



The economic contribution of the Maritime Sector in the Liverpool City Region

A Cebr report for Maritime UK, Mersey Maritime and the
LCR

August 2019

Cebr

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Authorship and acknowledgements

This report has been produced by Cebr, an independent economics and business research consultancy established in 1992. The views expressed herein are those of the authors only and are based upon independent research by them.

The industry figures making up the broad Maritime Sector are not always additive because some of the reports have been customised to cater for the overlap between certain industries. Simply adding together the industries would therefore produce a degree of double counting. Nonetheless, the broad Maritime report has had this double counting stripped out. Cebr believes fundamentally in the thoroughness and robustness of its approach and, as such, we stand by our own unbiased and fresh examination of the role of the Maritime Sector and its constituent industries in the UK.

The report does not necessarily reflect the views of Maritime UK.

London, August 2019

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Executive Summary

- The Centre for Economics and Business Research (Cebr) has been commissioned by Maritime UK and Mersey Maritime to quantify the economic contribution of the Maritime Sector in the Liverpool City Region (LCR). This report forms one of ten reports assessing the contribution of the Maritime Sector as a whole, at industry-level, in Scotland, Wales, the Liverpool City Region and the Solent LEP region.
- **In this context, the Maritime Sector has been defined as consisting of the ports, shipping, leisure marine, marine engineering and scientific and Maritime Business Services industries.** Each of these entities comprises a multitude of different activities, data for which has been aligned against the national accounts framework.
- The Maritime Sector in the Liverpool City Region makes an important macroeconomic contribution to the LCR and UK economies through business turnover, Gross Value Added (GVA), employment and through the compensation of employees. **It is estimated that the LCR Maritime Sector directly drove just under £2.0 billion in domestic output (through business turnover), £650 million in GVA and 7,899 jobs in the LCR in 2017.**
- The **productivity of workers in the LCR Maritime Sector substantially exceeds productivity across the UK as a whole:** for example in 2017 the productivity of the LCR Maritime Sector was estimated to be £77,358, as compared with £54,330 across the UK.
- The **shipping industry is the largest constituent industry within the LCR Maritime Sector** in terms of economic activity, directly contributing £1,260 million in domestic output, £370 million in GVA, and directly supporting approximately 3,828 jobs in 2017.
- **It is estimated that the Maritime Sector in the LCR contributed £163 million to the UK Exchequer in 2017, spread across VAT, Corporation Tax, Income Tax, National Insurance Contributions (NICs) and Business Rates.** Further, the contribution of the LCR Maritime Sector to the Exchequer in 2017 represents a £80 million increase relative to the 2010 level.
- After quantifying the wider economic impacts through the industry supply chains and induced effects on expenditures, **it is estimated that the Maritime Sector in the LCR helped to support a total of almost £1,700 million of GVA in 2017.** This implies that, for every £1 in GVA directly contributed by the LCR Maritime Sector in 2017, a total of £2.64 in GVA is supported across the wider LCR and UK economies.
- These wider economic impacts associated with the LCR Maritime Sector also extend to business turnover, employment and the compensation of employees. **It is estimated that the Maritime Sector in the LCR helped to support a total of approximately £4.2 billion in domestic output (through business turnover), 52,000 jobs and £570 million through the compensation of employees in 2017.**
- Our forecast shows the LCR Maritime Sector steadily growing over the period 2018-2023. **The LCR-based Maritime turnover and GVA are set to grow at a Compounded Annual Growth rate (CAGR) of 2.8% over the considered period.**

1 Introduction

This is a report by the Centre for Economics and Business Research (Cebr) on behalf of Maritime UK and Mersey Maritime on the economic impact of the Maritime Sector in the Liverpool City Region (LCR). In this context and henceforth, the “Maritime Sector” is defined as comprising the ports, shipping, leisure marine, marine engineering and scientific and Maritime Business Services industries.

This report is complementary with nine other reports that focus on the economic contribution of the UK Maritime Sector, with these reports focusing on the economic contribution of each of the five industries at UK level, the economic contribution of the sector in Scotland, Wales, the Solent LEP and the sector as a whole. It is therefore important to consider this report as part of the wider framework set out in the nine other 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 2017 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 in the LCR. As such, our report is not confined to direct ongoing contributions to GDP and employment through operations and activity in the LCR, but also provides assessments of the associated indirect and induced multiplier impacts.

1.1 About Maritime UK and Mersey Maritime

Maritime UK is the industry body for the UK’s Maritime Sector, representing companies and partner organisations in the shipping, ports, leisure marine, marine engineering and scientific and Maritime Business Services industries. It acts to promote the sector, influence government and drive growth.

Mersey Maritime, founded in 2003, is the representative body for the marine and Maritime Sector in the Liverpool City Region, working with large and small businesses across 33 different sub-sectors of activity to create conditions that will allow business to flourish. Mersey Maritime delivers trusted specialist expertise, networking, lobbying and influence at a local, national and international level; providing a collective voice for the region on behalf of its 200 members.

1.2 Purpose of this report

This report provides an in-depth assessment of the economic contribution that the Maritime Sector makes to the LCR economy. As such, our analysis combines Cebr’s estimates for the economic contribution of the Maritime Sector at UK-level with regional analysis and insights in order to produce estimates for the LCR.

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

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 LCR. It presents a range of analyses demonstrating different aspects of the value contributed by the Maritime Sector, including direct contributions to GDP and employment, indirect and induced multiplier impacts and the Maritime Sector’s contribution to the Exchequer through tax revenues raised.

An important task has been to develop an in-depth understanding of the Maritime Sector both in the UK and in the LCR. To produce a robust study, it is necessary to interrogate 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 Maritime Sector in the LCR. Following the collation of the necessary data capturing these activities, the values of key economic indicators were established to demonstrate the impact of the Maritime Sector in the LCR. The key macroeconomic indicators include:

- The value of the turnover of the Maritime Sector in the LCR, and the turnover supported in the UK economy through multiplier impacts.
- GVA¹ contributions to LCR and UK GDP supported by the Maritime Sector in LCR, directly and through indirect and induced multiplier impacts.
- Jobs supported by the LCR Maritime Sector, including direct, indirect and induced jobs through regional multiplier impacts.
- The value of employee compensation² supported by the LCR Maritime Sector, representing the total remuneration of employees.
- The Exchequer contribution of the LCR Maritime Sector through tax revenues raised.
- The direct contribution made by the Maritime Sector through LCR exports of goods and services.

Mapping the Maritime Sector in the UK

The first stage of the study has involved mapping the activities of the Maritime Sector against the national accounts framework, in order to establish clarity on the precise definition of the Maritime Sector as it maps against the Standard Industrial Classification (SIC) framework.³ For most activities, particularly those of the shipping industry, economic activity can be captured through a particular 3, 4 or 5-digit SIC code.

In essence, this involves taking each of the five Maritime industries and their constituent activities, and mapping these to the most relevant Standard Industrial Classification (SIC) code in order to identify the activity’s economic data. For example, “Transport of Passengers and International Sea Faring”, identified as an activity of the shipping industry, can be identified through SIC code 50100 within the National Accounts framework. However, some Maritime Sector activities do not map neatly onto the SIC framework; this has required Cebr to draw upon government or industry sources to quantify the contributions made through these activities, or in the case of Maritime Business Services, employ a bottom-up analysis.

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.

³ 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.

Data Sources

After completing the mapping of Maritime Sector activities, data for the macroeconomic indicators listed above have been obtained and collated by firstly interrogating the indicators gathered at UK level for the Maritime Sector, and disaggregating this at LCR-level using a combination of publicly-available data sources, industry sources and local estimates.

For those Maritime Sector activities which are in alignment with the SIC framework and are available on a disaggregated basis, the main source of information used in this study is Bureau van Dijk's Financial Accounts Made Easy (FAME) database. FAME provides detailed information on UK and Irish companies as taken from annual reports and other sources up to the latest available year. FAME has been used to establish the aggregated contribution of businesses in the Maritime Sector to the UK economy in terms of turnover, employee numbers and GVA. We also evaluate the breakdown of these business contributions by SIC industrial sector, using the primary and secondary five-digit UK SIC (2007) codes associated with for each company in FAME.

To capture the contribution of those Maritime Sector activities which do not map neatly across the SIC framework, and in order to disaggregate the economic contribution of the sector in the LCR, a variety of other sources have been used. For the former, the study draws upon insight from sector bodies included (but not limited to) British Marine, the Society of Maritime Industries (SMI), BEIS and the UK Chamber of Shipping. A full list of identified Maritime Sector activities and sources is set out in Section 2 of the report.

Quantifying the wider economic impacts

After collation and interrogation, the resulting LCR direct economic impacts have then been embedded within Cebr's regional economic impacts models of the UK economy that we use to assess the kinds of impacts that can be associated with an entity such as the LCR Maritime Sector.

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 – gross output (turnover), GVA, the compensation of employees, and employment. The three types of impact are:

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

These three impacts are then combined to convey the total impact associated with each Maritime industry in terms of business turnover, GVA, employment and the compensation of employees. Cebr has broadly taken a 'top-down' approach to estimate the direct impacts of the five Maritime industries within the LCR. In effect, this involves taking the UK direct impacts of each defined Maritime industry and applying relevant ratios from publicly-available data sources such as the UK Business Register and Employment Survey (BRES) – as well as private data sources such as Bureau Van Dijk's *Financial Accounts Made Easy* (FAME) database – in order to attribute the contribution from the Maritime Sector in the LCR.

For each of the five Maritime industries, the direct impacts are then combined with the regional economic multipliers provided by Cebr's suite of regional input-output models for the LCR, in order to then generate indirect, induced and subsequently wider impacts.

2 The Maritime Sector in the Liverpool City Region

Here we set out how the Maritime Sector has been defined for the purposes of the study. On a holistic level, the Maritime Sector can be disaggregated into the ports, shipping, leisure marine, marine engineering and scientific and Maritime Business Services industries, which in themselves are formed of numerous individual and distinct activities.

2.1 The definition of the Maritime Sector and its constituent industries

Maritime UK have provided a list of activities which fall under the auspices of the Maritime Sector; Cebr has subsequently undertaken a mapping exercise using this list to identify how each of these five industries aligns with the national accounts. For most Maritime Sector 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.

The Maritime Sector in the LCR has therefore been identified as consisting of the following activities. Each of the sub-sectors have been mapped to their sector by Cebr, in order to attribute Standard Industrial Classification (SIC) codes to the activity to allow their direct impacts to be measured.

