



The economic contribution of the UK Maritime sector

A report for Maritime UK

September 2017

Cebr

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London, September 2017

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Executive Summary

Report Purpose

- The Centre for Economics and Business Research (Cebr) has been commissioned by Maritime UK to quantify the economic contribution of the Maritime sector. This report forms one of seven reports which also assess the contribution of the Maritime sector at industry-level, in Scotland, and in the Solent LEP region.

Defining the Maritime sector

- **The Maritime sector is defined as consisting of the individual shipping, ports, marine and maritime business services industries, each of which comprise a diverse array of activities.** This report draws upon a combination of data sources, including company financial database FAME, industry sources and publicly-available data to quantify both the direct and aggregate economic impact of Maritime sector activities in the UK economy in the years 2010 to 2015.

Economic contribution of the Maritime sector

- The Maritime sector makes a substantive macroeconomic contribution to the UK through turnover, Gross Value Added (GVA), employment and through the compensation of employees. **It is estimated that the sector directly supported just over £40 billion in business turnover, £14.5 billion in GVA and 185,700 jobs for UK employees in 2015. The marine and shipping industries are the largest constituent industries terms of economic activity**, contributing £6.5 billion and £4.3 billion in GVA respectively, and directly supporting around 99,500 jobs and 50,800 jobs respectively in 2015.
- **The substantial direct economic contribution of the Maritime sector exceeds those of other comparable industries.** For example, the sector's direct turnover contribution of just over £40 billion compares to £31.1 billion from the entire Aerospace industry in 2015; similarly, the sector's direct GVA contribution of £14.5 billion compares favourably to £10.0 billion from the Aerospace industry.
- **The direct contribution of the Maritime sector through turnover, GVA and employment has increased since 2010**, when turnover, GVA and employment are estimated to have been £35.5 billion, £13.6 billion and 178,800 jobs respectively. Average productivity in the Maritime sector – as measured through the GVA generated by each job – exceeds that of the national average. Average productivity in each maritime industry also exceeded the national average in each year from 2010 to 2015.

The Maritime sector also helped to raise billions of pounds each year to the UK Exchequer and made a sizeable contribution to UK trade through exports of goods and services. The sector contributed an estimated total of just under £4.7 billion in tax revenues in 2015, or 0.7% of total UK tax revenues, spread across Income Tax, NICs, VAT, Corporation Tax and Business Rates. The Maritime sector exported £12 billion of goods and services in 2015, or around 2.3% of the UK total.

- After quantifying the indirect economic impacts through the industry supply chains and induced effects on expenditures, **it is estimated that the Maritime sector helped to support a total of £37.4 billion of GVA in 2015.** This implies that, for every £1 in GVA directly contributed on average by the sector, a further £2.59 in GVA was generated across the UK economy.
- These aggregate economic impacts associated with the Maritime sector also extend to turnover, employment and the compensation of employees. **It is estimated that the Maritime sector helped to**

support a total of £91.9 billion in turnover, 957,300 jobs and £21.0 billion through the compensation of employees in 2015.

- **While the economic contribution of the industry is spread across all UK regions, London contributes the most to GVA and employment, both directly and more widely.** In 2015, it is estimated that the industry in London directly contributed £4.3 billion of GVA (29% of the industry) and 35,800 jobs (19%). After indirect and induced effects are considered, the aggregate contribution from London rises to £8.9 billion of GVA (26%) and 236,000 jobs (28%).

Forward look

- **The Maritime sector faces a considerable amount of uncertainty over the next few years.** Much of this comes down to the Brexit process itself and the uncertainty that poses for the UK economy and associated Maritime sector. **We therefore expect the sector to experience sluggish growth over the next five years.** Industry GVA and turnover will essentially remain flat until 2019, followed by a slow recovery up to 2022. By 2022 GVA and turnover are forecasted to be around 15% and 13% higher than they were in 2015.
- **As of August 2017 UK business still has relatively little clarity on what Britain's post-Brexit relationship with the EU might look like after March 2019.** While the UK government did lay out a broad approach to leaving the EU in early 2017, the subsequent General Election and relatively firm position taken by the EU has produced less certainty around the previous assumptions. The forecast provided is therefore subject to considerable upside and downside risk.
- **Cebr's Brexit analysis feeds into the Maritime UK forecast.** Our assumption entailing a continuing free trade relationship with the EU provides a macroeconomic driver for the model, channelling into macro factors such as GDP growth, inflation and exchange rates. The Brexit narrative also feeds into cost drivers, covering areas such as wages and energy input costs. Some of the individual maritime industries themselves also showed a degree of seasonality and inertia, such that current period changes are influenced by prior period changes. Many of these trends will be less relevant over the coming years due to the structural impact of Brexit, so we have also exercised discretionary judgement in tempering down certain impacts.

1 Introduction

Cebr is pleased to present this report to Maritime UK on the economic impact of the Maritime sector on the UK economy. For the purposes of this study, the Maritime sector is broadly defined as comprising of the individual shipping, ports, marine and maritime business services industries; each of these industries comprises numerous and diverse activities which are reflected in the study.

This report forms one of seven reports on the economic contribution of the Maritime sector. The other reports focus on the economic contribution of each of the four constituent industries at UK level, the economic contribution of the sector in Scotland, and in the Solent LEP region. It is therefore important to consider this report as part of the wider framework set out in the six reports, which set out the impact of the Maritime sector both at a national and regional level.

Our examination spans the period from 2010 to 2015 (inclusive), with the latter being the latest year for which full data are available, and endeavours to capture the full economic ‘footprint’ of the Maritime sector. As such, our report is not confined to direct ongoing contributions to GDP and employment through the Maritime sector’s operations and activities in the UK, but also provides assessments of the associated indirect and induced multiplier impacts.

1.1 About Maritime UK

Maritime UK is the promotional body for the UK’s maritime sector, representing companies and partner organisations in the shipping, ports, marine and maritime business services industries. It acts to promote the sector, influence government and drive growth.

1.2 Purpose of this report

This study seeks to equip Maritime UK with statistics and figures on the value of the Maritime sector to the UK economy, within the context of the value of the Maritime sector. As such, Cebr has focused on the following key economic indicators: business turnover, employment, Gross Value Added (GVA), the compensation of employees, the Exchequer contribution (through tax revenues raised) and exports of goods and services.

The study also seeks to identify the contribution of the Maritime sector at regional level (across the former Government Office Regions), after accounting for the relatively high concentration of economic activity taking place in the City of London.

1.3 Overview of the study and methodology

Purpose of the study

This report provides a thorough and comprehensive examination of the role of the Maritime sector in the UK and its constituent sub-regional economies. It presents a range of analyses demonstrating different aspects of the value contributed by the overall sector, including direct contributions to GDP and employment, indirect and induced multiplier impacts and the Maritime sector’s contribution to the UK Exchequer through tax revenues raised.

An important task has been to develop an in-depth understanding of the Maritime sector. To produce a robust study, it is necessary to analyse the available data to ensure that it captures the full range of activities that should be included in establishing the total economic ‘footprint’ of the industry. Following the collation of the necessary data capturing these activities, the values of key economic indicators were established to demonstrate the impact of the sector. The key macroeconomic indicators include:

- GVA¹ contributions to UK and regional GDP generated by the Maritime sector, directly and through indirect and induced multiplier impacts.
- Jobs supported by the sector, including direct, indirect and induced jobs through multiplier impacts.
- The value of the turnover of Maritime sector and, again, the turnover supported in the UK and regional economies through multiplier impacts.
- The value of employee compensation² generated by the Maritime sector, representing the total remuneration of employees operating in the sector.
- The contribution of the Maritime sector through revenues raised for the Exchequer.
- The value of goods and services exported by the industries comprising the Maritime sector.

Mapping the UK Maritime sector

Here we set out how the Maritime sector has been defined for the purposes of the study. On a holistic level, the wider sector can be disaggregated into the shipping, ports, marine and maritime business services industries, which in themselves are formed of numerous individual and distinct activities.

Cebr has subsequently undertaken a mapping exercise using this list to identify how each of these four industries aligns with the national accounts. For most industry activities, a corresponding Standard Industrial Classification (SIC) code exists which enables the identification and quantification of the direct economic impacts using publicly-available data sources. A minority of activities do not map neatly against the SIC framework, necessitating the use of industry or local-level data for quantification purposes.

- **Shipping industry**
 - International transport of passengers;
 - Transport of passengers on inland waterways;
 - International transport of freight;
 - Transport of freight on inland waterways.
- **Ports industry**
 - Warehousing and storage;
 - Port activities and management;
 - Stevedores, cargo and passenger handling;
 - Border agency, HMRC and public sector employees operating in ports.

¹ GVA, or gross value added, is a measure of the value from production in the national accounts and can be thought of as the value of industrial output less intermediate consumption. That is, the value of what is produced less the value of the intermediate goods and services used as inputs to produce it. GVA is also commonly known as income from production and is distributed in three directions – to employees, to shareholders and to government. GVA is linked as a measurement to GDP – both being a measure of economic output. That relationship is (GVA + Taxes on products - Subsidies on products = GDP). Because taxes and subsidies on individual product categories are only available at the whole economy level (rather than at the sectoral or regional level), GVA tends to be used for measuring things like gross regional domestic product and other measures of economic output of entities that are smaller than the whole economy.

² Compensation of employees is the total remuneration, in cash or in kind, payable by an employer to an employee in return for employers' social contributions, mainly consisting of employers' actual social contributions (excluding apprentices), employers' imputed social contributions (excluding apprentices) and employers' social contributions for apprentices.

- **Marine industry**
 - Shipbuilding;
 - Boatbuilding (leisure marine vessels);
 - Marine renewable energy;
 - Marine support activities for offshore oil and gas, engineering and mining;
 - Recreational marine activities, marine finance and legal activities and general marine services;
 - Marine science and academic activities, including government vessels and technical consulting;
- **Maritime Business Services industry**
 - Shipbroking and other miscellaneous transport services;
 - Maritime insurance, finance and legal services;³
 - Ship surveying and classification;
 - Maritime Education;
 - Maritime Consultancy;
 - Maritime Accountancy.

Here we focus solely on the Maritime sector on a holistic basis; a full description of how the direct, aggregate and regional economic impacts of each industry has been measured can be found in Cebr's separate reports for each industry.

Quantifying the direct economic impacts of the Maritime sector and data sources

The first stage of the study, discussed in more detail in Cebr's separate reports on the shipping, ports, marine and maritime business services industries, has involved mapping the activities of each industry against the National Accounts framework, in order to establish clarity on the precise definition of activities as they map against the Standard Industrial Classification (SIC) framework.⁴

In essence therefore, this involves taking each of the sector's and industry's activities, and mapping these to the most relevant Standard Industrial Classification (SIC) code in order to identify the activity's economic data. It is clear from Cebr's analysis that the majority of activities do map neatly onto the National Accounts framework. As a result, Cebr have been able to exploit company financials data in addition to publicly-available data sources such as the Annual Business Survey to gather data for some constituent activities of the sector. Cebr has therefore drawn upon a combination of publicly-available data, desk research and industry data to quantify the economic contribution from the Maritime sector.

In order to quantify the direct economic impacts of the Maritime sector, a number of different approaches have been taken which reflect the degree of alignment (or otherwise) for each shipping activity against the National Accounts framework. They are as follows:

- The major source of data used to quantify the direct economic contribution of the Maritime sector is the Financial Accounts Made Easy (FAME) database, which provides business demography and financial accounts data for companies operating in the UK Maritime sector. The FAME database has been used to generate estimates for the business turnover, GVA, employment, the compensation of employees and profitability of the shipping industry.
- For those industries and constituent activities which do not map neatly against the national accounts framework, a combination of industry sources (such as the British Marine Key Performance Indicators) and publicly-available data sources have been used to generate direct economic impact estimates.

³ These activities are distinct from those Insurance, Financial and Legal activities taking place within the Marine industry, and the contribution of these activities are treated and quantified separately as a result.

⁴ The United Kingdom Standard Industrial Classification of Economic Activities (SIC) is used to classify business establishments and other standard units by the type of economic activity in which they are engaged.

- As FAME does not provide data on exports of goods and services, data have instead been sourced from both the ONS Pink Book or industry sources such as the UK Chamber of Shipping's (UKCoS) Annual Sea Inquiry. In some instance the ONS Supply Use Tables have been used to generate estimates.
- Data for the direct economic contribution of each industry have by extension been then used to quantify the contribution that the Maritime sector makes to the UK Exchequer, and the productivity of the sector in terms of GVA per job.

Again, a more detailed description of sources used for each industry and their constituent activities can be found in Cebr's separate industry reports, which quantify the economic contribution of each industry.

Quantifying the aggregate economic impacts of the Maritime sector

After collation and interrogation, the direct economic impacts for the Maritime sector have then been embedded within Cebr's economic impacts models of the UK economy. For each of the activity groups, the direct impacts are then combined with the bespoke economic multipliers to generate indirect, induced and so aggregate impacts. These multipliers were calculated by Cebr using our input-output modelling approaches, as these activities are not 'standard' sectors reported in the ONS' input-output tables. Cebr's models establish the relationships between industries through supply chain linkages, as well as industries' linkages with government, capital investors and the rest of the world (through trade).

The models produce three types of impact for four indicators – turnover, GVA, employment and the compensation of employees. The three types of impact are:

- **Direct impact:** this is the value generated and jobs supported directly by the economic activities of the UK Maritime sector.
- **Indirect impact:** this is the value generated and jobs supported in industries that supply inputs to the UK Maritime sector industry.
- **Induced impact:** this is the value generated and jobs supported in the wider economy when the direct and indirect employees of the sector spend their wages and salaries on final goods and services.

These three impacts are then combined to convey the aggregate impact associated with each industry and activity within the Maritime sector in terms of turnover, GVA, employment, and the compensation of employees.

Removal of "double-counting" effects

As this report considers the activities of the entire Maritime sector (as defined above), when quantifying the associated aggregate economic impacts it is necessary to consider and account for the crossovers or interlinkages that will exist between each of the constituent industries. For example, the UK shipping industry will purchase a significant amount of services from either the UK ports or UK maritime business services industries. So if we were to simply apply multipliers to each of the four maritime industries and combine the resulting aggregate impacts, we would in effect be double-counting some of the economic contributions, and would by extension overstate the aggregate impacts of the sector.

To avoid double-counting it has therefore been necessary to remove these surplus interlinkages from our analysis. In practice, this involves removing coefficients relating to affected industries within Cebr's input-output models which would otherwise feature as part of the maritime industry multipliers. For example, the coefficient reflecting the additional activity generated when the shipping industry consumes ports services has been removed. As a result, the summation of the aggregate economic impacts taken from Cebr's individual industry reports will not align with the aggregate economic impacts for the Maritime sector as presented in this report (and the Maritime sector aggregate impacts will necessarily be lower.)

1.4 Structure of the report

The remainder of the report is structured as follows:

- Section 2 outlines the direct economic impacts of the Maritime sector. We consider the direct impacts through turnover, GVA, employment, the compensation of employees, the contribution to the UK Exchequer through tax revenues contributed by the industry, and the contribution through exports.
- Section 3 considers the multiplier impacts of the Maritime sector through the activities it stimulates in local supply chains and in the wider economy when employees directly and indirectly employed by the different industries spend their wages and salaries in the local and wider economy.
- Section 4 examines the direct and multiplier impacts of the Maritime sector at regional level, as disaggregated by the 12 former Government Office Regions (GORS).⁵
- Section 5 provides forecasting analysis for the Maritime sector in the context of the current economic climate and likely Brexit outcomes.
- Annex A sets out the full set of direct economic impacts by region.

⁵ These are: Scotland, Wales, Northern Ireland, the East of England, the East Midlands, London, the North East, the North West, the South East, the South West, the West Midlands, and Yorkshire and the Humber.

