Maritime governance after COVID-19: how responses to market developments and environmental challenges lead towards degrowth

Jason Monios1 · Gordon Wilmsmeier2,3,4

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Abstract

This paper considers two current challenges in the governance of maritime transport, specifically container shipping. The first is the oligopolistic market structure of container shipping, the downsides of which became evident during the COVID-19 pandemic. The second challenge is climate change, both the need to reduce emissions to zero by 2050 and to adapt to effects that are already locked in. The paper reviews the academic and policy literature and unveils a link between these market and environmental challenges which result from a focus on efficiency without considering negative effects such as diseconomies of scale and induced traffic, leading to a continued rise in total industry carbon emissions. The review likewise identifies links in how policy-makers react to the two challenges. Regulators could remove anti-trust exemptions from carriers, and policy-makers are being pushed to provide strict decarbonisation targets with a coherent timeline for ending the use of fossil fuels. Recent thinking on ecological economics, degrowth and steady-state economics is introduced as the paradigm shift that could link these two policy evolutions.

Keywords Maritime transport · Governance · Regulation · Shipping · Seaports · Climate change · COVID-19 · Decarbonisation · Degrowth

Jason Monios
Jason.Monios@kedgebs.com

Gordon Wilmsmeier
g.wilmsmeier@uniandes.edu.co

1 Kedge Business School, Marseille, France
2 Facultad de Administración, Universidad de los Andes, Bogotá, Colombia
3 Kühne Logistics University (KLU), Hamburg, Germany
4 Hochschule Bremen, Bremen, Germany
1 Introduction

COVID is the canary in the coalmine. It has exposed the fragility of our supply chains (Manheim 2020), illustrated the perils of under-regulation (ITF 2018; Haralambides 2019) and revealed the negative effects of industry consolidation (Benacchio et al. 2007; Wilmsmeier and Sánchez 2011). Action on carbon emissions remains feeble, with neither the global regulator the International Maritime Organisation (IMO), nor industry bodies, such as the International Chamber of Shipping (ICS), yet accepting the Intergovernmental Panel on Climate Change (IPCC) target of full decarbonisation by 2050. At COP26 in November 2021, fourteen countries (Belgium, Britain, Denmark, Finland, France, Germany, Honduras, Hungary, Iceland, the Marshall Islands, Norway, Panama, Sweden and the United States) challenged the current IMO level of ambition and called for a target of full decarbonisation by 2050, including the setting of intermediate targets for each decade (Reuters 2021). These efforts were supported by the call from more than 50 Climate Vulnerable Forum (CVF) countries (including countries from Africa, Asia, the Caribbean, Latin America, the Middle East and the Pacific) to establish a greenhouse gas (GHG) levy on international shipping (part of the CVF Dhaka-Glasgow Declaration) (Safety4Sea 2021).

This paper considers two current challenges in the governance of maritime (container) transport. The first is the sector’s oligopolistic market structure (Sys 2009; Wilmsmeier and Sánchez 2011; Brooks et al. 2019), characterised by exemptions to anti-trust legislation (Benacchio et al. 2007). This market structure has allowed market leaders to expand capacity, enjoy economies of scale and scope and increase market share vis à vis smaller competitors (ITF 2018). These challenges became more evident during the COVID-19 pandemic, as shipping lines implemented capacity restrictions to protect profits and, later, increased rates (Notteboom et al. 2021). The second challenge is climate change: both the need to reduce emissions to zero by 2050 (IPCC 2018) and to adapt to the effects that are already locked in (Becker et al. 2018). These effects include extreme weather, geopolitical risks and resource depletion, all of which will produce more disruptions to global supply chains which, in their turn, will influence the demand for shipping (WEF 2020; Monios and Wilmsmeier 2020). Both of these challenges can be considered market failures; the container shipping market structure is a result of shielding carriers from competition (Haralambides 2019), and climate change is occurring at least partly because carbon emissions are treated as external costs (Stern 2007). Both challenges also result from a focus on economies of scale and efficiency without considering negative effects such as diseconomies of scale (Haralambides 2017) and artificially low freight rates that induce additional traffic (Wilmsmeier and Monios 2020), leading to a continued rise in total industry carbon emissions (IMO 2020).

The paper reviews the academic and policy literature to identify a pattern in how policy-makers may react to these two related challenges. Sections 2 and 3 establish the nature of the market and environmental challenges. Section 4 introduces recent thinking on ecological economics, degrowth and steady-state
economics as the paradigm shift that could link needed policy evolutions in both areas. This paradigm shift links issues of resource depletion (Jackson 2009, 2017), failure to decouple economic growth from material footprint (Hickel and Kallis 2020) and the unlikelihood of producing sufficient zero-carbon fuels (ETC 2020a).

The paper concludes by exploring potential governance changes in the post-COVID-19 era. For the market challenge, regulators could remove anti-trust exemptions from carriers and policy-makers could review public investment in ports, as well as maritime subsidies, aiming to remove incentives for mega-ships and instead link public funding to decarbonisation targets (ITF 2015, 2017, 2019). Regarding the environmental challenge, policy-makers could respond to recent calls (Global Maritime Forum 2021) to set strict decarbonisation targets and a timeline for ending the use of fossil fuels by 2050.

2 First challenge: market structure

2.1 Consolidation and market power

Before COVID-19, the container shipping market was in a state of overcapacity (ITF 2015). If the brief upturn in rates in 2010/2011 represented what Stopford (2009) calls the “dead cat bounce” in market cycles, two years after the onset of the global economic crisis in 2008/09, then the industry should have reached its recovery phase, and indeed the next peak, by around 2016. Even after the overcapacity crisis in 2008, however, carriers continued to over-invest (Haralambides and Thanopoulou 2014). Such behaviour implied that the traditional shipping market cycle, whereby shipbuilding is halted after an overcapacity crisis, no longer applied (Sánchez 2017). This strategy of continued investment was linked to mergers and acquisitions, and the search for further economies of scale by increasing vessel sizes. Between 2010 and 2017, annual fleet capacity growth outstripped demand in all but two years. By 2020, supply and demand were still in imbalance, yet new investments continued to be made (Wilmsmeier and Monios 2020).

How to explain such a strategy? There is some evidence that carriers were engaged in a bidding war to drive out competition rather than reacting to genuine demand forecasts (Wilmsmeier et al. 2018). A knock-on effect is that tonnage is cascaded from primary to secondary and tertiary routes (Wilmsmeier and Sánchez 2011). Such behaviour worsened the situation by preventing a market correction, thereby prolonging the period of low freight rates and raising the prospect of another overcapacity crisis, which duly arrived in 2020 as a result of the disruptions triggered by COVID-19 (Notteboom et al. 2021).