- **Shipping industry**
 - International passenger transport (cruise and ferry);
 - Domestic and inland waterway passenger transport;
 - International freight transport (bulk, container, gas and tanker);
 - Domestic & inland waterway freight transport;
 - Other shipping activity.
- **Ports industry**
 - Warehousing and storage;
 - Port activities and management;
 - Stevedores, cargo and passenger handling;
 - Border agency, HMRC and public sector employees operating in ports.
- **Leisure marine industry**
 - Recreational marine activities, marine finance and legal activities and general marine services;
 - Boatbuilding (marine leisure vessels);
- **Marine engineering and scientific industry**
 - Shipbuilding;
 - Marine renewable energy;
 - Marine support activities for offshore oil and gas, engineering and mining;
 - Marine science and academic activities, including government vessels and technical consulting;
- **Maritime Business Services industry**
 - Shipbroking services;
 - Maritime Insurance services;
 - Maritime Financial services;

- Maritime Legal services;
- Ship Surveying and Classification activities;
- Maritime Education (including Maritime university courses and cadetships);
- Maritime Consultancy; and
- Maritime Accountancy.

2.2 Mapping the Maritime Sector against the National Accounts framework

Here we set out how the direct economic contribution of the industries and activities listed in the previous subsection have been mapped against the national accounts framework. For activities which do not map neatly against this framework – in other words, when SIC codes cannot be used to accurately reflect or capture a particular Maritime Sector-related activity – we outline the industry-level sources to separately quantify the economic contribution.

It should be stressed that the Maritime industries as defined here are unlikely to be exhaustive, and that further work may be necessary to fully capture the fullest extent of activities taking place in the Maritime Sector, several of which are often difficult to define within the existing National Accounts framework. There may therefore be a greater role for the UK Government to expand the existing definition of the Maritime Sector, in order that the true value of economic activity supported is then measured.

The ports and shipping industries

Table 1: Mapping of the shipping industry by activity

INDUSTRY	ACTIVITY	MAPPING	SOURCE(S) USED
SHIPPING	International passenger transport (cruise and ferry)	Identified through SIC code 50100, "Sea and Coastal Passenger Water Transport".	FAME, BRES
	Domestic and inland waterway passenger transport	Identified through SIC code 50300, "Inland Passenger Water Transport".	FAME, BRES
	International freight transport (bulk, container, gas and tanker)	Identified through SIC codes 50200 and 77342, "Sea and coastal freight water transport", and "Renting and Leasing of Freight Water Transport Equipment".	FAME, BRES
	Domestic and inland waterway freight transport	Identified through SIC code 50400, "Inland Freight Water Transport".	FAME, BRES
	Other shipping activity	Identified and quantified through UKCoS statistics for shipping-related employment	UKCoS Manpower Survey, FAME

Source: Maritime UK, Cebr analysis

Table 2: Mapping of the ports industry by activity

GROUPING	ACTIVITY	MAPPING	SOURCE(S) USED
PORTS	Warehousing and Storage	Identified through SIC code 52101, "Operation of Warehousing and Storage Facilities for Water Transport activities". Activities are then mapped to council wards containing major and minor UK ports.	FAME, BRES
	Port Authority Management, Port Security and Marshals, Port Marine and Vessel Management Services, Marine Pilots, Port Harbour Support Vessels, and Engineering and Maintenance	Identified through SIC code 52220, "Service activities incidental to water transportation". Activities are then mapped to council wards containing major and minor UK ports.	FAME, BRES
	Stevedores, cargo and passenger handling including crane/vehicle/plant drivers/operators	Identified through SIC code 52241, "Cargo Handling for Water Transport Activities". Activities are then mapped to council wards containing major and minor UK ports.	FAME, BRES
	Border Agency, Home Office and HMRC staff operating in Ports	Identified as public sector employees operating in UK ports.	Institute for Government, Port Freight Statistics, Cebr analysis

Source: Maritime UK, Cebr analysis

Table 1 and Table 1

Table 2 shows how activities for the shipping and port industries have been identified, and the data sources used to capture and quantify the associated economic activity.

For the majority of shipping and port industry activities, business demography data taken from the FAME database has been used to generate UK-level estimates for the direct economic impacts of each activity. Data taken from the ONS Business Register of Employment Survey (BRES) has then been used to disaggregate national level data to LCR-level.

The leisure marine and marine engineering and scientific industries

Table 3 and Table 4 below shows how activities for the leisure marine and marine engineering and scientific industries have been identified, and the data sources used to capture and quantify the associated economic activity.

Table 3: Mapping of the leisure marine industry by activity

INDUSTRY	ACTIVITY	MAPPING	SOURCE(S)
Leisure Marine	Boatbuilding (marine leisure vessels)	Leisure boatbuilding has been identified through SIC code 3012 ("Building of pleasure and sporting boats") as well as through the British Marine "Key Performance Indicators for the Leisure, Superyacht and Small Commercial Marine Industry".	ABS, BRES, British Marine, Cebr Analysis

	Other leisure marine activities	Other Leisure Marine activities do not map neatly across the SIC framework, as they are typically bundled together with others within the leisure industries; this precludes the effective use of FAME to gather economic impact data. Cebr have therefore drawn upon the British Marine "Key Performance Indicators for the Leisure, Superyacht and Small Commercial Marine Industry" to derive employment, turnover and GVA estimates, stripping out firms involved in non-leisure marine activities.	British Marine, Cebr Analysis
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Source: Maritime UK, Cebr analysis

Table 4: Mapping of the marine engineering and scientific industry

INDUSTRY	ACTIVITY	MAPPING	SOURCE(S)
Marine Engineering & Scientific Industry	Shipbuilding and Marine Engineering	Identified in the National Accounts framework through SIC code 3011 ("Building of ships and floating structures") and 3315 ("Repair and maintenance of ships and boats")	ABS, BRES, FAME, Cebr Analysis
	Marine Renewable Energy	Marine renewable energy activities do not map neatly across the SIC framework. Cebr have therefore drawn upon the BIS report, "The size and performance of the UK-low carbon economy" BIS report (2013) to derive employment, turnover and GVA estimates.	BIS, Cebr Analysis
	Marine Support activities for Offshore Oil and Gas, Engineering and Mining	Identified in the National Accounts framework through SIC code 91, "Support activities for petroleum and natural gas extraction".	FAME, Cebr Analysis
	Marine Scientific and Technical	Marine Scientific and Technical activities do not map neatly across the SIC framework, as they are typically bundled together with other activities within the Manufacturing and "Other Scientific and Professional" sectors. Cebr have therefore drawn upon the Society of Maritime Industries (SMI) "Annual Review of UK Marine Scientific Industries" reports to gather data.	SMI, Cebr Analysis

Source: Maritime UK, Cebr analysis

The leisure marine industry is defined narrowly as encompassing activities ranging from leisure boat manufacturing to leisure marine services, such as marine finance.⁴ Marine engineering and scientific industry encompasses activities such as renewable energy generation and scientific development within marine.

A key source of information used by Cebr to capture marine leisure activities is the Key Performance Indicators (KPI) analysis produced by British Marine. The KPI analysis is produced each year, drawing upon information supplied to British Marine by its membership, such as company turnover and statistics declarations.

KPI analysis covering the years 2010 to 2017 (inclusive) has therefore been used as a major source of information for capturing and quantifying leisure boatbuilding as well as business and customer marine activities.

⁴ The industry figures making up the broad Maritime Sector are not always additive because the reports have been customised to cater for overlap between certain industries, i.e. leisure marine and Maritime Business Services. Simply adding together the industries would therefore produce a degree of double counting. Nonetheless, the broad Maritime report has had this double counting stripped out.

The Maritime Business Services industry

The methodology of the Maritime Business Services industry is unique compared to the other reports of this study into the Maritime Sector. The MBS industry is a fairly abstract concept comprising of, for the purpose of this study, eight sub-industries which are not exclusively maritime related and hence do not map neatly onto SIC codes.

For this analysis Cebr has drawn on a variety of data sources to produce a bottom-up analysis for each of the sub-industries. Data is limited for Maritime Financial services and Maritime Accountancy and as such for these sub-industries, we rely on PwC's 2016 study 'The UK's Global Maritime Professional Services: Contribution and Trends', augmenting it with trends in the broader industry to generate estimates for the entire period, 2010 to 2017. The other sub-industries have been computed through a combination of bottom-up analysis using company and financial accounts, FAME, ONS and insights from representatives of the industry.

For a more detailed description of the individual methodologies, please see 'The economic contribution of the UK Maritime Business Services industry' report.

3 The direct economic impact of the Maritime Sector in the Liverpool City Region

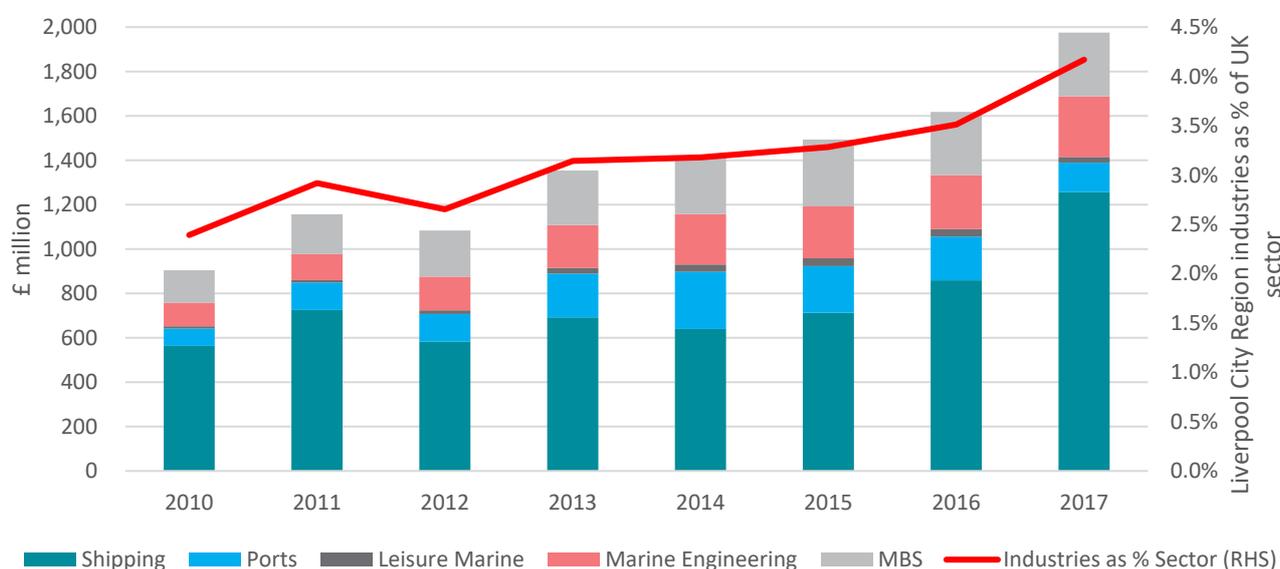
In this section we set out estimates for the direct contribution of the Maritime Sector in the LCR across the following key macroeconomic indicators: business turnover, GVA, employment, the compensation of employees, the Exchequer contribution through tax revenues raised and exports of goods and services. After quantifying the direct contributions made through the first four of these activities, the wider contribution that the LCR-based Maritime Sector makes to the LCR and UK economies is then examined in the following section of this report.