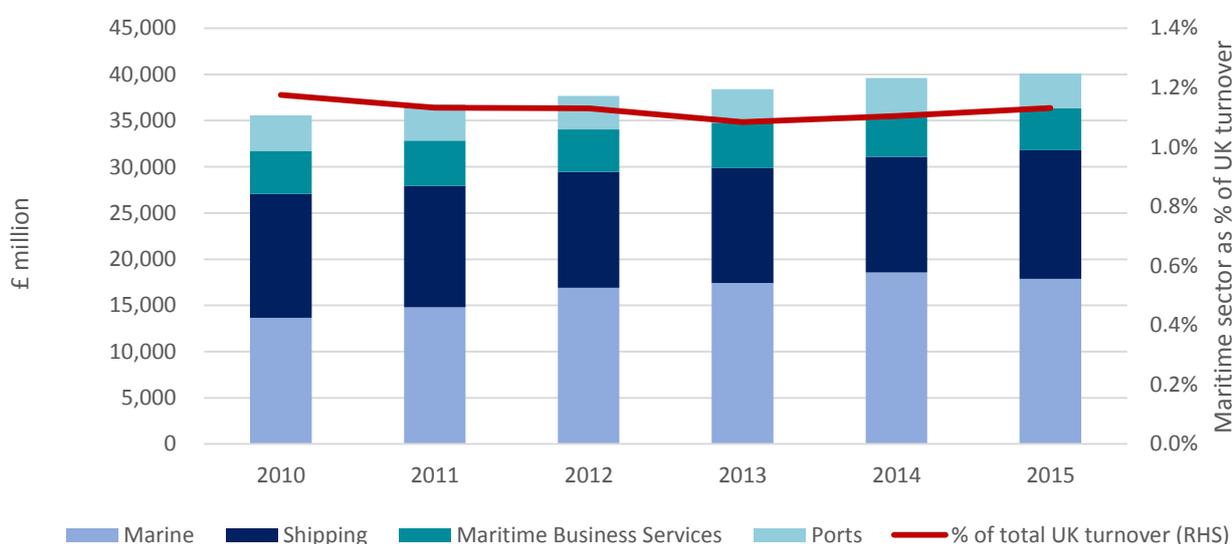
2 The direct economic impact of the Maritime sector in the UK

In this section we set out estimates for the direct contribution of the Maritime sector to the following key macroeconomic indicators: turnover, GVA, employment, the compensation of employees, and the Exchequer contribution through tax revenues raised.

2.1 The direct economic impact through turnover

Figure 1 below shows the breakdown of business generated by the Maritime sector and its constituent industries between 2010 and 2015, and expressed as a share of the total UK Non-Financial Business Economy.⁶ Overall, the Maritime sector contributed an estimated £40 billion in turnover in 2015, an increase of 1.2% from the 2014 level (£39.6 billion) and above the period average of £38 billion.

Figure 1: The estimated turnover of the Maritime sector, and expressed as a share of total UK turnover from the non-Financial Business Population, 2010 to 2015, £ million



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

The largest constituent industry within the Maritime sector in terms of turnover directly generated was the marine industry, with £17.9 billion of business turnover in 2015; turnover from this activity increased fairly consistently over the period considered (though the 2015 value was slightly lower than the 2014 value of £18.6 billion). The shipping industry was the next largest, with £13.9 billion of turnover in 2015. Combined, these industries represented 81% of the Maritime sector's turnover in 2015.

In line with increases in turnover directly generated by the Maritime sector, average profitability (as measured using the ratio of gross profits to turnover) in the Maritime sector is estimated to have grown since 2010. Table 2 overleaf shows trends in profitability for the sector and across each industry. The overall average profitability of the industry rose from 19% to 23%; in other words, for every £1 in turnover

⁶ This is the total level of turnover for businesses not in the Financial Services industry as taken from the Annual Business Survey; The Annual Business Survey covers only the UK Non-Financial Business Economy, which accounts for approximately two thirds of the UK economy in terms of Gross Value Added (GVA). Simply put, this is the turnover for businesses that do not trade in financial/investment-related goods and services.

generated by a business in the Maritime sector in 2015, an estimated 23 pence was generated in gross profit; the shipping industry boasted the highest rate of average profitability in 2015.

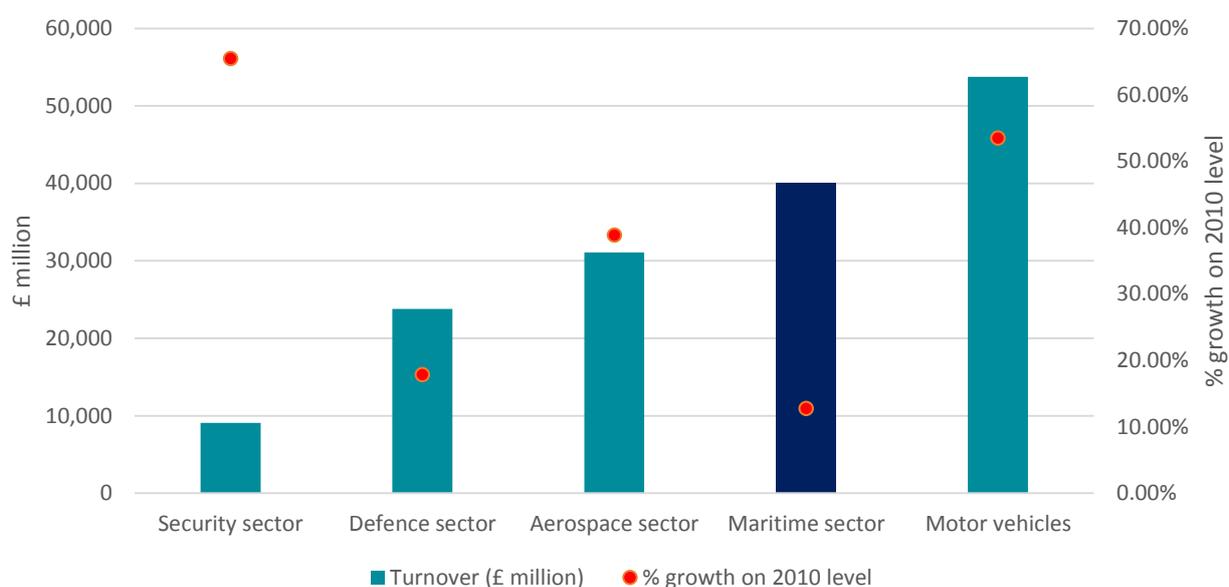
Table 1: Estimated average profitability (gross profit ratio) of the Maritime sector and constituent industries

| Profitability | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| UK Maritime sector | 18.4% | 19.7% | 21.4% | 21.4% | 23.0% | 22.9% |
| Shipping industry | 18.9% | 21.5% | 24.3% | 25.3% | 29.2% | 30.7% |
| Ports industry | 25.8% | 23.2% | 25.4% | 26.0% | 25.6% | 26.2% |
| Marine industry | 18.2% | 19.4% | 20.1% | 19.0% | 19.0% | 16.7% |
| MBS industry | 11.6% | 12.8% | 15.4% | 16.6% | 20.1% | 20.1% |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

To place the Maritime sector's direct contribution through turnover in context, Figure 2 below compares turnover in the Security; Defence; Aerospace and Motor vehicle manufacturing industries with that of the Maritime sector; both in absolute levels and % growth on the 2010 level. Turnover data for the comparable industries has been sourced from ADS Group⁷ and the Annual Business Survey (ABS).

Figure 2: The direct contribution through turnover of the Maritime sector against comparable sectors in 2015, and growth against the 2010 level



Source: ADS, ONS, Cebr analysis

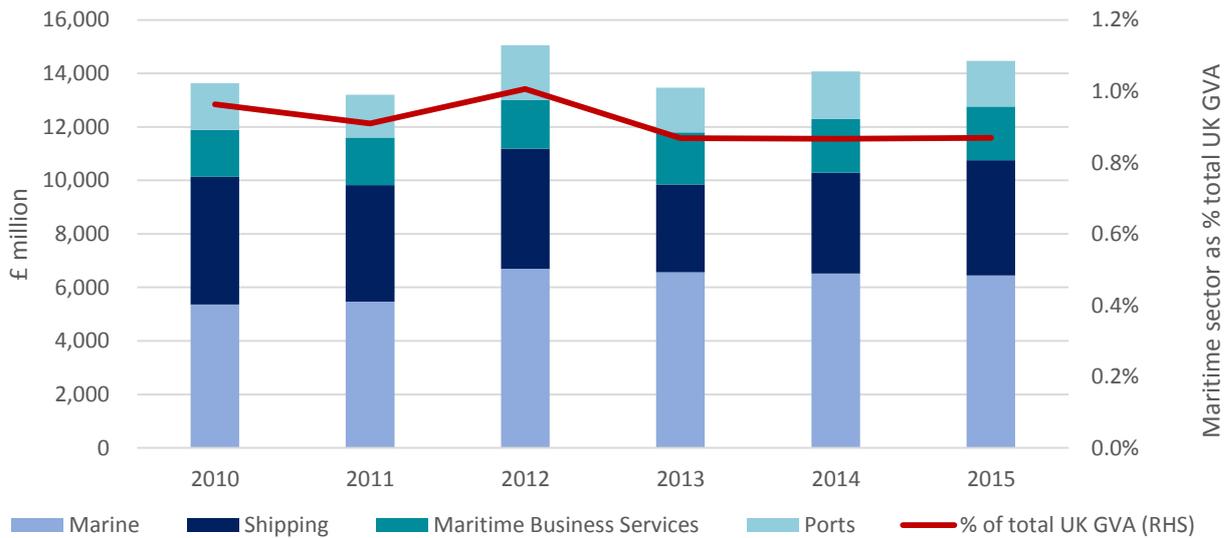
Turnover generated by the Maritime sector in 2015 is estimated to have increased by approximately 13% since 2010, with this outturn comparing favourably to other industries. In 2015 the Maritime sector turnover exceeded that of the Security sector (£9.1 billion), the Defence sector (£23.8 billion) and the Aerospace sector (£31.1 billion), although growth since 2010 was lower. However, using this measure the Maritime sector direct turnover was exceeded by the manufacture of motor vehicles, with £53.7 billion.

⁷ <https://www.adsgroup.org.uk/about/>

2.2 The direct economic impact through Gross Value Added (GVA)

This subsection illustrates the contributions in terms of the GVA from the Maritime sector to UK GDP. Figure 3 shows this direct impact, disaggregated by industry in the years 2010 to 2015, as well as the Maritime sector's share of total GVA in the UK. It is estimated that the Maritime sector directly contributed a total of £14.5 billion in GVA in 2015, an increase from £13.6 billion in 2010.

Figure 3: The direct contribution of the Maritime sector through GVA, and the sector's share of total UK GVA, 2010 to 2015, £ million

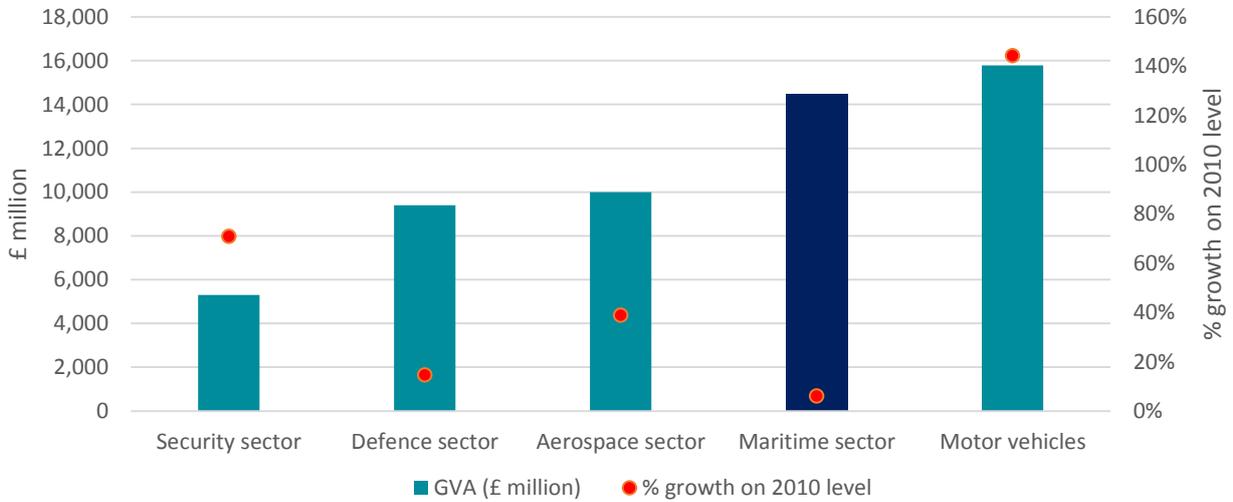


Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

A decline in the direct contribution of the shipping industry over the six-year period has been offset by increases in the direct contribution from the Marine and Maritime Business Services industries. The Marine industry in particular directly generated £6.4 billion of GVA in 2015, or around 45% of the sector total. The fall in shipping industry GVA, and partial recovery, is consistent with UK-owned shipping fleet trends, discussed in further detail within Cebr's report on the shipping industry.

Following Figure 2, Figure 4 below compares Maritime sector GVA against those of comparable activities in 2015: the Maritime sector is larger than the entire Security sector (£5.3 billion); the Defence sector (£9.4 billion); and the Aerospace sector (£10 billion); although growth against the 2010 level is lower in comparison with these other industries. As illustrated, the direct GVA of the Maritime sector is comparable with that of the manufacture of motor vehicles (£15.7 billion).

Figure 4: The estimated GVA of the Maritime sector against comparable industries in 2015, and growth against the 2010 level

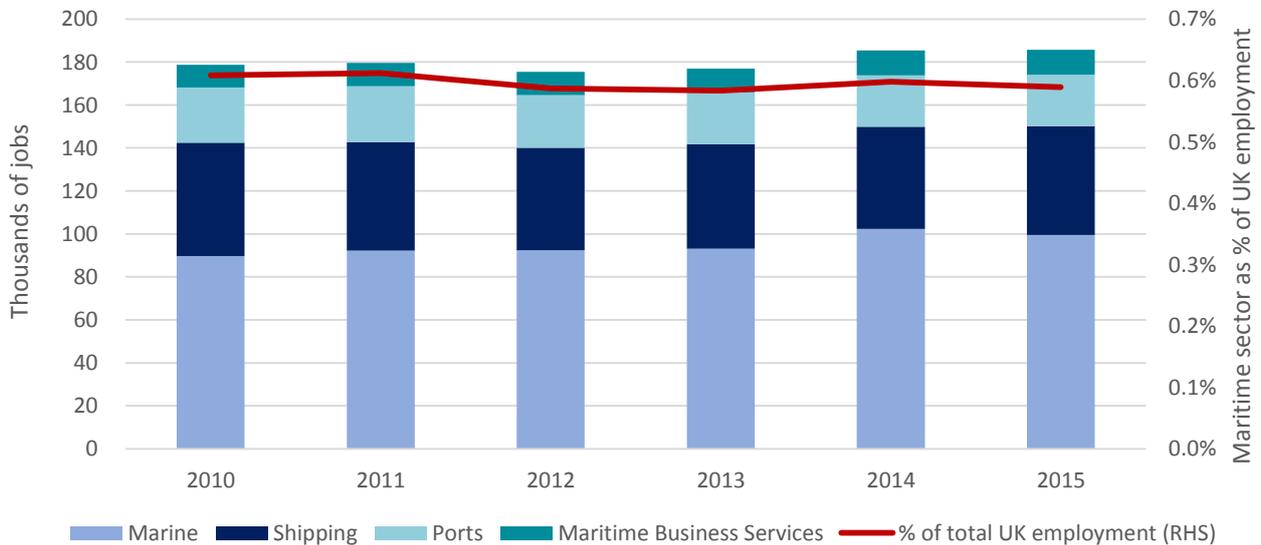


Source: ADS, ONS, Cebr analysis

2.3 The direct economic impact through employment

In addition to its contribution through GVA, the Maritime sector also directly supports a significant number of jobs. Figure 5 below highlights the direct contribution of the Maritime sector to UK employment, again disaggregated by individual industry.

Figure 5: The direct contribution of the Maritime sector through employment, thousands of jobs, and the sector’s share of total UK employment from 2010 to 2015



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

It is estimated that the Maritime sector directly supported around 185,700 jobs for UK employees in 2015, an increase from 178,800 jobs in 2010. The sector’s share of total UK employment remained broadly stable over this period, on average around 0.6%. As with turnover and GVA, in each year the Marine and Shipping industries contributed the lion’s share of employment, equating to 81% in 2015.

Based on trends in GVA and employment presented in Figure 2 and Figure 4, employees operating in the Maritime sector are highly productive, as measured by GVA per job. Table 2 below shows the estimated productivity of jobs in the sector and across each industry across the years 2010 to 2015, and compared against the UK economy as a whole. The average job in the Maritime sector in 2015 raised just under £78,000 and so compares favourably to the UK average of £50,800; the average job in each consistent industry was more productive than the UK average in each year, with those operating in the Maritime Business Services industry found to be the most productive on average (three-times the national average).

