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The economic value of the EU shipping industry – update

A report for the European Community Shipowners' Associations (ECSA)

February 2015

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Contents

Executive Summary

This study updates the main elements of Oxford Economics' 2014 study *'The economic value of the EU shipping industry'*.[1]

Economic impacts estimated in this study

This study estimates the economic impact of the shipping industry across three channels:

- the direct impact of the shipping industry itself;
- the indirect impact of shipping firms' expenditure on inputs of goods and services from their EU supply chain (such as port services, ship repairs, insurance, and shipping-related financial and legal services); and
- the induced impact of spending by employees in the shipping industry and its supply chain.

Direct impact

- In 2013, the EU shipping industry is estimated to have directly contributed €56 billion to EU GDP and employed 615,000 people.
- It is estimated that around four-fifths of posts, or 501,000 jobs, are based at sea. It is tentatively estimated that around 44 per cent of these seafarers are EU or EEA nationals.
- Shipping is a high productivity industry: each worker is estimated to have generated €85,000 of GDP, significantly above the EU average of €53,000.

Indirect and induced impacts

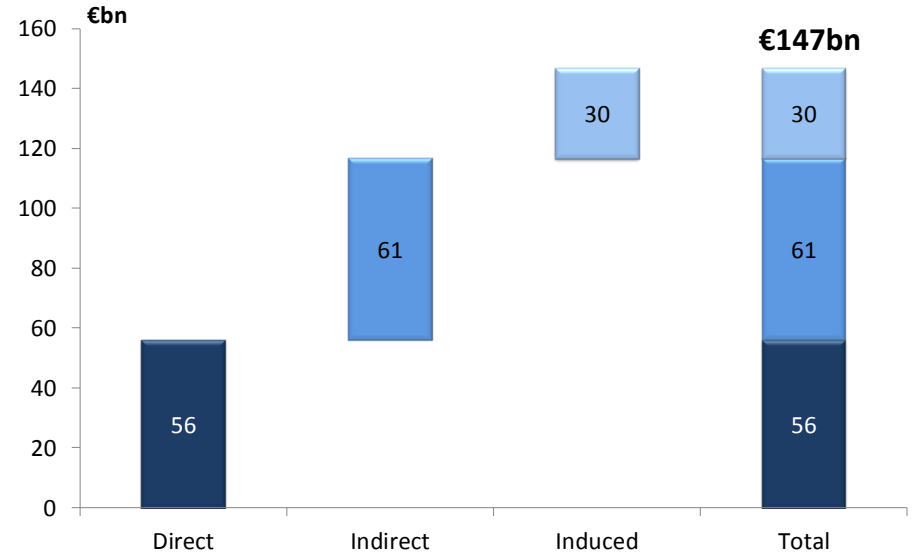
- The shipping industry indirectly supported an estimated €61 billion contribution to GDP and 1.1 million jobs through its European supply chain in 2013.
- The spending of wages by those employed in the shipping industry and its supply chain supported an estimated €30 billion of GDP and jobs for 516,000 people.

Total economic impact

- Taking all of the impacts together, direct, indirect and induced, the total GDP contribution of the European shipping industry in 2013 is estimated to have been €147 billion.
- For every €1 million the European shipping industry contributes to GDP itself, it creates another €1.6 million elsewhere in the European economy.
- The industry also supported employment for an estimated 2.2 million people.

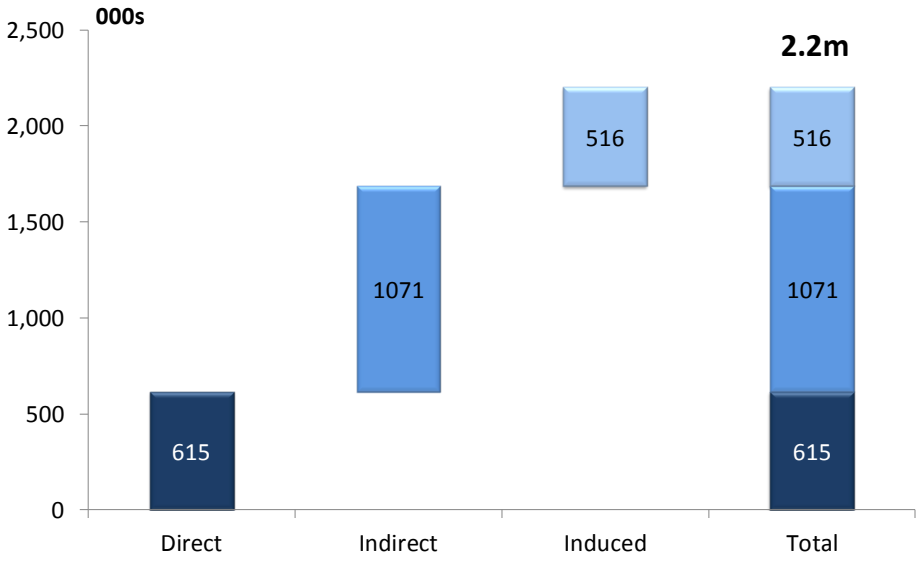
[1] Available at: http://www.ecsa.eu/images/2014-04-01%20Oxford%20Economics%20ECSA%20Report%20FINAL.pdf

The total GVA impact of the EU shipping industry, 2013



Source: Oxford Economics

The total employment impact of the EU Shipping industry, 2013

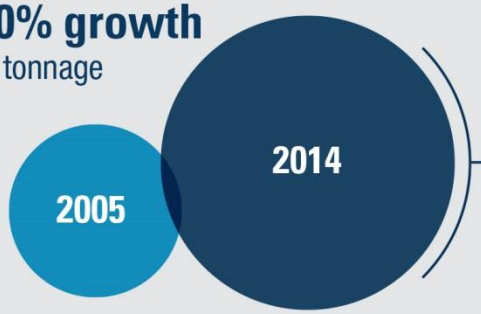


Source: Oxford Economics

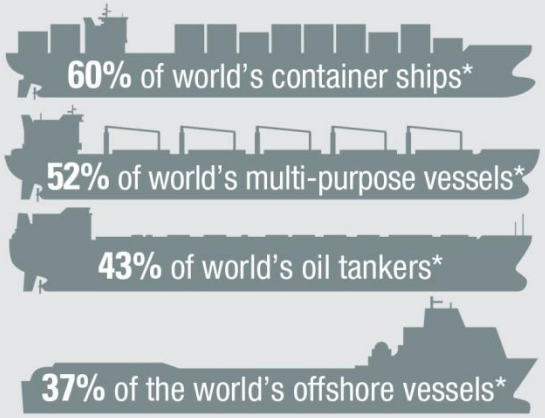
The economic value of the EU shipping industry

