The economic value of the European shipping sector

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Content

Summary

This report provides the latest update on the status of the European-controlled fleet for the year 2024 and assesses the economic impact of the European shipping industry for 2021, which is the latest year for which economic indicators were publicly available for the European shipping industry at the beginning of the project.[1] The European shipping industry, encompasses diverse activities, including freight and passenger transport, offshore activities, and maritime services. As of November 2024, the European-controlled fleet, considering EU-27 plus Norway, represents 33.6% of the world's total gross tonnage (GT) and, with more than 22,000 vessels, approximately 20% of the total number of vessels worldwide.

Key findings
The European shipping sector's turnover, which inherently measures the direct and indirect economic impact, showed a high nominal growth, reaching €183.4 billion in 2021, a significant rebound from the dip experienced in 2020 due to the COVID-19 pandemic.

In 2021, the European shipping industry provided jobs for 219,000 employees (direct employment) and added a value of €58.5 billion, with the value added featuring a high growth not only compared to the COVID-19 period but also compared to the pre-COVID-19 period. This includes activities related to sea and coastal freight and passenger transport, renting and leasing of transport equipment as well as water project construction services.

Indirect economic impacts of sea and coastal freight and passenger transport, derived from related industries supplying the shipping sector, added an additional €56.9 billion in value, with further induced effects bringing the total economic contribution to €127.8 billion. In addition to the direct employment contribution, indirect and induced employment globally created over 1.3 million jobs.

The European shipping industry maintains a strong global position accounting for over a third of the capacity of the global fleet (33.6% of the global gross tonnage) and for 20% of the number of ships in the global fleet in 2024. The share in the global tonnage differs highly between fleet segments, with ferries, containerships, dredgers and oil tankers featuring an above average capacity share. The same holds for the global share in terms of the number of ships, with container ships, LNG carriers, ferries, cruise vessels, bulk carriers and dredgers featuring an above average share.

The European fleet continued growing in gross tonnage, increasing by 8% from 2018 to 2024. Also, the previous trend of a gradual, steady decline in the number of ships seems to be reversed, with the 2024 fleet consisting of 1% more ships compared to 2018. Nevertheless, the European controlled fleet's share of the world fleet's gross tonnage has seen a decline from 38.5% in 2018 to 33.6% in 2024. This is since regions such as East and Southeast Asia

[1] Since 2014, ECSA has published reports on 'The economic value of the EU shipping industry', with updates published in 2015, 2017 and 2020. These reports present figures and graphs on the development of the EU-controlled shipping fleet and the direct and indirect economic impact of the EU shipping industry, both in terms of gross value added and employment. For the indirect impacts, the impacts in the wider economy, i.e. higher up in the value chain are also accounted for. Estimations differ from estimations as presented by Oxford Economics and ECSA in the previous studies due to the change in geographical scope (exclusion of the UK) and in metric definitions. Additionally, the current study relies exclusively on publicly available data, whereas previous studies used extra research/surveys to complement the publicly available data.

have grown at a faster rate and as a result have increased their market share. Also, the number of employees in 2021 has decreased by around 5% compared to 2020 and approximately 16% compared to 2018 and 2019 respectively.

There are more than 4,100 shipping companies based in the EU and Norway. The vast majority of EU shipping companies are Small and Medium Enterprises (SMEs), with 90% owning less than ten vessels.

Method and Scope

The status and recent development of the European-controlled fleet have been analysed using two primary indicators: the number of vessels and their capacity measured in gross tonnage. To assess the economic value of the European shipping industry, three key indicators have been applied: value added, employment, and turnover. This comprehensive approach ensures a detailed understanding of both the fleet's status and the broader economic contributions of the industry.

The geographical scope of this analysis covers the EU-27 countries and Norway, providing a focused regional perspective. The analysis is based exclusively on publicly available data, ensuring transparency and reliability. The direct economic impact of the EU shipping industry is determined using data provided by Eurostat, which focuses on the economic activities within European boundaries. The indirect economic impacts, which include both value added within Europe and employment effects on a global scale, are estimated using input-output tables provided by Exiobase. This methodological approach allows for a nuanced understanding of how the European shipping industry influences not only its immediate surroundings but also the global economy.

1 Introduction

1.1 Purpose of the study

Since 2014, ECSA has published reports on 'The economic value of the EU shipping industry', with updates published in 2015, 2017 and 2020.[2] These reports present figures and graphs on the development of the EU-controlled shipping fleet and the direct and indirect economic impact of the EU shipping industry, both in terms of gross value added and employment. For the indirect impacts, the impacts in the wider economy, i.e. higher up in the value chain are also accounted for.

This report presents the latest update on the status of the European controlled fleet for the year 2024 and the economic impact of the European shipping industry for the year 2021 – the latest year for which economic indicators for the European shipping industry were publicly available at the beginning of the project.

1.2 Geographical scope

This document discusses the status of the 'European shipping industry', which includes the 27 EU member states[3] and Norway.

To be able to compare data over time, data from before Brexit has been corrected so that data from the UK are not included.

The direct economic impact of the EU shipping industry is determined based on data as provided by Eurostat. This inherently means that the direct economic impact of the EU shipping industry is determined within the European boundaries and not globally. The indirect economic impacts derived partially reflect the economic effects within the European boundaries (value added) and partially the effects on a global scale (employment).

1.3 Defining the shipping industry

ECSA defines the shipping industry by the following economic activities (Oxford Economics, 2014):

- the transport of cargo by sea;
- the transport of persons by sea (both on ferries and on cruise ships);
- maritime activities by service and offshore support vessels such as ships that are:
  - laying or repairing undersea cables or pipelines;
  - prospecting for oil;
  - conducting oceanographic research;
  - providing diving assistance;
  - undertaking undersea work;
  - servicing offshore wind farms, oil and gas platforms.
- maritime activities by towage and dredging activities at sea.

[2] See Oxford Economics (2014, 2015, 2017, 2020).

[3] For some of the landlocked EU countries there is no data available as their participation in the maritime sector is negligible.

Ships that perform these maritime activities are registered in the World Fleet Register of Clarksons (Clarksons Research Portal, 2022). The analysis of the fleet is based on the data from this register as well as on the World Fleet Monitor, which Clarksons Research provides on a regular basis.

1.4 Indicators and data sources economic impact assessment

Indicators of fleet sizes

The status and recent development of the European controlled fleet are analysed by means of two indicators: the number of vessels and their capacity; the latter is measured in gross tonnage (GT), giving the volume inside the vessels. Where available, deadweight tonnage (dwt) is also provided.

Indicators of economic impact

The economic impact of the shipping industry is measured by means of the following indicators:

- **Direct economic impact:**
  - value added by the shipping industry;
  - employment in the shipping industry.
- **Indirect economic impact:**
  - value added by industries supplying the shipping industry;
  - employment in industries supplying the shipping industry.
- **Induced economic impact:**
  - indirect impacts on value added and employment induced by the increased income resulting from the direct and indirect economic impact.

In addition, we also present the turnover of the shipping industry. Eurostat defines turnover as comprising "the totals invoiced by the observation unit during the reference period, and this corresponds to market sales of goods or services supplied to third parties." (EC, 2013) This thus also includes the costs related to intermediates stemming from other sectors. Turnover is thus an economic indicator which inherently combines direct and indirect impacts.[4]

Data sources economic impact assessment

The economic impacts are derived based on publicly available data: the direct economic impacts are determined by means of data as provided by Eurostat, while the indirect economic impacts are estimated using input-output tables as provided by Exiobase.

Due to new data requirements as laid down in the European business statistics (EBS) regulation, the Structural business statistics data reported by Eurostat from 2021 show inconsistencies with the data from before 2021 in terms of the labelling of the indicators as well as the type of indicators for which data is provided. Annex A of this report provides more information on these changes and on how we have dealt with these changes to ensure a maximum degree of consistency.

[4] Summing up of the turnover along the value chain would lead to double counting.

1.5 Report structure

In Chapter 2 the status and the recent development of the European fleet are presented. Chapter 3 presents the assessment of the economic impacts of the European shipping industry. Chapter 4 concludes.

2 The European fleet

2.1 Introduction

In this chapter, the status and recent development of the European fleet are analysed, considering the EU-27 countries and Norway and applying the indicators as specified in the introduction above.

In Section 2.2, the European fleet as considered in this report is defined and the data sources used for the analysis of the fleet are presented. Section 2.3 presents the current status and recent development of the European fleet at an aggregated level. It also provides a comparison to the control of fleets from other world regions. In Section 2.4, the European fleet is disaggregated by vessel type and a further comparison made to other world regions. In Section 2.5, the European fleet is discussed in terms of controlling company size.

2.2 Method

The European fleet can be defined in several ways. Vessels can be allocated to the European fleet:

- if controlled[5] by shipping companies based in Europe;
- if operated by an entity based in Europe;
- if registered/flying the flag of a European country.

In line with previous publications analysing the economic value of the EU shipping industry, the first option has been applied in this report and the accordingly determined fleet will be referred to as the 'European controlled fleet'. The 'controlled' fleet includes ships whose ultimate ownership and control lies in one of the considered European countries.

For the statistical analysis of the European controlled fleet, data from Clarksons' World Fleet Monitor[6] and Clarksons' World Fleet Register were used. The data from the Clarksons' World Fleet Register were downloaded on the first of November 2024, reflecting the status of the fleet at that particular day. The data provided in the November edition of the World Fleet Monitor also gives the fleet status for this date. Both publications include ships of 100 GT and above.

The World Fleet Register data was downloaded for 'Group Company Nationality/Region' to align with the World Fleet Monitor and allows a breakdown for a higher number of vessel types compared to the World Fleet Monitor.

