
International competitiveness of the UK maritime sector

Final report

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Executive summary

The UK maritime sector—how does it compare internationally?

It is estimated that the UK maritime sector contributes between £7.6bn and £13.8bn of direct gross value added (GVA) to the UK economy each year. Indeed, in both business services and maritime education, it appears to be one of, if not *the*, global market leader.

- The UK has a market-leading 26% of global maritime insurance premia and 61% of Protection & Indemnity Clubs. The UK's share of the maritime insurance market has remained reasonably constant over the past decade.
- London is seen as the market leader in maritime financing, although there are signs that this sector of the maritime industry has lost ground in recent years.
- Maritime legal services are also an area of strength, with London leading in arbitration services. The UK is home to leading governance and regulatory bodies, such as the International Maritime Organization and the International Association of Classification Societies.
- London is home to the Baltic Exchange, a leading source of market information on trading and settlement of both physical and financial shipping derivatives. London is the base for 400 of the Baltic Exchange's 600 members.
- There are around twice as many providers offering maritime training in the UK compared with its next-largest rival in this area. Most of these institutions are located near ports.

The UK has a strong presence in the shipping sector, with 1.5% of the world fleet's capacity owned by UK-based companies and 3.2% managed by UK-based companies. However, the UK's merchant fleet is significantly smaller than those of the market leaders, which include China and Greece. Registration is often a focus for the shipping industry, however, Oxera is not aware of any evidence demonstrating the direct economic benefit of this to the UK.

The UK ports sector is one of the largest in Europe, handling 500m tonnes of freight per year and 28m passenger movements. There is potential scope for competition between ports in Northern Europe for the transshipment of containerised cargos serving hinterland markets. The presence of ports more generally may indirectly contribute to other parts of the maritime industry, such as maritime education, since maritime colleges are often located near ports.

Key factors influencing the international competitiveness of the UK maritime sector

Shipping

A country's trade patterns appear to be important in shaping its shipping fleet. At the same time, a strong shipping and maritime business services cluster attracts workers. It also facilitates ship operators' interactions with the many services they need, as well as their access to market information and industry expertise. Similarly, the appeal of a particular location to a ship owner includes stability in the fiscal regime and in the government's policy strategy, the availability of premises in the cluster area, and the cost of doing business. Fiscal incentives could help to create a level playing field with rival nations as

locations for ship management, rather than providing the sole means for attracting ownership and management activities. The introduction of the tonnage tax regime in 2000 in the UK seems to have played a role in reversing the decrease in British-owned vessel tonnage. That decline has resumed in more recent years, driven by greater international competition, changes in the location of physical trade activity, and the wider adoption of the tonnage tax internationally.

Ship owners also appear to appreciate stability in the fiscal regime and in the government's policy strategy. Business regulations can impose significant compliance costs but may not have a clear impact on competitiveness if they are derived from international agreements to which other nations with significant ship management and registration sectors are signatories.

The number of sea passengers in the UK is likely to be a major driver of the performance of the UK passenger market. The scope for international competition is likely to be small for passenger travel, since there is generally a single operator per ferry route and limited substitutability between routes and modes in the UK. A key driver of demand is income, with the majority of international sea travel starting or ending in the UK being for leisure purposes.

Ports

UK ports could offer an alternative to ports in mainland Europe when serving UK-bound traffic. However, the UK's island status represents a major barrier to it serving as a container transshipment hub for Europe because of the additional costs of onward transport. Some 16% of UK container imports originate from the Hamburg–Le Havre region of Northern Europe. Further work would be required to establish whether this represents a potential market for additional direct calls to UK ports.

The need for port capacity is directly driven by UK trade in goods, which is outside the control of the UK government and maritime industry. However, the planning system is critical to creating conditions for the development or expansion of ports. Oxera is not aware of any evidence comparing ports' planning processes across countries. However, the UK National Policy Statement for Ports provides both a transparent framework for assessing development applications and a streamlined process for obtaining development consents.

In terms of the efficiency of port services, UK ports compare well against key competitor countries, based on the financial and time costs of landing cargos. The proposed EU ports services regulations could increase the level of competition among providers at ports, reducing prices to port users, but the regulations are unlikely to affect the UK's competitiveness relative to other EU countries.

Maritime business services

The UK's maritime business services cluster has historically been linked to physical ports and shipping activity, but this is now less important as the cluster has become more knowledge-based. Physical activity is cited as the motivator of the Singapore, Hong Kong and Shanghai business services clusters that are now posing a threat to London's dominant position.

The general costs of doing business are a very important driver of competitiveness in this sector. On taxes, the UK is ranked 16th out of the 189 countries considered by PwC's Paying Taxes metrics, comparing favourably

with many of the major maritime nations, although rival maritime clusters, Hong Kong and Singapore, both score higher than the UK.

Intermediary services such as legal services and ship broking benefit from the co-location of customers and other suppliers (known as ‘agglomeration’). We estimate that the productivity of labour in these sub-sectors would be around 5.6% lower if the cluster were halved in size (as measured by density of employment). The agglomeration effect tends to be self-reinforcing and, in London’s case, is augmented by the presence of key regulatory and industry bodies in the City.

Maritime legal services benefit from the widespread use of English law and the promotion of London by the UK government as a centre for international dispute resolution, with an emphasis on the enforceability of settlements, a strong regulatory regime for legal services, and the availability of commercial legal expertise.

In the insurance and financing sectors, the proximity of the financial services centre in London is helpful for the development of key specialisms in maritime services. EU rules on prudential regulation could have an impact on UK competitiveness relative to countries outside the EU, although Lloyd’s has suggested that non-EU countries are likely to move in the same direction as the EU. The relative competitiveness of the UK depends on how EU Directives are transposed into domestic law.

The availability of staff with specialist maritime expertise is crucial for offshore as well as onshore maritime activities. Stakeholders have reported particular difficulties in obtaining work visas for onshore personnel.

Maritime education

The support offered by the UK government for training makes a maritime career an attractive financial proposition in the context of rising university tuition fees outside the sector. The maritime sector also pays well relative to roles with similar skill requirements. The average salary for a master mariner was £54,000–£60,000 in 2011 (although this would vary significantly with vessel size). This compares with median annual pay of around £42,000–£46,000 for those with engineering or medicine degrees and around £21,000–£36,000 for other degrees. Perhaps the most challenging demand-side issue is the perception of the maritime sector as a long-term career option involving extended periods at sea.

The flow of trainees through the maritime education system affects both on- and offshore sub-sectors, all of which need suitably trained and experienced labour. This includes the supply of ex-seafarers needed to act as experienced instructors.

There is some scope to lessen the link between maritime education institutions and ports, for example by increasing distance learning and the use of simulators. However, the competitiveness of the ports, shipping and maritime education sectors can be seen as mutually dependent.