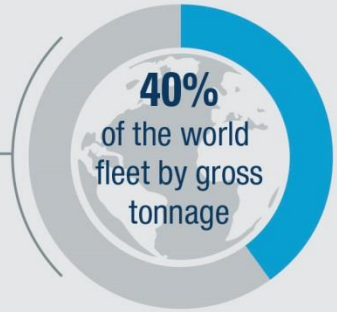
The EU controlled shipping fleet in numbers

70% growth
in tonnage



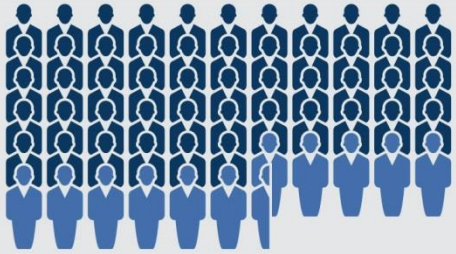
660 million deadweight tonnes
450 million gross tonnes
23,000 vessels





*By gross tonnage

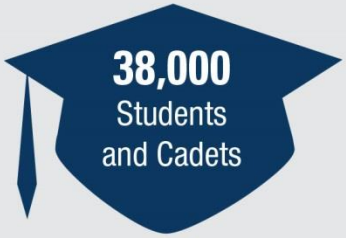
Direct economic impact



615,000
people employed

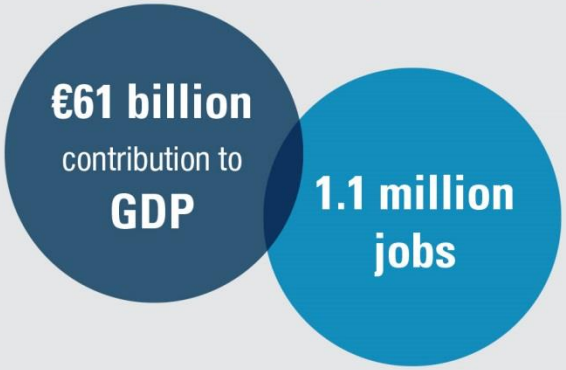
Sea based jobs

Land based jobs

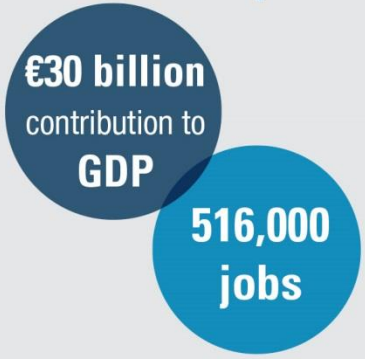


GDP per worker

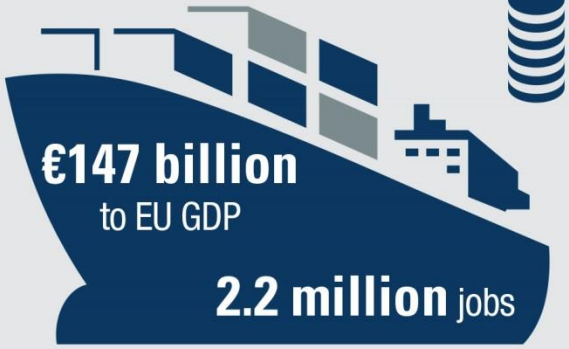
Indirect impacts



Induced impacts



Total economic impact



For every **€1 million** of GDP the shipping industry creates, another **€1.6 million** is created elsewhere in the EU economy

50% Amount by which the total economic contribution of the EU shipping industry could have been reduced in the absence of EU-approved state aid measures.[1]

1 Based on illustrative counter-factual scenarios for nine EU countries

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1 Introduction and definitions of terms used in the study

1.1 Purpose of the Study

This report has been prepared for the European Community Shipowners' Associations (ECSA), the trade association representing the national shipowners' associations of the EU and Norway. This study provides updated estimates of the gross value added contribution to GDP and employment contributions of the European shipping industry that were previously presented in Section 3 of Oxford Economics' 2014 study *'The economic value of the EU shipping industry*'. [2]

1.2 Geographical coverage

Throughout this document results are reported for the '*EU shipping industry*' which is defined as the industry within the 28 EU member states plus Norway. Where data are presented over time, information for all 29 countries is presented for the entire time period to avoid distortions caused by new member countries joining the EU.

1.3 Defining the shipping industry

The brief for the study was to assess the economic contribution of the shipping industry. Consistent with the original study, the shipping industry has been defined by ECSA as:

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

To analyse the economic contribution of the EU shipping industry it is necessary to identify the best possible fit between this preferred definition of the industry, and the categories for which economic data are available.

Eurostat categorises economic activity according to its NACE[3] system. This identifies a number of sectors which include activities that predominantly fall

[2] Available at: http://www.ecsa.eu/images/2014-04-01%20Oxford%20Economics%20ECSA%20Report%20FINAL.pdf

[3] Nomenclature statistique des activités économiques dans la Communauté européenne

within the preferred definition of the shipping industry set out above (see Table 1.1). Using these definitions it has been possible to gather information from the Eurostat national accounts and Structural Business Statistics datasets on gross value added and employment in passenger transport, freight transport, and the renting and leasing of water transport equipment.

The study has drawn on existing research, official statistics and the Oxford Economics Global Input-Output model

During the time between the publication of Oxford Economics' original 2014 report and the writing of this update, the methodology for compiling Eurostat national accounts transitioned from the ESA 95 methodological framework to the ESA 2010 framework.[4] Consequently, a number countries' gross value added and employment estimates have significantly changed from those incorporated in the previous report.[5]

Wherever possible, the Eurostat data have been complemented with information provided by ECSA members drawn from previous economic impact studies and national sources. Where such figures have been used, they have been adjusted to match the Eurostat categories as closely as possible.

Similar to the issues encountered with the Eurostat data, there have also been changes to the methodologies and data sources used by some ECSA members to compile and calculate country-specific shipping data. This has, once again, resulted in revisions to a number of estimates.

In light of the changes described above, the estimates in this study should not be directly compared to the previous report's estimates for 2012 or 2004.

