



The economic contribution of the Maritime Sector in Wales

A report for Maritime UK and the Welsh Ports Group

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

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Executive Summary

- The Centre for Economics and Business Research (Cebr) has been commissioned by Maritime UK to quantify the economic contribution of the Maritime Sector in Wales. This report is complementary with nine other reports that assess the contribution of the Maritime Sector, as a whole, at industry-level, in the Solent Local Enterprise Partnership (LEP), Liverpool City Region and Scotland.
- **In this context, the Maritime Sector has been defined as consisting of the ports, shipping, marine engineering and scientific, leisure marine 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 Wales makes an important macroeconomic contribution to the Welsh and UK economies through business turnover, Gross Value Added (GVA), employment and through the compensation of employees. **It is estimated that the Welsh Maritime Sector directly supported £493 million through business turnover, £256 million in GVA and 4,067 jobs in Wales in 2017.**
- **The shipping industry is the largest constituent industry within the Welsh Maritime Sector in terms of economic activity**, directly contributing £248 million in turnover, £127 million in GVA, and directly supporting approximately 1,379 jobs in 2017.
- **It is estimated that the Maritime Sector in Wales contributed £94 million to the UK Exchequer in 2017, spread across VAT, Corporation Tax, Income Tax, National Insurance Contributions (NICs) and Business Rates.**
- After quantifying the wider economic impacts through the industry supply chains and induced effects on expenditures, **it is estimated that the Maritime Sector in Wales helped to support a total of almost £640 million of GVA in 2017.** This implies that, for every £1 in GVA directly contributed by the Welsh Maritime Sector in 2017, a total of £2.50 in GVA is supported across the wider Welsh and UK economies.
- These wider economic impacts associated with the Welsh Maritime Sector also extend to business turnover, employment and the compensation of employees. **It is estimated that the Maritime Sector in Wales helped to support a total of approximately £1 billion through business turnover, 19,900 jobs and £230 million through the compensation of employees in 2017.**

1 Introduction

This is a report by the Centre for Economics and Business Research (Cebr) on behalf of Maritime UK on the economic impact of the Maritime Sector in Wales. 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 at both 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 Wales. As such, our report is not confined to direct ongoing contributions to GDP and employment through operations and activity in Wales, but also provides assessments of the associated indirect and induced multiplier impacts.

1.1 About Maritime UK

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.

1.2 About the Welsh Ports Group

The Welsh Ports Group includes all the main cargo handing ports in Wales as well as a wide range of smaller ports focussed on marine leisure, recreation and fishing activity. The Group meets regularly with the Welsh Government and considers a wide range of agenda items from transport and economic issues to marine and environmental topics. The current chairman of the Group is ABP’s Port Manager of Cardiff and Barry, Callum Couper, and he helps to drive forward the Group’s agenda and represents the industry at a number of forums and levels.

1.3 Background on the facilitating role of the Maritime Sector in Wales

Some qualitative examples serve to provide background on the importance of the Maritime Sector to Wales, and in turn the UK economy.

- *Ports and Steel.* The ports industry in Wales is of paramount importance to the UK steel sector. Port Talbot is the largest integrated steelworks in the UK, and its continued operations are dependent on the ability to bring in raw materials from Brazil and Australia, and to ship the high-quality output around the world. Without access to efficient ports, the UK steel sector would be unlikely to compete economically against continental and global steel companies.
- *Marine renewable energy production.* There is significant potential for marine renewable energy production in Wales. For example, there is evidence of substantial economic benefits that would arise from a concentration of tidal lagoon power in Wales¹ (with projects at Colwyn Bay; Newport; Cardiff and Swansea Bay).
- *Maritime and Tourism.* The Welsh coastline naturally lends itself to a range of tourism activities within the Maritime Sector; for example in the form of sailing.

¹ See, for example, http://www.tidallagoonpower.com/wp-content/uploads/2016/08/The-Economic-Case-for-a-Tidal-Lagoon-Industry-in-the-UK_final.pdf

1.4 Purpose of this report

This report provides an in-depth assessment of the economic contribution that the Maritime Sector, including ports, makes to the Welsh 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 Wales. Wales is an important region for the UK Maritime Sector, hosting a number of both major and minor ports.

This study seeks to equip Maritime UK with statistics and figures on the value of the Maritime Sector to the Welsh 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).

1.5 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 Wales. 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 Wales. 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 Wales. 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 Wales. The key macroeconomic indicators include:

- The value of the turnover of the Welsh Maritime Sector, and the turnover supported in the UK economy through multiplier impacts.
- GVA² contributions to Welsh and UK GDP generated by the Maritime Sector in Wales, directly and through indirect and induced multiplier impacts.
- Jobs supported by the Welsh Maritime Sector, including direct, indirect and induced jobs through regional multiplier impacts.
- The value of employee compensation³ generated by the Welsh Maritime Sector, representing the total remuneration of employees.
- The Exchequer contribution of the Welsh Maritime Sector through tax revenues raised.

² 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.

³ 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.

- The direct contribution made by the Maritime Sector through Welsh exports of goods and services.

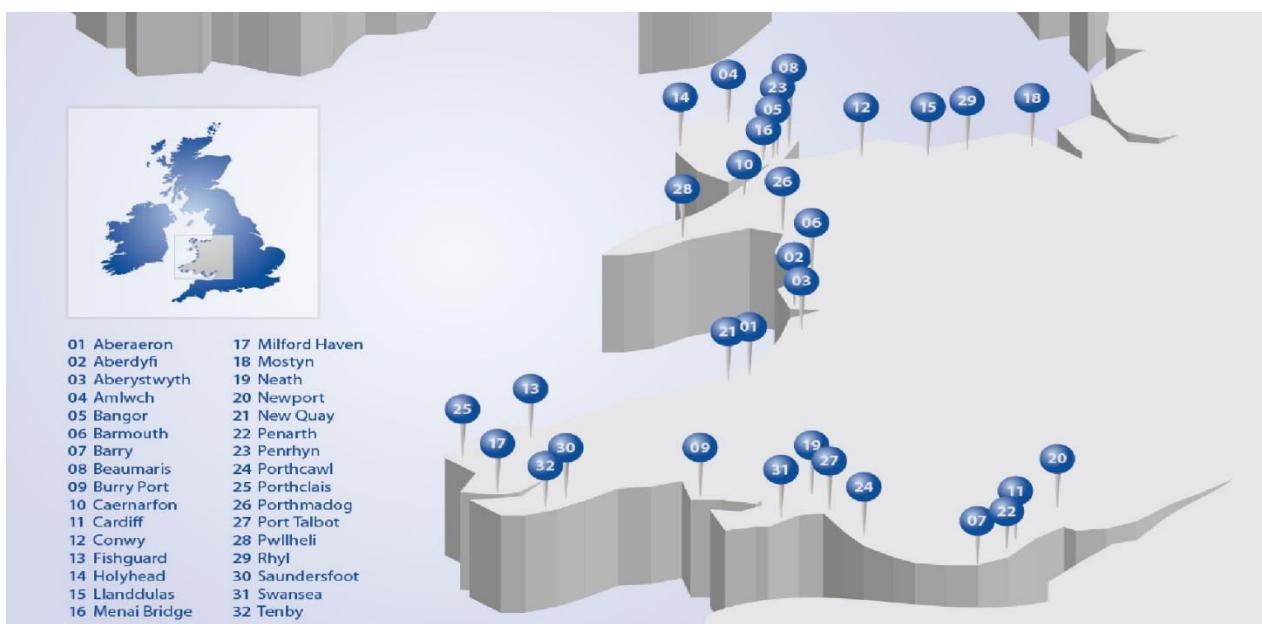
Mapping the UK Maritime Sector in the UK and Wales

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.⁴ 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 therefore, 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.

Figure 1 graphically illustrates key locations of Maritime activity in Wales.

Figure 1: Ports in Wales



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 Welsh-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

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.

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 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 Wales, 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 Welsh 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 Welsh 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 – 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 Wales.
- *Indirect impact*: this is the value and jobs supported in industries that supply inputs to Wales's Maritime Sector.
- *Induced impact*: this is the value and jobs supported in the wider economy when the direct and indirect employees of the Maritime Sector in Wales 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 Wales. 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 Wales.

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 Wales, in order to then generate indirect, induced and subsequently wider impacts.

2 The Maritime Sector in Wales

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

Table 1: Mapping of Maritime Sector activities: ports industries

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 2: Mapping of Maritime Sector activities: shipping industries

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

For the majority of ports and shipping 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 at Wales-level. In the case of activities for the Ports industry, only activity taking place in council wards in Wales which contain a major or minor UK port has been captured, on the assumption that warehousing and storage and other activities taking place in these locations relate to the associated port.

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 Maritime Sector activities: marine engineering and scientific industries

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

Table 4: Mapping of Maritime Sector activities: leisure marine industry

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

Source: Maritime UK, Cebr analysis

The marine engineering and scientific industry encompasses activities, such as renewable energy generation and marine scientific activities. The leisure marine industry is defined narrowly as encompassing activities ranging from leisure boat manufacturing to leisure marine services.⁵

⁵ 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

A key source of information used by Cebr to capture leisure marine 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.

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.

2.3 Quantifying the direct economic impacts of the industry in Wales

In this final subsection we set out the approach taken to disaggregate the direct economic impacts at regional level for each Maritime industry. For the majority of Maritime Sector activities, the approach taken to disaggregate the direct economic impacts of sector has involved combining the direct economic impacts at UK-level with publicly-available statistics which can be disaggregated at regional level. However, this approach is not always possible, as a result of the difficulties in mapping some activities against the national accounts framework. In these instances, industry-level information has been used to estimate the Welsh proportion of economic activity.

Ports

The first step in disaggregating the economic activity of the ports industry has been to identify the proportion of employment within council wards which contain a major or minor UK port. It is assumed that employment in ports-related activities (as set out in Table 1) within a council ward containing a UK port directly relates to the port. The major source of employment in council wards used was BRES.

A full list of the Welsh ports considered as part of this report is provided in the Annex.⁶ Table 5 below shows the proportion of employment in the UK ports industry which applies to Wales, as estimated using the approach described above.

industries would therefore produce a degree of double counting. Nonetheless, the broad Maritime report has had this double counting stripped out.

⁶ Ports employment in Northern Ireland has been estimated using a combination of BRES and the Annual Business Survey, the latter providing the proportion of employment in Northern Ireland across the broader industrial sector categories.

Table 5: The breakdown of UK employment in ports as implied by BRES and ABS, 2010 to 2017

Ports Employment	2010	2011	2012	2013	2014	2015	2016	2017
England	83.8%	82.2%	84.6%	83.1%	83.9%	85.8%	85.6%	85.4%
Scotland	9.1%	9.6%	9.2%	10.9%	8.9%	8.4%	9.6%	10.1%
Wales	5.5%	6.5%	4.7%	4.5%	5.7%	4.5%	3.2%	3.0%
Northern Ireland	1.6%	1.6%	1.5%	1.5%	1.5%	1.4%	1.7%	1.4%
East of England	16.6%	15.2%	16.7%	14.7%	15.0%	13.5%	14.9%	16.0%
East Midlands	0.5%	1.2%	1.1%	1.3%	0.5%	1.1%	1.0%	1.4%
London	5.2%	6.7%	9.4%	5.8%	7.3%	6.6%	5.8%	4.7%
North East	10.8%	10.2%	11.9%	17.0%	17.4%	12.5%	10.7%	7.1%
North West	5.2%	5.5%	6.9%	8.4%	6.7%	7.4%	9.0%	5.2%
South East	15.0%	14.4%	15.6%	12.7%	17.4%	20.8%	20.5%	25.7%
South West	4.9%	4.2%	6.3%	7.4%	6.0%	6.6%	4.8%	4.2%
West Midlands	0.9%	0.5%	1.1%	1.2%	1.6%	2.0%	2.2%	1.0%
Yorkshire and the Humber	24.7%	24.3%	15.7%	14.6%	12.2%	15.2%	16.5%	20.1%

Source: ONS, Cebr analysis

The Welsh proportion has then been applied to the UK-level estimates for ports employment, with the other key macroeconomic indicators (GVA, Business Turnover and Compensation of Employees) estimated using the implied ratios to employment at UK-level.

