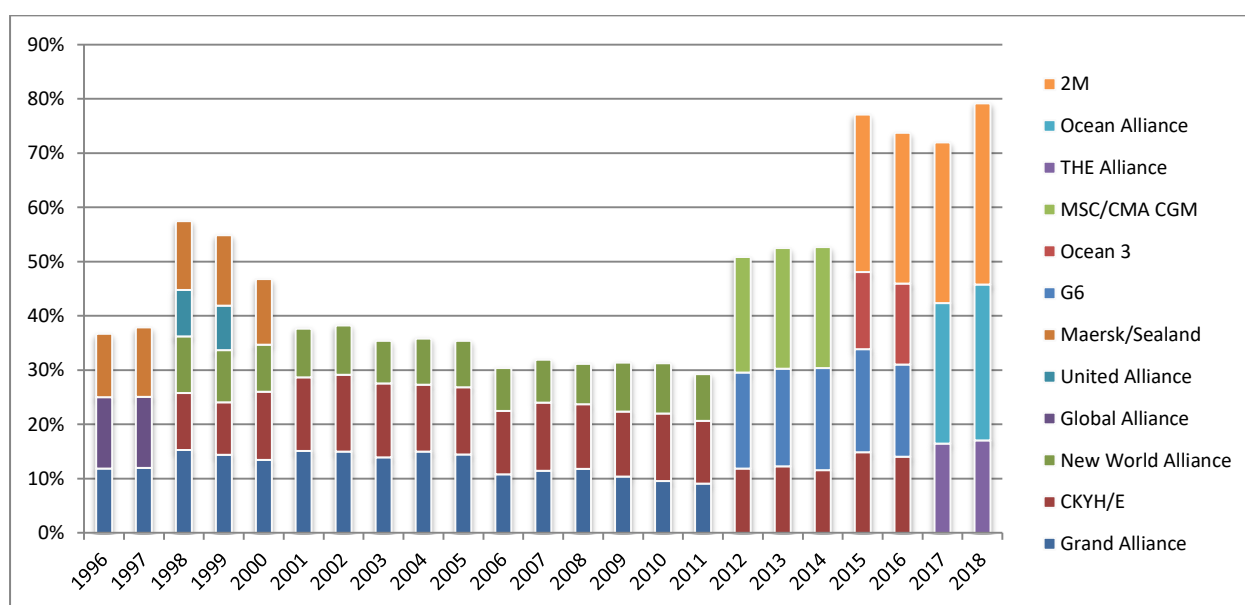
Table 1. Overview of the three global alliances in container shipping (June 2018)

Alliance	Carriers	Global market share (%)	Global carrier rank
2M	Maersk	19	1
	MSC	15	2
Ocean Alliance	Cosco-OOCL	12	3
	CMA CGM	12	4
	Evergreen	5	7
THE Alliance	Hapag-Lloyd	7	5
	ONE	7	6
	Yang Ming	3	8

Note: Global market share indicates the share of global container carrying capacity of the carrier

Source: Own elaborations based on data from Alphaliner (2018)

Figure 1. Global market share (container carrying capacity) of global alliances (1996-2018)



Source: Author's elaborations based on data from Alphaliner (1996-2018)

Current alliances could be considered to be the “fourth generation” of alliances. The first generation of alliances emerged in 1996. They were ambitious in scope, as they were made up of an extremely large share of the vessels held by the individual carriers, but these were short-lived in practice, with the exception of the Grand Alliance. The second generation of alliances proved more stable, with three main alliances – New World, Grand Alliance and CKHY – active throughout that period with only a few minor changes in composition made. The main model of these alliances was the combination of one dominant carrier with several smaller carriers: e.g. in 2010, both APL and Hapag-Lloyd provided more than 50% of all vessels in their respective alliance (New World Alliance and Grand Alliance). The exception to this was the CKHY Alliance. There were two dominant players, but their competition was moderated by complementarities between the two and with the other smaller carriers.

A crucial change to the alliances model occurred around 2012 when also the largest carriers started to move into alliances. This was a reaction to the creation of the G6 Alliance in 2012, bringing together carriers from the New World Alliance and the Grand Alliance. The G6 Alliance formed a threat to the large carriers that had not participated in alliances until then. As a result, Evergreen entered into the CKHY alliance (since then called CKHYE), MSC and CMA CGM created an alliance in 2012 and formed together with Maersk the P3 Alliance in 2014, which did not receive regulatory

approval in China, but gave rise to 2M in 2015, an alliance between Maersk and MSC. The result of this was a constellation of alliances that could be considered hybrid, consisting of:

- an alliance with one dominant and many smaller carriers (G6),
- an alliance with one dominant and two smaller carriers (O3),
- an alliance with the two largest global carriers (2M),
- an alliance with various dominant carriers (CKHYE).

In addition, it was a constellation that was considered unbalanced and unstable, as the market shares of the four alliances were fairly different; so many industry observers predicted that this constellation would disintegrate rather quickly. This happened indeed, due to many cross-alliance mergers and acquisitions since 2015. The generation of alliances between 2012 and 2017, the “third generation”, could be considered a transition from the previous alliances model to a new type of alliances, the “fourth generation” (Table 2).

The characteristics of this “fourth generation alliances” are fundamentally different from earlier alliances: all current alliances are made up of at least two dominant very large carriers. CMA and Cosco have almost identical market shares, as do Hapag-Lloyd and ONE – and to a slightly lesser extent Maersk and MSC – so no carrier could be considered dominant in any of the three alliances. This could have various consequences: the reduction of the number of carriers per alliance could make decision processes easier, but the equivalence of carriers could also imply stronger conflicting intra-alliance dynamics, especially when complementarities between carriers are lower than before.

Table 2. **Four generations of global alliances in container shipping**

Generation	Alliances	Period	Characteristics
First	Global, Grand, Maersk/Sealand	1996-1998	Ambitious focus, instability
Second	New World, Grand, CKHY	1998-2012	Stability, used by mid-sized and smaller carriers.
Third	G6, CKHYE, 2M, O3	2012-2017	Transition: the largest carriers also become part of alliances. Instable alliance constellation
Fourth	2M, Ocean, THE	2017- ?	No alliance has one dominant carrier. The carriers in alliances are the eight biggest carriers globally

Drivers of alliances in container shipping

The first and second generations of alliances were facilitated by globalisation and the financial position of the carriers. The growth of world trade and increased internationalisation of the economy in the 1990s, made it essential for container shipping companies to extend their market coverage globally. At the same time, the costs of providing such operations were increasing due to the need to deploy ever larger and costlier vessels (Slack et al., 2002). Moreover, the financial position of most carriers made this a difficult avenue. Alliances between mid-sized and smaller carriers solved this dual challenge of internationalisation and the capital intensity of bigger ships.

The partial prohibition of shipping conferences made alliances the main avenue for cooperation of shipping companies. Although vessel sharing agreements have been deployed in liner shipping for a long time, global alliances are relatively new. The demotion of the conference system primarily through the United States Ocean Shipping Reform Act (OSRA) in 1998 and the abolition of the exemption from anti-trust rules by the EU in 2008 have led companies to seek other forms of cooperation, in particular alliances (Fusillo, 2006). So, it is fair to say that strategic alliances have taken the place of liner conferences as means of co-operation (Sjostrom, 2010).

The emergence of “third generation” alliances is strongly linked to the first order of mega-ships in 2011. This order was perceived by many smaller carriers as the creation of an entry barrier, so they stimulated intensified cooperation between their existing alliances (New World and Grand Alliance), in order to create the economic size needed to order these mega-ships. This development – illustrated

by the creation of G6 – and the rise of economic and financial risks due to the deployment of new ultra-large container vessels has subsequently compelled the largest ocean carriers to cooperate with each other in global alliances. The consolidation in container shipping has driven the emergence of the “fourth generation” of shipping alliances. The composition and more concentrated nature of these alliances is a direct consequence of acquisitions of smaller carriers that made the previous constellation of alliances no longer sustainable.

Major global trends related to liner alliances

Liner shipping operates in a dynamic and changing global environment. Containerised trade flows are impacted by population and economic trends in main world regions, developments in manufacturing, development of new transport corridors and evolving geo-political conditions. This implies that alliances should be assessed not only as a sectoral business strategy, but also in its inter-connections with a wider global environment.

Technical innovation is often associated with economic concentration. For example, digital technologies become more valuable when they can be scaled up and many digital platforms compete until they reach monopolistic positions. Such innovations and related investments could increase barriers to entry in many sectors and might make it more difficult for smaller companies to compete. As result, various industries have become more concentrated over the last decades. Concentration tendencies are also visible in other transport sectors than maritime transport. For example, the rail freight sector in Europe has become more consolidated, which could lead to the disappearance of a certain number of operators and create a risk of concentration (Laroche et al. 2017). Concentration in liner shipping in a way reflects these larger developments. As this report will set out, the concentration of the sector – and related to that, the emergence of alliances – has effects that trickle down to global supply chains and transport systems.

How alliances work

Despite differences between alliances, most of them work relatively the same. Most carriers have considerable experience with alliances, so the practices of alliances that have ceased to exist sometimes survive in new alliances. Most of the coordination and information sharing in alliances covers the same areas, such as stowage plans, vessel assignment and scheduling, as well as problem-solving expertise in the event of engine failures. Regulation of fuel types, environmental issues, operational efficiencies and engine failures are also openly discussed within alliances (Tan and Thai, 2014).

Essential elements in each alliance include planning of the overall capacity, the contribution of each individual carrier in the alliance and the way each carrier gets compensated. One of the determining choices is the capacity that the alliance wants to offer on the different trade lanes and the ships that each partner in the alliance wants to dedicate to the alliance service. The general principle of an alliance is that the benefits that a carrier gets out of an alliance are related to what a carrier puts in it, in terms of pooled vessels. Each alliance has developed a reference cost model that is applied for internal accounting purposes (Box 2).

Box 2. Cost calculation models within alliances

In essence, global alliances are global bundles of vessel sharing agreements. All alliance partners define their contributions in terms of the vessels they are willing to operate for the alliance. Alliances are usually closed systems, so the idea is that slots offered on vessels operated by carriers in one alliance are taken by their alliance partners and exchanged for slots on the vessels that they operate. In order to make sure that this process runs smoothly, each alliance has a reference cost model to clear these exchanged positions at the end of the month, which avoids that certain partners would be net takers or contributors for too long. In at least one alliance, this clearing takes place each week via buying and selling of slots; after each month the net position is invoiced to carriers that pay each other if they have a surplus of slots bought. The cost model used for this internal accounting procedure could be considered the average of the individual cost models used by each carrier within the alliance. At the outset, partners have discussed the merits of each individual model and have agreed on a common reference cost model. This reference cost model could be based on theoretical costs or on real costs; different alliances apply different practices. The reference cost model takes into account fuel costs, vessel operating costs and depreciation costs, but excludes the terminal handling fees and port costs that each carrier pays individually and that do not enter into the alliance reference cost model. The Ocean Alliance specifies the reference costs per service, whilst the other alliances do this per trade lane.

Although the reference cost model is presented as a theoretical model, it probably allows carriers in the same alliances to develop a fine sense of the costs of other carriers. Their own position in relation to the reference cost model also determines if they are net winners or losers from the slot exchange. In the case of the theoretical reference cost model: the carrier that has the lowest real costs has an interest in a reference cost model with higher reference values, as it maximises the profit of their net surplus of slots provided.

Port choice is also subject to negotiations among alliance members and can deviate from the choice of one particular member. This could be particularly contentious for carriers that have large stakes in container terminals that do not overlap. As will be set out in Chapter 2, various carriers have acquired stakes in container terminals to handle their ships, sometimes on an exclusive basis via dedicated terminals. Vessel sharing via alliances complicates this strategy, as in most cases the carriers in the same alliances have stakes in different container terminals. These differences could provide complementarities, but some of the terminals might also be competitors, in which case compromises would have to be found on which ports and terminals the ships of the alliances should call.

There are some differences between alliances with regards to joint procurement for port services, such as cargo handling, and the pooling of risks. The G6 Alliance applied joint procurement with one tariff negotiated for all alliance partners for the joint services, with each alliance partner negotiating their own tariffs for the services that they operated outside the alliance. Joint procurement of port services is in some jurisdictions excluded from the scope of the carrier alliances in operation since April 2017. One alliance – THE Alliance – has extended the cooperation to a risk sharing arrangement: a joint emergency fund in case of bankruptcies (Box 3).

Box 3. Emergency Fund of THE Alliance

The bankruptcy of South Korean carrier Hanjin in 2016 showed the increased risk related to alliances that will be explored further in Chapter 2. Hanjin was member of the CKYHE Alliance. At the time of its bankruptcy its ships carried a substantial amount of containers from the other members of the CKYHE alliance, resulting in elaborate strategies being required to recover the cargo of their clients on board the Hanjin vessels. Following these events, the other members of THE alliance Hapag-Lloyd, K Line, MOL, NYK and Yang Ming decided to include an emergency fund within their alliance as a safeguard that could be used in the event that one of their members collapses, giving some reassurance to the shippers who want to engage in a contract with one of THE Alliance's members. The fund allows carriers to bring the ships to the port and unload the containers and therefore assure the continuity of the operations in the event of insolvency of one or more member lines. According to their safeguard, if a liner member collapses the other members have the option to make arrangements directly with entities providing vessels or space to the affected party that are used by the alliance, to make arrangements directly with agents or subcontractors of the affected party, or to take any other action to assure that the cargo that is on board the ships of the collapsed members can be discharged.

Most of the planning within alliances is done jointly and within established structures. This includes planning of which trade lanes to serve, alliance vessel capacity, service frequencies and port calls. These decisions are generally taken unanimously. Daily decisions are taken via majority vote. Global alliances have formal structural set-ups of committees as one of the significant mechanisms through which operational information sharing occurs. A characteristic set-up consists of principal committees, steering committees and a series of other support committees. These respective committees typically include one representative of each alliance member. These form the network for information flows within an alliance. The major alliances also established joint operational centres to enable closer coordination. However, the sharing of best practices or information on firm-specific organisational systems generally does not constitute a norm within alliance networks and is conducted mainly on a bilateral and ad-hoc basis. (Tan and Thai, 2014).

How to determine impacts of alliances?

Strategic alliances in container shipping have a history spanning two decades and have been fairly well documented. Our literature review showed the presence of hundreds of studies on liner shipping alliances. Our comprehensive assessment of these studies provides various indications on the impacts of global alliances since their emergence in the mid-1990s. However, a comprehensive study on the impacts of alliances for the whole maritime transport logistics chain – as we aim to provide here – does not seem to exist. Our review of existing literature provides insights in certain elements that underline the main findings of our study, but the most important information sources for our study come from industry data and interviews with relevant stakeholders.

Industry data sources give insight into the performance of container shipping within the maritime logistics chain. We have elaborated on data sources from Sea Intelligence, Alphaliner, Drewry and data sources that we have collected via individual firms and organisations. Our study has a particular focus on the fourth generation of alliances that came into force in April 2017. The transition from a situation of four alliances to three alliances as of that date provides an opportunity to assess the impacts of the new alliances, as all other circumstances – such as trade growth – could be considered constant. Part of our assessment of the new alliances consists of identifying main differences before and after this transition. This assessment is embedded in analysis of performance and trends over a longer time span. Complicating this analysis – like many recent analyses – is that the evolution of alliances in container shipping coincides with the global financial and economic crisis that started in 2008 and its aftermath.

A major information source for this study is interviews with representatives from container lines, short sea operators, port authorities, terminal operators, freight forwarders, trade unions, shippers, towage companies, ministries, government bodies, academics and other experts. These interviews

were semi-structured and lasted in most cases from one to one and a half hours. Many of these stakeholders are listed in Annex 2; in some cases interviews were conducted under the condition of anonymity for the persons interviewed. The series of interviews were part of study visits to specific places, including Barcelona, Valencia, Gioia Tauro, Genoa and Hamburg. The perspectives from these specific places provide specific examples of the impact of alliances, complemented with examples from other places to avoid a European bias.

The central question in this report concerns the impact of alliances in container shipping. The impact on the whole maritime transport logistics chain is treated in Chapter 2. Main elements in the assessment include the impacts on the efficiency of the transport system, the effects for transport users, alternative instruments to alliances and competition constraints related to alliances. A more specific analysis per maritime transport stakeholder is provided in Chapter 3, in which impacts for the shipping sector, ports, terminals, port service providers, freight forwarders and shippers are discussed. Finally, Chapter 4 describes main policy approaches in various countries and assesses possible public policy options with respect to alliances in container shipping.

Impact on transport systems

Global alliances in container shipping have far-reaching impacts on the whole maritime transport system and its stakeholders. These impacts are similar to those caused by mega-ships, which we assessed earlier (OECD/ITF, 2015). The emergence of global alliances in container shipping has often been treated as a specialised shipping subject, but we think it a mistake to frame shipping alliances as a phenomenon with impacts mostly relevant to the liner shipping sector itself. This chapter focuses on the impacts these alliances have on the transport system; the next chapter assesses impacts on the different maritime transport stakeholders.

Alliances have intended or unintended consequences for the whole containerised transport system and the container shipping sector forms only part of it: institutional innovations such as global shipping alliances do not take place in isolation. The question is whether alliances in container shipping have improved the efficiency of the maritime transport system as a whole; the door-to-door transport. Efficient transport should create also more value for transport users and consumers. Therefore, our assessment also explores the effects on transport users and consumers. Even if alliances would effectively create more value for transport users, one could wonder if alliances are inevitable instruments to achieve these outcomes. Finally, it is relevant to assess if alliances do not constrain competition.

Do alliances produce more efficient transport systems?

Alliances have allowed carriers to acquire and operate mega-ships, reducing unit costs. Without alliances certain carriers would not have been able to acquire mega-ships. As it is the ordering of mega-ships that has fuelled overcapacity, there is a link between alliances and overcapacity. Alliances have increased the uniformity of the transport offer and limited the possibilities of carriers to differentiate themselves. The new constellation of alliances since April 2017 - along with the deployment of mega-ships to which alliances are directly linked - has contributed to a decrease in service frequencies, less direct port connections, declining schedule reliability and longer waiting times. Independent carriers manage to provide more differentiated service levels and thus more value added to transport users. Moreover, alliances have proved to be inherently instable: considering that all major carriers are in alliances, changes in one alliance have an impact on the whole sector.

The impacts of alliances on the containerised transport system taken as a whole seem to be predominantly negative. They contribute to concentration of port networks and related underutilisation of public infrastructures, in combination with other factors some of which are directly related to alliances, such as mega-ships and the behaviour of port authorities. Within ports, the buying power of the alliances can create destructive competition between terminal operators and between other port service providers such as towage companies.

Economies of scale: mega-ships and overcapacity

Alliances have made it possible for smaller players to get access to big ships that they would otherwise not have had. Shipping alliances have greatly encouraged the deployment of large containerships and large-vessel deployment can be identified after the formation of the first strategic alliances in container shipping (Slack et al., 2002; Fusillo, 2004). The link between vessel size and the attractiveness of alliances is clear from research on the propensity to cooperate: carriers with the highest average vessel size had the lowest propensity to cooperate – and the largest carriers were less inclined to cooperate than medium-sized ones (Parola et al., 2014). At the same time, the benefit a carrier experiences by collaborating increases with the network size and the fleet capacity of the partnering carriers (Houghtalen et al., 2011). Another indication that global alliances facilitate the development of ever larger ships: alliance services generally deploy the largest-capacity ships, since

the emergence of alliances: e.g. the services of the Grand, New World and United Alliances in the early 2000s were provided by ships that were larger than the average size of the fleets of individual carriers (Slack et al., 2002). The practice that the largest ships are deployed in alliance services continues until today.

There are mega-ship orders that seem to have been coordinated within the same alliance. The determining characteristic of liner shipping is its regularity: the majority of container services is offered on a weekly basis. In order to be able to offer a weekly frequency, a carrier needs a set of ships, e.g. around 10-11 ships for a weekly Asia-Europe service, taking into account the time needed for a ship to make the roundtrip. The cost of eleven ultra large container ships could easily reach USD 1.5 billion, which might be difficult to finance for smaller carriers. For this reason, carriers in the same alliance have coordinated their mega-ship orders, so that they could pool similar-sized vessels for an alliance service. This seems to have been the case for carriers in the G6 Alliance (Box 4).

Box 4. Coordinated mega-ship orders in the G6 Alliance

Carriers from the same alliance can coordinate the purchase of mega-ships to be deployed in the same service, so that individual carriers do not have to share the burden of a full set of ships needed to service a trade lane. Therefore, some shipping companies that, under different circumstances, would not have been able to invest in mega-ships have the capacity to do so thanks to coordinated ordering within alliances. In 2015, the ocean carriers Mitsui O.S.K. Lines (MOL) and Orient Overseas Container Line (OOCL) – part of the G6 Alliance at that time – both ordered six mega-ships to be deployed on the Asia-Europe trade route. The announcement made by OOCL to order six ships with 21 100 twenty-foot equivalent unit (TEU) capacity followed three weeks after MOL ordered six mega-ships of 20 000 TEU capacity. The ships had similar delivery dates and were ordered at the same shipyard, Samsung Heavy Industries, which enhanced the impression of coordination. The ships were used to offer Asia-Europe services of the G6 Alliance.

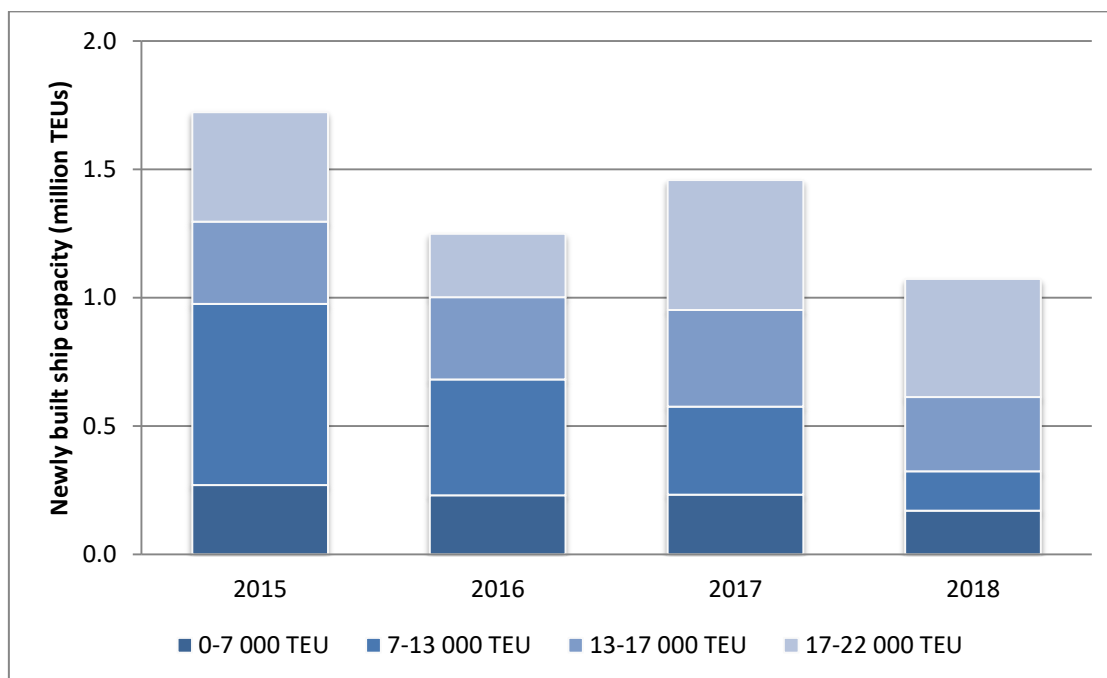
Intra-alliance competition might also contribute to orders of new mega-ships. The idea behind this is that the carrier with the largest fleet and the largest ships will be the dominant carrier in an alliance. As the latest generation of alliances all consist of at least two carriers of similar size, this constellation is more prone to intra-alliance competition than earlier generations of alliances, in which there was mostly one dominant carrier partnering with several clearly smaller carriers. The announced mega-ship order of CMA CGM in Autumn 2017 seems to be a direct consequence of this intra-alliance competition, in particular the expansion of alliance partner Cosco that made it of similar size to CMA CGM.

Mega-ships have driven overcapacity in the sector. Ships with a capacity over 17 000 TEUs represented around a third of the new-build container capacity during 2015-2018 (Figure 2). Considering sustained overcapacity in container shipping since 2009, the mega-ship orders have increased the oversupply of container ship capacity, despite substantial dismantling of older ships that has moderated overcapacity somewhat over the last years. Overcapacity – and a net growth rate of ship capacity that exceeds the growth rates of global containerised trade – is one of the main causes of the lack of profitability of container shipping. The demand of global containerised trade was negatively affected by the global financial and economic crisis that started in 2008. However, the ship overcapacity cannot be considered to be a result of the crisis, but rather the lack of restraint in ship orders since 2009, which resulted in a growing divergence between demand and supply.

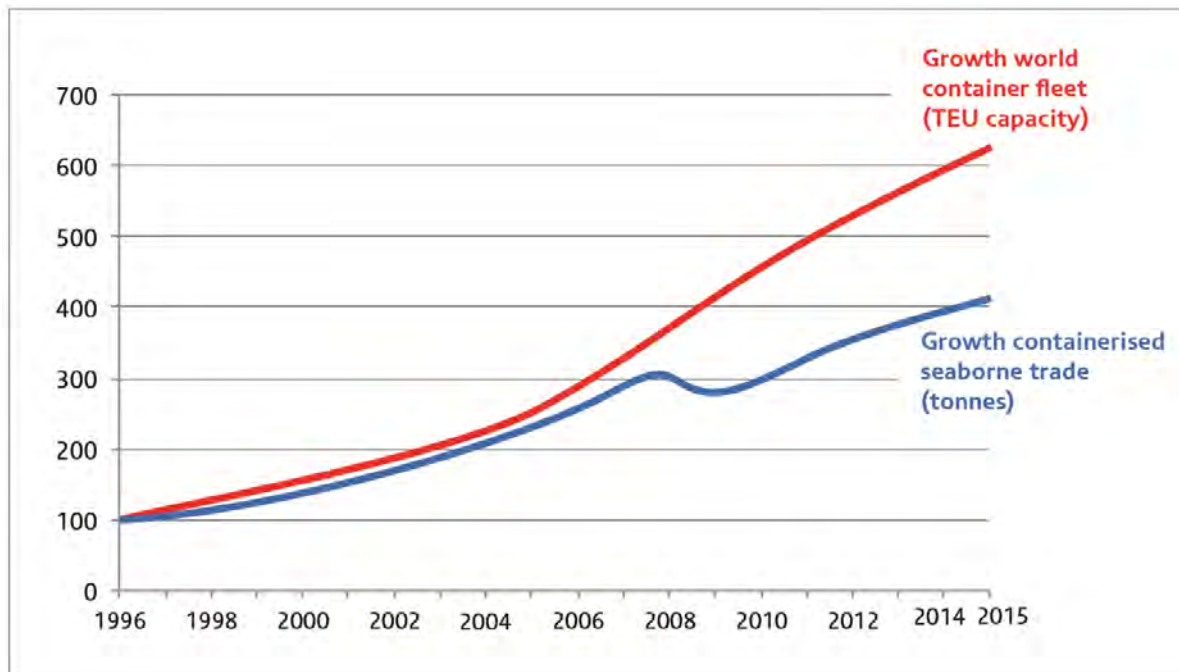
Global alliances have exacerbated the problem of excess investment and overcapacity (Higashida, 2015), which is one of the main causes of the lack of profitability of container shipping. It has been frequently observed that there is a prisoner's dilemma related to capacity investment in container shipping, where the strategic behaviour by each individual company (to expand capacity) can lead to mutually destructive effects and overcapacity in the shipping supply (Kou and Luo, 2016). Container shipping – like shipping in general – is highly cyclical (Stopford, 2008). The increasing dominance of alliances in the aftermath of the global economic crisis that started in 2008 has disrupted this cyclicity: instead of the decline of ship capacity it resulted in capacity growth that was

completely disconnected from demand for containerised transport capacity (Figure 3). Alliances made it possible for smaller carriers to follow market leaders in their ordering of mega-ships. Without alliances, this would not have occurred and container shipping capacity would likely have been closer to equilibrium with demand.

Figure 2. **Mega-ships' substantial share of container ship orders**



Source: Own elaborations based on data from Clarksons Research

Figure 3: **Disconnection of container ship size developments and seaborne trade growth (1996-2015)**

Source: OECD/ITF (2015)

Alliances are supposed to improve the utilisation of ships, but this cannot be called a resounding success. Vessel sharing might have helped to increase what would have otherwise been very poor utilisation rates, but this has come at the cost of blank sailings, a euphemism for cancelling a service. During 2015-2017, there were on average 22 blank sailings per year on the Transpacific trade lane and 13-14 blank sailings on the Asia-Europe trade lane (SeaIntel, 2018; 346). On average around 30% of these blank sailings are known less than four weeks in advance, which has repercussions for the supply chains of shippers. On the other hand, carriers are sometimes confronted with late cargo arrival or no-shows from shippers, which complicate carrier efforts to maximise ship utilisation. There are few indications that alliances have helped carriers to improve their financial performance. E.g., an analysis conducted between 1998-2002 found no conclusive evidence that either the increased concentration of slot capacity or attempts to boost slot capacity via alliances led to improved financial performance (Lam et al., 2007).

Less differentiation in services

Container lines have by nature limited opportunity to differentiate their core service, port-to-port transportation, since it is standardised and homogenous. This homogeneity and the lack of difference between offerings of container lines have made containerised transport services a commodity-like service. The price sensitivity of container shipping is also high since shippers usually look for the best price as they perceive the core product identical and as switching costs are considered to be low. Lim (1998) claimed that differentiation is challenging in container shipping and suggested cost leadership strategy based on cost reductions that could create a competitive advantage for a carrier. Cost leadership is also not very evident, as container lines can easily imitate technologies or processes that provide a cost advantage; the almost sector-wide deployment of mega-containerships is an example of this.

However, there are various ways in which container lines could differentiate themselves, if they wanted to. Durvasula et al. (2002) suggested high-quality service is important for carriers to differentiate themselves from competitors to gain a competitive advantage. Brooks (2000) stated that carriers must perform differently on service attributes that are important for shippers. Stopford (2008)

indicated differentiation in terms of vessel on-time differentiation, transit time door-to-door, carrier cost per move, cargo tracking, frequency of sailings, reliability of administration and space availability. Yap (2010) mentioned billing accuracy, responsiveness to customers' requirements, ensuring safety and security of cargo, schedule reliability, sailing time to destination port, connectivity offered and frequency of sailings.

Differentiation in service offerings would enable carriers to better serve their customers. There is a long history of discrepancies between the offerings of carriers and the selection criteria of shippers. Already in the 1990s, studies revealed significant differences between carrier and shipper perceptions. Whereas most shippers emphasised service factors, including reliability, on-time delivery and safety, as more important than costs, most carriers did not recognise prominent shipper selection criteria (Maloni et al. 2016) and continued to focus on cost reductions. Obviously, shippers with different product characteristics have not the same priorities in terms of service quality (Wong et al., 2008). Logistics managers in different industries like chemicals, tobacco, machines and electronics assign different weight scores to service attributes such as quality, time and cost (Danielis et al., 2005).

Further differentiation in service offerings could also help container shipping to attract cargo from other transport modes or shipping sectors. Container vessels compete with air freight – or combined sea and air freight - in time-sensitive, high value-added goods such as electronics, fashion products, sports gear, spare parts, tools, machines, expensive cars and perishable goods. Container shipping competes with bulk shipping in non-time sensitive, low value added goods, such as fertiliser and chemicals. Container lines could provide two different services instead of one standardised service: a fast service to be more attractive for time-sensitive goods and a slow service to be more competitive versus traditional types for transport of minor bulk, break bulk, liquid bulk and project cargo (Lindstad et al. 2016).

Yet, global alliances reduce the opportunities for differentiation among alliance partners. Differentiation on their core offerings such as transit time, on-time sailings and space availability at the vessel, are all covered via the vessel sharing and are equivalent across the alliance. Similarly, most ocean carriers rely on the same inland, rail and truck carriers (Maloni et al., 2016). In addition, it has been observed that the services of container lines have become less flexible and less customer-oriented (Murnane et al., 2016). In short, alliances have increased uniformity in container shipping, a point that was already made more than fifteen years ago (Slack et al. 2002) but that is increasingly pertinent. In some cases, carriers that get together in an alliance have opposed strategies with regards to service attributes, which makes it difficult to distil a joint strategy. This point could be made with regards to service reliability of 2M (Box 5).

Schedule reliability has converged to such an extent for carriers in alliances, that it can no longer be considered a differentiator. Although there are some differences between alliances and between carriers active in alliances, alliances also decrease the differentiation in this domain: carriers in alliances have a reliability score between 71%-81%, whereas the scores for non-alliances carriers is more differentiated: ranging from almost fully reliable to very unreliable. The best performing carriers on all trade routes are without exception non-alliance carriers. Shippers that attach very high importance to reliability will only find these attributes among non-alliance carriers that might actually not be active on the relevant trade lane. Similarly, shippers solely motivated by price and indifferent to unreliability could be better served by low-cost independent carriers. The new alliance structure has not had a favourable impact so far: the average schedule reliability of container carriers over 2017 ranged from 71%-81% which was considerably lower than the range of 82%-85% achieved in 2016 (SeaIntel, 2018; 360). Overall schedule reliability of carriers has decreased to 66.4% in the first quarter of 2018, 6% lower than in the first quarter of 2017 (SeaIntel, 2018; 360). This has been the lowest performance documented since the first data record in 2011. The analysis includes a breakdown of on-time performance for alliances, which show that the best performing alliance could guarantee on-time arrival (including one day deviance of schedule) in only 55.5% of the cases.

Limited reliability cannot exclusively be explained by alliance formation, or be fully attributed to liner shipping companies, as their reliability also depends on other stakeholders in the maritime logistics chain. Yet, the least that can be concluded is that alliances have not resulted in better reliability scores.

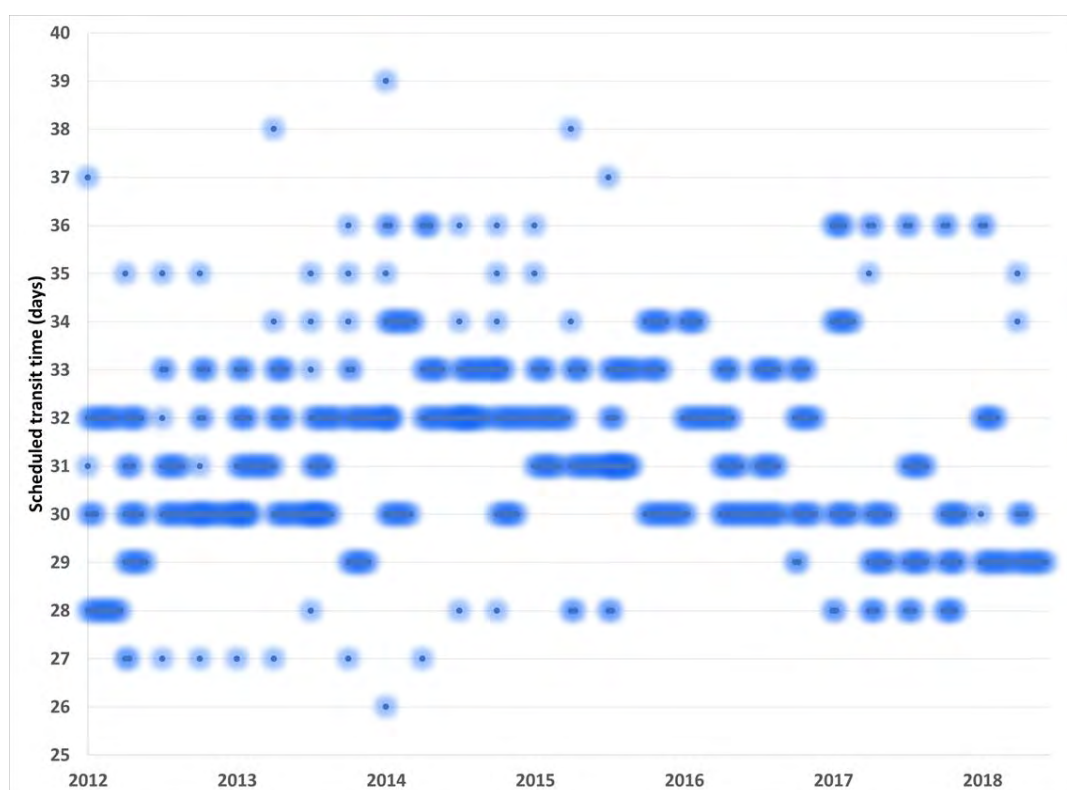
Box 5. Carrier strategies for schedule reliability

Shipping lines have different strategies for dealing with schedule reliability and transit times. An essential element in such a strategy is a time buffer. The larger the buffer, the higher the probability that the scheduled time can be realised. The buffer strategies of carriers are different. Mediterranean Shipping Company (MSC) was known for keeping its buffers low. Despite not having the best record with regards to schedule reliability, it maintained reasonably good transit time reliability by managing loops and vessels in a “creative” way. This implied ad hoc changes to the order of port calls, the ad hoc transshipment of containers at relay ports in the Mediterranean and the seemingly random cancellation of one or more ports of call during a round voyage (Notteboom, 2006). In contrast, Maersk Sealand was very strict in respecting scheduled times and the order of ports of call. This was made possible by sufficiently high time buffers to cope with unexpected disruptions. This resulted in high schedule reliability and high transit time reliability. The price of higher reliability was higher price: the rates of Maersk Sealand were known to be substantially higher than for low-cost carrier MSC (Notteboom, 2006).

Since the creation of the 2M alliance, the reliability scores of the carriers have converged, which is the result of a declining reliability of Maersk and increasing reliability of MSC. Instead of creating synergies, the alliance formation has in this respect homogenised the service quality, without providing either of the carriers with a competitive advantage vis-à-vis other carriers.