[4] Eurostat explain that "*ESA 2010 differs in scope as well as in concepts from its predecessor ESA 95 reflecting developments in measuring modern economies, advances in methodological research and the needs of users.*"

[5] Eurostat GVA and employment estimates have changed from the previous publication for the following countries: Belgium, Czech Republic, Germany, Estonia, Cyprus, Latvia, Hungary, Malta, Austria, Slovenia, Slovakia and Norway.

Table 1.1 Eurostat NACE categories included in this study

NACE code	Category	Includes	Excludes
50.1	**Sea & coastal passenger water transport**	- transport of passengers over seas and coastal waters - operation of excursion, cruise or sightseeing boats - operation of ferries, water taxis etc.	- restaurant and bars on board ships, when provided by separate units - renting of pleasure boats and yachts without crew - renting of commercial ships or boats without crew - operation of "floating casinos"
50.2	**Sea & coastal freight water transport**	- transport of freight over seas and coastal waters - transport by towing or pushing of barges, oil rigs etc. - renting of vessels with crew for sea and coastal freight water transport	- harbour operation and other auxiliary activities such as docking, pilotage, lighterage, vessel salvage - cargo handling - renting of commercial ships or boats without crew
77.34*	**Renting & leasing of water transport equipment**	- renting and operational leasing of water-transport equipment without operator: commercial boats and ships	- renting of water-transport equipment with operator - renting of pleasure boats

* adjusted by Oxford Economics to remove elements relating to inland waterways

Some elements of the preferred definition of the shipping industry cannot easily be identified within the Eurostat classification. This is a particular issue for service and offshore support vessels, for which output and employment are often incorporated within the categories for the type of activity they support (most notably in the energy sector). A similar issue arises in the case of dredging, which is included within Eurostat data for the mining and quarrying sector.

For these sub-sectors it has not been possible to obtain information across all EU countries. Nonetheless, a number of national shipowners' associations hold information for their own country on offshore support vessels and dredging. This has been included in the estimates of employment and GVA wherever it is available[6], as indicated in Table 1.2 below.

[6] This approach will tend to underestimate the overall size of the EU shipping industry in terms of employment and GVA, since data on service and offshore support activities and dredging, are not available across all countries. Nonetheless, consultation with ECSA members suggests that the countries with the largest amount of activity in these sub-sectors have provided data on their size. We do not, therefore, believe the amount of activity that has not been captured will significantly affect the overall results.

Table 1.2 Countries providing employment and/or GVA data for service and offshore support vessels, and dredging

Sub-sector	Countries for which information available
Service and offshore support vessels	Denmark, France, Italy, Netherlands, Norway, Portugal, UK
Dredging	Belgium, Denmark, Italy, Netherlands, Norway, Spain, UK

In many cases the time periods data are available for do not precisely correspond to the needs of the project and a degree of estimation has been necessary to generate consistent time series across countries.

1.4 The channels of economic impact

The economic value of the EU shipping industry is examined across two metrics of impact:

- the **gross value added contribution to GDP** measures the contribution to the economy of each individual producer, industry or sector. It is a measure of output and is aggregated across all industries or firms to form the basis of a country's Gross Domestic Product (GDP), the main measure of the total level of economic activity; and
- **employment**, measured on a headcount basis.

The economic impacts measured in this study are quantified across three channels:

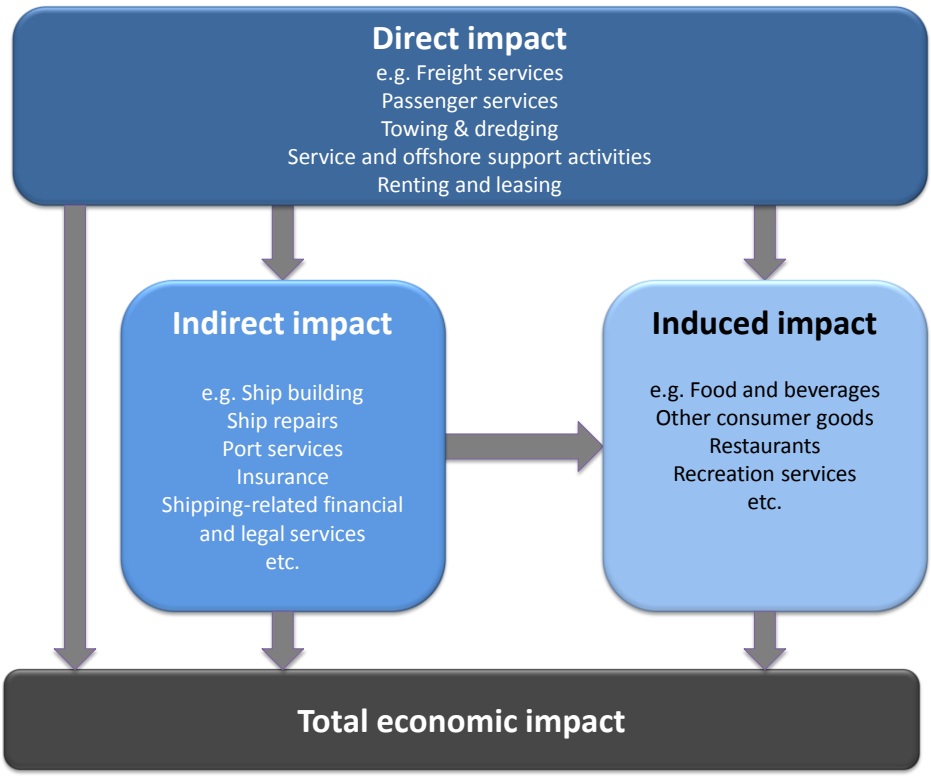
- **direct** impacts reflect the economic contribution of the shipping industry itself;
- **indirect** impacts occur as a result of shipping firms' expenditure on inputs of goods and services from their EU supply chain. Economic activity in this category could include, for example, ship building, ship repairs, port services, insurance, and shipping-related financial and legal services; and
- **induced** impacts arise as employees in the shipping industry and its supply chain spend a proportion of their wages on consumer goods and services. These impacts are first felt at the retail and leisure outlets close to where these employees live, but also ripple out through the supply chains of the businesses selling consumer goods and services.

The study assesses the direct and multiplier economic impacts of the EU shipping industry

Our calculations of these impacts are on a gross basis. They therefore make no allowance for what the people and other resources deployed by the shipping industry and its suppliers would have contributed to the economy if the industry did not exist.[7]

[7] This is a standard procedure in the analysis of the economic impact of individual industries.