The container shipping market has for some time been characterised as oligopolistic (Sys 2009; Wilmsmeier and Sánchez 2011; ITF 2018). During the financial crisis of 2008/9, the top ten container carriers held 70.8% of total fleet capacity but a wave of mergers and acquisitions followed, due to drops in profitability after the overcapacity crisis, as well as the high-profile bankruptcy of Hanjin, then the seventh-largest container carrier. By 2020, this figure had risen to 91.5% (Notteboom et al. 2021). From
a global perspective, the container shipping industry still has a significant number of companies, such as regional feeder specialists. The oligopolistic behaviour is observed on major routes where the large carriers dominate, with the top nine also joined in just three alliances (2M, Ocean Alliance and The Alliance).

A similar situation can be observed in container ports, where the top ten operators have increased their share of global throughput from 41% in 2001 to 70% in 2018, several of these in fact being vertically integrated operations with shipping lines (Notteboom et al. 2021). The port terminal operators showing the highest growth 2009–2018 were carrier-related operators such as Cosco, TIL and CMA CGM, with terminals in major ports around the world, from Rotterdam and Antwerp to Shanghai and Ningbo (Notteboom et al. 2021).

The restructuring of liner shipping networks towards hub-and-spoke models naturally reduces the number of direct services at each port (Wilmsmeier and Notteboom 2011). Having occurred in parallel with market consolidation, the data suggests that carriers have gained increasing monopsony power over ports (ITF 2018). According to Hoffmann and Hoffmann (2021): “The size of container ships calling in most ports has increased during these 15 years [2006–2020], while the number of companies has decreased.” A study of North-West European ports from 2006 to 2017 revealed a clear and stable relationship between port calls by alliance members and whether an alliance member had a share in a port terminal (Notteboom et al. 2017). Of 89 ports served by the three alliances on East–West services in 2017, only 16 received calls from all three (ITF 2018).

The sight of the Ever Given, stuck in the Suez Canal in March 2021, provided a tangible image to the world of the role of bottlenecks in the maritime supply chain. Even though an event of such duration is rare and will soon be forgotten, it nevertheless highlights the weakness of subverting other logistics decisions to the holy grail of economies of scale on the main haul. Haralambides (2019) points out that economies of scale are only small at the larger end of the container size spectrum, representing around 4% saving per TEU from 6000 to 18,000 TEU capacity. While even this small saving can be significant if multiplied across a large number of containers, achieving this outcome requires that the vessels are well filled, which is not always possible (ITF 2015). Moreover, such ship sizes create diseconomies in port handling (ITF 2015; Malchow 2017). From the shipper perspective, it is doubtful if these savings are passed onto the consumer; the opposite may in fact be the case since they increase total logistics costs for shippers (Haralambides 2019). And yet regulators continue to accept the argument that alliances are needed in order to allow carriers to fill these uneconomic vessels. Now that the alliances control the market, during COVID-19 they were able to reduce capacity, increase profits and later increase rates, which is discussed in the following section.

2.2 Lack of resilience to market shocks

A situation of overcapacity in 2008 could be forgiven once, if it were the only time it ever happened. Unfortunately, the history of shipping demonstrates amply that overinvestment and overcapacity are a regular occurrence (Sjostrom 2004; Haralambides and Thanopoulou 2014; Wilmsmeier and Monios 2020). The previous section
showed that, post-2008, capacity never returned in balance, raising the risk of similar rate crashes and market exit if another crisis were to arrive. By contrast, what is interesting is that the way carriers dealt with the COVID-19 shock was different to that of the 2008 global financial crisis. After an initial shock, carriers learned to control and limit capacity effectively. The effect of a small number of players effectively controlling capacity and thus market prices represents the exposure of the market to the exertion of market power deriving from limited competition. Whereas last time the carriers suffered the “hangover” when their pre-2008 capacity party ended, this time they passed it on to society (Wilmsmeier et. al. 2018).

Notteboom et al. (2021) showed that, compared to their reaction to the 2008/9 financial crisis, carriers reacted more proactively to COVID-19. They reacted to a drop in demand by “capacity management,” a euphemism for the artificial limitation of capacity via “blank sailings” (cancelling services), which cut costs and protected profits. Reducing sailings of under-utilised vessels might be more efficient from a systems perspective, as long as more capacity is not withdrawn than needed, or for too long a period. However, for the individual shippers caught in the middle, it may not be so simple, particularly when maritime freight rates leaped in late 2020 and early 2021. The Shanghai Containerised Freight Index showed base TEU rates to Europe increasing from 1000 USD in August 2020 to 3000 USD in December 2020, 4000 USD by April 2021 and 7000 USD by August 2021. The same timeline showed an evolution of 1000–6000 USD for South Africa, 3000–8000 USD for West Africa and an astonishing tenfold increase of 1000–10,000 USD for East Coast South America (UNCTAD 2021). Even if such spot prices hitting the headlines were not paid by all shippers, over time they have translated into higher contract rates, and most shippers have felt the consequences of delays and congestion charges. Ports have also been hit by both reduced container numbers and port congestion as a result of blank sailings (Notteboom and Haralambides 2020). Moreover, the congestion and container shortage had been having knock-on effects of increased prices and lower service frequency to shippers in developing countries, on peripheral North–South and South–South routes (UNCTAD 2021). These actors have less bargaining power on rates, less regulation in carrier price-setting and intrinsically less frequent services that are hit harder by blockages in container flows.

This situation was to some degree the result of the container shortage. The shortage was partly a supply issue, caused by the withdrawal of capacity in the first half of 2020, with priority given to exporters in Asia who were willing to pay more. This was also a demand issue because congested ports had stacks of full containers not picked up by customers and indeed customers were holding onto full containers unable to empty them. Increased numbers of containers per port-call also caused knock-on problems for ports. On the one hand, one could argue that this reactivity is a good thing in order to be more efficient in asset deployment and to limit the financial losses that carriers suffered last time. Unlike the financial crisis, all major carriers retained positive operating margins during the COVID-19 crisis (Notteboom et al. 2021). On the other hand, one could point out that they benefited from the crisis by reducing service quality and profited from the record rate rises that followed. Carrier operating margins in the first half of 2020, before capacity was brought back to the market in Q3, were already the highest since 2010 (Notteboom et al. 2021), and
Q4 was the most profitable in history for container shipping. Carriers then sought to make customers pay for the shortage that they themselves had created, by renegotiating contracts with significantly shorter free time before demurrage charges are applied. In this way, carriers can get the empties back to Asia faster as well as earn revenue from the charges.