Service differentiation has also declined in other respects. On the Asia-North Europe trade lane, transit times of all alliance carriers are almost entirely clustered around 29 days in the second quarter of 2018, losing a lot of variety compared to previous years (Figure 4). On Asia-Mediterranean, the choice of transit times for all alliance carriers is limited to either 19 or 24 days, which has been a trend since the launch of the new alliances in 2017. On the Asia-North America/West Coast trade lane the spread of the number of offered port pairs narrows quite drastically from a 3 to 25 port-pair range for most of 2015-2016 to a much narrower port pair range of 3-15 since the launch of the new alliances in April 2017. With regards to the transit times in the port pair Shanghai to Los Angeles/Long Beach a similar clustering effect has taken place, with 6-7 options narrowing to just 3-4 different options after the launch of the mega-alliances in 2015 (SeaIntel, 2018, 375/376).

Figure 4. Scheduled transit time Shanghai to Rotterdam/Antwerp per carrier (2012-2018)



Source: Own elaborations based on data from SeaIntel (2018).

There are various indications that service quality has gone down since the creation of the new alliances in 2017. For example, vessel delays have gone up: the average delay for all vessels in the second half of 2017 was 1.02 days; this was 0.60 days in the second half of 2016.⁴ This category includes vessels arriving ahead of schedule, on schedule and behind schedule. If we focus on the vessels that arrive behind schedule, the indicators are worse. The average delay for late vessel arrivals was 3.96 days, considerably higher than the 3.35 days recorded in the second half of 2016. The delays of both Ocean Alliance and THE Alliance went up considerably since their creation, whereas the delays of 2M went down slightly.

Customer service and customer relations could be effective differentiators for container lines, according to various studies (Jang et al., 2013; Maloni et al., 2016). More customer-focused business policies of the container lines may help carriers to develop and sustain their competitiveness in intra-alliance competition (Balci et al., 2018). Yet, most clients of container lines were outright critical of the level of customer service of most carriers, in particular those that outsourced their customer service to low-wage countries like India, as this deteriorated customer service to dramatic levels (see Chapter 3).

Significant differences exist in the appreciation of different categories of shippers with regards to transit time, availability of special equipment and cleanliness of containers. Thus, it is very critical for lines to reveal distinct needs of industries, routes and cargo types such as perishables, high-value products and fragile goods. This could be done via market segmentation (Balci et al., 2018). Customers of carriers could be divided into at least five groups, according to the service quality attributes that they find most important (Chen et al., 2017). Although charging higher prices through superior customer service and relations seems to be quite difficult in the current market environment, but superior performance on this may decrease the price sensitivity of shippers especially if carriers

would work on market segmentation strategies, currently underdeveloped in the sector (Balci et al., 2018; Balci and Cetin, 2017).

Outsiders could in theory provide services that are better aligned with shippers' preferences, but the fact that the three current alliances now include the eight largest carriers has made this more difficult, given the operational scale required to enter the market effectively. Moreover, there is some doubt as to the level of effective demand for higher price/higher quality service combinations in the market. It has been observed that shippers can express demands that they are actually not willing to pay for (Zhang and Lam, 2014). One possible explanation for this observation is that internal firm-level incentives for ocean transport procurement managers may not always be well-aligned with the optimal supply chain design for that shipper. That is, the procurement manager may not have appropriate incentives to deliver a solution which maximises overall benefits for the shipper, rather than minimising the core shipping cost component. Another part of the answer is likely related to alliances. Alliance carriers have limited possibilities to differentiate services because of being in an alliance. As noted above, carriers left outside the alliance structure are now generally smaller in size and may struggle to supply an adequate fleet to enable a sufficiently frequent service to operate.

Rationalisation of liner shipping networks

One of the justifications for alliances is the possibility of a carrier to offer a more comprehensive service to customers. Only a few container shipping companies demonstrate global presence in an industry that is often assumed to be highly internationalised: based on carrier networks in 2006 only three of nineteen global carriers could be considered as truly international, by serving the major and minor ports across the world (Gadhia et al., 2011). Joining an alliance made it possible for carriers - with the exception of Maersk and MSC - to widen the supplied services from 35% to 150% (Ferrari et al., 2008).

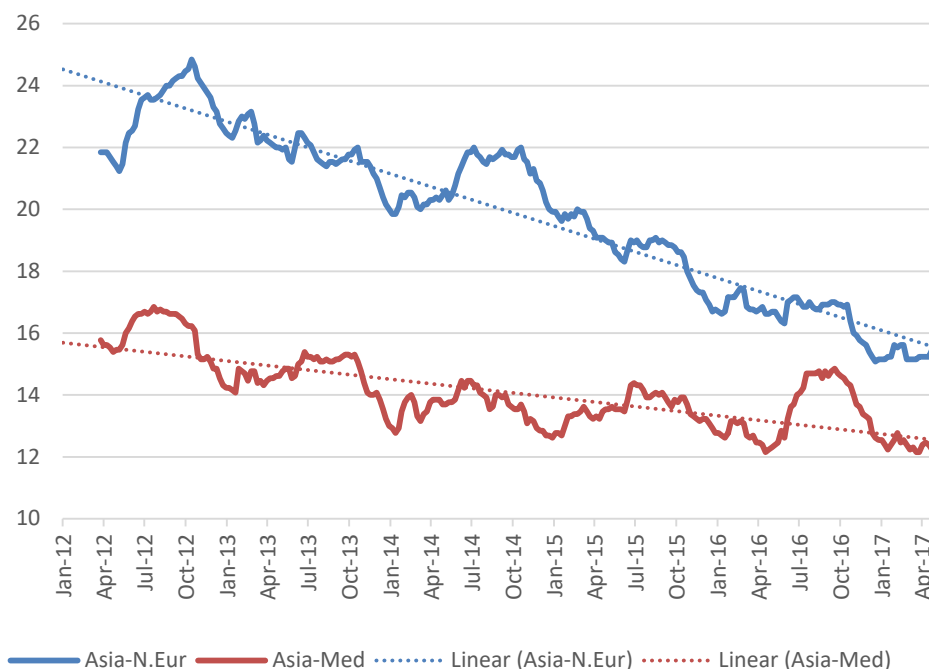
Throughout the 1990s, alliances contributed to an expansion of the number of liner services and their coverage. Many of the additional services mounted by the alliances and their members sought to widen the distribution network by adding more port calls: from 18 ports of call on average in 1989, carriers were serving 78 on at least a weekly basis in 1999, with membership in an alliance facilitating the expansion of services throughout the 1990s (Slack et al., 2002). However, this spectacular increase in the number of services did not translate in an increase in the number of discrete ports served by all of the alliances: 382 ports were connected in 1989, 384 in 1994 and 391 in 1999. This stability in the number of port connections was labelled puzzling and completely unexpected (Slack et al., 2012).

The newest generation of alliances is associated with declining weekly service frequencies and less direct port-to-port connections. The decline of weekly service frequency is the result of bigger ships and alliances and has been ongoing since at least 2006 (Notteboom et al., 2017). Over the last five years, the average weekly service frequency on the Asia-North Europe trade lane has decreased from 24 in 2012 to 15 in 2017 (Figure 5). With the currently expected annual capacity growth, one to two additional Asia-North Europe services are likely to be closed in 2018-2019, according to SeaIntel (2018: 351). Alliances result in less direct port-to-port connections, via the rationalisation of service networks of different carriers. This is clearly visible when comparing the direct port-to-port connections in the four alliances constellation (before April 2017) and the three alliances constellation (from April 2017): in the new alliances constellations the number of direct port-to-port connections significantly decreased in the Asia-Mediterranean trade lane (-8%) and the Asia-US East Coast trade lane (-13%) (Figure 6).

This “rationalisation” of liner shipping networks most likely reflects a fallacy in most ship routing modelling. The majority of studies on ship routing in liner shipping focus on cost minimisation of the fleet operator. Alvarez (2012) claims that the level of service experienced by shippers is not properly addressed by such models. He uses the inventory holding cost, which is a linear function of the cargo's transit time through the liner shipping network, to represent the

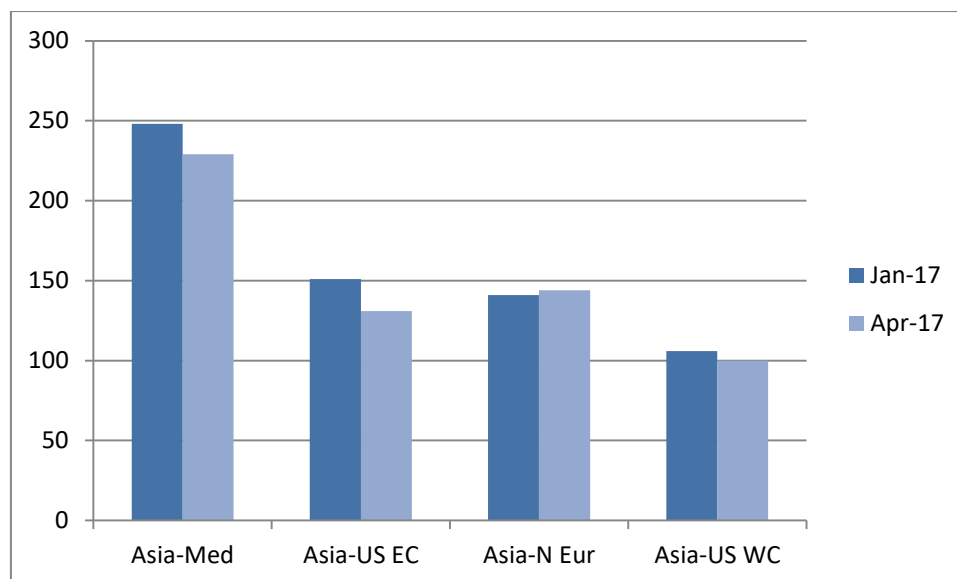
shipper's level of service. He suggests that these inventory holding costs should be included in liner shipping design analysis in order to achieve a balance between fleet operating costs.

Figure 5. Weekly service frequency Asia-Europe 2012-2017



Source: SeaIntel (2017; 314)

Figure 6. Direct port-to-port connections before and after new alliances (2017)



Source: Own elaborations based on data from SeaIntel (2017)

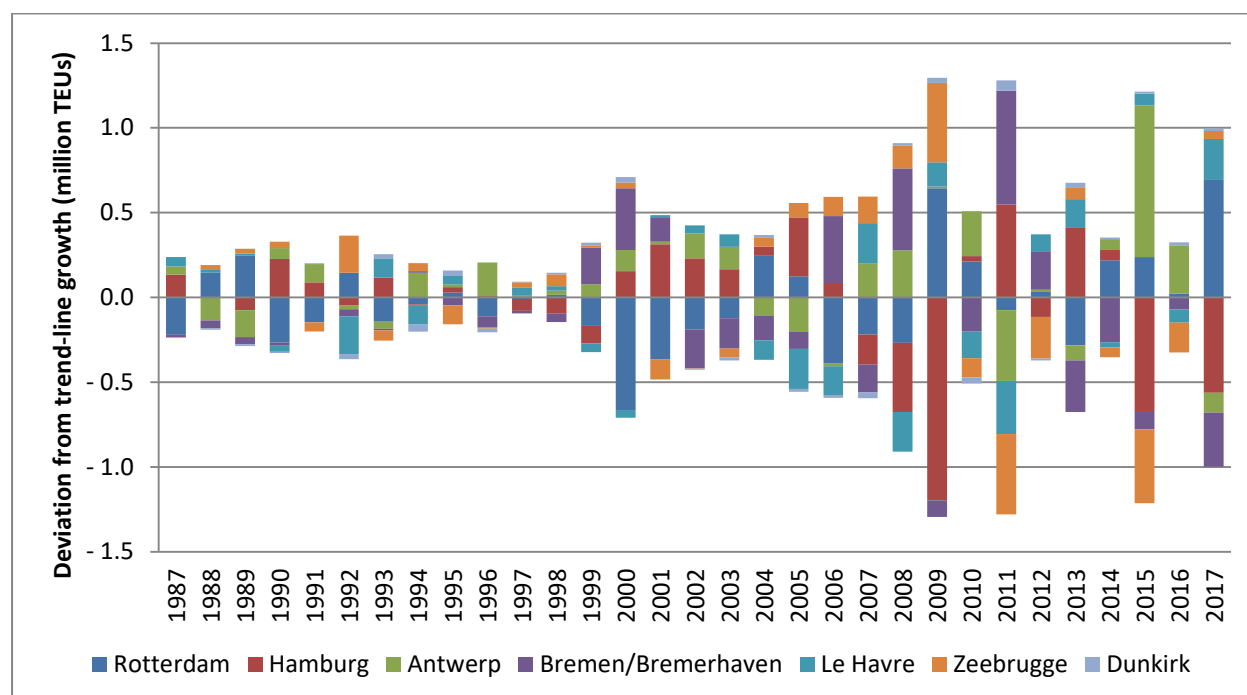
Less port to port connections means that some ports lose out. Generally, ports are often qualified according to their function, with transshipment ports handling cargo from ship to ship, with a final destination or origin in a different port (similar to hub airports) and ports that function as gateways for cargo with origin and destination in the port region – and sometimes extended region. Currently, two

sorts of container ports seem to be particularly under pressure. Firstly, the transshipment ports located in areas with a lot of competition from other transshipment ports, for example the Mediterranean. A second category of ports under pressure are the gateway ports located closely to other regional gateway ports. Adding to the pressure are the requirements to receive ever larger ships and larger call sizes, related to mega-ships and alliances. The consequence is inefficient public investments and allocation of funds to ports that are no longer in use (European Court of Auditors, 2016). In comparison, successful entry of new container ports is much rarer.

Within ports with multiple terminal operators, a “winner takes all”-model starts to emerge, in which the “winner” gets more cargo than he can handle, whereas the “loser” gets no or too little cargo for its capacity. Terminal operators on major East-West trade lanes had at least twenty potential customers just a few years ago, so competition between terminals within the same port would normally – in case of comparable performance of terminals – lead to more or less similar utilisation rates of the terminals. In the case of three (or less) customers – the alliances – this logic no longer works. In ports with two similar-sized terminals, calls from alliances will end up in overutilization of one terminal and underutilisation of the other terminal for reasons that are completely unconnected from the performance of either terminal. In ports with three terminals, each alliance could use a different terminal, but the shift of cargo from one alliance to another terminal would mean the end of business for one terminal and too much cargo for another terminal. This leverage of alliances over terminals is used to renegotiate terminal handling charges or additional services. Ports that have more than three terminals will have difficulty sustaining this, as alliances will prefer not to spread out their cargo over different terminals considering the additional moves this creates between terminals in case of transshipment and feeder cargo.

As the grip of alliances have become bigger, the cargo shifts between ports has also become bigger. Carriers generally have an interest in stimulating port competition, as this makes it possible for them to play out ports against each other, and shift ports if negotiations do not work out. This is nothing new; e.g. during 1989-1999, alliance members served a total of 541 different ports; as a more or less constant number of 385 ports were served each year, there was a considerable turnover of individual ports of call during the decade, reflecting a great deal of internal volatility (Slack et al., 2002). This volatility of port cargo has increased significantly as alliances have become more dominant: for most East-West cargo, a large package of services – and the connected port calls – is determined on the decisions of three alliances, rather than a much larger group of carriers as it was a few decades ago (Figure 7).

Figure 7. Volatility of port cargo



Source: Author's elaborations based on data from port authorities

Instability of alliance constellations

Carriers build collaborative relationships with each other, whilst competing to optimise their own profits. This dynamic, underlying the practices of carriers operating in global alliances, has been dubbed the “coopetition game”. Lin et al., 2017 show that carriers choose similar coopetition levels to maximise their profits and that this coopetition game can reach equilibrium under general conditions.

In practice, this equilibrium seems difficult to attain, as alliance constellations have been unstable over the last decades. This was particularly true for the first phase of alliance formations; described as a very unstable, repeated process (Midoro and Pitto, 2000) considering that up to 80% of alliances in the 1990s failed (Song and Panayides, 2002). The constellation of what we have dubbed the “second generation” alliances, which lasted from the beginning of the 2000s to 2012 is more stable. Although there were some changes to alliance composition during this time, in general the main alliances (New World, Grand Alliance and CKYH) remained in place with more or less the same carriers. However, since the mid-2010s there has been a reshuffling of alliances almost every year. The four alliances that were in place from 2015 were widely considered to be an unstable constellation, despite long official cooperation periods. A wave of cross-alliance mergers and acquisitions since 2015 indeed proved the instability of the “third generation” of alliances.

To a large extent this instability could be explained by the transaction costs of cooperation that can counterbalance the benefits of alliances (Bergantino and Veenstra, 2002). These costs generally rise with competitive intensity, the number of partners in an alliance, the nature of their role and contribution, the level of mutual trust and the complexity of the task (Killing, 1998; Pirrong, 1992; Sjostrom, 1989; Midoro and Pitto, 2000; Rau and Spinler, 2017). Alliances also need to find cost and benefit allocation schemes that do justice to the contributions of each carrier, which might be complicated if carriers do not share cost information with each other (Box 6). Alliances of firms with prior ties initially appear to have lower withdrawal rates, but this damping effect attenuates over time (Greve et al., 2010). According to Mitshuhashi and Greve 2009, ship age is the key matching feature: firms had lower performance and greater risk of failure if they formed alliances that were poorly

matched on ship age. Partnerships of carriers with strong market overlap are a source of friction and disruption that may cause it to leave its alliance (Greve et al. 2010).

Box 6. Alliance benefit allocation schemes and information sharing

One of the elements that can lead to friction between alliance partners is a proper cost or benefit allocation scheme among the participants in an alliance. A common way to cover the alliance costs is to share them proportionally, based on the carrier's capacity or demand. This method is easy to calculate and balances the budget, but it does not take the synergies between carriers into account, nor the economies of scale that might be different for different carriers. Therefore, the common allocation models might cause dissatisfaction for some carriers. In order to solve this, Zheng et al., 2017 propose an alternative cost allocation model that takes economies of scale into account and is based on inverse optimisation, by finding the capacity exchange prices that make the central optimal decision become each individual carrier's best option at the same time. This model supposes that each carrier in the alliance has access to full information on each other's costs. Although it is not fully improbable that carriers have this, cost and revenue information are usually corporate secrets that alliance partners are not likely to see. The implication of this is that perfect cost allocation in an alliance might not be possible unless carriers are aware of each other's cost structures.

The instability of alliance constellations has impacts on the maritime transport chain. At the minimum, potential cost saving advantages are often not fully exploited due to the frequency with which alliance restructurings takes place. Frequently, the transition from one situation to another leads to a transition period of deterioration of service quality and sometimes disruptive effects. Many shippers have complained about service problems related to the creation of the new alliances in April 2017 and, more recently, the integration of three Japanese carriers into Ocean Network Express (ONE).

One could wonder if the fourth generation of alliances will be less unstable, considering the competitive intensity of alliance carriers with mostly similar profiles. On the one hand, the number of carriers in each alliance becomes smaller, and with this decrease the costs of cooperation go down. On the other hand, the coordination costs increase with the larger company size and the related larger size of the network. In addition, the new generation of alliances probably have less complementarities than the earlier generations: each alliance has at least two large carriers of about the same size with very few differences in service offer, which could mean an intensification of the intra-alliance competition which could undermine the trust that might be necessary to create synergies.

Do consumers benefit?

Transport systems should serve the utility of transport users, so an assessment of alliances should also focus on the surplus transferred to consumers. In container shipping there is no direct contact between end consumers and most of the stakeholders in the transport chain. The most direct link is via shippers (the cargo owners) that import and export the products that consumers might eventually buy. As such, they are interested in a maritime transport system that delivers them their preferred goods with lowest costs, in the best conditions and in the most reliable manner.

Price

Containerised freight rates have halved over the last two decades. Average container freight rates are often used as an indicator for the costs of containerised transport and can be compared over time. There are differences in these freight rates, for example the average nominal freight rate as measured by the China Containerized Freight Index (CCFI). The CCFI reflects the average freight level in China's export container transport, including spot and contractual rates. Since 1998, the CCFI has declined by more than 20% and inflation-adjusted freight rates have shown that the costs of shipping a container have halved over this period, taking into account that bunker prices have increased more than five-fold since 1998 (Baker, 2018b).

There are various explanations for the decrease of the freight rates, one of which might be related to alliances. A major explanation of the development of freight rates is the balance between supply and demand for shipping: over the last two decades there have been regularly been periods of fleet overcapacity, in particular in the 2010s which heralds the era of mega-ships and the fourth generation of alliances. As alliances have facilitated mega-ship acquisitions that have driven overcapacity over the last years, the case could be made that alliances have indirectly resulted in lower prices for consumers. Other causes of the decline of freight rates could be higher operational efficiencies, e.g. via the lower slot costs of larger ships, and an increase in competition between carriers after the demise of the conference system.

However, freight rates only tell part of the story. Freight rates as reported by indices are based on averages, thus hiding the significant variations between customers and different destinations on the same trade route. Other cost elements include additional charges that are not included in the CCFI, such as bunker surcharges, demurrage and detention (Table 3). Additional surcharges vary significantly in amount, geographical coverage and time.

In most markets, surcharges represent a very significant addition to base rates and sometimes even a higher proportion of total costs compared to base rates. For instance, in 2009, surcharges accounted for more than 50% of the total freight charged to customers in 9 of 14 markets analysed by Slack et al. (2011). There is growing evidence that many of the surcharges are not transparent and that it is difficult to link those to actual costs incurred by carriers. Studies examining the composition of freight rates have shown that carriers have been involved in revenue generation in applying higher surcharges which did not reflect actual costs (Slack et al., 2011). While these additional costs are not systematically and coherently indexed, they have likely increased over the last years, based on reporting from shippers.

There is a tendency to apply surcharges for service characteristics that would previously be considered standard service, such as on-time delivery and guaranteed port calls. In this sense, container shipping is in a way starting to resemble the low-cost airline sector, with “bare-bone”, cheap service and surcharges for luggage, seat allocation and meals. As providing service quality beyond the bare minimum could be considered one of the few differentiators that carriers vis-à-vis competitors within and outside their alliance, it could be argued that the intensification of alliances in recent years has fuelled this emergence of service differentiation via surcharges.

The multitude of surcharges makes price comparison by customers difficult, so this complicates the assessment of whether transport users benefit from transport efficiency from alliances. Following the concerns of the European Commission (EC) that the practice of fourteen large container carriers publishing their intentions on future price increases may have harmed competition and customers, in 2016 these carriers have engaged in legally binding commitments on price transparency. As part of those commitments, carriers will announce figures that include at least five elements: base rate, bunker charges, security charges, terminal handling charges and peak season charges if applicable (EC, 2016). The emergence of new surcharges makes it difficult for carriers to live up to these commitments to be as transparent as possible, applying simple charging formulas and surcharges. The existence of surcharges also makes it sometimes difficult to assess whether alliances are indeed passing on price benefits to consumers. This does not need to be the case. In the United States liner trades, most cargo (roughly 90%) is shipped under service contracts with negotiated rates and surcharges. In its monitoring of agreements, the United States Federal Maritime Commission (FMC) collects and analyses average revenue data, inclusive of freight rates, surcharges and charges for inland haulage. Over 2014-2018, average revenue per TEU steadily declined for these trades.

Table 3. Overview of possible costs billed to shippers by carriers

Most common surcharges	Surcharges covered by the Shanghai Containerized Freight Index	Other specific surcharges
Terminal Handling Charges (THC)		Logistical imbalance, Piracy, Water level, Heavy weight, Chassis Pool, Winter surcharge, Aden Gulf, cancellation fee,
Bunker Adjustment Factor (BAF)	Bunker Adjustment Factor(BAF)/ Fuel Adjustment Factor(FAF)/ Low Sulphur Surcharge(LSS)	
	Emergency Bunker Surcharge(EBS)/ Emergency Bunker Additional (EBA)	
Currency Adjustment Factor (CAF)	Currency Adjustment Factor(CAF)/ Yen Appreciation Surcharge (YAS) Peak Season Surcharge(PSS) War Risk Surcharge (WRS) Port Congestion Surcharge (PCS) Suez Canal transit Fee/Surcharge (SCS)/ Suez Canal Fee (SCF)/ Panama Transit Fee (PTF)/ Panama Canal Charge (PCC).	

In addition, container freight rates do not take subsidies to container shipping into account, eventually paid by consumers (in their capacity as taxpayers). These subsidies could take the form of state support for ailing container shipping companies, favourable conditions for state-owned container carriers, shipping funds that allow carriers to acquire new ships and exemptions from taxes and social contributions. There are indications that these subsidies to the shipping sector have over the last years intensified in a variety of countries (OECD/ITF, forthcoming).

Moreover, operational efficiencies at the sea-side, such as bigger ships, require land-side adaptations that are frequently funded by public bodies – often with taxpayers’ money. These adaptations relate to larger port infrastructures, dredging works, buffer capacity in ports to accommodate larger peak loads. These infrastructure adaptations require investments that are often in excess of the operational savings caused by bigger ships (OECD/ITF, 2015). These costs are often burdened by public bodies and not recovered via fees to carriers.

A large portion of the observed variation in shipping prices across goods can be attributed to the exercise of market power. In Latin America, exporters served by only two ocean carriers face shipping prices that are 21% larger than exporters in which there are eight carriers competing. Shipping prices on Latin American imports are, on average, 30% higher than shipping prices on United States imports. One-third of this difference is explained by the small number of carriers serving Latin American importers. Another half of the difference is due to much higher tariffs on Latin American imports that allow ocean carriers room to charge higher mark-ups (Hummels et al., 2009).

Alliances have contributed to an increase in market power. Around 95% of the East-West trade lanes are covered by carriers in alliances, which presents them with considerable market power. On many trade lanes, market power of carriers is even larger. With rapidly evolving industry consolidation, the market power of carriers impacting on costs of trade will increasingly have an effect on consumers and the costs of their imported goods. This not only has impacts on developed economies, but could also have far-reaching impacts on the economies of small island developing states (UNCTAD, 2018).

System resilience

Consumers can be expected to want resilient maritime transport chains, so that the delivery of their goods will not be disrupted. Various indicators highlighted above, such as schedule reliability, delays, increased transit times related to less direct port connections, seem to suggest that containerised maritime transport chains could indeed run more smoothly. In addition, global alliances pose risks for system resilience, due to the limited possibilities for risk diversification, and to the extent that they have contributed to vertical integration between carriers and terminal operators.

Risk diversification by shippers is rendered complicated by alliances. The nightmare of shippers (and shoppers) is to lose cargo or not get cargo at its destination before a crucial time, e.g. Christmas. In order to mitigate risks, shippers have traditionally spread their cargo over different carriers. The dominance of alliances means that containers from different carriers can end up on the same ship. In doing so, alliances have reduced the possibilities for risk diversification. Most shippers now take this into account and use back-up options from carriers that are not in the same alliance, but the choice wears thin.

The lack of supply chain visibility is not helping efforts to diversify risk. An example of the limited visibility is the lack of transparency on what alliance services are and their characteristics. Almost none of the carriers indicate clearly if their services are operated by the carriers themselves, either as sole operator, through a vessel sharing agreement with competitors, or if the service is a slot charter operated entirely by their competitors. Shippers have in most cases no way to know who will move their cargo and it is often not clear which of the alliance members are operating an underlying service. Moreover, carriers rarely use the same service names across alliances, vessel sharing agreements and slot charter services, making cross-carrier comparisons difficult for shippers, possibly on purpose. The exception is THE Alliance where alliance members all use common service names. Finally, there is no standard for the information provided, e.g. different definitions and codes for ports and terminals, different calculations for transit times etc. (SeaIntel, 2018; 364). Due to this limited visibility, shippers are frustrated in their efforts to design diversification in their supply chains.

In addition to alliances, vertical integration risks also reduce system resilience. Integration of shipping, terminal handling and hinterland transport could mean that whole transport chains are in the hand of just a few players, creating huge leverage for cyber-attacks, especially if parts of the chain are digitally connected. This became painfully evident during the NotPetya attack that hit Maersk ships and terminals (Box 7). Vertical integration could be considered to be related to the emergence of alliances. As service differentiation for the sea-leg is difficult in alliances – as the product is basically the same – one of the few remaining possibilities for individual carriers to differentiate is via vertical integration.

Box 7. Cyber security and risks associated to vertical integration

On 27 June 2017, a major cyber-attack began hitting firms mainly in France, Germany, Italy, Poland, Russia, Ukraine, the United Kingdom, and the United States. The attack is suspected to have started when hackers compromised the update server of Ukrainian tax accounting software company M.E.Doc so that it would distribute a malware referred to as “NotPetya” throughout its network. The malware further propagated itself notably via an exploit using a vulnerable Microsoft Windows network protocol. After analysis of the encryption routine of the malware, experts from Kaspersky came to the conclusion that the attack, although appearing as a ransomware attack, did not allow victims to recover their data even after paying the ransom, and the aim was therefore suspected to be directed at major disruption instead of financial gain for hackers (Ivanov and Mamedov, 2017). The carrier Maersk was presumably contaminated by this malware via software used by one of its offices in Ukraine. Maersk was forced to shut down many of its operating systems to stop the attack from spreading. The company was unable to process new orders and cranes were operated manually at some of its 76 container ports. The disruption caused major delays and led to rerouting of several vessels to ports not, or less, affected (Odell et al./FT, 2017). At least 17 terminals operated by APMT got infected by Maersk’s central IT infrastructure (Reuters, 2017). A number of terminals were unable to identify which shipment belonged to whom and therefore needed to clear cargo manually. The largest Indian port JNPT operated by Maersk’s APMT was forced to shut down and the terminal Maasvlakte II in Rotterdam stopped operations completely for a full week, which led to a highly congested service level.

According to Maersk’s annual report for 2017, the attack mainly impacted Maersk Line, APM Terminals and Damco. The effect on profitability was estimated to be around USD 250-300 million, with the vast majority of the impact related to Maersk Line in the third quarter (Maersk, 2018). Maersk estimated a 20% drop in volume and lost out on carrying 70 000 40-foot containers within the two weeks of the attack. Besides lost revenue, the attack also involved high costs of rebuilding its IT infrastructure. At the moment of the cyber-attack, Maersk did not own any cyber risk insurance. The company reported that 4 000 new servers, 45 000 new PCs, and 2 500 applications had to be reinstalled (Chirgwin/The Register, 2018). Actual impacts on Maersk’s performance could be higher than reported and probably stretch beyond the second half of 2017 (Porter/Lloyd’s List, 2017a). In April 2018, analysts speculated that the attack could have cost Maersk group over USD 500 million in expenses and lost profit. Others situate the cost between USD 400-500 million because the effect from the attack continued in the fourth quarter of 2017 and led Maersk to make investments in new infrastructure and insurances. Furthermore, the cyber-attack could have had an extended impact on market shares until the first quarter of 2018 (Beck/ShippingWatch, 2018). Although for most affected terminals it took a few days before they could resume operations completely, shippers were affected by delays of up to two months, because Maersk reportedly had difficulties in allocating new slots and tracking and assigning correct data to containers. The impact was widely felt by interviewed shippers and Lloyd’s List reported a similar observation that nearly two months after the attack, Maersk was still dealing with containers in transit at the time of the attack (Porter/Lloyd’s List, 2017b). One of the interviewed shippers reports having received additional demurrage invoices due to complications and delays caused by the cyber-attack, which suggests the carrier might have tried to shift part of the costs of the attack to their consumers.

Maersk’s global coverage, as well as strong horizontal and vertical integration in the sector further facilitated the knock-on effect of the cyber-attack. Companies who are reliant upon common IT infrastructure will logically suffer business interruption simultaneously when that infrastructure is compromised. Since supply chains are highly interconnected and even more so with increasing automation and digitalisation, this can result in an insecure operating environment even for those firms that make cyber security a priority. However, there is not only interdependence in IT infrastructure, but also in the utilisation of common assets. According to SeaIntel analysis, 20 other carriers transported containers on-board Maersk vessels around the time of the cyber-attack (SeaIntel, 2017; 319). MSC was the most affected with 23 vessel sharing agreements and four slot-charters, followed by Safmarine and Hamburg Süd. The most affected outside the 2M alliance and Maersk ownership was CMA CGM, with six vessel sharing agreements and four slot charter agreements with Maersk. The shipping sector is the backbone of international trade and ports are a vital part of every country’s infrastructure. Any major disruptions in supply chains can therefore have impacts on the overall economy. The scale of the cyber-attack and the many interconnections that exist vertically and horizontally in this industry could transform the collateral and rather accidental damage on a firm that was presumably not directly targeted, into a systemic risk for global trade.

Are alliances indispensable?

The character of alliances has evolved. The first generations of alliances, emerging since the mid-1990s, allowed smaller carriers to achieve economies of scale, based on complementarities between them. The current three alliances each bring together two to three very large carriers that would be able to provide all their services outside an alliance, if it were not for the spectacular growth in ship size over the last five years (enabled by alliances). Economies of scale and service differentiation could also be achieved via mergers and acquisitions – or via the organic growth of carriers increasing market shares. For most of the current top ten carriers, alliances will continue to be interesting arrangements, even if many of the economies of scale in the industry have been realised via mergers and acquisitions or organic growth.

Alliances are different in character from mergers and acquisitions. Alliances are often cooperative in nature with negotiated terms and tend to be of lower risk, while acquisition deals tend to be more competitive in nature with market-based prices and associated with more risk. Higher synergies are more likely within an acquisition than within alliances. When carriers are faced with more intense competition, they are more likely to engage in acquisitions rather than partnerships. This highlights the strategic motive underlying acquisitions, whereby acquisitions are undertaken to prevent competitors from partnering with the acquired firm (Das, 2011).

Cooperation via global alliances has frequently created the ground for a merger. They have sometimes been used to test if there were sufficient economic conditions for a subsequent merger (Das, 2011). For instance, Maersk Line had a strategic alliance with Sealand during 1995-1998 before acquiring it in 1999. Despite the fact that the alliance between the two companies was considered extremely effective by industry analysts, Maersk was clearly pursuing maximisation of the benefits through a full-scale merger (Panayides and Gong, 2002). Alliances could also be pathways to minority deals: that is, an acquisition results in ownership of less than 50% of the firm being acquired. An analysis of maritime merger and acquisition deals between 1996 and 2000 found that 20 out of 27 minority deals were the result of alliance agreements (Brooks and Ritchie, 2006). In this respect, alliances could have two contrasting effects on consolidation: on the one hand they might have facilitated the increasing concentration in container shipping – as indicated above. On the other hand, cooperation in alliances might also have taken away some incentives for mergers and acquisitions. As such, reflections on how consolidated the container shipping sector would have been without alliances could be considered speculative.

In terms of value added for carriers, both alliances and mergers and acquisitions have a mixed score card. The upsurge in inter-alliance mergers in the early 2000s has been interpreted as shipping companies' reaction to the difficulties to achieve cost rationalisation within the alliances (Bergantino and Veenstra, 2002). Also recent mergers and acquisitions took place despite the intensification of cooperation in alliances. Yet, the results of shipping mergers and acquisitions are mixed themselves. Two high-profile mergers in container shipping in the 1990s (the merger of P&O Containers and Royal Nedlloyd Group and the acquisition of Sealand by Maersk), resulted in rapid stock price increases, which can be considered a market perception of value added (Panayides and Gong, 2002). However, a study on world-wide merger and acquisition activities in the shipping industry during 1980-2007 indicated that these transactions have resulted in an overall loss of shareholder value within the period of examination (Kammlott and Schiereck, 2011).

It is not altogether clear to what extent the value added for the wider transport system from alliances or mergers is different. If mergers manage to realise more benefits due to closer integration, there might potentially be more value to be transferred to transport users. In terms of choice for shippers and service indicators – such as frequency and direct port calls – the effects of alliances and consolidation could be considered similar. The same applies for the monopsony power vis-à-vis ports. Ultimately, the relative appreciation could depend on whether alliances are considered facilitator of or brake on further consolidation. That is: some stakeholders seem to prefer a situation of three alliances if the alternative would be a consolidated industry with only three - or even five - mega-carriers left.

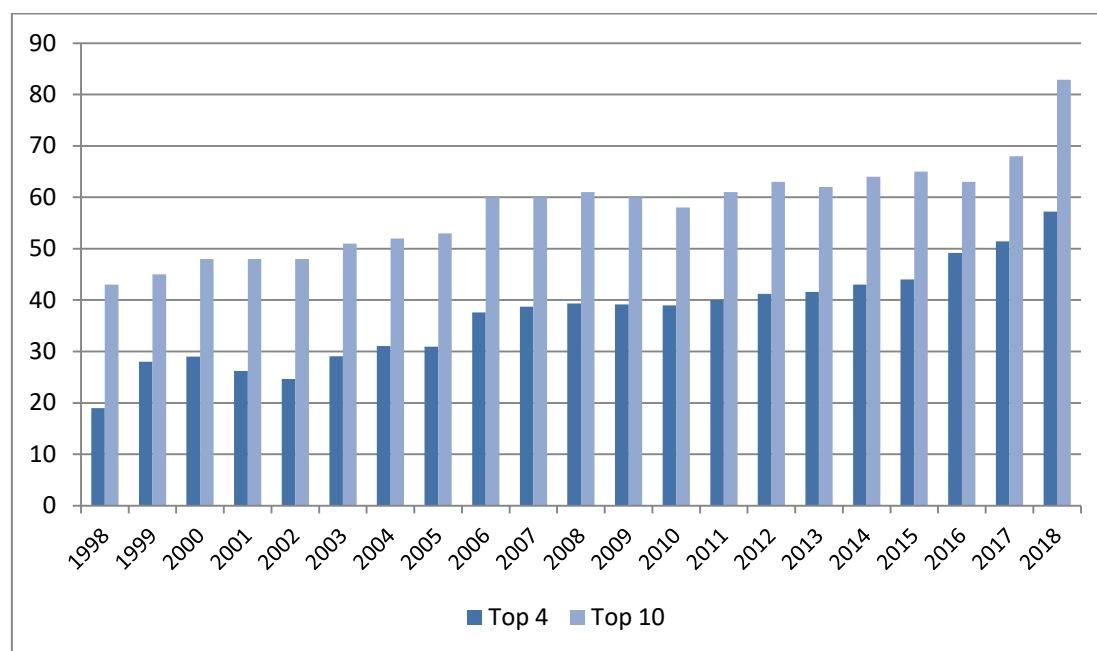
Other sectors, such as the commercial aviation sector, have recently seen the emergence of profit-sharing alliances. Such alliances, facilitating collaboration on commercial operations, go beyond the cooperation that is usual in liner shipping alliances. However, the possibilities of mergers in the aviation sector are more limited, due to constraints on foreign ownership and control of airlines, and the strong links between nations and national airlines still in place in many countries. For example, Japan and the USA place a limit of 33% and 25% on foreign ownership of their airlines respectively, and the European Union limits non-EU ownership of airlines to 49%. These constraints are missing in container shipping, which makes mergers and acquisitions a more common avenue for reaping economies of scale than in the aviation sector.