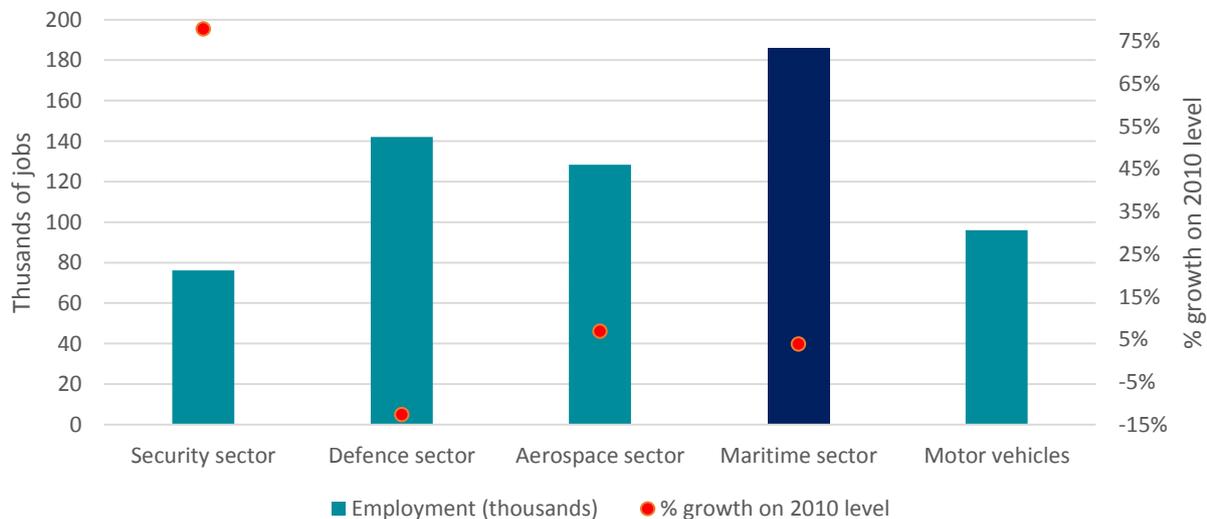
Table 2: Productivity (GVA per job) in the Maritime sector and constituent industries

| GVA per job | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------|----------|----------|----------|----------|----------|----------|
| UK economy | £45,734 | £46,652 | £47,735 | £49,009 | £50,205 | £50,830 |
| UK Maritime sector | £76,273 | £73,557 | £85,822 | £76,130 | £75,917 | £77,897 |
| Shipping industry | £90,447 | £86,400 | £94,206 | £67,678 | £79,226 | £84,818 |
| Ports industry | £68,092 | £61,951 | £84,232 | £68,990 | £74,496 | £71,090 |
| Marine industry | £59,750 | £59,283 | £72,477 | £70,509 | £63,714 | £64,805 |
| MBS industry | £165,400 | £162,763 | £165,805 | £176,989 | £173,426 | £174,416 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Figure 6 below compares the direct contribution that the Maritime sector made through UK employment in 2014 against comparable industries. Employment in the Maritime sector in 2015 was 4% higher than in 2010. Again, this compares favourably with each of the comparison industries.

Figure 6: The estimated employment of the Maritime sector against comparable industries in 2014, and growth against 2010 level



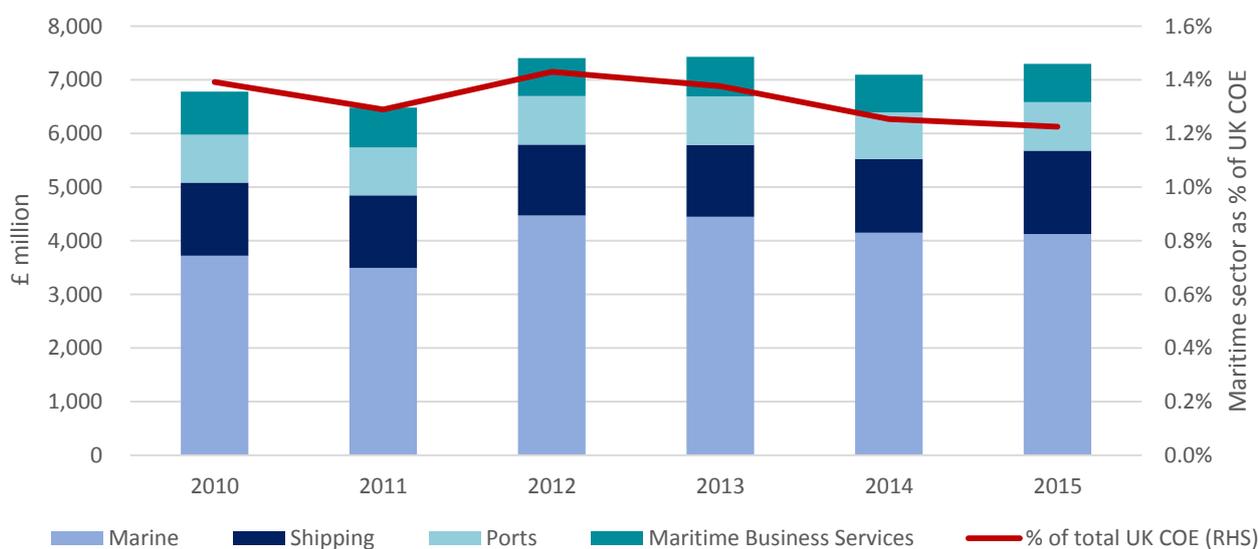
Note: Motor vehicles growth since 2010 not shown due to data suppression within the Annual Business Survey.⁸
Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

⁸ Employment number for Motor vehicles were not available from the ABS 2015, and so the direct employment number was estimated from the available data within the same report

2.4 The direct economic impact through the compensation of employees

Figure 7 below illustrates the compensation of employees which is directly supported by the Maritime sector, disaggregated by industry. It also illustrates the proportion of all direct employee compensation in the Maritime sector which is directly supported by the industry.

Figure 7: The direct contribution of the Maritime sector through the compensation of employees, 2010 to 2015, £ billion



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

It is estimated that the Maritime sector directly contributed just under £7.3 billion through the compensation of employees in 2015; this equates to around 1.2% of the total employment costs of the total UK Non-Financial Business Economy. Once again and largely due to its high direct employment contribution, the Marine industry contributed the highest share (around 56% in 2015). Driven by strong growth from the Marine industry, the direct value of compensation of employees directly supported by the Maritime sector is estimated to have increased from £6.7 billion in 2010 to £7.3 billion in 2015. The share of the UK total has remained broadly stable through the period, averaging at 1.4%.

2.5 The direct contribution of the Maritime sector to the UK Exchequer

This subsection discusses the contribution of the Maritime sector to the UK Exchequer through tax revenues. For each industry and constituent activity, Cebr have calculated the contributions in terms of the tax heads listed below:

- Income Tax;
- National Insurance Contributions (NICs) – from both employees and employers;
- Value-Added Tax (VAT);
- Corporation Tax;
- National Non-Domestic Rates (Business Rates).

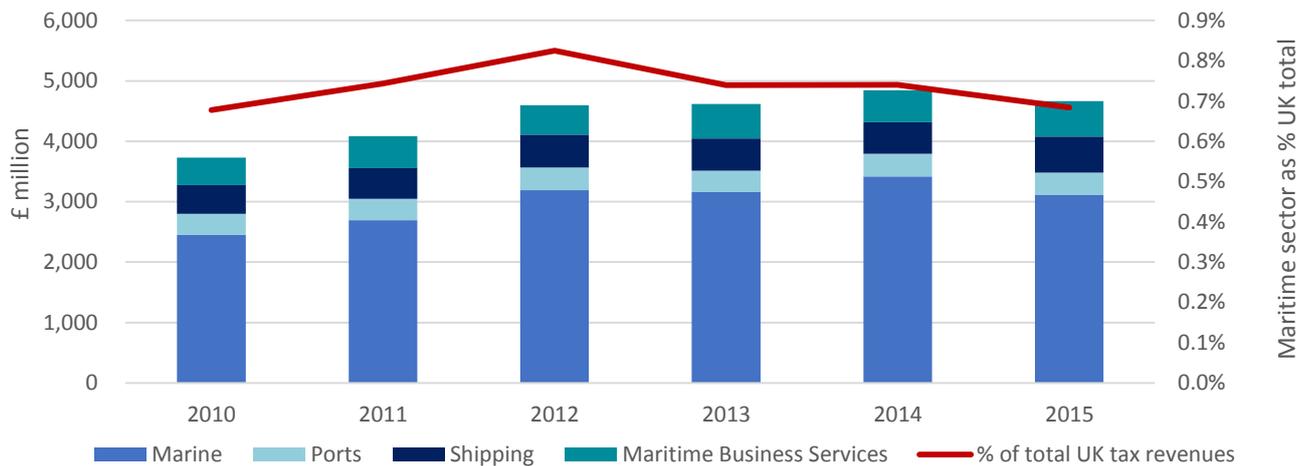
For the personal taxes listed above, Income Tax and NICs revenues have been calculated by applying tax rates to the estimated wages and salaries paid to employees operating in each industry; rates and

thresholds have been sourced from HMRC for the years 2010 to 2015. Wages and salaries for employees have been sourced from FAME and the Annual Survey for Hours and Earnings (ASHE).⁹

For the business taxes listed above and aside from revenues raised from the Tonnage Tax regime applied to the shipping industry (discussed in Cebr's separate report on the economic contribution of the shipping industry), Corporation Tax revenues have been estimated by combining the revenues raised through the Tonnage Tax regime, Corporation Tax revenues have been estimated by applying HMRC estimates for Average Effective Tax Rates (AETRs) to the estimated Gross Profit of each industry activity. Business Rates have been estimated using the average level of Business Rates paid as a proportion of GVA, drawing upon the ONS Annual Business Survey (ABS).

Figure 8 below shows the direct contribution of the Maritime sector to the UK Exchequer across the years 2010 to 2015, as disaggregated by industry and expressed as a share of total UK tax revenues. The Maritime sector is estimated to have directly generated just under £4.7 billion in tax revenues for the UK Exchequer in 2015, with this contribution higher than the £3.7 billion generated in 2010. In all years, the Marine industry contributed the lion's share of revenues raised by the UK Maritime sector.

Figure 8: The direct contribution of the Maritime sector to the UK Exchequer, 2010 to 2015, and the share of total UK tax revenues

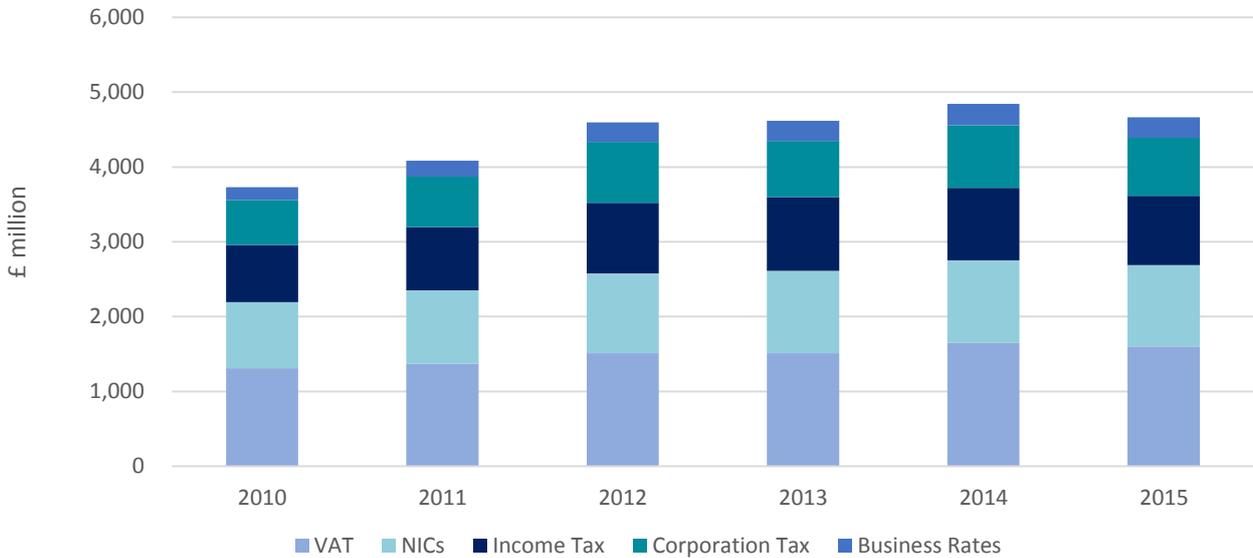


Source: UKCoS, British Marine, PwC, FAME, ONS, HMRC, Cebr analysis

On average, tax revenues raised from the Maritime sector represented 0.7% of all tax revenues generated in the UK. Figure 9 below disaggregates the Exchequer contribution of the Maritime sector by tax head. VAT formed the largest component of Exchequer contributions, with £1.6 billion in 2015 and averaging around 34% of total revenues from the sector from 2010 to 2015; this is despite the assumed zero contribution from those businesses undertaking shipping, ports and shipbuilding activities (among others). After VAT, the sector is estimated to have contributed £2 billion in combined Income Tax and NICs in 2015. Shipping benefits from the tonnage tax regime, hence the lower tax contributions relative to Marine.

⁹ The Annual Survey of Hours and Earnings (ASHE) provides data on the levels, distribution and make-up of earnings and hours worked for UK employees by sex and full-time or part-time status in all industries and occupations.

Figure 9: The direct contribution of the Maritime sector to the UK Exchequer, 2010 to 2015, by tax head

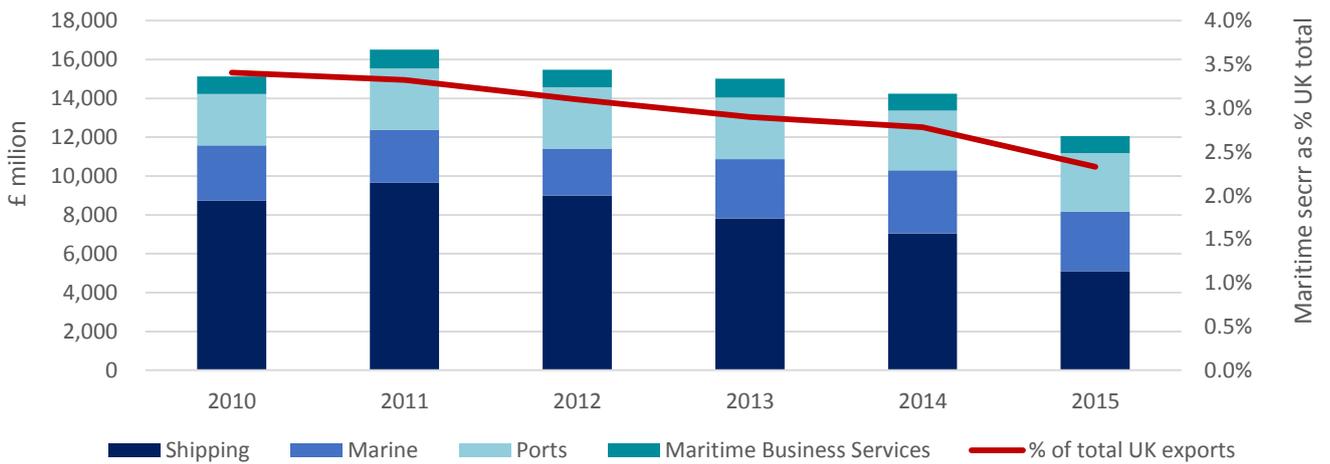


Source: UKCoS, British Marine, PwC, FAME, ONS, HMRC, Cebr analysis

2.6 The direct contribution to the UK’s exports of products and services

In this subsection we consider the contribution that the Maritime sector makes to goods and services exported from the UK. We compare this total value to the total value of products and services exported from the UK¹⁰. Figure 10 shows trends in the value of services exports from the Maritime sector between 2010 and 2015, with exports then expressed as a share of the total value of UK exports across the same period.