Figure 1.1 The economic impact of the EU shipping industry



2 The economic impact of the EU shipping industry

2.1 Direct impact

2.1.1 Direct contribution to employment

The EU shipping industry is estimated to have directly employed 615,000 people in 2013

ECSA members have provided detailed employment data for the following countries: Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Portugal, Spain, Finland, Luxembourg, and the UK. A 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.

As a result, for those countries for which detailed national figures are not available, it has been necessary to estimate this 'missing' section of the workforce using a combination of GVA statistics and productivity data.

Overall, it is estimated that the European shipping industry directly employed 615,000 people in 2013. This means that shipping employs more people than travel agents and tour operators; forestry and logging; and air transport (Table 2.1).

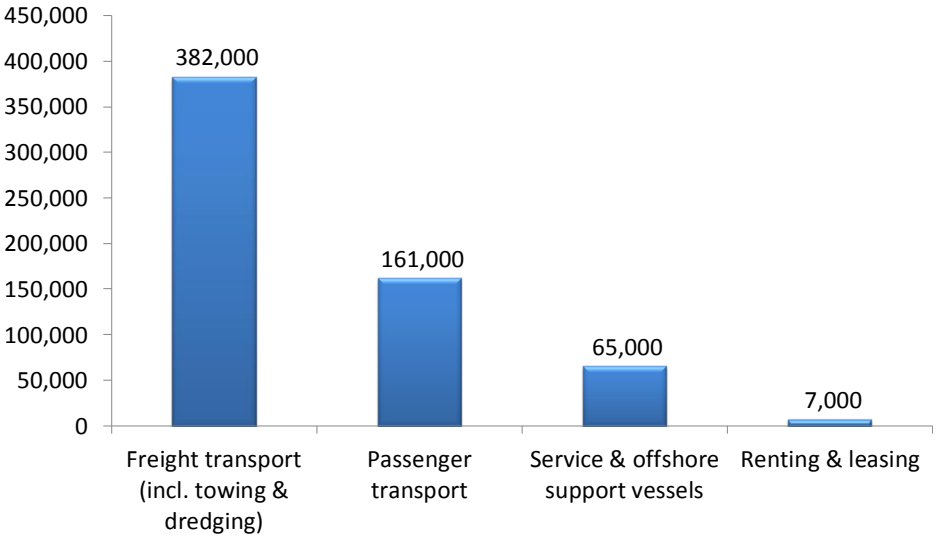
Table 2.1 Direct employment in the EU and Norway – shipping and comparator industries, 2013

Industry	Employment (000s)
Film, television and broadcasting	834
Paper manufacturing	648
Shipping	**615**
Travel agents and tour operators	556
Forestry and logging	497
Air transport	423

Source: Eurostat, Oxford Economics

Within the total shipping employment figure, 62 per cent of workers were involved in freight transport (including towing and dredging); 26 per cent were involved in passenger transport; and 11 per cent work in service and offshore support activities. Just under 7,000 people were employed in renting and leasing, equivalent to one per cent of employment (Figure 2.1).

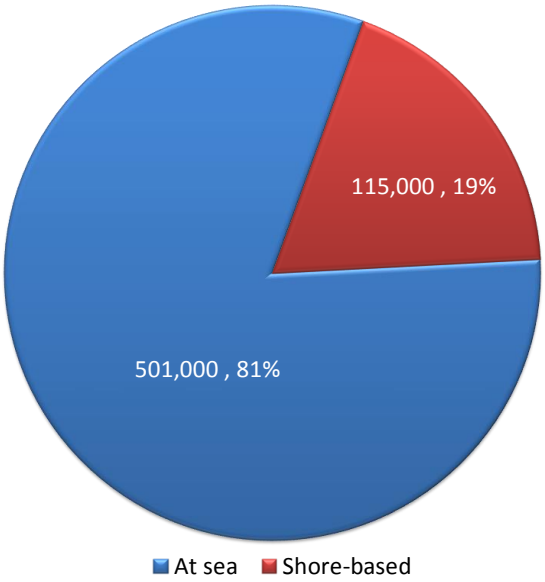
Figure 2.1 Direct employment in the EU shipping industry by sub-sector, 2013



Source: Oxford Economics

A proportion of employment in the freight, passenger, and services and offshore support sub-sectors comprises seafarers who generally work at sea. This element of employment in these sub-sectors has been estimated using information provided by national associations and ECSA. For countries where no such data are available, the number of workers at sea has been estimated using the average split of land-based and sea-based employment in the countries for which data are available. It is assumed that all of the employment in the renting and leasing sub-sector is shore-based. On this basis it is estimated that around four-fifths of European shipping industry employment consists of positions at sea (Figure 2.2).

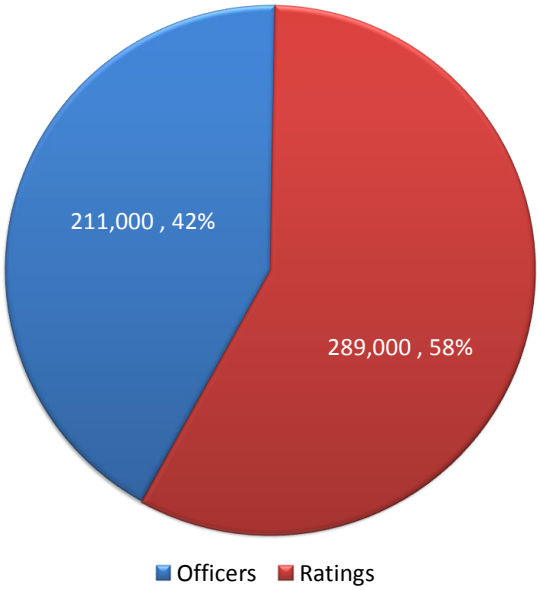
Figure 2.2 Total employment in the EU shipping industry by place of work, 2013[8]



Source: Oxford Economics

Officers account for an estimated 42 per cent of positions at sea, and ratings 58 per cent.[9]

Figure 2.3 Employment at sea split by officers and ratings, 2013[10]