Effects on competition

The emergence of global alliances occurred more or less at the same time as the demise of the conference system. A significant push towards this demise was given by the 1998 United States Ocean Shipping Reform Act (OSRA). The main innovation of this act was to shift away from public tariffs and publicly available contract rates to confidential rates packaged in individually negotiated service contracts. This confidentiality ensures that conferences no longer have the power to impose the conference tariff on their members. Although the Act did not forbid the collective fixing of rates and other terms, the conference agreements were no longer binding (Wang, 2014). Empirical evidence on freight rates of headhaul and backhaul container shipments on the Transatlantic and Transpacific trade lane shows that the United States liner market has become more competitive after implementation of the OSRA (Wang, 2014). In the European Union, the block exemption for conferences was repealed in 2008, which made alliances the main form of collaboration between carriers. The EU had a block exemption for liner consortia in place since 1995, this instrument was adapted in 2009 and became much more important after the repeal of the block exemption for conferences.

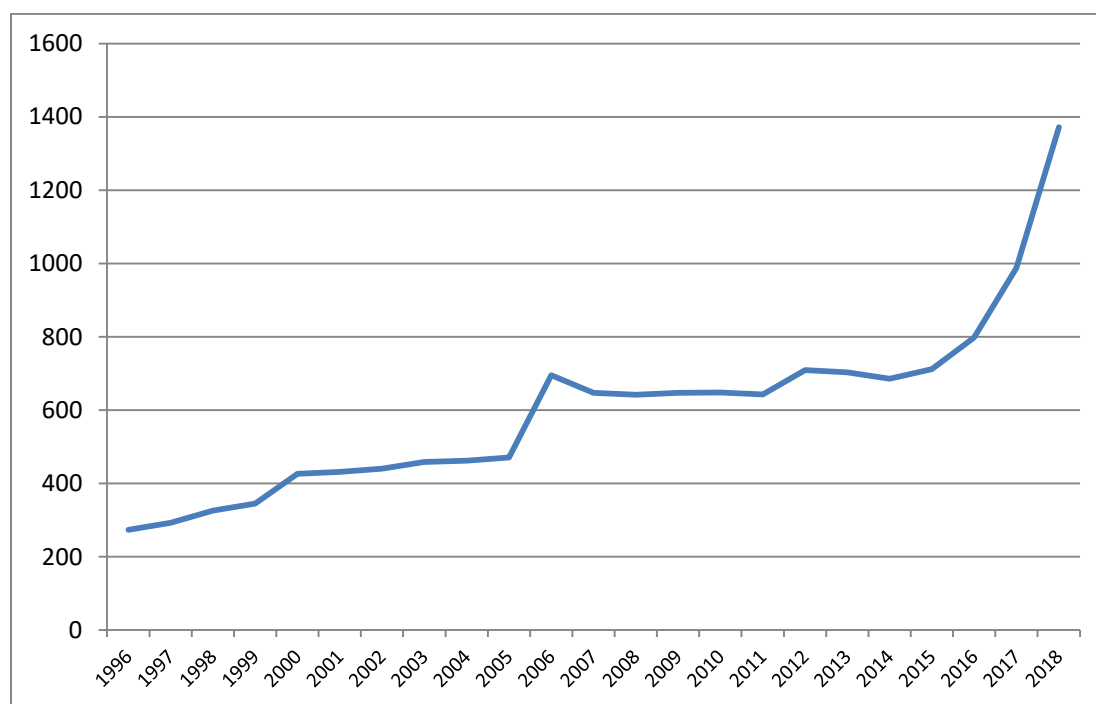
Since the emergence of global alliances, the container shipping industry has evolved into a concentrated industry, especially over the last five years. Whereas the top four carriers in 1998 had a market share of less than 20%, this share has increased to almost 60% in 2018 (Figure 8)⁵. The market share of the largest carrier, Maersk, is 19% in 2018, which is a larger market share than any global alliance ever had before 2012. Another measure for industry concentration, the Herfindahl-Hirschman Index (HHI), tells a similar story, with scores of around 300 in 1998 increasing to almost 1 400 in 2018 (Figure 9). These indexes point to a global market situation that could be considered an oligopoly and “moderately concentrated”. In comparison, container shipping clients form a highly fragmented demand base. Even carriers’ largest clients – large global freight forwarders and multinational shippers with high containerised cargo volumes – reach at maximum 1%-2% of the total global container shipping capacity.

Figure 8. Concentration rate (%) in container shipping 1998-2018



Source: Author's elaborations based on data from Alphaliner (1998-2018)

Figure 9. Concentration in container shipping: Herfindahl-Hirschman Index index 1996-2018



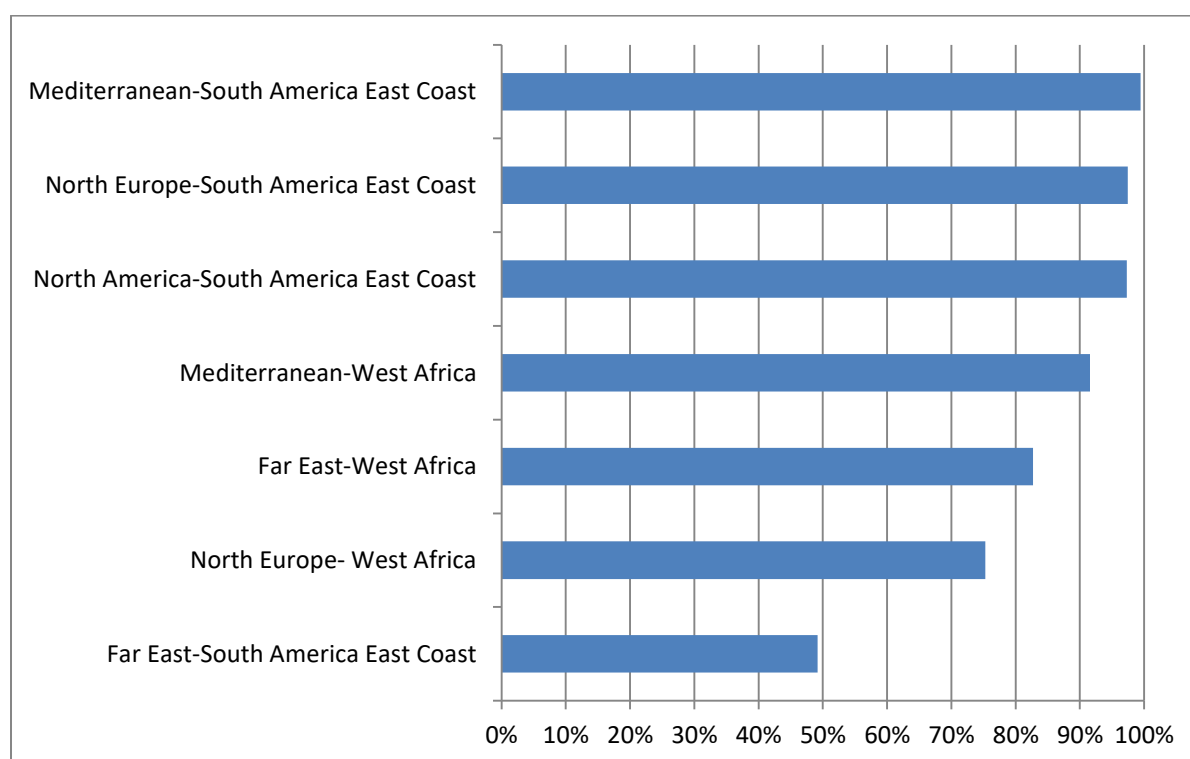
Source: Author's elaborations based on data from Alphaliner (1998-2018)

On individual trade lanes, the market shares of carriers are much higher. Already in 2010 it was shown that several containerised trade lanes were highly concentrated, using similar indicators to the ones used above, such as the four-firm concentration ratio and the HHI index (Sys, 2010). These concentration rates have only intensified over the last few years, but are not limited to trade lanes on which alliances are active. For example, certain North-South routes that are generally outside alliances agreements – such as those to and from West Africa and the East Coast of South America –

are highly concentrated, with most routes in the hands of just a few carriers (Figure 10): 91% of the carrying capacity on the Mediterranean-East Coast South America trade lane in 2015 was deployed by just one carrier (MSC). In the academic literature, an industry is considered a tight oligopoly when the four-firm concentration ratio exceeds 60% (Naldi and Flamini, 2014) or highly concentrated if the HHI-ratio is higher than 1 800 (Shepperd, 1999).

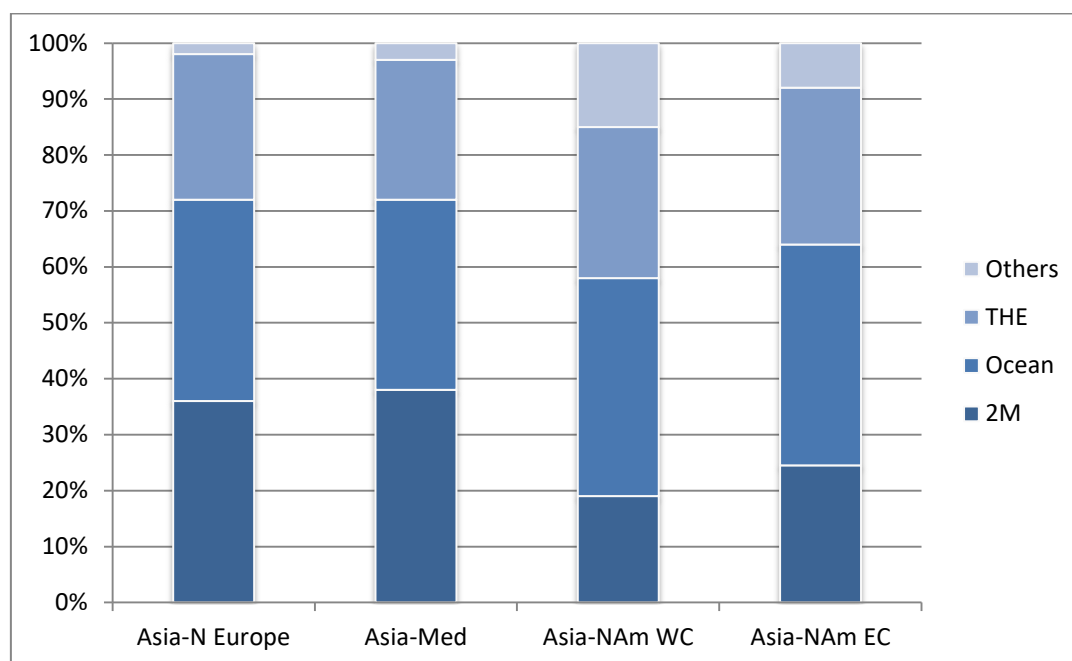
Alliances could be considered additional forms of market power. On all four main East-West trade lanes, one or more alliances have a market share of more than 30% (Figure 11). Moreover, the three alliances together represent around 95% of the market share, with limited activity from independent carriers, in particular on the Asia-Europe trade lanes. What are the effects on competition from this situation? We will argue below that the increased market power of alliances has resulted in barriers to entry, in monopsony power and in vertical integration.

Figure 10. **Four-firm market concentration (%) on selected trade lanes**



Source: Author's elaborations based on data from Dynamar (2015b and 2016).

Figure 11. Capacity shares of global alliances on main East-West trade lanes in 2018



Source: Author's elaborations based on data from SeaIntel (2018)

Alliance as a barrier to entry

Two types of structural barriers to entry can be observed in the shipping sector, a combination of absolute cost advantages and economies of scale. Absolute cost advantages imply that an entrant will enter with higher unit costs compared to incumbents. Economies of scale restrict the number of firms that can operate at minimum cost in a market of a given size. Investing in capacity can, in certain cases, act as strategic entry deterrence. One of the most striking aspects of excess capacity in the container shipping sector is its persistence (Wu, 2012), which is partially motivated by strategic entry deterrence, as shown by Wu (2009) and Fusillo (2003). So, building up over-capacity could be considered a subtle entry barrier and deter the potential entrant from the market (Wu, 2012; Hirata, 2017), related to alliances in so far as they facilitated the overcapacity.

Alliances act as a barrier to entry on the main East-West trade lanes, in particular the Asia-Europe trade lanes. It was already difficult for individual carriers to enter this market ten years ago, but the rapid size increase of ships operated on this trade lane – which need to be operated in strings of at least ten vessels – has transformed this trade lane into the “alliances playground” (Dynamar, 2015a). Carriers that do not manage to find alliance partners are practically excluded from the possibility to offer Asia-Europe services. A rare attempt by Pacific International Lines (PIL) to build up an independent service was not successful. Moreover, not all interested carriers are admitted to alliances. The Israeli carrier ZIM has long tried to become partner in an alliance, to no avail. ZIM is now a niche carrier, providing niche services (Dynamar, 2015a). Although it does not operate major services in the Asia-Europe trade, it deploys vessels and operates services in the United States Transpacific and Transatlantic trades. Over the last decades, there have been no new carriers active on the Far East-Europe route.

Alliances also create barriers for collaboration between carriers that do not belong to the same alliance. Alliance membership imposes restrictions on a member's use of a non-member carrier (Slack et al., 2002). Therefore, alliances might constrain the flexibility of carriers to engage in vessel sharing agreements with partners that would present great complementarities, but that do not form part of the same alliance. This is sometimes the result of government regulation: the EU consortia block

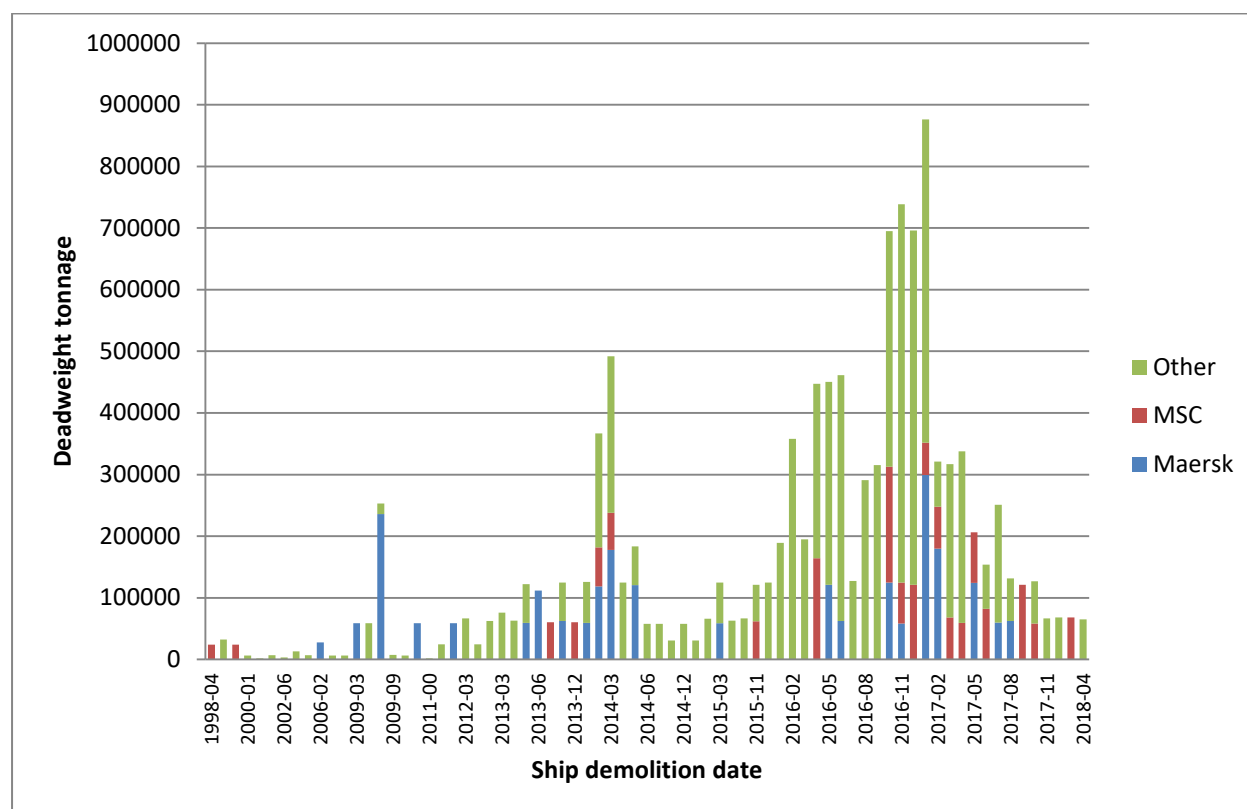
exemption includes an obligation on consortium members to refrain from chartering space on vessels belonging to third parties and an obligation on members of a consortium not to assign or charter space to other vessel operating carriers except with the prior consent of the other members (Werner, 2016).

Alliance as a vehicle for potential collusion between carriers

The effectiveness of alliances depends on the possibility for carriers to exchange information. Optimisation of vessel sharing is only possible if information between carriers is shared on stowage plans, schedules and a range of other operational issues. Sustained cooperation in alliances is only possible if partners find an equitable way of allocating costs and benefits, which is only possible if carriers are aware of the cost structures of their competitors. Not surprisingly, the carrier representatives have lobbied for wide-ranging information sharing agreements in the wake of the repeal of the block exemption for liner conferences. The revised EU consortia block exemption in place since 2009 allows carriers to engage in data sharing and exchange.

As most carriers have operated in different alliances and operate in areas where conferences are allowed, they generally have the information at their disposal that they would need to collude on prices or capacity. Most carriers have cooperated in alliances with carriers that are now part of other alliances or of alliances that did not happen, such as P3. As such, most carriers have a pretty detailed understanding of how other alliances work and what the cost structures are of other carriers. As conference agreements are allowed in various parts of the world, e.g. in Singapore, carriers can discuss prices of the services that relate to these jurisdictions. It is even likely that some jurisdictions have developed into free havens of exchange of shipping prices, so-called hub-and-spoke cartels (Braakman, 2017).

There are some possible indications of joint coordination of capacity. This could have capacity expanding and constraining effects, both of which could have competition-distorting effects. We already mentioned the orders of mega-ships by G6 Alliance members that seemed to have been jointly coordinated (Box 4); such coordinated overcapacity via alliances could create barriers to entry for other container shipping firms. But coordinated constraints on capacity could also be problematic. Some of the shippers that we interviewed also mentioned instances where the supply of empty containers might have been artificially reduced by carriers. Another way in which capacity can be reduced is via demolition of ships. This is an area where one would expect some coordination between carriers in order to avoid free-rider effects of carriers benefiting from reduction of fleet overcapacity without scrapping any vessels themselves. Such coordination could possibly take place within alliances. The timing of ships being scrapped could give some indications of this. Analysis of data on ship scrapping per carrier seems to suggest that the demolition dates of ships operated by Maersk and MSC are more closely clustered around each other since 2015 when their cooperation in the 2M Alliance started (Figure 12).

Figure 12. **Monthly volumes of demolished ships (dead weight tonnes) per month**

Source: Author's elaboration based on data from Clarksons

Monopsony power of alliances

The dominance of alliances has increased the buying power of a few carriers, also called monopsony power. Already in the early 2000s it was concluded that the bargaining power of carrier alliances vis-à-vis ports, terminals and other port service providers had substantially increased (Heaver et al., 2001). Since then, this bargaining position between carriers and ports has become hugely unbalanced.

Ports are increasingly dependent on just a few carriers. The service network in 2006 showed that approximately 32% of the container ports receive services from only one carrier (Gadhia et al., 2011). This concentration has continued and gotten another dimension with the dominance of alliances. Our analysis of port networks of the three global alliances since April 2017 shows that the three alliances use in total 89 different ports on their East-West services: 30 in Asia, 35 in Europe and 24 in North America. Only 16 of these ports receive calls of all three alliances on the main East-West trade routes: eight in Asia, five in Europe and six in North America. In Europe, only five ports receive calls from the three alliances on Asia-Europe and on North America-Europe trade lanes: Rotterdam, Antwerp, Le Havre, Valencia, Barcelona and Genoa. Some ports receive calls from three alliances on one of these two trade lanes, but not on the other: Bremerhaven has calls from the three alliances on the Atlantic trade lanes, but only from one alliance on the Asia-Europe trade lane (Figure 13). More than a third of the EU ports with calls from alliances are dependent on just one alliance, including large ports such as Gioia Tauro in southern Italy (Box 8).

Box 8. Dependence on one global alliance: the case of Gioia Tauro

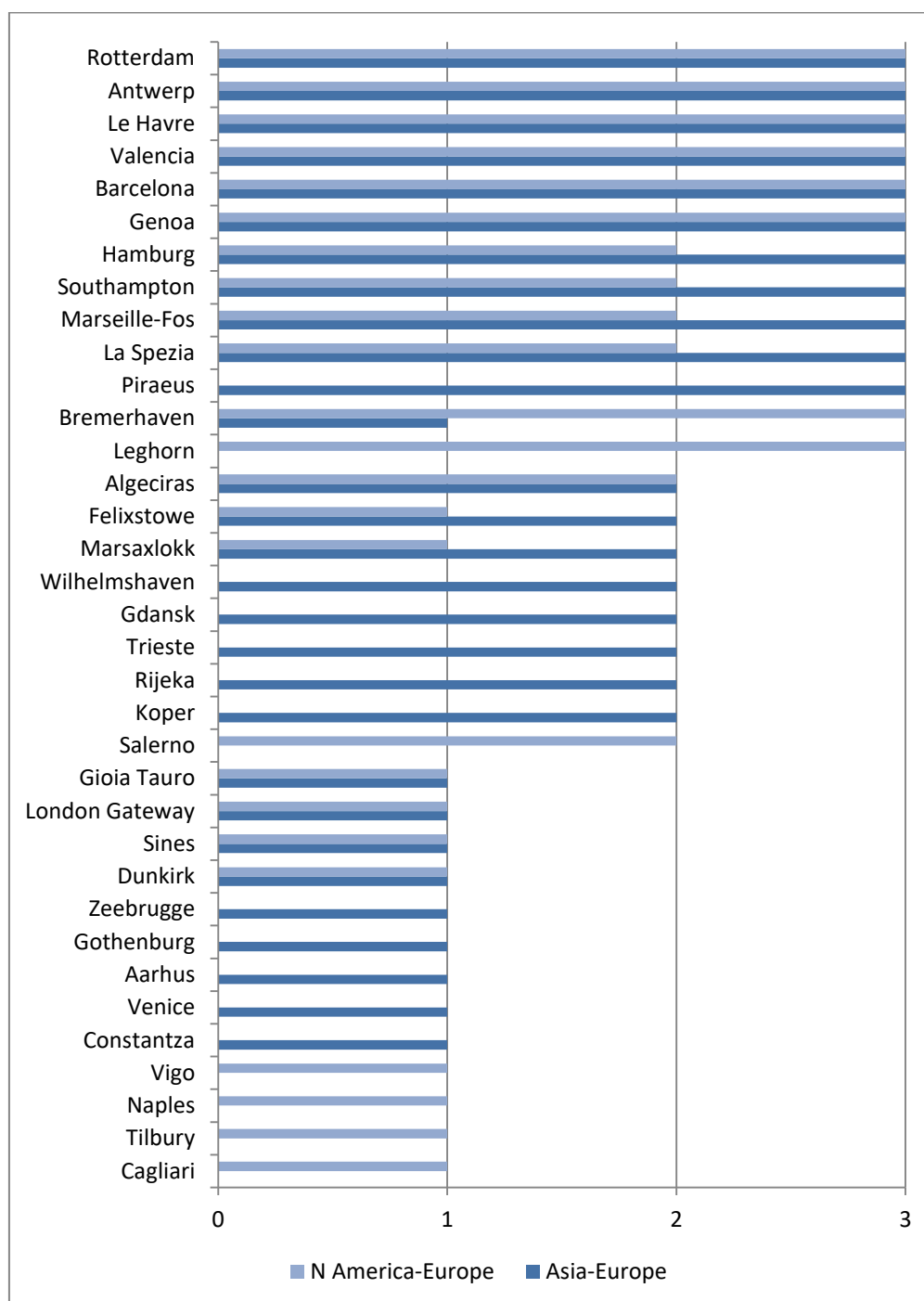
With a handling capacity of 4.2 million TEUs per years, the Port of Gioia Tauro in Calabria, Italy, is one of the biggest transshipment hubs in the Mediterranean and the 13th biggest container port in Europe. The Medcenter Container Terminal in Gioia Tauro acts as an almost pure transshipment terminal, with 96% of transshipment activity. The port is intensely competing for volumes with other transshipment hubs such as Malta, Piraeus and emerging North African ports. Among the 15 biggest European ports, Gioia Tauro is the only one experiencing a significant decline in volumes: the Medcenter Container Terminal lost 14.1% of container volumes between the first quarter of 2018 and the first quarter of 2017. Whereas volumes have decreased overall in the terminal, the number of TEUs per vessel call has increased owing to the deployment of ultra-large vessels.

As Gioia Tauro acts as a hub exclusively for MSC, the terminal is entirely dependent on strategic decisions of the carrier who also owns a 30% share of the Medcenter Container Terminal. MSC's alliance partner Maersk uses its own terminal facilities in Port Said (Egypt), Algeciras and Tanger-Med. Maersk stopped calling Gioia Tauro in 2011 as it could not use it as a gateway port due to inappropriate rail infrastructure. When Maersk stopped calling Gioia Tauro, volumes decreased by 30% which caused a temporary lay-off of 1 300 employees. Gioia Tauro – while being entirely dependent on MSC – does not get calls from small and medium-sized operators that would provide steady business for the port. In order to guarantee that investments in the port would be worth their cost, it was agreed with MSC that incoming volumes should ensure terminal activities of at least 40 000 moves per week. This objective appears to have been reached only eight times in the last four years.

While currently Maersk and MSC do not use the same hubs in the Mediterranean, closer integration between the two alliance partners could mean they rationalise their hub strategy in the Mediterranean. Largely cost-driven carriers can exercise leverage on ports, which stand in fierce competition to each other. Transshipment ports in the Mediterranean undercut each other by applying up to 20 times lower port dues. This phenomenon would highlight the need for a level playing field and a coherent ports policy in Europe that would also extend to non-European hubs such as Tanger-Med.

As cost competitiveness in the current context is difficult to realise Gioia Tauro has increased its focus on developing more value-added activities. In order to ensure stability and competitiveness of the port, Contship Italia has invested in its intermodal and rail facilities to attract inland container traffic. The Italian government has made EUR 275 million available for infrastructure projects at the port. As Gioia Tauro is located in one of Italy's poorest regions, the government established a Special Economic Zone (SEZ) at the port of Gioia Tauro in 2003, which has not had the desired job creation effect.

Figure 13. Dependence of European ports on alliances (2018)



Source: Author's elaborations based on data from SeaIntel (2017)

Some alliances use that monopsony power for joint bargaining with ports, terminal operators and other service providers. This was common practice of the G6 Alliance and is currently frequently deployed or tried by THE Alliance. Some alliances, like 2M, make a point of not engaging in joint negotiations. Some terminal operators also refuse to negotiate a joint alliance tariff, whilst others consider they do not have much of a choice. In some jurisdictions, such as the US, alliances can enter in joint procurement with terminals only if the terminal is agreeable to a joint contract. Even if there is no explicit joint bargaining, there is always the real threat that an alliance shifts cargo, so alliance carriers have huge leverage over ports and port service providers, even if there is no explicit coordination within an alliance.

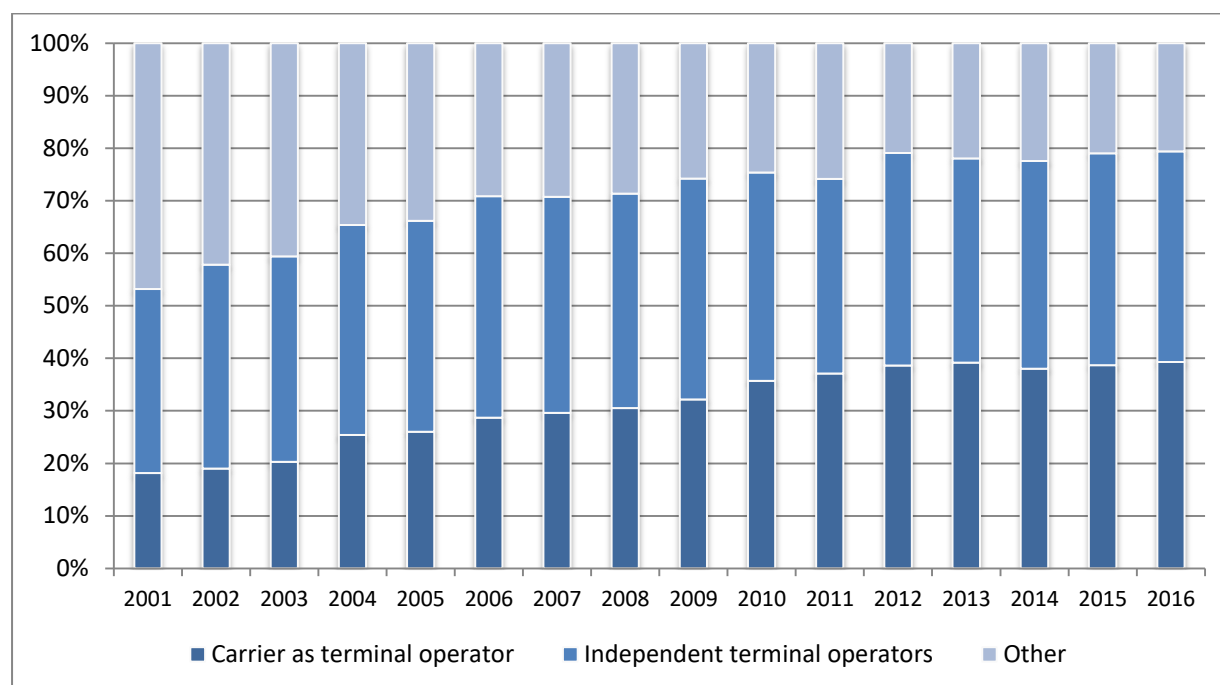
In addition, carrier consolidation leads to continuous pressure on rates. Many ports and port service providers indicate the same dynamic of rate negotiations following mergers and acquisitions, whereby the merged carriers take the lowest rate as the basis and start the negotiation from that level. This means that each consolidation has the effect of lowering rates. In addition, many ports provide some sort of a loyalty bonus to carriers with frequent calls to the port. Even if ports could manage to resist carrier's pressure for lower rates, they generally receive relatively less rate revenue from merged carriers because of these loyalty bonuses that are often correlated to the size of carriers.

This dynamic is reinforced by vertical integration between carriers and terminals. Terminals will then be used as cost centres that help to negotiate tariffs of the other terminals downwards. Carriers use direct investments in container facilities as a strategy for controlling costs, by creating bargaining power towards pure – independent – terminal operators (Rodrigue and Notteboom, 2010). Similarly, the emergence of new transshipment ports has frequently been driven by carrier dynamics. For example, the rise of new ports in the Pearl River Delta, such as Yantian and Shekou, has been attributed to the strategy of container shipping companies to gain bargaining power over Hong Kong by also using other transshipment ports (Wang and Slack, 2000). Vertical integration of carriers and terminals has over the last decade increased substantially, as will be shown in the section below.

Vertical integration

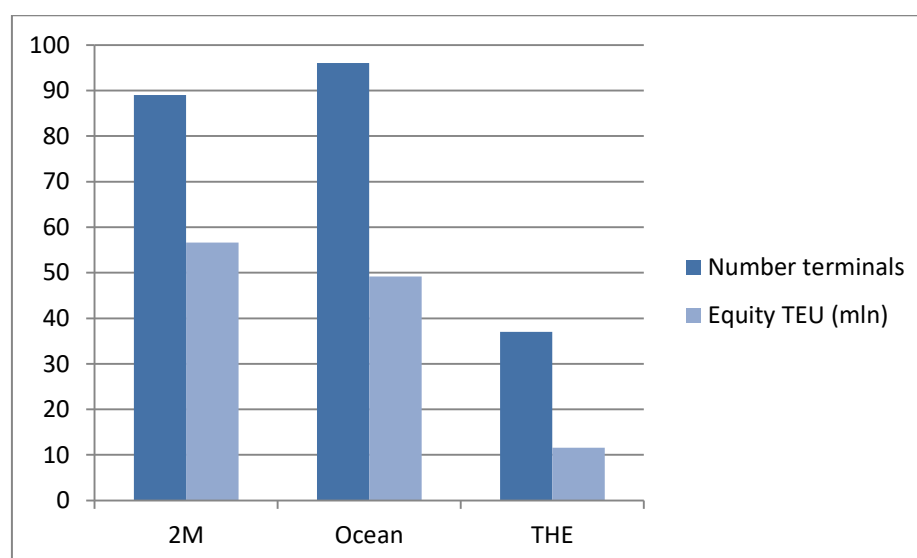
Vertical integration could be considered to be related to the emergence of alliances. As service differentiation for the sea-leg is difficult in alliances – as the product is basically the same – one of the few remaining possibilities for individual carriers to differentiate is via vertical integration. Vertical integration activities of carriers have intensified in parallel to more intense cooperation via alliances, as will be illustrated below.

Carriers have recently become more integrated with terminals.⁶ Some carriers, such as Maersk, traditionally have strong control over stevedoring operations via dedicated terminals and via APMT, its terminal subsidiary. Other carriers, such as MSC and Cosco, used to focus on shipping services and used bilateral contacts with stevedoring companies (Cariou, 2008). This has now changed: MSC and Cosco, as well as other carriers, have over the last decade acquired stakes in terminals. This has resulted in an increase of the global market share of carrier-controlled terminals from 18% in 2001 to 38% in 2017. This includes dedicated terminals and multi-user terminals. Dedicated container terminals are terminals dedicated to the traffic of one or more carriers. These are usually subject to a private agreement between one or more carriers and a port operator or authority.⁷ Multi-user terminals are terminals that are open to all carriers that would like to use it, so not for exclusive use of the carrier controlling the terminal. During 2001-2017, the share of independent private terminal operators has remained stable, whereas the share of other operators, in particular public port authorities operating terminals, has declined (Figure 14).

Figure 14. **Emergence of carrier-dominated terminals, 2000-2016**

Source: Author's elaborations based on data from Drewry (2002-2017)

Two of the three alliances have members with very large terminal handling capacity. The carriers in both 2M and Ocean Alliance have extensive terminal portfolios: if aggregated at the level of alliances, this represents around 90 terminals with handling capacity of around 50 mln TEUs for both alliances. The carriers in THE Alliance are much less vertically integrated: their combined terminal portfolio consists of little over 35 terminals, with handling capacity of around 10 mln TEUs (Figure 15). Vertical integration generally is not pursued via alliances.

Figure 15. **The global alliances as terminal operator**

Source: Author's elaborations based on data from Drewry (2017)

Carrier-controlled terminals, in particular dedicated terminals, could raise competition concerns. Acquiring exclusivity within a network industry facing increasing returns to scale and facing bottlenecks could be a way to deter entry (Cariou, 2008). Dedicated container terminals create

substantial sunk costs and thus make liner shipping a less contestable market. Investment in dedicated terminals could also be seen as a form of limit pricing whereby the operating costs of potential entrants are raised to such a level that entry is no longer profitable (Haralambides et al., 2002). Dedicated terminals are afforded to some carriers at a price less than social opportunity costs. This means that other carriers not using the dedicated terminals are placed at a competitive disadvantage, e.g. in the form of longer waiting times and operating costs. Such a situation could be considered as a barrier to entry due to the exclusivity on an essential facility. The price a carrier at a dedicated terminal will have to pay must also include potential losses born by all other carriers at the port due to increase in waiting time. So the possible gains to carriers through vertical integration - higher service rate and smaller variance – must be contrasted with potential losses from the reduction of competition and from the presence of negative externalities (Haralambides et al., 2002).

Most carriers have ambitions for further vertical integration. These ambitions build on established policies of carriers to have their own feeder services and hinterland transport operators, as well as other related industries. Whereas Table 4 provides an overview per carrier, more specific information per carrier of their stakes in other parts of the maritime logistics chain are provided in Annex 3. In addition, many carriers, such as CMA CGM and Hapag-Lloyd, stress their value-added logistics services. Maersk has engaged in a complete restructuring of its business model, selling its oil and tanker business, fully concentrating on becoming the global integrator of containerised transport flows. In order to achieve this, Maersk has strengthened the ties with its subsidiaries, such as APM Terminals, that in the past used to work quasi-independently. Many of these initiatives in vertical integration are linked to digitalisation of the maritime logistics chain. The idea is that control of information flows will also make it easier to have a smooth operation of physical flows. The ambition to become an integrator of the containerised supply chain brings carriers in the same playing field as freight forwarders.

Such initiatives might increase switching costs for customers and could thus reduce competition. A choice for a carrier could thus also imply an immediate choice for the feeder, terminals, rail and even towage services (in the case of Maersk that has its own towage subsidiary in Svitzer). Customers could thus be locked into one holistic supply chain solution that does not necessarily represent the best combination of different parts (which is what a freight forwarder would normally present) but that are chosen because they belong to the same company. Customers would in many cases have difficulties avoiding this lock-in as they would be confronted with switching costs. In addition, carriers might be using their client information systems as another way to lock-in clients, as these impose human capital costs for shippers in case of switching. Vertical integration also increases the risk that carriers use their market power as a carrier to distort competition in other segments, e.g. terminal operations or towage, vis-à-vis non-integrated service providers.