[5] 'Controlled fleet' means beneficially owned or controlled fleet.

[6] "The World Fleet Monitor provides data for 'Owned Fleets' applying the following definition in line with the controlled fleet as defined above: Vessel ownership is based on the 'Beneficial Owner', which is defined as the Primary Reference Company with the main commercial responsibility for the ship. Nationality is defined as the 'Real Nationality', i.e. the home country of the interests behind the primary reference company. None of the information contained in Clarksons Research databases is intended to confirm or otherwise the legal status of the companies or the ships associated with them." (see e.**g**. (Clarksons Research, 2022)).

2.3 Status and recent development of the European controlled fleet: total fleet

The status and recent development of the European controlled fleet (see Section 2.2 for the definition) is analysed by means of two indicators: number of vessels and aggregated gross tonnage. To put the status of the European controlled fleet into perspective, it is also compared to the world fleet.

Table 1 - Overview of the European controlled fleet by number of vessels and capacity (gross tonnage); status 1 November 2024

Year	European controlled fleet			World fleet			Share of European controlled fleet in world fleet	
	GT (million)	Number of vessels	Year-on-year growth (GT)	GT (million)	Number of vessels	Year-on-year growth (GT)	GT	Number of vessels
2018	514	22,108	-	1,336	95,376	-	38.5%	23.2%
2019	523	22,086	1.7%	1,395	98,027	4.4%	37.5%	22.5%
2020	533	22,084	2.0%	1,436	99,707	3.0%	37.3%	22.2%
2021	537	22,020	0.8%	1,482	102,226	3.2%	36.3%	21.5%
2022	543	21,999	1.0%	1,532	104,465	3.4%	35.4%	21.1%
2023	547	22,121	0.7%	1,590	108,155	3.8%	34.4%	20.5%
2024	556	22,318	1.7%	1,654	111,612	3.2%	33.6%	20.0%

Source: Based on Clarksons Research (2022), Clarksons Research (2023), Clarksons Research (2024); each year reflects the status as of 1 December, except for 2024, where the data reflects 1 November.

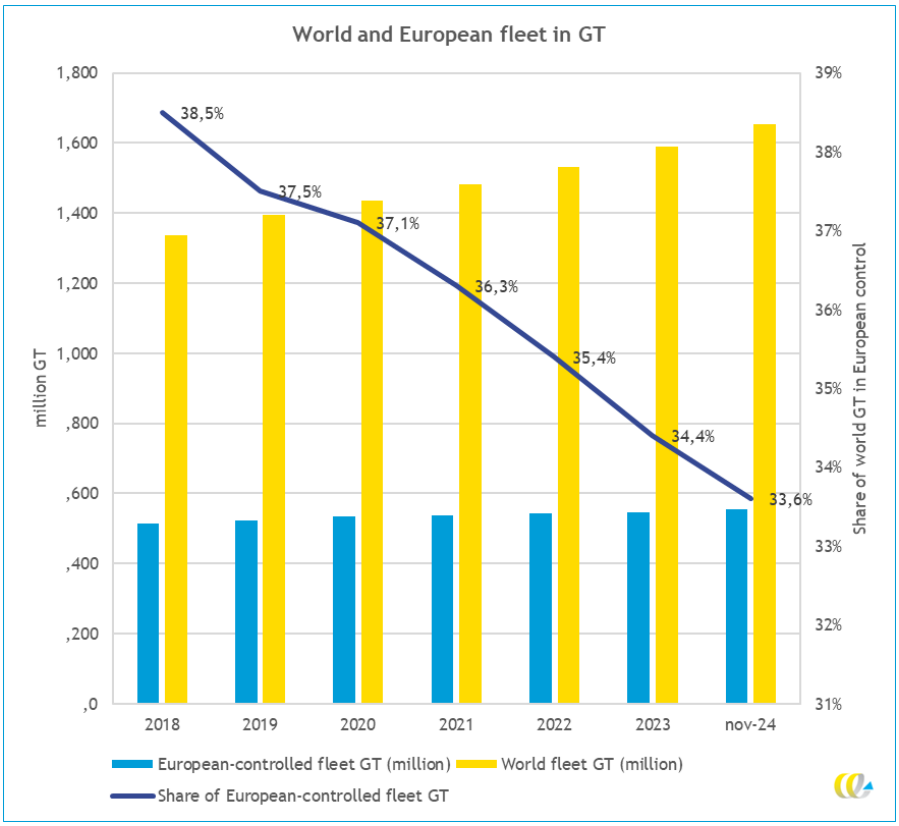
Note: The total number of ships in November 2024 in the European controlled fleet presented in Table 1, Table 2, Figure 1, and Figure 2 are based on Clarksons' World Fleet Monitor (Clarksons Research, 2024), and slightly deviates (54 more ships) from the total number of vessels presented in other tables/figures in this report, which are based on Clarksons' World Fleet Register (Clarksons Research, ongoing). The combined GT also differs by 0.1 million GT. These small differences can potentially be explained by different cut-off dates for data validation.

As Table 1 shows, in November 2024, the European controlled fleet had a total capacity of 556 million GT and consisted of, in total, 22,318 vessels. This means that in November 2024 the total European controlled fleet accounted for nearly 34% of the world fleet in terms of GT, and approximately 20% in terms of number of vessels (see Table 1).

While the number of vessels in the European controlled fleet has been slowly but steadily declining in the period from 2018 to 2022, it started increasing again from 2023 on, leading in 2024 to a fleet that is 1% larger (+210 ships) compared to 2018. In terms of GT, a steady growth of the European controlled fleet can be observed. Between 2018 and 2024, the European controlled fleet grew by 8% in terms of GT.

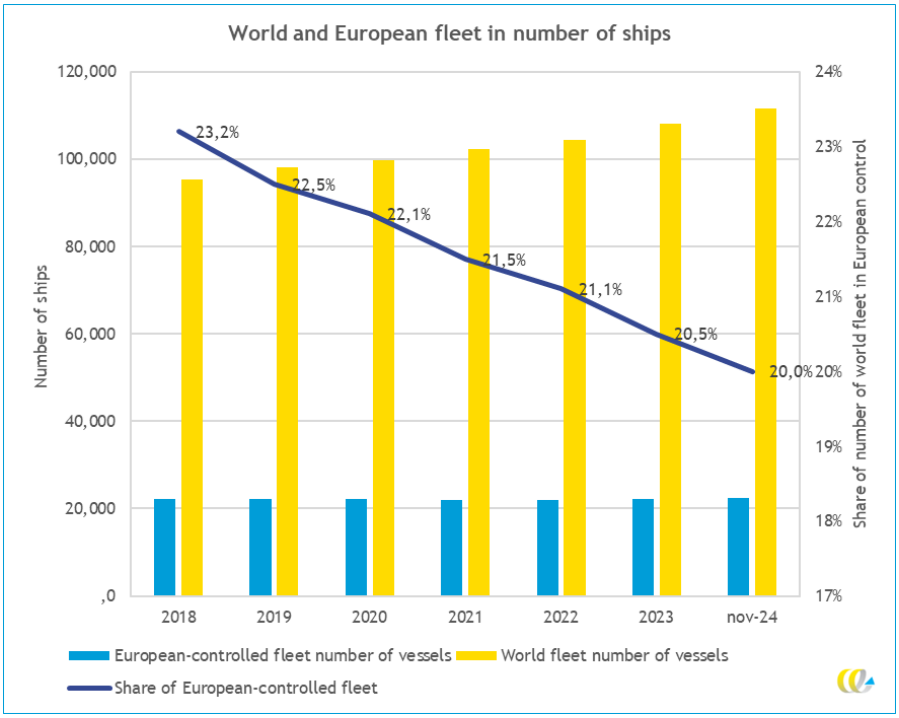
In the same period, the world fleet increased by 17% in terms of number of vessels and 24% in terms of total GT. As a result, in the period 2018 to 2024, the share of the European controlled fleet in the world fleet has been declining both in terms of number of vessels and GT. Figure 1 and Figure 2 visualise these trends.

Figure 1 - World- and European-controlled fleet in GT (million), status 1 November 2024



Source: Based on Clarksons Research (2022), Clarksons Research (2023), Clarksons Research (2024).

Figure 2 - World and European controlled fleet in terms of numbers of vessels, status 1 November 2024



Source: Based on Clarksons Research (2022), Clarksons Research (2023), Clarksons Research (2024).

Table 2 shows the development not only of the European controlled fleet, but also of the fleets in the other regions in the world as differentiated in the World Fleet Monitor by Clarksons Research.

Table 2 - Development of total fleet size per world region - share in world fleet in terms of GT

	EU-27 & Norway	Rest of Europe	Total Americas	Total Africa & Middle East & South & Central Asia	Asia/Pacific **	Unknown
2018 *	38.5%	6.0%	8.4%	5.9%	40.8%	0.4%
2019 *	37.5%	6.2%	8.2%	6.0%	41.6%	0.4%
2020	37.1%	6.1%	8.0%	6.1%	42.1%	0.6%
2021	36.3%	6.0%	7.9%	6.1%	42.7%	1.0%
2022	35.4%	6.2%	7.5%	6.5%	43.3%	1.0%
2023	34.4%	6.4%	7.0%	7.1%	44.0%	1.1%
2024	33.6%	6.2%	6.9%	7.1%	44.6%	1.7%

Source: Based on Clarksons Research (2022), Clarksons Research (2023), Clarksons Research (2024).

* Excluding the UK.

** 'Asia/Pacific' includes East Asia (notably China, Japan, South Korea, Taiwan, Hong Kong), Southeast Asia (notably Singapore, Indonesia, Malaysia, Vietnam, Thailand, Philippines and Oceania (notably Australia, Marshall Islands)).