Reports have even emerged of 3PLs, freight forwarders and individual shippers (e.g. DSV, DHL and IKEA) chartering small multi-purpose vessels to transport their own containers in order to overcome poor service by carriers and congestion at large ports (Vestergaard 2020; The Maritime Executive 2021). Is this a sign of a healthy market? Could a different market structure have produced a different result? More operators and no alliances would be more likely to prevent carriers from introducing so many blank sailings, which would maintain the fluidity of the system, although it would mean ships sailing lightly loaded at times. Such fluidity would have likely prevented rates from rising so much. Moreover, even if the number of calls were reduced, smaller vessels would not have caused large call sizes which caused problems for ports, leading to widespread port congestion and delays.

3 Second challenge: climate change

3.1 Climate change mitigation

Greenhouse gas (GHG) emissions from shipping continue to rise every year, reaching 1,076 million tonnes of CO$_2$e in 2018. Shipping’s share in anthropogenic GHG emissions also increased from 2.76% in 2012 to 2.89% in 2018 (IMO 2020).¹ Measures implemented by the IMO do not address the total amount of carbon emissions from shipping but focus only on increased efficiency of vessels to reduce energy intensity. Examples are the Energy Efficiency Design Index (EEDI) and the Ship Energy Efficiency Management Plan (SEEMP), introduced in MARPOL² Annex VI in 2011, and entered into force in 2013. The existence of the Jevons paradox, which argues that increased efficiency leads to increased total use (Jevons 1865), is shown in Fig. 1. Carbon intensity (emissions per unit of transport work, in this case tonne miles) declines, while total goods loaded, tonne miles travelled and carbon emissions go up. The majority of this improvement occurred before 2012 due to the adoption of slow-steaming to save fuel while carriers were losing money and fighting to stay in business due to the overcapacity crisis in those years (Cariou et al. 2019). The most recent IMO GHG study (IMO 2020) shows that even the best-case scenario, including all current and planned policies, will produce no reduction by 2050 because efficiency savings will be consumed by growth. The worst-case

¹ IMO figures in this paragraph relate to all shipping, not just containers.
² The International Convention for the Prevention of Pollution from Ships (MARPOL) was adopted by the IMO in 1973 and entered into force in 1983. It currently contains six annexes, with the first five covering pollution and waste in the sea. MARPOL Annex VI, covering air pollution, was added to MARPOL in 1997 and has been in force since 2005.
scenario shows a 50% increase in GHG emissions. The level of ambition in the IMO Initial GHG Strategy includes a reduction of total annual GHG emissions by at least 50% on 2008 levels by 2050 (IMO 2018), rather than full decarbonisation, as recommended by the IPCC. Moreover, it is not just CO₂ that is increasing; all other pollutants (Nitrogen Oxides [NOx], Sulphur Oxides [SOx], particulate matter [PM], methane, black carbon, etc.) continue to rise (IMO 2020).

Attention is now turning towards alternative fuels such as hydrogen and ammonia. Industry actors and researchers are working to develop these fuels (Bouman et al. 2017), but a greater policy push is needed to accelerate action to meet the 2050 target. The comparison with LNG is instructive. LNG was considered a viable alternative for some time. While not producing any overall carbon reduction when entire life cycle emissions are included, use of LNG vastly reduces NOx, SOx and PM (ICCT 2020). Sulphur regulations by the IMO and billions in funding from the EU have helped incentivise greater availability of LNG bunkering facilities (Monios and Fedi 2021). Nevertheless, the World Bank predicts a rapidly declining demand for LNG as bunker fuel after 2030 and recommends that policy-makers discontinue support for this market (Englert et al. 2021). Other observers are predicting around 20% LNG market share by 2050 and indeed only very small share for hydrogen and ammonia, with over 50% of industry fuel still coming from fuel oil (Duru 2019). This is a worrisome prediction, indicating an expectation to continue using fossil fuels as the main energy source until well past 2050. Shipowners have indeed lobbied actively against IMO regulations such as ECAs, and shipping industry
organisations such as the International Chamber of Shipping (ICS), the World Shipping Council (WSC) and the Baltic and International Maritime Council (BIMCO), which have consultative status at the IMO, have actively obstructed climate change policies (Lister et al. 2015; InfluenceMap 2017).

The problem is that “carrots” are provided to incentivise adoption of new fuels but there is no “stick” to require phasing out of fossil fuels. Fossil fuel companies have published plans to drill far more oil and gas than is consistent with decarbonisation (The Production Gap 2020). Once drilled, refined and on the market, that fuel is going to be used unless regulators act. This lack of action was one of the reasons behind the slow uptake of LNG, despite being abundant and cheaper than fuel oil. Without a need to stop using oil, only a small number of LNG-fuelled vessels have been ordered (ICCT, 2020). Thus, it is essential to consider maritime policy-making from both directions—not just encouragement of trials of new fuels but also the push away from fossil fuels.

The failure to reach agreement between IMO member states on market-based measures (MBMs) for decarbonisation of international shipping has been well documented (Psaraftis 2019; Lagouvardou et al. 2020). Neither an emission trading scheme (ETS) nor a carbon tax have come anywhere close to acceptance. The EU is going ahead with including maritime emissions in its ETS, but it already includes aviation without noticeable impact. Some individual countries are setting zero 2050 targets which is admirable, but this does not include international maritime emissions. One exception is the United Kingdom, which will include both maritime and aviation emissions in its national carbon budget from 2033. The latest proposal circulating at the IMO is a levy of 2 USD per tonne of fuel to create an estimated annual 500 million USD research fund (ICS 2019). This sum is not insignificant but should be seen in context, next to the 100 billion USD annual profit, forecast by Drewry for container shipping in 2021. While more research is welcome, it is difficult to view this move as anything other than displacement activity, from organisations with a documented history of opposing environmental regulation. Industry organisations such as the ICS continue to claim that the IMO 50% level of ambition is ambitious when the IMO’s own research shows that it is anything but. It was agreed, at the 76th session of the IMO Marine Environment Protection Committee (MEPC) in June 2021, to postpone further discussion of this proposed fund to MEPC 77, scheduled for November. There was also some support for a bunker levy of 100 USD per tonne of carbon (about 300 USD per tonne of fuel) proposed by the Marshall Islands and Solomon Islands. The likelihood of success is small, however, given that the MBM discussion has already taken place almost a decade before and the political situation now is more divisive (Psaraftis 2021).