Source: Oxford Economics

[8] This chart includes both EU and non-EU seafarers

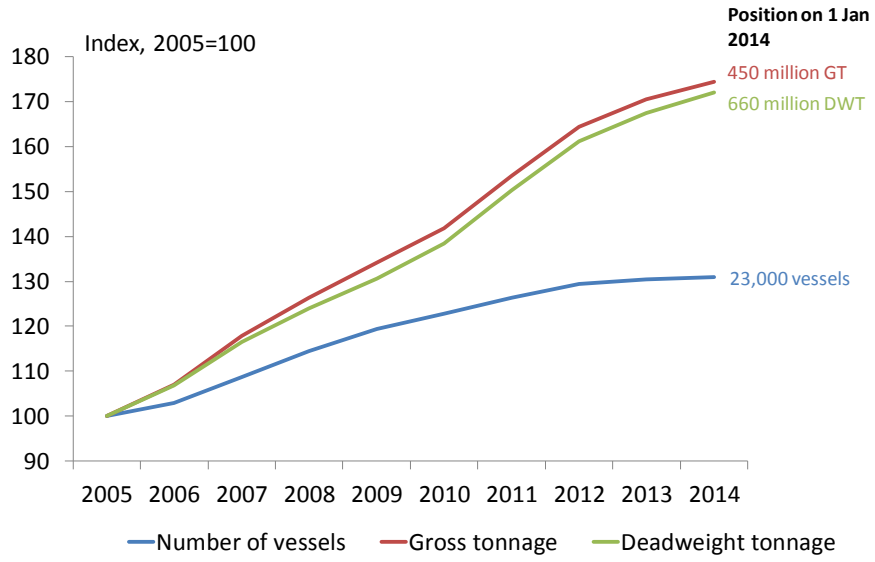
[9] The split between officers and ratings was estimated using information from ECSA members or, where none was held, from ISF/BIMCO data presented in the European Commission Study on Seafarers Employment, available at: http://ec.europa.eu/transport/modes/maritime/studies/doc/2011-05-20-seafarers-employment.pdf

[10] This chart includes both EU and non-EU seafarers

The international nature of the shipping industry means that a wide range of nationalities are employed on board ships. For a small number of countries data are available on the share of seafarers that are from an EU or EEA country. Taking a weighted average for these three countries suggests 44 per cent of employees working at sea were EU or EEA nationals. It is not possible to robustly calculate the equivalent figure across the entire EU fleet, but if the same proportion applied across the countries for which data are not available, around 220,000 of the estimated 501,000 seafarers on EU ships would have been EU/EEA nationals in 2013.

The EU controlled fleet[11] has grown strongly since 2005 (the earliest year for which data are available on a consistent basis for all EU countries). Between the start of 2005 and the start of 2014, the fleet expanded by 74 per cent in gross tonnage terms, and by 72 per cent in terms of deadweight tonnage (Figure 2.4).[12]

Figure 2.4 The evolution of the EU controlled fleet, 1 January 2005 to 1 January 2014



Source: Clarkson Research Services Ltd.

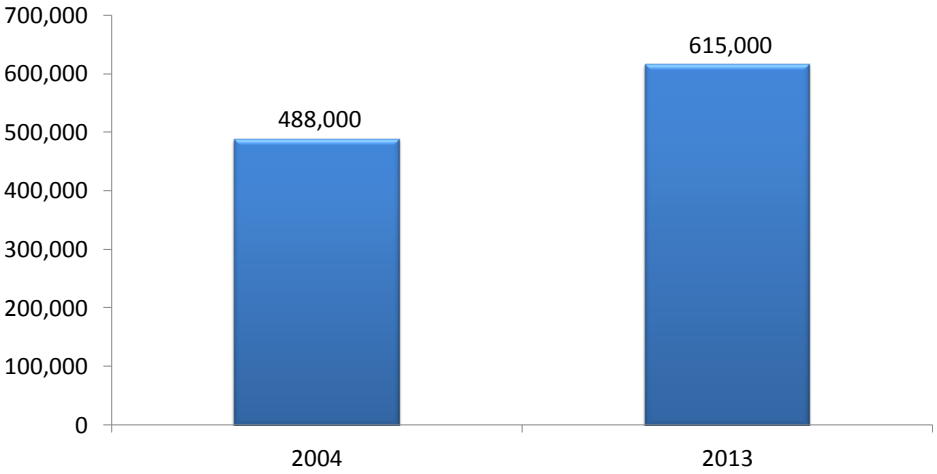
This fleet growth was accompanied by growth in employment, from 488,000 in 2004 to 615,000 in 2013. The increase in employment was proportionately less than the increase in controlled tonnage, indicating that productivity also increased over the period so that fewer workers are now needed per tonne of

[11] The 'controlled' or 'beneficially owned' fleet includes ships whose ultimate ownership or control lies in an EU country, but which may be flagged in a different country. There is further discussion of fleet definitions in chapter 2 of Oxford Economics' 2014 study *'The economic value of the EU shipping industry'*.

[12] This analysis includes all 28 EU countries and Norway for the entire duration of the time series. The growth trend shown is not, therefore, influenced by the accession of Bulgaria, Romania and Croatia to the EU during the period shown.

the fleet. This is perhaps unsurprising, given that newer ships entering the fleet are likely to incorporate more modern technology and automated systems than the older vessels they replace.

Figure 2.5 Direct employment in the EU shipping industry by country, 2004 and 2013[13]



Source: Oxford Economics

2.1.2 Direct contribution to GDP

The total direct gross value added contribution to GDP of the European shipping industry in 2013 was €56 billion. This means that the direct contribution of shipping to GDP is greater than that of postal and courier services, the manufacture of transport equipment (excluding motor vehicles), and the air transport industry.

In 2013, the EU shipping industry is estimated to have directly contributed €56 billion to EU GDP

[13] Includes workers who are land-based and those at sea. Both and EU and non-EU seafarers are included as well.

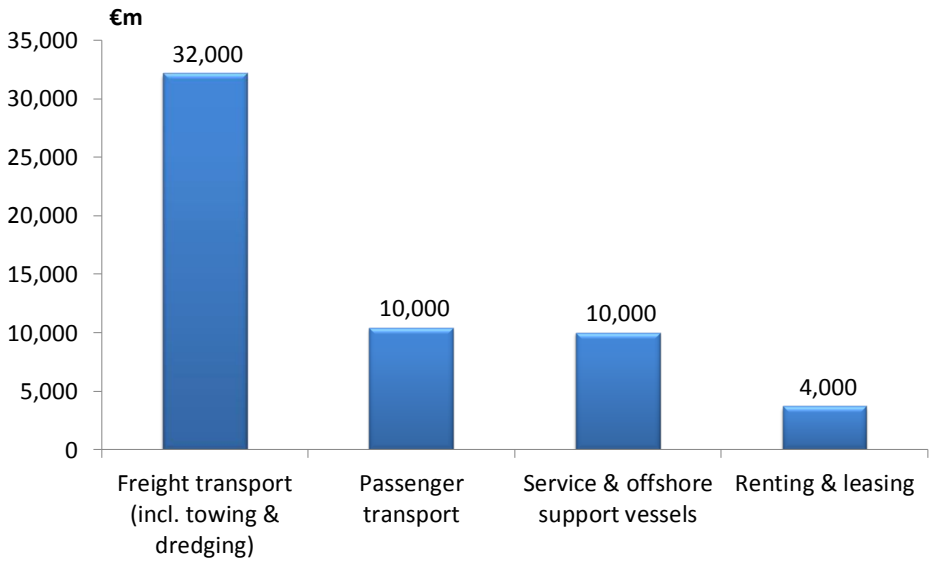
Table 2.2 Direct GVA in the EU and Norway – shipping and comparator industries, 2013