This shows that, while the capacity share of the European controlled fleet and the total Americas fleet in the world fleet have been constantly decreasing in the period 2018 to 2024, the share of the fleet in Asia/Pacific, South and Central Asia, Middle East and Africa has been increasing. More specifically: the share of the European controlled fleet in the world fleet has decreased from 38.5% in 2018 to 33.6% in 2024. At the same time, the share of the fleet in Asia/Pacific increased from 40.8% in 2018 to 44.6% in 2024.

2.4 Status of the European controlled fleet: vessel types

2.4.1 Categorisation by specific vessel types

Table 3 presents the European controlled fleet, broken down by vessel type, following the categorisation as set out in Clarksons' World Fleet Monitor. The vessel type categories are listed in descending order of GT in the European-controlled fleet. Data for the European-controlled fleet presented stem from the World Fleet Register database, while data for the world fleet stem from the World Fleet Monitor.[7] Both sources reflect the status of the fleet as of the first of November 2024. The total deadweight tonnage (dwt) under European control represents around 33% of the world total, which was 2,417 million dwt in November 2024 for ships of 100 GT and above (the same scope applied in this report).

[7] The World Fleet Monitor allows for a breakdown of the world fleet, but not for the European controlled fleet, for the higher number of vessel types.

Table 3 - The European controlled fleet compared to the world fleet, by vessel type; status 1 November 2024

Vessel types	Combined GT (million)		Share (GT) of European-controlled fleet in world fleet	Combined dwt under European control	Number		Share (number) of European-controlled fleet in world fleet
	Under European control	World fleet			Under European control	World fleet	
Bulk carriers *	170.5	570.5	30%	309,794,896	3,954	13,972	28%
Oil tankers *	127.4	367.3	35%	233,779,210	2,468	12,609	20%
Container ships	142.4	320.7	44%	159,269,977	2,575	6,699	38%
LNG carriers	26.9	81.6	33%	21,868,847	268	796	34%
General cargo vessels *	21.4	69.1	31%	20,471,490	3,028	20,947	14%
Offshore vessels	16.8	66.5	25%	20,190,200	1,624	9,150	18%
Ferries	12.0	22.8	53%	2,465,681	2,519	8,761	29%
Vehicle carriers	11.8	41.1	29%	3,970,552	217	804	27%
Chemical tankers	9.5	34.0	28%	14,410,156	880	4,261	21%
LPG carriers	6.4	30.9	21%	7,257,409	331	1,674	20%
Cruise vessels	5.7	29.1	20%	552,953	148	519	29%
Dredgers	2.0	5.4	37%	2,510,906	566	2,221	25%
Reefers	1.4	4.3	33%	1,497,781	187	1,552	12%
Tugs	0.9	6.7	13%	539,520	2,698	23,681	11%
Other non-cargo vessels	0.4	3.4	12%	295,806	758	3,537	21%
Specialised tankers	0.1	0.8	13%	136,848	43	429	10%
Total fleet	**555.6**	**1,654.2**	**34%**	**799,012,231 ***	**22,264**	**111,612**	**20%**

Source: Based on Clarksons Research (ongoing).

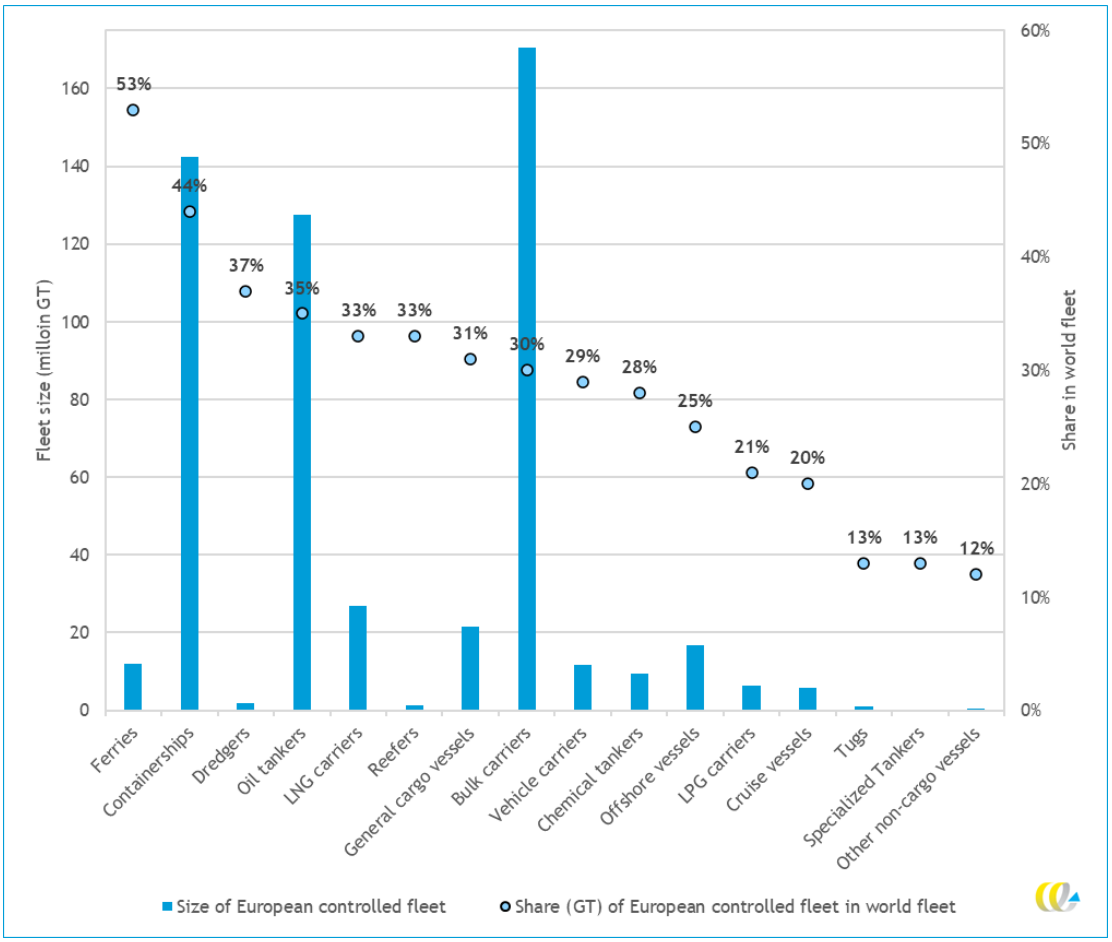
* 'Bulk carriers' includes combination carriers.

** 'Oil tankers' includes crude and product tankers.

*** 'General cargo vessels' includes general cargo, multi-purpose, Ro-Ro and other dry cargo ships.

Figure 3 visualises the data provided in Table 3 for the total GT of each vessel type in European control as well as the share against the total world fleet in GT of that vessel type. It shows that bulk carriers, oil tankers and container vessels were the largest vessel type groups by gross tonnage within the European controlled fleet. At world level, 30% of bulk carriers and 35% of oil tankers are under European control on a gross tonnage basis. For containerships, 44% are under European control on a gross tonnage basis. European shipowners also controlled a third or more of world GT in LNG carriers, ferries, dredgers and reefers. High shares of European control on a gross tonnage basis are also recorded for general cargo (31%), offshore (25%), vehicle carriers (29%) and chemical tankers (28%).

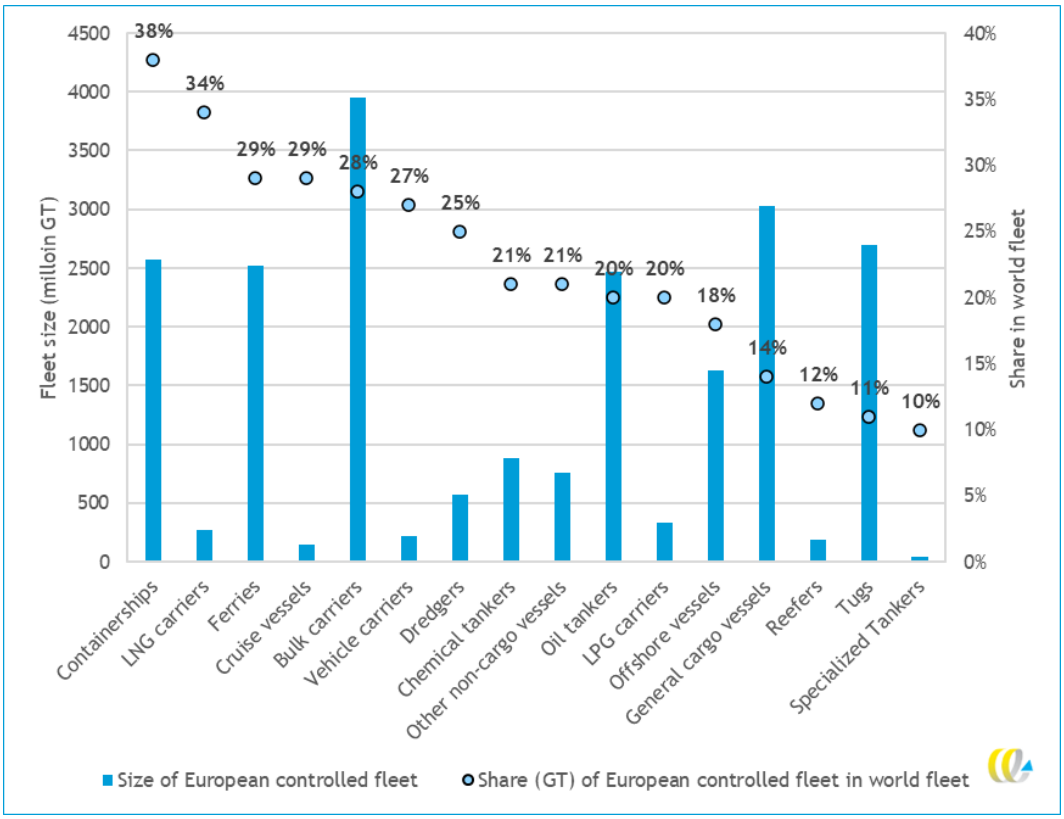
Figure 3 - Size of the European-controlled fleet by vessel type and its share of the world fleet by vessel type (GT); status 1 November 2024



Source: Based on Clarksons Research (2022); Clarksons Research (ongoing).