Opportunities and challenges to the maritime sector

This report looks at the ways in which the key drivers of competitiveness described above may evolve, and how this could present challenges and opportunities for the maritime sector, as summarised below.

Table 1 Opportunities and challenges to the maritime sector

	Timescale	Opportunity/challenge
The possibility of an advanced cluster in South East Asia	Medium to long term	Challenge: Growth in demand for business services in Asia supported by physical maritime activity would represent a challenge to London's maritime cluster, and for the business services sector in particular
Online learning and simulation training	Short to medium term	Opportunity: This would affect the maritime education sector in the UK. Online learning could lead to a wider distribution of courses, while simulation training could increase the effectiveness of seafarer training
Increases in vessel size	Medium term	Challenge: This could be an opportunity for transshipment business in Europe, and therefore a challenge for UK ports aiming to compete for UK-bound traffic. It also represents a challenge for ports in terms of accommodating larger vessels
Use of alternative fuels	Medium term	Opportunity: This could be an opportunity for certain shipping operations (particularly shorter voyages) to reduce fuel costs while adhering to the Sulphur Directive. It also presents an opportunity for bunkerers
Greenhouse gas emissions	Medium to long term	Challenge: This could present challenges for the world fleet, depending on whether all countries are bound to an emissions reduction, which will determine how great an impact this has on the competitiveness of the UK relative to the other countries
Government support to the maritime sector	Short, medium and long term	Challenge: More supportive legislation and regulatory environments in some Asian economies will promote the competitiveness of those countries' maritime sectors relative to the UK and EU's more stringent systems
New EU state aid guidelines	Short to Medium term	Opportunity: The extent to which new guidelines support the UK relative to its competitors will depend on the precise details. However, it would be reasonable to expect them to place limits on state support for ports. The state aid guidelines for airports provide insights into the Commission's approach for existing cases/principles for draft ports guidelines
Trade patterns	Medium to long term	Opportunity: Growth in trade patterns represents an opportunity for the shipping and ports industries in the UK, although the UK government cannot control this directly. This would be a major opportunity for providers of highly mobile services such as shipping and business services, which could serve customers globally
Demand for seafarers	Medium to long term	Opportunity/challenge: Future growth in global demand for seafarers could present a significant opportunity for both UK seafarers and the training institutions that accredit them. For the rest of the maritime sector, a shortage of UK-based seafarers would present a challenge for the sector. This includes physical activities but also business services, which depend on a supply of ex-seafarers.
Offshore wind energy	Medium and long term	Opportunity: The UK is currently a world leader in the supply of offshore wind energy, and can continue to develop its offshore wind capacity going forward. This presents a significant opportunity for UK ports to become 'energy ports',

Timescale	Opportunity/challenge
	supplying both the UK and other countries with offshore wind generation capacity

Source: Oxera.

Recommendations to improve competitiveness

Based on the analysis in this report, the UK government could explore the potential to improve or maintain the competitiveness of the UK maritime sector in the following ways.

- Consider responding to aggressive use of taxation by competitors through measures targeted at supporting the shipping sector as a whole, such as tonnage tax and personal taxes for maritime employees. This is preferred to actively using fiscal measures to attract ship owners, which could trigger a ‘race to the bottom’.
- Ensure that the compliance costs of taxation and regulation affecting the maritime sector are minimised in new and existing legislation. This is particularly important for mobile activity such as ship ownership and maritime business services.
- Consider whether immigration laws for skilled seafarers could be relaxed in a targeted way to facilitate maritime activity by adding to the labour force.
- Promote the maritime sector more actively to the public to improve its appeal as a career option and thereby expand labour supply in all parts of the sector in the long term.
- Ensure that the planning system allows ports to adapt to changes in shipping fleets and exert careful oversight of the regulatory environment for port services and import requirements.

Indicators for monitoring competitiveness

Oxera has compiled a set of metrics that could be used to monitor various aspects of maritime sector competitiveness. These should be seen as supplemental to the Department for Transport’s (DfT) existing statistical publications on the maritime sector.

Table 2 Maritime competitiveness metrics

Sector	Indicator	Suggested data source	Notes
All	Imports and exports of goods for the UK and key rivals	IMF	Trade is a key driver of demand, either directly or indirectly, across the maritime sector
All	Change in domestic regulatory burden	BIS Growth Dashboard	The regulatory burden faced by UK businesses is an important driver of competitiveness, and especially relevant to mobile activities such as shipping
All	GVA	Annual Business Survey and ONS Input-Output tables	The contribution of the maritime sector to the UK economy is a proposed metric for measuring activity over time. This is currently produced ad-hoc, but could be estimated annually with the suggested data sources

Sector	Indicator	Suggested data source	Notes
Shipping	Management and ownership of shipping assets	IHS	Consider splitting total owned/managed capacity according to actual or likely operations. Some shipping activity is subject to European competition, while other activities are subject to global competition and are potentially more likely to leave the UK
Ports	Volume of container imports from north-west Europe	Eurostat	Could serve as a proxy for transshipment activity
Ports	Time and cost of UK container imports relative to ports in north-west Europe	World Bank Group	Measures efficiency of UK ports
Maritime business services	Number of maritime arbitrations in London	MLex or other monitoring service	Could serve as an indicator of legal activity. This metric would not capture all legal advice
Maritime business services	Maritime insurance premia written in London	International Union of Maritime Insurers	Indicator of insurance activity and market share
Maritime education	Wages of maritime sector workers as a share of UK average	Office for National Statistics	Wages should control for education levels. Adjustments for seafarer tax deduction could also be made to better reflect pay differentials
Maritime education	Cost of seafarer training less funding	Maritime colleges, Maritime and Coastguard Agency data on funding support	Measures the net financial cost of seafarer training
Maritime education	Number of UK seafarer trainees becoming UK resident seafarers	Not currently collected. HMRC data on seafarers claiming tax deduction is one possible source	The aim of this metric is to monitor the pool of seafarers available to the shipping sector and potentially the wider maritime sector

Source: Oxera.

1 Introduction and background

In November 2014, the DfT launched its Maritime Growth Study, with the aim of considering all aspects of the sector to identify where and how improvements can be made to generate growth. As part of the evidence collection phase, the DfT has commissioned Oxera to undertake a study to:

- describe the nature of international competition faced by the UK in maritime services;
- assess the international competitiveness of the UK across key maritime services sectors, and the UK's main (relative) strengths and weaknesses;
- assess both the international competitiveness of the UK in attracting maritime businesses to locate in the UK, and the international competitiveness of the maritime businesses already located in the UK;
- identify the key trends across the sectors of maritime services and what they imply about the main opportunities and challenges facing the UK in the sector in the short, medium and long term.