Table 4: Vertical integration of selected carriers in the maritime logistics chain

Carrier	Shipping, Short-sea	Terminal	Logistics	Equipment	Towage	Rail	Barge	Truck
Maersk	✓	✓	✓	✓	✓	✓	✓	✓
MSC	✓	✓	✓			✓	✓	✓
CMA CGM	✓	✓	✓	✓		✓	✓	✓
Cosco	✓	✓	✓			✓		
Evergreen	✓	✓	✓	✓		✓		✓
Hapag-Lloyd	✓	✓	✓	✓				
ONE ⁸	✓	✓	✓	✓	✓		✓	✓
Yang Ming	✓	✓	✓					✓
HMM	✓	✓	✓			✓		✓

Note: This table includes activities, subsidiaries, jointly controlled entities and associated companies. It excludes bulk and passenger transport and local shipping agency subsidiaries. For a more detailed overview, see Annex 3.

Source: own elaboration based on annual reports of individual shipping companies

Implications of digitalisation for competition in the maritime transport sector

Digitalisation might have important implications for competition in the maritime transport sector. Various initiatives in the industry are currently ongoing (Box 9). The digitalisation of processing shipping services could indeed allow for the collection of large amounts of data related to various stakeholders. There are important efficiency gains as shipping companies that have access to such data will be able to offer more innovative and effective services to their customers. The capacity to process accurately big data can consequently become one of the parameters of competition in the market. However, the accumulation of large data can also become an asset that could actually be used to further enhance the market power of a company as it might allow for exclusionary practices, lock-in for customers and higher barriers to entry (OECD, 2016). Although it is difficult at this stage to predict how the various digitalisation initiatives in the maritime sector will play out, it is not unthinkable that digitalisation will be organised along the lines of alliances. As such, this could become a relevant element to consider with regards to the regulatory possibilities and constraints for alliances.

The greater use of digital services in maritime transport might pave the way for collusive practices amongst shipping companies. The latter might find it easier to exchange relevant information and align their market strategies. What is more, the implementation of platforms open exclusively to the members of a single consortium could have an anticompetitive outcome. In principle, platforms tracking the shipping process can be analysed as part of the technical cooperation between shipping companies. Thus, they could actually fall within the exemption regime for collaboration amongst competitors. Nevertheless, when implemented in highly integrated strategic alliances – which is currently not the case, but not unthinkable – such platforms can entail higher barriers to entry, switching costs and stifle competition, especially when they have strong network effects.

Box 9. Digitalisation initiatives in liner shipping

In January 2018, Maersk and IBM announced the creation of a digital joint venture that strives for enhancing digitalisation in the maritime transport sector. (Maersk, 2018) The new company TradeLens, owned 51% by Maersk and 49% by IBM, will provide a platform connecting a large number of stakeholders in the industry, thereby covering each stage of the transportation process from shippers to ports and terminals, and national authorities. Other major companies in maritime transportation have also increased investments in digitalisation. CMA CGM announced in 2018 the creation of *Ze Box*, an international incubator for start-ups in maritime transportation, in addition to several other initiatives part of its digitalisation strategy (CMA CGM, 2018). Moreover, HMM and SM Line have already piloted blockchain technology for shipping services (Kang, 2017).

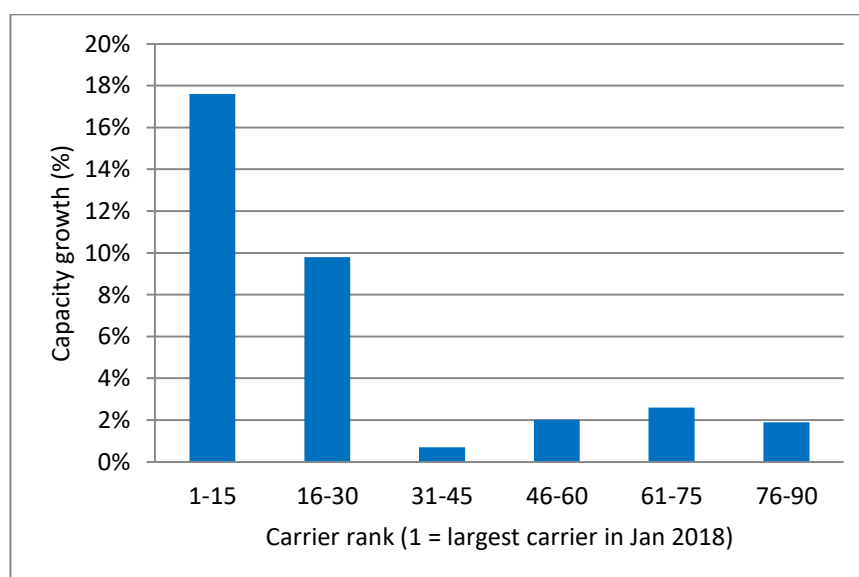
Impacts on transport stakeholders

Whereas the effects of alliances on the transport system are mixed, the effects on most transport stakeholders seem to be predominantly negative. Carriers that are not in alliances face unsurmountable barriers to entry on certain trade routes. Ports' interest in attracting alliance calls often leads to cross-subsidisation that negatively impacts other shipping sectors (e.g. bulk shipping). Ports, terminals and other service providers, such as towage companies, are often confronted with declining returns on investment, related to the buying power of alliance carriers and destructive competition within ports related to alliances. Freight forwarders are regularly confronted with increased transaction costs due to alliances and might face competition from carriers who diversify into freight forwarding. Alliances limit the available offer of shipping options and have frustrated risk diversification strategies of shippers and freight forwarders. The following chapter expands on this.

Shipping

Container shipping is becoming increasingly polarised between the small group of very large carriers in alliances and the rest of the companies. All of the top eight carriers form part of an alliance; these are the carriers that have shown the largest capacity growth, whereas the growth for the smaller carriers was more modest. The 15 biggest carriers have increased their capacity between January 2017 and January 2018 by almost 18% (Figure 16). While a significant degree of this growth is driven by mergers, the largest carriers have also added a significant number of new ships to their portfolio, whereas carriers ranked 31 to 75 have downsized their fleet since January 2017. These observations could suggest that, in the coming years, increased competitive pressure on medium-sized and niche carriers might lead to further consolidation in markets where small- and medium-sized carriers operate, but also that overcapacity might remain more problematic on the main trade lanes on which the largest carriers operate, in contrast to the niche markets of smaller players.

Figure 16. **Short-term capacity growth according to size group (01/2017-01/2018)**



Source: SeaIntel (2018; 345).

Impact on independent carriers

Alliances provide barriers to entry that will sustain the polarisation of container shipping. These barriers to entry in the shipping industry are characterised by capital requirement through high fixed costs and cost advantages, with incumbents of sufficient size being able to offer their products at a lower price. Ultra-large vessels achieve economies of scale that no smaller vessels can attain. Exploiting these economies of scale – under current demand conditions – is possible only by consolidating cargo through vessel- and slot-sharing agreements. Coupled with unsustainably low freight rates, such barriers to entry effectively reduce the capacity of independent carriers to compete in the industry. The strategic use of excess capacity can also signal an aggressive response to increased competition from smaller carriers, thereby effectively deterring entry by diminishing the prospects of profit for the entrant (Dixit, 1980; Luo et al., 2014; OECD, 2015). This can limit the pressure arising from potential competition and can help the largest carriers maintaining market power. The case of the Korean carrier Hyundai Merchant Marine (HMM) illustrates the challenges of size (Box 10) where the ability to enter into alliances with major carriers is conditioned by the carrier's fleet size and vessel capacities. The potential of digitalisation arguably makes software and digital applications arguably one of the defining competitive features of future liner shipping companies. These potentials are – for the moment – not being implemented within the framework of alliances.

Box 10. Hyundai Merchant Marine and the 2M alliance

The ability to approach large alliance groupings requires a large amount of cheap capacity to offer. This practice makes it particularly difficult for mid-sized and smaller carriers that are not backed by state support to grow and enter an alliance. Further, upgrading and investing in new vessels only grants temporary competitive advantages but aggravates a spiral into excess capacity and low returns in the shipping industry. Challenged by industry consolidation, the Korean mid-size carrier Hyundai Merchant Marine (HMM) was not been able to enter the 2M Alliance in 2016. Instead, a slot agreement was fixed with 2M as HMM fell short of the necessary negotiating power vis-à-vis the world's two largest carriers Maersk and MSC. While their slot agreement with 2M will expire in 2020, HMM attempts to improve its negotiating power with the purchase of 12 new vessels with a capacity of 23 000 TEU and eight new 14 000 TEU vessels. As these purchases are reportedly backed by Korean state subsidies, this will allow HMM to sell slots on their vessels at a relatively low price to Maersk and MSC.

Source: Reuters (2016).

The barrier to entry seems to be particularly high on the Asia-Europe trade lane, but less so on the Transpacific trade lane. There is no independent carrier offering ocean shipping services between Asia and Europe. However, there still are independent carriers on the Transpacific trade lane. After the alliance re-shuffle in April 2017, a number of independent carriers (Matson, ZIM, SM, Wan Hai and PIL) increased their combined market share on the Trans-pacific trade lane by 1.6 percentage points (to a 16% capacity share) vis-à-vis alliance carriers, growing their volume by 34.5% in the third quarter of 2017. (SeaIntel, 2018; 348). Explanations for the survival of non-alliance carriers on the Transpacific lane include draught limitations restraining the use of ultra-large vessels (Mongelluzzo, 2018b).

The barriers of entry have pushed the smaller carriers to trade lanes less dominated by alliances. Examples are PIL, Wan Hai and ZIM, that withdrew from the North Europe-East Asia trade lane but that are still present on the Far East-Mediterranean and Transpacific (and Transatlantic-Mediterranean for ZIM). The Israeli carrier ZIM increasingly focuses on trades where it has a competitive advantage, including Trans-pacific trades and intra-Asia routes (Baker, 2018a). In order to remain profitable, the company reportedly focuses on choosing gateways based on equipment repositioning opportunities and existing relationships with rail transport providers and where the company is able to offer value-added services (Mongelluzzo, 2017b). While a specialisation strategy can enhance the financial sustainability of mid-size carriers, presence on all trade lanes is no longer possible. Further, niche markets are by nature relatively restricted and leave only limited space for market followers. However, operating on a niche market could be considered as a possible profitable business strategy

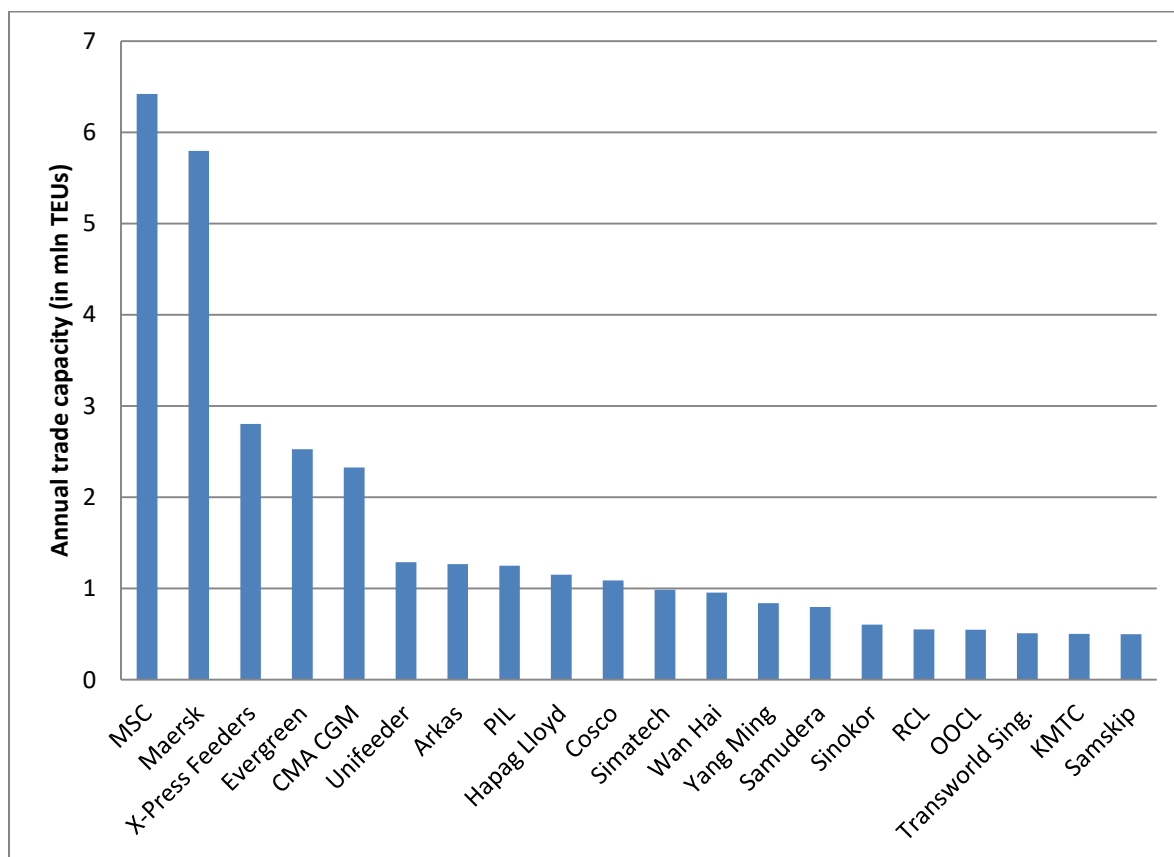
for carriers that are not able to realise more economies of scale (BCG, 2015). An example of this is Wan Hai Lines that has achieved satisfactory performance on the basis of low financial leverage to support small capacity. Its fleet strategy was concentrated on the intra-Asia trade market and it enjoyed a high revenue turnover in a niche market. By operating small ships, Wan Hai was able to achieve lower costs by calling directly at ports not served by mega-ships. Thus, Wan Hai eliminated the cost incurred in the extra handling of containers (Huang et al., 2017).

Operating outside alliances could provide advantages to some carriers, with higher flexibility being one of them. Cooperative agreements such as slot and vessel sharing provide opportunities for big liner shipping companies to benefit from higher flexibility in adjusting supply to demand. However, major independent carriers may ultimately find it easier to cope with volatile demand conditions, as these usually face less overinvestment in capacity. Further, carriers that operate independently do not face the same obligations of factoring in the customer requirements of partner lines. Carriers such as ZIM claim they “enjoy the best of both worlds” by engaging in slot sharing agreements without losing flexibility within an alliance (Baker, 2018a). Independent and niche carriers aim to sell this flexibility to their clients. Some very small players trust that a number of customers will ultimately prefer reliability and service quality to low rates and try to market their added value providing highly personalised services, complete visibility and a level of liability that larger carriers are often unable to guarantee for their customers (Baker, 2018a).

Instability created by alliance reshufflings has benefited independent carriers. They could bridge operational challenges of carriers during the restructuring phase of alliances. ZIM for instance claims to act more flexibly and could immediately communicate new service schedules to customers while alliances were still rearranging services. SM Lines mainly grew by taking over volume from Hanjin, but has recently struggled and lost important volume in the Asia-U.S. trade (Mongelluzzo, 2018a). PIL in contrast acted rather as a semi-independent carrier given the close working relationship with COSCO. While this does not seem to lead to a major shift towards independent carriers, it signals however that niche carriers could be able to compete for the customers that are dependent on more reliable alternatives and are willing to pay higher rates in order to decrease their dependence on alliances (Mongelluzzo, 2017a; Knowler, 2017).

Impact on feeder shipping companies

Feeder shipping companies collect and drop containers with small- and medium-sized container ships and provide volume to mega-vessels, as these cannot call at many ports. A product of transshipment, feeder service is the first or last leg of sea-borne transport. While feeders are distinct from regional liners, most short haul operators engage in both feeder service and regional shipping given the geographical overlap. A usual distinction in feeder services is between dedicated services and common services. **Dedicated feeders** exclusively work for one carrier, whereas **common feeders** carry containers from a variety of customers (mainlines). Currently, there are 13 purely dedicated feeder operators and 107 common carriers. However, among the top five feeder operators (those exceeding 2 million TEU of annual trade capacity), there is only one pure common feeder operator. All large ocean shipping carriers are large feeder operators: only the Japanese carrier ONE is not featuring in the top 20 of feeder operators (Figure 17). Most of the largest carriers are active as dedicated feeder operators for their own vessels, such as MSC, Evergreen, Hapag-Lloyd and Cosco. However, Maersk and CMA CGM offer both dedicated and common services. Almost all mainliners who are operating own feeders are also using common feeder carriers to ports where their own feeder tonnage is not calling. In terms of capacity, MSC and Maersk are far ahead of the other carriers.

Figure 17. **Top 20 feeder operators by annual trade capacity (2018)**

Source: Author's elaborations based on data from Dynamar (2018).

Alliance carriers do not usually operate joint feeder services. Exceptions were a joint feeder service by the G6 alliance linking Gothenburg to the main loop in 2012 and the establishment of a Black Sea feeder loop in 2013. Although there are no alliances among shortsea shipping companies and feeder operators, cooperation exists in the form of slot charter agreements. Similarly, shortsea operators use these agreements to diversify, broaden their transport networks and offer additional services to customers (Styhre, 2010). To benefit from maximum efficiencies, the mainline operators need a large enough volume to justify deploying its own vessels. In the past, some common feeders have been integrated into larger shipping companies, for instance in the deal between P&O Nedlloyd and Maersk in 2005. Other companies such as CMA CGM have outsourced part of their feeder services but still hold substantial own feeder capacity. In 2015, CMA CGM acquired OPDR, a feeder operator active in the Europe-Iberia/Canaries, which was integrated into a CMA CGM subsidiary MacAndrews. The company also acquired Mercosul Line from Maersk who was obliged by Brazilian competition authorities to sell Mercosul as a condition for the approval of the acquisition of Hamburg Süd (Waters/Lloyd's Loading List, 2017). And in June 2018, CMA CGM announced the acquisition of the Finnish feeder operator Containerships. The tendency of the biggest shipping companies to either outsource or establish and acquire own dedicated feeder services “swings back and forth” (Andersen, 2018).

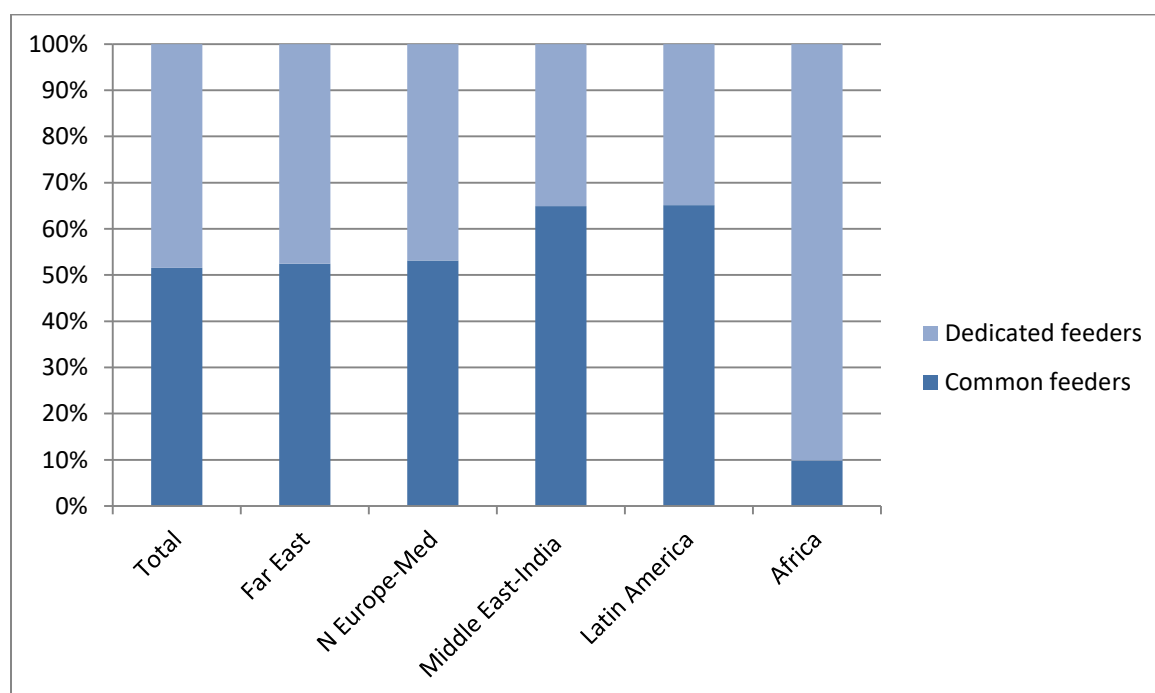
The emergence of carrier alliances and stronger consolidation has impacted feeder services in several ways. Feeder operators are required to quickly adapt to fundamental changes in routes and ports of call of mainlines. The demand of feeder services has increased in some regions and declined in others, as the deployment of even bigger vessels has imposed a hub-and-spoke structure on a number of routes. This system is based on the development of some hub ports for the transshipment of cargo from mother to feeder vessels or vice-versa. In other areas, ports have been added to mainlines,

pushing feeder services to the extremities of trade lanes. Another major impact is caused by peak volumes at gateway ports affecting feeder schedules.

Feeder networks experience shifts induced by alliance networks

The network rationalisations caused by alliances could create the need for more feeder operations in some parts of the world. The deployment of larger vessels has led to higher consolidation of volumes on a fewer ships. The resulting lower service frequency owing to higher consolidation of volumes led to into higher transshipment incidence in some parts of the world. Especially, container short-sea services in the North Europe range are expected to increase at short- and medium-term reflecting this scenario (European Commission, 2015). The biggest feeder trades are currently in the Far East with 33% total vessel capacities and North Europe-Mediterranean with 28% of total capacities. Around half of the feeder operations in Europe and Asia are from dedicated feeders; in Africa almost all feeder operations are done by dedicated feeders (Figure 18).

Figure 18. **Market shares of dedicated and common feeders in different world regions (2018)**



Source: Author's elaborations based on data from Dynamar (2018).

Alliance shifts require high degrees of flexibility and adaptation from feeder operators. Alliances regularly reshuffle their networks by adding or cancelling calls in certain ports. In various instances, feeder services have been replaced by mainline calls. For instance, Gdansk transformed into a regional hub relocating feeder networks closer to the final destination or origin, whereas in Jakarta, volumes rose to a level that made direct calls viable for large carriers (Dynamar, 2018). It remains to be seen whether large network relocations on a global scale will push common feeders to the extremities of global networks or whether, on the contrary, higher transshipment incidence due to mega-vessels will lengthen feeder networks and increase relay services.

Consolidating in ocean shipping has reduced the client pool of feeder operators. Considering the large capacity of the remaining mainline carriers, they are naturally able to exert more influence than previously, thereby driving down feeder rates (Dynamar, 2018). As a result of growing pressure from alliances, a few common carriers have moved into the regional cargo segment and scale up their presence in different markets to become a global feeder operator. An example for this is X-Press Feeders who operate in Asia, as well as the Europe-Mediterranean and the Middle East-Indian

Subcontinent trade lanes. Others are Arkas (North Europe-Mediterranean and Africa), Samudera (Asia and Middle East-Indian Sub-Continent) and Simatech (Middle East-Indian Sub-Continent and Africa).

Peak volumes in ports have affected feeder and barge schedules

Alliances, consolidation and mega-ships have led to greater peak volumes in ports. This has exacerbated congestion risks in ports that might have multiple causes not solely related to carriers. With a higher volume to be brought to the port, feeders risk missing the large ocean-going vessel at the hub port as many feeders line up to off-load cargo or take in cargo from larger vessels. In the past, feeder companies have struggled with the low priority accorded to them by ports as compared to the ever-bigger mainline vessels. Particularly at congested hub ports, feeder operators have experienced difficulties in securing berth space, severely affecting their schedules and causing additional costs of calling a port (Dynamar, 2018). According to Dynamar, low priority given to feeder vessels at berth is probably caused by the fact that feeder operators are not direct clients of the terminal but contract with mainline carriers through “Free In and Out” (FIO) agreements in which the carrier bears the costs of loading and unloading the feeder with their volumes. In practice, this often means that when the mainline vessel leaves the berth, another mainline ship might claim priority before the feeder vessel that is to be loaded, because the feeder operator is not a direct customer of the terminal. Common carriers have reported that priority is given to dedicated feeder vessels, as large carriers are able to exert bargaining power on terminal schedules. In some tidal ports, this phenomenon becomes even more of a problem, as short berthing windows additionally affect schedules. Some feeder operators therefore need to carefully weigh in each case whether volumes make it worth to wait for a delayed mega-vessel, as waiting times and missed tidal windows cause further costs to feeders. As a consequence, feeder operators have lamented that they face additional costs that are “out of their control”.

Congestion has important repercussions for feeder vessels and barges, as well as their clients. One of the shippers interviewed for this study has reported that, at least once a week, cargo does not reach the originally scheduled vessel because of congestion in a major European port. In that case, the container is rolled to the next vessel and shipping companies may apply additional detention and demurrage charges. In the reverse situation, important delays occur for containers at Rotterdam bound to inland Europe. In April 2018, the operator Contargo reported waiting times for barges of up to 48 hours at the port of Rotterdam (Knowler, 2018).

Port congestion also requires more coordination and alignment between the different parts of the maritime logistics chain. There are many of such stakeholders, whose actions need to be aligned. Alignment is particularly needed at the interfaces between organisations. Examples are: when the ship arrives in the port, when the cargo moves through the port, when trucks, trains or barges deliver or pick up cargo in the port, and when the land transport company reaches the final customer. Limited communication and coordination on these interfaces can quickly result in port congestion, particularly in the case of mega-ships. For these ships to realise the economies of scale intended when ordered by shipping companies, collaboration between various actors in the supply chain is needed: between carriers, shippers and freight forwarders to ensure reliability; between carriers, terminals and ports to assure productivity and adaptability of infrastructure; between carriers, terminals, ports and hinterland transport companies to provide smooth movement out of the port. As new ships will come available, planning on deployment of these vessels merits coordination with ports and terminals that need to be prepared to handle these ships efficiently.

Ports, terminals and port services

Whereas alliances might create value for some carriers, Chapter 2 illustrated that they likely destroy value for ports, terminals and port services, by undermining their return on investment. This is public investment for most port authorities, and private investment for terminal operators and port service providers, such as towage companies. Most ports depend on one or two alliances and the risk

of losing the alliance calls provides these with huge leverage over ports to reduce rates and invest in additional infrastructure. Within ports, alliances have frequently resulted in simultaneous over-utilisation and under-utilisation of terminals, related to a “winner takes all” dynamic related to the dominance of the three global alliances. Rationalisation of alliance networks has reduced the number of direct port connections. Alliances and consolidation of the industry have contributed to the disappearance of smaller container ports, various independent terminal operators and drive consolidation in the towage sector.

Declining return on investment

The extent to which public money has been misspent on port infrastructure has been well documented for Europe in a series of reports by the European Court of Auditors, who identified various ports financed by EU-funds that were underutilised or not utilised at all (ECA, 2011; ECA, 2016). Underutilisation of ports is not reserved to Europe; many world regions have more port capacity than needed (OECD/ITF, 2016). Port infrastructure is lumpy and maritime trade projections frequently inaccurate, so there is an inherent challenge in providing the appropriate amount of port capacity. Moreover, the relation between carriers and container ports is subject to hold-up problems, which increase the bargaining power of carriers (Box 11). However, this challenge has been amplified by the effects of alliances, as will be set out below.

Buying power of carriers

The buying power of carrier alliances stems from the fact that only a few world-wide ports seem truly inevitable. In North America only six ports receive calls from the three alliances on the two main trade lanes with Asia and Europe (Figure 19); this is 9 ports in Asia (Figure 20) and 5 ports in Europe (Figure 11). This implies that most large container ports are dependent on just one or two alliances; a decision of alliances to revise their port networks has large effects for the ports, which gives them huge leverage over these ports. Apart from a very select group of ports that seem inevitable for all alliances, most of the other ports have the constant risk that the alliance carriers will review their schedule and stop calling the port. Even the largest ports are not immune to the pressure and leverage from carriers.

Moreover, many ports compete with each other, so they provide carriers with real alternatives that they can use as leverage. Cargo shifts between ports are very frequent. Carriers and alliances very regularly update their service schedules and often change ports. The effects of these changes have much larger impacts than one or two decades ago, considering that much larger flows are now involved. We illustrated this with Figure 6 in Chapter 2 for the case of North-West European container ports. The relation between shipping lines and ports is per definition asymmetric, as ships are movable assets, whereas ports cannot be moved and have a longer investment repayment span. This asymmetry has increased due to the combined effects of alliances, consolidation and mega-ships.

Box 11. The hold-up problem of carriers and container ports

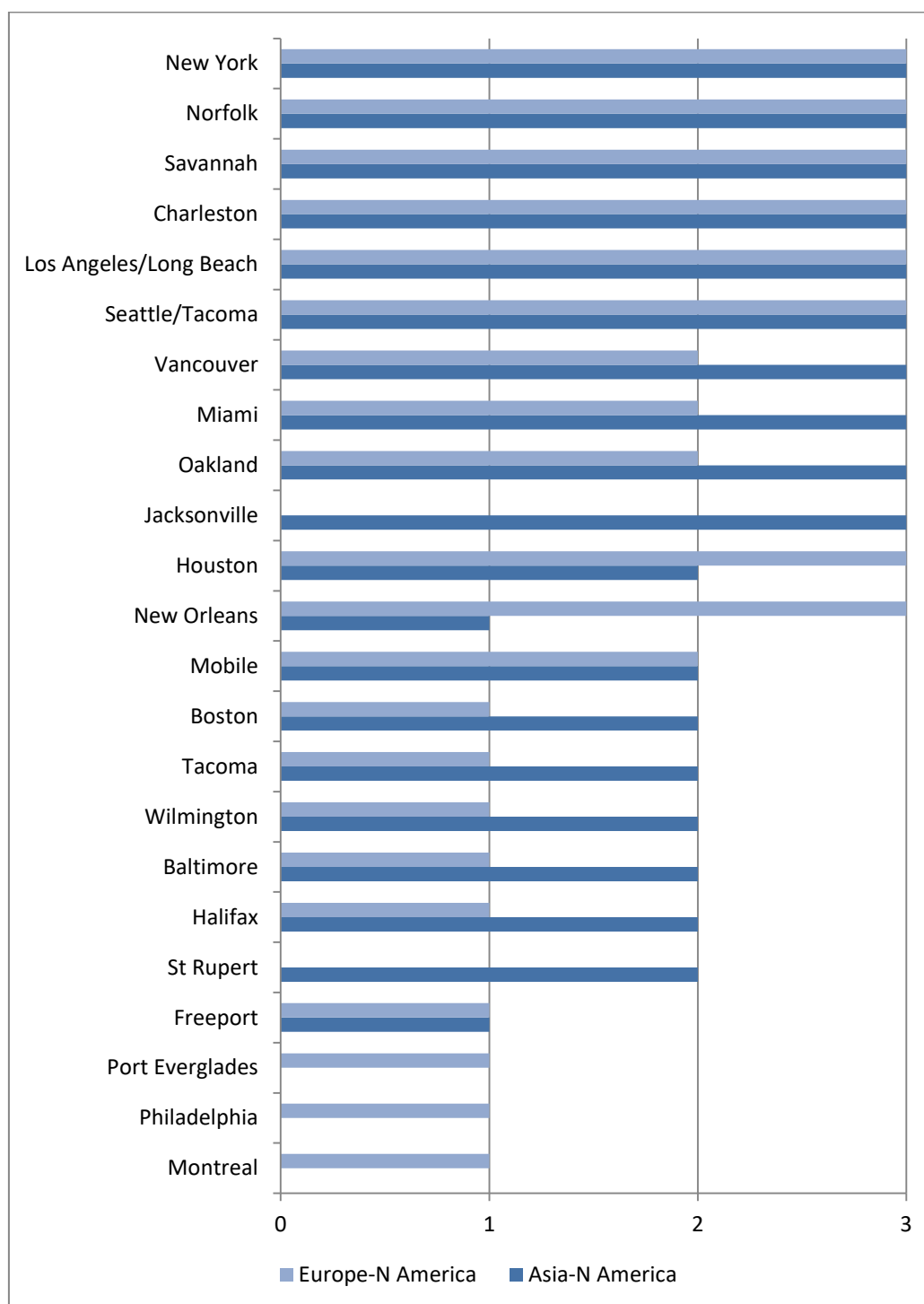
A hold-up problem can be defined as a situation where two parties would derive benefits from cooperating, but refrain from doing so because they fear that they may give the other party increased bargaining power, which could reduce their own profits. This is pertinent in the case of infrastructure investment: when firm A makes an investment from which firm B derives a benefit, this could be considered “sunk investment”, so firm B could change the rules of cooperation after the investment to implicitly or explicitly expropriate the investor (OECD/ITF, 2018). The *ex post* bargaining position of the investor will be weaker if the share of sunk investment is larger. In other words, the risk of a hold-up problem is larger with high asset specificity: the assets cannot be redeployed elsewhere because they are specific to that transaction. The risk of hold-up problems is higher in cases of high uncertainty because contracts cannot foresee every potential eventuality (they are “incomplete”). In case of competition amongst buyers and repeated transactions the hold-up risk is lower. In the latter case the investor’s next investment could be used as a threat to contain the buyer’s incentives to behave opportunistically (CRA, 2015). Hold-ups also tends to be less severe in situations where both parties could take some of the other side’s specific investments “hostage” (Williamson, 1983).

The relation between shipping lines on the one hand and container ports and terminals on the other hand, could also be considered a hold up problem. Ports hold some market power over shipping lines before investing in new infrastructure, but as soon as they have made this investment, the bargaining power balance shifts in favour of shipping companies. These companies behave opportunistically and ask for lower port fees, with the threat of reducing the number of port calls (the hold-up). The proportion of sunk investment is high: container ports that can handle mega-ships require deep access channels and berths (hence high dredging costs) that are not needed for most other ships. In addition, a container port has certain specific design features, which makes redeployment only possible after expensive adjustments. As there is enough container port capacity available now and in the foreseeable future (OECD/ITF, 2016), liners not calling the port is a realistic threat: carriers have moveable assets and face no switching costs from changing one port for another. New expansions of the same port generally take decades to materialise; which means that future port investment can hardly contain carrier incentives for opportunistic behaviour. The only reason that so many port investments still take place, despite the risk of hold-ups, is that governments owning the ports absorb the risk of hold-up problems. So, the problem to be solved here is not only the behavior of the carriers, but also the “disloyal” competition between countries, some of which are willing to go below full cost recovery of port and hinterland infrastructure investment to become attractive. If countries were not to do that, the “extortion” of the carriers would not work and only competition would be at play. The result of governments absorbing hold-up risks even below full cost recovery is over-investment in port infrastructure, resulting in empty or under-utilised ports financed with taxpayers’ money (ECA, 2016). Liner shipping alliances have aggravated the hold-up effects, as they limit the possibility for port authorities to find alternative users of their port infrastructure. There are generally two solutions to mitigate hold-up problems: vertical integration and more complete contracts:

- Vertical integration between container carriers and *terminal operators* – via dedicated terminals, joint ventures and equity stakes - is common, but that is no guarantee for port authorities, as this gives carriers even more leverage to press for lower port fees, more infrastructure spending and – moreover – to renegotiate terminal concession fees. Vertical integration between carriers and *port authorities* is very uncommon, and probably also not desirable, considering the regulatory power of port authorities (almost exclusively public authorities), which would transform the carrier into a regulator.
- More complete contracts with carriers could help both terminal operators and port authorities. Carrier-*terminal operator* contracts are generally relatively short-term contracts, with fairly loose commitments from carrier side that are not really enforceable. The challenge for terminal operators would be to strengthen the commitments of carriers in more long-term strategic contracts and cooperation. The commitments of carriers towards *port authorities* are usually not part of a contract, but informal and oral. More formalised commitments from carriers towards ports – e.g. on guaranteed volumes - could help to reduce hold-up risks for ports. Such commitments would “kill” competition between ports as the carriers could no longer switch between ports with minimal cost, which is unfair if ports are not performing well. A way to solve this could be to define a port performance score below which the carrier-port “contract” could be nullified. Considering that ports are often backed up by governments, there is some room for two-sided relationships in which investments of the other side are taken “hostage”; governments could decide to only provide subsidies and tax exemptions to their shipping sector under the condition that they make use of domestic ports.