Figure 4 visualises the data provided in Table 3 for the total number of each vessel type in European control as well as the share against the total world fleet of that vessel type. It shows that bulk carriers make up the largest vessel type by number in the European-controlled fleet (almost 4,000 vessels). This corresponds to 28% of world bulk carriers being in European control. European shipowners also control high numbers of oil tankers, containerships, general cargo vessels, ferries and tugs. 38% of global container ships are under European control as well as 34% of LNG carriers and 29% of ferries and cruise vessels. Around a quarter of the world's dredging and vehicle carriers are also in European control. However, for most vessel types, the share of European control by number of ships is lower than European control by total GT.

Figure 4 - Size of European-controlled fleet by number of vessels per vessel type and share of world fleet; status 1 November 2024



Source: Based on Clarksons Research (2024), Clarksons Research (ongoing).

2.4.2 European-controlled fleet compared to other world regions

This section compares the fleet of vessels under European control on 1 November 2024 to the control of vessels from other regions of the world. Table 4 provides this comparison on a gross tonnage basis while Table 5 focusses on the number of vessels. The data is derived from Clarksons' World Fleet Monitor which breaks the world fleet down to five main vessel types to show the ownership per region. Within that publication, ships under Norwegian control are assigned to 'other Europe' so data from the World Fleet Register has been used to assign those ships to Europe instead.

Table 4 - European-controlled fleet compared to fleets controlled from other world regions (GT); status 1 November 2024

	World region - gross tonnage under control						
Vessel type	**EU 27 & Norway**	**Other Europe**	**North America**	**Other Americas**	**Africa/ Mid-East/ South Asia**	**Asia/ Pacific**	**Others**
Oil tankers	34.7%	6.18%	4.6%	1.3%	15.3%	32.8%	5.2%
Bulkers *	29.9%	5.28%	2.2%	0.4%	4.0%	57.9%	0.4%
General cargo (incl. containership, Multi-Purpose, Ro-Ro, Other Dry Cargo)	42.0%	6.34%	6.5%	0.3%	2.6%	41.4%	0.9%
Specialised (Chemical Tanker, Specialised Tanker, Gas Carrier, Pure Vehicle Carrier, Reefer)	29.1%	7.1%	5.6%	0.6%	9.8%	47.0%	0.9%
Non-cargo (Offshore, Dredgers, Tugs, Cruise, Ferries, Other non-cargo)	28.30%	7.99%	24.20%	5.38%	7.17%	26.21%	0.75%

Source: Based on Clarksons Research (2024), Clarksons Research (ongoing).

* 'Bulkers' also includes Combined Carriers.

The following can be concluded from Table 4:

- With 34.7%, European shipowners control the highest share of oil tankers in the world fleet in terms of GT. Shipowners from Asia/Pacific follow closely behind.
- With 42%, European shipowners control the highest share of general cargo vessels (which includes container ships in the used dataset), marginally ahead of shipowners from Asia/Pacific.
- European shipowners control almost 30% of bulk carriers and specialised vessels by gross tonnage, however owners from Asia/Pacific control the most significant shares of these vessel types (almost 58% of bulkers and 47% of specialised vessels).
- European shipowners control the largest share of non-cargo vessels by gross tonnage (28%), followed closely by owners from Asia/Pacific and North America.

Table 5 presents the ownership of the same vessel types but focusses on the number of ships instead of the combined gross tonnage. Consistent with the data presented in Section 2.4.1, the share of European control by number of ships is for each vessel type lower than the share by GT. That being said, the share of European-controlled bulk carriers remains high at 28%. Table 5 notably shows that owners from Asia/Pacific control the most significant shares by number of ships, including almost half of oil tankers and more than half of all bulkers, general cargo ships (including containerships in this dataset) and specialised vessels.

Table 5 - European controlled fleet compared to fleets controlled from other world regions (number of ships); status 1 November 2024

	World region - number of ships under control						
Vessel type	**EU 27 & Norway**	**Other Europe**	**North America**	**Other Americas**	**Africa/ Mid-East/ South Asia**	**Asia/ Pacific**	**Others**
Oil tankers	19.6%	8.1%	2.2%	2.3%	11.9%	49.3%	6.7%
Bulkers *	28.3%	6.8%	2.2%	0.5%	4.8%	57.0%	0.5%
General cargo (incl. containership, Multi-Purpose, Ro-Ro, Other Dry Cargo)	20.3%	10.4%	2.2%	2.3%	8.8%	51.9%	4.2%
Specialised (Chemical Tanker, Specialised Tanker, Gas Carrier, Pure Vehicle Carrier, Reefer)	20.3%	11.1%	2.7%	1.6%	6.8%	54.0%	3.6%
Non-cargo (Offshore, Dredgers, Tugs, Cruise, Ferries, Other non-cargo)	17.4%	6.7%	9.5%	5.8%	12.9%	43.8%	3.8%

Source: Based on Clarksons Research (2024), Clarksons Research (ongoing).

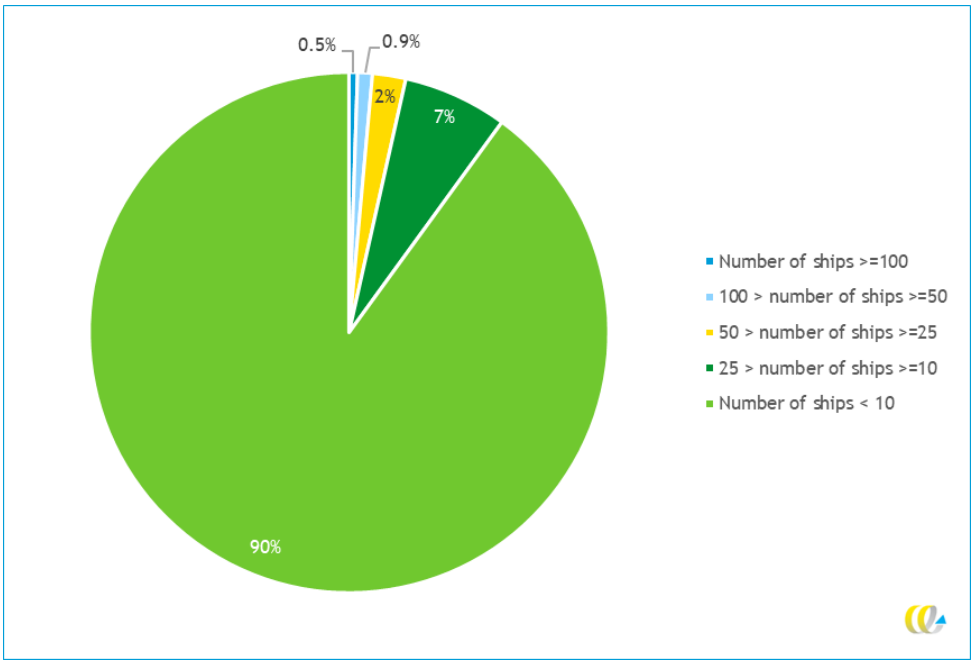
* 'Bulkers' includes Combined Carriers.

2.5 Status of the European-controlled fleet: distribution over companies

The European-controlled fleet is unevenly distributed over the related company groups.

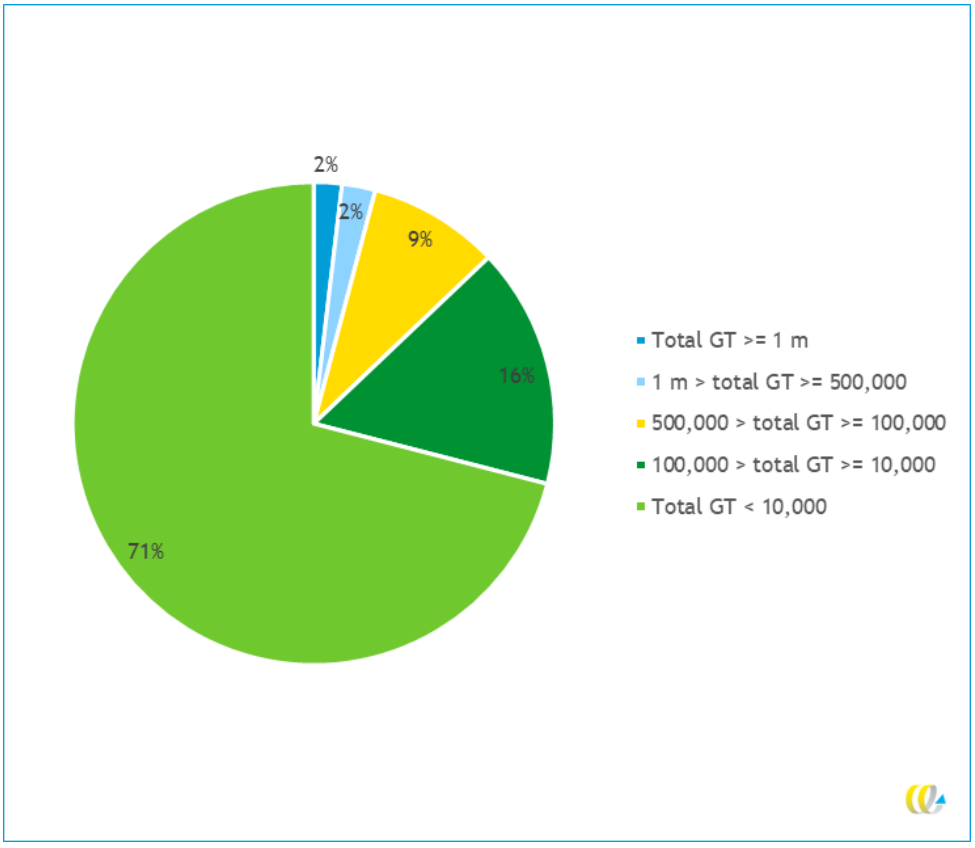
In 2024, the vast majority (90%) of the 4,153 company groups located in an EU country and Norway, controlled less than 10 ships, while a very small share (0.5% of the companies) controlled more than 100 ships (see Figure 5). Accordingly, also the capacity of the fleet is unevenly distributed (see Figure 6). While a high share (around 70%) of the 4,153 company groups control a fleet of less than 10,000 GT in total, less than 5% of the companies control a fleet of 500,000 GT and above (see Clarksons Research (ongoing)).