For the purposes of this project, the maritime sector is defined as comprising the following sectors:

- ship ownership, management, support services;
- port services, port support services;
- education, skills, training;
- business services, comprising:
 - ship broking;
 - maritime insurance;
 - maritime legal services;
 - classification services;
 - maritime financial services.

The remainder of this report is structured as follows. Section 2 describes the nature of competition in the maritime sector based on key market characteristics, and maps the links in the maritime supply chain. Section 3 assesses the UK's performance in each sector of the maritime industry and identifies the UK's main competitors. Section 4 identifies the main drivers of performance and competitiveness in the maritime sector. Section 5 outlines the main trends in the sector and considers the future drivers of performance and competitiveness in the industry.

Throughout the report, we also make recommendations for indicators of maritime competitiveness (and possible data sources) that could be monitored alongside the DfT's existing statistics on the maritime sector.

2 The nature of competition facing the UK maritime sector

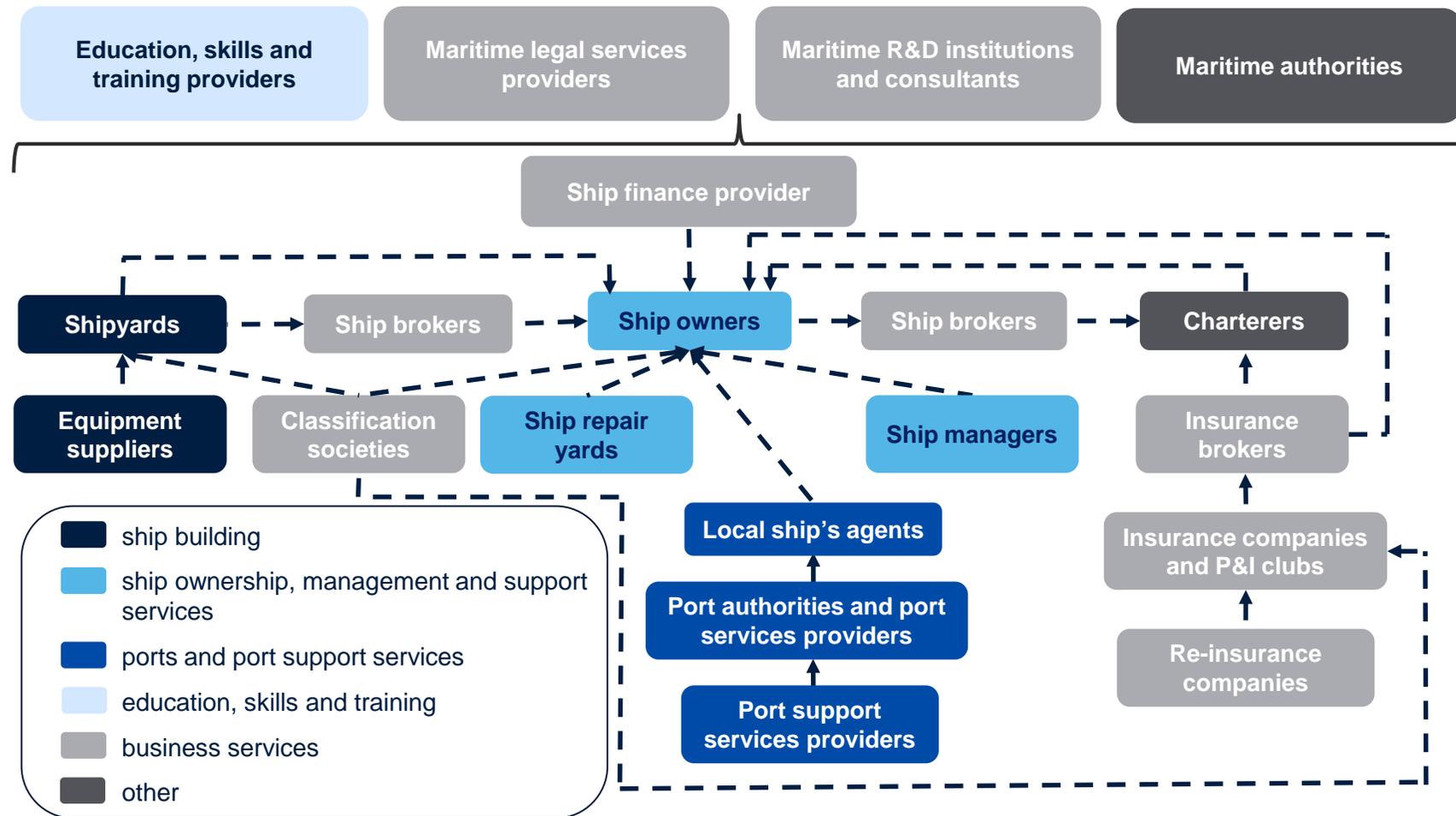
This section describes the nature of competition in the UK maritime sector.

- Section 2.1 maps the supply chain to capture the links between the sectors.
- Section 2.2 reviews various types of clusters.
- Section 2.3 describes the factors ('market characteristics') influencing international competitiveness for each sector.
- Section 2.4 summarises the previous sections.

2.1 Industry structure and supply chain mapping

Figure 2.1 below provides a high-level overview of the structure of the maritime sector and its key relationships. The remainder of this section describes the relationships in more detail and discusses what they reveal about how the sector is organised.

Figure 2.1 Maritime supply chain structure



Note: R&D, research and development; P&I, protection and indemnity.

Source: Oxera.

Shipbuilding

Shipyards generally build vessels to order for ship owners, having been through a tendering process. Alternatively, they may build a vessel to put it on the 'new-build' market. They build the ship hull and buy the equipment for the ship (e.g. the engine and the accommodation outfit), following guidelines and standards on ship construction established by classification societies. On the new-build market, and on the 'sale and purchase market' (for second-hand ships), ship brokers bring together sellers and buyers of ships. Ship owners assess vessels based on ship grades assigned by classification societies, which also supervise ship construction and undertake regular inspections to assess vessels' seaworthiness.

Ownership, operation and management

Ship owners buy vessels via ship brokers. They may borrow funds from ship finance providers against the value of their vessel. Ship brokers may act as links between charterers and ship owners. Ship owners can choose between various 'chartering' options (or contracts), which determine the allocation of costs and ship management responsibilities between the owner and the charterer. The main types of contracts are:¹

- bareboat charter—the charterer hires the ship without crew or equipment and pays for all operational costs;
- time charter—the charterer hires the vessel for a time period; the owner is only in charge of the nautical and technical operation of the vessel and bears the fixed operational costs;
- voyage charter—the owner agrees to deliver a cargo from A to B on a specified ship, usually bearing the full cost;
- contract of affreightment—similar to the voyage charter, but the ship is not specified.

At ports, ship owners usually rely on ship's agents, which liaise with port authorities and provide or organise a wide range of port services (such as food, spare parts and fuel supply, repatriation of seafarers). Further up the value chain, various actors provide ports with required services (such as dredging, port management).