3.2 Climate change adaptation and supply chain disruption

According to the World Economic Forum, climate change and environmental concerns such as extreme weather and biodiversity loss are the most likely threats facing global society (WEF, 2020). A body of work has developed on the topic of adaptation of ports to climate change effects (see Panahi et al. 2020 for a
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The primary threats are sea level rise, extreme weather events, stronger storm surges, flooding and erosion. These are being addressed by measures such as increased coastal defences, raising quays, moving facilities and even managed retreat (Becker et al. 2018; Yang et al. 2018). An UNCTAD (2017) survey of 44 ports found that 72% had been affected by serious weather events. A recent study of 141 incidences of disruptions across 74 ports in 12 countries, as a result of 27 natural disasters, revealed a median disruption duration of six days (Verschuur et al. 2020). Moreover, the authors found little evidence of port substitution, as natural disasters usually affect all ports in the same local area. As worst-case predictions for the coming decades become more probable, such disruptions will become more common and policy-makers, planners and industry alike may need to make difficult decisions not to repair port or transport infrastructure at certain locations. The disruptions of the port of New York due to Hurricane Sandy, and the port of New Orleans from Hurricane Katrina resulted in billions of dollars in damage to port-related infrastructure and businesses in the wider area. If the IPCC is correct that such once-per-century storms will become once-per-year storms by 2050, such levels of disruption and cost must be expected (Monios and Wilmsmeier 2020) and repair bills cannot be paid ad infinitum.

While the growing body of work on climate change adaptation of ports focuses on the supply of maritime infrastructure, what has been ignored until recently is the effect on demand for maritime transport as a result of climate change. Almost 1 billion people live in low-elevation coastal zones which will be impacted by the changing climate (Neumann et al. 2015). Increased droughts are predicted, given that the global demand for fresh water by 2050 is expected to increase by 55%, in a scenario where 40% of the world’s population will be living in areas of severe water stress (OECD 2012). These water shortages are predicted to lead to crop failures and food shortages causing over 500,000 deaths per year (Springmann et al. 2016). As a result, the International Organisation for Migration (IOM) estimates 200 million climate refugees by 2050 (IOM 2020). The billions of dollars impact on supply chains from a 6-day blockage of the Suez Canal (even if lower than some of the figures seen in the headlines) could be replicated frequently by local and regional climate-related conflicts and resultant geopolitical disruptions (WEF 2020; US National Intelligence Council 2021). These events are likely to reduce, as well as shift geographically, demand for maritime transport and increase its cost, incentivising companies to make their global supply chains more resilient and reliable. Responses may involve changing or diversifying supplier locations as well as shortening supply chains for key inputs (Foerstl et al. 2016).

It seems likely that we are seeing the first signs of globalisation changing its form; global supply chains will be less reliable, slower and more expensive. Some shortening of product supply chains has already been evidenced since the global financial crisis (Miroudot and Nordström 2020). The pros and cons of reshoring and nearshoring have been discussed in recent years (Foerstl et al. 2016; The Economist Intelligence Unit 2020), yet whether the costs of disruptions justify such restructuring will be case-dependent. The question is when disruptions on a similar scale to
COVID-19 may become sufficiently common that the calculation changes for a significant share of products.

4 The need for a new vision

4.1 The future requires more than efficiency

The uncertain future in a changing climate requires more than just predicting and managing risks within traditionally existing control limits. By contrast, both public and private analysts will need to consider the role of interconnected systems and the unpredictability of future shocks such as pandemics like COVID-19. The current concentrated industry structure is driven as much by commercial decision-makers as by public policy that encourages alliances and mega-ships through anti-trust exemptions, public port investments and billions in ongoing subsidies (ITF 2015, 2018, 2019). Linkov et al. (2014) argue for the primacy of “distributed decision-making, modularity, redundancy, and ensuring the independence of component interactions”. They point out that a focus on risk management prioritises single components and underplays the role of interdependence with other components of the system or connections with related systems. Many of these recommendations are ignored by disconnected maritime decision-makers; for example, the focus on economies of scale by carriers causes diseconomies in ports and hinterlands (ITF 2015). Priority is given to making infrastructure stronger and putting planning systems and training in place (Becker et al. 2018), with less focus on transforming systems, which would mean a trade-off that reaches beyond the primary focus of efficiency. In the race towards efficient systems and economies of scale, risks and fragility are increased (Manheim 2020). An efficiency-based supply chain model was considered appropriate in the last couple of decades which were more stable politically and environmentally. We argue that in fact society is currently facing a “Minsky moment”: the stability of recent times leads to the taking of greater risks in the belief that this stability will continue, ignoring the increasing evidence to the contrary (WEF 2020; US National Intelligence Council 2021).

Economies of scale can no longer be the panacea of the container shipping industry, as shown in the preceding analysis of the twin challenges of market and climate. Economies of scale in shipping have enabled carriers to deploy ever-larger vessels to push competitors out of the market and drive the expansion of port infrastructure to its economic, social and environmental limits (ITF 2015). This process has created a less agile business that can only respond to crisis by withdrawing capacity and creating further bottlenecks and problems. While carriers would argue that smaller vessels are less scale-efficient and hence less green, efficiency is a chimera that leads to the Jevons paradox (Fig. 1), whereby all the efficiency gains in recent times have been eaten up by overall growth, leading to no net reduction of carbon emissions and indeed an increase. The Fourth IMO GHG study, even when including all expected efficiency improvements, predicts a best-case scenario of no net reduction in GHG emissions by 2050 (IMO 2020). The urgency of the climate crisis requires several different solutions, knowing that only some will succeed. Professor
Joachim Schellnhuber, founding director of the Potsdam Institute for Climate Impact Research, comments that “efficiency is the enemy of innovation. You have to strand assets, you have to waste capital, because you invest into the wrong things, because you cannot know beforehand. But you also invest in the right things... We cannot efficiently get ourselves out of this predicament. So we have to save the world but we have to save it in a muddled way, in a chaotic way, and also in a costly way. That is the bottom line, if you want to do it in an optimal way, you will fail” (Breeze 2019).