Figure 5 - 2024 distribution of group companies of the European-controlled fleet in terms of number of ships



Source: Clarksons Research (ongoing).

Figure 6 - 2024 distribution of group companies of the European controlled fleet in terms of total capacity (GT) per company



Source: Clarksons Research (ongoing).

3 Economic impact

3.1 Introduction

In this chapter we evaluate the economic impact of the shipping sector in terms of value added, employment and turnover. The direct economic impact is based on public statistics available at the beginning of the project. The indirect impact of the shipping sector in the EU and Norway is assessed using input-output modelling, generating multipliers that are applied to the determined direct effect. This method allows the assessment of direct, indirect and induced economic impacts. The methods are further outlined below, after which the results are presented. Annex D discusses the outcomes of the analysis compared to other studies.

3.2 Method

3.2.1 Direct economic effects

The direct economic impact is determined based on public data sources only. Eurostat provides sector information according to industry definitions in the NACE Rev. 2 classification.[8] According to previous studies, we consider the three subsectors for which Eurostat data are available. Two of these subsectors are in line with the first two activities as presented in the definition of the shipping industry as presented in Section 1.3, i.e. transport of cargo and transport of passengers by sea. The third subsector provides services to the sector. Here a potential overlap with the also determined indirect economic effects might occur, but for the sake of consistency with the previous studies this sector is also considered for the determination of the direct economic effect.

The exact NACE Rev. 2 categories considered are as follows:
- H50.1: sea and coastal passenger water transport;
- H50.2: sea and coastal freight water transport;
- N77.34: renting and leasing of water transport equipment;
- F42.91: construction of water projects.[9]

For the remaining two activities of the shipping industry as defined in Section 1.3, i.e. ‘maritime activities by service and offshore support vessels’ and ‘maritime activities by towage and dredging activities at sea’, Eurostat does not provide economic data. For this reason, the estimated economic value of the sector can be expected to be an underestimation.

Due to the high level of granularity of these sector definitions, data is not always complete, for instance due to confidentiality issues. There is no data for further subcategories of the categories above. Therefore, the best-fitting indicators and time scope are selected for which data are available. The most recent year for which data is available, is 2021.

[8] Definitions are available on www.ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-ra-07-015.

[9] This class includes (Eurostat, 2024) 1: construction and reconstruction of dams, dykes, waterways, harbour basins, etc. and 2: dredging of waterways. River related projects, i.e. inland projects are also included in this category.

In line with the analysis of the European-controlled fleet, we consider the EU countries and Norway as a whole. For brevity, any further mention of the EU therefore includes Norway as well.

3.2.2 Indirect and induced economic effects

The main method for determining the indirect and induced impacts used is input-output analysis. This analysis is based on input-output tables, which provide information on the input from one sector to another. Using matrix algebra, this allows a calculation of the total direct and indirect economic value (value added) of one sector in terms of the whole economy. Moreover, information on e.g. employment can be added, in order to estimate the employment in other sectors due to activity in the sector of interest.

We use Exiobase[10] as a source for the input-output tables. These tables are based on national accounts and define the economy along sectors in line with NACE Rev. 2 definitions, making it compatible with the sector definitions as used by Eurostat. We used Exiobase to calculate Type I and Type II multipliers, which respectively include the indirect and the indirect plus the induced effects. A detailed description of the input-output tables and the computations is given in Annex C.

The most relevant Exiobase products (i.e. sectors) are:
- Shipping activities:
  - sea and coastal water transport;
  - inland water transport.
- Shipping services, as part of:
  - supporting and auxiliary transport activities; activities of travel agencies;
  - sale, maintenance, repair of motor vehicles and parts;
  - retail sale;
  - renting of machinery and equipment.

The first two products are directly linked to the shipping industry. However, the remaining four, shipping services related products, do not only cover the shipping industry as such, but also other industries. Those products can therefore not directly be linked to shipping, as it would be an overestimation of the impact of the shipping industry. Moreover, in line with the direct economic impact, we exclude inland water transport from the analysis. Therefore, we limit our analysis to sea, coastal water transport. We recognise that this is a conservative approach, caused by the degree of aggregation of the data available in Exiobase. The analysis, however, still covers the lion's share of the shipping industry as defined in Section 1.3, namely sea and coastal passenger water transport and sea and coastal freight water transport.

The input-output database from Exiobase is updated once every few years.[11]
Yearly estimates are given using GDP and trade projections by IMF. The current version of Exiobase makes use of base data from at the latest 2018. This means that developments since e.g. the outbreak of COVID-19 and their impact on the economic linkages are not incorporated in the database. Therefore, the data for the years from 2020 onwards is likely less accurate than reality has proven. Nonetheless, the results will give a general estimate of the indirect and induced impacts, given the direct economic impact as gathered from Eurostat.

[10] See: www.exiobase.eu.

[11] The EXIOBASE consortium consists of NTNU, TNO, SERI, Universiteit Leiden, WU, and 2.-0 LCA Consultants.

Methodological note on induced effects

Generally, induced effects must be interpreted with caution. Induced effects occur if a sector can be said to incite an *expansion* of economic activity, namely that there is additional demand for the sector under analysis, which leads to a general growth of economic activity that would not have taken place without the demand for that sector. An example would be for instance the expansion of a harbour, which would increase the number of shipping movements and create employment, and as such increase general spending by consumers who found a job in the expanded harbour. This can in theory be true. In this case, however, we analyse the *static state* of the current situation. This means that there is no added demand under analysis. As such, the induced effects calculated here cannot be attributed as 'caused' by the shipping sector. Especially in current economic times, where labour is scarce, there cannot be a case inferred from input-output analysis that without the shipping sector, general economic consumption would have been lower (Muchova et al., 2011). Moreover, it is entirely possible that the people employed in shipping would have found employment in a different sector, without commenting on the practical need for the shipping sector. In the case of a harbour expansion, it might be that the people working there would have had a job in other sectors in the area that would arise from the use of resources on other projects rather than expanding the harbour (such as investing in housing, shops, etc.). To correctly estimate induced effects due to increased demand for a sector, a general equilibrium analysis would have to be carried out - with an input-output analysis as applied in this study the effects tend to be overestimated. All in all, we present the induced effects below, but they should be interpreted with caution.

3.3 Direct economic impact

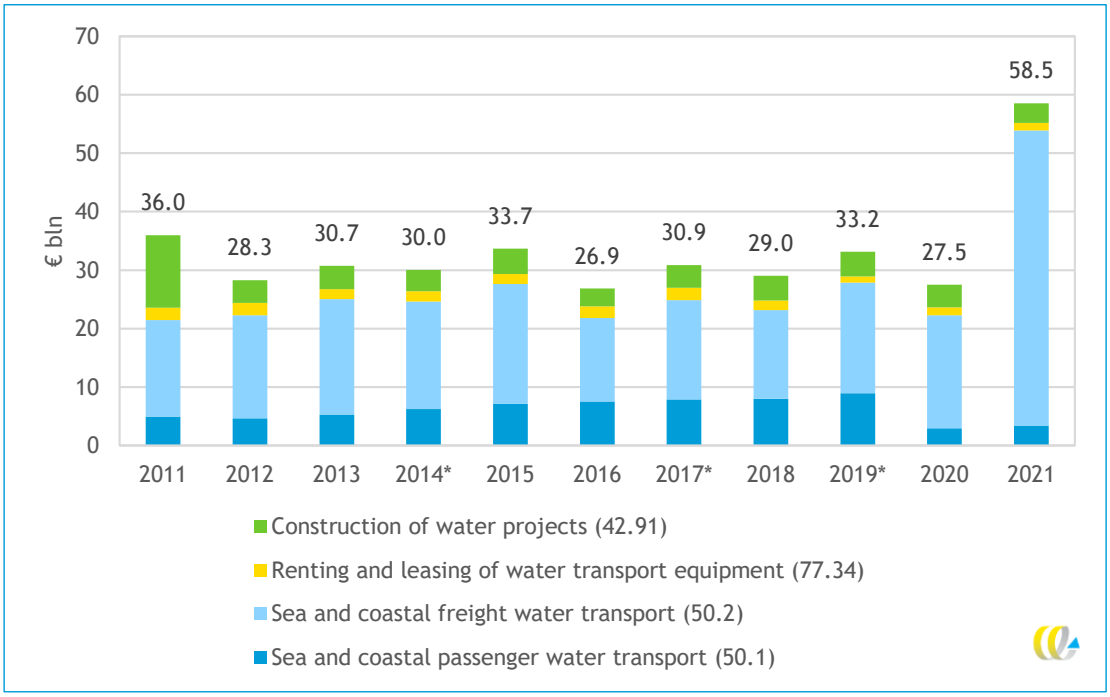
Figure 7 shows the value added by the shipping sector (see Section 3.2.1 for sectoral delimitation) in the EU-27 and Norway over the period 2011-2021.