Auxiliary services

Ship owners purchase maintenance and repair services from ship repair yards, as well as insurance for the vessel. They may also buy hull and machinery insurance and/or join protection and indemnity (P&I) clubs, which are non-profit mutual insurance fund providers. The insurance premium depends on the ship's grading by classification societies. As in other sectors, insurance brokers link buyers and sellers of insurance, while insurance providers buy re-insurance from re-insurance providers. For cargo insurance, the entity that owns the cargo will arrange for cargo insurance, this may be the shipper or the receiver of the cargo.

Parallel to this structure, education, skills and training providers train staff for the industry. The maritime law sector provides legal advice to all participants in the value chain and assists in settling litigations. Governments and other providers fund research projects undertaken by dedicated institutes, universities or

¹ Maritimeknowhow, 'Chartering and Charterparty online', available at: <http://www.maritimeknowhow.com/home/chartering-and-charterparties/chartering-and-charterparty-online>.

consultants. Finally, maritime authorities set the legal and administrative framework for the industry.

2.2 Maritime clusters

Benefits from clustering are revealed from the links in the supply chain. Three clusters that are likely to emerge in the industry are discussed below. Many of the well-known maritime centres are located in major port cities. The concept of business clustering or agglomeration is well established in the field of spatial and urban economics, and is especially important in the maritime sector due to widespread use of sub-contracting and outsourcing and the use of highly specialised skills. The concept behind clustering is that firms in the same or similar sectors are able to gain a productivity advantage by locating close to one another. These productivity advantages could come through a number of channels such as:

- increased competition in upstream sectors driving down prices;
- greater specialisation;
- knowledge spillovers;
- access to specialised labour.

Maritime clusters may also evolve over time. One model for cluster development in the maritime sector is presented in Lam and Zhang (2011), which describes the evolution of maritime clusters as the location becomes home to more value-adding and knowledge-intensive activities.² In the initial phases of development, activity in the cluster is focused on basic transshipment services and storage. As the cluster develops, it will also include value-added processing before shifting to more knowledge-based activities by integrating technological and financial support services. In its most advanced form, the maritime cluster becomes a centre for both maritime business services, regulators and industry associations characterised by large amounts of human capital. At this stage, the centre itself can be considered distinct from the physical activities it serves. This is a useful model for considering the evolution of maritime business services clusters in particular, although other models of cluster development may exist.

Figure 2.2 Maritime cluster classifications

Type 1	Type 2	Type 3	Type 4
<ul style="list-style-type: none"> • cargo loading, discharging, distribution • low value added 	<ul style="list-style-type: none"> • value-added processing • cargo transformation 	<ul style="list-style-type: none"> • key node in global/regional supply chains • integrates capital, information and technology 	<ul style="list-style-type: none"> • international maritime service centre • human capital • physically separate from activity

Source: Adapted from Lam, J.S.L. and Zhang, W. (2011), 'Analysis on Development Interplay between Port and Maritime Cluster', December.

The first cluster is likely to form around shipyards, with the primary benefit coming from reduced transport costs. Equipment suppliers in this cluster have lower costs of delivering equipment to shipyards, and lower travelling costs if

² Lam, J.S.L. and Zhang, W. (2011), 'Analysis on Development Interplay between Port and Maritime Cluster', December.

they need to visit the building site. Classification societies would also have lower costs of travelling to supervise the construction.

A cluster is also likely to form around ports, where the main advantage is, again, reduced transport costs and access to a pool of skilled labour. Besides the port authorities and services, it would comprise classification societies, which need to access the ships they inspect, ship repair yards, which need to be easily accessible to ships that need maintenance and repair, and providers of port support services. It is also easier for ship's agents that are located in ports to organise or provide port services.

The third cluster is centred on maritime business services. As with the ports cluster, business services could benefit from the concentration of a pool of skilled labour, although physical transportation of goods and equipment is less of a concern here. Instead, other effects are likely to be important, such as sharing financial expertise. These knowledge spillovers would exist in the industry, but could also extend to regulators and international organisations (such as the IMO). The maritime cluster itself would include ship managers, charterers, legal services, consultants, ship brokers, ship finance providers and all those involved in maritime insurance. The division of tasks in the industry, and advances in communications technology, seems to have removed the need for these sub-sectors to be close to ports and ships; agglomeration effects appear to be more important. London for instance is categorised by Lam and Zhang as being stage 4, and this is supported by the continued growth of maritime business services despite the lack of growth of throughput at the Port of London itself. In effect, the growth of maritime business services in London is no longer dependent on the growth of London (or indeed the UK) as an importer/exporter. Agglomeration and clustering becomes critical to success. To support this claim, Lam and Zhang present data taken from TheCityUK³ report on the London maritime business services industry that suggest that overseas earnings of maritime business services in London increased from £930m in 1999 to £2,216m in 2010, while throughput in the Port of London was stable over the same period.⁴

2.3 Market characteristics

When assessing the nature of competition, the characteristics of the industry must first be identified. There are common features in assessing competition between countries and between individual firms. For example, both will be affected by the scope of the market. As a result, Oxera has selected some market characteristics that draw on concepts from competition economics. Product market and geographic market definitions, in particular, are commonly used in market investigations by competition authorities, while supply-responsiveness is also a feature of competition assessment.⁵ While these market characteristics draw on ideas from competition economics it is important to note that due to the broad scope of this work, the analysis presented here is intended to characterise the nature of competitiveness rather than replicating a detailed market assessment.

There are some important distinctions between competition in an industry and competition between countries; the remaining market characteristics aim to capture these. Specifically, Oxera considered demand-side drivers for different

³ Formerly International Financial Services London.

⁴ This is based on data produced by the DfT on the throughput of major UK ports.

⁵ See Competition Commission (2013), 'Guidelines for market investigations: Their role, procedures, assessment and remedies', April.

maritime services, and the regulatory and policy context to be important areas that could affect competitiveness.

These market characteristics define how businesses interact with suppliers and customers, how they make investment or expansion decisions, and how businesses perform. In turn, these interactions determine the nature of the competition within the particular industry, which is relevant for assessing the performance of a particular country. This section presents the framework for assessing the market characteristics under which cross-country comparisons can be made, and applies these to the four broad maritime sub-sectors (i.e. ship ownership, management, support services; port services, port support services; education, skills, training; and business services).

The market characteristics have been categorised as follows.