The total tonnage at major and minor Welsh Ports in 2017 was just over 51.6 million tonnes. Of this, total inward traffic was 34.6 million tonnes, whilst total outward traffic was 17.0 million tonnes.⁷

Shipping

In order to disaggregate the economic activity of the shipping industry, it is firstly necessary to identify the proportion of employment in the shipping industry across each UK region.

The major source of employment was the Business Register and Employment Survey (BRES)⁸, as accessed through NOMIS. Employment data associated with each Standard Industrial Classification code for the shipping industry were gathered and an implied regional breakdown estimated after interpolating for some missing information.⁹

⁷ See DfT (2018) 'Port freight statistics: 2017 final figures' port0101.

⁸ The Business Register and Employment Survey (BRES), produced by the ONS on an annual basis, is the official source of employee and employment estimates by detailed geography and industry within Great Britain.

⁹ Shipping employment in Northern Ireland has been estimated using a combination of BRES and the Annual Business Survey, the latter providing the proportion of employment in Northern Ireland across the broader industrial sector categories.

Table 6: The breakdown of UK employment in shipping as implied by BRES and ABS, 2010 to 2017

Shipping Employment	2010	2011	2012	2013	2014	2015	2016	2017
England	79.8%	76.4%	77.7%	78.2%	78.9%	80.3%	78.3%	81.5%
Scotland	11.6%	13.1%	13.9%	13.0%	14.8%	12.4%	13.9%	13.9%
Wales	6.0%	7.0%	5.2%	6.0%	4.0%	5.1%	5.5%	2.3%
Northern Ireland	2.6%	3.6%	3.3%	2.8%	2.3%	2.2%	2.3%	2.3%
East of England	7.1%	8.1%	5.4%	6.7%	7.2%	4.8%	9.4%	6.1%
East Midlands	1.7%	0.4%	0.3%	1.2%	5.6%	0.5%	0.0%	0.1%
London	24.0%	26.7%	23.1%	21.5%	25.6%	35.2%	21.8%	22.4%
North East	1.0%	1.1%	0.8%	0.7%	1.2%	1.7%	0.4%	0.2%
North West	7.8%	8.2%	6.6%	8.1%	8.3%	7.7%	9.3%	9.0%
South East	25.1%	23.7%	26.2%	28.6%	24.4%	20.4%	28.4%	33.1%
South West	5.8%	4.2%	9.1%	7.2%	3.6%	6.0%	5.5%	8.3%
West Midlands	3.3%	0.8%	0.4%	0.9%	2.2%	0.8%	1.5%	0.9%
Yorkshire and the Humber	4.2%	3.2%	5.8%	3.2%	0.7%	3.3%	2.0%	1.3%

Source: ONS, Cebr analysis

Leisure marine and marine engineering and scientific industries

A key source informing the regional disaggregation of the economic activity of the leisure marine and marine engineering and scientific industries is the British Marine Key Performance Indicators, providing the share of leisure marine industry revenue, employment, exports and business numbers across each UK region between 2010 and 2017. GVA for the leisure marine industry in each region has then been estimated using GVA-to-employment ratios.

Following the approach taken for the shipping and ports industries (see above), a combination of data sourced from BRES and the Annual Business Survey have been used to estimate the proportion of employment in Shipbuilding and Marine Offshore Oil and Gas support activities across each UK region. These are set out in Table 7 and Table 8 respectively below.

Table 7: The breakdown of UK employment in Shipbuilding activities as implied by BRES and ABS, 2010 to 2017

Shipbuilding Employment	2010	2011	2012	2013	2014	2015	2016	2017
England	68.9%	68.8%	67.6%	67.5%	65.1%	69.9%	68.0%	68.1%
Scotland	26.5%	26.0%	28.0%	27.5%	30.6%	25.3%	26.5%	27.3%
Wales	1.5%	1.7%	1.2%	1.4%	0.7%	1.3%	1.8%	1.0%
Northern Ireland	3.1%	3.5%	3.3%	3.6%	3.7%	3.5%	3.7%	3.6%
East of England	3.1%	1.3%	1.0%	2.1%	1.3%	1.9%	2.2%	1.6%
East Midlands	0.4%	0.7%	0.9%	0.7%	0.9%	0.2%	0.3%	0.6%
London	0.1%	0.1%	0.8%	0.0%	0.3%	0.2%	0.4%	0.0%
North East	4.4%	3.0%	2.3%	1.4%	1.0%	0.8%	0.8%	0.6%
North West	26.5%	26.0%	28.0%	27.5%	30.6%	37.9%	35.3%	36.4%
South East	11.0%	8.7%	10.5%	8.0%	3.9%	2.9%	2.0%	1.1%
South West	22.0%	26.0%	23.3%	27.5%	26.2%	25.3%	26.5%	27.3%
West Midlands	0.7%	0.4%	0.5%	0.2%	0.2%	0.2%	0.2%	0.1%
Yorkshire and the Humber	0.7%	2.6%	0.2%	0.2%	0.7%	0.4%	0.2%	0.5%

Source: ONS, Cebr analysis

Table 8: The breakdown of UK employment in Marine Offshore Oil and Gas activities as implied by BRES and ABS, 2010 to 2017

Oil & Gas Employment	2010	2011	2012	2013	2014	2015	2016	2017
England	8.1%	12.0%	16.2%	13.7%	11.1%	7.4%	10.0%	5.4%
Scotland	91.4%	87.5%	83.4%	85.8%	88.5%	91.9%	89.2%	94.3%
Wales	0.5%	0.5%	0.4%	0.5%	0.4%	0.7%	0.8%	0.3%
Northern Ireland	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
East of England	1.9%	2.2%	2.6%	2.1%	1.6%	2.0%	1.8%	1.2%
East Midlands	1.4%	1.5%	1.8%	1.2%	1.0%	1.5%	0.8%	0.8%
London	1.0%	1.5%	2.6%	1.4%	0.7%	1.0%	1.8%	1.6%
North East	1.4%	1.7%	0.7%	0.2%	0.2%	0.1%	0.1%	0.1%
North West	0.5%	0.2%	0.1%	0.0%	0.3%	0.2%	0.2%	0.3%
South East	0.4%	2.4%	5.5%	6.0%	3.6%	0.5%	0.5%	0.7%
South West	0.5%	1.0%	1.8%	0.8%	0.8%	0.7%	0.5%	0.0%
West Midlands	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%
Yorkshire and the Humber	1.0%	1.5%	1.1%	1.9%	2.8%	1.3%	4.2%	0.8%

Source: ONS, Cebr analysis

For the Marine renewable energy activities, the proportion of employment in Wales has been based on the BIS report released in 2015, "The Size and Performance of the UK Low Carbon Economy".¹⁰

¹⁰ BIS, 2015. "The size and performance of the UK Carbon Economy, Report for 2010 to 2013."

Maritime Business Services Industry

When conducting our bottom-up analysis of the MBS Sector, we found that between 75% and 85% of MBS activities were located in the London region. Therefore, we have distributed regional activity for each indicator based on these findings, for example, London was found to account for 84% of MBS GVA and thus the remaining 26% was allocated based on the economic activity of the ports industry in each region.¹¹ For further information on the regional disaggregation of Ports industry activities, please refer to Cebr's separate report on the economic activity of the UK ports industry.

Other adjustments for regional economic activity

Other adjustments have been made to the regional disaggregation of the key macroeconomic indicators which represent the direct economic impacts of the Maritime Sector in Wales, in order to reflect differences in wider economic performance between Wales and the other UK regions. These are as follows:

- To account for regional differences in productivity (GVA per employee), GVA in Wales has been adjusted using the ONS GVA per employee by region statistics.¹² For example, the average employee in Wales in 2017 was 22% less productive than the average UK employee.
- To account for regional differences in wages and salaries, estimated wages and salaries paid to employees in the Maritime Business Services industry have been adjusted using differentials taken from ASHE.¹³
- To account for regional variation in the ratio of compensation of employees to GVA in different sectors, the compensation of employees for the industry have been adjusted using regional differentials implied by the closest industry, as sourced from the Annual Business Survey.

The next sections in this report set out the direct and wider economic impacts of the Maritime Sector in Wales, broken down by Maritime industry.

¹¹ The allocation of MBS activity based on port activity comes from the assumption that maritime related services primarily operate within or close to ports. Data on this type of activity is not generally available to produce a rigorous disaggregation and thus we rely on this assumption which may over and understate certain regions, but should reflect major maritime hubs.

¹² ONS, 2017. Subregional Productivity: Labour Productivity (GVA per hour worked and GVA per filled job) indices by UK NUTS2, NUTS3 subregions and City regions.

¹³ Ibid.

3 The direct economic impact of the Maritime Sector in Wales

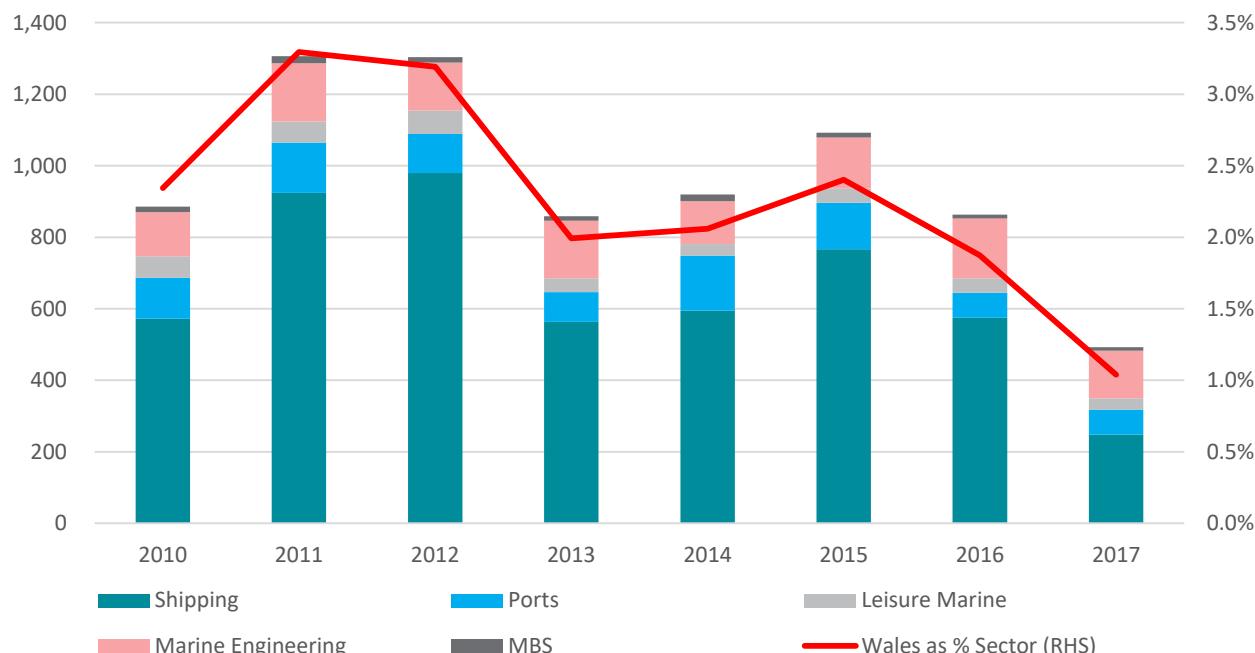
In this section we set out estimates for the direct contribution of the Maritime Sector in Wales across the following key macroeconomic indicators: business turnover, GVA, employment, the compensation of employees, the Exchequer contribution through tax revenues raised, and exports of goods and services.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

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

3.1 The direct impact through turnover

This subsection considers the total amount of turnover directly supported by the Maritime Sector in Wales through turnover generated by businesses. Figure 2 below shows the breakdown of business turnover generated by the Maritime Sector and its constituent industries in Wales between 2010 and 2017; and this turnover as a percentage of the UK Maritime Sector as a whole.