In 2021, the value added by the sea and coastal passenger transport sector was €3.4 billion, €50.4 billion by the sea and coastal freight transport sector, €1.3 billion by the renting and leasing of water transport equipment sector, and €3.3 billion by the construction of water projects sector, adding to a total of €58.5 billion.

Sea and coastal freight water transport represents the largest share of the total value added by the four subsectors.

Figure 7 also shows that the value added in 2020 was slightly lower than in 2018, mainly due to a decrease in value added by the sea and coastal passenger water transport sector. The explanation is the COVID-19 pandemic, which caused most countries to impose travel restrictions. 2021 shows a significantly higher added value than for any previous year, which is due to a significantly larger value added by sea and coastal freight water transport.

Figure 7 - Value added by the shipping sector in EU-27 and Norway, € billion



Source: Eurostat (data sets: sbs_na_1a_se_r2, sbs_na_1a_con_r2 and sbs_ovw_act).

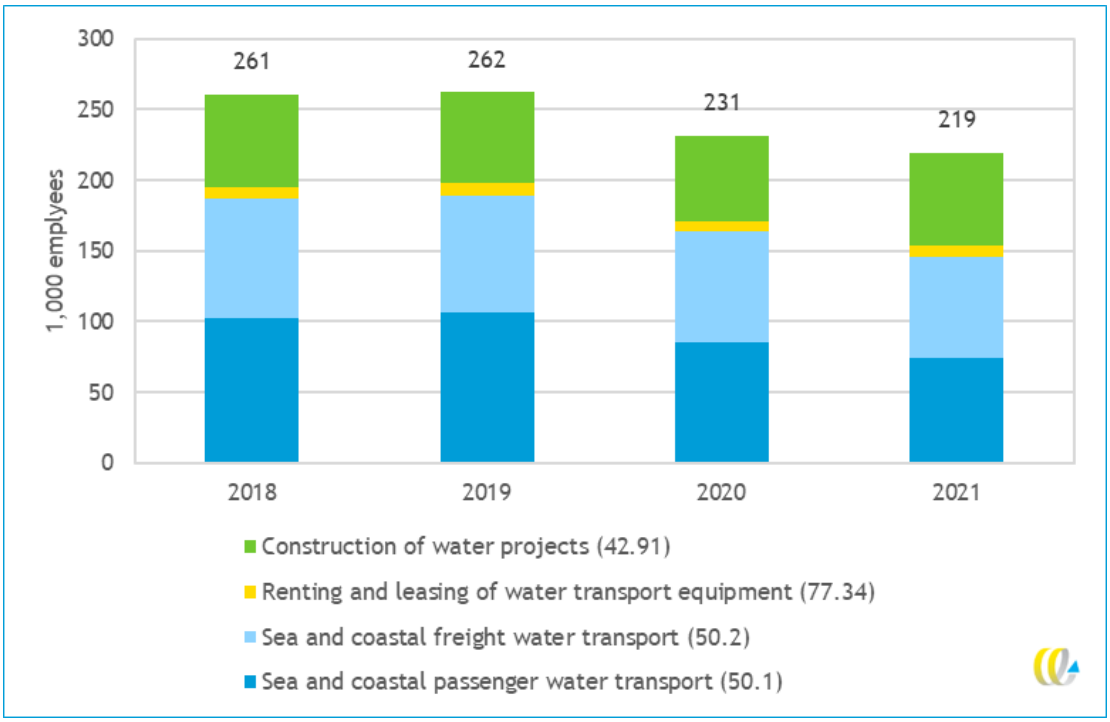
Note: GVA is measured as the total value added at factor costs.
For 2014, 2017 and 2019, no estimate for sea and coastal freight water transport is available. For 2011 and 2015, no estimate for construction of water projects is available. Estimates have been made based on countries within the EU-27 that have the highest added value within this economic indicator (the countries with the highest values, or above a threshold, as these are the countries that the largest share of the added value comprises of).

Figure 8 shows the direct employment in the European shipping sector (EU-27 and Norway), measured in 1,000 employees.

In 2021, there were 219,000 employees in the European shipping sector, of which approximately 74,000 in sea and coastal passenger water transport, 72,000 in sea and coastal freight transport, 8,000 in renting and leasing of water transport equipment, and 65,000 in construction of water projects.

The number of employees in the European shipping sector in 2021 has decreased by around 5% compared to 2020, and about 16% compared to 2018 and 2019 respectively.

Figure 8 - Number of employees in the shipping industry in EU-27 and Norway, 1,000 employees



Source: Eurostat (data set sbs_na_1a_se_r2, sbs_na_1a_con_r2, sbs_ovw_act, and sbs_ovw_act).

Note: For 2019, no data for construction of water projects is available. An estimate has been made based on the countries with the highest added value within this economic indicator (the countries with the highest values, or above a threshold, as these are the countries that the largest share of the added value comprises of).

3.4 Indirect economic impact

The indirect and induced economic effects are estimated through input-output analysis. We conducted the calculation of the multipliers based on the input-output tables of Exiobase for the given years. The resulting multipliers for the EU are given in Table 6, together with their interpretation. In this section, we include sectors 50.1 and 50.2 (Sea and coastal freight and passenger water transport) and we omit sector 77.34 (Renting and leasing of water equipment) as well as F42.91 (Construction of water projects), as these last subsectors are not available in Exiobase. It is therefore not possible to calculate the indirect effects of this sector.

Table 6 - Outcomes input-output modelling: multipliers and effects for 2021, 2020 and 2018

Effect	Value 2021	Value 2020	Value 2018	Interpretation (given 2021 values)
Direct economic effect	1	1	1	€1 additional output is assumed in the EU shipping sector.
Share of value added in output	0.280	0.275	0.309	Every €1 of total output in the EU shipping sector consists of €0.28 value added.
Share of intermediate output EU	0.554	0.566	0.524	For every €1 output from EU shipping, €0.554 of direct input is required in the EU shipping sector from other sectors.
Multiplier indirect value added	2.056	2.089	1.994	For every €1 output in EU shipping, an additional €1.06 of value added is required from other sectors in the EU economy.
Multiplier indirect and induced value added	2.372	2.204	2.114	For every €1 (additional) output in EU shipping, an additional €1.37 of value added is required and induced from other sectors in the EU economy.
Indirect employment effect	0.022	0.022	0.021	For every €1 value added by EU shipping, 0.022 employees are needed in other sectors of the world.
Indirect and induced employment effect	0.024	0.023	0.023	For every €1 (additional) value added by EU shipping, 0.024 employees are needed and induced in other sectors of the world.

The indirect effects can be obtained by subtracting the direct effect from the indirect output multiplier. The induced output effects can be obtained by subtracting the direct and indirect effects from the output multiplier for indirect and induced value added. We apply these results to the output, demand and consumption values of the EU shipping sector as found in the previous paragraph and implied in the input-output model. That gives the results as presented in Table 7 and Table 8.

Table 7 - Overview direct, indirect and induced economic impact of EU sea and coastal freight & passenger transport sector* for 2021, 2020 and 2018

Impact of EU shipping sector	Value added		
	2021	2020	2018
Direct economic value: value added EU shipping sector (Eurostat) *	€ 53.9 billion	€ 22.3 billion	€ 23.2 billion
Indirect economic effects due to EU shipping sector in EU	€ 56.9 billion	€ 24.3 billion	€ 23.1 billion
Induced economic effects EU economy	€ 17.0 billion	€ 2.6 billion	€ 2.8 billion
Total economic value EU shipping sector	**€ 127.8 billion**	**€ 49.1 billion**	**€ 49.0 billion**

* Renting and leasing activities and construction of water projects are excluded, since these subsectors are not distinguished in Exiobase. This explains why the direct effects presented in this table deviate from the direct effects as presented in Section 3.3.

Table 8 - Overview of direct EU and indirect and induced global employment effects of the EU sea and coastal freight & passenger transport sector* for 2021, 2020 and 2018

Impact of EU shipping sector	Number of employees		
	2021	2020	2018
Direct employment EU shipping sector (Eurostat) *	146,000	163,000	187,000
Indirect employment due to EU shipping, worldwide	1,190,000 **	480,000	490,000
Induced employment due to EU shipping, worldwide	110,000	40,000	40,000
Total employment in and due to EU shipping	**1,446,000**	**683,000**	**717,000**

* Renting and leasing activities and construction of water projects are excluded, since these subsectors are not distinguished in Exiobase. This explains why the direct effects presented here, deviate from the direct effects as presented in Section 3.3.

** The much higher 2021 indirect effect can be explained by the much higher 2021 value added of 'sea and coastal freight water transport' (see also Figure 7).

In 2021, the value added by the European sea and coastal freight and passenger transport sector amounted to € 53.9 billion, with an even higher indirect impact of € 56.9 billion. The value added led to an indirect employment effect of 1,190,000 employees.

3.5 Turnover

As explained in the introduction (Section 1.4), the economic indicator 'turnover' inherently measures the direct and indirect impact, which is why we analyse the turnover separately.