- **Geographic market:** this defines the area in which the product can be bought or sold. It is relevant for determining which other market players are active or can access the market, and therefore whether incumbent businesses in the market have an advantage, and what scope there is for challengers to enter the market.
- **Product market:** the availability of substitutes, and the ease and cost of switching, can broaden the definition of the market. If other products can be included in the product market, the behaviour and developments in these wider markets will also be relevant to assessing the level of competition.
- **Supply-responsiveness:** this includes the speed at which capacity can be expanded to respond to changes in demand. Whether the additional capacity arises from the expansion of an incumbent or the entrance of competitors can be important in determining the nature of competition in the market. The physical and capital intensity required to enter a market can provide a barrier to entry for new competitors. This is particularly the case if these costs are 'sunk' (i.e. irrecoverable), which can discourage entry or expansion.
- **Regulatory and policy context:** administrative and regulatory requirements vary across countries, as do national strategies and, therefore, taxes and subsidies. If the costs of compliance, including monetary and time costs, vary between nations, this can have a material impact on the costs faced by businesses and, therefore, the decision to locate.
- **Demand-side drivers:** the demand for the total market, as well as changes of preferences within it, can play an important role in the dynamics of demand and supply. The level and composition of demand can change the levels of risk and return faced by businesses, and therefore affect investment or entry decisions as well as overall performance.

These factors are relevant to the discussion around the competitiveness of any industry. The following section applies them to the maritime sectors defined in section 1.

2.3.1 Ship ownership, management, support services

Shipping services refers to the transport of passengers and freight over water including excursion, cruise or sightseeing boats, ferries and water taxis. The full list of activities are listed under Standard Industrial Classification division 50

'Water Transport'.⁶ For the purposes of this research, Oxera has excluded towage services (which are part of the SIC classification), as these are considered under port services.

Geographic market

In general, the provision of shipping services is geographically mobile. Standard ships can be easily transferred to alternative routes, or into different ports; however, specialist or bespoke ships—such as supersized containerships—may require specific infrastructure or equipment that limit or prohibit this.

Product market

Vessels are categorised according to the maximum dimensions that meet the restrictions of either bottleneck main sea routes (such as the Panama and Suez Canals or the Strait of Malacca) or common port terminal standards. This creates market segmentation according to trade routes. For example, Capesize vessels cannot be used to ship goods through the Panama Canal, while one would expect Panamax vessels (whose dimensions fit the Panama Canal) to struggle to compete with the economies of scale offered by larger vessels on routes travelling via the Cape of Good Hope.

The market is also segmented by the various categories of cargoes and passengers that require a specific type of ship. Bulk carriers generally transport raw materials; container carriers transport manufactured goods; tankers carry a range of liquids including crude oil, Liquid Petroleum Gas (LPG), petroleum, agricultural products (e.g. vegetable oil) and chemical products; specialised tankers transport Liquefied Natural Gas (LNG), since a cooling system is required to keep the gas in its liquid state at -163°C ;⁷ and ferry and cruise ships serve passenger transport for passenger and roll-on/roll-off (ro-ro) traffic. Ro-ro vessels can also accommodate goods vehicles. There is also a range of specialised freight vessels for goods such as livestock. For the purposes of this report, Oxera has considered the key broad categories of vessel—i.e. bulk, liquid, LNG, container or passenger transport.

Alternative transport modes can substitute for shipping services, as long as they can serve the appropriate types of cargo or passenger. The connectivity, price and reliability of these services can provide competitive pressure for shipping services. To assess the extent of competition between transport modes, Oxera considered the German and Chinese markets, which were selected because:

- China is the world's largest exporting and second largest importing country, while Germany is the third largest country for both exports and imports;⁸
- China serves as an example of the long-distance shipping market and Germany an example of the short-distance market.

Germany is crossed by six core Trans-European Transport Network (TEN-T) corridors⁹ and is therefore well connected by rail and road to its main trade

⁶ Office for National Statistics (2009), 'UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007) Structure and explanatory notes'.

⁷ UNCTAD (2010), 'Review of maritime transport 2010'.

⁸ Exports data: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2078rank.html>. Imports data: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2087rank.html>.

⁹ European Commission, 'Infrastructure – TEN-T – Connecting Europe', available at: http://ec.europa.eu/transport/themes/infrastructure/index_en.htm.

partners—i.e. European countries.¹⁰ Short-sea shipping is likely to be a viable alternative for trade with some European countries that are not direct neighbours, such as Spain. Several rail routes also link China to its largest trading partner, Europe, while the main sea route between the two locations is South of Asia and through the Suez Canal.¹¹ Oxera estimated the operational costs of freight for the various modes for both origin–destination pairs.¹²

Oxera found that the costs of sea freight are less than half those of the cheapest alternative mode (rail) for both origin–destination pairs. Note that some costs were not included in these estimates, such as transshipment costs and port charges, but including these does not materially reduce the gap between modes.¹³

Table 2.1 Freight monetary costs by route (2013, €/tonne)

Origin–destination pair	Sea	Rail	Road
EU–China	350	784	–
Germany–Spain	123	367	678

Source: Oxera.

The large difference in monetary costs indicates that for most goods sea shipping is not likely to compete in the same market as alternative modes. Commodities with a high inventory cost (value of freight time) would be carried by train or road, while non-time-sensitive freight is likely to be shipped.

Supply-responsiveness

In the short term, ships operating at below full capacity are able to offer increased capacity immediately, which can produce an environment of aggressive price competition that increases volumes and reduces the excess capacity. However, where there is important oversupply in capacity, it is likely to persist for several years: as long as shipping rates are above marginal shipping costs—the cost of using ships that are already available—ship owners will prefer offering their capacity to leaving their ships idle.¹⁴

¹⁰ In 2014, 68% of German exports and 71% of German imports were to and from European countries. See Statistisches Bundesamt, available at: <https://www.destatis.de/EN/FactsFigures/NationalEconomyEnvironment/ForeignTrade/TradingPartners/Curent.html>.

¹¹ For Europe–China trade figures, see: http://eng.rzd.ru/stalice/public/en?STRUCTURE_ID=88.

¹² For Germany–Spain, Oxera estimated the distances between the capital cities using CIS (<http://cis-online.rne.eu/>) for rail, the AA Route Planner (<http://www.theaa.com/route-planner/index.jsp>) for road, and Searates (<http://www.searates.com/reference/portdistance/>) for sea. Oxera multiplied these by average operational costs in Western Europe for the three modes from the Compete study. See: Compete (2006), 'Final Report, Annex 1: Analysis of operating cost in the EU and the US', July. For the sea route, Oxera assumed that goods would be carried to the port by HGV. For the other O-D pair rail cost, Oxera estimated the distance between Beijing and each EU-15 capital using a combination of CIS, Google Maps, and the Russian Railways website (<http://rpp.rzd.ru/Rzd/>); Oxera multiplied these by the average rail operational cost for Eastern Europe; and Oxera took a simple average (Sweden and Finland were excluded due to the complexity of accurately estimating rail distances, but this does not have a material impact on the results). For sea freight, Oxera used OECD data on the maritime transport cost of different types of goods between China and the EU-15 and estimated an average weighted by the quantity traded of each type of good.