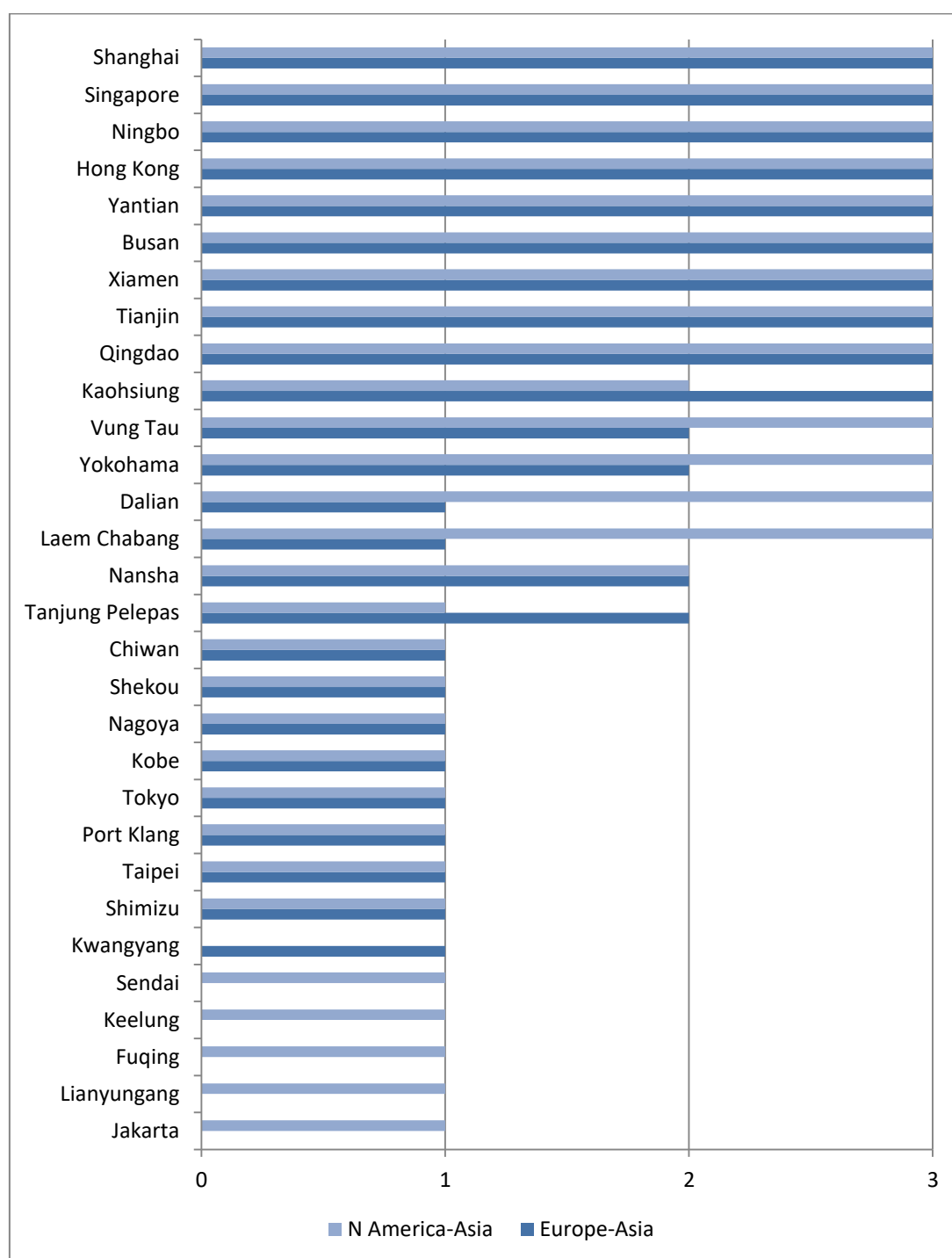
It is important to realise that this requires cooperation between governments. No unilateral solution attempt by any country would work, considering that ports often compete beyond national borders. If only one country would insist on full cost recovery, carriers would simply go to other countries that are less strict and willing to spend taxpayers’ money on port infrastructure without full cost recovery.

Figure 19. Global alliances and their preferred North American ports on East-West trade routes (2017)



Source: Author's elaborations based on data from SeaIntel (2017)

Note: Due to their proximity and functional integration Los Angeles and Long Beach, as well as Seattle and Tacoma, are here considered to be part of two single port complexes: Los Angeles/Long Beach and Seattle/Tacoma.

Figure 20. **Global alliances and their preferred Asian ports on East-West trade routes (2017)**

Source: Author's elaborations based on data from SeaIntel (2017)

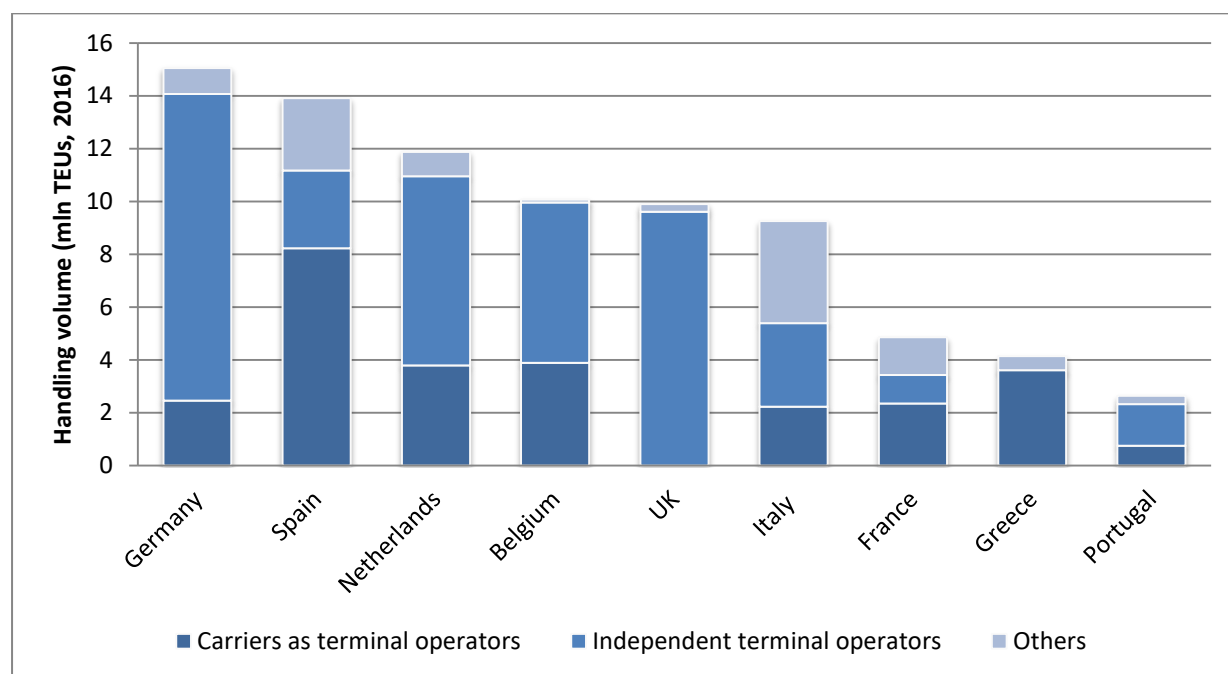
Pressure on rates and investments

Carriers will use their own terminal assets as cost centres, which helps them to negotiate downwards the rates in other terminals. In other words, carriers use direct investments in container facilities as a strategy for controlling costs, by creating bargaining power towards pure – independent – terminal operators. This strategy can be applied within the framework of alliances, as carriers in alliances will predominantly use the terminals that they control. E.g. a study on port choice in North-

West Europe showed that carriers in alliances predominantly chose ports where they have terminal interests, with the exception of UK and Hamburg where carriers do not have stakes (Notteboom et al., 2018).

This tactic can be particularly effective in countries where a large share of the terminals is controlled by carriers, such as Spain, whereas this would be much more difficult to realise in countries with higher shares of independent terminal operators, such as Germany (Figure 21). Some countries, such as the UK, have no carrier-controlled container terminals, so private returns on investment in UK terminals are not affected by rate pressures from terminals that act as cost centres.

Figure 21. Different types of terminal operators in European countries (2017)



Source: Author's elaborations based on data from Drewry (2017) and interviews

If carriers also have positions in other shipping segments, they can use these to put additional leverage on ports. For example, MSC is not only a container carrier but also active in cruise shipping, with multiple port calls and stakes in cruise terminals in Italy, a position it uses to advance its container shipping interests, such as a call for public investment in a new breakwater in Genoa to support a MSC-controlled container terminal (Box 12).

Box 12. Construction of a new dedicated container terminal at the Port of Genoa

In June 2018, a 33-year concession was signed for the container terminal at Calata Bettolo, in the Port of Genoa, involving an agreement between MSC and Gruppo Investimenti Portuali (GIP). The Consorzio Bettolo is formed by Itaterminaux Sàrl (65%) and Seber Srl (35%). The first is a terminal company based in Luxemburg, controlled by MSC, the second is an Italian terminal operator controlled by GIP (TrasportoEuropa, 2018). Seber also controls the South Europe Container Hub (SECH), located directly next to the planned Bettolo terminal. MSC is also completing the acquisition of the major stake of Ignazio Messina & C., a company that operates a terminal in the Sampierdarena basin (Molo Ronco and Molo Canepa), known for its advantageous rail connections (Alphaliner, 2018). The Bettolo terminal will be operational in 2022 after the finalisation of infrastructure works. The design capacity of the terminal is 750 000-800 000 TEU per year and should host container ships of up to 20 000 TEU. The 760 meter deep-water pier will be equipped with six gantry cranes (Genova24, 2018).

In order to accommodate ultra-large container vessels, large infrastructure costs will be imposed on the Ports of Genoa, the Port Authority of the Western Ligurian Sea. A landfill was constructed to provide the necessary width and length of the terminal and the currently existing breakwater protecting the city port of Genoa will need to be replaced by a new five kilometres-long breakwater - 500 meters from the coast, compared to its current 160 meters – in order to accommodate larger vessels (Scaletti/BJ Liguria, 2018). The design and construction cost of the new breakwater is estimated at around EUR 1 billion (Autorità di Sistema Portuale del Mar Ligure Occidentale, 2017), excluding costs for demolishing the current one. According to media reports, the construction of the new breakwater –if confirmed – would be the largest port work ever made in an Italian port since the war. The design of the new breakwater should take two years and reportedly involves the use of eight million cubic meters of stone materials and 150 reinforced concrete cubes (20x20m large and 30m high) to be placed on an (on average) 40m deep seabed and covered with around 250 000 cubic metres of concrete (Dell’Antico/MediTelegraph, 2018).

The demolition of the current breakwater is highly controversial, as the sole rationale for replacing it is to conform to access requirements of mega-vessels into the city port. As the current breakwater obstructs entry for mega-vessels and Calata Bettolo is in direct vicinity to the inner city of Genova, the use of the new terminal is likely to bring even higher inland congestion risks, increase shipping emissions and could hence aggravate air pollution levels in the inner city. Considering these risks, other locations outside Genoa could have been more suitable for calls from mega-ships. Further, there is a high cost compared to the potential benefit of attracting more container volumes, which are subject to demand fluctuations. Although the interest of the Port of Genoa is to maximize the potential of Calata Bettolo and Ronco-Canepa and to strengthen the competitiveness of the port, these projects, especially under the conditions of replacing the breakwater, remain uncertain as to whether long-term benefits will outweigh the costs. In addition to the cost of transferring to the new breakwater, the construction of the Bettolo quay has cost the authorities EUR 35 million; EUR 136 million will reportedly be provided by the terminal operator (Primocanale Genova, 2018). The required landfill to realise the Ronco-Canepa terminal is estimated to cost the authorities EUR 16 million (Scaletti/BJ Liguria, 2018). Given the already overstretched capacities of hinterland connections, public authorities would need to make extra efforts in terms of road and rail connectivity in order to absorb and reap the benefits of additional cargo volume at the city port. Considering current demand, this would also mean growing capacities in Genoa at the expense of other terminals. The new Bettolo terminal will primarily compete with PSA’s Voltri Terminal (with GIP as a minority shareholder), but it could also compete with LSCT La Spezia, depending on the stability of the joint-venture between Contship Italia and MSC which has been described as “difficult” in recent media reports (Alphaliner, 2018). As a main provider of container and cruise traffic in Genoa MSC has strong leverage over the port authority.

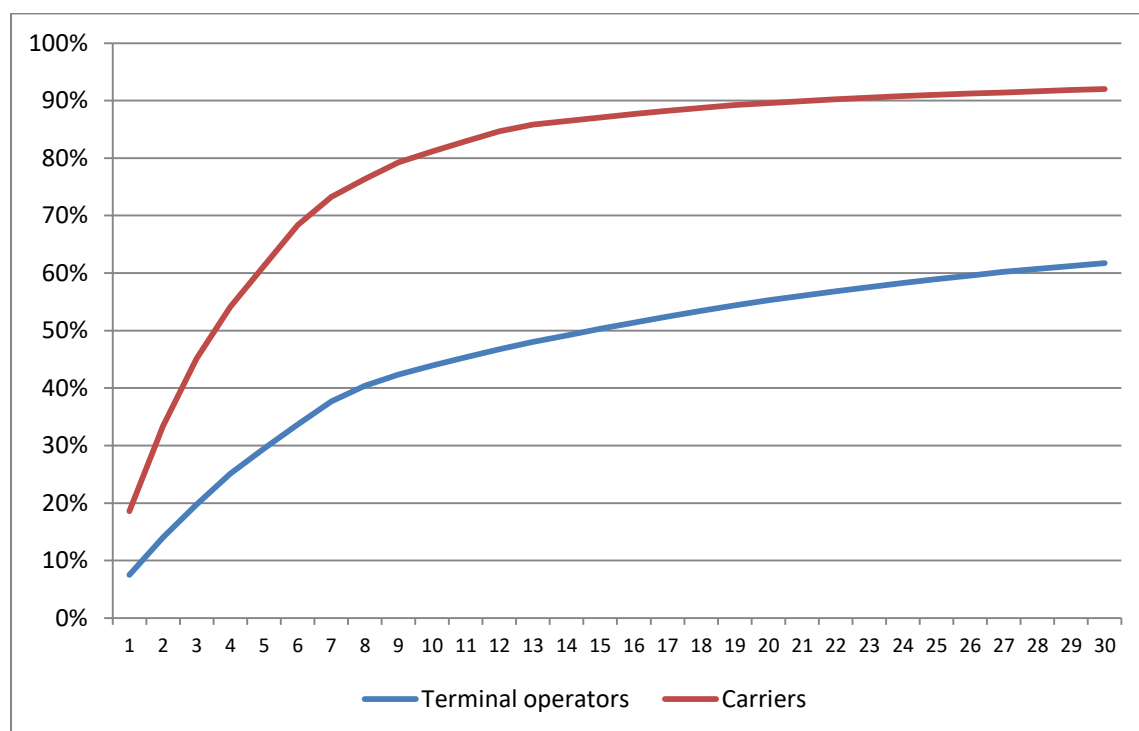
MSC’s strategy of vertical integration is particularly visible in Italy where MSC or holdings owned by members of the Aponte family have been active in acquiring stakes in terminals. MSC has acquired the company Conateco in the port of Naples, taking over the controlling interest from COSCO and owns stakes in Contship Italia, which has terminal concessions in Gioia Tauro, Ravenna and La Spezia. MSC participates also in the Trieste Marine Terminal Pier VII. Venice’s Terminal Intermodale Venezia (TIV) is a subsidiary of Malta-based Marin Hill Holdings and Marinvest, a unit of Mediterranean Shipping Company (MSC). With its participation in terminal operator Lorenzini, MSC expanded its influence to Civitavecchia and Livorno (Savelli/Corriere della Sera, 2017).

These carrier strategies work because there is limited countervailing power from ports. Even if ports can have a natural catchment area, most container ports compete for cargo of alliances cargo, so seem unwilling to cross their main clients. This will make it difficult for them to recoup infrastructure investment costs via port fees, so port authorities will either compensate via public money or more revenues from concessions with private terminal operators. Considering that terminals have sunk investment in ports, port authorities have more bargaining power vis-à-vis terminal operators than vis-à-vis carriers, so they are tempted to renegotiate concession fees, so that they can lower port fees. E.g. in the port of Rotterdam, the share of port revenue from port fees has decreased from 56% in 2008 to 41% in 2017; or – using a different indicator: the revenue from port fees per tonne of cargo throughput has decreased from EUR 0.70 in 2008 to EUR 0.62 in 2017. Due to pressure on port rates, ports might be tempted to add terminal concessions, so as to increase port revenue, even if there is not enough demand.

Corporatisation of ports in some parts of the world has tended to strengthen this competitive focus, possibly to the detriment of focus on the public interest that could be achieved by joint coordination of ports. Ports could coordinate to avoid terminal overcapacity being developed that enables carriers to play off terminals against each other. Ports might also benefit from jointly adopting explicit and comprehensive principles on port pricing which would seek to ensure that all relevant costs are taken into account in setting port fees e.g. dredging needs for larger ships). In certain ports of the world, there is already a tendency for ports to act to increase their bargaining power, e.g. by mergers – as exemplified by major Chinese ports – or port alliances, as in the US. The last chapter of this report elaborates on these initiatives.

There is also an asymmetric relationship between carriers and terminal operators, albeit less asymmetric than between carriers and ports. Terminal operators have consolidated like carriers and the largest of them have developed into global groups with world-wide coverage. This has led some authors to describe the relation between carriers and terminal operators as a dual oligopoly. However, this seems more like a theoretical construct than an adequate description of reality, for a variety of reasons. First, the market concentration of terminal operators is far lower than the concentration rates of carriers (Figure 22). Moreover carriers operate in three alliances, which is not the case for terminal operators. The ten largest carriers have an 80% market share, whereas ten largest terminal operators only have a 40% market share. Second, the competitiveness of terminals depends to a considerable degree on local circumstances, such as port policies, port-hinterland connections and regional trade growth. This means that global terminal operators hardly negotiate with carriers on the whole package of rates that carriers are confronted with, so terminal operators have limited control over the attractiveness (for shippers) of the total package of services. Third, carriers have movable assets whereas terminals are mostly fixed assets, so the risk allocation between carriers and terminals is skewed. Finally, terminal operators have only rarely been able to introduce higher handling charges for better or faster service; in most cases the bargaining power of carriers is such that the threat of their potential shift to another terminal gives them enough leverage to require faster service.

Figure 22. Concentration rates of container lines and container terminal operators (2018)

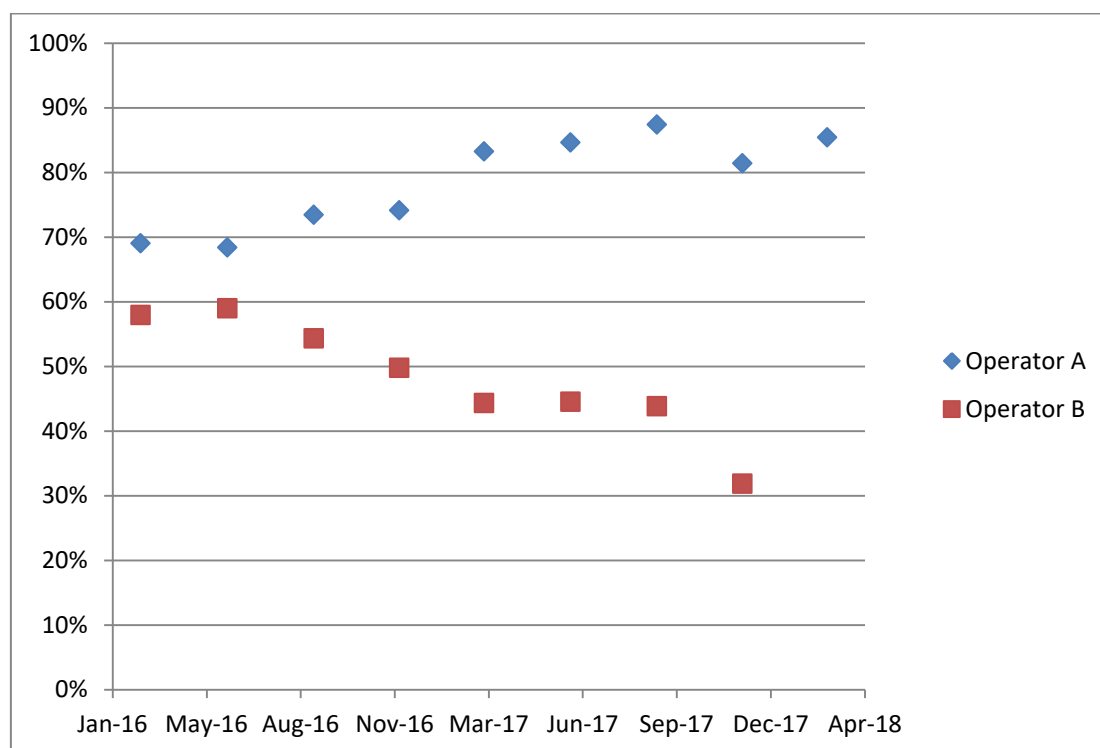


Source: Author's elaborations based on data from Drewry (2017) and Alphaliner (2018)

Destructive competition

Alliances can create destructive competition between terminals within ports. Competition generally enhances efficiency and there is a substantial literature that illustrates the benefits of intra-port competition (see e.g. De Langen and Pallis, 2005). The dominance of the three alliances has changed the character of that competition, as it provides a lot of leverage to alliances. A port with calls from the three alliances would ideally have three or more competing terminals that have exactly the right capacity to serve the calls from the respective alliances. Needless to say, this is rarely ever the case. Ports with three terminals and calls from three alliances can find themselves confronted with three alliances that predominantly use two terminals. Other ports might have two terminal operators that will have to deal with the cargo from three alliances. Often the outcome of such dynamics is a “winner takes all” phenomenon, where one terminal is over-utilised whereas the competing terminal will be underutilised. This is for example the case in a large European port where the reshuffling of alliances calls has brought down the utilisation rates of one terminal to around 30%, whereas the utilisation rate of the competing terminal has reached 90%, which is above the utilisation rate that is generally considered to be optimal by the industry (Figure 23). Before the dominance of alliances the amount of cargo was much more fragmented with a large amount of potential carriers, so the character of terminal competition was less binary.

Figure 23. The effect of alliances on utilisation rates of a port with two terminals



Source: Author's elaborations based on data from Drewry (2017) and quarterly reports of the terminal operators

Decline of smaller container ports

The effects of alliances on different types of ports are comparable to the effects of slow steaming – which also leads to rationalisation of networks – namely: transshipment ports could benefit, medium to small sized ports will be negatively affected, and gateway ports could have a good chance to increase their traffic by attracting new services only if their catchment area and infrastructure allows for substantial call sizes (Ferrari et al., 2015). The increase in ship size and the reduction of possible calls due to network rationalisation in alliances can pose big threats for port authorities. They could also constitute a new competitive barrier for ports that cannot assure a minimum traffic volume or that have physical limits on their terminals (Ferrari et al., 2015). In case rationalisation of port networks results in more feeder traffic, certain smaller container ports could benefit from more feeder traffic.

The last decade has seen the withering away of various container ports. Certain smaller transshipment ports that were dependent on one carrier or one alliance lost these calls and have since then no longer been used as container ports; this was the case of Mediterranean ports like Malaga (Spain) and Taranto (Italy). This situation is a constant risk in areas with an abundance of well-equipped transshipment ports. Gateway ports can, to a certain extent, always rely on their own catchment areas, but smaller regional gateway ports have also been vulnerable when there are larger gateway ports close by that could absorb their traffic, e.g. in the case of Barcelona and Tarragona. Regularly, governments invest in port infrastructure at the request of carriers, who in the end do not use the port (Box 13). Only rarely do new container ports manage to get established in mature markets; one of the recent exceptions is the London Gateway port. Contrary to common knowledge, carrier-dominated terminal operators do not necessarily help as their alliance partners might oppose using that port considering their own terminal interests; this was one of the reasons why Amsterdam never managed to develop its ambitions as container port, despite the interest of NYK Line.

Box 13. Public investment to support carrier strategies: the case of Malaga

The origin of the container terminal in Malaga was the demand of Maersk in early 2000s to create a medium-sized overflow terminal for the APM terminal in Algeciras, the port in southern Spain that is located close to Malaga. The idea was to develop Malaga as a transshipment port in tandem with Algeciras. The Malaga container terminal became operational in 2004 after public investment in port infrastructure by the Malaga Port Authority and private investment in terminal pavement and equipment by the concessionaire, Dragados, later re-named Noatum. Container volumes from Maersk managed to boost volumes from scratch to 0.5 million TEUs in 2007.

As the global financial crisis of 2008 began to take its toll, traffic flows contracted and volumes in Malaga started to decrease. By 2009, the container throughput had fallen to 0.3 mln TEUs as Maersk concentrated its traffic on Algeciras and the Moroccan port Tanger-Med, its main container terminal hubs in the area. Although volumes started to go up again in 2010 and 2011, Maersk's increased focus on the APM terminals in Algeciras and Tanger Med left Malaga without much container traffic, despite an agreement with local stevedores to reduce costs by 35% on all Maersk traffic. Over the years, the port of Malaga cumulated debt partly related to investments in the deepening of the draft at the container terminal to 14 metres, necessary to attract large containerships (Port Strategy, 2014), so it had to cut down its investment plans to almost zero for several years. In 2015, only 43 000 TEUs were handled in Malaga and in 2016 the concession agreement was changed so that the Noatum terminal could handle other cargo types. The container cranes were removed. The concession stipulated minimum container throughput volumes, so Noatum had to pay a fine to Malaga Port Authority to cover this. In 2017, a 51% stake of Noatum was sold to Cosco, with a terminal portfolio that included the Malaga terminal. This had an impact on the strategy for Malaga. In 2018, Noatum and the port authority of Malaga decided to develop Malaga into a terminal for gateway traffic serving shippers in the local hinterland of Andalusia. In June 2018, Noatum installed three new container cranes in Malaga to achieve that ambition.

Concerns for independent terminal operators

Commoditisation of container shipping, in part driven by alliances, has increased the motivation for individual carriers to acquire terminal operators, as this presents them with a way to differentiate themselves from their competitors. Although carrier-dominated terminal operators participate in bids for new greenfield terminals, many carriers also buy existing terminal operators, in particular smaller and medium-sized independent terminal operators. This has for example happened in Spain in recent years, with the acquisition of TCB by APM Terminals and a majority stake of Noatum by Cosco. Carriers that have been very active acquiring container terminals over the last few years include Cosco and MSC. As we mentioned in Chapter 2, this has increased the share of carrier-dominated terminal operators from 18% in 2001 to 38% in 2017. Although, the acquisition of terminals by carriers like Cosco is likely to continue, considering their global and holistic supply chain ambitions, a more established player like Maersk has recently started to sell some of the terminals that are not essential to its service network.

This acquisition of independent operators by carriers sometimes happens via an intermediary stage of acquisition by financial investors. The Spanish terminal operator Dragados was acquired in 2010 by a consortium of investment bank J.P. Morgan and Dutch pension fund ABP, and rebranded as Noatum in 2011. In Italy, similar consortia of financial investors have acquired small - often family-owned - terminal operators. Although they can provide injections of capital that could improve the productivity and capacity of these terminals, there is also a risk that these consortia will after a few years sell their terminal assets to the highest bidder, which often turns out to be a carrier from China.

Certain large independent terminal operators, such as PSA, have tried to develop long-term relations with carriers, via terminal joint ventures (with MSC), dedicated terminals (for CMA CGM and Cosco) and other forms of cooperation. However, these forms of cooperation are generally fairly loose and they do not bind carriers.

Concentration of the towage sector

The globalisation and consolidation of shipping is mirrored in the towage sector. A similar movement is now taking place, resulting in the emergence of a few multi-national players, such as Kotug Smit and Fairplay being present in many ports. Vertical integration is less frequent than in the terminal handling sector, yet the largest towage company, Svitzer, forms part of Maersk. The result of consolidation is the disappearance of smaller, family-owned towage companies, particularly in Northern Europe. Competition for towage services within ports has emerged after 1993 in Europe, with the entry of companies such as Kotug and Smit in Hamburg, and Fairplay in Rotterdam. The dominance of alliances and mega-ships in major ports has similar effects as for terminal operators: the need for more capital investments, more peak and troughs, pressure on rates and declining returns on investment.

Similar to developments in the terminal segment, the deployment of ultra-large vessels has increased pressure on towage operators to increase the capital investments required to serve these vessels. The number of tugboats and human capital needed to serve a single ultra-large vessel increases while the frequency of these vessels calling a port has decreased, leaving assets idle for the remaining time. As a consequence, size and scale has become a requirement in the towage sector to ensure profitability. Combined operation allows towage companies to meet the increasing demands of their clients, especially when this allows flexibly deploying tugboat fleets in different ports. This has led to mergers, such as Kotug Smit or, in some tidal ports where entry windows are limited, to occasional cross-charters among towage providers.

Although there is no joint purchasing of towage contracts by alliances, consolidation has reduced the number of customers in ports, thereby increasing the pressure on towage rates. Most large container ports are dependent on just one or two alliances. Often, there is one vessel operator representing an alliance in a specific port, which often reduces the number of towage contracts to 1-2. In the case of a merger, the towage company serving the target carrier will likely lose the contract if the acquiring carrier has a contractual relation with another towage competitor. This has effectively increased the leverage carriers can exert on port services such as towage. In ports where several towage companies compete, such as in Hamburg, rates have gone down significantly. As a towage operator interviewed for this study reports, rates to serve container ships in Europe generally do not cover their incremental costs anymore, which has led some companies to cross-subsidise their towage activities for container vessels with the bulk trade and tanker business. Other companies have exited the market or have been acquired by other operators, leading to increasing concentration in the towage market. In some ports, due to local or state monopolies of some towage companies, rates have remained at a higher level. However, increased inter-port competition has also impacted local monopolies. While low rates temporarily benefit carriers, market exit of smaller towage companies favours concentration in the towage market, which, in the future, could lead to the re-emergence of local towage monopolies.

In response to rate declines, tug owners have started to cut costs which has led to consolidations of their operations. Towage companies are increasingly broadening their networks and have engaged in joint ventures across Europe in order to be able to access a bigger tugboat fleet and move around tugboats. However, an obstacle to further cut costs in response to carriers' demands is the inability for some European towage companies to access similar tax exemptions as ship owners, especially on the costs of the crew. This has had the effect that some towage companies have now registered tugboats under foreign flags, which has allowed them to save costs – however to a lesser extent than tax rebates could offer, as reported by a towage operator.

The towage sector in Europe might have witnessed practices of predatory pricing. Predatory pricing as part of the deliberative strategy of dumping, usually involves setting very low prices or selling below the firm's costs in order to drive competitors out of the market or to hurt rivals in order to increase chances for future acquisition. In Portugal, towage services have been offered at around 5% of the estimated cost in a Portuguese port, according to a towage company. Similar practices have

been observed in Denmark and Sweden. Vertical integration means for towage companies that they effectively compete with a customer owning the strongest competitor in towage. This has effectively impeded competitors not backed by a large carrier and without a certainty to be able to recoup losses at a later time to compete in this market. Although complaints have been filed in the past, previous legal procedures and investigations have taken up to four years – a time period during which towage companies might not be able to survive.

Freight forwarders

Freight forwarders organise shipments and perform a variety of value-added services related to documentation of shipments. Freight forwarders are comparable to the so-called non-vessel operating common carriers (NVOCCs) that often act as cargo consolidators that might offer freight forwarding services in addition. Both freight forwarders and NVOCCs do not own physical assets, in contrast to logistics companies. In this sector, when referring to freight forwarders, we will cover both freight forwarders and NVOCCs.

Freight forwarders have been mainly impacted by decreasing schedule reliability and service quality owing to rationalisation strategies of carriers and alliances. A satisfaction survey with 400 freight forwarders and shippers published by Drewry in June 2018 showed that transit times, reliability of booking and cargo shipped as booked were considered to have deteriorated since 2016 and attracted scores of around 2.9 out of 5. None of the 16 categories rated received a score higher than 3.4. Assessing the performance of the carrier industry in general, over 60% of respondents noticed deterioration in the range of different carriers available and over 40% observed a decreasing availability of different services (Drewry, 2018). These findings are in line with our own assessments, as presented in Chapter 2 and public statements from leading freight forwarders (Box 14).

Box 14. Benchmarking performance and managing low reliability

Multinational freight forwarders, such as Kuehne+Nagel (K+N) have strongly criticised decreasing schedule reliability in the past. Although a variety of factors impact vessels during sailing, e.g. waiting time in ports or weather conditions, K+N has attributed the deterioration of reliability mainly to the transition phase of the new alliance structure. In order to better manage the effects, freight forwarders and shippers have developed own performance comparisons on individual services. K+N has developed their own scoring system for all route networks, ranking services from A to E based on vessel arrival. The company adjusts cargo allocation accordingly.

Freight forwarders have resorted to spreading risk and taking more informed allocation decisions, as companies such as K+N are increasingly concerned that their complaints with carriers are not being heard. This reflects their low bargaining power despite a substantial supply of volumes to carriers. Although issues related to a prolonged transition phase from four to three global alliances may disappear once the three alliances are well established, a new round of alliance restructuring could be the consequence of further industry consolidation in the future. Competition within alliances and possible future merger rounds make alliances an inherently instable construct (Pico, 2018).

The use of slot sharing and high volume consolidation – both direct effects of shipping alliances – can negatively impact visibility into the logistics chain. This is case because cargo is loaded on either vessels of alliance members or on feeder vessels that do not belong to the same company. In the case of cancelled sailings or rollovers of containers, both freight forwarders and shippers have experienced low quality of information flows, which complicates the activities of freight forwarders. During the alliance reshuffle in early 2017, they report to have faced refusals of bookings, rollovers of containers and blank sailings. Missing information on these incidents further complicated the task for freight forwarders. In 2017, the CEO of K+N criticised that information on delays or rollovers, at best, arrived too late and at worst, relevant information was never transmitted. Further, as it was argued, K+N were able to get the required information before the carrier provided it. Although increased digitalisation could potentially solve or at least mitigate this difficulty, it does seem to suggest underlying problems of service quality and visibility issues within the alliance setting

(Kristiansen, 2017). Low visibility complicates risk management of freight forwarders and shippers (Box 15).

The increasing market power of alliance carriers translates into stronger leverage over contracts. Carriers have tightened and insist on stricter application of contract clauses. A specific issue observed by some freight forwarders are lower free times for pickup of containers acknowledged by carriers in transport contracts. In the case of South African major ports, containers stored by shipping companies were charged about USD 100 per day after exceeding five days of free time, but both freight forwarders and shippers have witnessed that the charges included a tenfold mark-up of the actual storage cost for the carrier, with charges climbing quickly the more time containers remained in storage premises. This has led a group of freight forwarders to file a complaint with the South African Competition Authority for abuse of power and dominant position expressed in excessive land-side demurrage charges. The group suspects that carriers use the strategy of charging higher land-side fees in order to compensate low freight rates. Due to carrier consolidation, freight forwarders face less choice and consider it inevitable to work with all major carriers, even if they are not satisfied with the quality of their services.

Consolidation and cooperation among container lines have also affected availability of equipment and vessel slots. The availability of containers appears to be a concern for various forwarders and shippers. Empty containers are not commonly shared among carriers, not even those within the same alliance. In order to obtain equipment, forwarders and shippers are often faced with additional container surcharges, such as container availability fees. Avoiding these fees on the spot market would oblige the shipper to book volumes in advance without knowing whether there will be demand from customers.

Some carriers are also active in freight forwarding, or have announced ambitions in this area. Although some of the largest freight forwarders do not consider this to be a competitive threat yet, carriers that start to operate as freight forwarders could present concerns. One could wonder about level playing field conditions, especially since many carriers receive state aid and subsidies, whereas freight forwarders are not subsidised. The emerging digitalisation initiatives could potentially provide carriers with information on land-side transportation and logistics that they could use to strengthen their position as global integrator. One of the actors that we interviewed claims that a large carrier has sought to access his clients directly, proposing finance solutions and transport without him as an intermediary. The company fears that vertical integration of carriers in forwarding could potentially threaten business models of intermediaries that are partly based on providing value-added financial products to customers.

Shippers

While many shippers prioritise low cost, reliability, choice and fast transit times are often considered as important for the smooth functioning of their supply chains. We noted in Chapter 2 that alliances can be associated with less choice, less service differentiation and less service quality. These challenges are recognised by many shippers and they perceive a deterioration of service quality since the new alliances structure was introduced (Drewry, 2018). The direct impacts for shippers include higher costs related to supply chain disruptions, eroding bargaining power and constrained risk management.

Supply chain disruption costs

The eroding service quality, associated with alliances, creates disruption in supply chains that represent considerable costs to shippers. This is especially the case for those commercially dependent on just-in-time deliveries or the trade in perishables. Further, it was observed that frequent spontaneous cancellations of calls to main ports have led to cargo being discharged elsewhere than initially foreseen. The limited shelf life of products coupled with important delays has led to a devaluation of the product once arrived at its destination. In the case of important delays, some

companies that use containers to source their raw materials have switched either to local suppliers or order deliveries by truck, which can significantly increase overall transport costs. For some shippers, such occasional modal shifts, although costly, have become the norm in dealing with delays and port call omissions.

In order to face the risk of delays, the costs of stock holding and inventory management have increased for some of the shippers. In order to avoid fluctuations and delays in deliveries to the customer, shippers need to increase inventories and provides additional warehousing at destinations. Inconsistent lead times however reserve the possibility that shipments arrive as planned, which means shippers need to strike a balance between too few and too many stocks in order not to face space issues. While generally longer, but consistent lead times could be beneficial for some shippers, those trading with reefer cargo or perishables would also need speed.

A range of studies have showed that improving transport service frequency and reliability would allow shippers to reduce supply chain inventories. More reliable liner shipping services can provide significant inventory cost savings to shippers (Saldanha et al., 2009). Low schedule reliability makes it difficult for shippers to deploy just-in-time production and supply chains. With low reliability, shippers have to keep more safety stock, or from time to time use more expensive transportation modes for cargo to catch up lost time. Offering short transit times are particularly important for perishable goods and consumer goods with a short life cycle and elevated economic or technical depreciation, such as fashion and computers (Notteboom, 2006). Improving schedule reliability (from 70% to 99%) and offering higher service frequencies (from weekly to daily sailing) could enable inventory cost savings of 25% according to Zhang and Lam (2015).

Estimating inventory cost increases due to liner shipping delays could be related to the value of transit time. Many of the shippers we interviewed have not been able to quantify the impacts of declining reliability on their inventory costs. A promising approach in the academic literature is related to estimating the value of transit time (VOTT). The cost of the cargoes associated with transit time is directly borne by the customers and could be considered as a proxy of inventory costs. The idea is that an extra day at sea creates opportunity costs related to fixed capital that could lower the economic value of the goods concerned (Notteboom, 2006). Various studies, referenced in Table 5, provide estimations of these different sorts of value of transit time, indicating that the average value of transit time for containerized cargo falls within the range of 15-30 USD per TEU per day. Future studies might be able to assess the relative costs and benefits of the reduction of ocean freight rates in recent decades and the supply chain disruption costs incurred by shippers as a result of the consequent changes in industry operations.

Table 5. Overview of studies on the value of transit time

Studies	Value of transit time (USD/TEU/day)
Notteboom 2006	19
Bakshi and Gans 2010	272
Cariou 2011	26
Wang and Meng 2011	14 – 38
Bell et al. 2013	20
Wang et al. 2015	5 - 30

Bargaining power of shippers under pressure

There is a growing difference in size of carriers and the size of shippers: even the volumes associated with the largest shippers hardly ever represent more than 1% of the total number of containers carried by major carriers. Although large shippers may have some leverage via the volumes of the cargo that they own, this is different for the large base of small and medium-sized shippers. Considering the limited range of carriers and the even more limited number of alliances, customers have only limited possibilities to “vote with their feet” as it would usually be the case in highly competitive industry sectors.