The direct economic impacts of the Maritime Sector in the LCR are separated based on those contributed by each Maritime industry (shipping, ports, leisure marine, marine engineering and scientific and Maritime Business Services).

3.1 The direct impact through turnover

This subsection considers the total amount of domestic output directly supported by the Maritime Sector in the LCR through turnover generated by businesses. Figure 1 below shows the breakdown of business turnover generated by the Maritime Sector and its constituent industries in the LCR between 2010 and 2017; and this turnover as a percentage of the Maritime Sector as a whole.

Figure 1: The estimated turnover of the Maritime Sector in the LCR, and the share of the Maritime Sector's total turnover, 2010-2017, £ million



Source: FAME, ONS, Cebr analysis

In 2017 the direct turnover contribution of the Maritime Sector in the LCR was £1,980 million. This constituted 4.2% of the overall UK Maritime Sector turnover contribution. Further, the 2017 direct turnover impact of the LCR Maritime Sector was approximately £1 billion greater than in 2010, with significant growth between 2016 and 2017. This is a total growth of 118% over the period, with a growth of 22% between 2016 and 2017. In percentage terms, Marine engineering and scientific industry grew the most, with a 158% increase between 2010 and 2017.

A primary driver of the growth between 2016 and 2017 has been shipping, more specifically the transport of international freight which accounts for 55% of the total turnover of the entire LCR Maritime Sector. Liverpool also plays a strategic role in international trade; as it stands, Liverpool facilitates approximately 32% of total Irish freight trade with the UK.⁵ This industry is becoming increasingly important to the LCR with large sums of investment being pumped into the local ports to support the expansion of container shipping. For example, Liverpool 2 is a £400 million project aimed at creating one Europe's most advanced deep water container ports.⁶ The Liverpool 2 port will allow exporters in the North easier routes to international competitors and increase turnover for companies located around the Liverpool region. In addition to the Liverpool 2 port project, there has also been a £50 million investment for a new cruise terminal in Liverpool, and a £30 million investment for a new ferry terminal between Liverpool and the Isle of Man. In all, there has been approximately £1.4 billion of investment across the Liverpool and Manchester Ship Canal. With this significant level of investment, it may not be surprising to see the shipping industry in the LCR grow so significantly compared to the Maritime Sector as a whole: 46% compared to 2% between 2016 and 2017.

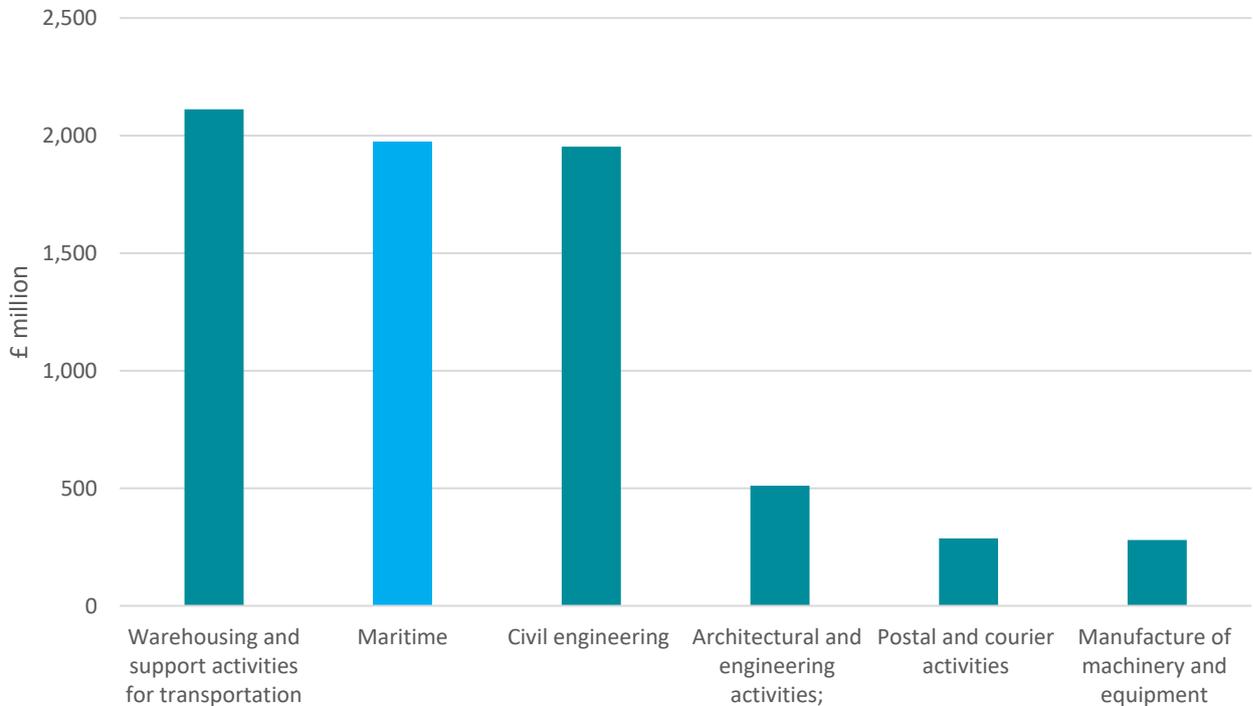
For each year Figure 1 illustrates how each industry within the LCR Maritime Sector contributed to the direct turnover impact. In 2017 shipping accounted for the lion's share of business turnover at 64%; followed by the Maritime Business Services industry at 15% and the marine engineering and scientific industry at 14%.

To place the LCR Maritime Sector's direct contribution through turnover in context, Figure 2 below compares the direct turnover of the Maritime Sector in LCR in 2017 with other industries in the LCR region. The direct turnover of the LCR Maritime Sector exceeded that of civil engineering, architectural and engineering activities, postal and courier activities, and manufacture of machinery and equipment. The direct turnover of warehousing and support activities for transportation had the highest direct turnover of £2.1 billion in 2017 across the other industries.

⁵ Figures provided by Mersey Maritime.

⁶ Peel Ports Group (2019). ['Introducing Liverpool 2'](#)

Figure 2: The direct contribution through turnover of the Maritime Sector in the LCR against comparable LCR industries in 2017, £ million

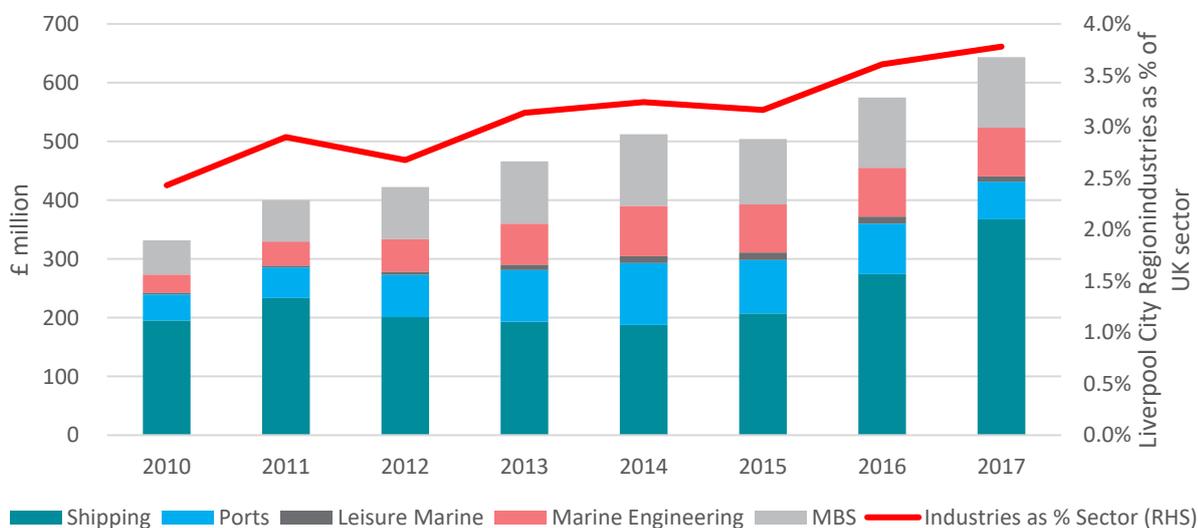


Source: FAME, ONS, Cebr analysis

3.2 The direct impact through GVA

This subsection illustrates the contributions in terms of the GVA from the Maritime Sector in the LCR. Figure 3 below shows the direct GVA contribution of the Maritime Sector in the LCR, both in levels and as a percentage of the UK Maritime Sector, for years 2010 to 2017. The direct contributions are disaggregated by industry.

Figure 3: The direct contribution of the Maritime Sector in the LCR through GVA, and the LCR's share of the Maritime Sector's total direct contribution through GVA, 2010-2017, £ million



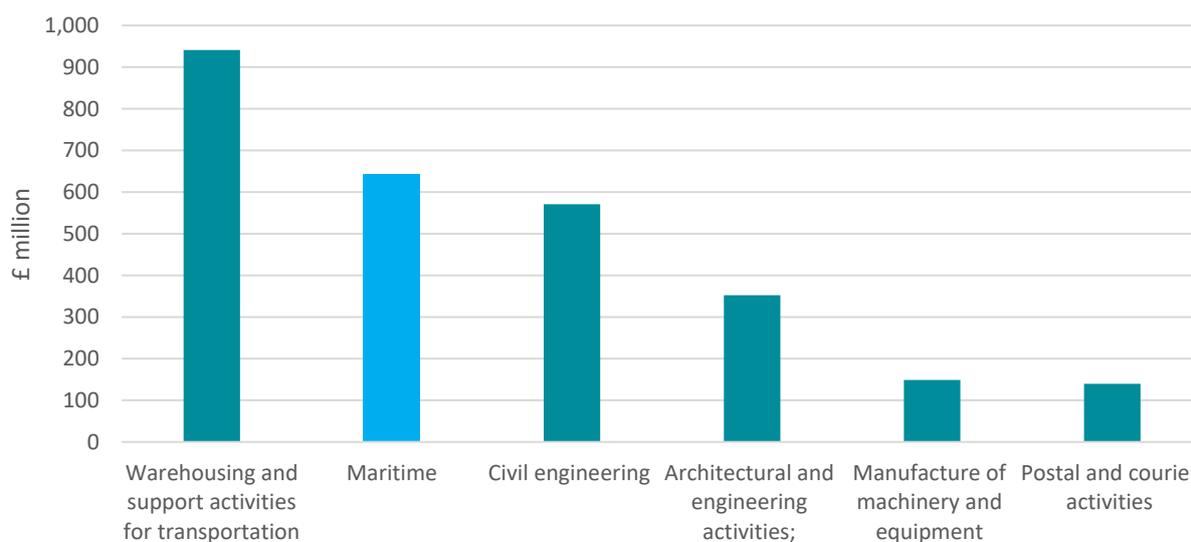
Source: ONS, FAME, Cebr analysis

In 2017 the direct GVA contribution of the Maritime Sector in the LCR was £640 million: this represented 3.8% of the UK Maritime Sector contribution as a whole. This 2017 percentage was also significantly higher than 2010 level (2.4% of the UK Maritime Sector contribution), further demonstrating the significant growth over the period.