¹³ Oxera estimated average transshipment costs from HGV to ships to be 4 €/tonne. It is obvious that adding two transshipments to sea costs in the table does not make a material difference. Furthermore, transshipment costs would have to be added to rail costs as well. Oxera used transshipment costs from truck to ship at the port of Le Havre from the Compete study mentioned above and average container weight from IFEU (IFEU Heidelberg (2010), 'Ecological transport information tool for worldwide transports: methodology and data—second draft report', available at: http://www.ecotransit.org/download/EcoTransIT_World_Methodology_Data_100521.pdf)

¹⁴ If the market is oligopolistic, it is sufficient that the marginal return to supplying additional capacity—that is the impact on total revenues of supplying an additional unit of capacity, taking account of the effect on prices of other units supplied—is greater than the marginal cost for oversupply to persist.

It is possible for excess capacity to be reduced with the use of slow-steaming¹⁵ or laying-up vessels,¹⁶ to reduce capacity during periods of low demand. These techniques are particularly useful to ship owners if charter rates fall to a level below the operating cost of their vessel. However, these forms of supply adjustments require appropriate price signals, which appears to be present in the data. Freight rates in the past year have been low in container, tanker and dry bulk capacity markets across most carrier types because of oversupply and idle capacity, and UNCTAD forecasts that the gap between supply and demand will persist or increase in some of these markets.¹⁷ If slow steaming is being practised, supply can be increased rapidly by resuming normal travelling pace.

The market for Freight Forward Agreements (FFAs), such as the Baltic Exchange trading platform, where capacity is traded and re-traded, is liquid. This suggests that freight capacity is easily accessible, and potential future capacity shortfalls can be identified early. Ships can be bought and sold on the secondary market, and can be moved to different routes, which allows for some degree of supply-responsiveness. A potential constraint to the supply-responsiveness of shipping is the capacity available at port terminals, although the high (and increasing) levels of port capacity in the UK means that this effect is likely to be limited. Furthermore, long-term contracts between shipping companies and shippers or between ports and carriers can limit supply-responsiveness, and potentially restrict entry from new competitors. Long-term contracts are standard in LNG shipping, but a mixture of long- and short-term contracts seems to exist in other markets.¹⁸

Building new ships has a long lead time. Excluding the planning and design phase, ships generally take around two years to build, with smaller ships taking around a year, and large, bespoke cruise ships over four years.¹⁹ Due to the high fixed costs involved in shipping, and the long lead times, it is difficult to increase the supply of ships in the short and medium term, beyond the secondary market for ships.²⁰

Lagged supply-responsiveness has been exacerbated by the increase in larger container ships, which have a higher risk of running far below capacity. The shipping industry has responded to this with carriers trading and sharing slots in

¹⁵ Operating a vessel below its maximum speed, as slow as 14–16 mph. Slow steaming can also be used to save fuel and therefore cost. White, D. (2010), 'Ocean shipping lines cut speed to save fuel costs', *Los Angeles Times*, 31 July, available at: <http://articles.latimes.com/2010/jul/31/business/la-fi-slow-sailing-20100731>.

¹⁶ Temporarily removing a ship from service. This does involve some cost and cannot be reversed as quickly as slow steaming

¹⁷ UNCTAD (2014), 'Review of Maritime transport 2014', November

¹⁸ For example, long-term charters of two years of more made up 34% of total tanker chartering activity in 2009. UNCTAD (2014), 'Review of Maritime transport 2014'.

¹⁹ For example, a shuttle tanker takes around two years to build, see Liang, L. (2015), 'Cosco shipyards bag orders to build shuttle tanker and module carrier', *Seatrade Global*, 6 February, available at: <http://www.seatrade-global.com/news/asia/cosco-shipyards-bag-orders-to-build-shuttle-tanker-and-module-carrier.html?highlight=YToxOntpOjA7czo1OiJidWlsZCI7fQ>.

LNG carriers take around two years to build, see Liang, L. (2015), 'Yangzijiang wins first order to build LNG carriers for Evergas', *Seatrade Global*, 17 February, available at: <http://www.seatrade-global.com/news/asia/yangzijiang-wins-first-order-to-build-lng-carriers-for-evergas.html?highlight=YToxOntpOjA7czo1OiJidWlsZCI7fQ>.

Small container ships take just over one year to build, see Liang, L. (2014), 'Wenchong Shipyard wins order for two small container vessels', *Seatrade Global*, 18 December, available at: <http://www.seatrade-global.com/news/asia/wenchong-shipyard-wins-order-for-two-small-container-vessels.html?highlight=YToxOntpOjA7czo1OiJidWlsZCI7fQ>.

²⁰ Ships can cost in the region of \$100m, with cruise ships as much as double this. See Liang, L. (2015), 'China EximBank extends \$312m loan to SWS to build 18,000 teu boxships', *Seatrade Global*, 26 January, available at: [http://www.seatrade-global.com/news/asia/china-eximbank-extends-\\$312m-loan-to-sws-to-build-18000-teu-boxships.html?highlight=YToxOntpOjA7czo1OiJidWlsZCI7fQ](http://www.seatrade-global.com/news/asia/china-eximbank-extends-$312m-loan-to-sws-to-build-18000-teu-boxships.html?highlight=YToxOntpOjA7czo1OiJidWlsZCI7fQ); and Chanev, C. (2015), 'Cruise Ship Cost to Build', *Ship Cruise*, 15 March, available at: <http://www.shipcruise.org/how-much-does-a-cruise-ship-cost/>.

other carriers' ships. This allows them to increase the number of ports served, while also reducing the excess capacity on ships.²¹ Over time, this has developed into more formalised alliances between carriers, with arrangements including sharing terminals, joint service agreements (termed slot sharing), and purchasing inputs—such as containers—together.²² These practices are common, and change the competitive landscape in the industry.

Regulatory and policy context

As with other maritime sectors, regulations and policy factors play a role in providing an attractive and competitive location. For example, regulatory burdens could reduce the attractiveness of the UK as a business location, as well as the ability of existing firms in the UK to compete globally by increasing operating costs.

Tax is a key area of the policy and regulatory environment. For shipping services, tonnage tax, a specific tax for the shipping industry, allows carriers to pay tax based on fixed rates according to the tonnage of the ships in their fleet, instead of corporation tax on actual profits. Many countries operate a tonnage tax, which is generally levied as a lower obligation than corporation tax.^{23,24}

For shipping services, differences in maritime law across countries can affect where shipping firms locate their headquarters. Precedent on the enforcement of contracts and arbitration procedures can also determine the relative attractiveness of different jurisdictions and, therefore, the competitiveness of firms located in different territories.