Figure 2. The estimated turnover of the Maritime Sector in Wales, and the share of the Maritime Sector's total turnover, 2010 to 2017



Source: FAME, ONS, Cebr analysis

In 2017 the direct turnover contribution of the Maritime Sector in Wales was £493 million. This constituted 1.0% of the overall UK Maritime Sector turnover contribution. This is a significant reduction on the peak turnover contributions made by the Maritime Sector in Wales (approximately £1.3 billion in 2011 and 2012). The most significant decline occurred between 2016 and 2017, where the turnover

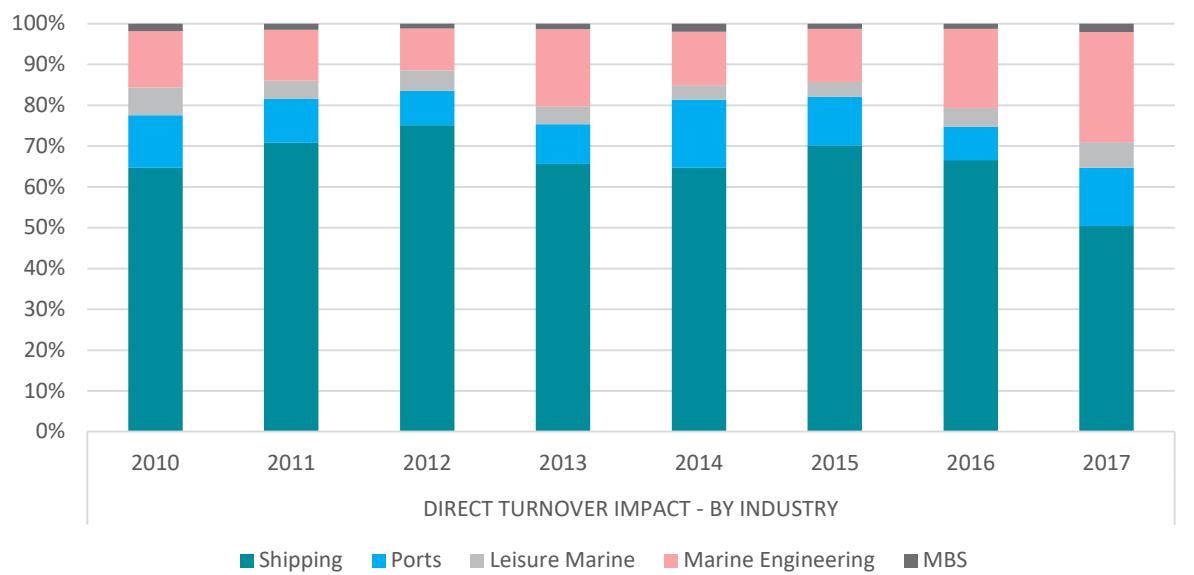
contributions made by the Welsh Maritime Sector declined by 43%. Shipping contributed to the biggest decline in 2017, with turnover declining by more than 56% from 2016 to 2017. Within shipping, the biggest decline can be identified within international freight transport which decreased 80% from 2016 to 2017. International passenger transport (cruise and ferry) contributed the most to turnover within the shipping industry at £196 million, however, this is still a decline of 48% from the previous year. One reason for the decline in the shipping industry could be due to shipping companies changing their flag registry and registered offices away from Wales.

While the figure above show a significant decline in turnover for 2017 compared to previous years it is worthwhile to take into consideration the volatility of regional BRES data, as such it's important to study the overall trend rather than solely considering the levels for each year. From 2015 and onwards, there has been an overall negative trend in the turnover of the Welsh Maritime Sector. Additionally, the turnover for the Welsh Maritime Sector was exceptionally high in 2011 and 2012, creating a steeper decline in turnover.

Figure 3 illustrates for each year how each industry within the Welsh Maritime Sector contributed to the direct turnover impact. In 2017 shipping accounted for approximately 50% of the contribution; followed by the marine engineering and scientific industry at 27%. The ports industry contributed approximately 14% of the total turnover contributions in 2017. This proportion has risen since 2016 (where ports contributed around 8% of total turnover) offset by a significant decline in the shipping industry. The leisure marine and maritime business services industries contributed the least to total turnover in Wales, approximately 6% and 2% respectively.

This *ordering* of contributions is largely consistent across each of the years considered (though the numbers of course change).

Figure 3: Contributions to turnover made by each constituent maritime industry, 2010 to 2017



Source: FAME, ONS, Cebr analysis

To place the Welsh Maritime Sector's direct contribution through turnover in context, Figure 4 below compares the direct turnover of the Maritime Sector in 2017 with other Welsh industries. It also compares the growth rates of these industries over the period 2010-17. Turnover data for the other industries has been sourced from the Annual Business Survey (ABS).

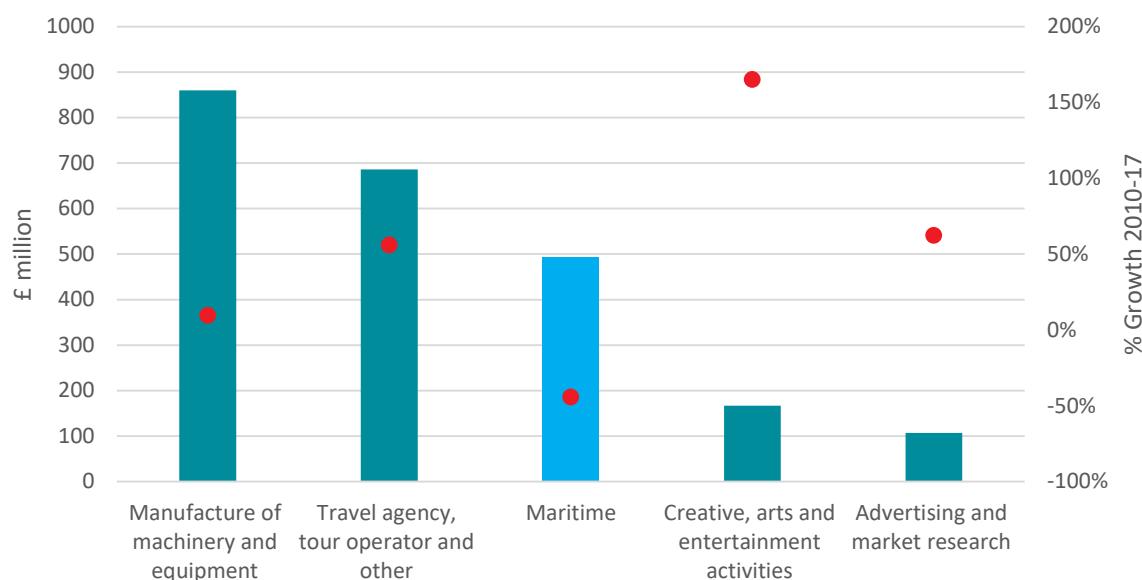


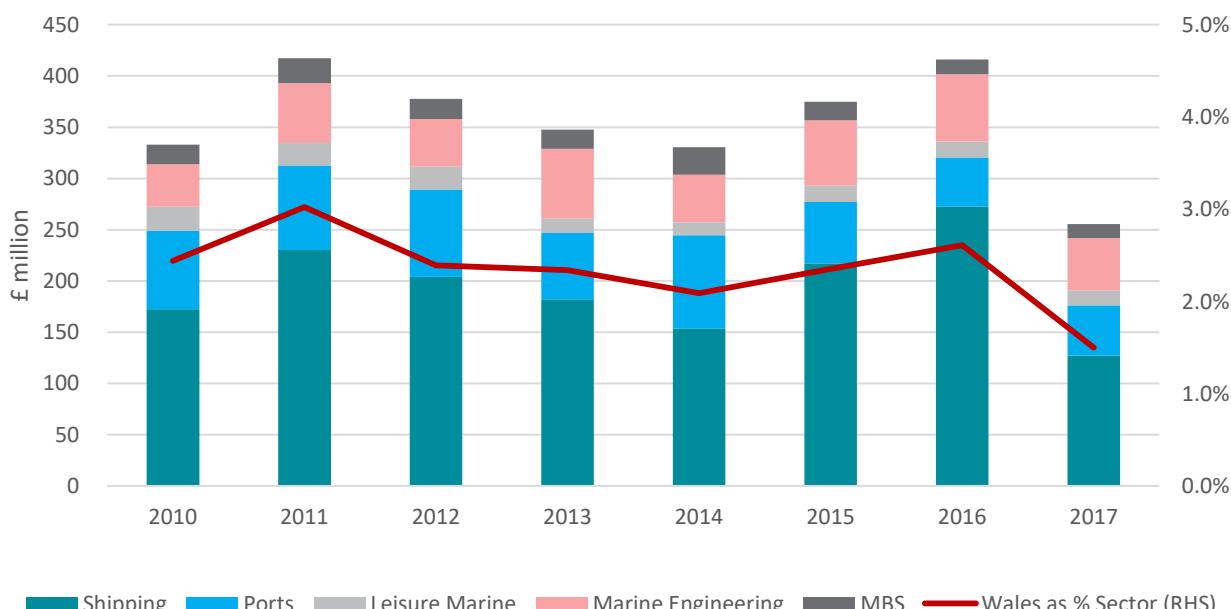
Figure 4: The direct contribution through turnover of the Maritime Sector in Wales against comparable Welsh sectors in 2017

Source: ONS, FAME, Cebr analysis

3.2 The direct impact through GVA

Following turnover, this subsection illustrates the contributions in terms of the GVA from the Maritime Sector in Wales to Welsh and UK GDP. Figure 5 below shows the direct GVA contribution of the Maritime Sector in Wales, 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 5. The direct contribution of the Maritime Sector in Wales through GVA, and the Wales's share of the Maritime Sector's total direct contribution through GVA, 2010 to 2017



Source: ONS, FAME, Cebr analysis

In 2017 the direct GVA contribution of the Maritime Sector in Wales was £256 million: this represented 1.5% of the UK Maritime Sector contribution as a whole. Similarly to the case of turnover, the most significant decline occurred between 2016 and 2017, where GVA contributions of the Welsh Maritime Sector declined by approximately 40%.

Comparing UK and Wales GVA across all industries can help to add some context to this decline. Figure 6 below illustrates their respective growth trajectories.