Maritime Business Services, in conjunction with the marine engineering and scientific industry, plays a significant role within the LCR's Maritime Sector. Although only accounting for 28% of total GVA in 2017, the LCR has placed significant resources and emphasis on educational and engineering facilities. Liverpool is home to the Centre for Autonomous Systems Technology (part of the University of Liverpool). This institution may become increasingly important within the wider Maritime Sector as the emerging autonomous vessels industry grows; it is projected that the industry's global worth will reach \$136 billion by 2030.⁷

To put the LCR Sector's direct contribution through GVA in context, Figure 4 below compares the direct GVA impact of the LCR Maritime Sector with other industries in 2017. The direct contribution through GVA of the LCR Maritime Sector exceeded that of all other industries except for warehousing and support activities for transportation.

Figure 4: The estimated GVA of the Maritime Sector in the LCR against comparable LCR industries in 2017, £ million



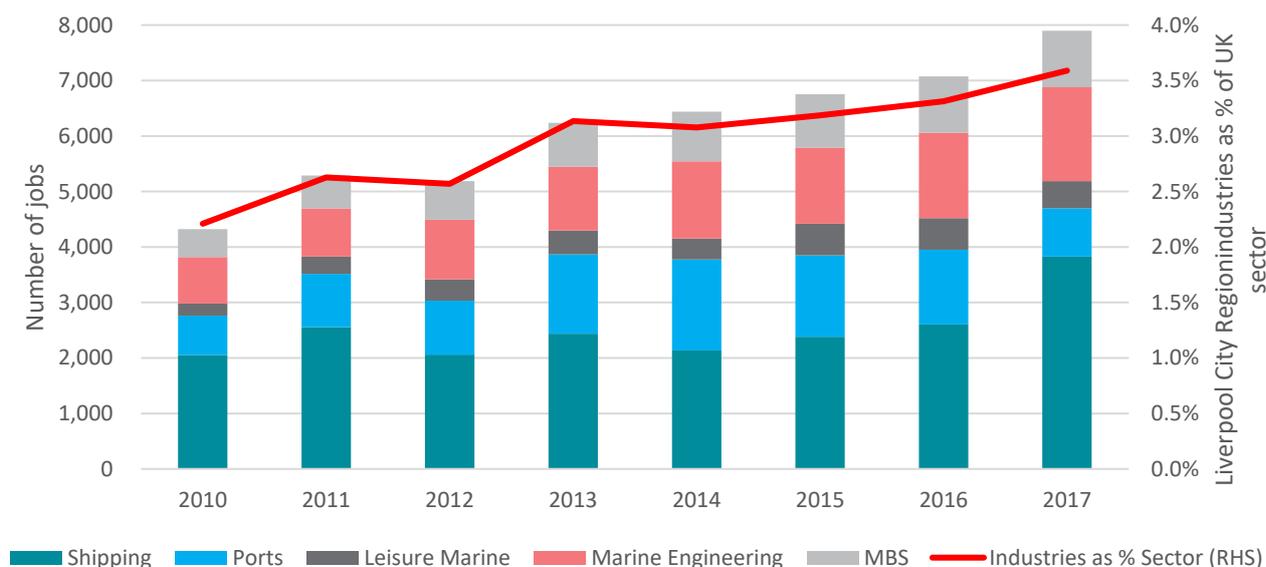
Source: ONS, FAME, Cebr analysis

⁷ HWF. (2018). 'Autonomous Ships: Shipping 4.0'.

3.3 The direct impact through employment

Figure 5 below shows the direct employment impact of the Maritime Sector in the LCR, both in levels and as a percentage of the UK Maritime Sector, for years 2010 to 2017. The direct impacts are disaggregated by industry.

Figure 5. The direct contribution of the Maritime Sector in the LCR through employment, and the LCR's share of the Maritime Sector's total direct contribution through employment, 2010-2017



Source: ONS, FAME, Cebr analysis

In 2017 the direct employment contribution of the Maritime Sector in the LCR was 7,899 jobs: this represented 3.6% of the UK Maritime Sector contribution as a whole. The LCR Maritime Sector employed 3,500 more people in 2017 than in 2010, a growth figure of 83%. The direct employment impact of the LCR Maritime Sector has shown continued growth over the entire period, aside from a small dip in 2012 which recovered in 2013.

As indicated in the previous section, LCR's marine engineering and scientific industry is growing, with the potential to continue significantly. As it stands, the industry has grown by 102% since 2010, and by 23% since 2015. In terms of employment, it is growing at a faster pace than the overall LCR Maritime Sector which grew by 83% between 2010 and 2017 and by 17% between 2015 and 2017, further indicating the emerging importance of the industry.

For each year Figure 5 illustrates how each industry within the LCR Maritime Sector contributes to the direct employment impact. In 2017 the shipping industry accounted for approximately 49% of the employment, followed by the marine engineering and scientific industry at 21% and the Maritime Business Services industry at 13%.

Through combining the direct economic impacts of the LCR Maritime Sector through GVA and employment, we can determine the levels of productivity across each industry within the LCR Maritime Sector. Table 5 below shows the levels of productivity across each industry within the LCR Maritime Sector.

Table 5: Productivity (GVA per employee) in the LCR Maritime Sector and constituent industries, 2010-2017

GVA per job	2010	2011	2012	2013	2014	2015	2016	2017
UK economy	£46,215	£47,176	£48,355	£49,691	£50,877	£51,619	£53,013	£54,330
UK Maritime Sector	£69,760	£68,554	£78,170	£74,721	£75,599	£75,209	£74,609	£77,358
Liverpool City Region Maritime	£76,721	£75,682	£81,418	£74,732	£79,595	£74,690	£81,238	£81,461
Shipping	£95,094	£91,342	£97,421	£79,202	£87,821	£86,913	£105,275	£96,001
Ports	£62,373	£54,052	£74,018	£61,625	£64,209	£62,118	£63,779	£73,698
Leisure marine	£14,735	£11,040	£14,431	£21,415	£31,560	£22,535	£20,966	£18,083
Marine engineering and scientific	£36,737	£47,128	£51,775	£60,813	£61,402	£59,565	£54,158	£49,035
Maritime Business Services	£115,334	£118,760	£127,112	£134,049	£136,625	£116,112	£117,503	£117,632

Source: ONS, Cebr analysis

LCR's Maritime Sector productivity is consistently greater than the UK average and slightly more productive than the wider UK Maritime Sector in every year apart from 2015. The Maritime Business Services industry dominates, with average productivity over the period of £122,891 of GVA per head over the period, peaking in 2014 at £136,625. This is usually the case with highly specialised service-based industries. Liverpool itself is home to significant Maritime Business Services institutions, including University of Liverpool which has specialities in Autonomous Systems Technology, the Liverpool Logistics and Offshore and Marine Research Institute and the Liverpool Institute for Sustainable Coasts and Oceans.

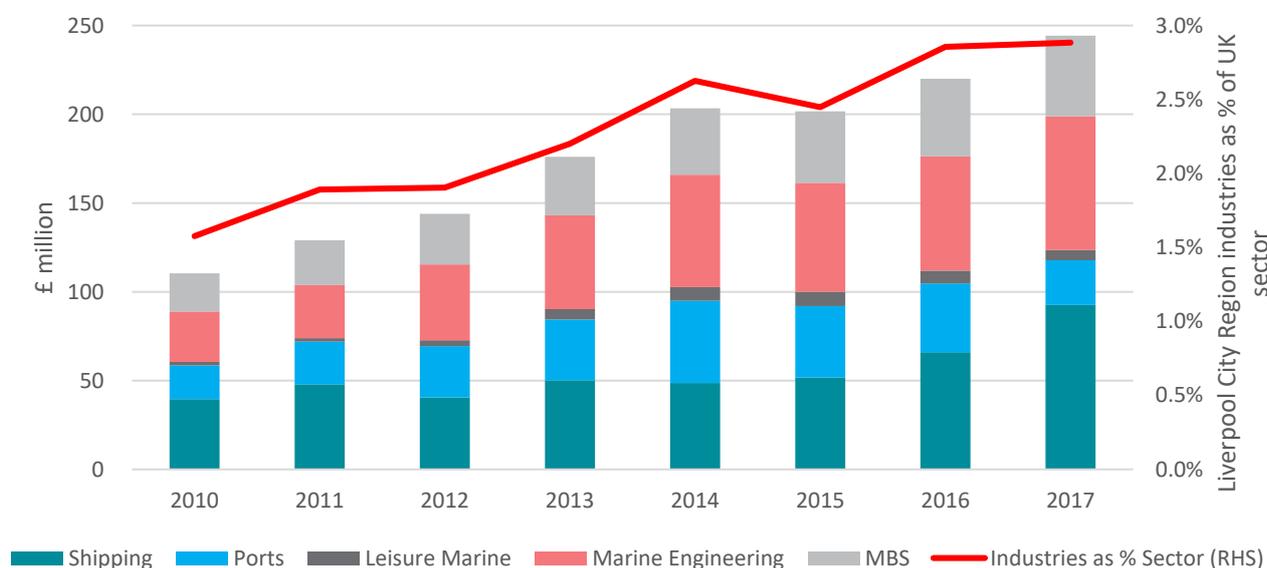
As a whole, it is clear that the UK Maritime Sector is highly productive compared to the UK average. This stems from the fact it comprises of highly specialised industries such as shipping and the Maritime Business Services industry. The LCR has greater productivity than the UK Maritime average, likely owing to its significant port and maritime hub.

3.4 The direct impact through the compensation of employees

This subsection considers the compensation of employees (COE) which is directly supported by the Maritime Sector in the LCR. As noted in Footnote 1 earlier in this report, GVA is commonly known as income from production and that the principal recipients of this income are labour (through employee compensation), capital (shareholders, financiers, depreciation etc.) and government (through taxes on production, chiefly Business Rates). The principal beneficiary in most businesses and in most sectors of the economy are typically employees.

Figure 6 below shows the direct employment compensation impact of the Maritime Sector in the LCR, both in levels and as a percentage of the UK Maritime Sector, for years 2010 to 2017. The direct employee compensation impacts are disaggregated by industry.