Many shippers have noticed that the terms of their contracts have become more restrictive, allowing less container free time and applying higher detention and demurrage charges. As there is less free time acknowledged in the contract, the majority of the interviewed shippers receive additional bills for storage and container rental costs depending on product value, even in cases where the responsibility for exceeding cargo dwell time in ports was the responsibility of the shipping company, e.g. when a delay led to missing the feeder service or when cargo was discharged at the wrong port. Detention and demurrage charges not caused by the shipper are often difficult to claim back and various shippers prefer quickly settling the dispute in order not to lose additional time and avoid costly detention charges, which rise fast with each additional day that the container is stored by the shipping company.

Constraints to risk management

Alliances generate risks for the resilience of supply chains. In order to avoid delays and disruption in the supply chain, shippers tend to spread risk and avoid “putting all eggs in one basket”. Alliances limit these possibilities, by providing less choice, but they also affect supply chain visibility: it has become more complicated to know precisely on which vessel of a vessel- or slot-sharing partner (even outside an alliance) cargo has been loaded. Whenever possible, most shippers tend to distribute risk across the different alliances. Nonetheless, it appears to happen that all of a customer’s shipments appear on the same vessel even if booked with different carriers. In the case of the Hanjin bankruptcy in autumn 2016 and following dissolution, shippers who booked cargo space with other THE Alliance members automatically had risked their cargo being loaded on a Hanjin vessel, causing major supply chain disruptions and months-long delays, leaving roughly 520 000 containers stranded (Barnard, 2017). This incident affected beneficial cargo owners who had booked with Hanjin directly, but also those who booked with alliance partners and those engaged with looser vessel- or slot-sharing agreements with Hanjin. Similar problems arose during the cyber-attack affecting Maersk Line and APMT, whereas in this case the close integration of IT infrastructure highlighted not only the risk of horizontal, but also vertical contamination of the attack’s operational impact (Box 7).

Alliances have constrained the possibilities for risk management by shippers. Inter-dependence increases not only the scope and gravity of issues in the supply chain, but coupled with low visibility, these issues also reduce the possibility for shippers to manage risks accordingly. For example, this has led some shippers to spend additional resources on risk management. Given the uncertainty attached to knowing on which partners’ vessel the cargo would be loaded, Electrolux states that it is “a risk

impossible to manage” (Box 15). Some large shippers, have developed own internal rankings on the financial health of carriers. Some shippers have started to require a specified percentage of cargo to be transported on the carrier’s own vessels and demand a guarantee from carriers not to place the cargo on a vessel operated by an alliance partner (Inbound Logistics, 2017). Carriers’ own risk management, which entails fixed allocations from a single shipper under a specified threshold, has had the effect that a major shipper and one of the biggest global forwarders interviewed for this study have been faced with difficulties in “getting cargo on-board” even in times of overcapacity.

Box 15. Risk management in the context of alliances

In 2016, the large Swedish appliance manufacturer Electrolux voiced fierce criticism of container alliances. The shipper reportedly faces major challenges in terms of risk management for the transport of its 180 000 TEU annually and laments the decrease of differentiation between carriers, which has made it difficult for shippers to take decisions based on performance levels and reliability. Bjørn Vang Jensen, Vice President of Global Logistics at Electrolux, criticised that “the alliances have reduced all the carriers to a basic service” and that container shipping “has become a watered down product”. While the shipper acknowledged that it would be impossible to expect excellent service, he notes that “There is nobody doing it worse than anyone else, and nobody delivers well”. The shipper disagreed on the benefits that alliances could provide their customers. “Today, it doesn't make a difference whether you sail your container on a Cosco or a Hanjin vessel. The differences between carriers which existed before, where you could for example count on the fact that Maersk always arrives on time, have gone out the window. Today, nobody comes on time.” He further explained “What the alliances give us, is a headache – a major headache – within risk management. We waste huge amounts of time trying to find out who is in collaboration with whom, and how it relates to our booked cargo.”

Electrolux reported on an accident in November 2014 in which two vessels collided and caught fire at Port Kelang in Malaysia. While only 15 containers had initially been sent with one of the involved vessel operators, it turned out that 98 containers of the company’s containers were on the same vessel, all sent with different carriers and that the number of containers made up more than half of the Christmas sales to Brazil. While such incidents stand in no comparison to the large impact caused by the Hanjin bankruptcy or the cyber-attack on Maersk, the shipper reported a number of incidents of a smaller scope which all expose the same patterns of low visibility and difficult risk management. “We have learned from the episodes, that it is necessary to use many resources and a lot of time on risk management. Otherwise you risk that an event is not just limited to one carrier, where you might incidentally have some containers sailing.” The Electrolux executive added that “In many cases, it is a risk which is actually impossible to manage.”

Source: Schoer (2016).

Policy assessment and options

Alliances in container shipping have been enabled by government policy. This chapter gives an overview of these policies, in particular with respect to competition law, but it also covers port strategies and transport policies necessary to successfully adapt to liner shipping alliances. As alliances have changed in character over the last decades, increasingly yielded adverse impacts on the transport chain, the question is how government policies could be brought up to date with this changing reality of liner shipping alliances. We formulate policy recommendations based on our analysis of this question.

Competition policy frameworks

There is a long history of shipping-specific exemptions from competition law, in particular related to “conferences”. Conferences can be considered as classic, closed cartels, in which liner shipping companies can collaborate on all sorts of issues, most importantly fixing prices and regulating capacity. The first liner conference emerged in 1875 and since then many trade routes have witnessed the formation of conferences. Such conferences were in many cases facilitated by governments, convinced that this would be necessary for the emergence of reliable services, stable freight rates and a profitable shipping sector. The idea was that the shipping industry had specific characteristics that could give rise to market failure. Principal among these are high fixed costs and regularity of sailings (i.e. the need to follow the sailing schedule irrespective of whether a ship is full). These factors would lead carriers to apply marginal cost pricing, which would lead to destructive competition that would threaten sustainability of the sector in the long term (Haralambides, 2007). A particular strand of literature sometimes used for justifying “conferences” was the “empty core” theory, consisting of the argument that competition would result in instability and inefficiency if the core of the market is empty, that is: a lack of unique cost allocation that satisfies all participants (Sjostrom, 1989). This perceived market failure was used to justify liner conferences. Conferences were authorised either via specific shipping laws or specific exemptions from generic competition law. One particular form of such an exemption is a “block exemption”. This exempts the whole sector from key competition law provisions, provided that certain criteria are met. For example, the European Union had a block exemption for liner conferences in force from 1987 to 2006 (Council Regulation 4056/86) that allowed liner shipping companies to set common freight rates, to take joint decisions on the limitation of supply and to coordinate timetables.

The current treatment of shipping in competition law can be broadly divided into three categories below. Table 6 provides a fuller list of countries that adopt each of these three approaches:

1. Several countries have no sector-specific antitrust exemptions for shipping companies. In these countries, agreements between shipping companies can be accepted as long as they are compatible with the relevant antitrust rules, usually via the operation of an exemption regime. In Turkey, for example, there is currently no block exemption covering maritime transport services. Nevertheless, the Competition Authority is competent to grant individual exemptions to agreements that lead to economic efficiencies with benefits that outweigh the cost of their anticompetitive effects.⁹
2. Other countries without shipping-specific antitrust exemptions include Chile, Brazil, South Africa, Russia, Vietnam, Indonesia and China.¹⁰
3. Some countries have a block exemption for alliances. This group includes the European Union, Hong Kong, New Zealand (from 2019 onwards) and Israel. Malaysia could also be considered to be part of this group although its block exemption also extends to voluntary

- discussion agreements that provide for the broad exchange of information and the establishment of non-binding price guidelines.
4. Various countries have specific shipping legislation that allows for conferences. A prominent example is Singapore where the exemption regime for liner shipping cooperation agreements, including conferences, was extended in 2015 for another five years, until the end of 2021. In Japan, the 1949 Marine Transportation Act exempts international ocean shipping from the 1947 Antimonopoly Act. This exemption regime applies to conferences, discussion agreements and alliances and is motivated by the assumption that the Japanese shipping sector would not be globally competitive without the exemption. In various Reviews, the Japanese competition authority argued for repealing the exemption, most recently in 2016 (Japan Fair Trade Commission, 2016). In both the United States and Canada, conferences are not prohibited in the relevant legislation, but reforms, such as the Ocean Shipping Reform Act (OSRA) in the US, have resulted in the disappearance of most conferences on trade routes touching United States and Canada.¹¹

Table 6. Liner shipping and competition law in selected countries

Treatment in competition law	Countries
No shipping-specific exemptions	China, Chile, Turkey, Brazil, South Africa, Russia, Vietnam, Indonesia
Block exemption for shipping alliances	EU, Hong Kong, New Zealand, Israel, Malaysia
Exemption for all agreements (including on prices)	US, Australia, Singapore, Japan, South Korea, Canada

Shipping-specific exemptions for liner conferences have largely disappeared over the last two decades. Major reforms in this respect were the 1998 Ocean Shipping Reform Act (OSRA) in the United States and the repeal of the EU Block Exemption for liner conferences in 2006. The OSRA stipulated the right for shipping companies to enter into independent confidential service contracts, which meant that the authority of liner conferences in keeping compliance with the agreed freight rates was significantly eroded. In the European Union, the block exemption for liner conferences (Council Regulation 4056/86) was repealed in 2006, following a 2002 OECD report that showed that there was no justification for continuing to allow liner conferences (OECD, 2002).

In various jurisdictions, *block exemptions for conferences* have been replaced by *block exemptions for alliances*. The rationale for these is not so much a perceived market failure (as was the case for the block exemption for conferences) but a desire to facilitate alliances - as they would allow for economies of scale - and to reduce administrative burdens for the industry (by avoiding the need for case-by-case assessments). The model for this institutional arrangement is the EU Block Exemption exclusively covering consortia and other types of operational cooperation agreements. This consortia block exemption has been in force since 1995 – in parallel with the EU Block Exemption for liner conferences – but gained more strategic importance for carriers after the block exemption for conferences was repealed. This repeal resulted in a revision of the consortia block exemption in ways that made it more favourable to liner shipping – as shown below in the section on the EU Block Exemption Regulation. The regulatory framework adopted in the EU was used by other jurisdictions as a benchmark when adopting block exemption regimes for shipping agreements. This was particularly the case for the exemption regimes adopted in Israel and Hong Kong (OECD, 2012; Hong Kong Competition Commission, 2017).

The most recent move to reduce the extent of competition exemptions for the shipping sector was adopted in late 2017 in New Zealand. Shipping agreements will become fully subject to the general antitrust rules in New Zealand in August 2019, with the exception of vessel sharing agreements, which will continue to benefit from a block exemption regime.

Block exemptions for liner shipping alliances: the case of the EU

EU regulation provides for an exemption regime for certain categories of cooperation agreements, notably consortia agreements (EC, 2009a). The latter are defined as agreements whose objective is to promote or establish cooperation in the joint operation of maritime transport services between liner shipping companies, for the purpose of rationalising their operations by means of technical, operational or commercial arrangements. In the regulation, consortium agreements are considered to contribute positively to the overall productivity and quality of maritime transport services. Although the regulation is called consortia regulation, it also covers global alliances.

In practical terms, the regulation allows shipping companies to conclude cooperation agreements for the joint operation of liner shipping services such as sharing of vessels or other shipping equipment, and cooperation related to space and slots on vessels. The exemption gives room for capacity adjustments due to market fluctuations and for joint operation or use of port terminals and services, as well as the services connected to the infrastructure (Werner, 2016). The Regulation also allows for the conclusion of agreements on ancillary activities. The block exemption does not cover agreements related to price fixing, capacity limitation (other than capacity adjustments in response to temporary fluctuations in supply and demand that are allowed) and market or customer allocation. Nor does it cover exchange of any commercially sensitive information. Agreements on these items would fall in the category of hardcore restrictions on competition and cannot be declared pro-competitive in the EU. EU consortia regulation subjects exemption to two cumulative conditions: (i) the combined market share of all consortium members should not exceed 30% and (ii) there should be a right to withdraw from the agreement. The EU's general guidelines on horizontal cooperation between undertakings remain applicable in all cases not covered by the block exemption regulation for consortia.

A block exemption could be considered as a categorical “free pass”: as long as the alliance has certain characteristics, the block exemption provides the guarantee that cooperation in these alliances is allowed. This is different from individual exemptions that require filing by the relevant companies and approval from the relevant authorities. As such, block exemptions are – in theory – considered to provide legal certainty, thus taking away transaction costs. E.g. the EU Block Exemption regulation provides that liner shipping alliances with a market share below 30% and a withdrawal clause are automatically deemed to meet four cumulative criteria of paragraph 3 of article 101 Treaty on the Functioning of the European Union (TFEU) that make exemptions from antitrust law possible. Firstly, it should contribute to improving the production or distribution of goods or to promoting technical or economic progress. Secondly, it should also allow consumers a fair share of the resulting benefit. Thirdly, the agreement should not impose on the undertakings concerned restrictions that are not indispensable. Finally, it should not allow the complete elimination of competition in respect to a substantial part of the relevant market. Without block exemption regulation, shipping alliances might still have been exempted from antitrust rules in the EU. Nevertheless, in that case companies would have to conduct in-depth assessment for each of their agreements and there would be less certainty that these are effectively immune from antitrust-related investigations.

The EU consortia block exemption has existed since 1995, but underwent considerable revision in 2009.¹² The revised consortia block exemption (Commission Regulation No.906/2009) came into force the 26th April 2010, it applied until 25th April 2015, and was extended in 2014. The exemption regime put in place by the extension will remain applicable until 25th April 2020, unless extended by the Commission. The 2009 regulation takes into account the repeal of the EU Block Exemption of conferences, agreed to in 2006. In addition, it defines the relevant market share ceiling as 30% instead of the 35% share for non-conference consortia in the earlier regulation. Apart from these elements, the 2009 regulation provides considerably more leeway to consortia than the previous regulation, in particular on the following elements (Table 7):

- **Joint capacity adjustments.** In the revised regulation, consortia have more freedom to make joint capacity adjustments. In the 1995 regulation, joint capacity planning is only allowed in

case of temporary capacity adjustments; in the 2009 regulation this has changed into “capacity adjustments in response to fluctuations in supply and demand”, which potentially provides for a much broader application. Moreover, the 1995 exemption regulation that prohibits consortia to jointly arrange the non-utilisation of existing capacity no longer applies in the 2009 regulation. It should be noted that these provisions give the room allowed for capacity adjustments which do not constitute capacity limitation under “hardcore restrictions” of Article 4 of the TFEU. However, the wording of Article 3 (2) on joint capacity adjustments in the current EU consortia block exemption regulation has been qualified as “opaque” and “legally uncertain”, because of unclarity on where the exemption of Article 3 (2) ends and where the prohibition of capacity restrains in accordance with Article 4 (2) starts (Werner, 2016).

- **Price discrimination.** The 1995 regulation stipulates that consortia and consortia members shall not cause detriment to ports, users or carriers by applying different rates and conditions according to the country of origin or destination or port of loading or discharge, unless such rates or conditions can be economically justified. Such a section is absent from the 2009 regulation.
- **Obligation to consult transport users.** The 1995 regulation stipulates that there be real and effective consultations between transport users (or their representative organisations) and the consortia, for the purpose of seeking solutions on all important matters concerning “conditions and quality of scheduled maritime transport services offered by the consortium or its members”. These consultations shall take place whenever requested by one of the parties. The regulation sets out the procedure of these consultations and also gives the Commission the right to request consortia members to demonstrate that conditions and obligations in the regulation are still met. Such an obligation is absent from the 2009 regulation. According to EC (2008) such consultations did not take place as shippers contacted individual members of a consortium directly.
- **Possibility of withdrawal of the exemption.** The 1995 regulation mentions the possibility of withdrawal of the block exemption in case of ineffective competition and insufficient consultations with transport users. Such a possibility of withdrawal in individual cases of non-compliance is absent from the 2009 regulation, but is covered by other EU rules, in particular Article. 29 of the EU Framework legislation related to competition law.¹³

Table 7. EU consortia block exemption regulation: 1995 and 2009 version

Characteristics	1995 regulation	2009 regulation
Applied:	1995-2010	2010-2020
Maximum market share	30% for consortia in conference 35% for non-conference consortia	30%
Joint capacity planning allowed for:	“temporary capacity adjustments” Joint arrangements of non-utilisation of existing capacity are excluded	“capacity adjustments in response to fluctuations in supply and demand”
Other conditions for consortia/liners	Not “cause detriment to certain ports, users or carriers by applying to the carriage of the same goods (...), rates and conditions which differ according to country of origin or destination or port of loading or discharge (...)”	No other conditions
Obligations for consortia	To conduct real and effective consultations between transport users (or their representatives) and consortia.	No explicit obligations

Source: Author’s elaborations based on EC (1995, 2000, 2005, 2009, 2014)

Block exemptions in other countries are similar to the EU consortia block exemption, with some minor differences. In the Hong Kong regulation, in place for 2017-21, the combined market share shall not exceed 40%, whereas 30% is applicable in the EU. In the New Zealand scheme, that will become operational in 2019, only the offshore activities of liner shipping companies are covered by the block exemption.

Block exemptions of alliances: are these still justified?

A key question is whether block exemptions of liner shipping alliances are still justified. In at least two cases – the EU and Hong Kong – the block exemption could be considered as a transitional measure that facilitates the removal of exemptions for conferences, rather than necessarily constituting new permanent features of the regulatory regime. These two block exemptions include a sunset clause that makes it possible to reassess the usefulness of the exemption. For example, the European Commission will start a public consultation in 2018 on whether the consortia block exemption regulation should be extended after April 2020. Such extensions have occurred in the past: the 2014 extension was granted on the basis that the original justification for the block exemption was still valid and that the conditions on which that 2009 regulation was based had not substantially changed. Considering the substantial changes in the alliance system that have occurred since that time, the evidence of the adverse impacts of alliances on the transport system and the considerable changes in the container shipping industry, illustrated in earlier chapters, the continued validity of these arguments can be questioned.

Block exemptions for alliances require certain crucial conditions to justify them. Within the European Union (EU) as well as other jurisdictions such as Hong Kong and Turkey, cooperation agreements amongst competitors can be exempt from the relevant antitrust rules when they provide for sufficient efficiency gains. The specific EU requirements were cited above. Similar provisions apply in Hong Kong.

The four conditions that justify a block exemption in the EU have been extensively discussed in Chapter 2, which concludes that there is no convincing evidence that these four cumulative conditions are still met. Although alliances were initially a key enabler of economies of scale, consolidation in the industry suggests that this is no longer a major factor. Thus, the size of any efficiency gains has become questionable while, at the same time, the exemptions have facilitated a business model – based on ever larger ships – that has yielded offsetting efficiency costs, by enabling overcapacity, reducing the number of destinations and limiting actual and potential service differentiation. Thus, while the official freight rates have halved over the last two decades, suggesting significant efficiency gains, other price increases, which include various surcharges by carriers, such as for demurrage and detention, have partly offset these gains. The deterioration of service quality, encompassed in lower frequencies, less direct port connections and lack of service differentiation, has yielded further costs.

The increased bargaining power of carriers in alliances has put pressure on rates for ports and port service providers. Moreover, the evolution of the alliances has resulted in a model where the terminal or service operators that manage to get the alliance calls are frequently overutilised, while others that do not get these calls are underutilised. Alliances have also been accompanied by vertical integration of carriers with terminals: Chapter 2 showed that the market share of carriers in global terminal operations increased from 18% in 2001 to 38% in 2017. Such vertical integration could increase risks to supply chain resilience: for example, the NotPetya cyber-attack affected not only the carrier's ship movements but also its terminal operations in a wide variety of ports (Box 7).

Many of the negative impacts of alliances have emerged since the 2009 revision of the EU consortia block exemption regulation, which provided carriers with fewer restrictions than the previous consortia block exemptions. As a result, the block exemption enabled carriers to order mega-ships in the reasonable expectation that their alliance members would also contribute to the efficient capacity utilisation of such mega ships and achieve a reasonable return on their investment. In addition, carriers were allowed to engage in mega-ship orders without consulting transport users on the consequences, play off ports against each other and do so knowing that the exemption would not be withdrawn until at least 2020. It is likely that several of the negative developments in the industry described in Chapters 2 and 3, such as declining returns on public port investments and reductions in service frequencies and numbers of port calls, would have been less severe if, instead of the 2009 regulation, the previous consortia block exemption had remained in place.

One of the arguments used in favour of a block exemption regulation is that it provides greater legal certainty for carriers engaging in alliances, and possibly lowers compliance costs for business. However, these compliance costs might actually be fairly limited in practice. Moreover, the shipping sector would not be confronted with a legal vacuum if consortia block exemptions were repealed (Box 16).

Box 16. Legal certainty and block exemptions

The liner shipping industry fears that repealing the block exemption will introduce legal uncertainty, resulting in higher compliance costs. The block exemption provides the liner industry with more certainty on what collaborative practices are allowed and repealing the exemption would reduce some of this certainty (WSC et al., 2018). Repeal of the block exemption would mean that carriers engaging in collaboration would need to conduct a self-assessment on how their collaboration fits in with generic competition law. Depending on country and legal system, carriers could submit notification or seek clearance from the regulator for the collaboration proposed. In the EU, repeal of the block exemption would mean that carriers would need to self-assess their alliance agreements under the Commission's Horizontal Guidelines (Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements).

It is sometimes argued that other transport stakeholders might also feel more secure in a regulatory environment in which the possibilities of market abuse are specifically constrained, like in a block exemption. Many shippers, ports, terminal operators or other stakeholders perceive themselves to be in an unfavourable position to complain about treatment by carriers, considering their market power: carriers have huge leverage over these actors via their decisions where to call and which cargo to accept. A regular review of a block exemption could – at least in theory – correct abuse of market power via intervention of representative organisations in consultation processes, whereas individual firms would be very reluctant to file a complaint in individual cases. However, the increase in compliance costs might be fairly marginal. A regulatory impact statement of new competition regulation of international shipping in New Zealand estimated that the increase of compliance costs in case of a full repeal of block exemptions for liner shipping would be in the order of NZD 1-4 million, based on 30 known agreements between liner companies that relate to New Zealand. In the case of larger markets, such as the EU, there might be more agreements, so the compliance costs might be higher, but this might also incentivise carriers to streamline their various agreements into fewer but more comprehensive agreements.

If higher compliance costs resulted in fewer or less dominant alliances, this might actually be desirable from the perspective of maritime logistics chain performance. Since the EU consortia block exemption regulation amendment in 2009 regulation brought little benefit to transport users, one question whether the sanction of not extending the exemption is an effective incentive for improving performance of the maritime logistics chain. It should also be noted that some alliances are already in a position where they are supposed to conduct self-assessments. The EU Block Exemption applies to alliances that remain below the relevant market share of 30%; alliances need to conduct self-assessments in case they exceed this ceiling. Both 2M and Ocean Alliance exceed that threshold for certain relevant markets, so could already be expected to conduct self-assessments.

Moreover, repeal of the consortia block exemption does not create a legal vacuum. In the case of the EU, there are guidelines on horizontal co-operation agreements (the Horizontal Guidelines). Industry associations have indicated that these Horizontal Guidelines might not be perfectly applicable to the liner-shipping sector (WSC et al. 2018). Within that context, the Commission could consider providing temporary guidelines for the application of the Horizontal Guidelines to liner shipping, similar to the temporary guidelines put in place after the repeal of the block exemption for liner conferences. Such Guidelines could focus on the need for alliances to ensure the transfer of a fair share of the benefits from their operations to the consumers and downstream supply chain operators in accordance with the requirements of Article 101 (3) TFEU and thus satisfactorily deal with the concerns identified in the previous chapters.

Applying the generic antitrust rules could result in lower risks of anti-competitive conduct and higher probabilities of customers getting a fair share of any cost savings arising from alliances. Even without sector-specific rules, shipping companies can still have collaboration arrangements. However, these would be placed under greater scrutiny with regard to their effects on competition, productivity

and consumer welfare. For this reason the New Zealand Ministry of Business, Innovation and Employment considered applying full application of generic antitrust rules a more effective policy than a targeted block exemption for alliances (Box 17).

Box 17. The case of New Zealand

The New Zealand government reformed its competition treatment of the shipping sector in 2017. During the development of the new legal regime, several options were considered, most notably the full application of the general antitrust law and the introduction of a targeted block exemption for operational collaborations. The initial text of the relevant Bill provided for the full applicability of the generic antitrust rules to maritime transport services, on the recommendation of the Ministry of Business, Innovation and Employment. The rationale for this proposed change was that the full application of antitrust rules would increase the scrutiny over agreements between shipping companies. It was assumed that more agreements would have to be reviewed by the Commerce Commission under the formal authorisation procedure, which would ensure that only those agreements that yielded genuine pro-competitive effects would be implemented. The Ministry believed that this would help to ensure that customers also benefited from the efficiencies generated by collaboration. Conversely, it was not expected that the full removal of the antitrust immunity would substantially hinder cooperation between shipping companies. For these reasons, the Ministry of Business, Innovation and Employment recommended full application of the general antitrust law.

This proposal was amended after concerns were expressed by shipping companies and shippers. Their main concerns included the supposed administrative costs of filing for authorisation at the Commerce Commission and compliance costs that were expected to be higher without a specific exemption specifying the types of collaborative activities that would be allowed. While the government did amend the original proposal to take account of these concerns, it nevertheless indicated an expectation that a result would be a reduction in the incentives for shipping companies to pass on the cost-savings achieved to customers. It also considered that some of the exempted agreements might have anti-competitive effects, due to specific circumstances of the relevant market, so that the block exemption could negatively affect the potential for ensuring competitive markets and enhanced productivity. In light of these concerns, the government chose to retain limited antitrust immunity for shipping companies for only a brief period, which will end on 17 August 2019. After that time the generic antitrust rules will apply to all activities in the shipping sector, with the exception of operational and vessel sharing agreements, which will continue to be subject to a block exemption.

Given the widespread phasing out of block exemptions for other sectors internationally, there must be a strong presumption in favour of adopting a similar approach in relation to liner shipping. In the EU, in contrast to shipping alliances, airline alliances are subject to generic antitrust rules, and this does not seem to impede their creation and effective implementation (Box 18). In a letter to the New Zealand Productivity Commission, the European Commission argued that the liner industry does not differ from other transport industries with high fixed costs and fixed schedules. The European Commission's guidelines in application of Article 101 TFEU to the tramp shipping sector have been superseded by general, non-specific guidelines as of 26 September 2013 (Werner, 2016). Given the EC's recent decision not to extend the block exemption for the insurance sector, liner shipping is the only sector in Europe that still has a block exemption. In addition to being consistent with the general direction of change in EU competition law, repealing sector-specific exemptions is in line with OECD recommendations to restrict exemptions from competition as much as possible, e.g. as expressed in the OECD Council Recommendation on Competition Policy and Exempted or Regulated Sectors (OECD, 1979).

Over the last decades, the EU has acted to remove the sectoral exemption from competition policy long enjoyed by liner conferences, but the remaining block exemptions for alliances have enabled a rapid evolution of these arrangements and the industry has, as a result, recently reached a position of high concentration when assessed on key measures. One could wonder if there are still welfare benefits from maintaining block exemptions.

Box 18. Regulatory framework applicable to airline alliances

In a report on competition policy in liner shipping, the OECD questioned the existence of specificities in the maritime transport sector that require special treatment under competition law (OECD, 2002). Several transport industries have similar cost structures and returns on investment to those in maritime shipping. Airlines also operate with high fixed costs and fixed schedules. Air carriers often enter into cooperative arrangements that are very similar to those in the maritime transport sector. In fact, alliances of international airlines are particularly common, especially in the international transport. Cooperation among members of the three biggest airline alliances, Star Alliance, SkyTeam, and Oneworld, ranges from sharing sales offices, maintenance and operations facilities to code-sharing agreements. Countries regulate airline alliances in different ways. The OECD (2014b) distinguishes between an immunity regime, merger control, and cartel enforcement. The United States has an immunity regime in place to assess potential code-sharing agreements. The Office of International Aviation of the Department of Transportation (DoT) is responsible for processing all airline applications for antitrust immunity. The DoT determines whether granting such immunity could substantially reduce or eliminate competition. If this could indeed be the case, then the DoT determines whether there could be sufficient public benefit of granting immunity. If that is the case, the DoT has the authority to exempt the airlines in the proposed agreement from antitrust law.

In the EU, some agreements between airlines were subject to a block exemption regulation¹⁴ until 2007. These are no longer in force. In 2009, the Council of the European Union adopted a regulation that empowers the European Commission to adopt exemption regimes for air carriers in respect of, amongst other things, agreements on joint capacity planning and consultation on tariffs (EC, 2009b). As the Commission has so far not adopted such block exemption regulation, the air transport sector is currently fully subject to the generic antitrust rules. In practical terms, air carriers can establish alliances without notification to the Commission unless they constitute a concentration and therefore fall within EU merger control rules (EC, 2004). If an airline alliance has the potential to infringe EU antitrust rules, the Commission might open an *ex officio* investigation regarding the agreement and eventually impose fines or accept commitments from the concerned undertakings.¹⁵

Co-existence of different regulatory regimes

As noted above, there is a wide range of regulatory regimes for competition in international shipping. These approaches range from no shipping-specific exemptions on one end of the scale to specific exemptions for shipping conferences at the other. Despite this divergence in approaches, it is clear that repeal of the EU consortia block exemption would be in line with a growing trend in countries to limit special treatment of shipping.

There is a risk that the current regulatory heterogeneity will leave the door open to collusion. Braakman (2017) has suggested that there might be “hub-and-spoke cartels” in the container shipping industry, defined as the exchange of strategically sensitive information between competitors through a third party that facilitates the cartelistic behaviour of the competitors involved. An example of such a hub could be Singapore, where carriers are allowed to cooperate on prices. The idea is that exchange of strategically sensitive information on the intra-Asia leg of a voyage could aim to align the market conduct of lines with regards to the contingents of cargo that remain on board and are destined for ports in Europe. Such a hub-and-spoke-cartel might be facilitated by the Shanghai Shipping Exchange that on a weekly basis publishes the freight rates and surcharges in which the rates and surcharges for the intra-Asia trade are incorporated and that could have the effect of policing the agreed rates and surcharges.

Competition law in various countries has extra-territorial application, but one could wonder if this currently is enforced. Extra-territorial application means that anti-competitive conduct directed at foreign markets – e.g. markets outside the EU – may come within the jurisdiction of the European Commission, even when the conduct would be permitted under the foreign jurisdictions. What is relevant is the effect of that conduct on other undertakings inside the EU; not the location of that conduct (Braakman, 2014). The EU leaves it to firms to conduct a self-assessment of the extraterritorial application of its competition laws, but has not formulated specific guidelines for this

self-assessment. Considering the global nature of the liner shipping sector and the heterogeneity of competition regimes for shipping, one wonders how shipping companies could carry out such a self-assessment. The sector would be provided with more legal certainty if such specific guidance were provided.

The main relevant competition authorities have initiated coordination of their activities that might help to address these issues. Regulators from the EU, United States and China have met several times since 2013, spurred by their divergent approaches to the proposed P3 alliance, to discuss market developments and competition law. Such coordination has become increasingly important with consolidation and market concentration, and might benefit from the participation of regulators from other major maritime countries such as Singapore.

Asymmetry of treatment of shipping and ports

One of the main concerns regarding strategic alliances in liner shipping is the bargaining power the members collectively acquire vis-à-vis ports. This leverage over ports makes it possible for alliances to pressure ports to decrease rates or invest in infrastructure provided free at the point of use. This dynamic seems to explain, at least in part, the observed pressures on returns on investment in ports and related services, such as terminal operations and towage (see Drewry, 2017).

The asymmetry between liner shipping and container ports is increased by public policies that provide specific competition treatment for the shipping sector, but not for the port sector. This asymmetry goes beyond the different treatment of liner shipping and ports in competition law in many countries, and extends to the domain of subsidies, taxation, labour requirements and social security contributions, where liner shipping is often exempted, but not the ports sector. Key examples are:

- Subsidies; liner shipping benefits from a variety of subsidies (such as for shipbuilding, short sea shipping, green shipping) that considerably lower their costs and increase their net profitability. In some cases ports are also subsidised, but the effects of these are mostly beneficial to shipping companies as it decreases their costs.
- Favourable tax treatment; shipping companies in many countries are exempted from paying corporate taxes, but instead pay tonnage taxes, which are tax schemes linked to the company's fleet capacity and always considerably more favourable for shipping firms than a regular corporate tax would have been. Ports are exempted from taxes only if they form part of public administrations, which is less and less the case. Terminal operators are generally not exempt from any tax.
- Labour requirements; shipping companies employ a large share of foreign labour and are generally not bound by national labour legislation, as a large share of their ships fly the flags of open registries (flags of convenience). Domestic ship registries frequently have requirements to employ domestic seafarers, but these required shares are usually limited. Ports and terminals use local labour and are constrained by the relevant local and national labour regulations.
- Social security contributions; various countries exempt their shipping companies from the payment of social security contributions, so that they can be more competitive. Ports and terminals are not exempted from such social contributions.

Moving toward more equal treatment of the two sectors in these policy dimensions would be one way to tackle the asymmetric power relationship between liner shipping and ports.

Another way to re-balance the relationship between carriers and ports would be increased cooperation between ports. In order to cope with simultaneous overutilisation of one terminal and underutilisation of another terminal commonly caused by alliances exercising a preference to locate all their port visits at a single terminal, more cooperation between terminals could be enabled by governments. The section below describes potential means of cooperation and the way regulation constrains or facilitates this.

Coordination between ports

Collaboration between ports can be seen as a direct and necessary response to the increased operational cooperation between shipping companies. Port cooperation could, similar to cooperation between shipping companies, theoretically range from cooperation on technical and operational issues to coordination of capacity and prices. In various other parts of the world, strong cooperation between major ports is emerging. For example, in the United States the ports of Seattle and Tacoma formed strategic alliances aimed at intense operational cooperation and joint planning of port capacity, in reaction to shipping alliances (Box 19). In addition to achieving efficiencies, cooperation between ports could allow for economies of scope as they might be operating on different markets with different customers and it could also galvanise inter-port competition. For example, the recently formed alliance between the ports of Savannah and Norfolk could strengthen the position of the two ports *vis-à-vis* the port of New York and New Jersey, currently the largest port in the United States East Coast in terms of container traffic. In other words, strategic alliances with rival ports can help ports to guarantee market share and profit. Cooperating rather than competing with nearby regional ports can also have advantages, as port capacity can be constrained by geography and neighbouring ports could serve as overflow modes (Asgari et al., 2013).

Alliances between ports are relatively rare, but emerging. Most of the cooperation between ports does not go beyond the exchange of good practices or joint marketing. In Europe, the dominant idea – also pushed by successive EU port package proposals – seems to be a concern about perceived lack of competition in and between ports, rather than a lack of coordination and cooperation between ports. This focus on port competition coupled with over-investment in terminal capacity, in combination with carrier concentration and alliances, has resulted in considerable waste of public spending in European ports (ECA, 2016).

Box 19. The Northwest Seaport Alliance

In 2015, the ports of Seattle and Tacoma (Washington, U.S.) formed the Northwest Seaport Alliance strategic partnership agreement, the first of its type in the U.S., the Alliance enables the two ports to cooperate in the management of their marine cargo terminals, especially with regard to investments, operations, planning and marketing. This cooperation is facilitated through the creation of a common Port Development Authority that effectively allows operating certain marine facilities jointly, mostly related to handling containers and breakbulk cargo. The creation of the Alliance was presented as direct response to the changes in the shipping industry (Port of Tacoma, 2015). There is an increased competition from expanding ports to improve efficiencies and lower costs. Moreover, the consolidation in shipping lines, through mergers and alliances, leads to fewer port calls, thereby increasing the competitive pressure. The two ports also emphasised the need for strategic coordination in capacity-related investments, particularly in response to the greater use of ever larger vessels. In these circumstances, the Alliance is seen as a means to expand handling capabilities and protect market share while adopting a sustainable financial business model. In August 2016, the Alliance issued an open letter disclosing the main achievements for the first year of cooperation between the two ports (NW Seaport Alliance, 2016). The letter brought attention to the recovery of cargo volumes and the first planned joint investment for handling very large vessels. One year after launching the Alliance, the overall growth of cargo volume was 2.4%; full imports increased by 6% and full exports by 13%. The increase of cargo volume continued throughout 2017 with a rise of 4.1%. While this increase in cargo volume can partly be explained by the overall burgeoning United States economy, it also shows the improved capability of the Alliance in maintaining and attracting customers.

Mergers between ports do not take place very often either. Whereas smaller ports have over time more easily integrated in larger ports, the last decade has also seen mergers of large ports, e.g. in various Australian ports, in China (Ningbo-Zhushan) and in Japan, where the Keihin port was created as a result of the amalgamation of the ports of Yokohama, Tokyo and Kawasaki. This trend reflects the fact that larger than ever ships and the greatly increased bargaining power of carrier alliances have posed challenges to ports in terms of critical size needed in order to accommodate mega-ship calls, which includes ensuring adequate hinterland transport infrastructure is present. There is also an increasingly clear imperative to avoid duplication in building up port and hinterland infrastructure.

Mergers could help to build critical size and avoid duplication in port and hinterland infrastructure. Port mergers are often stimulated by national governments, which directly bear a large part of the costs of duplicating infrastructures in many cases, as they are frequently called upon to fund the necessary infrastructure investment. A recent example of port mergers stimulated by a national government is Italy (Box 20). Port mergers could provide a way for national governments to concentrate their port and hinterland infrastructure investments in fewer ports.

Box 20. Port reform in Italy: In search of economies of scale

In August 2016, the Italian cabinet gave the green light to the “Ports Decree” establishing the “reorganisation, rationalisation and simplification of Port Authorities”. This decree includes mainly the abolition of local port authorities, creating Port System Authorities (PSAs) based in Italian “core” ports as set out by the EU TEN-T policy, grouping together 57 ports of national importance. See Annex 4 for the 15 new PSAs and the ports they cover.