Figure 10: Exports of goods and services from the Maritime sector, 2010 to 2015, £ million, and the share of total UK exports



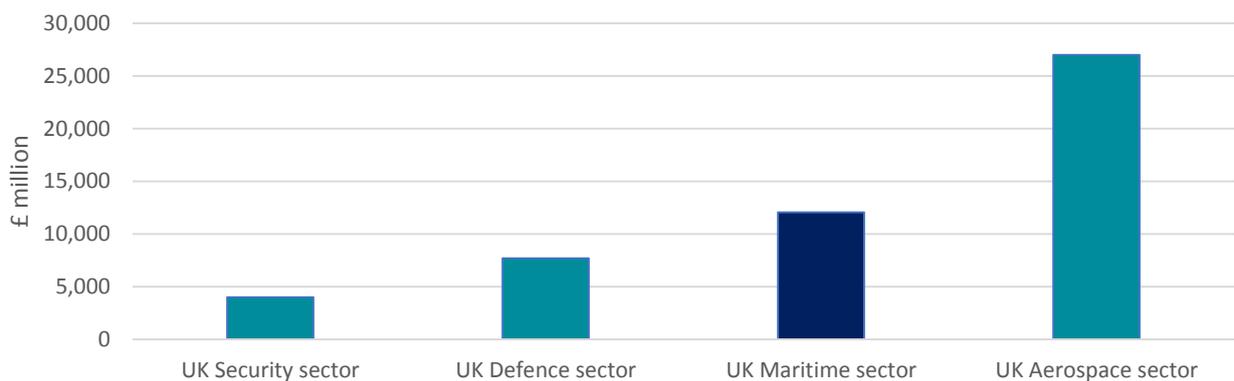
Source: UKCoS, British Marine, PwC, FAME, ONS, HMRC, Cebr analysis

¹⁰ A full description of how the value of industry exports have been calculated can be found in each of Cebr’s reports for the Shipping, Ports, Marine and Maritime Business Services industries.

The Maritime sector is estimated to have exported services valued at £12.1 billion in 2015, in comparison to just over £15.1 billion in 2010; the value of exports has fallen in recent years largely driven by falls in shipping services exports; as a consequence, the proportion of UK exports supported by the Maritime sector has fallen from 3.4 % in 2010 to 2.3% in 2015.

Figure 11 below compares exports from the Maritime sector against those from other comparable sectors: Security; Defence and Aerospace. We observe that the value of exports of products and services from the Maritime sector in 2015 was substantially larger than that of the Security and Defence sectors, but lower than the value of exports from the entire Aerospace sector (£27 billion).

Figure 11: Exports of services from the Maritime sector in 2015 against comparable activities, £ million



Source: ADS, ONS, Cebr analysis

In the next section we examine how the direct contribution that the Maritime sector makes through business turnover, GVA, employment and the compensation of employees translates into aggregate economic impacts through indirect and induced effects.

3 The aggregate economic impact of the Maritime sector

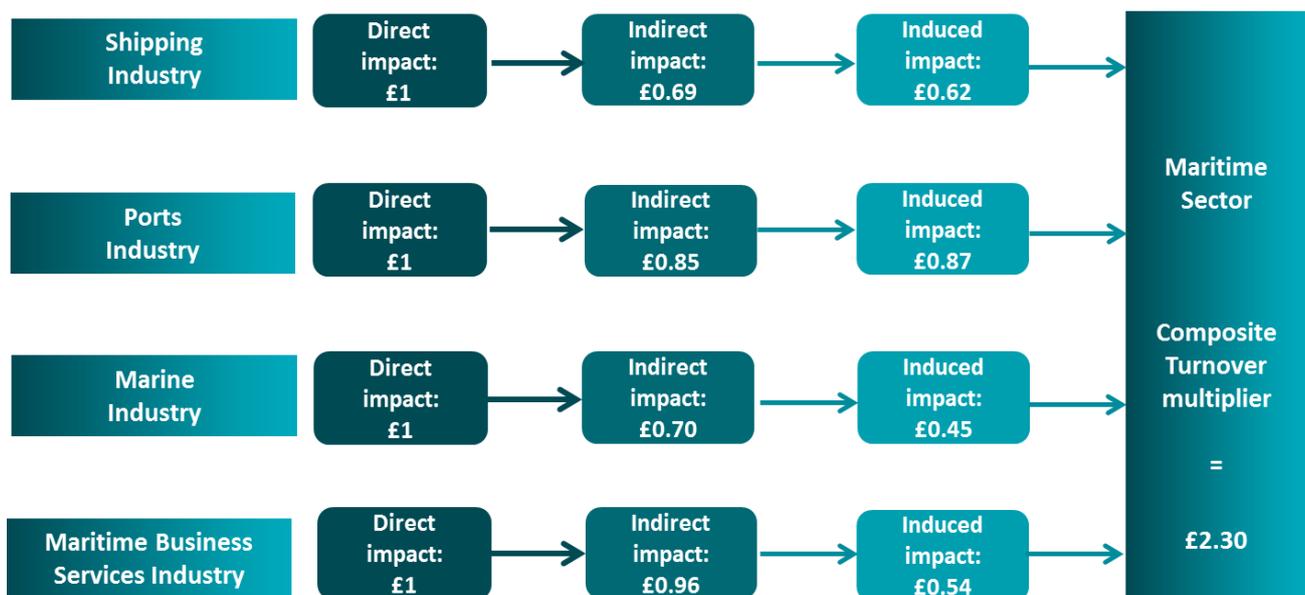
This section sets out the aggregate economic impacts of the Maritime sector, by taking into account the indirect (or supply chain) and induced (employee spending) impacts that arise from the activities of firms within this industry. The four macroeconomic indicators for which the aggregate economic impact have been calculated are as follows: business turnover; GVA; employment; and the compensation of employees. Multipliers have been generated from Cebr's economic impact model for the UK.

3.1 The aggregate economic impacts through turnover

Figure 12 below illustrates the turnover multipliers for the Maritime sector within the UK. The interpretation is that for example, for every £1 of turnover directly generated by the sector, £0.74 worth of turnover is stimulated in the supply chains and £0.56 worth of turnover in the wider economy when direct and indirect (supply chain) employees spend their earnings.

Therefore, for every £1 of turnover initially generated by the Maritime sector in 2015, the UK economy as a whole experienced an increase in turnover of £2.30.

Figure 12: Turnover multiplier impacts of the UK Maritime sector in 2015



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table 3 shows the estimated aggregate turnover impacts from the individual industries when taken in isolation. The Maritime sector directly contributed just over £40 billion in turnover in 2015 (see previous section); once the indirect and induced economic channels are taken into consideration the industries contributed £91.9 billion in turnover.

Within this aggregate economic contribution, the activities of the Marine industry generated the largest turnover impact, with £38.4 billion in 2015; after Marine, the Shipping industry generated an aggregate turnover impact of £32.1 billion; however, the Ports industry had the largest overall turnover multiplier of £2.71 in 2015.

Table 3: Turnover impact of the Maritime sector in 2015 by industry, £ million

| Turnover in 2015 | Direct Impact | Indirect Impact | Induced Impact | Aggregate Impact |
|----------------------------|---------------|-----------------|----------------|------------------|
| TOTAL | 40,038 | 29,564 | 22,289 | 91,891 |
| Shipping | 13,917 | 9,581 | 8,631 | 32,129 |
| Ports | 3,719 | 3,154 | 3,223 | 10,096 |
| Marine | 17,885 | 12,508 | 8,015 | 38,407 |
| Maritime Business Services | 4,517 | 4,321 | 2,421 | 11,258 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table 4 below presents in each year the direct contribution to turnover from the Maritime sector, alongside our estimate of the composite turnover multiplier that applies to the entire sector. The aggregate turnover impact grew from £81.6 billion in 2010 to £91.9 billion in 2015.

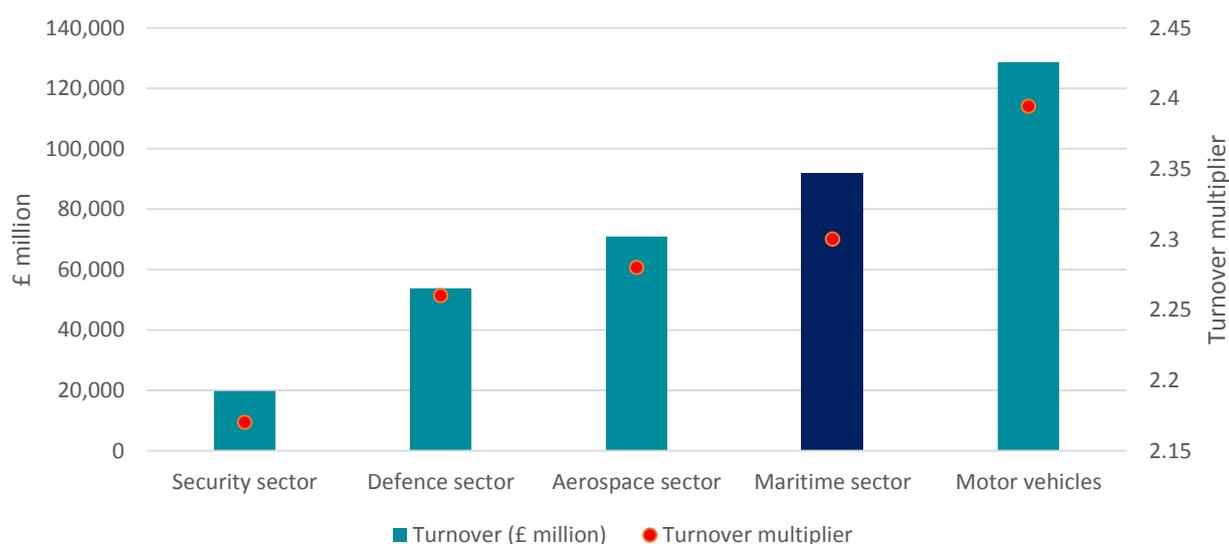
Table 4: Direct and total turnover impact of the Maritime sector, 2010 to 2015, £ million

| | Direct Impact | Composite multiplier | Aggregate Impact |
|------|---------------|----------------------|------------------|
| 2010 | 35,561 | 2.30 | 81,673 |
| 2011 | 36,780 | 2.31 | 84,828 |
| 2012 | 37,661 | 2.30 | 86,522 |
| 2013 | 38,401 | 2.29 | 87,916 |
| 2014 | 39,618 | 2.29 | 90,858 |
| 2015 | 40,038 | 2.30 | 91,891 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

To place these results in context, Figure 13 below compares the total turnover impact of the Maritime sector against the comparable transport activities identified in the previous section. In addition, the turnover multipliers associated with each activity are also presented.

Figure 13: The aggregate turnover impact and GVA multiplier of the Maritime sector against comparable industries in 2015



Source: ADS, ONS, Cebr analysis

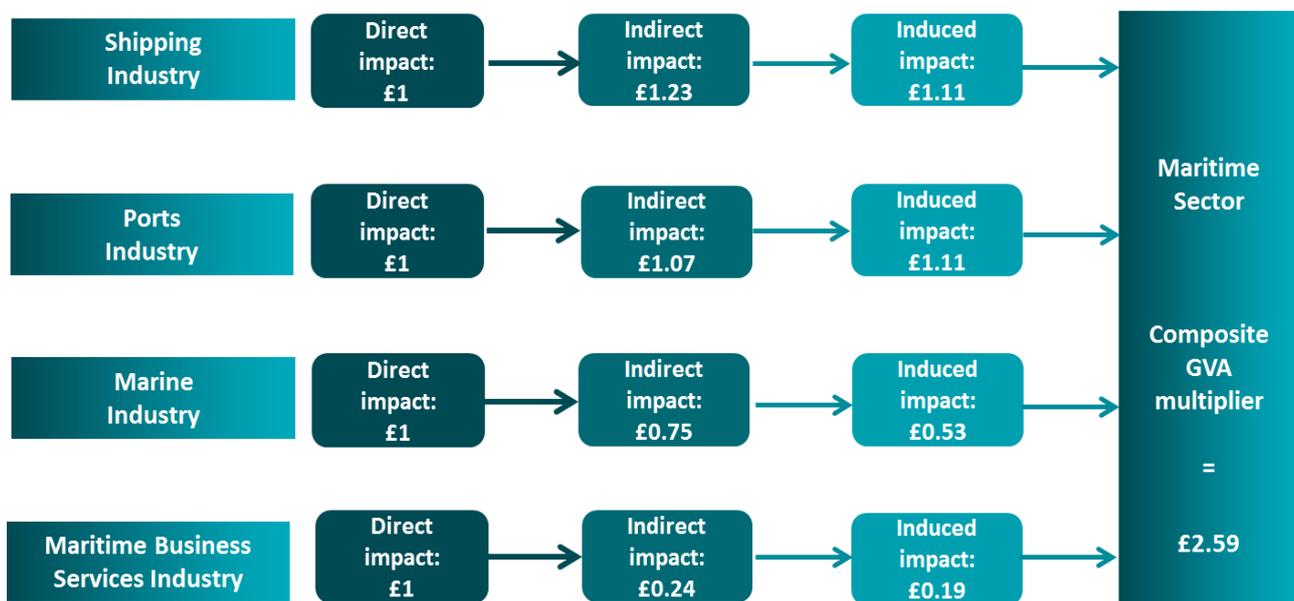
As illustrated, the Maritime sector performs favourably relative to the Security, Defence and Aerospace sectors; both in total turnover impacts and in turnover multipliers.

3.2 The aggregate economic impacts through GVA

Figure 14 below illustrates the GVA multipliers for the Maritime sector within the UK, disaggregated by industry activity. The interpretation here is that, for every £1 of direct GVA generated by the Maritime sector, £0.86 worth of GVA is stimulated in the supply chains and £0.73 worth of GVA in the wider economy when direct and indirect (supply chain) employees spend their earnings.

Therefore, for every £1 of GVA initially generated by the Maritime sector in 2015, the UK economy as a whole experienced an increase in GVA of £2.59.

Figure 14: GVA multiplier impacts of the UK Maritime sector in 2015



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table 5 below shows the estimated direct and total GVA impacts from the individual industry activities when taken in isolation. The Maritime sector directly contributed £14.5 billion in GVA in 2015 (see previous section); once the indirect and induced economic channels are taken into consideration the industries contributed £37.4 billion in GVA. Within this aggregate economic contribution, the marine and shipping industries made the largest aggregate contributions, with £14.7 billion and £14.4 billion respectively.

Table 5: GVA impact of the Maritime sector in 2015 by industry activity, £ million

| GVA in 2015 | Direct Impact | Indirect Impact | Induced Impact | Aggregate Impact |
|----------------------------|---------------|-----------------|----------------|------------------|
| TOTAL | 14,465 | 12,438 | 10,501 | 37,404 |
| Shipping | 4,306 | 5,282 | 4,785 | 14,373 |
| Ports | 1,700 | 1,816 | 1,889 | 5,405 |
| Marine | 6,446 | 4,856 | 3,439 | 14,741 |
| Maritime Business Services | 2,012 | 485 | 388 | 2,885 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table 6 below presents in each year the direct contribution to GVA from the Maritime sector, alongside our estimate of the composite GVA multiplier that applies to the entire industry. The total GVA impact has risen from £36.1 billion in 2010 to £37.4 billion in 2015, although the composite multiplier has fallen slightly.

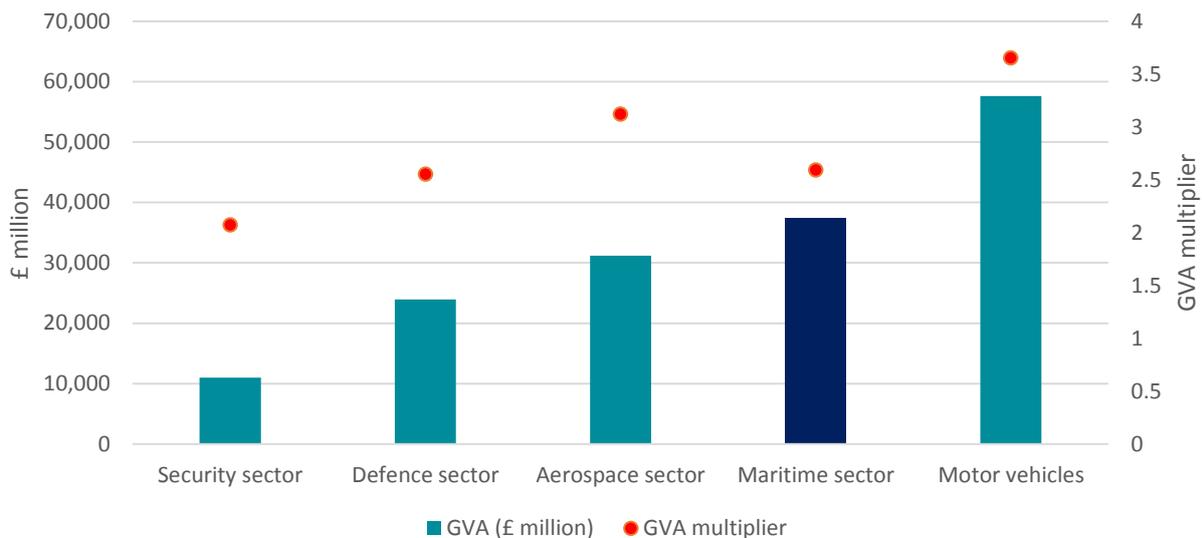
Table 6: Direct and total GVA impact of the Maritime sector, 2010 to 2015, £ million

| | Direct Impact | Composite multiplier | Aggregate Impact |
|------|---------------|----------------------|------------------|
| 2010 | 13,634 | 2.65 | 36,159 |
| 2011 | 13,209 | 2.66 | 35,145 |
| 2012 | 15,058 | 2.66 | 39,999 |
| 2013 | 13,469 | 2.57 | 34,592 |
| 2014 | 14,076 | 2.61 | 36,667 |
| 2015 | 14,465 | 2.59 | 37,404 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

To place these results in context, Figure 15 below compares the total GVA impact of the Maritime sector against the comparable transport activities identified in the previous section. In addition, the GVA multipliers associated with each activity are also presented. The total GVA impact of the Maritime sector exceeded that of the Security, Defence and Aerospace sectors, but was exceeded by the total GVA for the manufacturing of motor vehicles. The GVA multiplier for the Maritime sector is comparable with the Defence and Aerospace sectors, but exceeds that of the Security sector.