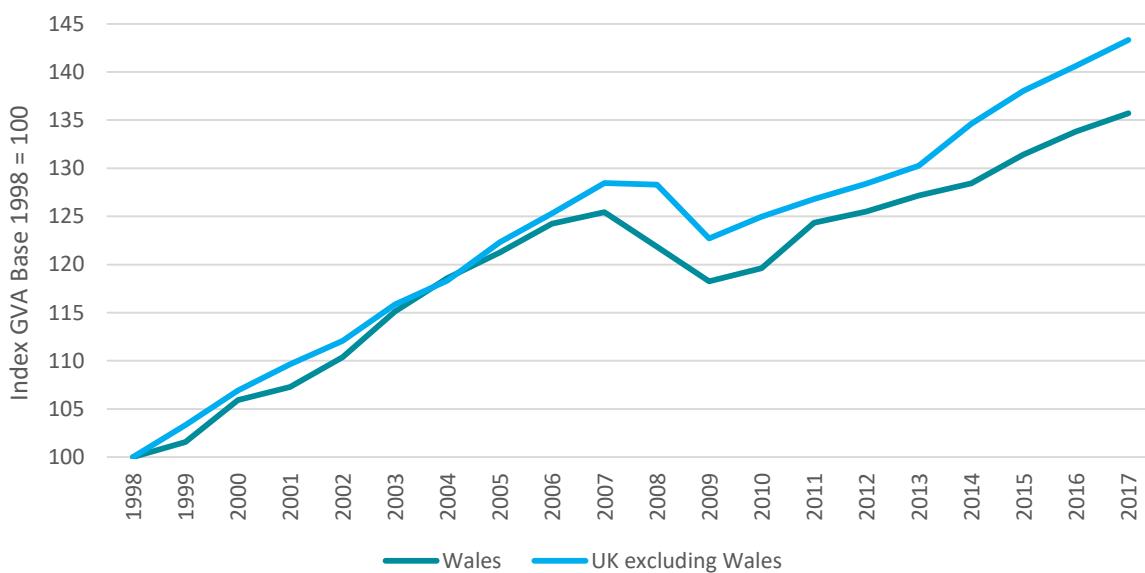


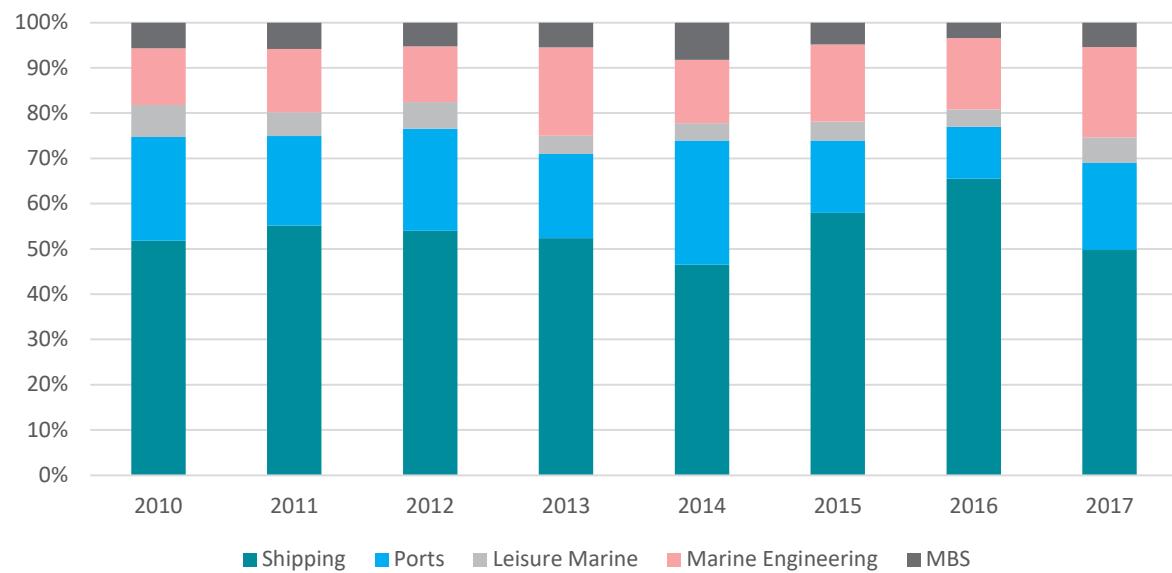
Figure 6: GVA in Wales and UK (excl. Wales), 1998 to 2017

Source: ONS, Cebr analysis

Generally, the growth of Welsh GVA has lagged behind that of the rest of the UK since 1998. The gap has become more pronounced in later years. In the period 1998-2017, the Welsh economy grew by 36%, in comparison to 43% for the rest of the UK. Given this slower growth in Wales, it is perhaps unsurprising that the Welsh Maritime Sector has performed worse compared to the UK Maritime Sector more broadly. However, the decline in the contributions made by the Welsh Maritime Sector is still somewhat surprising given the relatively stable growth exhibited by the Welsh economy since 2010.

Figure 7 below illustrates how much each industry within the Welsh Maritime Sector contributed year-on-year to the direct GVA impact.

Figure 7: Contributions to GVA made by each constituent Maritime industry, 2010 to 2017

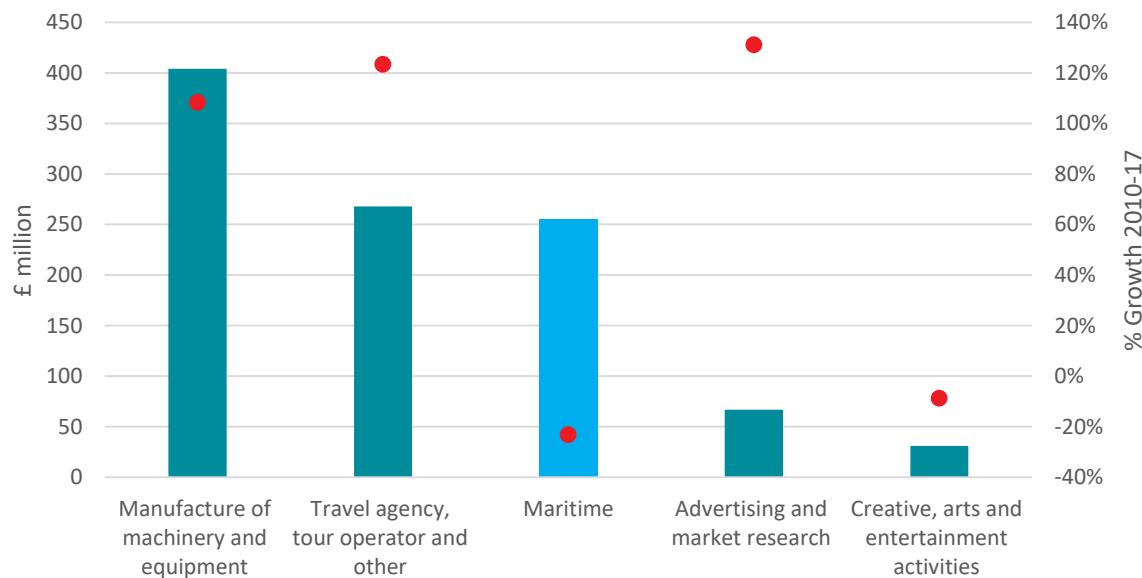


Source: ONS, FAME, Cebr analysis

The distribution of contributions is unsurprisingly similar to the distribution for turnover discussed previously. In 2017 the shipping industry accounted for just under 50% of the total GVA impact of the Welsh Maritime Sector.

To put the Welsh Maritime Sector's direct contribution through GVA in context, Figure 8 below compares the direct GVA impact of the Maritime Sector in 2017 with that of other industries. GVA data for the comparable industries has been sourced from the Annual Business Survey (ABS).

Figure 8: The estimated GVA of the Maritime Sector in Wales against comparable Welsh industries in 2017

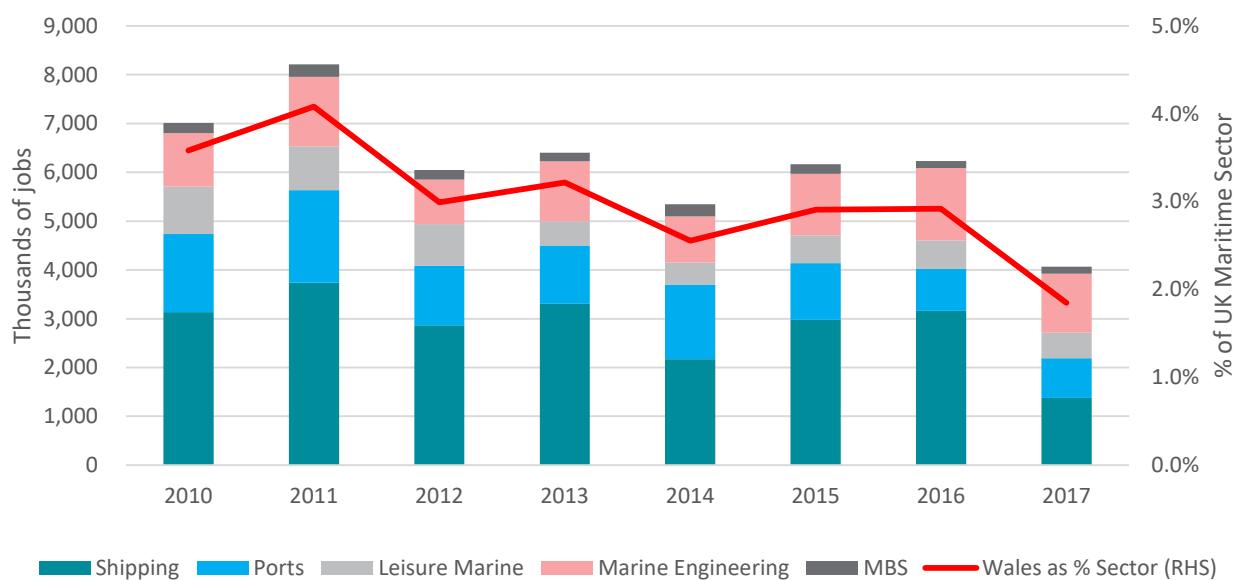


Source: ONS, FAME, Cebr analysis

3.3 The direct impact through employment

This subsection outlines the direct employment impact from the Maritime Sector in Wales. Figure 9 below shows the direct employment impact of the Maritime Sector in Wales, 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 9. The direct contribution of the Maritime Sector in Wales through employment, and Wales's share of the Maritime Sector's total direct contribution through employment, 2010 to 2017



Source: ONS, FAME, Cebr analysis

In 2017 the direct employment contribution of the Maritime Sector in Wales was 4,067 jobs: this represented 1.8% of the UK Maritime Sector contribution as a whole. Once again, this decline was mainly driven by a decline in shipping industry employment.

Figure 10 below illustrates the proportion of employment in the Welsh Maritime Sector that is attributed to each industry. Interestingly, while the shipping industry contributed almost 50% of the Welsh Maritime Sector's GVA, it contributed just 34% of its employment. In comparison, marine engineering contributed 30% of the direct employment compared to only contributing 20% to direct GVA in 2017.