While ports and carriers aim to build-in a certain level of spare capacity to cope with demand spikes, the increased size of individual vessels has reduced flexibility and frequency of calls (ITF 2015). On some routes capacity may be managed in small increments with less disruption, but on secondary routes already served by overly large and unfilled ships, cascaded down from mainlines (Wilmsmeier and Sánchez 2011), a blanked sailing means that capacity is cut suddenly. This explains why the largest jump in rates was seen on North–South routes, e.g. Asia to South America and Africa (UNCTAD 2021). A move to smaller vessels and away from “gigantism” (Haralambides 2019) would be better for the market and the environment, if it reduced incentives for induced traffic at artificially low rates to fill large vessels, leading to increased total industry emissions. The goal for researchers in the future is not how much efficiency can be gained by larger carbon-fuelled ships that lead to larger total emissions. Instead, research is needed to investigate how to improve efficiencies of smaller ships and identify the optimum size of smaller vessel that can combine economies of scale, flexibility of service provision and zero-carbon fuel.

4.2 Steady-state economics and degrowth rather than growth

It is already well known that GDP was never intended to be the main indicator of progress. It was developed during the Depression for the US government by Simon Kuznets as a measure of economic activity and during the second world war it was valued as a tool to understand all economic activity and relate it to managing the war economy. But Kuznets never intended it to be the measure of economic progress. GDP includes all market activity, good and bad, does not include many positive things, and indeed gives no indication of how a nation is progressing in terms of health, education, etc. According to Hickel (2020): “As soon as we start focusing on GDP growth, we’re not only promoting the things GDP measures, we’re promoting the indefinite increase of those things, regardless of the costs”. Jackson (2017) shows that there is no direct correlation between GDP growth and growth in the quality of education or healthcare. A different measure, the Genuine Progress Indicator (GPI) was developed in 1989 by Herman Daly and John Cobb. The key to this indicator is that it subtracts the negative economic activity (e.g. pollution, crime, illness) from the positive. GPI per capita levelled off in the mid-70s and even declined slightly since, while GDP per capita continued to grow.

Hickel (2020) observes that “in 2018, 238 scientists called on the European Commission to abandon GDP growth and focus on human well-being and ecological stability instead. The following year, more than 11,000 scientists from over 150
countries published an article calling on the world’s governments to ‘shift from pursuing GDP growth and affluence towards sustaining ecosystems and improving well-being’.” Raworth’s (2017) doughnut model concept is based on the idea that, instead of chasing growth, based on spurious targets such as GDP, we should be growth-agnostic and instead aim to achieve all the social foundations of life (food, water, shelter, energy, etc., linked to the UN Sustainable Development Goals) without overshooting the ecological ceiling (not just avoiding climate change but retaining liveable levels of air pollution, fresh water, etc., drawn from the nine planetary boundaries of Steffen et al. [2015]).

Raworth states that five factors determine whether we can live in this safe space of the doughnut: population, distribution, aspiration, technology and governance, many of which are clearly relevant to maritime transport governance. While some authors argue that we can live within these boundaries while remaining agnostic about growth, others argue actively for degrowth. Hickel (2020) defines degrowth as “a planned downsizing of energy and resource use to bring the economy back into balance with the living world in a safe, just and equitable way.” ETC (2020a) shows that we cannot produce enough renewable energy (e.g. electricity and “green” hydrogen)3 to fuel society at current levels of usage. Jackson (2009) calculated that with current growth levels, decarbonising by 2050 would require carbon efficiency improvements that are ten times higher than at present, and even under a scenario of no growth, this level would still need to be eight times higher: “It follows that a combination of degrowth and efficiency improvements is therefore necessary.”

5 Required changes to maritime governance

5.1 Regulation of the market

Under the threat of ‘ruinous competition,’ laws are on the books of many states and cities legalizing the ruin of competition. C. Wright Mills (1951)

For 35 years, the European Commission has permitted certain exemptions from competition regulations under the justification that liners collaborating can improve efficiency of capacity utilisation and reduce destructive competition. From 1986 to 2008 liner conferences were allowed to fix prices.4 This regulation was repealed in 20065 and the Consortia Block Exemption Regulation (CBER) was applied since

3 Use of hydrogen as shipping fuel does not produce emissions from the ship, but the life cycle emissions can be very different depending on the production process. “Green” hydrogen is considered a zero-carbon fuel as it is produced from renewable electricity. “Grey” hydrogen is produced from methane gas and results in carbon emissions. “Blue” hydrogen is produced from gas but aims to capture the resultant emissions (ETC 2020b).

4 Council Regulation (EEC) No 4056/86 of 22 December 1986 laying down detailed rules for the application of Articles 85 and 86 of the Treaty to maritime transport.

5 Council Regulation (EC) No 1419/2006 of 25 September 2006 repealing Regulation (EEC) No 4056/86.
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Under the CBER carriers have not been allowed to fix prices, but have been permitted to operate in consortia (vessel sharing agreements) as well as alliances in order to coordinate capacity. The CBER was renewed in 2014 and, despite growing opposition from shippers, forwarders and terminal operators (ITF 2018), the regulation was once again renewed again in 2020 until at least 2024 (European Commission 2020).

It is also necessary to consider the complications of different regulatory jurisdictions in which global carriers operate. For example, Singapore allows conference price-setting, and “discussion agreements” are permitted in the United States. The 2M alliance would have been P3 had not China intervened. However, as the European jurisdiction represents one end of two major East–West trade lanes with Asia and the Americas, its periodic reconsideration of the exemption is always widely discussed and analysed.

The container shipping market has for some time been oligopolistic and exhibiting tacit collusion (Sys 2009; Wilmsmeier and Sánchez 2011; ITF 2018; Brooks et al. 2019). Now 91.5% of the sector is controlled by the top 10 players, with 9 out of the top 10 also joined in just three alliances. Alliances are exempt from anti-trust regulation on the premise that they reduce overcapacity via economies of scope, with the requirement that (part) of these efficiency gains be shared with the customer through lower prices (Benacchio et al. 2007). Have alliances reduced overcapacity? No. This arrangement allowed carriers to build up capacity, disadvantaging smaller competitors (ITF 2018) and leaving them vulnerable to acquisition. Carriers then withdrew that capacity during the COVID-19 crisis in order to protect and indeed increase profits. Have economies of scope (alliances) and economies of scale (ship size increases) resulted in lower, market-driven, freight rates? No. Freight rates fell in 2009 as a result of overcapacity triggered by the global financial crisis. They remained low in recent years, not due to alliances, but due to continued overcapacity as carriers continued to order more tonnage than was required by levels of demand (Wilmsmeier and Monios 2020). Carriers argue that they need alliances in order to manage overcapacity, that overcapacity is an unavoidable aspect of shipping cycles, but it would be more efficient if incentives were changed such that overcapacity, at least at these levels, did not exist. In fact it is the alliances that allow, even require, carriers to pursue such a strategy, a dilemma summarised succinctly by Haralambides (2019): “The industry has fallen into some sort of vicious circle where the need to cut costs leads to the construction of larger ships, creating overcapacity that depresses rates, thus leading to a stronger need to cut costs.” The backwards logic that carriers need anti-trust exemptions in order to fill large vessels shows how unhealthy the market has become. Alliances incentivise uneconomic behaviour, supply leading demand, and, in the case of the container shipping industry, seem to facilitate collusive behaviour, such as the coordination of overcapacity which disadvantages smaller competitors, or the coordinated timing of ship scrapping (ITF