In Europe, regulations set by the EU can affect ships either operating in EU waters or owned by companies operating in the EU. In general, legislation that applies to EU-owned or- managed vessels would be expected to change the international competitive landscape. Ongoing Commission legislation in the shipping sector covers competition law, state aid and environmental emissions reductions.

In the UK, light dues are also levied on commercial vessels to fund the provision of lighthouse services, creating additional costs for vessels operating in UK waters.

Demand-side drivers

Changes in trading relationships between nations, or in global supply chains, can affect the demand for shipping services. These external factors can significantly change the landscape of shipping routes. Similarly, changes in logistics and supply chains can drive a shift between types of ship—such as from dry bulk to containers when the location of manufacturing activity shifts.

The customer's degree of price sensitivity is another key demand driver. Shipping services face derived demand, as demand for shipping arises as a result of demand for the final goods. As shipping costs generally make up a

²¹ Trujillo, L. and Serebrisky, T. (2003), 'Market Power: Ports', The World Bank Group, Private sector and infrastructure network, March.

²² Trujillo, L. and Serebrisky, T. (2003), 'Market Power: Ports', The World Bank Group, Private sector and infrastructure network, March.

²³ For the difference between corporation tax and tonnage tax for UK registered companies that elected to pay tonnage tax from 2000–01 to 2003–04, see HMRC, 'International - Tonnage Tax', available at: <http://webarchive.nationalarchives.gov.uk/+http://www.hmrc.gov.uk/international/tonnage.htm>.

²⁴ In principle, a tonnage tax could also reduce the incentive to maintain large amounts of spare shipping capacity as the tonnage would still attract a tax charge. However, the level of the charge is set at a level such that this is unlikely to have a material effect on incentives to invest in vessels.

small share of production costs, consumers of shipping services may be less responsive to changes in price.

Summary

The shipping sector is generally geographically mobile, which highlights the importance of the regulatory context. Regulation, tax and policy stability can drive the location and performance of shipping companies. The product market is diverse, with different types of freight and passengers, which is crucial to consider when assessing a particular market. The evidence suggests that sea shipping is unlikely to compete with alternative transport modes in most markets. Supply-responsiveness within each market segment is limited in the short term by the lead times associated with shipbuilding and the use of long-term contracts. Conversely, when there is excess capacity in the market, the mobility of ships and established brokerage services both allow high supply-responsiveness. Overall, the performance of the shipping sector relies heavily on trade patterns and the demand for transport, which drives the level of investment being undertaken and the growth in this sector.

2.3.2 Port services, port support services

Ports can offer core/traditional services, as well as value-added services.²⁵ Table 2.2 provides a description of core services generally offered at ports:

Table 2.2 Core services offered at ports

Service type	Sub-class
Marine services	<ul style="list-style-type: none"> Access and protection Pilotage—to secure the safety of ships navigating in, or in the approaches to, a harbour Towage of vessels Vessel traffic management Fire protection service Chandlery (provision of supplies or equipment for ships)
Terminal services	<ul style="list-style-type: none"> Mooring services Container handling and transfers Breakbulk and neo-bulk cargo handling (handling of goods that are neither bulk nor containerised—e.g. drums, crates and pallets) Dry and liquid bulk cargo handling Container stuffing and stripping (packing and unpacking of containers) Bagging and packaging (baggage services for passengers) Cargo storage
Repair services	<ul style="list-style-type: none"> Dredging and maintaining channels and basins Lift equipment repair Dry dock ship repairs Container and chassis repairs
Estate management services	
Information management services	

Source: Oxera.

²⁵ World Bank (2003), 'Framework for port reform', Port Reform Toolkit, Module 1, p. 9.

Geographic market

Ports and port services can serve hinterland markets by connecting to inland transport infrastructure, by serving as a transshipment hub, or both. Each of these operations has a different competitive dynamic. In some locations, only a single port can logistically connect hinterland markets to maritime transport. Whether a port is a hinterland or transshipment type could be driven by geographical features, lack of adequate transport infrastructure to other potential port sites, or political or other issues.

In the transshipment market there may be a number of competing ports across or within countries, although certain sites may be favoured owing to their geographical location. Ports may not need to compete directly with neighbouring ports—for example, a regional port can become a hub for transshipment to small ships that distribute within the region. This is known as a ‘hub-and-spoke’ network. It can be more efficient than moving a larger vessel to all the required ports, and it allows regions to adapt—for example, to large container ships—without all of the ports in a region having to undertake the significant capital investment required.

The competitiveness of the UK is relevant to the extent that it operates in the same market as other countries. While other maritime services are relatively mobile, the fixed nature of ports means that it is worth considering how far UK ports might compete with alternative ports (and transport modes). This affects individual cargo types as follows.

- For bulk cargoes with a low value to weight ratio, analysis by the OFT²⁶ suggests that the geographic market can be as little as 30 miles.²⁷ Diversion of cargoes to European ports before onward travel to the UK (or vice versa) seems especially unlikely due to the additional travel costs in reaching the final inland destination. Eurotunnel competes with sea routes by offering a link between continental Europe and the UK. However, dedicated rail freight passing along this line is relatively modest, at 1.65m tonnes in 2014.²⁸
- For ro–ro traffic, Eurotunnel use is significantly larger, at around 18.7m tonnes.²⁹ However, assuming that the ultimate destination for journeys is fixed, the onward cost would still seem to be a barrier to competition between UK and European ro–ro ports.
- In container transport, the OECD has reviewed Commission decisions in competition cases.³⁰ This provides an insight into how far UK ports might be expected to compete with other countries. For servicing the hinterland market, the UK and Ireland are considered a separate market from Northern Europe and the Mediterranean.³¹ For the transshipment of containers from larger to smaller ships, the Commission considers the UK to be part of the Northern European market, although it has recently suggested that limits to

²⁶ Now the Competition and Markets Authority (CMA).

²⁷ Office of Fair Trading (2002), ‘Acquisition by Peel Ports Ltd of Clydeport plc’, ME/1656/02.

²⁸ See Eurotunnel, ‘Traffic figures’, available at: <http://www.eurotunnelgroup.com/uk/eurotunnel-group/operations/traffic-figures/>.

²⁹ See Eurotunnel, ‘Traffic figures’, available at: <http://www.eurotunnelgroup.com/uk/eurotunnel-group/operations/traffic-figures/>.

³⁰ OECD (2011), ‘Competition in Ports and Port Services Policy Roundtables’.

³¹ Case No IV/39.689 Sea Containers v Stena Sealink, Commission decision of 21 December 1993; Commission decision 94/119/EC of 21 December 1993, concerning a refusal to grant access to the facilities of the port of Rodby (Denmark). Case C-242/95 GT-Links v DSB [1997] ECR I-4449.

substitution between facilities might mean a narrower definition is more appropriate.³²

- Among the more specialised vessel types, there may be some scope for LNG vessels landing in the UK to travel on to Europe. This is because of the potential to export natural gas through the IUK pipeline, which links the UK and Belgium without the need for transshipment.