Figure 6: The direct contribution of the Maritime industries in the LCR to the compensation of employees, and the combined industries' share of the total contribution from the UK Maritime Sector, 2010 to 2017, £ million



Source: ONS, FAME, Cebr analysis

In 2017 the direct COE impact of the Maritime Sector in the LCR was £244 million: this represented 2.9% of the UK Maritime Sector contribution as a whole. The 2017 level was almost £140 million higher than the 2010 level, which was 1.6% of the UK Maritime Sector contribution as a whole. The direct COE impact of the LCR Maritime Sector has shown continued growth over the period, withstanding a slight drop in 2015 (falling by £1 million compared to 2014) which was more than recovered the following year.

3.5 The direct Exchequer contribution in the Liverpool City Region

In this subsection we examine the contribution of the Maritime Sector in the LCR to the UK Exchequer, through tax revenues raised from Maritime-related activities. In order to capture the incidence of taxation on the direct activities of the sector, Cebr has measured the contribution through revenues raised from the tax heads listed below⁸:

- Income Tax;
- National Insurance Contributions (NICs) – from both Employer and Employee contributions;
- Value-Added Tax (VAT) as paid by businesses operating in the Maritime Sector;
- 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 the LCR Maritime Sector; rates and thresholds have been sourced from HMRC for the years 2010 to 2017. Wages and salaries for

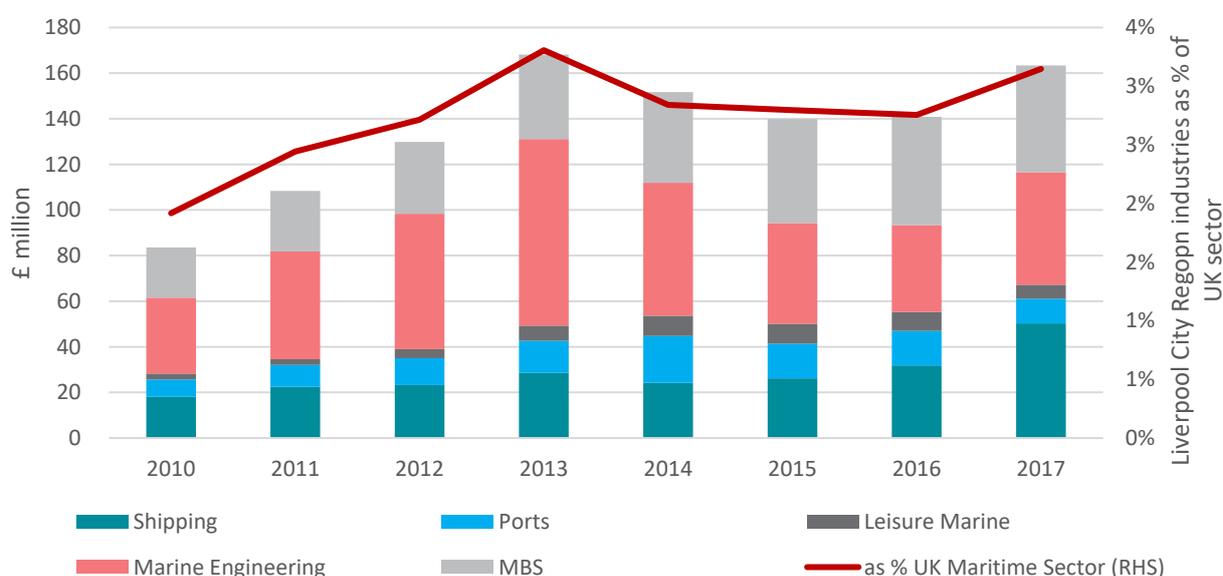
⁸

Tonnage Tax revenue has not been apportioned regionally, as it makes up such a minor percentage of total Maritime Sector tax revenue (0.058% in 2017).

employees have been sourced from the Annual Survey for Hours and Earnings (ASHE)⁹ and adjusted for wage differentials in the LCR. For the business taxes listed above, Corporation Tax revenues have been estimated by applying HMRC estimates for Average Effective Tax Rates (AETRs) to the estimated Gross Profit of each Maritime industry. Business Rates have been estimated using the average level of Business Rates paid as a proportion of Maritime Sector GVA, taken from the ONS Annual Business Survey.

Figure 7 below shows the direct contribution of the LCR Maritime Sector to the UK Exchequer, both in levels and as a percentage of the UK Maritime Sector as a whole, for years 2010 to 2017. The direct exchequer impacts are disaggregated by industry contribution.

Figure 7: The direct UK Exchequer contribution of the Maritime industries in the LCR, 2010 to 2017, £ million



Source: ONS, FAME, Cebr analysis

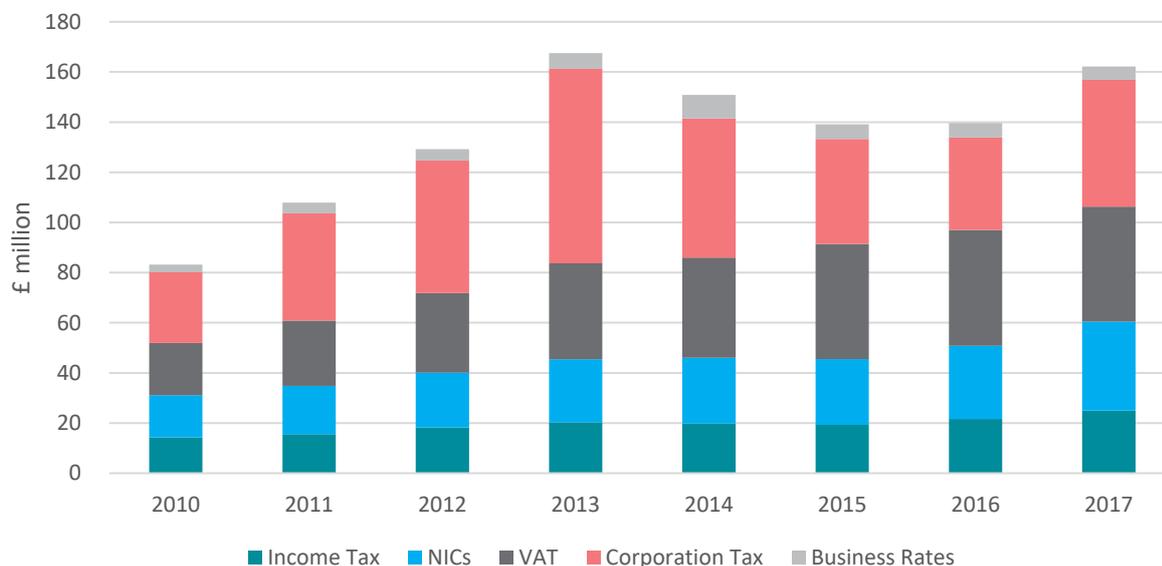
In 2017 the direct Exchequer contribution of the Maritime Sector in the LCR was £164 million: this represented 3.1% of the UK Maritime Sector contribution as a whole. The 2017 tax contribution was almost double the 2010 level, which was 1.9% of the UK Maritime Sector as a whole. The direct exchequer impact of the LCR Maritime Sector peaked in 2013, at £168 million and 3.3% of the UK Maritime Sector contribution as a whole.

Disaggregating the direct impact by constituent industry, we can see that in 2017 the shipping industry contributed the greatest share of the direct Exchequer revenues for the LCR Maritime Sector (£51 million, 31%), followed by the marine engineering and scientific industry (£49 million, 30%) and the MBS industry (£47 million, 29%).

Figure 8 below disaggregates the direct Exchequer contribution of the LCR Maritime Sector by tax head across the years 2010 to 2017.

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 8: The direct contribution of the Maritime Sector in the LCR to the UK Exchequer by tax head, 2010 to 2017, £ million



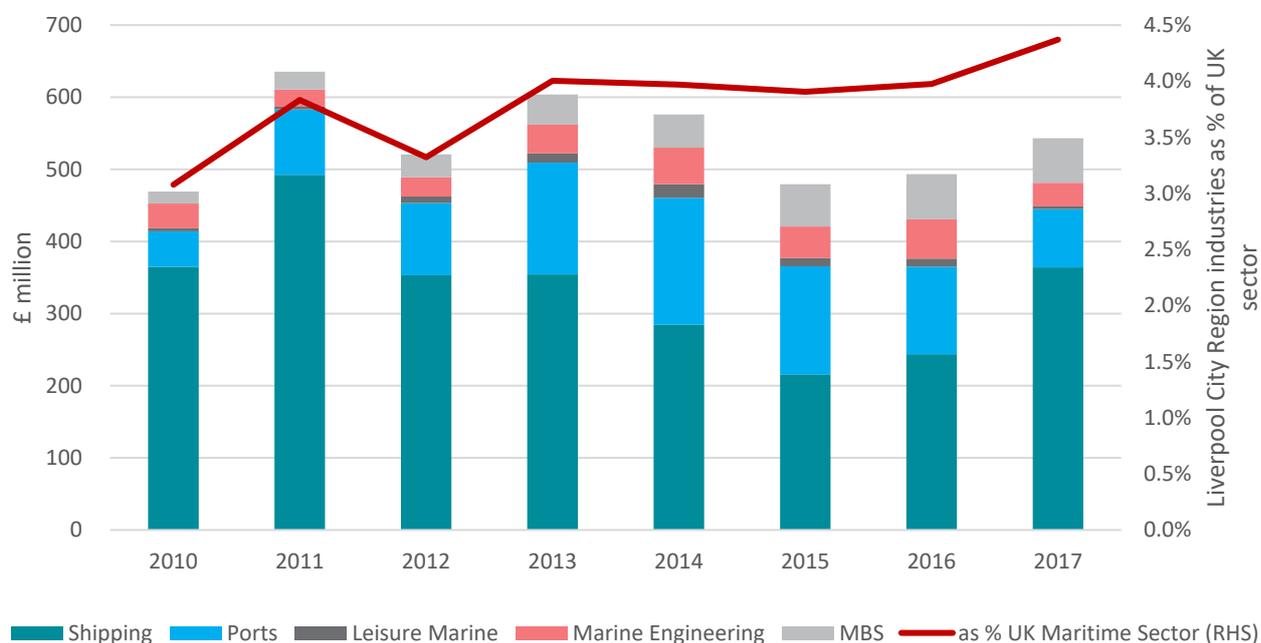
Source: ONS, FAME, Cebr analysis

Across each year, VAT and Corporation tax were the highest contributors to the direct Exchequer impact of the LCR Maritime Sector, contributing £46 million and £51 million, respectively. These together equate to 59% of the total contribution. NICs and Incomes taxes make the next largest contributions to the direct Exchequer impact across each year, while Business rates contribute the least.

3.6 The direct contribution through exports

Figure 9 below shows the direct contribution of the LCR Maritime Sector to exports, both in levels and as a percentage of the UK Maritime Sector export value as a whole, for years 2010 to 2017. The direct impacts are disaggregated by industry contribution.