Industry	GVA
Film, television and broadcasting	€70 billion
Manufacture of textiles	€64 billion
Shipping	€56 billion
Postal and courier services	€55 billion
Manufacture of transport equipment (excluding motor vehicles)	€46 billion
Air transport	€31 billion

Source: Eurostat, Oxford Economics

Freight transport (including towing and dredging) accounted for 57 per cent (€32 billion) of the EU shipping industry's total contribution to GDP. Passenger transport contributed 19 per cent, and service and offshore support activities contributed 18 per cent. The remaining 6 per cent came from renting and leasing (Figure 2.6).

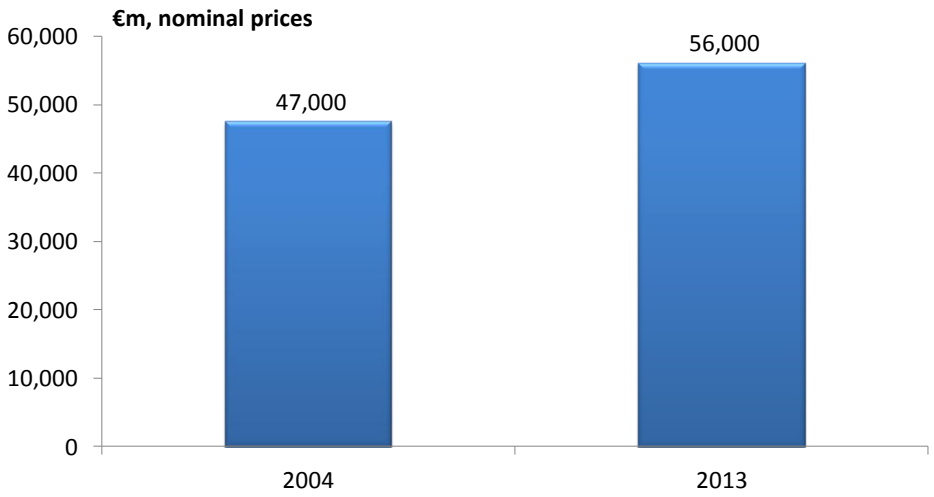
Figure 2.6 Direct gross value added contribution to GDP of the EU shipping industry by sub-sector, 2013



Source: Oxford Economics

In 2004, the EU shipping industry made a direct gross value added contribution to GDP of €47 billion.[14] This means the industry's direct contribution to GDP increased by around 18 per cent from 2004-2013.

Figure 2.7 Direct gross value added contribution to GDP of the EU shipping industry, 2004 and 2013

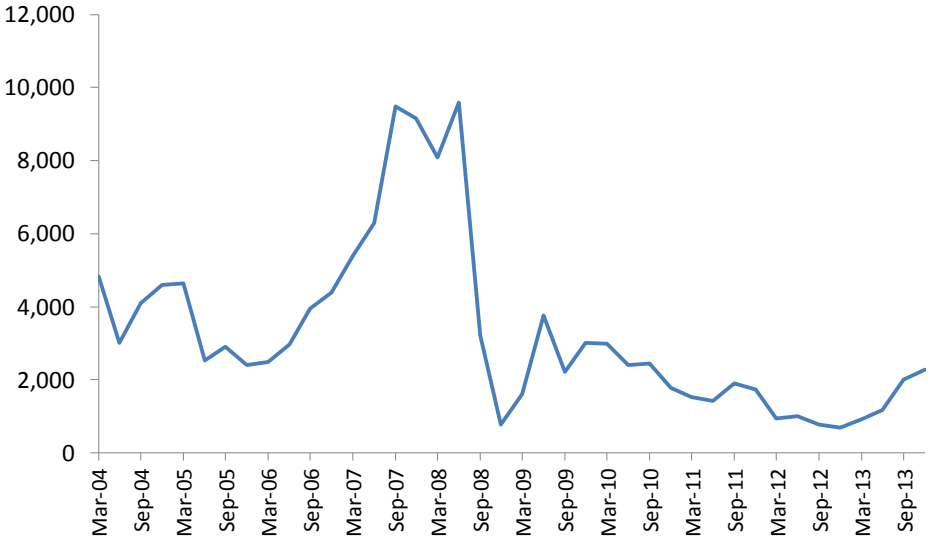


Source: Oxford Economics

Whilst the EU fleet grew strongly between 2004 and 2013, growth in the industry's GDP contribution has been held back by the challenging trading conditions experienced during and in the years after the 2008-09 global recession. In particular, global over-capacity and the associated drop in freight rates affected profitability in the six years to 2013. By way of illustration, Figure 2.8 shows the Baltic Dry Index which measures the cost of moving major raw materials by sea, as assessed by a panel of shipbroking houses around the world, on a per tonne and a daily hire basis, and across a range of routes. The Index suggests global shipping rates fell by 50 per cent between the final quarter of 2004 and the final quarter of 2013.

[14] This value is expressed in current (non-inflation-adjusted) terms. There have been large fluctuations in global shipping rates between 2004 and 2013. This has led to considerable year-to-year volatility in GDP deflators for the water transport sector which make it difficult to draw clear conclusions regarding the evolution of the shipping industry's direct GDP contribution over the period when data are expressed in real (inflation-adjusted) terms.