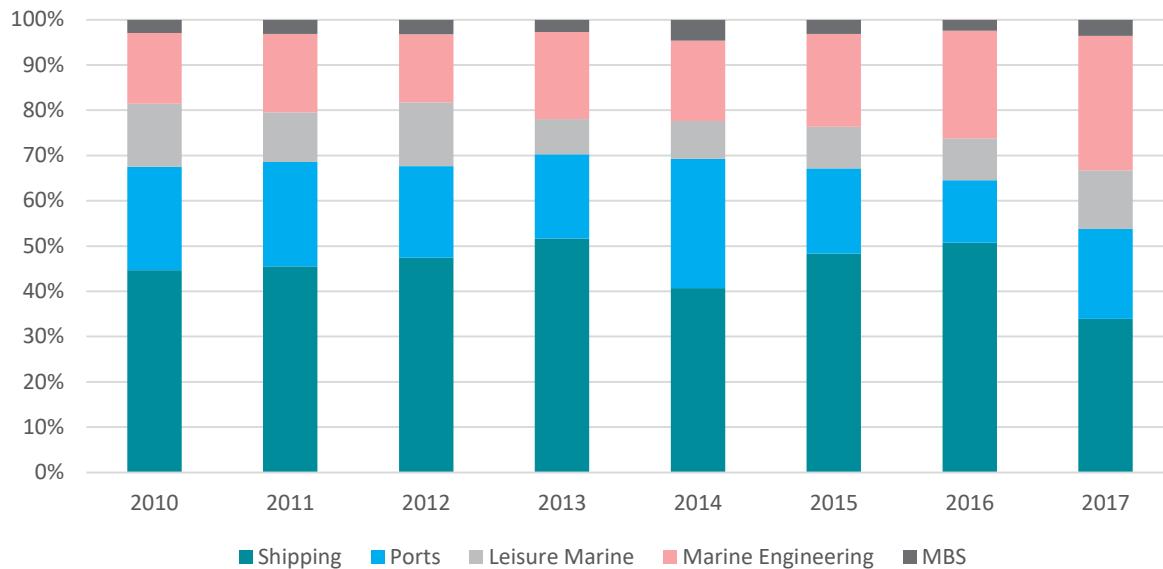


Figure 10: Contributions to employment made by each constituent Maritime industry, 2010 to 2017

Source: ONS, FAME, Cebr analysis

Through combining the direct economic impacts of the Welsh Maritime Sector through GVA and employment, we can determine the levels of productivity across each industry within the Welsh Maritime Sector. Table 9 below shows the levels of productivity across each industry within the Welsh Maritime Sector, as well as productivity across Wales as a whole, for the years 2010 to 2017.

Table 9: Productivity (GVA per employee) in the Welsh Maritime Sector and constituent industries, 2010 to 2017

GVA per employee	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
Wales Maritime Sector	£47,510	£50,812	£62,496	£54,334	£61,878	£60,834	£66,735	£62,818
Shipping	£55,036	£61,538	£71,137	£55,082	£70,715	£72,957	£86,236	£92,259
Ports	£47,790	£43,706	£69,795	£54,325	£59,438	£51,528	£55,412	£60,595
Leisure Marine	£24,166	£24,216	£26,203	£27,945	£28,127	£27,899	£27,237	£27,592
Marine Engineering	£38,035	£40,906	£50,994	£55,294	£48,980	£50,554	£44,283	£42,198
Maritime Business Services	£91,629	£95,433	£102,961	£108,660	£110,264	£93,301	£94,595	£95,125

Source: ONS, Cebr analysis

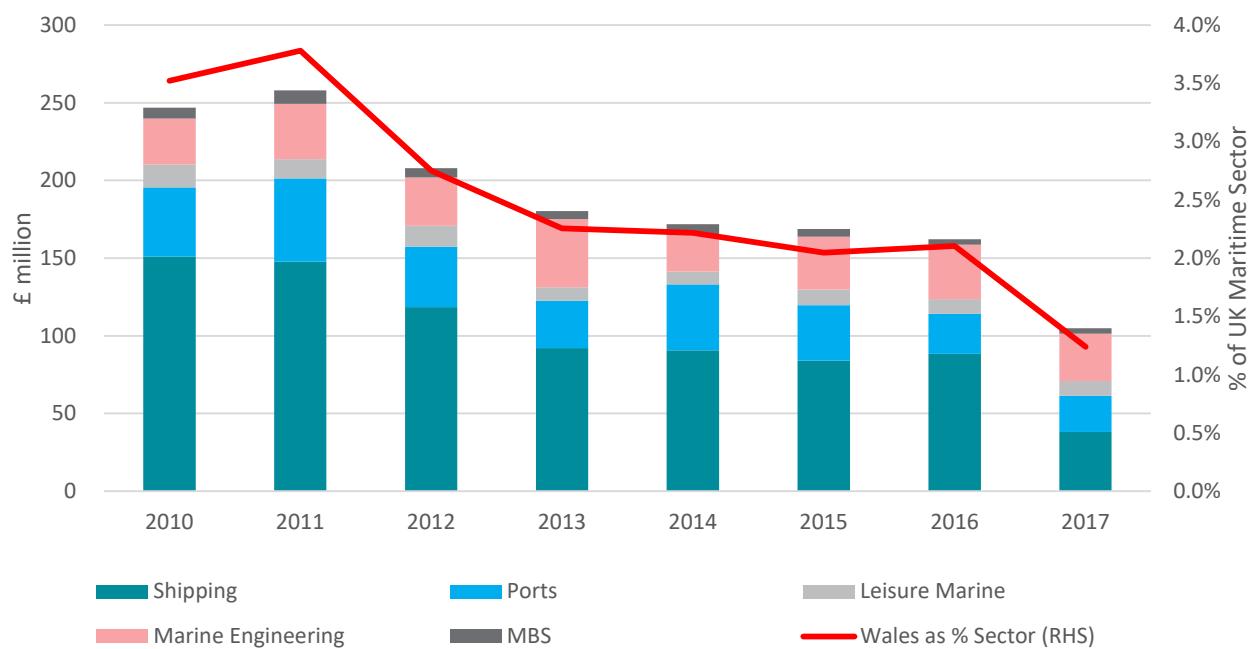
Whilst productivity in the Welsh Maritime Sector is outperformed by the UK Maritime Sector, it *substantially exceeds* the productivity level for the UK economy as a whole.

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 Wales. Figure 11 below shows the direct employment compensation impact of the

Maritime Sector in Wales, 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 11: The direct contribution of the Maritime industries in Wales to the compensation of employees, and the combined industries' share of the total contribution from the UK Maritime Sector, 2010 to 2017

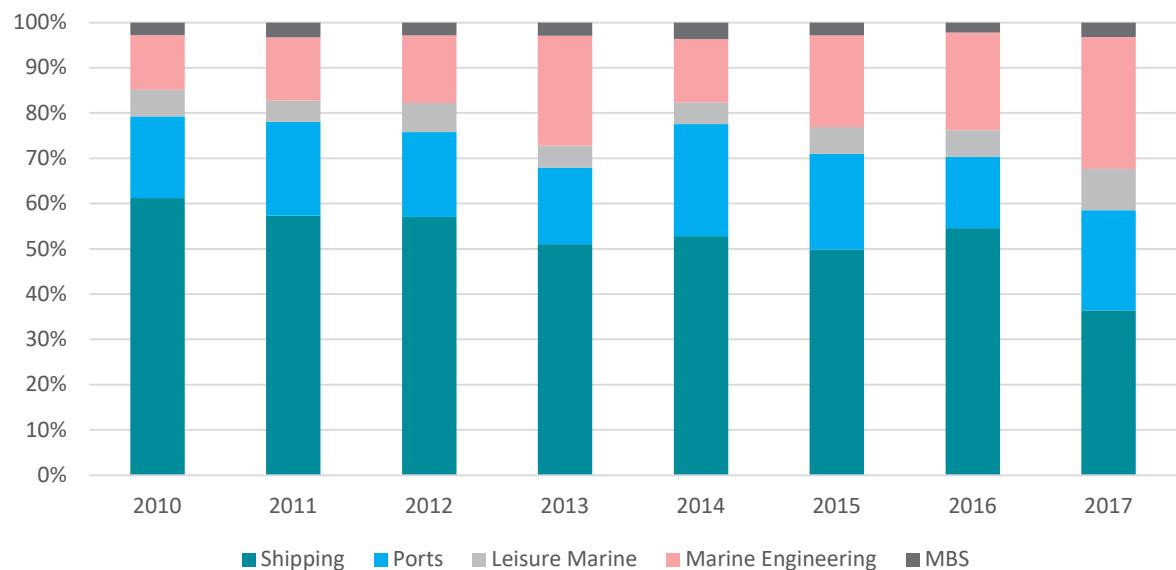


Source: ONS, FAME, Cebr analysis

In 2017 the direct COE impact of the Maritime Sector in Wales was £105 million: this represented 1.2% of the UK Maritime Sector contribution as a whole.

Figure 11 illustrates how each industry within the Welsh Maritime Sector contributed year-on-year to the direct COE impact. In 2017 36% of all compensation paid to employees in the Welsh Maritime Sector was paid to employees in the shipping industry. Just under 30% of all compensation paid was to employees in the marine engineering and scientific industry. Perhaps unsurprisingly, this distribution is very similar to the distribution of employment discussed previously.

Figure 12: Contributions to compensation of employees made by each constituent Maritime industry, 2010 to 2017



Source: ONS, FAME, Cebr analysis

3.5 The direct Exchequer contribution in Wales

In this subsection we examine the contribution of the Maritime Sector in Wales 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 below¹⁴:

- 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 Welsh Maritime Sector; rates and thresholds have been sourced from HMRC for the years 2010 to 2017. Wages and salaries for employees have been sourced from the Annual Survey for Hours and Earnings (ASHE)¹⁵ and adjusted for wage differentials in Wales. 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.

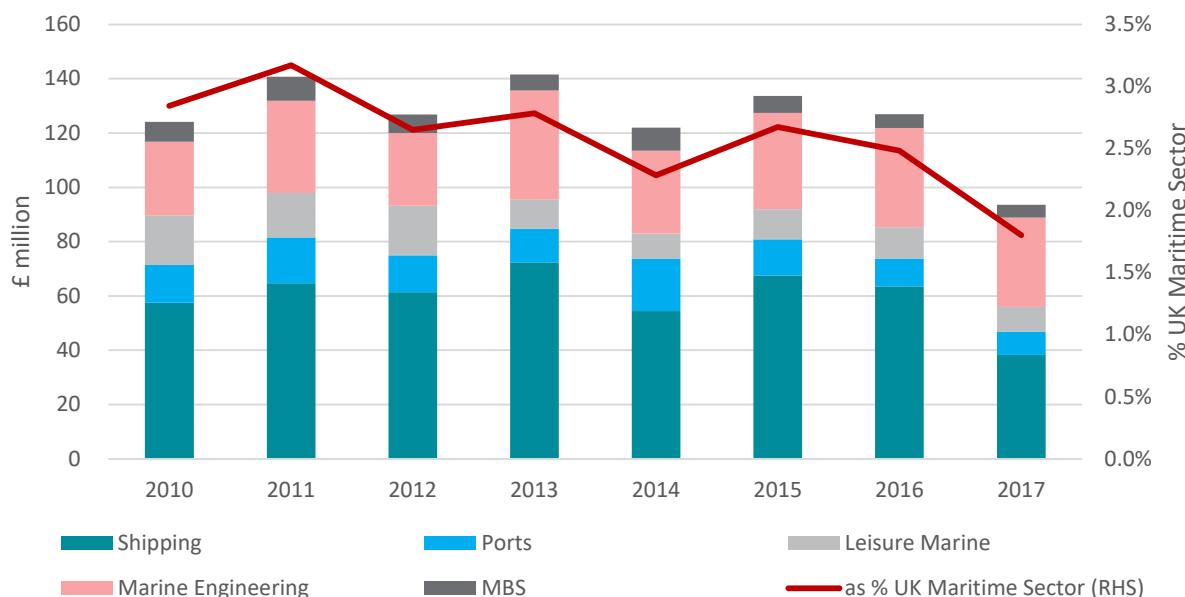
¹⁴

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).