Figure 15: The aggregate GVA impact and GVA multiplier of the Maritime sector against comparable industries in 2015



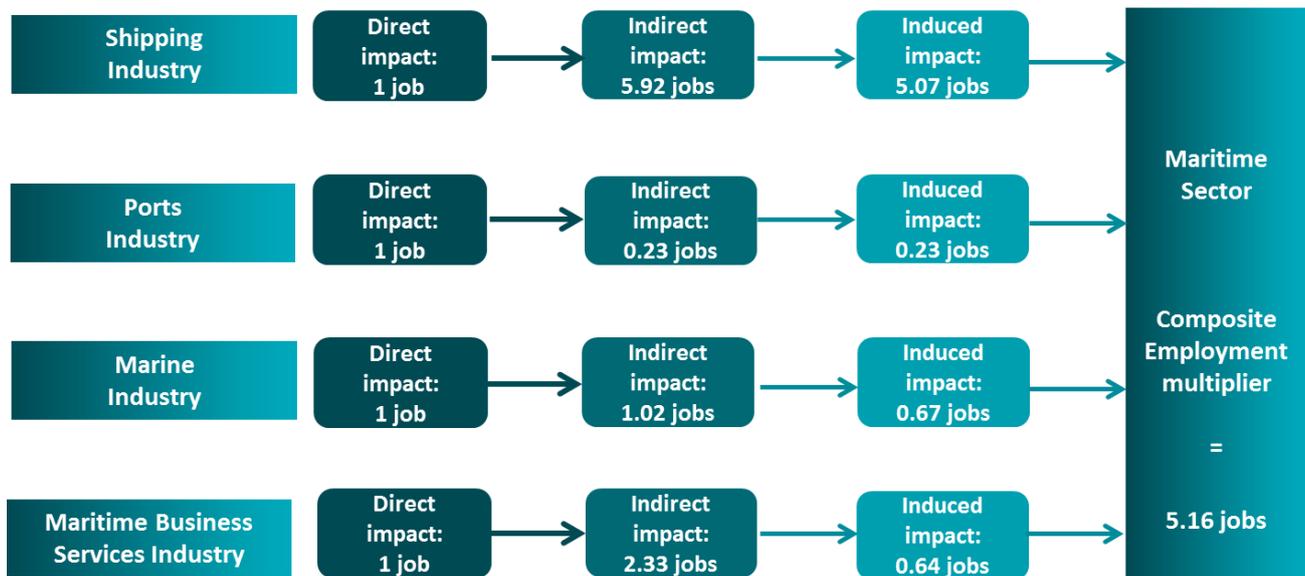
Source: ADS, ONS, Cebr analysis

3.3 The aggregate economic impacts through employment

Here we examine the aggregate economic impact of the Maritime sector through employment. Figure 16 below illustrates the employment multipliers for the sector within the UK, disaggregated by industry. The interpretation here is that, for every job supported by the Maritime sector, 2.3 jobs are stimulated in the industry's supply chains and a further 1.8 jobs supported in the wider economy when direct and indirect (supply chain) employees spend their earnings.

In other words, for every additional job initially supported by the Maritime sector in 2015, the UK economy as a whole experienced an increase of 5.16 jobs.

Figure 16: Employment multiplier impacts of the UK Maritime sector in 2015



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table 7 below shows the estimated aggregate employment impacts from the individual industries when taken in isolation. The very high employment multiplier associated with the shipping industry in the UK accentuates the aggregate impact employment impact across the sector; as a result, the shipping industry is responsible for around 65% of the sector aggregate employment impact.

Table 7: UK Employment impact of the Maritime sector in 2015 by industry activity, thousands of jobs

| Employment in 2015 | Direct Impact | Indirect Impact | Induced Impact | Aggregate Impact |
|----------------------------|---------------|-----------------|----------------|------------------|
| TOTAL | 185.7 | 434.8 | 336.8 | 957.3 |
| Shipping | 50.8 | 300.6 | 257.2 | 608.6 |
| Ports | 23.9 | 5.5 | 5.6 | 35.0 |
| Marine | 99.5 | 101.7 | 66.6 | 267.8 |
| Maritime Business Services | 11.5 | 26.9 | 7.4 | 45.8 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table 8 below presents in each year the direct contribution through employment from the Maritime sector, alongside the domestic employment multiplier that applies to the entire sector. The total employment impact has grown very slightly from around 952,500 jobs in 2010 to 957,300 jobs in 2015, although the multiplier has fallen slightly due to the reduction in employment in the Shipping industry in recent years.

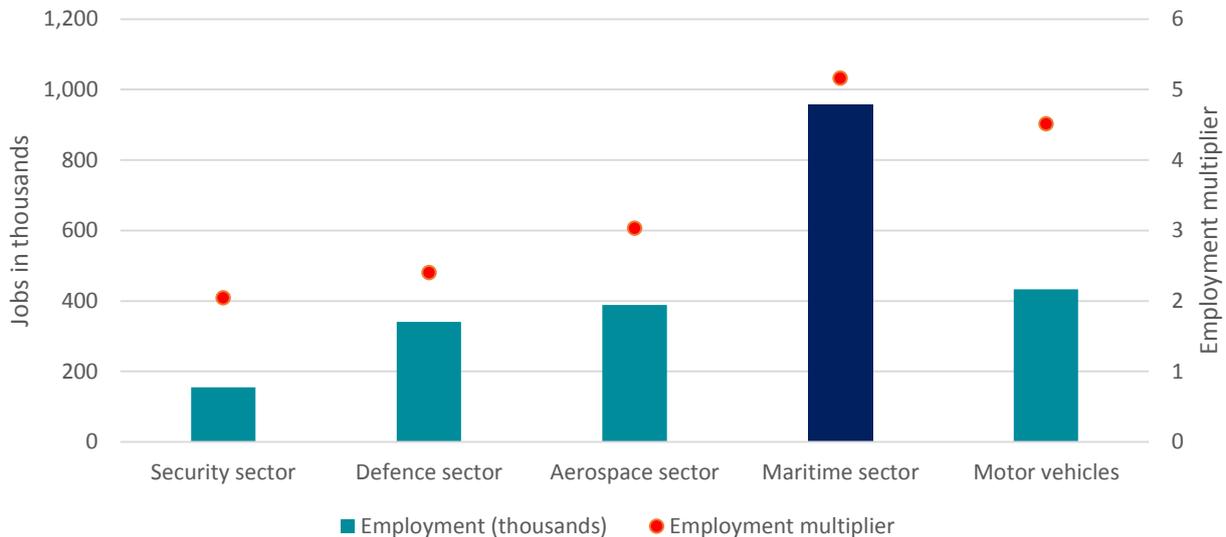
Table 8: Direct and aggregate UK employment impact of the Maritime sector, 2010 to 2015, thousands of jobs

| | Direct Impact | Composite multiplier | Aggregate Impact |
|------|---------------|----------------------|------------------|
| 2010 | 178.8 | 5.33 | 952.5 |
| 2011 | 179.6 | 5.20 | 933.7 |
| 2012 | 175.5 | 5.12 | 898.2 |
| 2013 | 176.9 | 5.14 | 909.3 |
| 2014 | 185.4 | 4.98 | 924.1 |
| 2015 | 185.7 | 5.16 | 957.3 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

To place these results in context, Figure 17 below compares the total employment impact of the Maritime sector in 2014 against the comparable transport activities identified in the previous section. In addition, the employment multipliers associated with each activity are also presented.¹¹

Figure 17: The aggregate employment impact and employment multiplier of the Maritime sector against other industries in 2014



Source: ADS, ONS, Cebr analysis

Having a comparatively high employment multiplier, the Maritime sector has a much higher total employment impact in 2015 in comparison to the other sectors.

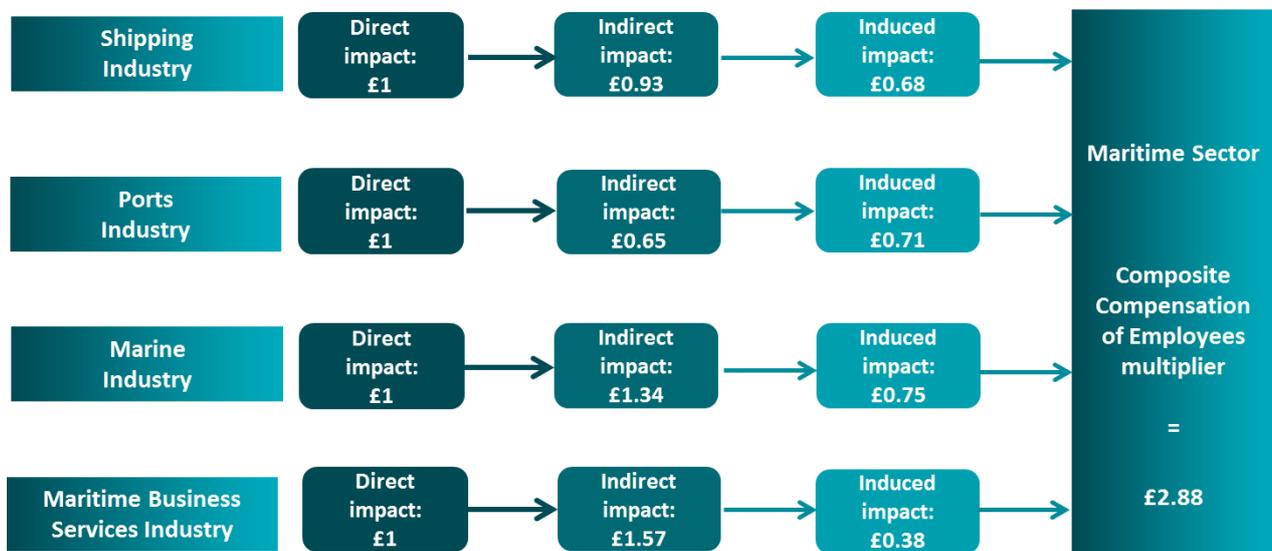
3.4 The aggregate economic impacts through the compensation of employees

In this final subsection we consider the aggregate economic impact of the Maritime sector through the compensation of employees. Figure 18 below illustrates the direct, indirect and induced compensation of employee impacts associated with the sector, disaggregated by industry activity. Here the interpretation is that, for every £1 of employee compensation directly supported by the Maritime sector, '£X' of wages and salaries and other employee remuneration is supported in total throughout the economy through supply chain (indirect) and employee spending (induced) channels. For example, for each £1 of employee compensation in the shipping industry in 2015, £0.93 was supported through the supply chain and an additional £0.68 was supported through employee expenditures – yielding an aggregate impact of £2.61.

For the Maritime sector as a whole therefore, for every £1 directly raised in the compensation of employees in 2015, a total of £2.88 in employee compensation was supported in the UK economy.

¹¹ Employment number for Motor vehicles were not available from the ABS 2015, and so the direct employment number was estimated from the available data within the same report.

Figure 18: Multiplier impacts for the compensation of employees for the UK Maritime sector in 2015



Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table 9 below shows the direct and total impact through the compensation of employees across each industry. From within the £21 billion aggregate economic impact for the Maritime sector, the largest impact was sourced from the Marine industry with £12.7 billion.

Table 9: Impact through the compensation of employees (COE) of the Maritime sector in 2015 by industry activity, £ million

| COE in 2015 | Direct Impact | Indirect Impact | Induced Impact | Aggregate Impact |
|----------------------------|---------------|-----------------|----------------|------------------|
| TOTAL | 7,295 | 8,660 | 5,050 | 21,004 |
| Shipping | 1,549 | 1,437 | 1,048 | 4,033 |
| Ports | 906 | 589 | 642 | 2,137 |
| Marine | 4,127 | 5,515 | 3,088 | 12,731 |
| Maritime Business Services | 713 | 1,118 | 271 | 2,103 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Finally, Table 10 below shows the progression in the direct and aggregate impact through the compensation of employees in the Maritime sector, from 2010 to 2015. The aggregate impact through the compensation of employees has grown from £20.4 billion in 2010 to £21 billion in 2015.

Table 10: Direct and aggregate impact through the compensation of employees of the Maritime sector, 2010 to 2015, £ million

| | Direct Impact | Composite multiplier | Aggregate Impact |
|------|---------------|----------------------|------------------|
| 2010 | 6,795 | 3.01 | 20,426 |
| 2011 | 6,485 | 2.88 | 18,690 |
| 2012 | 7,406 | 2.91 | 21,585 |
| 2013 | 7,428 | 2.90 | 21,532 |
| 2014 | 7,098 | 2.81 | 19,926 |
| 2015 | 7,295 | 2.88 | 21,004 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

In the next section we examine how both the direct and aggregate economic impact of the Maritime sector is disaggregated at regional level.

4 The regional economic impact of the Maritime sector

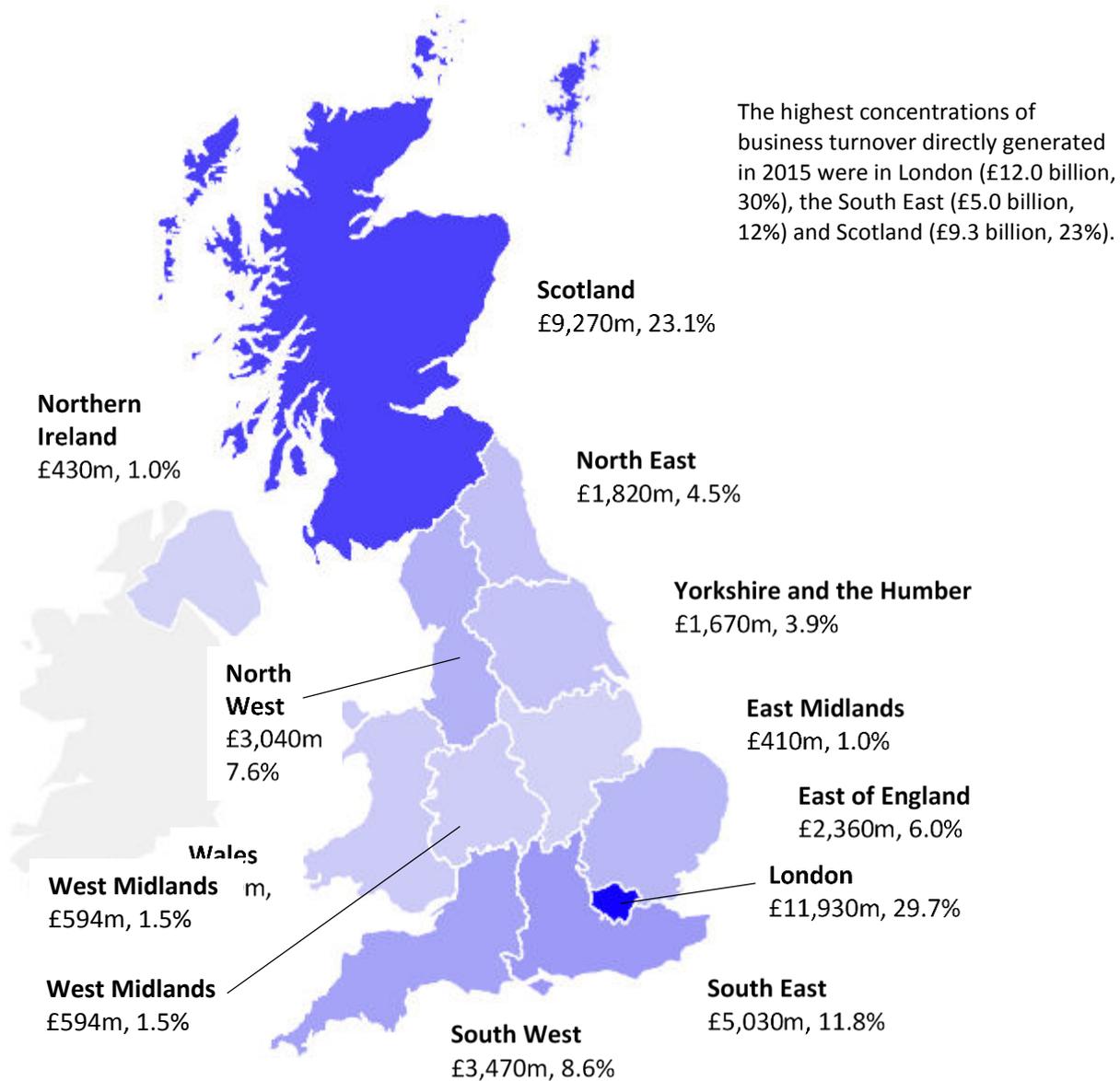
In this penultimate section we examine the economic contribution of the Maritime sector across the different UK regions. In this context, these regions are defined as the former Government Office Regions.