Figure 2.8 Baltic Dry Index, quarterly values from March 2004 to December 2013

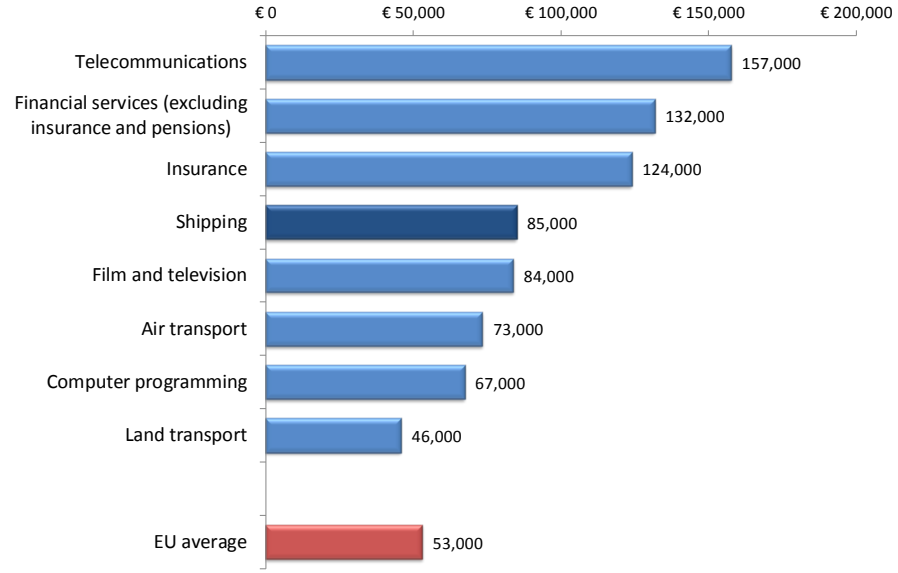


Source: Baltic Exchange, Reuters

Combining the results for the direct employment and gross value added contributions suggests productivity levels are extremely high within the European shipping industry: each worker generated an average of €85,000 of gross value added in 2013 (Figure 2.8).[15] This compares to an average for the EU and Norway of €53,000 across all industries.

[15] The employment data available for Greece appear to under-estimate total employment in the Greek shipping industry, resulting in an extremely high productivity estimate. To avoid any potential distortion to the results for the EU, Greece has been excluded from the calculation of EU productivity.

Figure 2.9 Productivity in EU shipping and comparator industries, euro per employee, 2013



Source: Oxford Economics

High productivity means the shipping industry contributes an above-average amount to Europe's GDP for each worker employed and therefore helps to raise living standards. Based on the estimate above, productivity in the shipping industry is higher than for the film and television industry (€84,000 per worker), the air transport sector (€73,000 per worker) and the computer programming industry (€67,000 per worker). Productivity in the land transport sector is €46,000 per worker, around half the figure for shipping.

2.2 Total impact

2.2.1 Indirect and induced impact on GDP

The indirect, or supply chain, impacts of the shipping industry are estimated using 'input-output' tables which map the inputs required by firms in a sector to produce a unit of output. To illustrate this concept consider the following simple example: to provide shipping services that sell for €5 million, a shipping firm may need to purchase fuel for €1 million, port services for €1 million and professional and technical services for €0.5 million. In this example the shipping firm has generated €2.5 million of gross value added (the value of its output less the value of inputs), and has generated €2.5 million in turnover for other firms in the supply chain.

The estimation of indirect GDP impacts for this project has been undertaken using Oxford Economics' Global Input-Output model. Overall, it is estimated that the indirect gross value added contribution to GDP of the European shipping industry in 2013 was €61 billion.

Induced impacts result from the spending of workers employed in the shipping industry or its supply chain. The impacts are mainly felt in sectors serving households such as hotels, restaurants and shops. Within the Input-Output model, the induced GDP impact is estimated through ratios which estimate the value of wages generated by the activity associated with the direct and indirect contributions to GDP. From there it is possible to estimate consumer expenditure, and the induced contribution to GDP associated with this expenditure.

The total induced gross value added contribution to GDP of the European shipping industry is estimated to have been €30 billion in 2013.

2.2.2 Indirect and induced impact on employment

Once the indirect and induced impacts have been estimated in GVA terms, productivity data can be used to estimate the number of jobs created in the supply chain and in sectors where direct and indirect employees spend their wages. In total, the indirect employment contribution of the European shipping industry is estimated to have been equivalent to around 1.1 million jobs across Europe in 2013. The induced impact is estimated to have been 516,000 jobs.

2.2.3 Total economic impact of the EU shipping industry

Adding together the direct, indirect and induced impacts described above gives the total economic contribution of the EU shipping industry. The total gross value added contribution to GDP from the EU shipping industry is estimated to have been €147 billion in 2013. This is equivalent to one per cent of EU GDP.

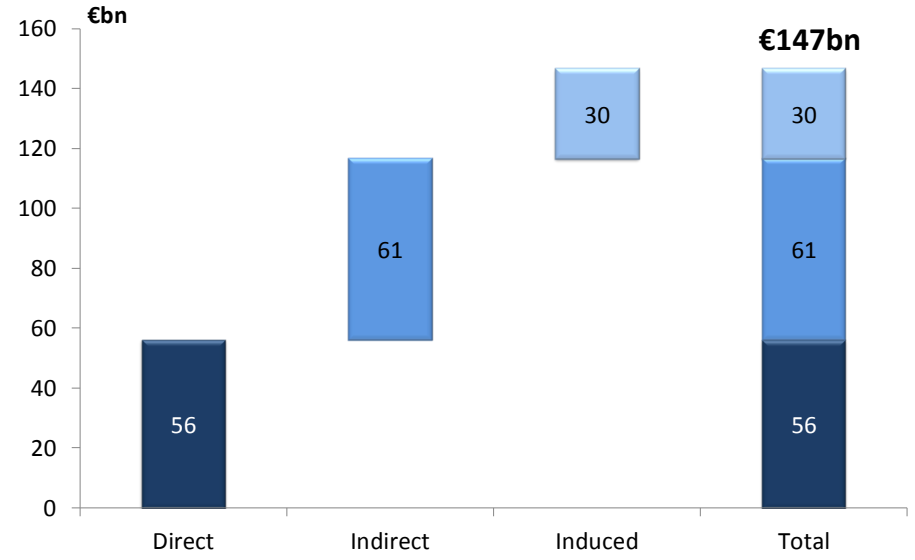
For every €1 million the European shipping industry contributes to GDP itself, it creates another €1.6 million elsewhere in the European economy. This means that that industry's GDP multiplier is 2.6.[16]

Following a similar approach, the European shipping industry is estimated to have supported a total of 2.2 million jobs in 2013, either directly through its own activities, or through its supply-chain or the induced expenditure of its employees and those in its supply chain. For every direct job the industry creates, another 2.6 are created elsewhere in the European economy. This means the shipping industry's employment multiplier is 3.6.