Figure 9: The direct contribution of the Maritime Sector in the LCR through exports of goods and services, 2010-2017, £ million



Source: ONS, FAME, Cebr analysis

The direct value of exports from the LCR Maritime Sector in 2017 was approximately £540 million: this represented approximately 4.4% of the UK Maritime Sector contribution as a whole. The 2017 impact was marginally greater than that in 2010, however the contribution peaked in 2011 at £630 million. Despite a lower export contribution, Liverpool's exports now account for a greater share of the UK Maritime exports as a whole, indicating a fall in total exports throughout the UK at a rate greater than the LCR has seen.

Disaggregating the direct impact of exports by industry within the LCR Maritime Sector, we can see that the shipping industry consistently made the largest contribution (£360 million in 2017), followed by the ports industry (£80 million in 2017).

4 The wider economic impact of the Maritime Sector in Liverpool City Region

This final section sets out the wider economic impacts of the Maritime Sector in LCR, taking into account the indirect (or supply chain) and induced (employee spending) impacts that arise from the activities of firms operating within the sector.

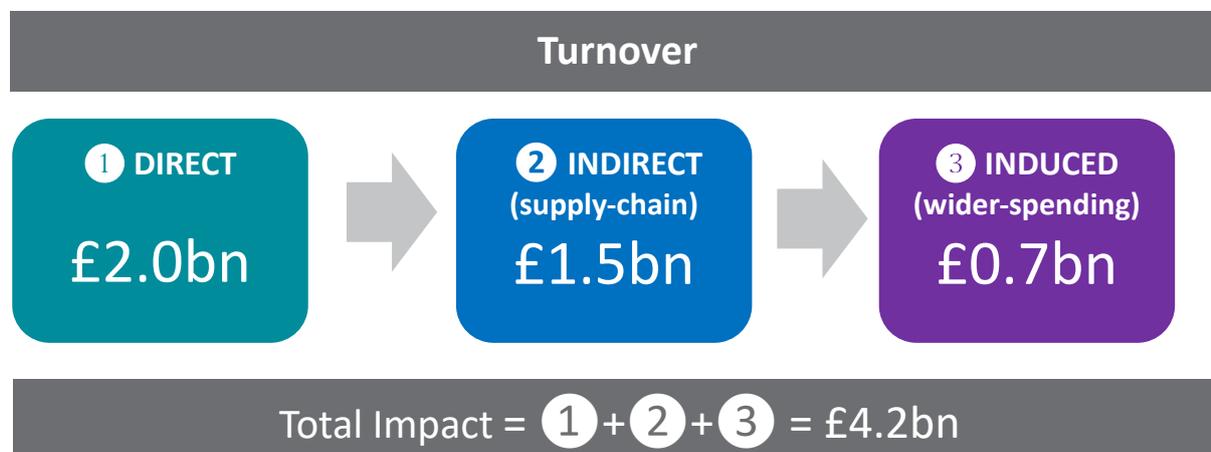
The macroeconomic indicators for which the wider economic impacts have been calculated are as follows: domestic output (through business turnover); GVA; employment; and the compensation of employees. Multipliers have been generated from Cebr's regional economic impact model.

4.1 The wider economic impacts through business turnover

Figure 10 below illustrates the turnover multipliers for the Maritime Sector in LCR. The LCR Maritime Sector directly contributed £2.0 billion in turnover in 2017, where £1.5 billion worth of turnover is stimulated in supply chains and £0.7 billion worth of turnover in the wider economy when direct and indirect employees spend their earnings. Once the direct, indirect and induced economic channels are taken into consideration the LCR directly contributed £4.2 billion to the UK economy.

Alternatively, this can be interpreted as for every £1 of turnover initially contributed by the Maritime Sector in LCR in 2017, LCR and UK economies as a whole experienced a stimulus in domestic output of £2.10.

Figure 10: Turnover multiplier impacts of the Maritime Sector in LCR, 2017



Source: ONS, FAME, Cebr analysis

Table 6 below shows the estimated aggregate turnover impacts from the individual Maritime industries when taken in isolation. The largest direct impact is attributed to the shipping industry at approximately £1.3 billion, equivalent to 64% of the total direct impacts of the Maritime Sector in LCR. The second biggest contribution came from Maritime Businesses Services at £290 million followed by marine engineering at £270 million. Unsurprisingly, the shipping industry represents the biggest aggregate impact at £2.8 billion followed by Maritime Businesses Services at £560 million.

Table 6: Turnover by each Maritime industry in LCR in 2017, £ million

Turnover in 2017	Direct Impact (£m)	Indirect Impact (£m)	Induced Impact (£m)	Total Impact (£m)
TOTAL	1,975	1,498	678	4,151
Shipping	1,257	970	529	2,757
Ports	132	118	65	316
Leisure Marine	25	16	4	45
Marine Engineering	273	162	34	470
Maritime Business Services	287	230	46	563

Source: ONS, FAME, Cebr analysis

Table 7 Table 5 below shows the estimated direct and aggregate domestic output impacts of the Maritime Sector in LCR across the years 2010 to 2017. The total impact on turnover was substantially higher in 2017 compared to 2010. The direct impact of turnover has grown each year from 2010 to 2017, increasing by 22% from 2016 to 2017. Similarly, the highest aggregate turnover impact can be noted in 2017 at £4.1 billion. The composite turnover multiplier has remained relatively stable across the eight years, peaking at 2.13 in 2012.

Table 7: Direct and aggregate domestic output impact of the Maritime Sector in LCR, 2010 to 2017, £ million

Year	Direct Impact (£m)	Composite Turnover multiplier	Aggregate turnover impacts (£m)
2010	904	2.11	1,908
2011	1,157	2.13	2,460
2012	1,083	2.10	2,278
2013	1,354	2.11	2,856
2014	1,418	2.11	2,992
2015	1,493	2.09	3,120
2016	1,618	2.10	3,396
2017	1,975	2.10	4,151

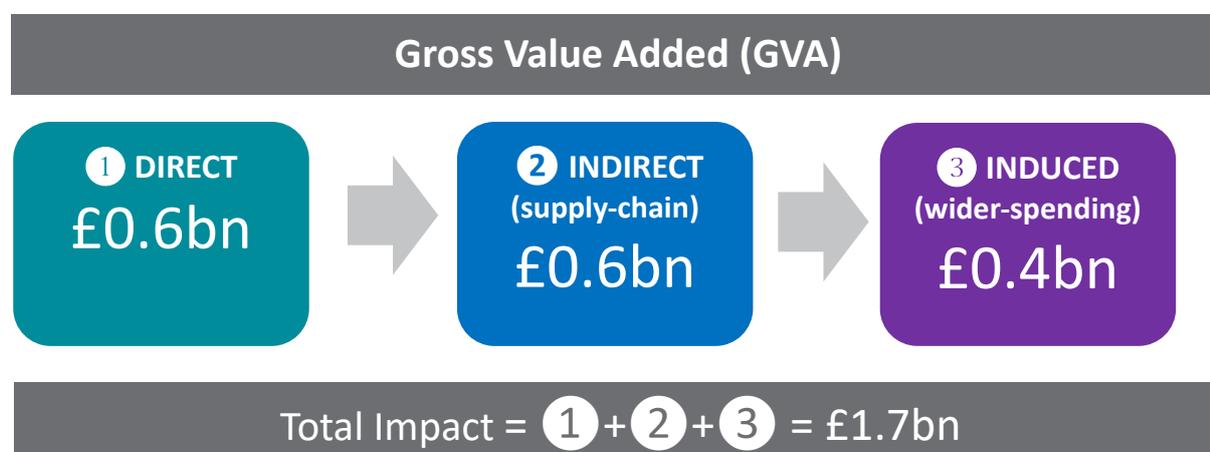
Source: ONS, FAME, Cebr analysis

4.2 The wider economic impacts through GVA

Figure 11 below illustrates the GVA multipliers for the Maritime Sector in LCR. The LCR Maritime Sector directly contributed £0.6 billion to GVA in 2017, where £0.6 billion worth of GVA is stimulated in supply chains and £0.4 billion worth of GVA in the wider economy when direct and indirect employees spend their earnings. Once the direct, indirect and induced economic channels are taken into consideration the LCR Maritime Sector contributed £1.7 billion to the UK economy.

As such, for every £1 of domestic output initially generated by the Maritime Sector in LCR in 2017, the LCR and UK economies as a whole experienced a stimulus in GVA of £2.64.

Figure 11: GVA multiplier impacts of the Maritime Sector in the LCR, 2017



Source: ONS, FAME, Cebr analysis

Table 8 below shows the estimated aggregate GVA impacts from the individual Maritime industries. The shipping industry contributed the majority of the direct impacts at £368 million, equivalent to 57% of total direct GVA impacts from LCR. The second largest direct impact can be attributed to Maritime Businesses Services at £120 million. The largest total impact can be identified within the shipping industry at £990 million followed by Maritime Businesses Services at £319 million.

Table 8: GVA impacts by each Maritime industry in LCR in 2017, £ million

GVA in 2017	Direct Impact (£m)	Indirect Impact (£m)	Induced Impact (£m)	Total Impact (£m)
TOTAL	643	644	413	1,701
Shipping	368	382	240	990
Ports	64	72	47	183
Leisure Marine	9	6	6	21
Marine Engineering	83	53	52	188
Maritime Business Services	120	131	69	319

Source: ONS, FAME, Cebr analysis

Table 9 below shows the estimated direct and aggregate economic impacts of the Maritime Sector in LCR across the years 2010 and 2017. The direct and total impacts have increased year-on-year. The direct impact of GVA in 2017 was £643 million – an increase of 11% from the previous year and an increase of 94% from the 2010 value. The composite GVA multiplier has remained relatively stable across the years averaging at 2.65, with the highest value noted in 2010 at 2.67.