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6 Commission Regulation (EC) No 906/2009 of 28 September 2009 on the application of Article 81(3) of the Treaty to certain categories of agreements, decisions and concerted practices between liner shipping companies (consortia).
Low rates are therefore the reason for alliances, not the result of them. Breaking up alliances would make it more difficult for individual carriers to fill large vessels, leading to a reduction in average vessel size and more direct services. Such a model would facilitate more direct competition rather than a focus on economies of scale to reduce prices (Haralambides 2019).

The other issue of allowing alliances is the danger that the shipper ends up with fewer direct services, lower frequency and less choice of port calls. Has this happened? The evidence presented above (cf. Hoffmann and Hoffmann 2021) suggests that this has indeed occurred, as does the evidence from shippers (ITF 2018). However, it is not clear whether shippers are against concentration or only alliances. The Global Shippers Forum (2016) is in favour of mergers but not alliances, so there would be less choice of company but at least they would compete directly and shippers would know which carrier they were dealing with. Reducing transhipment and bringing the container as close to the customer as possible are highly prized by shippers (Haralambides 2019), who regularly complain about not knowing which carrier in fact has their container and how many times it has been handled.

OECD (2015) and UNCTAD (2018) pointed out that alliances lead to less port choice, fewer services and general quality issues, but stopped short of making recommendations for change. ITF (2015) had recommended that port costs and public investments should be better aligned to public interests so as not to incentivise use of mega-ships, and to ensure that any associated costs incurred by ports (e.g. dredging) would be recovered through appropriate port dues. ITF (2018) highlighted several downsides of alliances, including monopsony power over ports, lower service quality for shippers, market power that prevents new entrants in the market and overcapacity by allowing carriers to purchase mega-ships. The report proposed “a presumption toward” ending the EU block exemption from anti-trust regulations for shipping lines. This very reasonable proposal that shipping lines should compete like any other business caused a predictable industry outcry (Knowler 2018).

Brooks et al. (2019) summarised the key issues in the debate such as the role of different jurisdictions across the globe and the divergent views between shippers, carriers and other stakeholders such as ports, as well as challenges of data collection on trade lane market shares and freight rate indices. The report focuses on providing certainty for carriers, and ensuring none is forced to exit the market: “Carriers have been unable to get the freight rates they need but seek renewal of the CBER [Consortia Block Exemption Regulation], while shippers are unable to get the certainty they desire on non-monetary aspects of carrier service and so seek abolition, but without providing the supporting evidence that it will resolve their concerns.” However, one could argue that it is not the task of the regulator to ensure that badly run businesses stay in the market. If they are inefficient then the role of the market is to remove them. In any case, more and smaller carriers would reduce this “too big to fail” bankruptcy risk of huge carriers. The current state of the market contains high barriers to both entry and exit, precluding its smooth functioning (Wilmsmeier and Monios 2020). Brooks et al. (2019) provide evidence of the problem of the current market which incentivises the wrong decisions: “the size of vessels in service today raises serious doubts about the future of the industry under the expiry pathway as most carriers are unable to mount a viable service with only their own vessels.”
While the analysis of Brooks et al. (2019) focuses on carrier cost, it is not necessarily the goal of regulation to achieve lowest cost for carriers (either as a whole or individually). A more important goal is to create a level playing field with open competition thus providing the best service for users. As long as freight rate increases, for example due to smaller ships or environmental regulations, are the same for all carriers, then there is no reason to intervene in the market. Maritime transport is vastly under-priced because it does not internalise external costs; in the low freight rate period before COVID-19, rates could represent around 1% of the final product price for high-value goods or low-value low-bulk goods. In this period, rates could amount to around 10% for more bulky goods such as large appliances or assembled furniture (Rodrique 2020), and these products are among the worst hit by recent rate increases, with the new freight rates accounting for 40–60% of the cargo value (Sea-Intelligence 2021). A quote from a shipper during the recent COVID-19 rate hike is instructive: “It is only worth paying that rate if you have a container full of iPhones—not a container full of plastic toys or household goods” (Landon 2021). In order to get anywhere near meeting environmental targets, it will be necessary to reduce transport of such low-cost goods that are only feasible for export due to under-priced maritime transport.

Studies that recommend retaining the block exemption focus on keeping costs low for inefficient carriers, arguing that removing the exemption would lead to increased rates hence a drop in demand. Demand was booming in 2008 when rates were three times higher than after the crash, according to the basic economics that demand exceeded supply hence rates were higher. Even if a future rate increase due to the internalisation of external costs does lead to a drop in demand, this would in any case primarily affect demand for shipping of low-cost goods, which should in fact be the goal of policy-makers seeking to reduce shipping emissions.

This dilemma goes back to the rise of Chicago school economics at the expense of previous approaches to issues of anti-trust, market concentration and barriers to entry. Davies (2017) writes that “Bain (1956) viewed high profit and industrial concentration as the consequences of anti-competitive behaviour” but the later Chicago school “saw them as positive side-effects of efficiency”. Given that the container shipping market has enjoyed exemptions from anti-trust regulation for almost 40 years, it is impossible to prove by an ex ante study that banning alliances would drive up prices, but even if so, this would almost certainly improve quality. The whole point of the market mechanism according to the early neoliberals like Hayek (1944) is that the market outcome is unpredictable so it cannot be steered either by governments or powerful corporations. Before the rise of Chicago school neoliberalism, such market power would be broken up as a matter of principle, in order to prevent dominance of any one actor or group of actors, regardless of the potential benefits it may bring. The high fixed costs characteristic of liner shipping are not unique to this sector and have been shown to lead to dominant or oligopolistic market structures when the industry is protected from competition (Benacchio et al. 2007).