The decree also foresees administrative reorganisation and bureaucratic simplification. For example, the respective authorities’ presidents are no longer appointed in consultation between local municipalities and Chambers of Commerce, and with the opinion of the regional authorities, but are now chosen directly by the Italian Ministry of Infrastructure and Transport in agreement with the President or the Presidents of the affected Regions. Each PSA is now also fitted with a national coordination board in order to guarantee that local decisions are consistent with the national ports strategy.

The background of this reform were inefficiencies and fragmentation of the Italian port system, redundancies and function overlap, a lack of overarching strategic planning, neglected land-side development, instability and frequent conflicts of interest in local port governance, and a fierce climate of competition between Italian ports, broadly resulting in a waste of resources, as highlighted in a 2015 ITF discussion paper (Ferrari et al., 2015). Further, the average size of Italian port authorities – mainly in comparison with other European competitors – did not seem fit to attract major investments or to exploit potential economies of scale. With the increase of average ship size and higher volumes per call, terminal size became crucial in order to be able to compete internationally. Other shifts, such as vertical and horizontal integration, as well as new North African competitors also exposed Italian ports to a variety of new challenges that were difficult to meet in a context of institutional rigidity and slow decision-making. In addition, the centralised financial resources allocation process did not reward efficiency and made port projects less attractive for private investors.

Overall, the Italian port reform has helped to decrease the fragmentation of the Italian port system, increasing the focus on links with hinterland and dry ports (interporti), especially rail connections (see Box 22), and has been implemented with a view to award efficient projects instead of dividing the budget country-wide among all authorities. As such, the reform also provided for a better integration of Italian ports within the European TEN-T network. Nevertheless, some doubts remain regarding the long-term effectiveness of the reform. While the reform aimed at avoiding problematic inter-port competition, some ports that compete within a close geographical space have not been integrated into a single PSA, e.g. the ports of Ravenna, Venice and Trieste.

Source: Ferrari et al. (2015); Italian Ministry of Infrastructures and Transport (2018).

Cooperation between terminals

Cooperation between adjacent terminals could both help increase the utilisation of port assets and reduce waiting time for shipping companies, thus benefiting both parties. Alliances have increased the phenomenon of peaks and troughs in terminals: they bring call sizes to terminals that need large amounts of equipment, and labour and space that is not needed at many other moments in the week. As these peaks occur rarely at the same time among different terminals in a port, terminals might benefit from asset sharing arrangements, in which terminals could use equipment, labour and space from an adjacent terminal when they are confronted with peak loads. Such cooperation could particularly make sense for adjacent terminals and could be achieved by “taking away the fence” between the two terminals, which could allow for sharing of berth space, when needed. Some terminals already apply such cooperation on equipment, but there are still large potential savings to be

made. Simulation for the Hong Kong port shows that collaboration and facility sharing among terminal operators could reduce inter-terminal transfers – necessary because of alliances - by 49%, bring down waiting times and reduce negative environmental impacts (Wong et al., 2018).

Cooperation could also make sense for terminals that are not located immediately next to each other. Sharing equipment for peak loads is not an ideal option as the costs to move equipment could outweigh cost savings. These terminals could still cooperate on back-up space, labour and overflow functions. Many countries have a labour pool system that makes it possible to share dock labour forces according to needs in terminals. Terminals could also have overflow functions for each other in case of peak loads from alliances and mega-ships.

Mega-ships and alliances might make it necessary to merge certain port terminals. Ever larger ships require larger terminals, with quay lines that are long enough and have a big enough yard space. Various ports have a large number of carrier-dominated terminals. With intensification of alliances, these ports have multiple terminals served by the same alliance, which leads to many unproductive inter-terminal moves. In such cases, it could make sense to merge terminals or start discussions on coordination of terminal activities, as currently initiated by the port authority of Los Angeles, who considers that it has the convening power to bring together its terminal to explore collaboration between the terminals in the port.

At the macro-level, there also seems to be increasing collaboration between terminal operators. A growing amount of container terminals are operated as a joint venture between different actors, often between terminal operators, between terminal operators and carriers, or other combinations. OECD/ITF (2015), shows that the largest number of joint venture terminals are between Cosco and Hutchison, and between APMT and Bolloré. Such joint ventures might create trust and goodwill for a broader cooperation. It should be noted that PSA has participation in Hutchison and that Terminal Link is a terminal joint venture of CMA CGM and China Merchants Holdings.

Antitrust regulation remains essential to competitive markets in container terminal services but competition policy towards terminal ownership and collaboration needs to keep abreast of the geographic scale of port hinterlands as they grow with increasing ship size.

Regulations of alliances of ports and terminals

Some countries, such as the US, allow wide-ranging port and terminal cooperation, including on capacity and pricing. Marine terminal operators in the United States can benefit from sector-specific antitrust exemptions similar to those for shipping companies after filing their agreement with the Federal Maritime Commission (FMC). The Shipping Act of 1984 allows marine terminal operators (MTOs) to enter into an agreement for discussing, fixing or regulating rates or other conditions of service. Nevertheless, concerted actions between MTOs such as discrimination in the provision of terminal services to shipping companies are prohibited. The FMC remains competent to challenge each port's agreement, even if it is already in effect, if it results in unreasonable reduction in transportation service or an unreasonable increase in transportation cost. Moreover, all amendments to existing agreements require refiling with the FMC. Currently, there are twelve agreements between MTOs providing for rate fixing that are filed with the FMC. The geographical scope of the agreements varies from terminals located in a single port - for example, the New York Terminal Conference (NYTC) Agreement - to all ports within one or several federated states, for example, the West Coast MTO Agreement. Most of the agreements explicitly provide for an indefinite effective period. The most recent agreement allowing rate fixing is the Tacoma Marine Terminal Operator Conference Agreement between Washington United Terminals and Husky Terminal and Stevedoring. Such antitrust exemptions for ports and terminals do not exist in the EU.

Cooperation between terminals in some countries is complicated by regulations aimed at promoting competition between terminal operators. In Chile, if a consortium owns more than 15% of a port terminal, the group or its branches are not allowed to own directly or indirectly more than 15%

of another concessionaire of a terminal in a public port of the same region. This also applies to a business group owning more than 15% of the shares of a *private* port. If these conditions are not respected, port authorities have the power to end a concession (OECD/ITF, 2016a). Some countries or ports prohibit incumbent operators from bidding for new concessions in the port, sometimes even in a competitor port. For example, the port of Sydney barred the incumbent operators Patrick Stevedores and DP World from bidding for the third container terminal. In Chile, the concession framework prohibited the incumbent container terminal in Valparaíso, a joint venture led by the Chilean port operator Ultramar, to bid for the second container in Valparaíso and in San Antonio, considered competitor port to Valparaíso. Ongoing practice of many large ports in the EU appears to be favourable towards new operators during bidding procedures for new terminals.

Regulation of vertical integration

Vertical integration is generally subject to merger control rules. In general, the acquisition of controlling stakes in other parts of the transport chain should thus be notified to the competent National Competition Authority (NCA), which will evaluate whether there are any possible antitrust concerns with the transaction (Box 21). In addition to this *ex-ante* control of vertical integration, NCAs can also intervene *ex-post* if abusive conduct occurs. For example, in the EU, companies with a dominant position cannot, without justification, refuse access to infrastructure essential for operating in a given market. In such a case, NCAs can oblige the company to grant access to the facility (Braakman, 2015a). Finally, NCAs can intervene in the port privatisation process and recommend the exclusion of vertical integration strategies. This was the case during the privatisation of the Ports of Izmir and Mersin when the Turkish Competition Authority recommended successfully that the operating rights should not be transferred to liner transport services companies (OECD, 2011). Some countries have specific regulations to limit vertical integration in ports. For example, Chile's 1997 Port Law stipulates that port users cannot own more than 40% of the shares in the corresponding concessionaire (OECD/ITF, 2016). Some countries have mechanisms for screening foreign investments in ports, which might hinder the acquisition of controlling stakes by foreign shipping companies in domestic ports (Box 22).

Box 21. Merger control rules in case of carrier acquisition of terminals; two recent examples

One recent example is the acquisition of sole control by Cosco Group in the Port of Piraeus. In 2016, the Hellenic Competition Commission (HCC) cleared the transaction subject to two conditions: the withdrawal of exclusivity terms in the provision of port services, and the freezing of some ports tariffs until 31.12.2017. It is noteworthy that the HCC did not express concerns about the vertical integration. It was emphasized that risks of restricted access to ports services were mitigated by the low importance of stevedoring costs in the overall shipping costs and the volatility in cooperation arrangements in the sector (Kyriakides Georgopoulos, 2017). More recently, the acquisition of controlling shares by Cosco in the Noatum Ports in Spain was cleared without conditions by the Spanish Competition Authority (CNMC, 2017).

Box 22. Cosco and the Orient Overseas Container Line terminal in Long Beach

The merger of Cosco and Orient Overseas Container Line (OOCL) is subject to regulatory approval from competition authorities in various countries. The merger has also undergone a review by the Committee on Foreign Investment in the United States (CFIUS), an inter-agency committee of the United States Government that reviews the national security implications of foreign investments in United States companies or operations. In a context of tense relations with China, CFIUS has recently blocked take-overs such as the sale of MoneyGram International Inc. to the Chinese Ant Financial Services Group. The take-over of OOCL would make Cosco the second-biggest mover of United States imports with an 11.8% market share. In July 2018, CFIUS stated that there were no “unresolved national security issues” with regards to Cosco’s plan to take over the Hong Kong-based carrier, under the condition that the parties were to sell off the container terminal in Long Beach. Cosco and OOCL reached a national security agreement with the United States Department of Homeland Security and Justice to sell all entities that directly or indirectly operate the Long Beach Container Terminal business to an unrelated third party. Pending the sale, the ownership of LBCT is to be transferred to a United States trust, under which OOCL is the beneficiary and of which the principal trustee will not be a shareholder of OOCL (Baker, 2018c).

Ports policies

Although not all countries have explicit port policies, governments generally make either implicit or explicit policy choices that determine how the national ports system is adapted to developments in shipping and trade. Containerised maritime trade has been characterised over the last decades by a continuous quest for economies of scale that has translated into ever larger ships, industry consolidation and alliances. Many countries are attempting to find appropriate adaptations to these developments, acknowledging the desire of national industries for well-functioning maritime logistics chains and the need for efficient public spending. These policy responses often focus on three related issues: which ports have priority (port hierarchies), which port does what (port specialisation) and which port is connected to which hinterland (hinterland connectivity).

Port hierarchies

A considerable number of countries have defined an explicit national port hierarchy. Such a hierarchy identifies ports of national importance or strategic interest and other categories of ports that are not considered of national importance. These latter ports could be of regional significance or secondary ports. OECD/ITF (2017) identifies such explicit port hierarchies in at least eleven countries, including Canada, France, Greece, India, Indonesia, Ireland, Italy, South Korea, Poland, Portugal and Spain. Other countries have not translated a port hierarchy into legislation, but still give priority to certain ports, e.g. the Dutch “mainport”-policy that has favoured the port of Rotterdam. At the EU level, a ports hierarchy is provided via the classification of ports as either “core ports” or “comprehensive ports”, as defined in the TEN-T networks.

Such port hierarchy policies can help to set priorities for public infrastructure investment. However, port hierarchies need to be sufficiently selective if they are to be effective. The number of ports of national importance is generally associated with population numbers, the concentration or dispersion of population, geography and the length of a coastline. For example, Poland with its fairly limited coastline has only three ports of national importance, whereas the archipelago state of Indonesia counts 25 strategic ports. In addition, there is also a regional political dimension, as ports are often perceived as infrastructure that can help achieve inter-regional equity. However, if the group of “strategic” ports becomes too large, there is a risk of fragmentation of the ports system and inefficient public infrastructure spending.

Countries frequently decentralise the management of the ports that are not considered to be of national importance. France enacted a port reform in 2008 in which a number of ports were decentralised to regions that could choose to take on the responsibility as port authority or shared it

with other local governments in mixed governance structures. In Canada, a port decentralisation reform that started in the 1990s resulted in the transfer of 65 ports to other federal departments, 40 ports to provincial governments, 123 ports to local interests and 239 de-proclaimed as public harbours or demolished (OECD/ITF, 2017).

The combination of alliances, mega-ships and consolidation requires more selective port hierarchies. The higher call sizes – facilitated by alliances and larger ships – can only be accommodated in larger ports that are especially equipped for the largest ships. The substantially larger investment requirements of these ports can necessarily be accommodated at relatively fewer ports.

Port specialisation

Different ships are associated with different forms of cargo handling. For example, container ships are mostly handled using specific container gantry cranes and yard equipment that cannot be used for other cargo handling operations. Similarly, there are specialised terminals for liquid bulk, dry bulk and cars. Some of the world's largest ports contain all these specialised terminals. However, in order to avoid duplication of infrastructure, most countries adopt a degree of port specialisation: ports build up specialised infrastructure, equipment and expertise in a particular cargo type and leave other cargo types that would require different infrastructure to other ports. Not all ports can be container ports and only a few can be container ports equipped to handle mega container ships.

Some countries have explicit port specialisation policies. For example, South Korea identifies the ports that are supposed to handle certain cargo categories. This has allowed Busan to become a prime global container hub port. Other countries, e.g. South Africa, have policies that attempt to direct cargo to specific ports in their system, sometimes even via decisions on port tariffs. Governments can also adopt implicit port specialisation policies via their infrastructure investments. For example, public investments in infrastructure connecting North Brazil with the grain producing regions in the centre of the country can be considered indirect policies to shift these cargo types to the north, away from the ports that traditionally handled these goods, such as Santos, Rio de Janeiro and Paranaguá (OECD/ITF, 2017).

Alliances and mega-ships have increased the need for port specialisation policies. Alliances and mega-ships arguably created a new port category: the port that is able to handle the largest container ships that are used by alliances on the main East-West trade routes. Most container ports are not able to handle these vessels, as they need large terminal areas, deep access channels, longer berths, sufficient dockworkers and enough equipment to handle the peak loads associated with mega-ships. This requires another level of port specialisation. The question is not only: who handles which cargoes, but also: who handles the mega-ships of the alliances?

Decisions on port specialisation require a balanced interplay between state and market. Governments cannot unilaterally decide which ports should handle which cargo, as market forces (carriers or shippers) ultimately decide on this. However, these market decisions are necessarily influenced by governments' public infrastructure expenditure choices. The objective for carriers is to have a sufficient number of efficient ports available at the lowest rates possible. For governments the objective is to minimise port capacity and expenditure which ensures that cargo – including that unloaded by mega-ships – is unloaded efficiently and at the lowest possible costs for taxpayers and other supply-chain participants.

Port hinterland connectivity

Port policies are increasingly focused on port hinterland connectivity. With the privatisation of port operations over the last decades, the role of the public sector in ports has been reduced to provision of basic port infrastructure, regulatory functions and the assignment of concessions or leases to private operators. Although this still provides some room for governments and public port

authorities to define some form of hierarchy and specialisation in the national ports system, the main public policy that structures the place of ports in national or supra-national port systems is the provision of hinterland corridors, such as freight railway infrastructures and other connections of ports with hinterlands.

Good hinterland connectivity cannot only attract but also “bind” alliances. The reason is that good hinterland connectivity increases the natural catchment area of the port, which makes port shifts by carriers less attractive, because it will imply additional costs. Port hinterland connectivity will likely also increase the share of gateway traffic of a port, which by definition is more difficult to displace than transshipment traffic. As such, port hinterland policies could be effective ways to adapt to consolidation and alliances in container shipping. However, there is also a risk of duplication and wasteful public spending in hinterland transport infrastructure. Selective port hierarchies could help to minimise this risk, for example with regard to infrastructure investment in southern Italy (Box 23).

Box 23. Infrastructure investment in the ports system of southern Italy

Some economic areas of Southern Italy are still peripheral in relation to national and international traffic flows and some areas located within the region remain marginalised. In order to strengthen social, economic and territorial cohesion, the Italian government has identified a strong need to connect the various industrial districts in the zone with the existing logistics nodes and port systems in Southern Italy. In the context of the TEN-T, a European Union (EU) directed towards the development of a Europe-wide connected network of roads, railway lines, waterways, shipping routes, ports and airports, the Italian Ministry of Infrastructure and Transport identified and selected five Integrated Logistics Areas (ALI - Aree Logistiche Integrate) in Southern Italy that will benefit from investments in port and inter-port connectivity in the framework of the Programme Infrastructures and Networks 2014-2020. The logistics areas are defined as follows:

- South-Eastern sector of Sicily
- Gioia Tauro Logistics Pole
- System in Puglia
- Campanian logistics area
- Western Sicily sector

As defined in the agreement concluded between Italy and the European Commission, measures relating to improving competitiveness in these five logistics areas include harbour constructions and inter-port infrastructures, with corresponding connections to the multimodal corridors of the European transport network. These investments are made with the objective of improving competitiveness and reducing marginalisation of Southern Italian regions, increasing accessibility and connectivity of the nodes, favouring modal diversion towards the rail system, enhancing integration between the various types of infrastructure and transport modes, and better connecting various industrial areas to rail, road and ports. The budget for the Programme Infrastructures and Networks 2014-2020 is EUR 1 843 733 334 of which EUR 1 382 800 000 is provided by the European Regional Development Fund and EUR 460 933 334 from national funds (Fondo di Rotazione). Beneficiaries are five port authorities (four of them cover several ports), national road, air navigation and rail providers, and the Italian customs agency.

In order to avoid overly fierce competition and duplication of roles between ports in Southern Italy, a Central Coordination Committee has been established by the Italian Ministry of Infrastructures and Transport, which aims to help South Italian Port System Authorities coordinate their strategies. Strategic documents for each logistics areas should help define the specialised role, priorities and needs of each of the areas. This approach of centralised coordination and prioritisation, as well as the provision of integrated logistics corridors to increase connectivity of sea ports, could ultimately help to mitigate the risks of port shifts by large carriers in the context of alliance strategies. Most importantly, attributing specific roles and importance to core ports helps to avoid duplication of public investments that risk becoming stranded assets once important port shifts take place. These ports or port systems should benefit from investments that increase their long-term attractiveness for carriers by providing ample hinterland connectivity, particularly providing for efficient freight rail connections.

Source: Italian Ministry of Infrastructures and Transport (2018).

Policy options

Considering the diversity of policies in place in different countries, there is no uniform policy recommendation that would fit the circumstances of all countries. Policy options need to be aligned with the local circumstances and the most pressing concerns. E.g. our comparison shows that policy frameworks in the United States allow for more countervailing power of ports vis-à-vis carriers than in Europe, so in the EU it could be more important than in the United States to restrict cooperation between carriers and facilitate the collaboration between ports. The policy options provided below

aim to present possible generic policy responses that require fine-tuning according to local circumstances.

Adopt a presumption in favour of the repeal shipping-specific block exemptions

Liner shipping does not have unique characteristics that justify exemptions from competition law, neither for conferences nor for alliances. Generic antitrust rules should apply to all agreements between liner shipping companies, as for any other industry, with regard to the cooperation that is allowed. This is in line with the global long-term trend to dismantle sector-specific exemptions from competition law and in line with OECD regulatory principles. Thus, countries where “conferences” are still allowed should reconsider their position.

The same logic also applies to shipping-specific block exemptions from competition law. The European Commission should carefully consider allowing the EU Consortia Block Exemption Regulation to expire in April 2020, as currently scheduled, rather than extending it. Without a block exemption, the generic antitrust rules will apply to all agreements between liner shipping companies, thereby strengthening antitrust monitoring in the maritime transport sector. As has been amply demonstrated, e.g. during the consultation process of the EU repeal of the block exemptions for liner conferences, the liner shipping sector does not have unique characteristics that justify the continued existence of exemptions for price-fixing. The same line of argument also holds for block exemptions for alliances in liner shipping, which is the focus of this report and the recommendations below.

The specific feature of a block exemption regulation is the assumption that agreements complying with a set of criteria are automatically valid and enforceable. However, some agreements which conform to the exemption conditions might nonetheless have anticompetitive effects, due to idiosyncratic features of the relevant market. By repealing block exemption regulations, authorities will have greater opportunity to scrutinise and challenge individual agreements between shipping companies where these have unjustified or undesirable restrictive effects, thereby more effectively deterring anticompetitive conduct in the sector. In addition, this will allow the authorities to verify that the agreements put into action do generate their alleged efficiencies and assess whether consortia agreements between shipping companies are adversely affecting other actors of the global supply chain, notably ports and shippers. The repeal of the block exemption regulation could also allow other actors in the maritime transport sector to challenge more easily agreements with undesirable market effects.

A repeal of the block exemption regulation will likely not result in the termination of actual and future consortia agreements between liner shipping companies. In fact, currently, consortia agreements between liner shipping companies that do not fulfill the conditions in block exemption regulations can still benefit from individual exemptions in accordance with the general exemption regime for agreements between competitors. Moreover, alliance agreements are currently implemented by companies in many other sectors, e.g. in civil aviation while being subject to the generic antitrust rules. Repeal of the consortia block exemption regulation in the EU will restore the regulatory neutrality in antitrust enforcement in the transport sector. Alliances of shipping companies are the only agreements in the transport sector – actually in any sector – that still benefit from an antitrust block exemption regulation.

In order to guarantee some legal certainty, regulators could introduce some sector-specific guidance to mark the transition to full application of the generic antitrust policies. In the case of the EU, this could take the form of temporary guidance for the application to liner shipping of the guidelines on horizontal co-operation agreements (the Horizontal Guidelines). This could be similar to the temporary guidelines put in place after the repeal of the block exemption for liner conferences. Such guidelines could focus on the need for alliances to ensure the transfer of a fair share of the benefits from their operations to the consumers and downstream supply chain operators in accordance with the requirements of Article 101 (3) TFEU and thus satisfactorily deal with the concerns identified in the previous chapters.

If existing consortia block exemption regulations are extended, their scope should be strictly limited. Similar limitations of scope would also be appropriate inclusions in the sector-specific guidance to the Horizontal Guidelines mentioned above. Any remaining block exemptions should tackle concerns related to information exchange, market definitions, data exchange, joint purchasing, performance conditionalities and consultation requirements. The following sets out the key reasons for excluding such provisions from authorisation:

- **Market definitions.** Most consortia block exemptions deploy market definitions that might need to be aligned to the developments of vertical integration and increasing ship size. One could also argue that the relevant product is no longer a port-to-port maritime transport service, but rather a door-to-door transport service. This could alter the perspective on market power. It also raises the question as to why carriers could be allowed certain forms of collaboration (e.g. data exchange on land transport) that would not be allowed to competitors.
- **Joint negotiation.** Excluding the possibility of jointly negotiating with ports and shippers could be envisioned in order to mitigate the market power of alliances. Such limitations might have as an additional positive effect to encourage greater competition between consortia members. In the US, joint purchasing of terminal handling services by alliances can only happen if the terminal is agreeable to a joint contract.
- **Performance conditionalities.** Consortia block exemptions assume performance improvements due to alliances that are actually never monitored. If policy-makers see continued justification in consortia block exemptions, we recommend linking their extension to rigorous monitoring of impacts on the maritime logistics chain, including comprehensive assessment of maritime transport and logistics costs, service frequency and quality.
- **Consultation requirements.** Alliances – and related to this the rapid increase in container ship size – have large impacts on transport users and downstream supply chain operators, on which they have not been consulted. A joint vision of the maritime logistics chain could help to generate win-win situations and thus ensure users reap some of the benefits of alliances. In that context, reintroduction of the obligation for alliances to consult with transport users (and extension of this requirement to consultation with ports and terminals), could be considered. This requirement was part of the former EU consortia block exemption, in force between 1995 and 2010.
- **Withdrawal clause.** Although most consortia block exemptions have a sunset clause their duration is generally five years, which does not provide the regulator with leverage to request improvements in the meantime. Regulators should consider introducing clauses that make it possible to withdraw the block exemption if its goals or agreed performance indicators are clearly not met. A condition of the maintenance of the block exemption could be the provision by carriers of clear evidence – on an annual basis – that other transport users obtained benefits from their alliances.

Improve infrastructure project appraisal and port pricing

Much of the investment required to upgrade ports to handle mega-ships is publicly funded, either directly or indirectly. It is essential that these public expenditures be based on sound economic assessments and that risk-minimisation strategies are in place. Approvals of new port and hinterland transport projects should be based on sound projections of predictable cargo flows, particularly from shippers. It is the demands from shippers that ultimately drive cargo flows, yet these are not frequently taken into account during decision-making on new port infrastructure. Port infrastructure planning should be flexible, so that new capacity can be phased in, aligned to demand conditions. Demands from carriers for new facilities should be backed by enforceable commitments to actually use the new port, to minimise the risk that publicly financed ports are underused. In the European Union, this could be achieved by imposing stricter conditions on funding for port projects using EU-funds and those of the European Investment Bank. A reduction in the number of EU “core ports” in the Trans-European Network as part of the elaboration of a clearer and more detailed port strategy would also reduce over-capacity risks in respect of container ports for mega-ships.

The adoption of common principles for port pricing – ideally at a global level but at least at regional level - could help to offset the monopsony power of alliances and support sound project analysis in cases where new facilities are proposed to accommodate mega-ships. A key requirement is to address the current position in which many of the additional costs imposed in accommodating mega-ships are commonly covered by other port users (via cross-subsidies) or by the taxpayer (via subsidies), as competition between ports for the alliance calls makes them wary of seeking to internalise costs such as dredging, buffer capacity and other adjustments. Such common principles could include cost coverage, the polluter-pays-principle and the internalisation of the external costs of mega-ships and alliances.

Establish more coherent ports policies

Establishing clear focus in port systems – both nationally and supra-nationally - could help to minimise the development of further overcapacity of container ports for mega-ships. Particularly in light of the frequent taxpayer subsidisation of the costs related to mega-ships, states could define more clearly which ports are expected to service mega-ships and which ports have different roles. Despite the political complexity of prioritisation of ports, various countries have established an explicit port hierarchy that translates into a public investment hierarchy. However, some of these hierarchies do not prioritise strongly enough a limited and selected number of ports (OECD/ITF, 2017). Although a strong port hierarchy does not exclude the possibility that alliance carriers will not use the prioritised ports anyway, it should minimise the risk of ports being played off against each other, resulting in low returns on public investment and underutilisation of infrastructure. In the EU, the port hierarchy provided by the “core ports network” and the “comprehensive ports network” could be strengthened by introducing a more limited and clearly defined group of “gateway ports” that could include the main inevitable European container ports, as evidenced by calls from all three alliances.

Government policy has frequently focused on introducing competition between and within ports. Although competition has often increased efficiency, it is also likely to have limited the propensity for ports to cooperate. This dynamic should be addressed, as cooperation between ports provides a potentially significant source of countervailing power in a context of the rapidly increasing concentration of the shipping industry resulting from the growth of liner shipping alliances, as has already been shown via the actions of various governments that have facilitated this cooperation. This facilitation can take different forms, depending on local circumstances and on different port governance models. In countries with centralised port systems, port mergers have been stimulated by central governments. Examples of such approaches include the creation of the Keihin port in Japan, which amalgamated the ports of Yokohama, Tokyo and Kawasaki. Other examples of centrally arranged port mergers include China and Italy. In countries with more decentralised port governance, central government and its bodies have provided the regulatory space needed for local entities to initiate intensive cooperation, like in Seattle/Tacoma and Savannah/Norfolk.

Within ports, collaboration between terminals could improve the efficiency of the maritime supply chain. Governments could consider how – and under which circumstances – they could allow facility sharing in ports, without introducing new sector-specific block exemptions from competition law. In some cases this would require liberalisation of certain regulations, e.g. the regulation in Italy that does not allow terminal operators to operate more than one terminal per port.

More collaborative approaches in the maritime logistics chain at large could also help to unlock value. One of the ways to do this would be a more constructive and continuous dialogue amongst main stakeholders in the maritime logistics chain. Following the recommendations in OECD/ITF (2015), the International Transport Forum has initiated a Global Maritime Logistics Dialogue with main stakeholders to identify good collaborative practices that could help to increase the performance of the maritime logistics chain. These and other initiatives could be expanded.

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Annex 1: Case Studies – Shippers

Our analysis of impacts of alliances on shippers is based on a series of in-depth interviews. These were semi-structured interviews on the supply chain of the shipper, their supply chain policies, their perspective on container shipping and their assessment of the role of alliances within this context. The focus of these interviews was on shippers with considerable activity and employment in Europe. The representatives of the shippers interviewed are in charge of the maritime supply chain and ocean shipping procurement in their company. The selection of companies was diverse, providing a snapshot of European manufacturing and trading activity (Table 8), presented here on an anonymised basis.

Table 8. Overview of case studies of shippers

Case	Size	Sector	Demand for sea transport (TEUs per year)
1	SME	Hygiene products	900
2	SME	Wholesale	7 000
3	Multinational	Construction and insulation	10 000
4	Multinational	Recyclable and finished materials	90 000
5	Large multinational	Food products	100 000
6	Large multinational	Chemicals	300 000
7	Large multinational	Chemicals	> 700 000

Box 25. Impact of alliances on shippers: Case 2

Headquartered in a European capital, the company has a turnover of around EUR 1 billion and employs 150 people. The main activity is development and marketing of food and non-food products. Of the goods that the company markets in the country, 60%-70% are sourced from inside the country and transported by truck. The remaining 30%-40% of goods are imported and mainly transported by sea. The company is not active in the export business. Oversea imports are mainly sourced from Asia, North America and the Mediterranean region. The main country of origin in Asia is China. Goods from Asia are mainly shipped from South China ports, i.e. Qingdao, Shanghai and Bangkok to Northern Europe. The company is not affected by extreme peaks in demand and therefore covers almost 100% of the volume under a service contract. While the products are not time-sensitive, the company maintains safety stocks. The shipper normally negotiates with carriers via a third party (freight forwarder), because the shipping lines have proven less competitive during the past years. The company uses a consortium of wholesalers to procure shipping services in order to increase volumes and hence bargaining power. For its supply chain, the company prioritises cost in order to keep product prices competitive, although reliability, space and container availability are considered as important.

While most goods are imported via a medium-sized Northern European port served only by feeder vessels with relatively stable schedules, lead time from main ports of origin and European major ports are subject to important fluctuations. The company deals with these fluctuations by maintaining safety stocks and has invested in greater storage capacity in response to delays. Irregularities of +/- five days are usually taken into account. Storage however can be costly and increases the price of products. As many products are used for daily consumption, demand is very sensitive to price increases which can reduce the competitiveness of the products sold by the wholesaler. Delays of more than five days occur regularly and happen several times per month.

According to the shipper, reliability has decreased in the last ten years. This, for example, is illustrated by frequent delays in schedules and omissions. For the shipper, this implies that the cargo will not be discharged at the foreseen port and will miss the feeder service. To counteract this, the shipper must evaluate shipping lines according to reliability as well as for price, and in many cases pay a premium to assure that shipping schedules are kept. The main issue for the shipper is the visibility. The company claims that most of the time, delays are discovered later and that there is a great lack of visibility where the cargo is located. The shipper claims to be unable to develop reliable KPIs because of this visibility gap and has issues identifying the most reliable services, as the shipments are mainly managed by their intermediary freight forwarder. As a relatively small customer, the shipper affirms that in terms of bargaining power, he is the price taker (he has no say in the price and must accept what is offered) and finds it harder to negotiate more favourable conditions. He has observed that contract clauses have gotten stricter in recent years.

Box 26. Impact of alliances on shippers: Case 3

Headquartered in a Northern European capital, the company has 40 manufacturing facilities worldwide and employs over 11 000 people. Most factories are close to the consumer base, within a radius of about 300 km. 95% of products are transported by road, especially building insulation. The remaining share consists of exports shipped by container, which include mostly value-added products. Most are low value and lightweight goods (six-eight tonnes per 40' container). Exports are directly delivered to consumers without warehousing. Imports are limited, as manufacturing relies on local resources. There is seasonality for a certain product line that is time sensitive, with a week maximum possible delay. The company often has fluctuating volumes, related to sudden orders for new port pairs, which differ from the ones agreed in the tender contract. Since 2015 the procurement of ocean shipping has been centralised, with the exception of intra-Asia services that are procured locally. The company's procurement negotiates shipping tenders (one-year contracts) directly with the carrier. Priorities in the annual tender of ocean shipping are: price, transit time and minimum transshipment (in the order of priority). There is a large amount of daily inquiries related to project business, but a low percentage is turned into business: these are also procured centrally with smaller validity terms. The booking is done via a third party booking agent. Price and volumes are fixed in the tender. An approximate transit time is also declared in the tender, although the de facto length can vary significantly.

The shipper observes that delays have become regular. The Hanjin bankruptcy and the almost concurrent restructuring of Alliances and schedules led to price increases by a variety of carriers (up to five times the price that was agreed in the tender). Reportedly, the cyber-attack on Maersk led to IT issues provoking delays of up to two months in some cases. The company also reports having received additional, unjustified demurrage invoices from a carrier (e.g. in a port in Ivory Coast). Schedule reliability is very low when compared to the road and air freight modes. Delays can in the worst case lead to supply disruptions for clients (that need to adjust their building or plant growing schedules). For the shipper, this can result in overall reputational damage and complaints from customers, which are estimated to occur around five times a year. Such complaints can incur additional costs for the shipper if penalty clauses form part of the contract with the customer. A high premium is paid to carriers for shipments with a very high time sensitivity (agricultural supply), exceeding standard prices by multiples of five. There is occasional shipment by air in order to ensure on-time delivery. Visibility into the supply chain is reported to be very low. Information on delays is often lacking and visibility on the location of containers is limited, which makes anticipation difficult.

With regards to the reduction of alliances from four to three alliances, the shipper reports the lack of service options as a main difficulty. The company's procurement allocates specific volumes in each port pair to two carriers from different alliances, in order to have different service options. Alliances have led to rapidly decreasing schedule options, according to this company. Although the shipper declares five-six different schedules would be desirable, only three are available per trade lane due to consolidation of cargo volumes on bigger vessels. The shipper notices a decrease in direct voyages and more transshipment calls, which tend to increase the risks of late delivery because delays reduce the time available in a transshipment port to shift the cargo to a different vessel. If the cargo misses the vessel, it might have to wait one week in the transshipment port. According to the shipper, increased concentration in the liner shipping industry increasingly affects small and medium-sized shippers' bargaining power, leading to imbalances. In addition, global carriers have become more adept in managing capacity (supply of vessels and space) and can thus influence prices much more than two or three years ago. The Intra Asia market is an exception, as there is strong competition for a multitude of very small carriers. The shipper observes that the Mediterranean, Baltic and Intra-Europe trades are also relatively competitive due to smaller carriers present but not as much as intra-Asia trades.

Carriers seem to have become increasingly rigid on the application of tender clauses. Free time has become more limited, which becomes a problem in countries with long bureaucratic procedures that lead to long dwell times in yards (e.g. in Mexico). Despite booking and documentation improvements, some carrier IT systems are antiquated, while customer service has- in some cases (due to cost pressures)- been outsourced to LCC thus creating serious problems, especially in an industry where there can be as many as 30 different entities involved in the transport lifecycle of one container. Only the top carrier is seriously considering digitalisation. The shipper also reports non-compliance with agreed tenders, especially with regards to transit time and prices, towards which the shipper feels defenceless. In addition, resolving disputes around invoices can take several months. Since the transition from four to three alliances, the shipper has observed a reduction of vessel sharing agreements that carriers conclude with others from a different alliance. He sees a link between alliances and increasing ship size, leading to growing congestion in ports. The shipper observes that the prices for a service between main hubs are becoming more similar, as well as those for connections with smaller ports. He believes that information systems could become more integrated within alliances via a common vessel management centre), which would make it easier for carriers to converge. At the same time, the shipper observes that the differentiation in service among the carriers has decreased. A redesign of the whole supply chain could help to reduce the high administrative costs (e.g. by blockchain or better tracking platforms). The shipper declares to be willing to accept higher prices if this would lead to a healthier shipping sector that refrains from "undercutting each other".

Box 27. Impact of alliances on shippers: Case 4

Headquartered close to a major European port, the company operates in 18 countries and employs more than 200 people. The main business of the company (in the order of volume) is the export of finished or recyclable steel, rubber products (such as tyres and tubes), plastics (recyclable plastic scrap, PET and engineering plastic) and timber. The company is mainly engaged in West-East trade with major exports shipped from the EU, U.S., UK, Central America and Australia to destinations such as India, Pakistan, Turkey, South-East Asia, Southern America and North Africa. While most customers are located in Asia, timber is also shipped to North America. The company sources from around 1 500 inland locations and uses more than 240 ports worldwide. The major proportion of exports leaves from Antwerp, Hamburg and UK ports. Major traffic also concerns Spanish ports such as Bilbao, Valencia, as well as Koper in Slovenia. In the U.S., the company ships from the entire East Coast, as well as Long Beach, Los Angeles. Sea transport procurement is carried out in-house, in direct negotiation with carriers. The majority of supply contracts are short-term monthly or quarterly contracts. Approximately 50 % of container transport is purchased on the spot market. Average loading per TEU is around 26 tonnes. Goods are valued between USD 5 000 – USD 10 000 per container. Main priorities for the company's procurement are ocean freight rates and the availability of containers. The shipper keeps two-three options not to rely on one single carrier.

A major concern for the shipper is the availability of containers. In high season, between March and May, while sufficient containers are often available at the time of the request, the shipper reports having received notification that containers are finally not available, suspected to be due to an artificial shortage (because a different company has agreed to pay more). Unavailability of containers has resulted in the fact that the shipper is unable to conclude deals in many cases. The company reports that in 15%-20% of the cases annually, no containers are available upon request and deals are postponed. In the season from March to May, reportedly 40% of deals are postponed due to this issue. Delays and postponements threaten the deal because particularly in plastics recycling, collectors face limited storage space and therefore leave the materials to those companies which are able to collect and resell the material in periods as short as one week. The company declares to work closely with container depots (such as in Stuttgart, Germany) and to know their inventory situation. In addition to providing a container based on an agreed price, shipping companies allegedly charge container surcharges or container availability fees on a regular basis, according to the shipper. In consequence, the shipper feels obliged to book early in advance without knowing whether there will be business to fill the reserved container space. According to the shipper, this does not seem to happen very often. Another solution would be to hire a freight forwarder to increase the chances to secure containers. The shipper underlines however that the company loses around USD 280 000 in its European business because of container rental surcharges due to the lack of container availability. While the shipper's goods are not particularly time-sensitive and two-three weeks of delay in reaching the consignee do not pose a problem, considerable delays can become an issue, especially under conditions of low visibility into the logistics chain. For example, the shipper has faced considerable delays to South Africa in 2016 in which case the company was informed four months later that the goods had not reached the consignee. Apart from such cases however, the shipper believes tracking services of carriers are overall satisfactory.