4.1 The direct economic impact of the Maritime sector by UK region

Business turnover and GVA

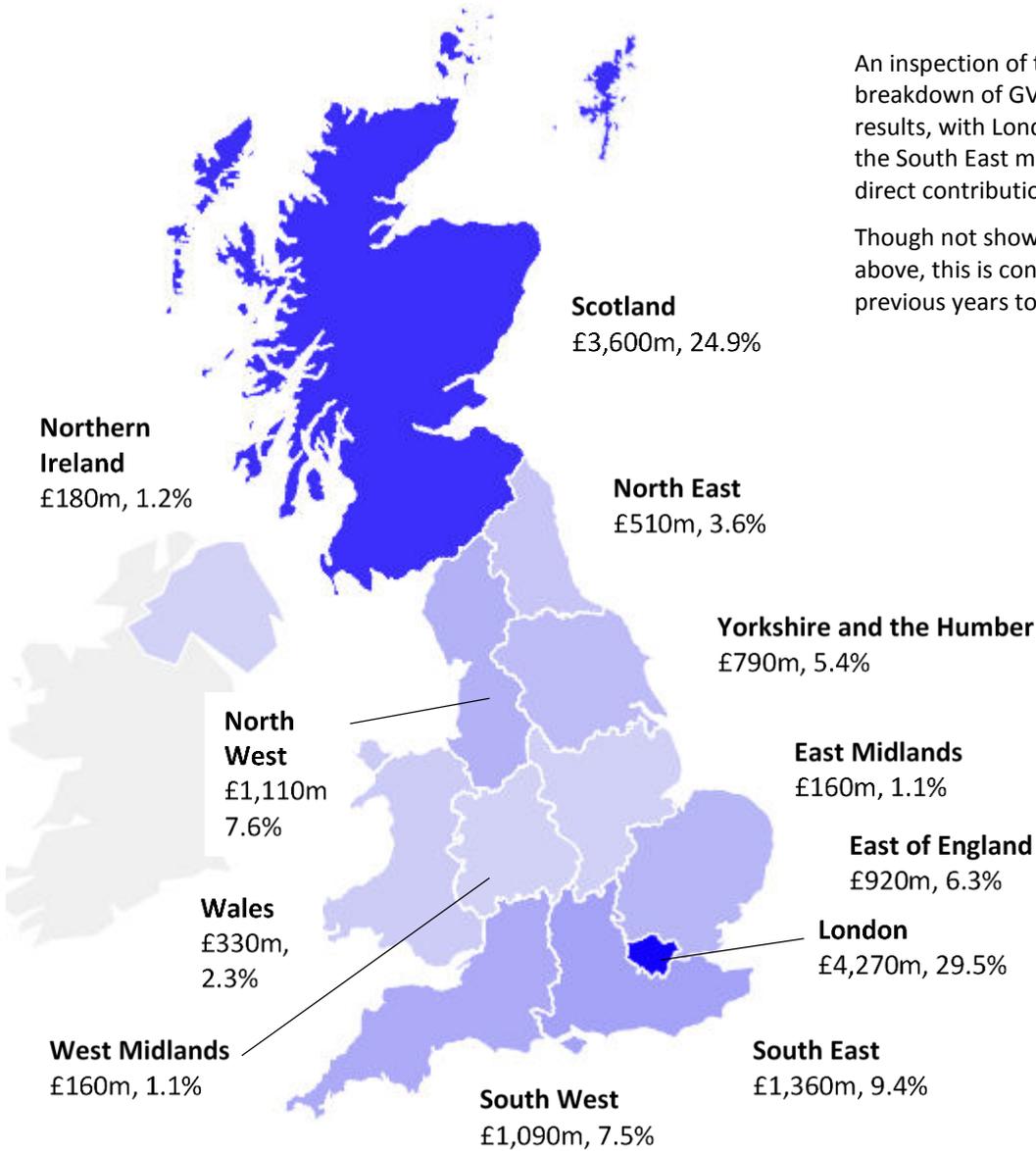
Figure 19 and Figure 20 below show the estimated regional breakdown of business turnover and GVA directly supported by the Maritime sector in 2015.

Figure 19: Regional breakdown of turnover directly contributed by the Maritime sector in 2015, £ million



Note: Figures subject to rounding to nearest £10 million. Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Figure 20: Regional breakdown of GVA directly contributed by the Maritime sector in 2015, £ million



An inspection of the regional breakdown of GVA yields similar results, with London, Scotland and the South East making the largest direct contributions to GVA in 2015.

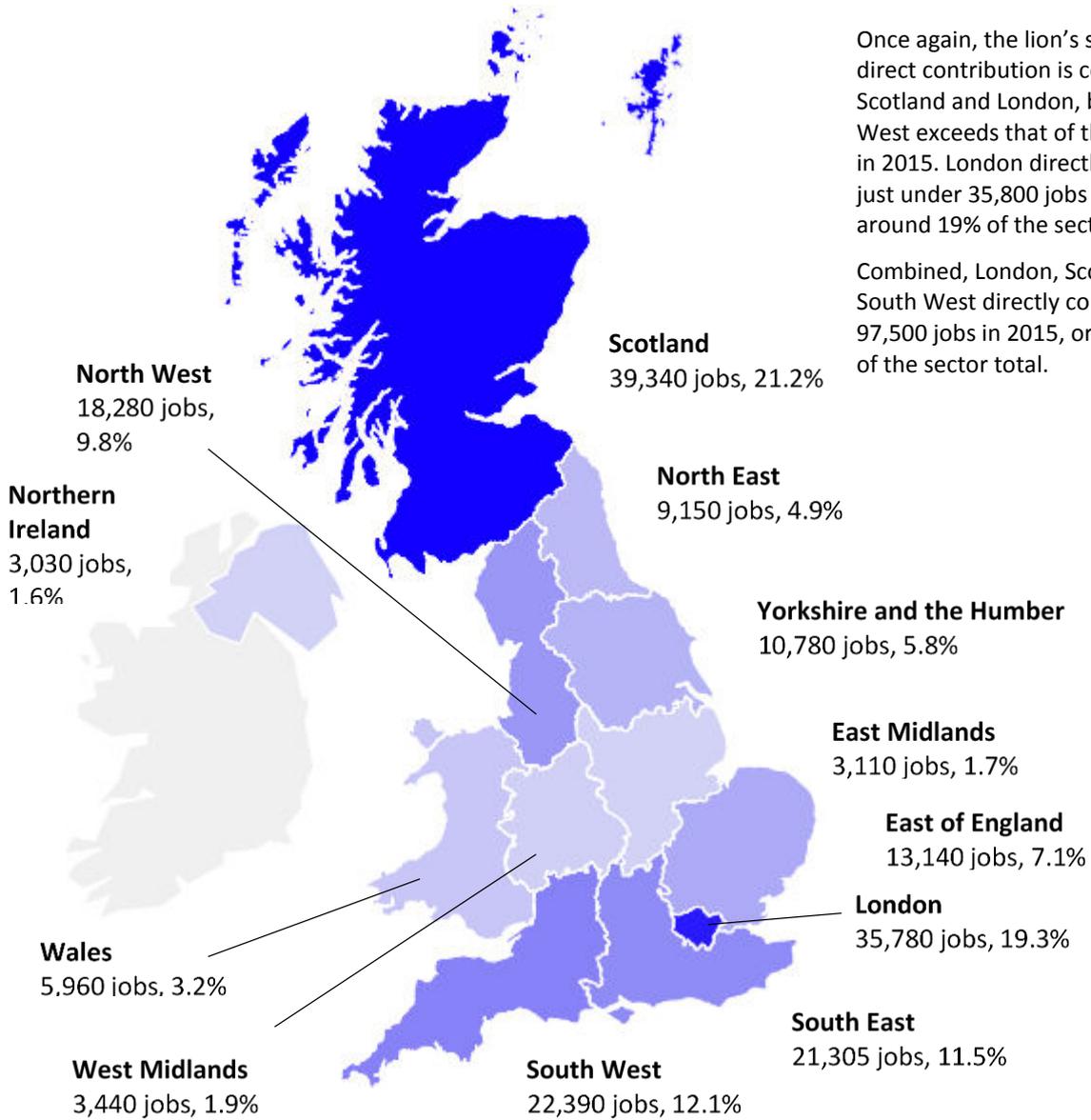
Though not shown in the table above, this is consistent with the previous years to 2010 also.

Note: Figures subject to rounding to nearest £10 million. Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Employment and the Compensation of Employees

Figure 21 and Figure 22 below show the estimated regional breakdown of employment and the compensation of employees directly supported by the Maritime sector industry in 2015.

Figure 21: Regional breakdown through the employment directly contributed by the Maritime sector in 2015

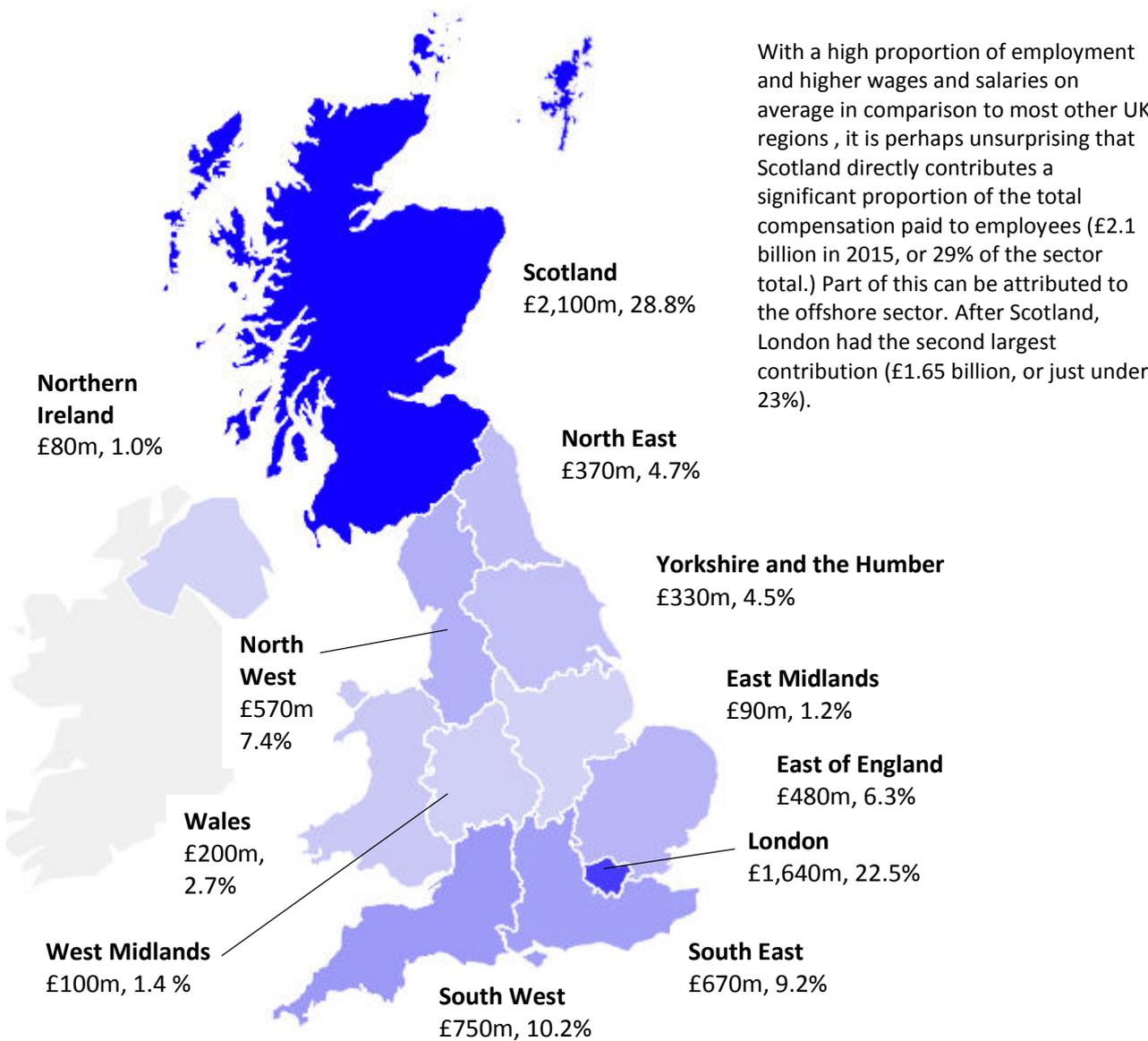


Once again, the lion’s share of the direct contribution is concentrated in Scotland and London, but the South West exceeds that of the South East in 2015. London directly supported just under 35,800 jobs in 2015, or around 19% of the sector total.

Combined, London, Scotland and the South West directly contributed 97,500 jobs in 2015, or around 53% of the sector total.

Note: Figures subject to rounding to nearest £10 million. Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Figure 22: Regional breakdown through the compensation of employees directly contributed by the Maritime sector in 2015



With a high proportion of employment and higher wages and salaries on average in comparison to most other UK regions, it is perhaps unsurprising that Scotland directly contributes a significant proportion of the total compensation paid to employees (£2.1 billion in 2015, or 29% of the sector total.) Part of this can be attributed to the offshore sector. After Scotland, London had the second largest contribution (£1.65 billion, or just under 23%).

Note: Figures subject to rounding to nearest £10 million. Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

4.2 The aggregate economic impact of the Maritime sector by UK region

This final subsection examines the aggregate economic impact of the Maritime sector across each region for the four macroeconomic indicators covered in the previous subsection.

In order to estimate the aggregate economic impact of the sector at regional level, the direct economic impacts as already estimated were combined with Cebr's suite of regional economic impact models, within which the activities of the Maritime sector were separately identified and isolated. It should be noted that the economic impact multipliers as estimated for each region are necessarily lower than the equivalent multiplier for the sector as a whole, reflecting the leakage of impacts when the activity of the sector in a particular region imports inputs from elsewhere in the UK outside that region.

The aggregate economic impacts for business turnover and GVA by region

Table 11 below shows the breakdown of direct and aggregate economic impacts for business turnover and GVA in 2015, alongside the composite sector multiplier for each region. It is estimated that from a total of £40 billion in turnover and £14.5 billion in GVA directly contributed by the Maritime sector in 2015, a total of £84 billion and £35 billion respectively was sustained in aggregate across the UK regions. For GVA, the highest multipliers are associated with the South East, the South West and the East of England.