If the discipline of economics has a goal, it is to achieve the optimum allocation of scarce resources. The market is a socially constructed and regulated tool to achieve this goal. The market aims not to produce the lowest cost but to achieve equilibrium between supply and demand and optimal allocation given relevant limits.
and constraints set by market regulators (e.g. safety and environmental standards). It is clear from both commercial and environmental perspectives that the shipping market has failed. Low freight rates between 2009 and 2019 were not achieved by market success but by market failure, with under-priced maritime transport leading to declining service quality and increased environmental damage.

How could regulators prioritise agility and flexibility rather than economies of scale? In theory, regulators could regulate vehicle size, as is done with land-based modes of transport (e.g. truck length and weight regulations), or enforce a certain level of service (e.g. require carriers to maintain advertised schedules or keep a certain percentage of empty boxes per trade lane or coastal range—such regulations are common in the regulation of public transport provision by private operators). Such proposals are unrealistic in international shipping due to the regulatory impasse at the IMO and the preference at both IMO and EU levels for market-based measures (Monios and Ng 2021). What can realistically be done is to revise existing policy that incentivises the current market structure. The first proposal is to end the CBER, as discussed above and also recommended by ITF (2018). Haralambides (2019) argues that: “if container shipping becomes more open and competitive in the future, and alliance agreements regarding vessel sharing, investment planning, etc. are scrutinised more closely for their compatibility with competition law, as I expect, the joint filling of the ship will become more difficult and ship sizes shall by necessity decrease, together with an increase in the number of ports of call. Low prices would then be achieved through more competition rather than big ship sizes.” Second, both public port investments and port pricing could be reviewed, aiming to reduce the public subsidy for mega-ships (ITF 2015; Haralambides 2019). Third, maritime subsidies, currently totalling EUR 3 billion annually in OECD countries alone, could also be reviewed to ensure they do not encourage industry consolidation and disproportionately benefit vertically integrated companies and increase the link with clear outcomes, particularly decarbonisation (ITF 2019). Such a change in policy would aim to prioritise smaller carriers that are closer to the market and avoid the creation of behemoths which create an unhealthy market, display abuses of market power and use regulatory capture to prevent regulation and derail policies for climate change (InfluenceMap 2017). Such a move would also aim to improve flexibility and fluidity in the maritime supply chain, helping to resolve some of the issues surrounding the post-COVID-19 period of high rates and container shortages.

5.2 Linking the market with the environment

While the discussion above and previous analyses of the liner market have focused on economic considerations, the emerging question is whether ending the block exemption and disincentivising mega-ships would also improve the environmental perspective. The myth that large ships are greener is constantly retold, ignoring the Jevons paradox and the data that show total emissions from

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7 A study of an IMO MEPC meeting by InfluenceMap (2017) revealed that 31% of countries were represented in part by industry actors.
shipping rising every year (cf. Fig. 1). Large ships produce fewer emissions per unit of transport work, but create overcapacity that leads to artificially low freight rates, which induce increased maritime transport hence an increase in total emissions from the sector. A related challenge is that, even if the entire fleet switched to hydrogen/ammonia, it is not currently possible to produce enough “green” hydrogen to fuel all sectors of the economy, of which transport is only one (ETC 2020a). Even if all countries were able to produce sufficient renewable energy to meet all their current energy needs, as well as enough to meet demand growth in coming decades, this will then require a huge additional demand from the electrification of domestic life such as transport (cars, trucks, trains, etc.) and heating of homes and offices. As international maritime emissions are, for the most part, not currently included in national emissions, producing “green” hydrogen for shipping will be a lower priority. There is a strong danger that shipping switches to “grey” hydrogen and never obtains sufficient “green” hydrogen. In order to meet decarbonisation targets, degrowth of total shipping will be required, an approach that is complementary to reducing average ship size. Smaller vessels also reduce the significant environmental damage of dredging (ITF 2015). Breaking up alliances and revising port and shipping subsidies will reduce concentration in the industry as well as disincentivising ever-larger vessels. Such changes are not only necessary to recreate a competitive container shipping industry, but could also contribute towards environmental targets by inducing less demand growth.

In the future, shipping services will need to internalise the external costs they produce. A survey by Lloyd’s Register and University Maritime Advisory Services (2018) has shown that a tax of 50 USD per tonne of CO₂ was the maximum level industry was prepared to condone. The World Bank calculated that this level of tax could result in an increase in shipping costs of up to 16%, and less than 1% on the final price of the goods (Halim et al. 2019). Yet, the 2021 rate increases, in the order of several hundred percent, have enabled record industry profits without reducing demand. Some rebalancing of demand is, however, likely to come when rates find a new level after the current congestion and blockages are resolved.

Given that the transition towards decarbonisation must be achieved in a socially just manner (Rayner 2020), the effects of increased transport costs as a result of economic or environmental regulations or policy changes must be considered. Yet, as developing countries will bear a disproportionate share of the costs of climate inaction (IPCC 2018), it is important that they are not used as a “discourse of climate delay” (Lamb et al. 2020). As discussed above, increased transport costs primarily affect low-value bulky goods. Therefore, key to ensuring that increased transport costs do not disproportionately affect developing countries is to redress the current “ecologically unequal exchange” (Givens et al. 2019). During 1990–2015, high-income countries generated 11 times the value added per tonne of raw material embodied in exports compared to low-income countries (Dorninger et al. 2021). An important avenue for future research is to determine whether an increase in the cost of shipping could decrease the
transport of low-value resources and production inputs but increase value-added activity closer to the resource origin, which could bring greater benefit to developing countries.

5.3 Policy goals, targets and measures

It is clear that the shipping industry will not act at the required scale and speed without a policy push. Investors need certainty and long timescales. Maritime policymakers could take the lead from countries (e.g. UK and France) that are banning the sale or use of fossil-fuelled vehicles in the next two decades. In September 2021, over 150 maritime organisations, including some major ports (e.g. Rotterdam and Hamburg) and carriers (e.g. Maersk and MSC) called on the IMO to adopt a target of full decarbonisation by 2050 (Global Maritime Forum 2021). The technology already exists, but will not be developed and scaled up in time unless there is an incentive to stop using fossil fuel. A supporting target could be to ban the sale of new fossil-fuelled vessels some years in advance of 2050. Such policies are already being applied in other modes; for example, the UK and France have banned the sale of new diesel-fuelled cars and trucks from 2040. Given the current state of technology and the 20+ year lifespan of ships, there is no perfect date to choose, but adopting the same date of 2040 could be a suitable compromise. Additional regulations could be applied to encourage ship owners not to continue to use old polluting vessels past this date, such as increasing the strictness of the already-existing SEEMP, notwithstanding that it is currently toothless and seen only as a compliance issue (Poulsen and Johnson 2016). Newer vessels delivered around 2030–2040 would need to retrofit their engines or fuel systems to continue operation past 2050.