Table 9: Direct and aggregate GVA impact of the Maritime Sector in LCR, 2010 to 2017, £ million

Year	Direct Impact (£m)	Composite GVA multiplier	Aggregate GVA impacts (£m)
2010	332	2.67	884
2011	400	2.66	1,065
2012	422	2.65	1,121
2013	466	2.65	1,234
2014	512	2.64	1,353
2015	504	2.64	1,330
2016	575	2.64	1,518
2017	643	2.64	1,701

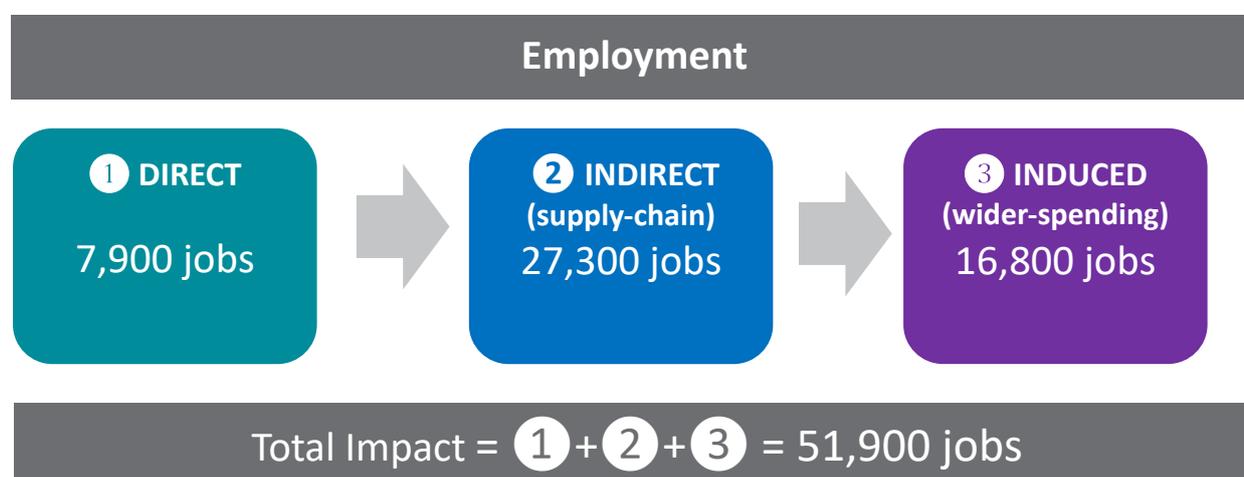
Source: ONS, FAME, Cebr analysis

4.3 The wider economic impacts through employment

Figure 12 below illustrates the employment multipliers for the Maritime Sector in LCR, separated by industry activity. The number of jobs directly supported by the LCR Maritime Sector in 2017 was 7,900 jobs while 44,100 jobs were additionally supported once the indirect and induced impacts of the industry are taken into account. The aggregate employment impact supported by the LCR Maritime Sector was therefore 51,900 jobs in 2017.

For every job initially generated by the Maritime Sector in the LCR in 2017, a total of 6.57 jobs were therefore supported in the wider LCR and UK economies.

Figure 12: Employment multiplier impacts of the Maritime Sector in LCR, 2017



Source: ONS, FAME, Cebr analysis

Table 10 below shows the estimated employment impacts from the LCR Maritime industries taken in isolation. The Shipping industry contributes the largest share with approximately 3,800 jobs, equivalent to 48% of the total direct impact of employment. Moreover, due to the high economic multipliers associated with the Shipping industry, the Shipping industry makes the largest total economic impact through employment in 2017, at 41,800 jobs. This is approximately 81% of the total employment impact.

Table 10: Employment impact by each Maritime industry in the LCR in 2017, jobs

Employment in 2017	Direct Impact	Indirect Impact	Induced Impact	Total Impact
TOTAL	7,899	27,266	16,751	51,916
Shipping	3,828	23,393	14,607	41,828
Ports	872	827	449	2,148
Leisure Marine	489	262	206	958
Marine Engineering	1,690	770	632	3,092
Maritime Business Services	1,020	2,014	857	3,891

Source: ONS, FAME, Cebr analysis

Table 11 shows how the total aggregate employment impact of the Maritime Sector in LCR is estimated to have evolved since 2010. Total employment increased significantly from 2016 to 2017. In 2017, total employment was 51,900 – an increase of 31% compared to the previous year. This increase is driven by a significant increase in the composite employment multiplier, which jumped from 5.59 in 2016 to 6.57 in 2017.

Table 11: Direct and aggregate employment impact of the Maritime Sector in LCR, 2010 to 2017, jobs

Year	Direct Impact	Composite Employment multiplier	Aggregate employment impacts
2010	4,323	6.49	28,069
2011	5,288	6.57	34,757
2012	5,189	5.84	30,295
2013	6,239	5.79	36,113
2014	6,438	5.29	34,076
2015	6,752	5.47	36,932
2016	7,075	5.59	39,584
2017	7,899	6.57	51,916

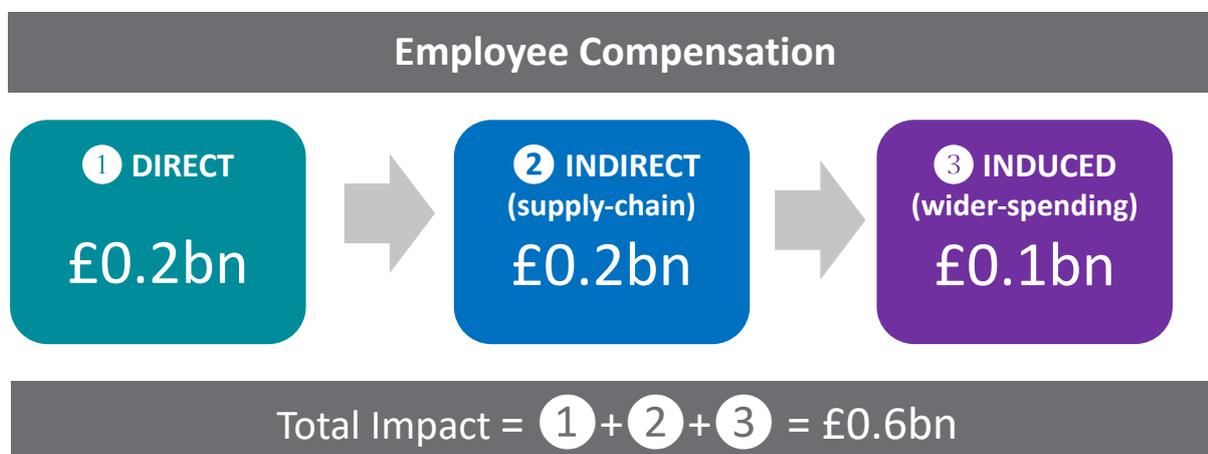
Source: ONS, FAME, Cebr analysis

The wider economic impacts through compensation of employees

Figure 13 illustrates the employee compensation multipliers for the Maritime Sector in LCR. The direct impact of the compensation of employees from the LCR Maritime Sector was £0.2 billion in 2017, whereas £0.2 billion of employee compensation is stimulated in the supply chains and £0.1 billion in the wider economy when direct and indirect employees spend their earnings. The total impact of compensation of employees was £0.6 billion.

Combining each Maritime industry in LCR, for every £1 initially contributed by these industries in 2017, a total of £2.33 in employee compensation was supported in the wider LCR and UK economy.

Figure 13: Employee compensation multiplier impacts of the Maritime Sector in LCR, 2017



Source: ONS, FAME, Cebr analysis

Table 12 below disaggregates the direct, indirect, induced and therefore aggregate impacts on the compensation of employees by Maritime industry in LCR. The shipping industry followed by the marine engineering industry contributed the most to the direct impacts of compensation of employees in 2017, £93 million and £75 million respectively. Unsurprisingly, the shipping industry had the highest total impact at £227 million followed by the marine engineering industry at £143 million.

Table 12: Impact through the compensation of employees by each Maritime industry in LCR in 2017, £ million

Compensation of Employees in 2017	Direct Impact (£m)	Indirect Impact (£m)	Induced Impact (£m)	Total Impact (£m)
TOTAL	244	219	107	570
Shipping	93	93	42	227
Ports	25	21	11	57
Leisure Marine	6	3	2	11
Marine Engineering	75	41	27	143
Maritime Business Services	45	61	25	132

Source: ONS, FAME, Cebr analysis

Table 13 below illustrates the aggregate impact through the compensation of employees in each year since 2010. The direct impact of compensation of employees has increased year-on-year since 2010. In 2017, the direct impact was £244 million which is significantly higher than the £110 million in 2010. The composite employee multipliers have remained relatively stable across each year, such that the differences in total impact can be attributed largely to differences in the size of direct impact. The total impact in 2017 at £570 million was higher than in any other year considered.

Table 13: Direct and aggregate impact through the compensation of employees of the Maritime Sector in LCR, 2010 to 2017, £ million

Year	Direct Impact (£m)	Composite Employee Compensation multiplier	Aggregate employee compensation impacts (£m)
2010	110	2.36	260
2011	129	2.37	306
2012	144	2.33	335
2013	176	2.32	408
2014	203	2.30	468
2015	202	2.32	467
2016	220	2.33	513
2017	244	2.33	570

Source: ONS, FAME, Cebr analysis

5 The Maritime Sector in the Liverpool City Region: A Forward Look

In this final section of the report we present projections of the Maritime Sector in the LCR for the period 2019-2023. The section starts off by describing the conceptual approach developed to produce projections of the direct economic impacts after 2017. We then present forecasts of LCR-based Maritime turnover and GVA over the period 2019-2023.

The LCR-based Maritime Sector Forecast (2019-2023)

Modelling approach

We investigate the relationship between the maritime economy in the LCR and a number of economic variables through an econometric approach. Our findings show that the maritime economy is primarily linked to overall LCR GVA. After having established the LCR-based Maritime economy's elasticities to LCR total GVA, we project these historical relationships forward to produce a forecast of LCR-based Maritime turnover and GVA. The output of this model constitutes our baseline forecast.

Forecast models rely on macroeconomic variables, for example, GDP, which are generally more suitable for long term horizon while the focus of our analysis is in the short-medium term (5 years). For this reason, we build on the baseline forecast, introducing more sector-specific assumptions which are used to flex the relation to the drivers previously identified. This approach also enables us to address deterministic expectations about the sector.

To identify the sector-specific assumptions, we drew on our knowledge of the sector composition and on UK-wide maritime trends and themes. Assumptions are assigned a specific weight reflecting its relevance to the LCR-based Maritime Sector and a set of adjustment factors have been produced.

Applying the adjustments to the baseline forecast, we obtain our central forecast of the LCR-based Maritime Sector turnover and GVA over the period 2019-2023. It is also important to note also that our historical analysis of ends in 2017. In order to link the historic figures to the forecast, we produced a "now-cast" for the first year (2018) for which we know the actual value of the drivers but not of LCR-based Maritime Turnover and GVA and a forecast for the following period.

Modelling Assumptions

LCR GVA

Cebr produces regular forecasts of key economic indicators for the UK national, regional and local economies, which directly inform our analysis. Combining the local authorities forming LCR, we can obtain historical and projected figures for the regional economy.

Cebr expects LCR regional GVA to grow at a Compounded Annual Growth rate (CAGR) of 1.5% over 2018-2023 in nominal terms. This rate is lower than the 3.1% CAGR observed during the past 5 years. A high level of uncertainty characterises the forecast as the outcome of Brexit negotiations could easily shift the projections.

Seaborne trade

LCR plays a major role for UK trade, by facilitating about one third of total Irish trade with the UK. In 2017, about 55% of LCR Maritime Sector direct turnover can be attributable to transportation of

international freight. Seaborne trade represents the main opportunity for the UK Maritime Sector over the near future. We consider both worldwide and UK-specific trade projections within our modelling framework.