¹⁵ 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 13 below shows the direct contribution of the Welsh 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 13: The direct UK Exchequer contribution of the Maritime industries in Wales, 2010 to 2017

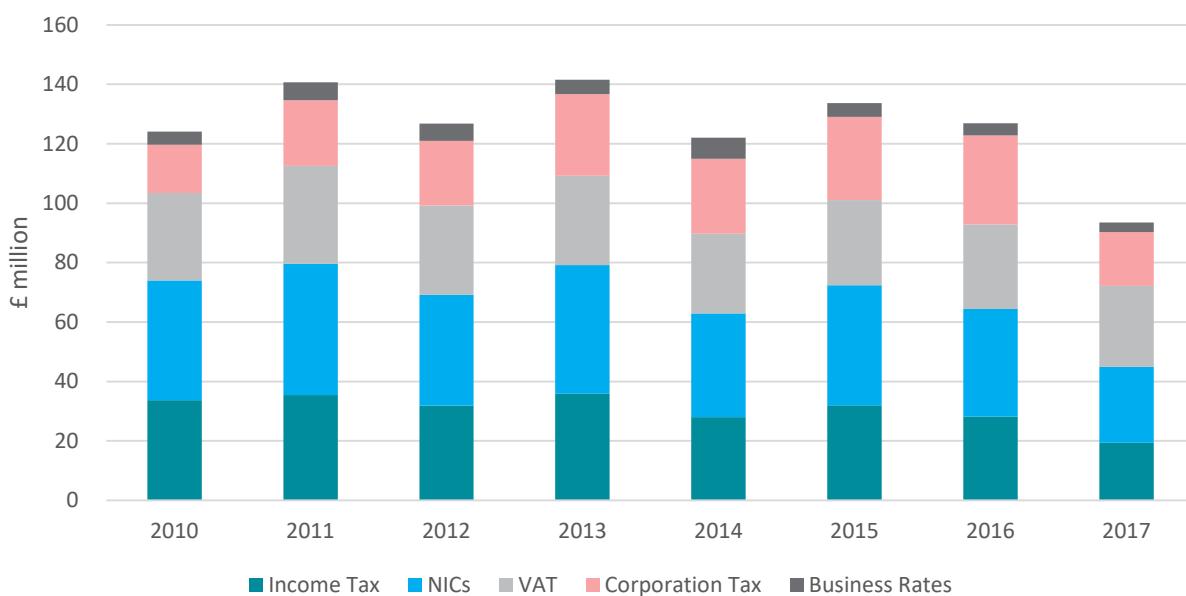


Source: ONS, FAME, Cebr analysis

In 2017 the direct Exchequer impact of the Maritime Sector in Wales was £94 million: this represented 1.8% 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 41% of the direct Exchequer revenues for the Welsh Maritime Sector, followed by the marine engineering and scientific industry and the ports industry which contributed 35% and 9% respectively to the Exchequer.

Figure 14 below disaggregates the direct Exchequer contribution of the Welsh Maritime Sector by tax head across the years 2010 to 2017.

Figure 14: The direct contribution of the Maritime Sector in Wales to the UK Exchequer by tax head, 2010 to 2017



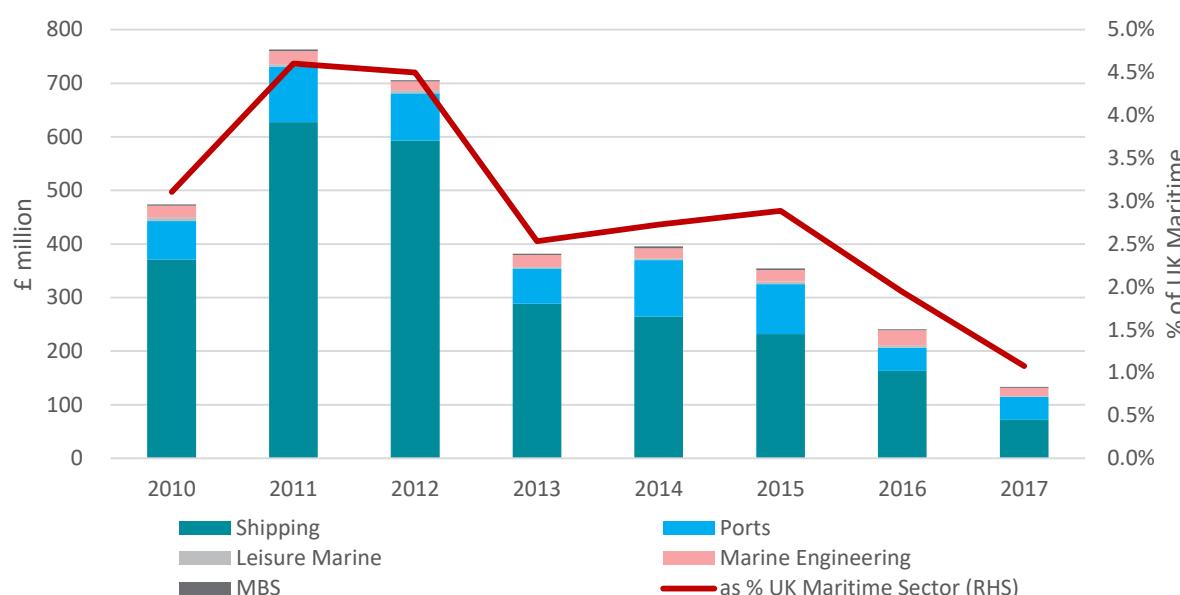
Source: ONS, FAME, Cebr analysis

Across each year, VAT and NICs were the highest contributors to the direct Exchequer impact of the Welsh Maritime Sector, contributing £27 million and £26 million, in 2017 respectively. These equate to 29% and 27% of the total contribution.

3.6 The direct contribution through exports

This subsection discusses the direct contribution of the Welsh Maritime Sector to UK economic activity through the exports of goods and services. Figure 15 below shows the direct contribution of exports to the Welsh Maritime Sector, 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 15: The direct contribution of the Welsh Maritime through exports of goods and services, 2017, £ million



Source: ONS, FAME, Cebr analysis

The direct impact of exports from the Welsh Maritime Sector in 2017 was approximately £134 million: this represented approximately 1% of the UK Maritime Sector contribution as a whole. Exports from the Welsh Maritime Sector has decline year-on-year from 2014 until 2017. The most dramatic decline in export can be linked between 2016 and 2017 where exports fell by 45%.

Disaggregating the direct impact of exports by industry within the Welsh Maritime Sector, we can see that the Shipping industry consistently made the largest contribution at £72 million followed by the Ports industry at £43 million in 2017.

4 The wider economic impact of the Maritime Sector in Wales

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

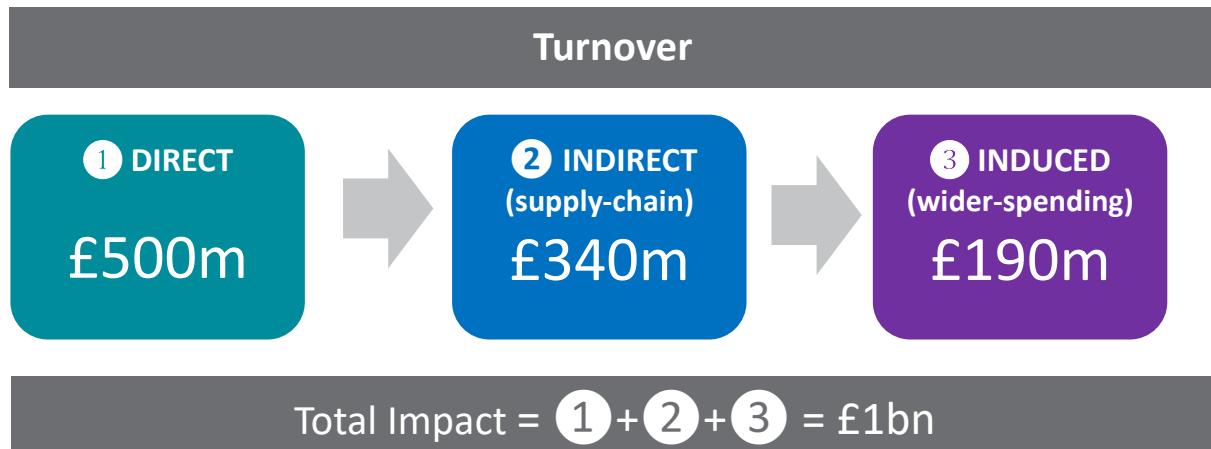
The macroeconomic indicators for which the wider economic impacts have been calculated are as follows: turnover; GVA; employment; and the compensation of employees. Multipliers have been generated from Cebr's regional economic impact model.

4.1 The wider economic impacts through turnover

This subsection sets out the aggregate economic impact of the Maritime Sector in Wales through business turnover. Figure 16 below illustrates the turnover multipliers for the Maritime Sector in Wales. The Welsh Maritime Sector directly contributed £500 million in turnover in 2017, where £340 million worth of turnover is stimulated in supply chains and £190 million 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 Welsh Maritime Sector contributed £1 billion to the wider UK economy.

Alternatively, this can be interpreted as for every £1 of turnover initially contributed by the Maritime Sector in Wales in 2017, the Welsh and UK economies as a whole experienced an increase in business turnover of £2.06.

Figure 16: Domestic output multiplier impacts of the Maritime Sector in Wales, 2017, £ million



Source: ONS, FAME, Cebr analysis

Table 10 below shows the estimated direct and aggregate turnover impacts from the individual Maritime industries when taken in isolation. The shipping industry contributed the highest direct impact to turnover in 2017 with £250 million equivalent to 50% of total direct turnover of the Welsh Maritime Sector. The second largest turnover impact can be attributed to marine engineering and scientific industry which contributed £130 million in 2017. Unsurprisingly, shipping accounts for the largest aggregate impact at £530 million followed by marine engineering and scientific industry at £240 million.

Table 10: Domestic output impact by each Maritime industry in Wales, 2017, £ million

Turnover in 2017	Direct Impact (£m)	Indirect Impact (£m)	Induced Impact (£m)	Aggregate Impact (£m)
TOTAL	493	338	186	1,016
Shipping	248	188	94	530
Ports	70	62	31	163
Leisure Marine	31	20	12	63
Marine Engineering	133	62	45	240
Maritime Business Services	10	6	4	21

Source: ONS, FAME, Cebr analysis

Table 11 below shows the estimated direct and total domestic output impacts of the Maritime Sector in Wales across the years 2010 to 2017. The total impact on turnover was significantly smaller in 2017 compared to previous years. The aggregate impact peaked in 2011 at £2.75 billion but has steadily declined since then reaching its lowest value in 2017. In contrast, the composite turnover multipliers are relatively stable across each year.