Nevertheless, it does not seem likely that such action will be taken at the IMO, as too many individual countries will not agree. This impasse is exacerbated by the conflict between the United Nations Framework Convention on Climate Change (UNFCCC)\(^8\) principle of “Common But Differentiated Responsibilities” (CBDR) and the IMO policy of “No More Favourable Treatment” (NMFT). Selin et al. (2021) suggest that this deadlock could be broken by transferring the IMO’s mandate for decarbonisation of shipping to the UNFCCC which would bring shipping emissions into nationally determined contributions (NDCs), and propose allocating these emissions to each country according to the location of the shipowners.

Shipowners rather than users are arguably the right actor to target, since they order the vessels and choose the parameters, whereas increased fuel prices or port dues target the users of existing ships (Poulsen et al. 2021). Other options such as flag country or countries with the most port traffic are possible, yet the analysis of Selin et al. (2021) reveals that using country of beneficial ownership produces the most equitable result, allocating increased emissions to OECD countries. The Marshall Islands receive the highest increase according to both ownership and flag approach, but far less in the former case. The authors add that the UNFCCC has

\(^8\) The UNFCCC (signed 1992, entering into force 1994) was the forerunner of the annual COP meetings (starting 1995), the Kyoto Protocol (1997, entering into force 2005) and the Paris Agreement (2015).
a larger membership than the IMO and also allows for differentiation of responses according to CBDR, which is proving a sticking point at the IMO (Psaraftis 2021).

Therefore, whether as a result of incorporating maritime emissions into NDCs, or simply as an alternative to lack of action by the IMO, if decarbonisation leadership is going to appear, it will need to come from individual countries and maybe blocs such as the EU. Independent analysts, commentators and academics can play their part in demanding such leadership. The EU has at times led the IMO in environmental policy, such as sulphur limits and vessel inspection. To achieve decarbonisation, the EU is relying on including maritime emissions in the EU ETS rather than direct regulation or taxes on supply. There is as yet no evidence that market solutions will lead to decarbonisation by 2050 without additional incentivisation. Policy-makers should give such clear targets and deadlines for phasing out fossil fuels but leave the technical details of new fuels to the market. As long as fossil fuels remain abundant and cheap and their use remains permitted, industry will continue to be structured around them.

6 Conclusions

As researchers and analysts, we must be ever vigilant, asking better questions, frequently challenging our assumptions, checking our biases, and looking for weak signals of change – US National Intelligence Council (2021)

The maritime transport sector will face more challenges than COVID-19 in the coming decades, both directly through climate change effects on shipping operations and indirectly through changes in demand influenced by climate change, global health crises and geopolitical evolutions. Potentially turbulent future scenarios are being discussed in many fields, from economics and finance (Verisk Maplecroft 2021) to energy and defence (US National Intelligence Council 2021). While the governance of maritime transport is complex, involving public and private actors at several geographical scales, finally bringing the natural environment fully into the economic context can provide some guidance to policy-makers. The goal of the discipline of economics is to achieve the optimal allocation of scarce resources. It is not to find the lowest cost nor to increase GDP; these are commercial and political goals which may in fact prevent the correct functioning of the market. The market and environmental challenges analysed in this paper show that the shipping market is not producing the optimal allocation of resources, therefore the liner shipping sector is a case of market failure that requires correction.

The preceding analysis addressed two current and related governance challenges in container shipping. The first challenge is the oligopolistic market structure that acts in an anti-competitive manner, reducing service quality and causing environmental damage, unable to change because of regulatory capture. Its reactions to crises like COVID-19 allowed increasing profits while decreasing service quality. Policy recommendations to improve this situation were proposed above, including ending the CBER, reviewing public port investments and revising public subsidies to link them with clear outcomes such as decarbonisation. While
there is no global governance body that could perform this task, revision of regulations and subsidies at least by the European Commission on carriers trading in its jurisdiction would influence at minimum two of the three major East–West routes and would influence the global market to some degree. The need for such policy changes has been raised before (ITF 2015, 2018, 2019; Haralambides 2019); it may be that the rate rises during the COVID-19 pandemic will finally result in action.

The second challenge is climate change. As regards mitigation, pressure is increasing on the IMO and individual countries and blocs to set targets for full decarbonisation by 2050. The corollary of such a policy is to ban the use of fossil-fuelled ships by that date, while leaving the technical development of alternative fuels to the market. As regards adaptation, the challenges of COVID-19 are only a taste of the kinds of blockages and disruptions to come. Change will be slow at first, but in the decades to come there will be a reduction in globalised supply chains due not just to climate change adaptation but also to geopolitics. The transition to this uncertain future is likely to be smoother if both regulators and policy-makers prioritise higher quality rather than quantity of shipping. This means prioritising smaller companies with smaller ships; container shipping could be less commoditised, transporting fewer low-value goods which would have a smaller market if the external costs of environmental damage were internalised. A key avenue for future research is to investigate how to improve efficiencies of smaller ships and identify the optimum size of vessel that can combine economies of scale, flexibility of service provision and zero-carbon fuel.

However, it must be remembered that analysing current trends and “looking for weak signals of change” (US National Intelligence Council, 2021) require not only proactive governance changes now, but also serve to prepare decision-makers for future changes. The “weak signals” are clearly evidenced, but the rate and scale of change cannot be forecast with full confidence. Thus, the discussion in this paper concerns analysts and planners as much as maritime governance organisations. It is necessary that both public and private decision-makers be aware of how current trends and predictions may play out and prepare themselves accordingly for a range of scenarios.

Policies and regulations are geared towards continued growth, but the evidence can no longer be ignored that continued growth is not consistent with decarbonisation, nor with expected turbulent scenarios. Not only are more shocks like COVID-19 to be expected in the future, but in the medium- and long-term several drivers have been identified that could cause maritime trade to decline. These drivers include the following: climate change, making trade and globalised supply chains difficult and costly; geopolitics, causing local and regional conflicts and blockages; and policy, such as regulations and taxes on fuels. The shipping market will look different in 2050 but it seems that public and private decision-makers expect and demand continued growth forever. Changing the narrative as regards growth can complement new thinking on both the commercial and environmental aspects of market failure in maritime transport.
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