The total GDP contribution of the European shipping industry in 2013 is estimated to have been €147 billion. The shipping industry also supported employment for an estimated 2.2 million people

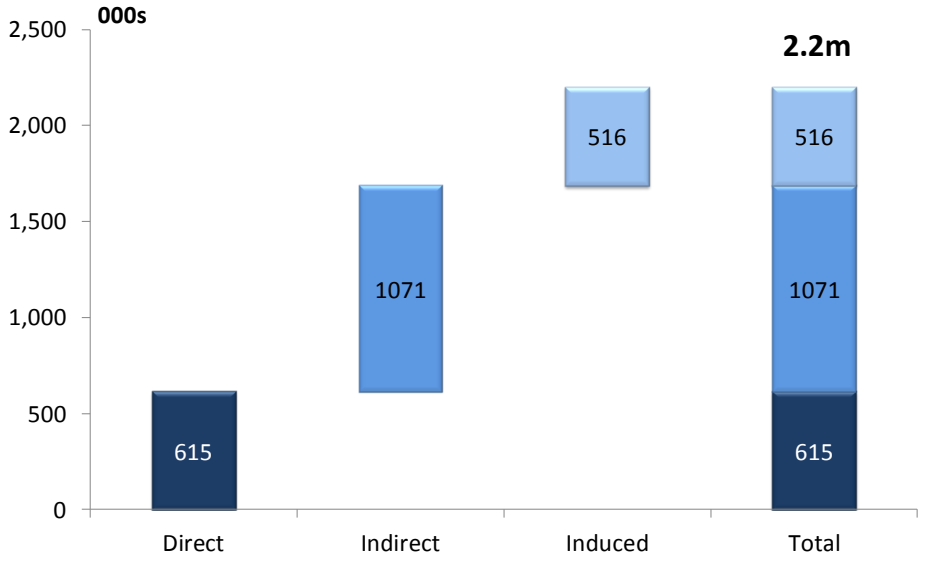
[16] The multiplier is calculated as: (Direct GDP + Indirect GDP + Induced GDP) / Direct GDP

Figure 2.10 The total GVA impact of the EU shipping industry, 2013



Source: Oxford Economics

Figure 2.11 The total employment impact of the EU Shipping industry, 2013

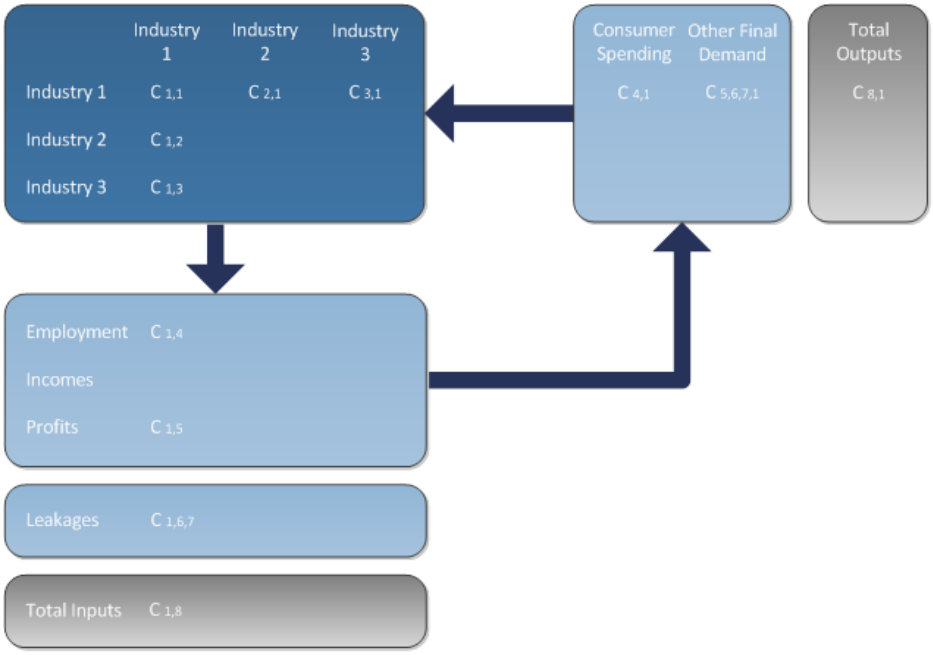


Source: Oxford Economics

Annex: An overview of input-output tables

An input-output model gives a snapshot of an economy at any point in time. The model shows the major spending flows from "final demand" (i.e. consumer spending, government spending investment and exports to the rest of the world); intermediate spending patterns (i.e. what each sector buys from every other sector – the supply chain in other words); how much of that spending stays within the economy; and the distribution of income between employment incomes and other income (mainly profits). In essence an input-output model is a table which shows who buys what from whom in the economy.

Figure A1: A simple input-output model



Traditionally input-output tables are produced on a national basis, with the linkages recorded for a single economy only. However, the World Input-Output Database, funded by the European Commission, has developed a series of global input-output tables that reflect the linkages between economies, as well as within them. Consequently, such tables enable supply chains to be tracked across multiple countries. For example, a Dutch shipping company may purchase a vessel from Germany, which in turn uses steel from Spain, the supplier of which uses an IT provider based in France. Under a traditional input-output table the purchase of a vessel from Germany would be a 'leakage' and be removed from the model. As a consequence, the economic activity created in Germany, Spain and France would not be captured. The World Input-Output Database's global input-output table captures all of these transactions, and consequently provides a greater degree of coverage and accuracy in an impact assessment.

This study has used the Oxford Economics' Global Input-Output model, which is based on the World Input-Output Database global input-output table. Norway and Croatia are not covered by the World Input-Output Database as standard,

but Oxford Economics has undertaken bespoke modelling to incorporate them into its model, based on national input-output tables and trade data.

Input-output tables can be used to generate industry multipliers by using the Leontief system.17 Under the Leontief system, industry multipliers are achieved through a series of manipulations of the input-output matrix. The first of these manipulations is the creation of a new base coefficients matrix (A matrix) for global economy. The second manipulation is the creation of an identity matrix (I matrix), within which all values are zero except for when the consuming industry (columns) and the producing industry (rows) are the same; these cells are given a value of 1. The third stage of the manipulation is the subtraction of the A matrix from the I matrix. The final stage is the inversion of the matrix produced in the third stage. The result of these manipulations is a matrix in which the values represent the individual cross-multipliers for each industry, showing the impact on each producing industry (row) of an increase in 1 unit of output in a consuming industry (column). The total multiplier for each consuming industry is the sum of the multipliers in the relevant column.

[17] Leontief, W. (1986). *Input-output economics* (2nd ed.). New York: Oxford University Press

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