Table 11: Direct and aggregate domestic output impact of the Maritime Sector in Wales, 2010 to 2017, £ million

Year	Direct Impact (£m)	Composite domestic output multiplier	Aggregate impact (£m)
2010	886	2.10	1,864
2011	1,306	2.11	2,752
2012	1,304	2.11	2,750
2013	858	2.08	1,789
2014	919	2.12	1,947
2015	1,092	2.11	2,304
2016	863	2.08	1,796
2017	493	2.06	1,016

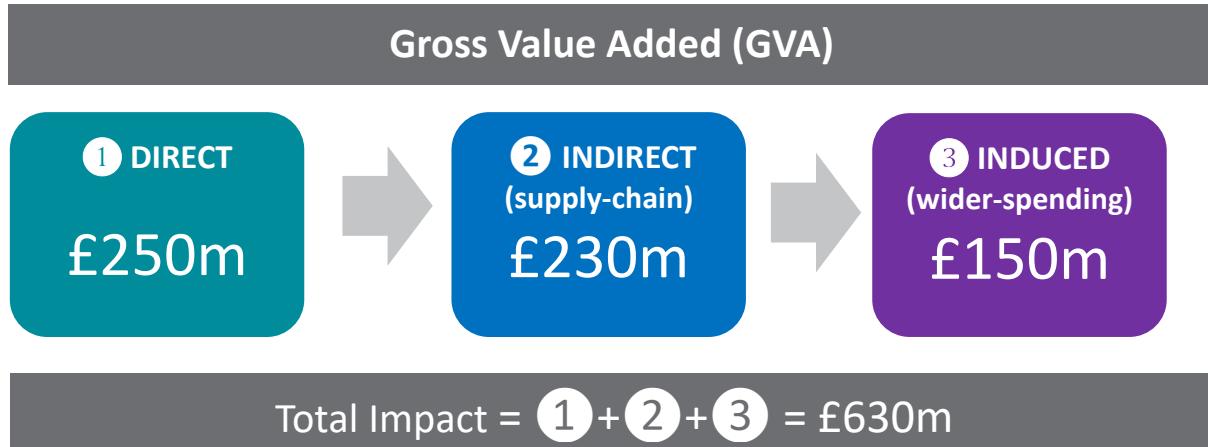
Source: ONS, FAME, Cebr analysis

4.2 The wider economic impacts through GVA

This subsection sets out the aggregate economic impact of the Maritime Sector in Wales through GVA. Figure 17 below illustrates the GVA multipliers for the Maritime Sector in Wales. The Welsh Maritime Sector directly contributed £250 million to GVA in 2017, where £230 million worth of GVA is stimulated in supply chains and £150 million 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 Welsh Maritime Sector contributed £630 million to the wider UK economy.

For every £1 of turnover initially contributed by the Maritime Sector in Wales in 2017, the Welsh and UK economies as a whole experienced an increase in GVA of £2.50.

Figure 17: GVA multiplier impacts of the Maritime Sector in Wales, 2017



Source: ONS, FAME, Cebr analysis

Table 12 below shows the estimated aggregate GVA impacts from the individual Maritime industries. Similar to turnover, the shipping industry contributed the majority of the direct impacts for the Welsh Maritime Sector in 2017. At £127 million, the shipping industry represented 50% of the direct GVA contributions in 2017. Following the shipping industry, the marine engineering and scientific industry and the ports industry directly contributed £51 million and £49 million respectively to GVA in 2017. The highest aggregate impact can be identified within the shipping industry at £331 million.

Table 12: GVA impacts by each Maritime industry in Wales, 2017, £ million

GVA in 2017	Direct Impact (£m)	Indirect Impact (£m)	Induced Impact (£m)	Aggregate Impact (£m)
TOTAL	256	233	150	638
Shipping	127	129	75	331
Ports	49	48	31	128
Leisure Marine	15	10	8	33
Marine Engineering	51	32	29	112
Maritime Business Services	14	14	7	35

Source: ONS, FAME, Cebr analysis

Table 13 below shows the estimated direct and total economic impacts of the Maritime Sector in Wales across the years 2010 and 2017. The direct and total impacts were significantly lower in 2017 compared to previous years. Total and direct impact peaked in 2011 and 2016. The composite GVA multiplier has remained relatively stable across the years considered.

Table 13: Direct and aggregate GVA impact of the Maritime Sector in Wales, 2010 to 2017, £ million

Year	Direct Impact (£m)	Composite GVA multiplier	Aggregate impact (£m)
2010	333	2.53	841
2011	417	2.53	1,054
2012	378	2.53	956
2013	348	2.51	872
2014	331	2.53	836
2015	375	2.52	943
2016	416	2.52	1,050
2017	256	2.50	638

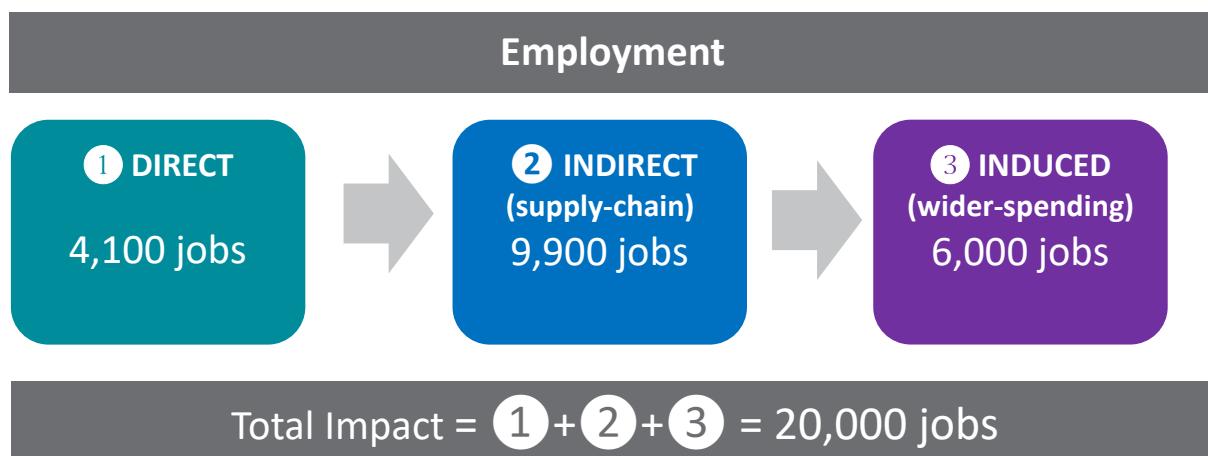
Source: ONS, FAME, Cebr analysis

4.3 The wider economic impacts through employment

This subsection sets out the wider economic impact that the Maritime Sector in Wales makes through employment. Figure 18 below illustrates the employment multipliers for the Maritime Sector in Wales. The number of jobs directly contributed by the Welsh Maritime Sector was 4,100 in 2017, while 15,900 jobs were supported once the indirect and induced impacts of the industry are taken into account. The aggregate employment impact supported by the Welsh Maritime Sector was 20,000 jobs in 2017.

Combining each Maritime industry, for every 1 job initially contributed by the Maritime Sector in Wales in 2017, a total of 4.90 jobs were therefore supported in the wider Welsh and UK economies.

Figure 18: Employment multiplier impacts of the Maritime Sector in Wales, 2017



Source: ONS, FAME, Cebr analysis

Table 14 below shows the estimated employment impacts from the Welsh Maritime industries taken in isolation. The shipping industry accounts for the largest direct impact of employment in 2017, contributing with 1,380 jobs to the Welsh Maritime Sector. This is followed by the marine engineering and scientific industry contributing 1,200 jobs to the sector. Combined these two industries contribute 63% of the direct employment to the Maritime Sector in Wales in 2017. The biggest aggregate impact can be attributed to shipping, where the aggregate impact represents 74% of the total aggregate impact

of the total sector. The large aggregate impact of the shipping industry can be explained by the large multipliers associated with the shipping industry.

Table 14: Employment impact by each Maritime industry in Wales, 2017

Employment in 2017	Direct Impact	Indirect Impact	Induced Impact	Aggregate Impact
TOTAL	4,067	9,870	5,980	19,917
Shipping	1,379	8,324	4,999	14,701
Ports	809	526	365	1,700
Leisure Marine	526	252	191	968
Marine Engineering	1,210	494	318	2,022
Maritime Business Services	144	275	107	526

Source: ONS, FAME, Cebr analysis

Table 15 shows how the total employment impact of the Maritime Sector in Wales is estimated to have evolved since 2010. Direct and total employment in 2017 was significantly lower than in any other year considered. Moreover, the composite employment multiplier was substantially smaller in 2017 than previous years partially explaining the low aggregate impact.

Table 15: Direct and aggregate employment impact of the Maritime Sector in Wales, 2010 to 2017, jobs

Year	Direct Impact	Composite Employment multiplier	Aggregate impact
2010	7,008	5.87	41,141
2011	8,214	5.94	48,814
2012	6,044	6.11	36,922
2013	6,401	6.46	41,358
2014	5,343	5.56	29,689
2015	6,162	6.17	38,048
2016	6,233	6.36	39,615
2017	4,067	4.90	19,917

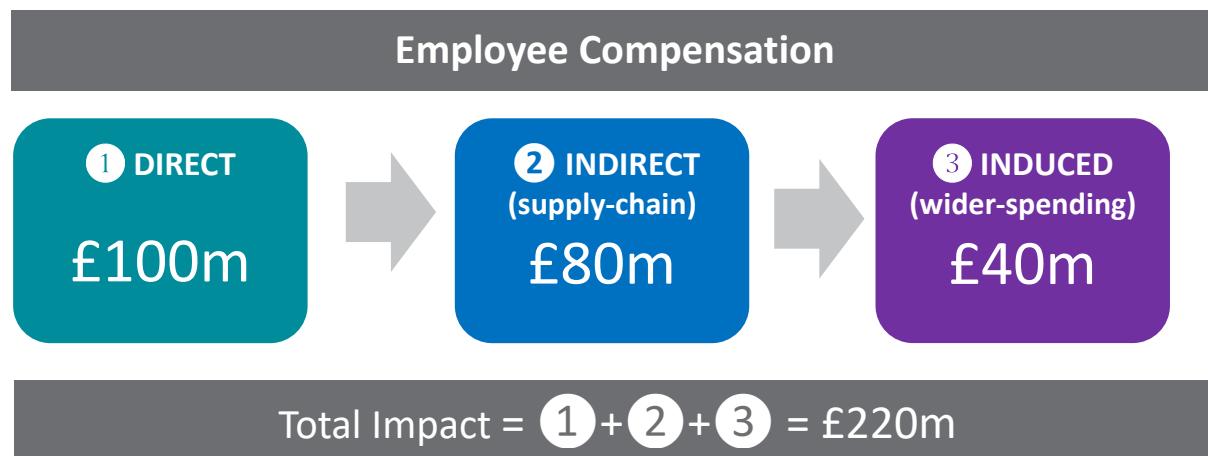
Source: ONS, FAME, Cebr analysis

4.4 The wider economic impacts through compensation of employees

This subsection sets out the wider economic impact that the Maritime Sector in Wales makes through the compensation of employees. Figure 19 below illustrates the employee compensation multipliers for the Maritime Sector in Wales. The direct impact of the compensation of employees from the Welsh Maritime Sector was £100 million in 2017, where £80 million of employee compensation is stimulated in the supply chains and £40 million in the wider economy when direct and indirect employees spend their earnings. The total impact of compensation of employees was £220 million.

For every £1 initially contributed by these entities in 2017, a total of £2.15 in employee compensation was supported in the Welsh economy.

Figure 19: Employee compensation multiplier impacts of the Maritime Sector in Wales, 2017



Source: ONS, FAME, Cebr analysis

Table 16 below disaggregates the direct, indirect, induced and therefore total impacts on the compensation of employees by Maritime industry in Wales. Once again, shipping contributes the most to direct impacts through compensation of employees with £38 million, equivalent to 36% of the Sector total. The next largest industry contribution comes from the marine engineering and scientific industry at £31 million followed by ports industry at £23 million. The largest aggregate impact contribution is credited to the shipping industry which contributed £91 million in 2017, equivalent to 40% of the total aggregate impacts from the Sector in 2017.