Figure 9 shows the turnover of the shipping sector (see Section 3.2.1 for sectoral delimitation) in the EU-27 and Norway over the period 2011-2021 in nominal terms.

In 2020, the turnover of the 'sea and coastal passenger transport' sector amounted to €12.7 billion of the construction of Water project sector to €14.2 billion of the Renting and leasing of water transport equipment sector to €3.1 billion, and the 2020 turnover of the Sea and coastal freight transport sector has been estimated to be approximately €101.4 billion[12], leading to a total turnover of the European shipping sector of approximately €131.3 billion in 2020.

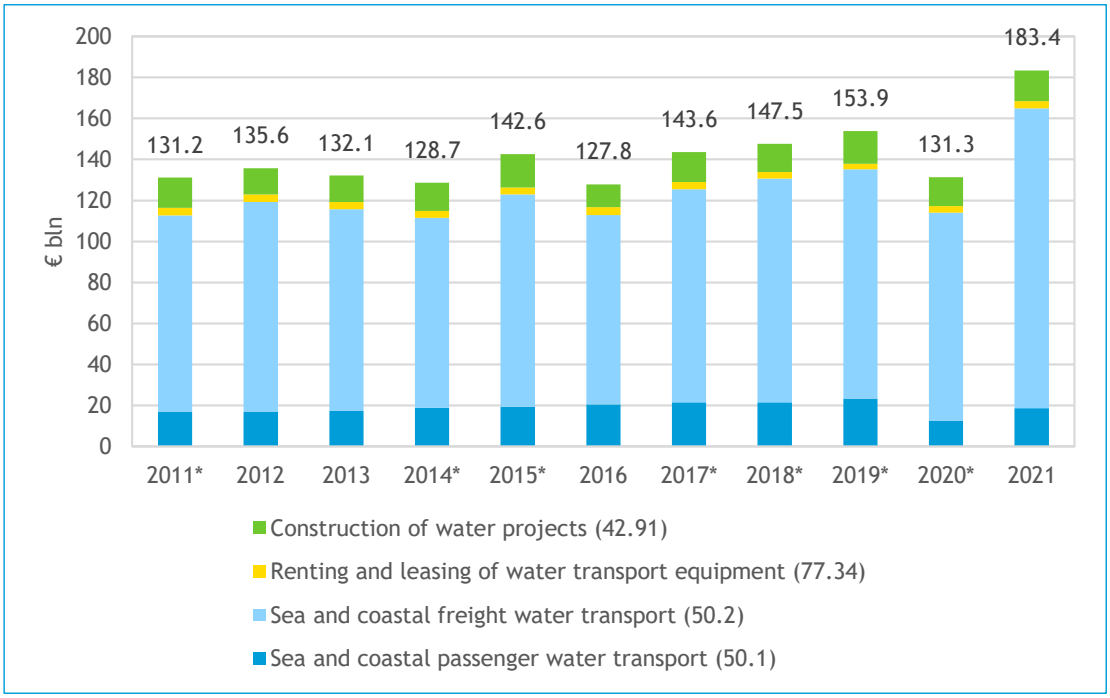
In 2021, the turnover of the Sea and coastal passenger transport sector amounted to €18.7 billion, of the Construction of water project sector to €14.9 billion of the Renting and leasing of water transport equipment sector to €3.5 billion, and the 2021 turnover of the Sea and coastal freight transport sector has been estimated to be approximately €146.2 billion[13], leading to a total turnover of the European shipping sector of approximately €183.4 billion in 2021.

Figure 9 also shows that the turnover in 2020 was lower than in the years 2017, 2018, and 2019. This is mainly due to a decrease in the 2020 turnover of sea and coastal passenger water transport, likely caused by the COVID-19 pandemic, which lead many countries to impose travel restrictions. In 2021, a significant increase in turnover is visible, which can mainly be explained by an increase in the turnover of the sea and coastal freight water transport.

[12] See footnote under Figure 9 for more information on this estimation.

[13] See footnote under Figure 9 for more information on this estimation.

Figure 9 - Turnover of the shipping sector in EU-27 and Norway, € billion, in nominal terms



Source: Eurostat (data set sbs_na_1a_se_r2 and sbs_na_1a_con_r2).

* For 2014, 2017, 2018, 2019 and 2020, no data for sea and coastal freight water transport is available on EU level. The EU-level data has been estimated making use of data that is consistently available for EU-27 countries with a relatively high turnover (the countries with the highest values, or above a threshold, as these are the countries that the largest share of the added value comprises of). These turnovers have been used to scale the turnover for EU-27 for the years that are not available.

* For 2011 and 2015, no data for construction of water projects is available on EU-level. The same methodology that has been used for sea and coastal freight water transport has been applied to estimate the turnover for construction of water projects on EU level for these years.

4 Conclusions

From the analysis of the status and latest developments of the European fleet, considering the EU-27 countries and Norway, the following can be concluded.

In 2022, the European-controlled fleet consisted of almost 22,000 vessels with a total capacity of approximately 543 million GT, accounting for around 21% of the total number of ships in the world fleet and for around 35% of the capacity of the world fleet measured in GT.

Within the European controlled fleet, bulk carriers, oil tankers and container vessels were the largest vessel type groups by gross tonnage.

In terms of gross tonnage, the European controlled ferry fleet had a very high share in the world fleet and the European controlled fleets of dredgers, container ships, oil tankers and general cargo ships all had a high share in the world fleet. With 9%, the European controlled cruise vessel fleet had the lowest share in the world fleet.

In the period 2018 to 2022, the share of the European controlled fleet in the world fleet has been declining in terms of both number of vessels and GT. In the same period, the capacity share in the world fleet of both the European controlled and the total American fleet has been declining while the share of the fleets in Asia, Middle East and Africa has been increasing. More specific: the share of the European fleet in the world fleet has decreased from 38.5% in 2018 to 35.4% in 2022. At the same time, the share of the fleet in Asia, increased from 40.8% in 2018 to 43.3% in 2022.

The European-controlled fleet is unevenly distributed over the related company groups. While the vast majority (90%) of the company groups located in an EU country and Norway controlled less than 10 ships in 2024, a very small share of the companies (< 1%) controlled more than 100 ships. Accordingly, also the capacity of the fleet is unevenly distributed. While a high share (around 70%) of the company groups controls a fleet of less than 10,000 GT in total, less than 5% of the companies controlled a fleet of 500,000 GT and above.

The **economic impact** of the European shipping industry has been analysed based on publicly available data.

The **direct** economic effect of the European shipping sector in 2021 has been estimated to amount to €58.5 billion value added and 219,000 employees, considering the following four subsectors as differentiated by Eurostat:

1. Sea and coastal passenger water transport.
2. Sea and coastal freight water transport.
3. Renting and leasing of water transport equipment.
4. Construction of water projects.

The **indirect and induced** economic impact of the sector has been derived for the first two subsectors as listed above. Table 9 shows the outcome of this analysis.

Table 9 - Indirect and induced economic impact of the European sea and coastal freight and passenger transport sector in 2021

	Value added	Employment	Scope
Direct impact	€ 53.9 billion	146,000 persons	Sea and coastal freight and passenger water transport*
Indirect impact	€ 56.9 billion	1,190,000 persons	
Induced impact	€ 17.0 billion	110,000 persons	
Total impact	**€ 127.8 billion**	**1,446,000 persons**	
Scope	Indirect and induced effect in EU	Indirect and induced global effect	

* For the analysis of the indirect and induced effects only two of the four subsectors could be accounted for because the limitations of the input-output tables applied. This also explains why the direct impact is lower than presented above.

In 2021, the value added by the European sea and coastal freight and passenger transport sector amounted to €56.9 billion, with an even higher indirect impact of €56.9 billion. The value added led to an indirect employment effect of 1,190,000 employees worldwide.

The economic indicator 'turnover'[14] inherently measures the direct and indirect impact and was therefore analysed separately. Considering again all four subsectors as listed above, the total turnover of the European shipping sector was estimated to amount to approximately €183 bn in 2021.

[14] Defined as totals invoiced.

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A Annex regarding Eurostat Structural business statistics

Currently, in the EU, short-term business statistics have to be provided on the basis of the European business statistics (EBS) regulation (Regulation (EU) 2019/2152) starting with reference periods in 2021. Due to the new data requirements of the EBS regulation, short-term business statistics as provided by Eurostat for years up to 2021 show inconsistencies with statistics starting from 2021. This applies to the labelling of the indicators as well as to the type of indicators for which data is provided.

In the context of this study, the following inconsistencies are of importance:

- This applies to the economic indicator that is known as 'turnover (gross premiums written, V12110)' in Eurostat dataset sbs_na_1a_se_r2 (which includes data until 2020) but is known as 'net turnover (GOS_MEUR)' in Eurostat dataset sbs_ovw_act (data after 2020). Due to a different methodology being applied when calculating the results of turnover and net turnover, there is a discrepancy between 2020 and 2021 and thus cannot be used interchangeably. To solve the issue, the turnover until 2020 has been applied, but by using dataset sts_setu_a, which includes index values of turnover for 1994 until 2023 specified on level 2 of economic activity, we were able to estimate the turnover for each economic activity in 2021.
- The different calculation methodology due to different applied Regulations also applies to value added. In sbs_na_1a_se_r2 (data until 2020), the economic indicator 'value added at factor cost (V12150)' has been included, but is known as 'value added (AV_MEUR)' in dataset sbs_ovw_act (after 2020). These indicators cannot be used interchangeably, as there is a difference in the calculation method. Eurostat (n.d.) mentions that the value added at factor cost can alternatively be calculated by adding the personnel costs to the gross operating surplus (GOS_MEUR). Both aforementioned datasets include these two economic indicators, and we were able to acknowledge that this indeed gives a correct value for value added at factor cost. This allowed us to consistently apply this indicator for the entire time period considered.
- For the economic indicator 'employees – number', there is no conceptual change nor rephrasing of the variable labelling due to the change of Regulation. This means that we were able to consistently use the indicator 'employees – number' in both datasets sbs_na_1a_se_r2 (data until 2020) and sbs_ovw_act (after 2020).