Table 11: Regional breakdown of business turnover and GVA directly contributed by the Maritime sector in 2015, £ million

| Region | Turnover | | | GVA | | |
|--------------------------|---------------|---------------------|------------------|---------------|---------------------|------------------|
| | Direct Impact | Industry Multiplier | Aggregate impact | Direct Impact | Industry Multiplier | Aggregate impact |
| Scotland | 9,265 | 1.84 | 17,058 | 3,601 | 1.94 | 6,978 |
| Wales | 936 | 2.17 | 2,031 | 333 | 2.70 | 899 |
| Northern Ireland | 429 | 2.14 | 918 | 178 | 2.72 | 484 |
| East of England | 2,357 | 2.31 | 5,441 | 917 | 2.94 | 2,692 |
| East Midlands | 414 | 2.14 | 885 | 163 | 2.60 | 423 |
| London | 11,930 | 1.99 | 23,701 | 4,266 | 2.09 | 8,930 |
| North East | 1,817 | 2.37 | 4,302 | 514 | 2.62 | 1,345 |
| North West | 3,036 | 2.16 | 6,552 | 1,105 | 2.62 | 2,890 |
| South East | 4,267 | 2.33 | 9,923 | 1,361 | 3.28 | 4,466 |
| South West | 3,474 | 2.17 | 7,527 | 1,084 | 2.88 | 3,121 |
| West Midlands | 594 | 2.15 | 1,274 | 159 | 2.71 | 432 |
| Yorkshire and the Humber | 1,657 | 2.36 | 3,910 | 785 | 2.74 | 2,151 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

The aggregate economic impacts for employment and the compensation of employees by region

Finally, Table 12 shows the breakdown of direct and aggregate economic impacts for employment and the compensation of employees in 2015, alongside the Maritime sector multiplier for each region. The region with the largest aggregate impacts through employment in 2015 was London, with 235,800 jobs; the largest for the compensation of employees was Scotland, with an aggregate impact of £6.7 billion.

Table 12: Regional breakdown of the direct and aggregate economic impact through employment and the compensation of employees contributed by the Maritime sector in 2015 (employment in thousands of jobs; compensation of employees in £ million)

| Region | Employment | | | Compensation of Employees | | |
|--------------------------|---------------|---------------------|------------------|---------------------------|---------------------|------------------|
| | Direct Impact | Industry Multiplier | Aggregate impact | Direct Impact | Industry Multiplier | Aggregate impact |
| Scotland | 39.3 | 3.30 | 129.8 | 2,103 | 3.18 | 6,690 |
| Wales | 6.0 | 5.19 | 30.9 | 199 | 2.31 | 459 |
| Northern Ireland | 3.0 | 5.43 | 16.5 | 77 | 1.87 | 144 |
| East of England | 13.1 | 4.01 | 52.7 | 428 | 2.38 | 1,019 |
| East Midlands | 3.1 | 3.74 | 11.6 | 78 | 2.60 | 203 |
| London | 35.8 | 6.60 | 236.0 | 1,640 | 2.54 | 4,172 |
| North East | 9.2 | 2.46 | 22.5 | 364 | 2.18 | 792 |
| North West | 18.3 | 4.16 | 76.1 | 558 | 1.90 | 1,060 |
| South East | 21.3 | 6.84 | 145.6 | 672 | 2.44 | 1,636 |
| South West | 22.4 | 3.43 | 76.7 | 746 | 1.95 | 1,453 |
| West Midlands | 3.4 | 3.37 | 11.6 | 100 | 2.34 | 234 |
| Yorkshire and the Humber | 10.8 | 3.16 | 34.0 | 332 | 2.33 | 773 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

5 The UK Maritime Sector: A Forward Look

In this final section of the report, we set out forward-looking research on the UK Maritime sector. The section starts off by discussing the Brexit macro drivers which feed into the forecast. We will then also describe the supplementary inputs considered in modelling the escalations shown in Figure 23. Beyond laying out direct economic impacts after 2015, the forward look has been done for a number of reasons:

- **Firstly, there is a considerable amount of uncertainty as to how the UK's exit from the European Union ("Brexit") will turn out**, and the implications for the heavily trade-exposed Maritime sector.
- **Brexit touches on a number of different economic themes, and increases levels of uncertainty for the Maritime sector.** For instance, GDP growth and inflation projections are currently under the spotlight given the slowing UK economy and weaker pound sterling.
- **There is also uncertainty concerning the framework for general UK Government policy.** Outside of the EU and the customs union, the UK will be in charge of its own trade policy, which presents both risks and opportunities for trade. Furthermore, outside of the EU's free movement rules the UK would also be fully in charge of migration, meaning that the inflow of EU nationals will likely face some restrictions.

As of August 2017, the UK business community still has relatively little clarity on what Britain's post-Brexit relationship with the EU might look like. While the UK Government did lay out a broad approach to leaving the EU in early 2017, the subsequent general election and relatively firm position taken by the EU has produced less certainty around the previous assumptions. Moreover, the recent renewed focus on a transition deal after 2019¹² has introduced a new source of uncertainty on whether the UK will stay in the single market as a short to medium term measure after Brexit officially happens in 2019. The present uncertainty also makes it very difficult to input specific assumptions on policy details that have also been discussed over recent months, such as the issue of "free ports" – or otherwise UK ports that may be unilaterally open to free trade in the future.

5.1 Summary of approach

We will discuss the above-noted risk factors within the context of the **EU single market's four freedoms** – these being the free movement of goods, capital, labour and services. The "capital" pillar will not be explicitly addressed however since restrictions on the free flow of capital are unlikely after Brexit. However, the customs union, trade policy implications and negotiation timing issues will be detailed separately. These post-EU framework assumptions feed into the UK Maritime sector forecast that is shown at the end of this section. The EU framework assumptions produce macro-drivers for the UK Maritime sector. These drivers are then further econometrically augmented with industry and sector cost factors and trends to produce the final GVA and turnover forecasts running to 2022.

5.2 Brexit risk factors for the UK Maritime sector

Free movement of goods

In principle, agreeing to a post-Brexit deal that preserves the free movement of goods between the UK and EU should not pose great difficulties – which is obviously good news for the UK Maritime sector given the overwhelming majority of physical UK trade handled through ports. In a narrow sense this should be quite achievable given that the EU has existing free trade relationships with a number of third-party countries such as South Korea and Canada. A free trade relationship will still pose some secondary problems for the UK Maritime sector though, such as customs checks, VAT processing, rules of origin and product standards – though at least tariffs for genuine UK-EU trade may be avoided.

¹² <https://www.theguardian.com/politics/2017/jul/28/philip-hammond-confirms-uk-will-seek-brexit-transitional-deal>

The case for maintaining free trade in goods will be further boosted by the “reverse” nature of EU-UK negotiations. While free trade deals often take years to hammer out due to negotiations over issues such as market access, product standards and arbitration procedures, in principle much of this can be avoidable given that the EU and UK both enjoy mutual market access and that this is the starting point for negotiations to take place. While free trade in goods may be preserved in a narrow sense, this still leaves the question of secondary barriers. We will discuss the customs unions/free trade implications later in this section as one such indirect trade barrier. Another potential friction touches on regulations. Outside of the EU and its associated institutions UK product standards may start to diverge, making it more difficult for trade to take place if new compliance and production processes need to be established.

Some of these frictions can be eliminated by the UK, through for instance the unilateral adoption of EU rules as envisioned in the Great Repeal Bill.¹³ However, this still leaves the issue of potential longer term divergence, unless some sort of equivalence regime is agreed with the EU as part of a trade deal. While the unilateral adoption of EU rules would help the UK mitigate some of the non-trade barriers, UK exporters may still end up having to formally go through EU compliance certification, thus increasing costs and complexity for exporters. This could affect the Maritime sector through decreasing trade volumes and it may also become an issue if new compliance and processing facilities need to be installed at UK ports.

Free movement of services

The continuing free movement of services is one pillar of UK’s current trade relationship with the EU that may not end up continuing as before. This is likely to be the case for three reasons:

- Firstly, there is a conceptual link between the free movement of services and the free movement of labour, since labour in itself can be thought of as a service. For instance, self-employed individuals can potentially be thought of as both workers and service providers, while companies that are allowed to move around the EU to offer their services may need to take their workers with them.
- Secondly, the free movement of certain regulated services will likely require both a common set of rules as well as oversight institutions – for instance in financial services. Given that one of the UK’s government’s “red lines” in Brexit negotiations concerns sovereignty and EU control, it is difficult to see how this can continue as before.¹⁴
- The EU’s approach to the single market has far entailed the indivisibility of the four freedoms. This commitment comes out of a desire to promote a unified European market space while resisting attempts at fragmentation. Setting a precedent that allows one country to separate elements of the single market that it likes could end up causing long term fragmentation problems that will have to be weighed up against the reality of short term pain from Britain’s exit.

Given the above noted observations it is clear that EU market access in services will emerge as a contentious issue. Some access will of course continue in areas such as unregulated services, potentially in such fields as research and consulting – but in other regulated areas trade frictions may emerge given the constraints that have been outlined. This could therefore potentially touch on issues such as the ability of UK operators to offer services in between EU ports or perhaps the sale of tickets in different jurisdictions or the provision of regulated financial services within the broader European Maritime sector. Moreover, given that approximately 80% of the UK economy is based on services, a curtailment of trade access in this area could have significant general economic implications, thus potentially impacting the Maritime sector.

Free movement of people

¹³https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/604516/Great_repeal_bill_white_paper_accessible.pdf

¹⁴ Otherwise known as “red-lines” or “constraints” in this report – these broad themes were outlined as part of Theresa May’s January 2017 Lancaster House speech.

The free movement of people is a contentious issue in the United Kingdom, widely considered to be one of the drivers of the 2016 Brexit vote. This issue will affect the UK Maritime sector for two reasons:

- Ferry operators are likely to be somewhat affected by free movement rules given that they transport people between EU and UK ports. Much of this traffic will continue if a visa free arrangement is maintained with the EU. However, if free movement changes result in lower levels of immigration this may impact long term traffic between the UK and EU if migrant populations with links to the continent stop growing at the same rate.
- Secondly, the Maritime sector may also have to deal with higher unskilled labour costs given that the supply of labour resource from Eastern Europe may not continue (as before) as part of a post-Brexit settlement.

Timing complications

While a post-Brexit agreement can be agreed in principle, the greatest practical constraint comes from the Article 50 exit process itself, as contained within the Treaty of the European Union. This sets out the process by which member states withdraw from the Union.¹⁵ After it is triggered there is a two-year time limit to complete exit negotiations, unless an extension is unanimously agreed.

It is important to note that the Article 50 process has thus far been treated by the EU as just covering the EU exit arrangements while talks on a new framework for EU-UK trade would have to take place separately. Moreover, the EU has thus far resisted calls by the UK for talks to take place simultaneously. The current sequential or “phased” process thus poses a number of challenges to a smooth and orderly Brexit settlement:

- The EU and UK could run out of time given the negotiating task at hand, especially considering that trade talks themselves have to be agreed in less than two years.
- Before even getting to trade talks, other sensitive issues will need to be addressed. Thus far a considerable impasse has emerged over the UK’s financial settlement associated with leaving and the role of EU institutions after Brexit in overseeing the rights of EU nationals who remain in the UK.
- Negotiations could further break down over the actual substance of talks. Given the tough language that has been circulating since the 2016 Brexit vote it is unclear whether the UK would accept a deal with the EU that provides for less market access than currently enjoyed.¹⁶
- Some of these constraints may be eliminated through a transition deal or an extension of the Article 50 process. Such stop-gaps could also end up being problematic though, given that a transition deal could entail similar EU single market constraints that the UK is currently resisting. Furthermore, an extension of the Article 50 window would be politically difficult given that this would require unanimous consent and remaining in the EU for longer could also be politically unacceptable in the UK itself.

Customs union and free trade

Despite the ongoing uncertainty associated with Brexit as of August 2017, we are still assuming that the process will also result in the UK leaving the EU customs union. This will have considerable implications for Britain’s trade policy. Although leaving the customs union will likely entail some significant costs, this has to also be considered alongside the economic gains associated with potentially less restricted third-party trade. How these two counteracting forces balance each other out will be critically important for the Maritime sector.

¹⁵ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12012M%2FTXT>

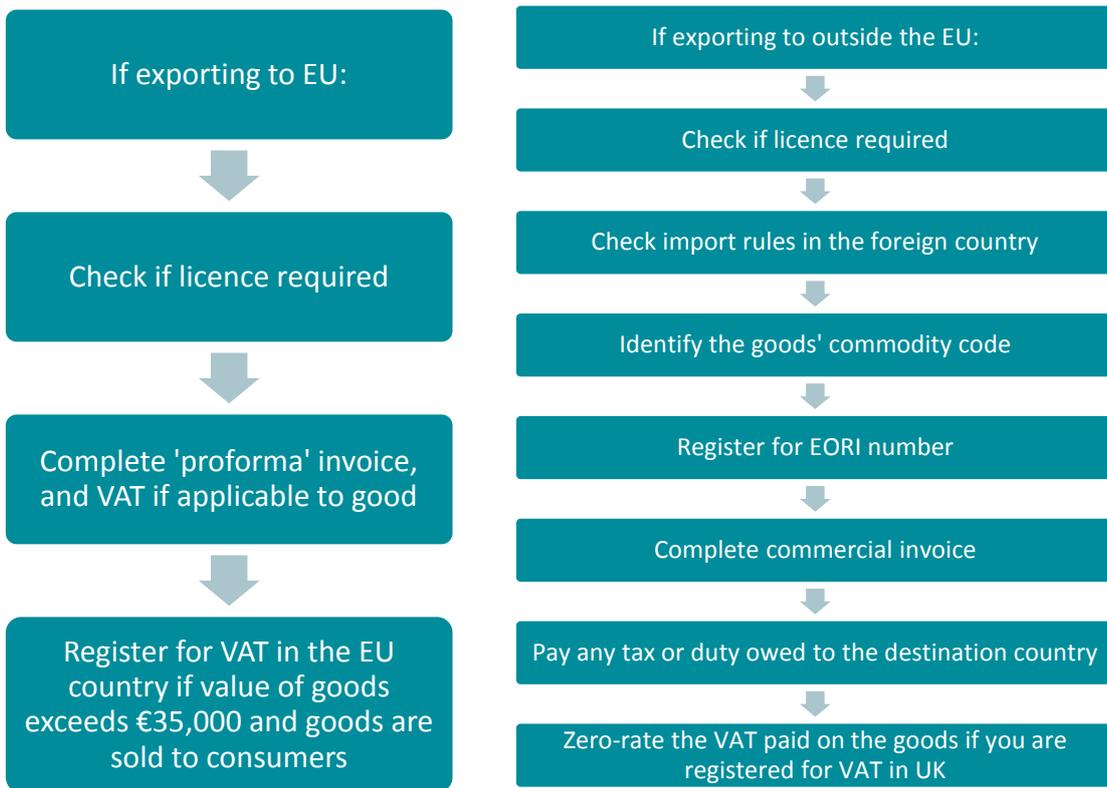
¹⁶ <https://www.gov.uk/government/speeches/the-governments-negotiating-objectives-for-exiting-the-eu-pm-speech>

Leaving the EU customs union also means that existing free trade agreements with third-party countries will need to be transitioned. Given that the UK currently participates in EU free trade deals covering more than thirty countries, adequate transition measures are needed to avoid a fall back on WTO terms. Some of these countries may grant the UK the same terms as the EU, others may be able to forge deeper trade links with the UK if UK constraints become less binding while in other cases preferential access may end up being downgraded or fall away altogether. Therefore, changes to this type of access will affect the UK maritime industry considerably depending on how advantageous to the UK the transition measures end up being.

There are also more tangible implications to consider as part of EU-UK trade. Outside the EU customs union UK trade flows with the EU will need to undergo customs checks to determine the origin of the products being exported or imported. This will affect the UK maritime sector as ports will likely need to be upgraded with new customs checking facilities, entailing higher operational complexity and potentially higher costs. Set out below is an illustration of how much more complex non-EU trade is compared to EU trade – though of course the UK Government may seek to streamline some of these processes after Brexit.