Worldwide trends indicate a sustained growth in trade. UNCTAD¹⁰ sees positive prospects for world seaborne trade forecasting a 3.8% compound annual growth rate between 2018 and 2023 with strongest growth in volumes for containerized and dry bulk commodities. Seaborne trade projections are in line with recent trends showing an average growth rate of 3.5% between 2005 and 2017. These figures are broadly in line with forecasts published by other organisations. DNV GL (an internationally accredited registrar and classification society) projected a 39% increase in seaborne trade tonnage over 2016-2030¹¹. According to the OECD, global trade is forecast to grow at a higher rate than the economy and specifically a 1% increase in GDP is expected to correspond to a 1.1% growth in seaborne trade (tonnes)¹².

UK prospects are slightly less optimistic than the aforementioned forecasts, as demonstrated by the 2019 DfT's projections of UK port freight traffic covering the years 2017 through to 2050. DfT reports that overall port traffic is forecast to remain relatively flat over the short term, but then grow over the long term, with tonnage 39% higher in 2050 compared to 2016.

Sea passengers

The Maritime Sector also plays a key role in tourism and leisure with nearly 2 million cruise passengers passing through UK ports and more generally in sea transportation of passengers. In 2017, 20 million international ferry passengers travelled on UK short sea routes, in addition to 44 million domestic sea passengers.

Using UK GDP as main driver, we projected forward the number of sea passengers obtaining a cumulative growth of 1% over 2018-2023. This figure is in line with historical trends of this sector.

The 2019-2023 forecast

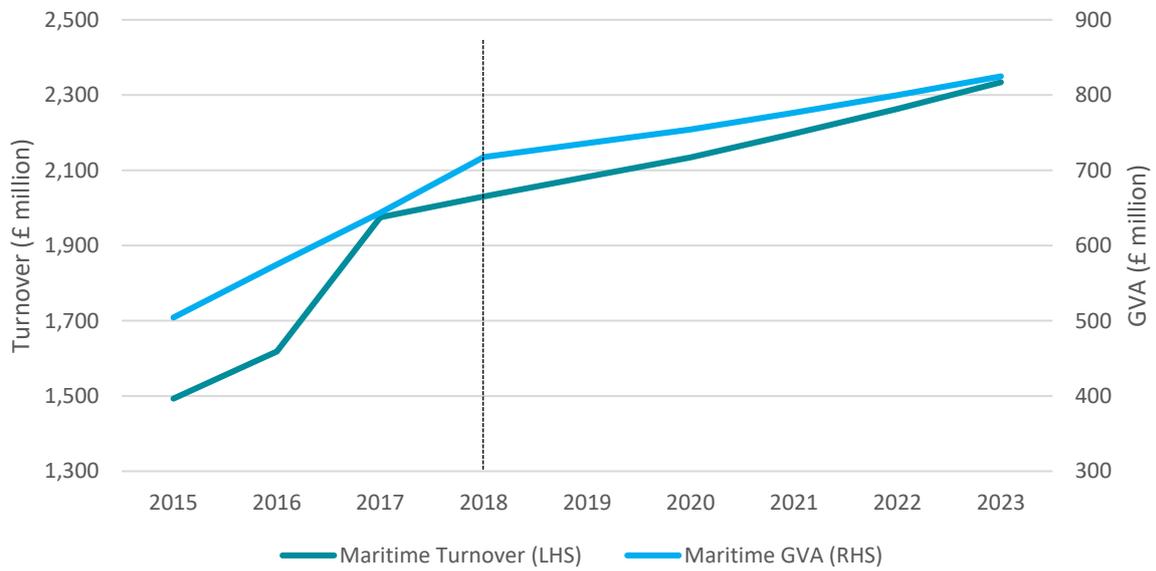
Figure 14 shows the LCR Maritime Sector steadily growing over the period 2018-2023. Our forecast indicates that LCR-based maritime turnover and GVA are set to grow at a Compounded Annual Growth rate (CAGR) of 2.8% over the considered period. This translates into cumulative nominal growth of 15% for 2018-2023. When the forecast is considered alongside projected inflation, cumulative real growth comes to approximately 5%.

¹⁰ United Nations Conference on Trade and Development. (2018). ['Review of Marine Transport 2018'](#).

¹¹ DNV GL (2018). ['Energy Transition Outlook'](#).

¹² OECD. (2018). ['Growth prospects, challenges and uncertainties for selected ocean industries'](#).

Figure 14: LCR-based Maritime Sector turnover and GVA and projections, £ million nominal, 2015 to 2023



Source: FAME, ONS, DfT and Cebr analysis

6 Case Study: Cammell Laird Ship Repairers and Shipbuilders

Cammell Laird, one of the most famous names in the history of British shipbuilding and ship repairing, was founded over 190 years ago in Birkenhead. Its fortunes have mirrored those of the wider economy in which it is located, centred on the River Mersey. Following several decades of decline both the firm itself and the Liverpool City Region have seen a recovery in recent years and are now poised to build on their new found confidence with ambitious growth plans.

Annual turnover was almost £95m in 2018 and has remained above £90m since 2012. The firm supports 1500 core and supply chain workers at peak times and 300 small business suppliers. As of mid-2019, there were around 1200 jobs maintained on site. Following a pause in growth from 2015, the firm is now raising its ambitions. It expects its on-site workforce to expand by 20% during the second half of 2019 and has growth plans that will see the scope and sophistication of its activities expand over the next five years or so.

The company is now at the heart of a modern marine cluster that plays a significant role in the economy of the Liverpool City Region. This provides it with access to a range of support services and also the deep pool of specialist skills that are critical to its success. It is active in planning for future workforce needs, investing £18m in 250 apprentices since 2008. A further success factor is the quality of Cammell Laird's facilities. The company claims to have some of the UK's most comprehensive facilities for heavy fabrication and specialist engineering in its sector. These include a flexible range of four dry-docks, a non-tidal wet basin, one of the largest modular construction halls in Europe and a network of covered workshops. These occupy a 120 acre site next to the River Mersey, offering direct access to the sea. The facilities have been upgraded in recent years, with £93m invested in the company and its infrastructure and equipment since 2008.

The firm's current success is all the more impressive when considered in the context of its recent history. Having driven the Birkenhead economy during the nineteenth and early twentieth century, the firm experienced a sustained period of decline and upheaval after World War II, including nationalisation and subsequent privatisation within the ten years from 1977, and then closure in 1993. The business was revived in 1997 as a ship repair operation and the current owners¹³ acquired it in 2005. Since then it has worked to rebuild its position as a leader in its sector, taking on a wide variety of projects that include specialist offshore conversions and fabrication, commercial ship-repair and the refit and upgrade of highly complex naval and naval auxiliary vessels.

In 2008 Cammell Laird won a 'Through-Life Support' contract for the Royal Fleet Auxiliary (RFA), under which the £44m refit of one of the Ministry of Defence's largest vessels, the RFA Fort Victoria, was recently completed. This included upgrading the ship to a double-hull tanker in a way that complied with the International Convention for the Prevention of Pollution from Ships (MARPOL). The quality and efficiency of the firm's work on the project have been cited by the MOD's procurement organisation, with very good collaborative working relationships with Cammell Laird and its main subcontractors,

¹³ North-western Ship Repairers & Shipbuilders. This company is 50% owned by Peel Holdings, owners of the Mersey Docks and Harbour Company. Peel Holdings purchased the shipyard site and surrounding land in 2007 to facilitate the proposed Wirral Waters development. North-western Ship Repairers & Shipbuilders continue to maintain a long-term lease on the shipyard facilities, which will form an integral part of Peel's regeneration scheme.

ships' staff and other stakeholders noted as key success factors. This refit was the last major package to be carried out under the contract. Cammell Laird has, however, won two new 10-year Through-Life Support contracts to support RFA ships worth £619 million, beginning in March 2019. These will sustain 300 jobs and enable the creation of 100 apprenticeships.

In 2012, Cammell Laird successfully re-entered the ship building market and it now has a growing reputation as a supplier of specialist ferries, military and military support vessels and scientific research ships. A notable recent commission was the state of the art arctic exploration ship, RRS 'Sir David Attenborough', worth £150m, which proved the firm's polar capability and is expected to act as a springboard for new export markets.

The business is also active in the energy sector, acting as a hub in the offshore wind industry. It also offers its facilities and highly trained workforce for work in the civil nuclear sector and the off shore oil and gas sector. An example of a recent energy related contract was the manufacture and installation of 400 tonnes of steelwork for fitting on board the A2SEA Sea Installer for its deployment works on the Burbo 2 wind farm extension¹⁴.

Cammell Laird is currently bidding for two contracts worth a total of £2bn that would set it on a course of sustained expansion to 2025, by when there could be 2000 workers on-site. It is part of a consortium bidding for a further RFA contract for new Fleet Solid Support (FSS) vessels and also part of a joint bid with BAE Systems to manufacture the Royal Navy's Type 31e Frigates, which has involved building up a network of more than 2,000 suppliers.

The Government has expressed a desire to see the British shipbuilding industry aggressively pursue export markets and the company is well placed to act on this. The recommendations made by Sir John Parker in his National Shipbuilding Strategy stand to create greater opportunities for shipyards such as Cammell Laird, particularly in the naval new build sector. The promotion of the Leander design, developed by BAE Systems for the Type 31e frigate competition, in potential export markets reflects this initiative. In addition to those referred to above, there are further prospects for domestic and overseas orders in the coming years, building on markets in which the company has a proven recent track record. These include:

- Further naval construction projects following the successful commissions for flight deck blocks for the Queen Elizabeth Class aircraft carriers and blocks for Astute Submarines;
- New build commissions in the specialist ferry market, which is expected to strengthen as the World's existing fleet ages. Cammell Laird has recently delivered a number of new ferries including a £10m Ro-Pax freight vessel for Isle of Wight ferry operator, Red Funnel;¹⁵
- Continuing routine and non-planned drydockings¹⁶ and repairs for the strong Irish Sea market and new business from overseas markets, taking advantage of a more favourable exchange rate;
- Green projects ranging from LNG Floating Power Stations and wave power generation to rigid foil wind propulsion technology.

¹⁴ This involved the manufacturing of three main structures, two to support 12 giant wind turbine blades and the other to support four turbine towers. A range of deck fittings were also manufactured to enable four nacelle hubs to be transported and installed offshore.

¹⁵ The project used 45 British supply chain businesses and generated 3,000-man hours of work for Cammell Laird's apprentices. The firm further employed 200 direct workers, 200 sub-contractors and 10 apprentices on the contract.

¹⁶ In 2016 more than 150 dry dockings and repairs were undertaken at the yard.

Cammell Laird's reputation, the growing scale and scope of its ambition and the strength of prospects in its sector augur well for its future. As it grows and prospers over the coming years it will support the success not only of the specialist marine cluster that has formed around it but also the wider economy. As a result it will make an increasingly prominent contribution to the innovation and growth that will ensure the Liverpool City Region's success continues.