B Thematic case: ownership of energy-carrying ships

Energy security is currently an important topic in Europe. To be able to see what share of the fleet is under control of firms from European countries and how this share relates to the seaborne import flows of energy commodities, this thematic exploration was performed.

To be able to see what the size of seaborne import of energy commodities in Europe is compared to the size of the European controlled fleet, a comparison of shares was carried out. First, the percentage of seaborne imports of energy commodities of Europe on the global imports was calculated. Second, the share of vessels owned by European companies for carrying these goods was analysed. The figures are presented in Table 10 and are based on data for the year 2022 and do not include the UK and Norway due to a lack of data. Seaborne imports are in a million tonnes, number of vessels in count per vessel type.

Table 10 - Imports and fleet ownership by commodity and accompanying vessel type; 2022

Seaborne imports	Crude	Products	LPG	LNG
Europe	481	248	18	104
World	1,980	1,051	120	398
Share of imports	24.3%	23.6%	15.0%	26.1%
Number of vessels	**Tankers**	**Gen. Cargo vessels**	**LPG carriers**	**LNG carriers**
EU-Europe	2,551	3,132	319	228
World	11,745	13,113	1,564	710
Share of fleet	21.7%	23.9%	20.4%	32.1%
Relative ownership to imports	Lower ownership share w.r.t. imports	Higher ownership share w.r.t. imports	Higher ownership share w.r.t. imports	Higher ownership share w.r.t. imports

Note: The totals of number of vessels can deviate from the figures in the tables in the previous sections because the figures in this table are from June 2023.

In 2022, the share of imports for crudes to Europe was almost a quarter of the global imports. The number of tankers under European ownership, which were able to transport crudes, were 21.7%, which is a lower share of the world fleet compared to the share of imports. European imports of products on the global total imports of products were approximately 23.6%. The number of general cargo vessels under European ownership (this includes multipurpose, Ro-Ro, and other dry cargo vessels) was 23.9% of the world fleet, which is a higher share compared to the share of imports. The share of imports for LPG to Europe was about 15% of the global imports. The number of LPG carriers under European ownership was 20.4%, which is a higher share of the world fleet compared to the share of imports. European imports of LNG by ship on the global total imports of LNG was approximately 26.1%. The number of LNG carriers under European ownership is 32% of the world fleet, which is a higher share compared to the share of imports.

The share of LNG in total EU gas imports increased from 20% in 2021 to 42% in 2023 (EC, 2024).

C Input/output modelling

For the calculation of indirect and induced impact, we make use of input-output modelling. The basis of such modelling is a system of input-output tables that model the economy, its interlinkages and its direct and external effects. We use the Exiobase database, which models the economy along 200 products and 39 countries and regions.

To determine the direct, indirect and induced effects, we follow the method as outlined for the Washington Input-Output Model.[15]

C.1 Input/output data

We use the following matrices from Exiobase:

- A, the input-output coefficients matrix, indicating the number of input needed from any country/sector combination in the output of any country/sector combination, relative to the total output in the output country/sector combination.
- X, the output vector, indicating the total output per sector and country.
- Y, the final demand matrix, indicating various demand categories (such as household consumption, exports) per country/sector combination.
- F, a satellite account containing data on indicators such as value added, emissions and employment involved in the output of any country/sector combination.
- F_Y, the satellite accounts for the final demand.
- The data in these tables is separated by country. To estimate the total indirect impacts for the EU as a whole, we aggregate the data by summing the data in each matrix over all 27-EU member states and Norway, leaving the rest of the world as is.

C.2 Calculating indirect effects

To calculate the indirect effects, the following steps are taken:

- We set up an identity matrix, containing all zeros and ones on the diagonal (indicating the intersection of country/sector combinations).
- We calculate the Leontief inverse by inverting the matrix: Identity – A.
- We sum every column of the Leontief inverse into a single-row vector, separated by EU and rest of world sectors. The result is the output multiplier for each country/sector combination for both the EU and ROW. The multiplier for the EU indicates the effect an extra unit of demand in one sector has on the rest of the EU economy. An output multiplier of 1.3 for instance, indicates that demand for 1 extra output of that sector leads to a total of 1.3 outputs across the EU economy.
- We multiply the Leontief inverse with the employment coefficients to obtain the indirect employment effects. These are summed together to calculate the total indirect employment multiplier.

[15] To be accessed at www.ofm.wa.gov/washington-data-research/economy-and-labor-force/washington-input-output-model.

C.3 Calculating induced effects

The method for estimating the induced effects are based on the equations as explained in detail in Emonts-Holley, Ross and Swales (2021)[16]. In this publication, a number of variations of the calculation of the Type II multipliers are explained and compared. The Type II multipliers include the indirect and induced effects. Given the availability of data in Exiobase, we apply the Miller and Blair method to the Exiobase input-output tables. According to the authors, this method provides a higher weighted sum of multipliers than the benchmark method, due to the complete endogenizing of household income. This is due to lack of detailed insight into the household, as the benchmark method assumes a higher degree of available information.

To calculate the induced effects, the following steps are taken:

- We take the labour earnings per sector and country from the satellite accounts for both the output and final demand matrices.
- We add all labour earnings together to determine total labour earnings across the world economy.
- We determine the worldwide household demand for each sector and country.
- Then we calculate the wage coefficients. This is done by dividing the labour earned per sector/country by the total output in that sector/country.
- Next, we calculate the consumption coefficients. This is done by dividing the household demand per sector/country by the total labour earnings across the economy.
- The wage and consumption coefficients are combined with the direct output coefficients. A second Leontief inverse is calculated from this table.
- We sum every column of the Leontief inverse into a single row vector. The result is the indirect and induced output multiplier for each country/sector combination. This multiplier indicates the effect an extra unit of demand in one sector has on the rest of the economy, including the induced consumption effects from labour income generated in each sector. A multiplier of 1.4 for instance indicates that demand for one extra output of that sector leads to 1.4 units of output in the EU economy, including added production due to demand from increased income resulting from the additional output created across the economy. These results are also separated by EU and ROW effects.
- We multiply the Leontief inverse with the employment coefficients to obtain the indirect and induced employment effects. These are summed together to calculate the total indirect and induced employment multiplier.

[16] (Emonts-Holley et al., 2021)

D Comparison with other studies

5.1 Direct economic impact

We note that direct employment and direct value added of the EU shipping industry as determined above, considering the data as reported by Eurostat for the three NACE Rev.2 categories considered (50.1, 50.2, 77.34), differ from the estimations as presented by Oxford Economics and ECSA in the previous studies. ECSA (2020) reports 685,000 employed persons in the EU shipping industry and a gross value added of € 54 billion for 2018. Although there may be differences in geographical scope (inclusion of Norway and exclusion of the UK) and in metric definitions ('persons employed'), the differences are of substantial size. This can be explained by the fact that in these studies, next to publicly available data, extra research/surveys have been carried out to complement the publicly available data. In this context Oxford Economics (Oxford Economics, 2014) states: "ECSA members have provided detailed employment data for the following countries: Belgium, France, Germany, Italy, the Netherlands, Norway, Portugal, Spain, and the UK. Comparison of Eurostat data and this more detailed country-specific information suggests the Eurostat figures tend to underestimate total employment in the shipping industry. It is difficult to be certain of the precise reasons for this, but our research and consultation with national experts and Eurostat suggests the most likely reason is that the Eurostat data do not capture some proportion of workers who work on ships, many of whom may not be subject to income tax in the EU state from which their vessel is managed."

The EU Blue Economy report 2023 reported 398,000 employed persons as well as a gross value added of €54 billion for 2018 for Maritime Transport, including the subsectors Passenger transport, freight transport, and Services for transport. These effects are higher than the effects determined in this report for these three subsectors, since inland water transport has been included in the definition of Maritime Transport in the EU Blue Economy report. Since the EU Blue Economy report also only uses publicly available Eurostat data, the effects are also lower than those reported by Oxford Economics and ECSA in the previous reports.

5.2 Indirect economic impact

The indirect and induced effects as presented above differ from the estimations as presented by Oxford Economics and ECSA in the previous studies. Although we do not have full insight into the methods and calculations employed by Oxford Economics, in the following, we offer some potential explanations for the varying results.

The indirect and induced economic impacts are derived based on the direct economic impacts as well as on multipliers stemming from an input output analysis. Given that the direct economic effects as estimated in this report are lower (see explanation above) it can be expected that the indirect effects are too.

The database to generate the indirect and induced effects are also different. While we use Exiobase, Oxford Economics uses their own global input-output model, based on the World Input-Output Database, to derive the multipliers.

The ratio between direct and indirect economic impact in terms of value added, however, is similar for the Oxford Economics study compared to our 2020 findings. We find that indirect economic effects are 109% of direct effects, and Oxford Economics reports indirect effects of 105% of direct effects. We deem these results to be within credible error margins (given different data sources and applied methods).

The estimated induced effects are, however, significantly lower following from our analysis, showing induced effects of 12% of direct effects, where they are 70% given results by Oxford Economics. These varying results, regarding the induced effects, are the only varying results which remain unexplained. We should note however that as explained in Section 3.2.2, the induced effects should be interpreted with caution regardless of their size.