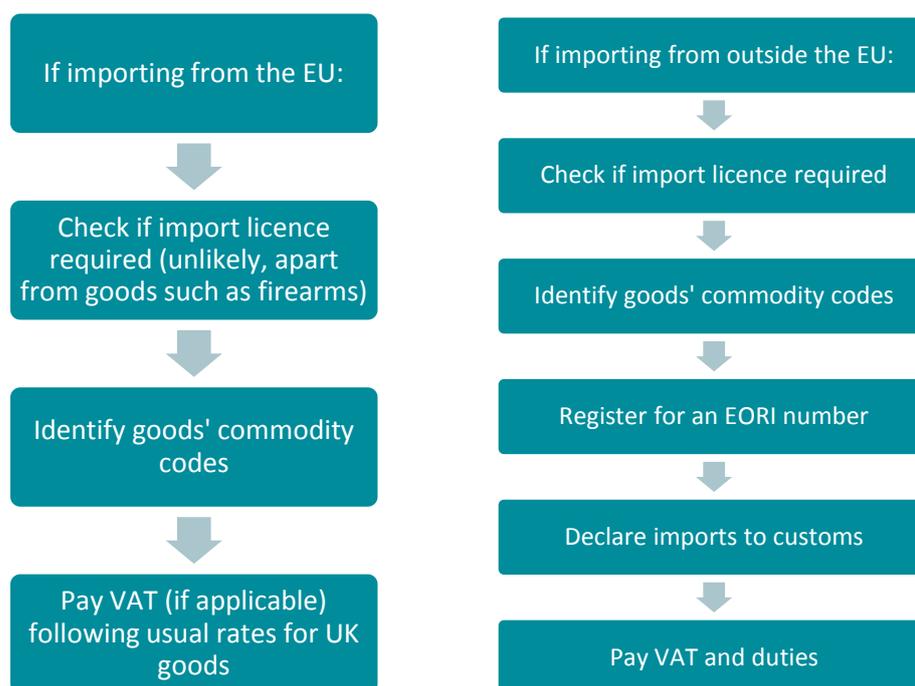
The flow charts below (Figures 22 and 23 below) are nonetheless important because some of these steps, such as clearing customs and paying VAT, may have to be done at UK ports themselves, entailing the need for greater processing capacity and infrastructure, thus potentially requiring a degree of physical capital investment and increased cost.

Figure 22: Flow chart illustrating operational complexity of exporting to EU vs non-EU destinations



Source: UK Government

Figure 23: Flow chart illustrating operational complexity of importing from EU vs non-EU destinations



Source: UK Government

The possible framework for compromise

Notwithstanding all of the constraints mentioned above, a deal between the UK and EU can still be done, thus ensuring that the Britain maintains some level of preferential access to the European Union market. In theory, the scope for agreement ranges from a minimalist goods-only free trade arrangement to more comprehensive market access, depending on how much of a trade-off versus EU framework compliance can be negotiated.

At one end of the spectrum one could envisage a modest free trade agreement that maintains the flow of goods between the EU and UK with little in the way of additional coverage. Further down the spectrum a CETA (EU-Canada Comprehensive Economic and Trade Agreement) type framework might be negotiable depending the amount of regulatory equivalence that can be achieved and maintained. Going further down the spectrum the UK might be able to negotiate a Swiss type deal with the EU that leaves it with very deep access in goods and services while being outside of the EU single market, but nonetheless having to accept the free movement of EU workers too and a mechanism for adopting EU rules. Otherwise, the UK might attempt to negotiate Norwegian type deal entailing EEA single market membership in exchange for fully accepting EU single market rules and de facto regulatory jurisdiction by the European institutions.

Therefore, if the UK takes a hard-line negotiating stance over “red line” issues this will likely ensure a more disruptive Brexit, while more flexibility on “red-line” constraints¹⁷ will ensure a deeper level of access with potentially less disruptive consequences. This trade-off is therefore consistent with the forecast outlined below. We have used Cebr macroeconomic projections as a baseline for these models, taking the view that a substantial free trade deal for goods will be achieved. Nonetheless, we have also assumed more limited access for regulated services, given the UK’s “red lines” in areas such as immigration, budget payments and EU jurisdiction.

The next few years for the Maritime sector

¹⁷ Typically described as entailing greater control over immigration, sovereignty/jurisdiction of EU institutions and budget payments.

The Maritime sector faces a considerable amount of uncertainty over the next few years. As outlined above, much of this comes down to the Brexit process itself and the uncertainty it poses for the economy and associated Maritime sector. We therefore expect the sector to experience sluggish growth over the next five years. Industry GVA and turnover will essentially remain flat until 2019, followed by a slow recovery up to 2022 – the end of our forecast coverage. By 2022 GVA and turnover are set to end up approximately 15% and 13% higher than they were in 2015.

5.3 The Maritime sector forecast

Approach taken for the forecast

The prior Brexit analysis feeds into the Maritime UK forecast in a number of ways. Firstly, the Cebr Brexit assumption entailing a continuing free trade relationship with the EU provides a macroeconomic driver for the forecast econometric model, driving macro factors such as GDP growth, inflation and exchange rates. Within this Brexit framework we have also exercised judgement to cater of economic flexibility and adaptability, such that loss of access in some areas may be offset/mitigated though economic adaptability or rechannelling of resources.

The Brexit narrative then also feeds into cost drivers, covering areas such as wage and energy input costs. Relatedly, Brexit spills over into exchange rate exposed cost drivers, such as internationally sourced raw materials. Furthermore, some of the individual maritime industries themselves showed a degree of seasonality and process inertia, such that current period changes are sometimes influenced by prior period changes. Many of these trends and patterns may of course be less relevant over the coming years due to the structural impact of Brexit, so we have also exercised discretionary judgement in tempering down certain impacts.

Modelling assumptions

Cebr sees oil prices hovering around \$50-\$55/bbl over the next few years, while UK GDP growth is set to remain under 1.5% up until 2018, after which growth will remain under 2% throughout the early 2020s. Despite the economic headwinds, general UK inflation will be providing some support to the overall GVA and turnover figures (due to the uplift provided to nominal process) given that this is expected to remain above the BOE's 2% target for the foreseeable future.

Our underlying Brexit assumption is that, notwithstanding all the potential frictions detailed earlier, the UK will leave the EU and the single market and customs union in 2019. Britain's new relationship with the EU is therefore assumed to entail a free trade agreement covering goods, while the relationship will be further initially facilitated by measures such as the unilateral adoption of EU laws. We have not made very specific assumptions given the heightened uncertainty currently surrounding any view taken, making the framework more specific at this stage (as of August 2017) would simply increase uncertainty over the forecast.

Caveats

Up until the middle of 2017 it seemed as if any assumptions surrounding a possible UK-EU free trade agreement would only be subject to downside risk given the perception of popular support for the UK government's negotiating position and hard-line stance also taken by the EU itself. Since then however, Theresa May's loss of a parliamentary majority has also brought about the prospect of more upside risk, given the re-emergence of more pro-EU elements in Government and Parliament. This is not to say that downside risks have disappeared however, since the government's diminished authority will also potentially make it more difficult to push through a deal, making the mechanics of a compromise more difficult to envision.

Looking more specifically at the risks associated with this forecast, several factors could come into play. Firstly, one needs to take into account the possibility of a no-deal scenario with the EU (i.e. "downside

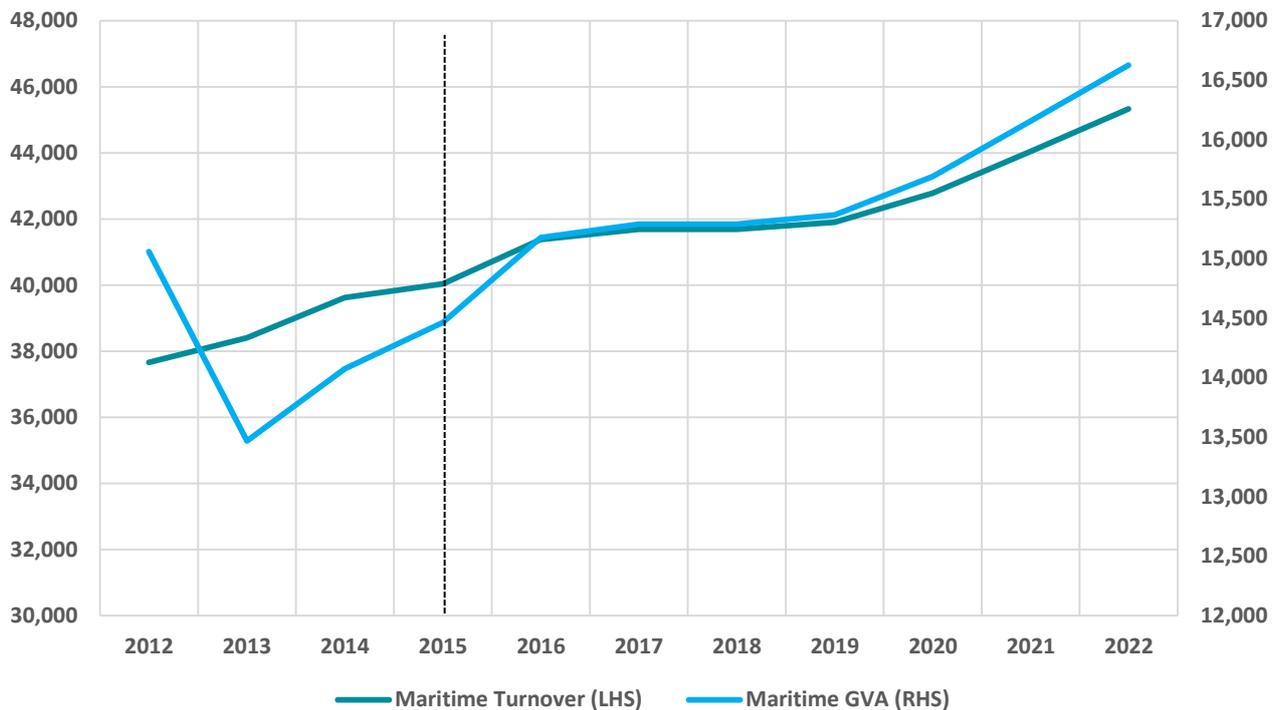
risk”). If this happens we could potentially see the overall Maritime sector experiencing more severe headwinds than expected as goods end up being hindered by tariff and non-tariff barriers. Offsetting this however, even in that extreme case we could see some price level support from inflationary pressures coming on the back of a weaker sterling. Our current outlook sees sterling remaining fairly stable versus the euro and the dollar over coming years, whereas generally a weaker pound would potentially support higher nominal prices and rates.

Looking at potential upside risks, if the UK stays in the single market and customs union over the short to medium term, the impact from Brexit may turn out to be far less than expected. UK Maritime revenue and GVA growth would significantly outperform the projection below. The long run would then be subject to further assumptions, though a “transition” period running to three years has been mentioned,¹⁸ taking this very close to our forecast horizon limit.

5.4 The forecast

Figure 24 below shows the Maritime sector experiencing sluggish growth over the next five years. Industry GVA and turnover will essentially remain flat until 2019, followed by a slow recovery up to 2022 – the end of our forecast coverage. By 2022 GVA and turnover are set to end up around 15% and 13% higher than they were in 2015. This has been projected in nominal terms, so it needs to be considered alongside inflation, which could provide a 10% cumulative impact over the next five years. Therefore, cumulative real growth in the sector will cumulatively be quite modest in the 3-5% range.

Figure 24: Maritime sector turnover and GVA projections (£m)



Source: Maritime UK, Cebr analysis

¹⁸ <https://www.theguardian.com/politics/2017/jul/28/philip-hammond-confirms-uk-will-seek-brexit-transitional-deal>

6 Annex A: Full set of direct economic impacts by region

Table A.1: Direct economic impact of the Maritime sector through turnover, 2010 to 2015, £ million

| TURNOVER | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| TOTAL UK | 35,561 | 36,780 | 37,661 | 38,401 | 39,618 | 40,175 |
| England | 26,358 | 26,994 | 27,495 | 27,647 | 28,460 | 29,545 |
| Scotland | 7,796 | 8,010 | 8,689 | 9,714 | 9,995 | 9,265 |
| Wales | 805 | 1,209 | 977 | 663 | 728 | 936 |
| Northern Ireland | 602 | 568 | 500 | 378 | 434 | 429 |
| East of England | 3,181 | 3,398 | 3,072 | 2,602 | 2,655 | 2,357 |
| East Midlands | 440 | 249 | 477 | 504 | 1,011 | 414 |
| London | 8,902 | 10,440 | 9,805 | 9,183 | 9,952 | 11,930 |
| North East | 1,251 | 1,109 | 1,195 | 1,639 | 1,890 | 1,817 |
| North West | 2,384 | 2,373 | 2,477 | 2,717 | 2,714 | 3,036 |
| South East | 5,292 | 4,570 | 5,267 | 5,406 | 4,694 | 4,267 |
| South West | 2,284 | 2,418 | 3,068 | 3,385 | 3,297 | 3,474 |
| West Midlands | 536 | 359 | 446 | 591 | 694 | 594 |
| Yorkshire and the Humber | 2,088 | 2,078 | 1,688 | 1,619 | 1,553 | 1,657 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table A.2: Direct economic impact of the Maritime sector through GVA, 2010 to 2015, £ million

| GVA | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| TOTAL UK | 13,634 | 13,209 | 15,058 | 13,469 | 14,076 | 14,465 |
| England | 9,745 | 9,753 | 10,926 | 9,691 | 10,227 | 10,353 |
| Scotland | 3,403 | 2,894 | 3,613 | 3,334 | 3,396 | 3,601 |
| Wales | 323 | 354 | 307 | 271 | 267 | 333 |
| Northern Ireland | 163 | 209 | 213 | 174 | 186 | 178 |
| East of England | 1,132 | 1,091 | 1,219 | 943 | 1,017 | 917 |
| East Midlands | 239 | 161 | 205 | 186 | 347 | 163 |
| London | 3,438 | 3,634 | 3,694 | 3,301 | 3,692 | 4,266 |
| North East | 418 | 349 | 372 | 446 | 522 | 514 |
| North West | 732 | 865 | 977 | 954 | 1,084 | 1,105 |
| South East | 1,764 | 1,647 | 2,050 | 1,738 | 1,540 | 1,361 |
| South West | 926 | 1,022 | 1,335 | 1,234 | 1,107 | 1,084 |
| West Midlands | 227 | 141 | 152 | 152 | 190 | 159 |
| Yorkshire and the Humber | 868 | 842 | 921 | 737 | 727 | 785 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table A.3: Direct economic impact of the Maritime sector through employment, 2010 to 2015, jobs

| EMPLOYMENT | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| TOTAL UK | 178,751 | 179,572 | 175,457 | 176,922 | 185,408 | 185,694 |
| England | 133,451 | 133,617 | 129,808 | 130,474 | 133,892 | 137,367 |
| Scotland | 36,525 | 35,622 | 37,793 | 37,858 | 43,539 | 39,336 |
| Wales | 5,977 | 6,966 | 4,809 | 5,477 | 4,924 | 5,962 |
| Northern Ireland | 2,798 | 3,366 | 3,048 | 3,114 | 3,054 | 3,028 |
| East of England | 16,967 | 16,399 | 14,185 | 12,694 | 14,128 | 13,138 |
| East Midlands | 4,828 | 3,582 | 3,686 | 3,538 | 6,233 | 3,111 |
| London | 27,316 | 31,046 | 27,221 | 26,513 | 30,393 | 35,776 |
| North East | 7,976 | 7,601 | 7,488 | 9,010 | 8,889 | 9,153 |
| North West | 13,617 | 14,390 | 14,415 | 15,522 | 16,731 | 18,278 |
| South East | 26,213 | 24,569 | 25,727 | 26,380 | 23,357 | 21,305 |
| South West | 19,580 | 20,102 | 22,152 | 22,852 | 20,722 | 22,385 |
| West Midlands | 4,294 | 3,190 | 2,967 | 3,049 | 3,627 | 3,444 |
| Yorkshire and the Humber | 12,661 | 12,737 | 11,967 | 10,913 | 9,813 | 10,777 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis

Table A.4: Direct economic impact of the Maritime sector through the compensation of employees, 2010 to 2015, £ million

| COMPENSATION OF EMPLOYEES | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| TOTAL UK | 6,782 | 6,481 | 7,407 | 7,427 | 7,097 | 7,297 |
| England | 4,368 | 4,350 | 4,888 | 4,929 | 4,878 | 4,918 |
| Scotland | 2,103 | 1,753 | 2,181 | 2,260 | 1,985 | 2,103 |
| Wales | 218 | 260 | 214 | 160 | 151 | 199 |
| Northern Ireland | 94 | 119 | 124 | 78 | 83 | 77 |
| East of England | 552 | 569 | 531 | 493 | 451 | 428 |
| East Midlands | 116 | 84 | 105 | 117 | 144 | 78 |
| London | 1,222 | 1,312 | 1,357 | 1,356 | 1,456 | 1,640 |
| North East | 276 | 242 | 263 | 331 | 344 | 364 |
| North West | 471 | 392 | 494 | 449 | 531 | 558 |
| South East | 792 | 720 | 885 | 903 | 741 | 672 |
| South West | 515 | 601 | 819 | 834 | 799 | 746 |
| West Midlands | 74 | 71 | 93 | 91 | 95 | 100 |
| Yorkshire and the Humber | 350 | 358 | 341 | 355 | 317 | 332 |

Source: UKCoS, British Marine, PwC, FAME, ONS, Cebr analysis