In terms of bargaining power, the company perceives decreasing flexibility and a tightening of carriage contracts with extended liability for the shipper. According to the shipper, detention and demurrage fees are frequently applied even though the carrier had committed an error. For example, a shipment that was supposed to arrive in Jebel Ali arrived in Salalah instead, where additional fees for detention and demurrage were applied by the carrier. The shipper notes that strict bill of lading clauses allow carriers to apply detention charges in case of dispute. This has effectively led the shipper to quickly settle the dispute in order not to lose additional time and avoid costly detention charges, which would amount to around USD 150-200 per container per day after four weeks of detention. Each month, the shipper counts two-three of such cases, which cost the company approximately USD 40 000 – USD 50 000. Due to the difficulty of proving the company's innocence, the shipper claims not to have the capacity to present each case to the insurance. In addition, the company notes that vertical integration could potentially reduce the bargaining power of shippers once carriers control freight forwarding, insurance and maritime finance activities. Given the extensive data that carriers can access, the shipper claims that a large carrier has sought to access his clients directly, proposing finance solutions and transport without the shipper as an intermediary. The company therefore fears that vertical integration could potentially also threaten the shippers' business model. As a general trend, the shipper observes a convergence of prices amongst alliances and carriers. While there is no effective collaboration between carriers yet, this could become problematic once carriers collaborate more efficiently within an alliance. The shipper also observes a reduction of direct connections and a drop in service quality. According to the shipper, there are no reliable forecasts for container freight rates, as opposed to commodity prices, which are covered by commodity indices and benchmarks. Given the difficulties the company encounters with regards to container shipping, the shipper is looking at innovative solutions that are still in a development phase but might become viable alternatives, i.e. plywood and Oriented Strand Board (OSB) containers that could be transported in bulkers.

Box 28. Impact of alliances on shippers: Case 5

The company is headquartered in a North European country, has a turnover of more than EUR 10 billion and employs more than 20 000 people. Its principal activity is the export of ambient food products. Around 12% of the containers needed for export are reefer containers. Production takes place in more than 20 countries. Products are exported in sea containers from more than ten countries to around 500 port pairs globally. The company counts on a large distribution network in which distribution is carried out by fixed service suppliers (external parties). The company operates mainly on the North Europe-Asia trade lane, as the company's main customer base is located in China. The company does not use freight forwarders and negotiates directly with 15 different carriers. As the company produces constant output, 99% of volume is covered under a service contract. The firm's preferences for shipping are, in the order of importance: reliability, speed, price and frequency. Reliability and speed are particularly important to the company, as the products have a limited shelf life (between 3 and 12 months) and therefore lose part of their value when transport times exceed a fixed duration. The company therefore tends to book direct shipments for their reefer segment whenever possible.

The shipper has observed a steady decrease in choice over time, which makes it increasingly difficult to spread volumes (and hence risk) among different carriers. According to the shipper, the decline of direct port-to-port connections has increased transshipment and decreased the reliability of schedules since the alliance restructuring in April 2017 and parallel delivery of ultra-large vessels. This has made it more and more difficult for the shipper to book reefer cargo on direct calls. Coupled with a decrease in reliability (schedule reliability dropped to 65% in 2018 according to the shipper's KPIs), the shipper is confronted on a daily basis with an increase in local costs at destination of around 5% to 10%. As there is less free time acknowledged in the contract, the shipper receives additional bills for storage and container rental costs depending on product value and interest rates, even though the responsibility for exceeding cargo dwell time in ports is in most cases the responsibility of the shipping company. The company experiences rollover of cargo and rescheduling without prior notification on a daily basis. The shipper notes that a reason for this is the high transit time, which increases the risk of missing the feeder service, or frequent spontaneous cancellations of calls to main ports, which leads to cargo being discharged at a different port. Generally, longer transit time also generates additional costs for the shipper, particularly in terms of working capital.

Bargaining power vis-à-vis shipping companies has eroded, as experienced by the shipper. The firm's key account managers find it increasingly challenging to negotiate with carriers. Although the firm generates important volumes, he claims not to be able to rely on contracts and agreements with carriers. According to the company, aforementioned issues have led to daily disputes with carriers. Settling claims has become increasingly difficult, which the shipper also links to service and communication obstacles. From the shipper's perspective, a reason for this is the outsourcing of booking, pricing and documentation desks to a variety of countries such as Poland, the Baltic States, India, or the Philippines. In the worst case, the shipper's claims get redirected between service centres in different countries, with an increasingly difficult information and documents flow. Due to the general tendency of increasing ship size and volume peaks in the ports of call, the shipper notices that many times, because of congestion, the cargo, delivered by truck or barge, cannot make it into the port on time and needs to wait for the next vessel. This is particularly striking in Rotterdam where barges line up to deliver cargo to the mega-ship. The shipper observes similar issues in ports of destination where it becomes increasingly difficult for cargo pick-up. Worldwide, the shipper deals with additional costs generated by congestion at least once a week. Considering the variety of issues, the shipper finds it increasingly challenging to make informed choices on carriers, alliances and ports. Distinction of services becomes difficult since the shipper might not always know on which vessel the cargo is transported, given the slot sharing agreements between carriers.

Box 29. Impact of alliances on shippers: Case 6

The company is headquartered in Germany with its core business in basic and specialised chemicals. The company mainly imports bulk raw materials and exports finished products mainly in containers. Total container volume per year is roughly 300 000 TEU. Instead of shipping from single points, production is relatively fragmented worldwide. Sea transport procurement is divided globally with procurement teams operating in Europe, North and South America and Asia/Pacific. The company's priorities in terms of procurement are satisfactory service quality, space and equipment availability, transit times, flexibility and price. The company has specific operational requirements and commercial conditions which acceptance is a precondition for carriers to participate in a tender.

Lower availability of direct connections has increased the risk of delays for the company. For example, the number of direct calls from European Ports to Dalian went down from three in 2016 to one in 2018. A similar trend toward a hub-and-spoke system was observed at a range of other Asian ports and on Trans-Pacific lanes, except for Trans-Atlantic trade where such phenomenon has not been observed yet. Beside the higher risk for delays, the shipper laments difficult information flow especially in feeder ports. They observe that the monitoring and tracking quality was satisfactory only until transshipment after which the information flow is less steady and reliable. The sea transport procurement managers state that in many cases, they are not even aware of transshipment delays when they occur. Consequences could then be a slow-down of a client's production, or that the customer seeks for alternative products that are available locally. While on some trade lanes, such as Europe to Mexico, service is direct and mostly reliable, other trade lanes such as from Europe to the Caribbean, reliability reaches only 50%-60%. As a result, shippers suffer a global reliability across all trade lanes of only 65%. Delays of more than one week can become problematic for all shippers and customers, especially as global supply chains become leaner and safety stocks lower.

To reduce risks, the company spreads their volumes between carriers and make use of all services available in the market. However, this is not always possible on trade lanes where the choice of high quality service products is limited. In the past the company discovered a continuous drop of customer service performance and accountability. Nevertheless since a few years some core carries started to focus back to customer relationship management and customer service on operational level. The shipper welcomes that trend while acknowledging a lot of room for improvement. A recurrent issue for the shipper is the often impersonal communication with outsourced service centres via electronic ticket systems, less qualified staff and unsatisfying solutions. According to the company, carriers would need to differentiate themselves by other factors than comprehensive alliance networks, such as service quality and customer orientation, since shippers would prefer to pay more for increased service, reliability and visibility. In their view, the steps before and after the ocean leg also seem to become increasingly decisive for a carrier's competitive advantage. With a better pre- and on-carriage network, they were often better able to solve recurrent supply chain issues, which made a tangible difference for shippers. However, the lack of resources to build comprehensive networks in the country was cited as a barrier to generating more integrated services. In terms of information systems, the company thinks a global open standard to offer digital information within one standardised system could bring important improvements.

Box 30. Impact of alliances on shippers: Case 7

As one of the world's biggest multinational companies producing mainly chemicals and plastics, this company has a high demand for bulk and container transport. Looking only at container demand, the company exports more than 700 000 TEU annually. Primary material imports are mainly bulk shipments. The company's container exports include mainly polyethylene, polyurethane such as foams and construction materials (20%-30%), as well as membranes, coatings, etc. (remaining share). The value per container varies roughly between USD 45 000 and USD 100 000. Most goods have relatively low shelf lives (of around a few months), so are somewhat time sensitive, although some are more delicate and therefore shipped by reefer (<5%). Monthly forecasts in terms of volume are provided to the carrier. The shipper observes relatively stable volumes, although he notices an increase by the end of each month, quarter, and year, as an attempt of the company to fulfil its business objectives. Due to its global weight the company disposes of key accounts with the majority of the large shipping lines. Global transport procurement is carried out via a matrix organisation, with officials based on four different continents in charge. The tender for containerised ocean transport takes place every year. The shipper uses stand-alone booking partners, so switching from one carrier to another is not complicated. Main ports used in Europe include Antwerp, Rotterdam, Barcelona, Hamburg and Bremerhaven, Le Havre and Fos-sur-Mer/Marseille. While the company negotiates tenders directly with the carriers, container space is booked via different freight forwarders and booking agents, which mainly fulfil documentation and administrative tasks. The company's priorities for container shipping procurement are cost, transit time, transshipment and service (e.g. costs to reach inland destinations).

The shipper explains that it has seen the choice of carriers for EMEA trade lanes erode, reducing from 20 to 15. The shipper uses a wide range of them to spread risks. Similarly, even the largest carriers are not interested in transporting the complete cargo volume of the shipper. In the selection of carriers, the carriers that are in the same alliance are generally not taken as a back-up option. While the company frequently uses the top six biggest carriers, some smaller, mid-range carriers are seen as much more reliable. The shipper laments for example that mid-range or small carriers had offered to provide a service from a closer port not called by bigger carriers. The shipper observes different industry structures in Asia where a range of small carriers persist with a main interest in contracts with freight forwarders avoiding direct negotiations with shippers. In terms of service, the company receives satisfactory assistance from carriers, including support when additional space is needed and advice on which vessel to use in order to be able to meet the delivery commitment. If there is differentiation between carriers, this mainly takes the form of differences in documentation and booking management. Some negative service experiences have occurred mainly with outsourced service centres that were unable to deliver practical solutions. The shipper acknowledged that key accounts benefit from better service, whereas smaller shippers often need to bear inferior service levels. In terms of reliability, internal KPIs of the company show that on-time delivery (OTD) figures are declining. The company therefore commits to a fixed delivery date estimated with sufficient time to cover eventual delays. The consequence of not delivering in time to customers could mean they would have to temporarily shut down a factory which generates significant costs. The shipper observes that carriers always assume that the weekly containerised volume is the equivalent of the annual volume divided by 52 weeks, even if the shipper is able to show the seasonal variations of their export flows and gives monthly updates.

The company also reports that in some cases, their strategy consisted in avoiding a certain carrier when there was a possibility that the cargo would be loaded with a different carrier that shared the same lane and that was perceived as less well performing in terms of reliability. As transshipment further increases the risk of delay, the company also attempts to avoid unnecessary transshipments and allocates more volume to carriers that – according to their own experience – have proven to deal efficiently with transshipments. Around 30% of the main containerised flows (the 1 000 trade lanes where shipper has a volume of more than 10 TEUs per week) involve transshipment; double transshipment is rare and triple transshipment is never accepted. The company also watches the shipping sector closely and take precautions to avoid allocating important cargo volumes with financially vulnerable carriers. The shipper is sceptical about the usefulness of the mutual financial safety net of the THE Alliance. The shipper sees carriers with their own terminals not necessarily advantaged, as their terminals might be more expensive and less productive than nearby competing terminals. The shipper observes that carrier strategies are in many cases not well aligned with their terminal or freight forwarding subsidiaries. The shipper thinks perspectives for independent terminal operators remain bright. The company representative observed that during 2017, carriers would have had an opportunity to recover in terms of profits; however, they decided to undercut each other's rates, which would make the sector vulnerable to further bankruptcies. He describes the alliances as a "necessary evil" that helps carriers to manage their costs, but anticipates a split up on the long run. As carriers are increasingly working together on costs, the shipper suspects their rate structure to converge gradually. Considering additional effects on the supply chain, the shipper notes the important challenge of port congestion related to bigger and fuller vessels as a consequence of alliances. The consequence of this is that the shipper will increasingly put pre-carriage in its own hands, increasing the share of merchant haulage.

Annex 2: People Interviewed

Sergio	Barbarino	Procter & Gamble
Gunther	Bonz	Eurogate GmbH
José Alberto	Carbonell	Port of Barcelona
Manuel	Carlier	ANAVE, Spanish Shipowners Association
Ennio	Cascetta	Italian Ministry of Transport
Marzia	Cicchietti	PSA International
Marco	Conforti	Assiterminal, Association of Italian Terminal Operators
Juan Manuel	Diez	Port of Valencia
Jens Kristian	Elvers	Hamburg Port Authority
Claudio	Ferrari	University of Genoa
Agostino	Gallozzi	Salerno Container Terminal
Karl	Gernandt	Kühne + Nagel
Chris	Gillespie	Gillespie-Munro Inc.
Ramón	Gómez Ferrer	Port of Valencia
Rolf	Habben Jansen	Hapag-Lloyd
Hans-Jörg	Heims	Hamburger Hafen und Logistik AG
Jorge	Hernández	Remolcadores de Barcelona
Jarle	Kjeltingtveit	UNIL AS
Alejandro	Lopez	OHL Concesiones
Vittorio	Marzano	University of Naples
Jens	Meier	Hamburg Port Authority
Francesco	Messineo	Central Tyrrhenian Port System Authority
Santiago	Mila	Port of Barcelona
Wolf von der	Mosel	Hamburg Port Authority
Lluis	París	Port of Barcelona
Milind	Pathare	ATC Global Logistics Private Ltd.

Eva	Perez	Fundación Valenciaport
Björn	Pistol	Hamburg Port Authority
René	Raaijmakers	Kotug Smit
Oscar	Rodriguez	Noatum Terminals
Álvaro	Rodríguez Dapena	Puertos del Estado (Spain)
Otto	Schacht	Kühne + Nagel
Giulio	Schenone	Gruppo Investimenti Portuali
Sven	Schröder	Fairplay Towage
Torben	Seebold	Ver.di Trade Union
Gene	Seroka	Port of Los Angeles
Paolo	Signorini	Ports of Genoa
Laurent	Spiessens	PSA International
Pietro	Spirito	Central Tyrrhenian Port System Authority
Antonio	Testi	Contship Italia
Daniele	Testi	Contship Italia
Angela	Titzrath	Hamburger Hafen und Logistik AG
Mike	Walwyn	Nexlog Supply Chain Management
David	Van Eynde	PSA International
Benjamin	Weinacht	TEAM LINES
Boris	Wenzel	Terminal Link

Additional interviews were conducted with representatives of five multinational shippers, a global forwarder, and a large ocean carrier who wish to remain anonymous. In addition, the report benefits from two roundtables with shippers, organised in the UK and Switzerland.

Annex 3: Vertical Integration of Selected Carriers

This table includes activities, subsidiaries, jointly controlled entities and associated companies. It excludes bulk and passenger transport and local shipping agency subsidiaries, as well as other subsidiaries not falling into below categories. The information below is extracted from financial statements of the companies and may not provide an exhaustive list of company activities.

Carrier	Shipping, Short-sea, cabotage	Terminal	Logistics	Equipment	Towage	Rail	Barge	Truck	Other
Maersk	Maersk Line & subsidiaries, Hamburg Süd & subsidiaries, P&O Nedlloyd & subsidiaries, Safmarine, Seago, MCC Transport Singapore Pte. Ltd., Aliança Navegação e Logística Ltda. Brazil (cabotage)	APM Terminals & subsidiaries	Damco & subsidiaries, Maersk Logistics, Anchor Storage Ltd. Bermuda (51%), Smart International Logistics Company Ltd. China (49%), Intra Inc. (25%)	Maersk Container Industry & subsidiaries, Addicks & Kreye Container Service GmbH & Co. KG Germany, CES Servicos de Manutencao em Guindastes e Equipamentos Brasil Ltda. (cranes and equipment maintenance), Brigantine Group Container Equipment Maintenance and Repair (30%)	Svitzer & subsidiaries/joint ventures, United Salvage Pty. Ltd. Australia, Tyne Towage Marine Ltd. UK	Bridge Intermodal Transport S.A. Chile	Caribbean Tug & Barge Ltd. British Virgin Islands (50%); Coastal Tug & Barge Pty. Ltd. Australia (50%)	Maersk South America Ltd., Bridge Intermodal Transport S.A. Chile	Maersk Trade Finance, Barkentine Insurance Company Ltd. Bermuda, Star Air (air cargo), Maersk Aviation Holding A/S, Atlantic Pacific Marine Corporation U.S. (marine engineering), U.S. Marine Management Inc. (operations and maintenance), BMSC Thailand (repair and maintenance), Bermutine Management Company Ltd. (ship management), Höegh Autoliners Holdings AS Norway (39%)
MSC	MSC	Terminal Investment Limited Sàrl (TIL)	MSC MEDLOG, MSC warehousing			MSC RAIL & acquisitions, partners/joint ventures, ie CP Carga - Logística e Transportes Ferroviários de Mercadorias SA, TransContainer Russia (acquisition of controlling stake, not confirmed), MSC Medlog	MSC barges	MSC intermodal and haulage, MSC Medlog	Marinvest (Cypriot financial company of Gianluigi Aponte)
CMA CGM	APL, ANL, CNC, MacAndrews, Mercosul Line, COMANAV, OPDR GmbH & Co. KG, CHENG LIE NAVIGATION CO. LTD, SOFRANA Unilines Oceania & South Pacific, Containerships plc Finland (approval pending)	CMA Terminals Holding, CMA Terminals Investments, Terminal Link SAS (51%) & participations/joint ventures, SAMP, Eagle Marine Terminal Holdings PTE LTD	CMA CGM Logistics, CC Log, ANL Logistics PTY LTD, APL Logistics, CMA CGM Transit SARL, CC Terminal Conteneurs Dakar (TCD), LCL Logistix India PVT LTD, USL Logistics LLC, FIRST LOGISTICS DEVELOPMENT (JV) COMPANY Viet Nam (47%), AMEYA LOGISTICS PRIVATE LTD India (50%), Pacific Maritime Services U.S. (10%), INTTRA Inc. (percentage share not provided), TRAXENS, CEVA Logistics (investment, convertible bonds, 24.99% of CEVA's capital)	ANL CONTAINER HIRE AND SALES PTY LTD Australia, PROGECO France, Investment and Financing Corp. Ltd (container leasing company, percentage share not provided)		CMA CGM Intermodal services (CC Log through partners), i.e. partnership with all major rail service providers in the U.S. and Canada (BNSF, Norfolk Southern, CSX, Canadian Pacific, National, Union Pacific)	CMA CGM Intermodal services (CC Log through partners), CMA CGM barges	CMA CGM Intermodal services (CC Log through partners)	Global Ship Lease Inc. Marshall Islands (44.41%), Merit SAL Lebanon (cost and revenue control, audit, percentage share not provided), Shone (investment in start-up, artificial intelligence on board ships)

Carrier	Shipping, Short-sea, cabotage	Terminal	Logistics	Equipment	Towage	Rail	Barge	Truck	Other
Cosco	COSCO SHIPPING Lines Co., Ltd., Shanghai Pan Asia Shipping Co., Ltd, China Shipping Agency Co., Ltd., CSCL, China Shipping Ports Development Co., Limited (CSPD)	COSCO SHIPPING Ports Limited (13 overseas terminals and 22 in China), China Shipping Ports Development Co., Limited, Piraeus Port Authority S.A., COSCO Ports (Holdings) Limited (percentage share not provided)				COSCO SHIPPING Ports investments: Khorgos Gateway dry port Kazakhstan (49%), Conterail Madrid, Noatum Rail Terminal Zaragoza (NRTZ), coordination/ partnerships with China Railway Engineering Corporation (ie Peru-Bolivia), COSCO Trains (Greece-Balkans)			Faulkner Global Holdings Limited British Virgin Islands, COSCO SHIPPING Financial Holding Co. Cayman Islands, COSCOL, COSCO SHIPPING Finance, COSCO SHIPPING Development, COSCO SHIPPING Technology Co., Ltd. (sells software and hardware for intelligent transportation systems, industrial automation, shipping information, and security protection engineering in China), Florens Capital Management (50%), China Cargo Airlines Co., Ltd. (percentage share not provided)
Evergreen	Evergreen Marine Corporation, Uniglor Shipping Corporation, Hatsu Marine Ltd. UK, Italia Marittima S.p.A.	Evergreen International Storage & Transport Corp. (EITC), TTSC (cargo loading and discharging, 55%), Everport Terminal Service Inc., Subsidiaries of Peony: Clove Holding Ltd. (investments in container yards and port terminals), Armand N.V. (investments in container yards and port terminals, 70%), investments and leases of operating machinery and equipment of port terminals (various sub-subsidiaries), Colon Container Terminal S.A., Taiwan Terminal Services Co., Ltd., Taipei Container Port Terminal (investee)	Evergreen Logistics Corp., Evergreen International Storage & Transport Corp. (EITC), EGH (container shipping and agency services dealing with port formalities, 79%), Peony investments: GMS (container shipping), EMU (container shipping, 51%), MBPI (container storage and inspections at customs, 95%), agency services dealing with port formalities (various sub-subsidiaries), Ningbo Victory Container Co., Ltd. (warehousing, associate, percentage share not provided), Evergreen agencies (various subsidiaries)	EHIC(M) (manufacturing of dry steel containers and container parts), 84.44%, KTEL (loading, discharging, storage, repairs and cleaning, 20%), MBT (inland transportation, repair and cleaning of containers, 17.93%), Qingdao Evergreen Container Storage & Transportation (associate), Whitney Equipment LLC, Evergreen Heavy Industrial Corp (M) Berhad (container production)		Evergreen International Storage & Transport Corp. (EITC)		Evergreen International Storage & Transport Corp. (EITC)	Evergreen International Corporation, EVA Air/Uni Air, Evergreen Aviation Technologies Corporation, Evergreen Air Services Corporation, Evergreen Air Cargo Services Corporation, and Evergreen International Storage and Services Corporation, Peony Investment S.A. (investments in transport-related business), Luenta Investment Netherlands, Balsam Investment (Netherlands), Evergreen Insurance Company Ltd., Evergreen Security Corp. (private security guards services), Greencompass Marine S.A. Panama (shipowner, indirect subsidiary), Gaining Enterprise SA Panama (shipowner)
Hapag Lloyd	United Arab Shipping Company (UASC) Ltd., Hapag-Lloyd Denizasiri Nakliyat A.S. (65%), Consorcio Naviero Peruano S.A. (47.93%)	Djibouti Container Services FZCO (19.06%), HHLA Container Terminal Altenwerder GmbH (25.1%)	Aratrans Transport and Logistics Service LLC,	Middle East Container Repair Company LLC					United Arab Shipping Engineering & Ship Repair Services LLC
ONE (see MOL, NYK and K-Line)									

Carrier	Shipping, Short-sea, cabotage	Terminal	Logistics	Equipment	Towage	Rail	Barge	Truck	Other
MOL	MOL Liner, Japan Express Co., Ltd. (86.27%)	Ube Port Service Co., Ltd. Japan (99.39%), Uto Stevedoring Corp Japan, Rotterdam World Gateway B.V. (20%), Tan Cang-Cai Mep International Terminal Co. Ltd Vietnam (21.33%), TIPS Co., Ltd. (operates container terminals and container depot, 21.33%)	MOL Logistics, Asia Uto Pte. Ltd Singapore, Bangpoo Intermodal Systems Co., Ltd Thailand (74.62%), Shinyo Kaiun Corp. Japan (36%), Chiba Uto Corp Japan, Euro Marine Logistics N.V. Belgium (50%), Hong Kong Logistics Co., Ltd., International Container Transport Co., Ltd. Japan (customs clearance, 51%), International Transportation Inc U.S. (51%), Shanghai Huajia International Freight Forwarding Co., Ltd. (76%), Thai Intermodal Systems Co., Ltd., Uto Logistics Corp, World Logistics Service (U.S.A.), Inc., PKT Logistics Group Sdn. Bhd. Malaysia (20.86%), Shanghai Longfei International Logistics Co., Ltd (22.05%)	Bangkok Container Service Co., Ltd (depot), MOL Container Center (Thailand) Co., Ltd. (99.6%), Nishinohon Sogo Setsubi Co., Ltd (equipment maintenance services)	Kitanihon Tug-boat Co., Ltd. (62%), Kobe Towing Co., Ltd., Nihon Tug-Boat Co., Ltd. (87.26%), Tokai Tugboat K.K. (70%), South China Towing Co., Ltd. (25%), Tan Cang-Cai Mep Towage Services Co., Ltd. Vietnam (40%)		Shosen Koun Co., Ltd. Japan (79.98%)	Blue Highway Express Kyushu Co., Ltd Japan, Blue Highway Service K.K. Japan	MOL Techno-Trade, Ltd., MOL Information Systems, Ltd., MOL Engineering Co., Ltd, Japan Hydrographic Charts & Publications Co., Ltd (95.25%), Vibank-Ngt Co. Ltd. Vietnam, Linkman Holdings Inc. Liberia, Mitsui Kinkai Kisen Co., Ltd. Japan (shipowner), MOL Ship Management Co., Ltd, Minaminippon Shipbuilding Co., Ltd. (24%), Shipowner/Chartering companies (50 companies) in Panama, Marshall Islands, Liberia, Hong Kong, Cayman Islands, Singapore and Isle of Man
NYK	Asia Pacific Marine Corporation, NYK Line North America Inc., ACX Pearl Corp.	Nippon Container Terminals Co. Ltd. (51%), NYK Terminals (North America) Inc, YUSEN Terminals LLC,	YUSEN Logistics Americas/ China/ UK/ Hong Kong, YUSEN Logistics Co. Ltd. Japan (59.73%), YUSEN KOUN Co. Ltd. (81%), YUSEN Logistics Thailand (84.48%), UNI-X Corporation (83.6%), GENEQ Corp (55.14%), KINKAI YUSEN KAISHA Ltd., ASAHI UNYU KAISHA Ltd. (95%), CAMELLIA LINE Co. Ltd. (51%)		NAKAI Tug Boat Service Co. Ltd.		YUSEN KOUN Co. Ltd. (81%), NIPPON CONTAINER YUSO Co. Ltd. (51%)		Nippon Cargo Airlines Co. Ltd., SANYO Trading Co. Ltd. (46.04%), NYK Trading Corporation (79.25%), BOLTECH Co. Ltd.

Carrier	Shipping, Short-sea, cabotage	Terminal	Logistics	Equipment	Towage	Rail	Barge	Truck	Other
“K”-Line	Kawasaki Kinkai Kisen Kaisha Ltd.(51%), Asahi Kisen Kaisha Ltd., Shibaura Kaiun Co. Ltd.	“K” Line European Sea Highway Services GmbH (port services), International Transportation Service, Inc. (70%), Husky Terminal & Stevedoring, Inc. (70%),	“K”LINE Logistics Ltd. (91.9%), Rinko Corporation (25%), Kawasaki Kisen Kaisha, Ltd., Kawasaki Kinkai Kisen Kaisha Ltd.(51%), Daito Corporation, Japan Express Transportaion Co, Ltd., Nitto Total Logistics Ltd., Seagate Corporation), Nitto Total Logistics, Hokkai Transportation Co. Ltd. (80.1%), Tokyo Kokusai Koun Kaisha Ltd., Century Distribution Systems, Inc. (cargo consolidation), Universal Logistics System, Inc. (warehousing), Universal Warehouse Co., Connaught Freight Forwarders Limited	Intermodal Engineering Co. Ltd. (container repairing), Bridge Chassis Supply LLC.	Nitto Tug Boat Co. Ltd.			Japan Express Transportation Co. Ltd., Shinto Rikuun Kaisha Ltd., Maizuru Kousoku Yusou Co. Ltd., James Kemball Limited, ULS Express, Inc., PMC Transportation Company, Inc.	“K”Line Shipmanagement Co. Ltd., Tayo Nippon Kisen Co. Ltd., Escobal Japan Ltd., SAL Heavy Lift GmbH, “K” Line Ship Management (Singapore) Pte.Ltd., Cygnus Insurance Company Limited, “K” Line Auto Logistics Pty Ltd.
Yang Ming <i>(ownership shares not available)</i>	Yang Ming Marine Transport Corporation, All Oceans Transportation Inc., Kuang Ming (Liberia) Corp., Yang Ming Line (Singapore) Pte. Ltd., Kuang Ming Shipping Corp., Taiwan Navigation Co. Ltd., Young-Carrier Company Limited (Hong Kong), Jing Ming Transportation Co.	Olympic Container Terminal LLC (U.S.), West Basin Container Terminal LLC (associate), United Terminal Leasing (associate, U.S.), Taipei Port Container Terminal Co. Ltd., United Stevedoring Corp., Honming Terminal and Stevedoring Co. Ltd. Taiwan, Corstor Ltd. (forwarding agency, UK), Manwa & Co., Ltd. (forwarding agency, Japan), ANSHIP-YES Logistics Corporation Ltd (terminal operation & stevedoring, Thailand)	Yes Logistics Corp., YES LIBERAL Logistics Corp., Sino Trans PFS Cold Chain Logistics Co. Ltd., Triumph Logistics Inc. (U.S.), Transcont Intermodal Logistics, Inc. (U.S.), Golden Logistics USA Corporation, YES MLC GmbH (import, export, storage, warehousing, Germany), Merlin Logistics GmbH (storage & logistics, Austria)					Topline Transportation Inc. (U.S.)	Ching Ming Investment Corp., Sunbright Insurance Pte. Ltd., LogiTrans Technology Private Ltd. (IT joint venture, India)
HMM	Hyundai Merchant Marine, Hyundai Ocean Service Co. Ltd., Hanjin Pacific Corporation, HT Algeciras Co. Ltd., HMM Pacific	Total Terminal International Algeciras S.A.U. (20%), HT Algeciras, Washington United Terminals Inc., Rotterdam World Gateway (20%)	Hyundai Intermodal Inc., Hyundai & C Butt Solutions Ltd (warehousing, UK, 51%), Shandong C&T Hyundai Logistics (50%)			Hyundai Intermodal (HII) International Rail Operations, NEO EXPRESS TRANSPORTATION Inc. (49%)		HII Trucking Operations, Hyundai & C Butt Solutions Ltd (51%), Netruck Franz Co. Ltd. (40%), NEO EXPRESS TRANSPORTATION Inc. (49%)	Haeyoung Maritime Services Co. Ltd. (support services, 80%), Hyundai U&I (port/marine IT technology, 18.95%), Hyundai Research Institute (17.68%)

Annex 4: The New Italian Seaport Authorities

Port System Authorities	Ports covered
Western Ligurian Sea Port Authority	Genova , main office Savona, Vado Ligure
Eastern Ligurian Sea Port Authority	La Spezia , main office Marina di Carrara
North Tyrrhenian Sea Port Authority	Livorno , main office Capraia, Piombino, Portoferraio, Rio Marina e Cavo
Centre-North Tyrrhenian Sea Port Authority	Civitavecchia , main office Fiumicino, Gaeta
Central Tyrrhenian Sea Port Authority	Napoli , main office Salerno, Castellamare di Stabia
Strait Port Authority	Gioia Tauro , main office Crotona (new and old port), Corigliano Calabro, Taureana di Palmi, Villa San Giovanni, Vibo Valentia, Reggio Calabria, Messina, Milazzo, Tremestieri
Sardinian Sea Port Authority	Cagliari , main office Foxi-Sarroch, Olbia, Porto Torres, Golfo Aranci, Oristano, Portoscuso-Portovesme, Santa Teresa di Gallura (only commercial quay).
Western Sicilian Sea Port Authority	Palermo , main office Termini Imerese, Porto Empedocle, Trapani
Eastern Sicilian Sea Port Authority	Augusta , main office Catania
Southern Adriatic Sea Port Authority	Bari , main office Brindisi, Manfredonia, Barletta, Monopoli
Ionian Sea Port Authority	Taranto
Central Adriatic Sea Port Authority	Ancona, main office Falconara, Pescara, Pesaro, San Benedetto del Tronto (excluding tourism harbour), Ortona
Centre-North Adriatic Sea Port Authority	Ravenna
Northern Adriatic Sea Port Authority	Venezia , main office Chioggia
Eastern Adriatic Sea Port Authority	Trieste

Notes

¹ The South Korean carrier HMM is associated to 2M via vessel sharing agreements, which makes some observers consider HMM an associate member of 2M.

² The O3, G6 and CKHYE alliances.

³ Another way to express the importance of alliances is by measuring the alliance intensity of different carriers. Not all ships of carriers in an alliance are shared. Alliance intensity indicates the ratio of ships that are contributed to the alliance in relation to the owned fleet. In 1998, alliances provided 84% to 96% of the capacities of Hanjin, K Line and Yang Ming, but they chose to reduce their reliance on alliances substantially in 2002, favouring instead slot charters (Hanjin and K Line) and joint service agreements (Yang Ming). In 2010, this ratio ranged between 35% and 75% (Panayides and Wiedmer, 2011).

⁴ This is based on the Global Liner Performance database by SeaIntel, which measures the average delay of all vessels (which includes vessels arriving ahead of schedule, on schedule and behind schedule) and the average delay of the vessels that arrive behind schedule.

⁵ Assuming that the merger of Cosco and OOCL will receive regulatory approval from the relevant competition authorities.

⁶ A reverse – although rare – example of vertical integration is the acquisition of Unifeeder by the global terminal operator DP World.

⁷ A carrier can have direct or indirect control over the terminal operations. Direct control means that the carrier is part of the company operating the terminal. Indirect control means that the carrier allows the terminal operator to run the terminal.

⁸ Through its individual members MOL, NYK and “K” Line

⁹ Undertakings can notify their agreement to the Competition Authority on a voluntary basis. In 2016, the Competition Authority granted seven exemptions in the Transport, Vehicles and Services sector.

¹⁰ In China, antitrust rules became applicable in 2008 with the adoption of the Anti-Monopoly Law. In principle, the Anti-Monopoly Law does not provide for any immunity applicable to liner shipping companies. Nevertheless, pursuant to article 20 of the Regulations of the People’s Republic of China on International Maritime Transport, international shipping companies that operate on Chinese ports have to file with the competent authorities all conference or other cooperation agreements. In 2014, the rejection of the proposed P3 Alliance by the Chinese authorities illustrated the diverging approaches to cooperation between shipping companies as an agreement analyzed as horizontal cooperation in the EU and US can actually be qualified as a merger in China and be subject to the relevant merger control rules. It should be emphasized, however, that there is an increasing cooperation between the aforementioned three countries aimed at achieving a more harmonised approach on competition matters in the maritime transport sector.

¹¹ In the United States consortia and other type of cooperation agreements can become effective after a filing to the Federal Maritime Commission (FMC) without the necessity to obtain a prior approval. It is thus incumbent upon the FMC to prove that an agreement has adverse effects on competition. The Shipping Act of 1984, as amended by the Ocean Shipping Reform Act (OSRA) of 1998, explicitly lists in its Section 40301 the categories of agreements that may receive immunity from U.S. antitrust rules. Shipping companies can conclude agreements related to, among others, capacity adjustments, sharing of vessels or other type of technical cooperation. Agreements on the joint operation of marine terminals based in the United States are not covered by the antitrust exemption.

¹² The 1995 regulation is almost similar to the 2000 regulation that was applicable until 2005 and extended until 2010.

¹³ Council Regulation 1/2003/EC of 16 December 2002 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty (OJ L 1/1,4.1.2003) amended by Council Regulation 411/2004/EC of 26 February 2004 (OJ L 68/1,6.3.2004) and Council Regulation

1419/2006/EC of 25 September 2006 (OJ L 269/1 28.9.2006). Article 29 (1) of this regulation states: “Where the Commission, empowered by a Council Regulation, such as Regulations 19/65/EEC, (EEC) No 2821/71, (EEC) No 3976/87, (EEC) No 1534/91 or (EEC) No 479/92, to apply Article 81(3) of the Treaty by regulation, has declared Article 81(1) of the Treaty inapplicable to certain categories of agreements, decisions by associations of undertakings or concerted practices, it may, acting on its own initiative or on a complaint, withdraw the benefit of such an exemption Regulation when it finds that in any particular case an agreement, decision or concerted practice to which the exemption Regulation applies has certain effects which are incompatible with Article 81(3) of the Treaty.”

¹⁴ Commission Regulation (EC) No 1459/2006 of 28 September 2006 on the application of Article 81(3) of the Treaty to certain categories of agreements and concerted practices concerning consultations on passenger tariffs on scheduled air services and slot allocation at airports

¹⁵ An interesting example is case AT.39595 concerning cooperation agreements between four air carriers, members of the Star Alliance. Pursuant to the cooperation arrangements, competition on price and capacity was eliminated between the four companies. Nevertheless, the Commission accepted the arrangements after the concerned companies offered commitments addressing the identified competition concerns.

The Impact of Alliances in Container Shipping

This report assesses the impact of alliances on the maritime transport chain and its main stakeholders. Alliances have become a dominant feature of container shipping, with around 95% of the major East-West container trades covered by carriers that form part of three global alliances. The report discusses the impacts on competition and asks whether alliances bring benefits, and for whom. Finally, it presents policy options for governments based on the findings.

This report is part of the International Transport Forum's Case-Specific Policy Analysis series. These are topical studies on specific issues carried out by the ITF in agreement with local institutions.

International Transport Forum

2 rue André Pascal
F-75775 Paris Cedex 16
+33 (0)1 45 24 97 10
contact@itf-oecd.org
www.itf-oecd.org



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