Table 16: Impact through the compensation of employees by each Maritime industry in Wales, 2017, £ million

Compensation of Employees in 2017	Direct Impact (£m)	Indirect Impact (£m)	Induced Impact (£m)	Aggregate Impact (£m)
TOTAL	105	83	38	226
Shipping	38	37	15	91
Ports	23	15	8	46
Leisure Marine	10	5	3	17
Marine Engineering	31	24	10	65
Maritime Business Services	3	2	1	7

Source: ONS, FAME, Cebr analysis

Table 17 below illustrates the total impact through the compensation of employees in each year since 2010. Following the trend from previous macroeconomic indicators, the direct and aggregate impacts were significantly lower in 2017 than in previous years. Both direct and total impacts have more than halved in size from 2010 to 2017. However, 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.

Table 17: Direct and aggregate impact through the compensation of employees of the Maritime Sector in Wales, 2010 to 2017, £ million

Year	Direct Impact (£m)	Composite Employee Compensation multiplier	Aggregate impact (£m)
2010	247	2.23	551
2011	258	2.22	573
2012	208	2.22	461
2013	180	2.21	399
2014	172	2.20	378
2015	169	2.20	371
2016	162	2.22	360
2017	105	2.15	226

Source: ONS, FAME, Cebr analysis

5 Maritime Sector in Wales: A Forward Look

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

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

Modelling approach

We investigate the relationship between the Maritime economy in Wales and a number of economic variables through an econometric approach. Our findings show that the Maritime economy is primarily linked to Welsh GVA. After having established the Welsh Maritime economy's elasticities to Welsh total GVA, we project these historical relationships forward to produce a forecast of Welsh-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. Each assumption has been assigned a specific weight reflecting its relevance to the Welsh-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 Welsh-based Maritime Sector turnover and GVA over the period 2019-2023. To note also that our historical analysis of Maritime ends in 2017. This requires us to produce a "now-cast" for the first year (2018) for which we know the actual value of the drivers but not of Welsh-based Maritime Turnover and GVA and a forecast for the following period.

Modelling Assumptions

Welsh GVA

Cebr's macroeconomics department produces regular forecasts of key economic indicators for the UK national, regional and local economies which can directly inform our analysis. We therefore rely on our own projections of the Welsh economy.

Cebr expects Wales regional GVA to grow at a Compounded Annual Growth rate (CAGR) of 3% over 2018-2023 in nominal terms. This rate is lower than the 3.8% 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

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. UNCTAD¹⁶ 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 2016-2030¹⁷. 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)¹⁸.

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.

The 2019-2023 forecast

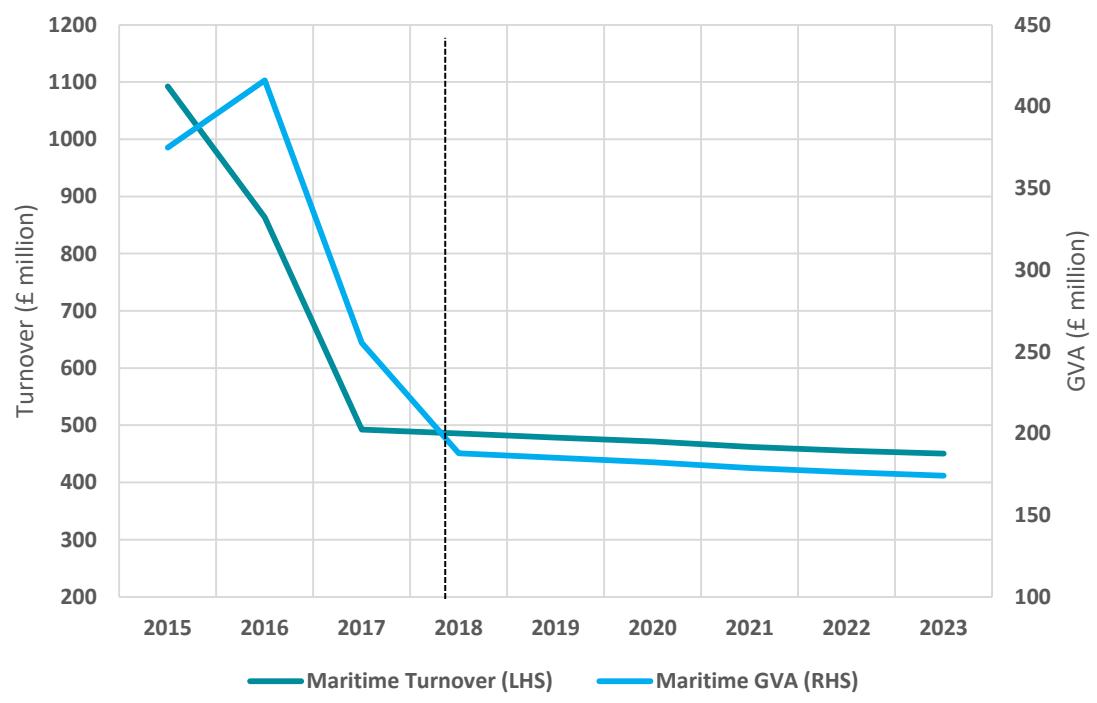
Figure 20 shows the Welsh-based Maritime Sector slightly shrinking over the five year horizon. Our forecast indicates that Welsh-based Maritime turnover and GVA are set to grow at a Compounded Annual Growth rate (CAGR) of -1.5% over the considered period. In GVA and this translates into a cumulative nominal decline of 7.3% for 2018-2023. Despite projected positive growth for the Welsh economy and UK trade this is not enough to support positive growth in the Welsh Maritime Sector, however it helps to dampen the forecasted decrease.

Figure 20: Welsh-based Maritime Sector turnover and GVA trends and projections, £ million, 2015 to 2023

¹⁶ United Nations Conference on Trade and Development. (2018). ['Review of Marine Transport 2018'](#).

¹⁷ DNV GL (2018). ['Energy Transition Outlook'](#).

¹⁸ OECD. (2018). ['Growth prospects, challenges and uncertainties for selected ocean industries'](#).



Source: FAME, ONS, DfT and Cebr analysis

6 Case Study: Port facilitated economic development in Wales – Cardiff Bay

Cardiff Docks has seen several phases of evolution over the course of its two hundred year history, reflecting changes in the nature of the economy in South Wales and the importance of access to the sea in supporting the various kinds of economic activity that have taken place in the area.

Cardiff's transition from a small town into a major port started around the turn of the nineteenth century, with the development of a canal¹⁹ linking the industrialising valleys to its north with the sea. This enabled significant export markets for coal and iron products to develop. Following construction of a rail link²⁰ and proper dock facilities,²¹ Cardiff handled almost half of UK iron exports in the mid nineteenth century.²² The docks continued expanding to accommodate growing coal exports, which reached 10.7m tonnes by 1913. By this time Cardiff was one of five principal ports for the export of South Wales coal, along with Swansea, Newport, Llanelli and Barry and it had one of the largest dock systems in the world with 7 miles (11kms) of quays.

The port's fortunes started to decline after World War I as competitive pressures on South Wales coal intensified for various reasons. Capacity issues also meant that Barry took over as the preeminent port for coal exports. Decline accelerated following World War II, with the port increasingly handling imports, while coal exports ceased altogether from Cardiff in the 1960s.

Regeneration began during the 1980s, through the Cardiff Bay Development Corporation. There was a significant transition into non-port uses, including housing, cultural and leisure activities and accommodation for the Welsh Assembly. The port has continued to function however, with two docks remaining in operation (Roath Dock and Queen Alexandra). These port now plays a niche role as a local centre for general cargo operations, which include the import and export of containers, steel, forest products and dry and liquid bulks. Throughput is approximately 2.5 million tonnes per annum. There are 25 berths with a total length of around 5.5km. The port has transit sheds with around 40,000m² (430,000 square feet) of indoor storage and there is over 20 hectares of open storage. Facilities include seven quayside cranes, mobile cranes, a distribution terminal and chill and cold storage for perishables. Services include chandlers, bunkering, towage, and a Seamen's Mission.

While there has been very significant diversification away from traditional port activities, with the amenity value of the waterside location established as a major 'pull factor' that attracts various non-maritime activities to the area, some of the regeneration in the docks is facilitated by the continued operation of the port. An example of port dependent investment follows.

In 2012, a Turkish owned firm, HDM Tubes Ltd chose to establish a UK steel manufacturing operation and they selected Cardiff Docks, investing £12m in their factory there. The company is a leading manufacturer of spirally welded LD pipes, i.e. large diameter tubes and specialises in tubular foundation piles used in the construction industry. The mill is laid out to roll heavy gauges of up to 32mm and long lengths of tubing, of up to 45m. The facility is equipped with a shot blasting and painting facilities,

¹⁹ The Glamorganshire Canal, opened to Cardiff in 1794 and the link to the sea in 1798.

²⁰ The Taff Vale Railway, opened in 1840.

²¹ The Bute Dock – West (1839), Bute Dock – East (1855).

²² Roath Dock (1887), Queen Alexandra Dock (1907).

clutch/interlock welding for combi-wall applications and there is a workshop for building custom made pile designs.

There is significant interaction with the port. The operator, ABP, discharges steel coil imports, placing them to order under the crane hook in HDM's factory which is on the quayside. The coil is then formed into spirally welded tubes which is then supplied to customers both by road and ship. In the latter case, stevedoring services are also provided by the port operator. The transportation facilities at the port were significant in the location decision, as they enable the factory to produce and ship long and heavy piles directly to customers in a wide range of markets. The company in fact supplies markets in the UK, Ireland and Scandinavia from its Cardiff operation.

As the UK's only spiral pipe producer in heavy gauge and long pipes, the company claims to be able to provide shorter lead times for specific UK projects than overseas based competitors, helping meet UK customer needs more effectively than would otherwise be possible. It also boosts the UK economy through the exports it generates. It has made a modest but valuable contribution to the local economy. For example, although its fortunes have fluctuated, it has annual turnover of around £5m and has continuously employed more than 20 people. The investment shows land on ports' estates can be successfully recycled for new industrial uses within a 'Port Economic Zone' and, more broadly, that UK sea ports continue to play a role in facilitating local economic development.

7 Annex: List of Welsh ports

Table A.1: List of Welsh ports considered as part of the study

Port	Council Ward	Postcode
Anglesey Marine Terminal	Twrcelyn	LL68 9DB
Bangor	Harbour	BT20 5ED
Barry	Castleland	CF63 3US
Bird Port	Liswerry	NP19 4RE
Burry Port	Burry Port	SA16 0ER
Caernarfon	Seiont	LL55 2PB
Cardiff	Butetown	CF10 4LY
Fishguard	Goodwick	SA64 0BU
Holyhead	Caergybi	LL65 1DQ
Llanddulas	Llysfraen	LL29 9YW
Milford Haven	Haverfordwest: Priory	SA73 3ER
Mostyn	Mostyn (Delyn)	CH8 9HE
Neath	Neath North	SA11 1RY
Newport	Pillgwenlly	NP2 UW
Penarth	St Augustine's	CF64 1TQ
Port Penrhyn	Arllechwedd	LL57 4HN
Port Talbot	Margam	SA13 1RB
Shotton	Dewi	LL57 2DJ
Swansea	St Thomas	SA1 1QR