Based on the analysis above, the scope for competition between ports in the UK and elsewhere appears to be limited for most sub-sectors. As such, it seems sensible to restrict the assessment of competitiveness to the transshipment of container freight. Using the Commission's geographic market definition, the key competitor countries will mostly be in Northern Europe. This report therefore restricts the assessment of the UK's competitiveness to containerised transport against competitor countries in Northern Europe. Moreover, given the additional seaborne journey that would be required when landing a cargo in the UK for onward transport to Europe, it may be the case that UK ports are only able to compete for UK-bound traffic. This view has been expressed in a study by Portopia for the Commission.³³

Product market

As with shipping, alternative transport routes can provide substitutes for the demand for ports and port services. Again, the connectivity, price and reliability of these rival freight corridors can provide competitive pressure for the maritime transport industry.

The services required by different types of ship vary, and many ports therefore need to specialise. Bulk cargo, containers and LNG (for example) require different water depth, docking and unloading services. Given the cost of specialist equipment, ports often specialise in offering services to one or several types of ship. As a result, the product market for ports is restricted to other ports and other modes of transport that offer the same specialised transport. Ports may be subject to buyer power from shipping carriers that provide large amounts of business to the port. Significant investment in specialist facilities to serve super container ships or LNG tankers would require a port to seek long-term contracts or joint-financing agreements with shipping carriers to ensure a return on the investment.

In principle, the market for port services could be extended to cover alternative modes of transport such as road, rail and air. In practice, however, the OECD notes that substitution from maritime to other modes is uncommon in freight, as maritime provides a low-cost method of transporting heavy or bulky goods.³⁴ Ports can offer further services to add value to their traditional services, such as general logistics (including storage, loading and unloading); distribution; higher-value services such as repackaging, quality control, and storage; and general services such as equipment renting and maintenance, cleaning facilities, security services, offices, and communication services. Companies are increasingly using improved logistics as a way to reduce costs. As a result, ports can offer logistics services to differentiate themselves and compete on grounds other than price. Examples of improved logistics systems include choosing the location for distribution centres offered by ports, connecting to a transportation network that

³² OECD (2011), 'Competition in Ports and Port Services Policy Roundtables', p. 234.

³³ Portopia (2014), 'Deliverable 1.1: State of the European Port System – market trends and structure update Partim transshipment volumes', January.

³⁴ OECD (2011), 'Competition in Ports and Port Services Policy Roundtables'.

allows easy and often multi-modal access, and developing an integrated information system.

Supply-responsiveness

Port terminals are characterised by having large fixed costs and low marginal costs. The financial investment required to build or expand terminals is usually upwards of £100m, with the Port of Liverpool's container terminal in 2012 costing £300m, and London Gateway Port totalling £1.5bn in investment.³⁵ Businesses undertaking this financial investment would seek to ensure that their new terminal gains and maintains market share. In addition, many of the assets required to provide port support services are not mobile, and have long economic lives. The upfront financial capital necessary for a new port facility—including the cost of dredging, access roads, and quay and port construction—or support services presents a barrier to entry for new entrants.

Port infrastructure is generally designed to provide capacity for actual and forecast demand. As such, excess capacity within ports is common.³⁶ As with shipping, the combination of excess capacity and low marginal costs allows the existing suppliers in the industry to easily increase supply, which characterises the ports sector as highly responsive in the short term. It is worth noting, however, that large amounts of excess capacity could increase costs.

If the ports in a particular region are operating close to capacity then supply-responsiveness is limited, as the lead time to build the necessary infrastructure can be several years. In this case, supply is less responsive in the short and medium term, reducing the potential competitiveness of the sector in this location.

There have been many recent changes in technology, predominantly increases in the speed and size of container ships (in both beam and length). Ports that have been able to offer the terminal facilities to cater for these ships, particularly faster loading facilities and larger docking and turning areas, are at a competitive advantage. Ports that are able and willing to undertake the physical capital investment required for these facilities can compete strongly in the sector.

In addition to the cost, constraints on land can be a barrier to supply-responsiveness. Sites must satisfy a number of criteria in order to be suitable for development from a commercial and planning policy perspective. In addition to its location (i.e. proximity to markets), a site must satisfy the natural requirements outlined above in the geographic market section, such as in terms of protecting bays, water depth, etc. Geographical restrictions can prevent an increase in supply, either from new entrants or from expansion for existing ports.

Regulatory and policy context

National planning policy is a key part of the long-term policy landscape for ports. The planning system can act as both a constraint and an additional cost to port development.

The customs procedures and regulations that a port must abide by can create a divergence in the relative efficiencies of different nations' ports. Lengthy procedures can hinder a port's ability to compete for market share.

³⁵ Mersey Maritime, 'Port of Liverpool's £300m giant dock project set to get underway', available at: <http://www.mersey-maritime.co.uk/about-us/liverpool-2-port-of-liverpool.phuse>; and Invest Essex, 'London Gateway Port', available at: <http://www.investessex.co.uk/studies/place-studies/london-gateway-port/>.

³⁶ Trujillo, L. and Serebrisky, T. (2003), 'Market Power: Ports', The World Bank Group, Private sector and infrastructure network, March.

A key responsibility of governments in the performance of ports is investing in connecting infrastructure, to ensure the port is sufficiently well connected to domestic transport networks. Where local or national policy is in place to support transport networks and the connectivity of the port, this can substantially reduce the time and therefore cost to transport, and increase the reliability of the corridor, thus increasing the competitiveness of the port and facilitating trade links.

Environment and safety regulations increase the requirements that a port must service, and therefore the costs faced. Environmental regulations include the disposal of spoils and hazardous materials used in operations, and coastal preservation. Safety regulations include holding appropriate licences, contingency planning, and emergency plans. These may vary between countries, which creates further competitive pressure; however, effective safety regulations can also be a signal for quality.

As with shipping, supra-national legislation (such as by the EU) can play an important role. Local governments and municipalities can also play a significant role in the regulatory environment for ports, for example through planning rules.

Demand-side drivers

Changes in trade patterns or distribution networks can affect the demand for ports and port services. New trading relationships between countries or increased trade between two regions can increase demand for particular freight corridors, and therefore for particular ports. These external factors can dramatically change the relative performance of ports.

The customer's degree of price sensitivity is another key demand driver. As in the case of shipping, this is affected by the share of port costs in the total costs of the goods being shipped. If the port costs make up a significant share then consumers of shipping services may be more responsive to changes in price, driving stronger competition between ports.

A barrier to entry for new competitors are the switching costs when carriers change their existing relationships with ports, which can involve long-term contractual arrangements.³⁷ In this context, customer loyalties, or economies of scale and discount arrangements, may affect carriers' propensity to switch. Carriers may have equipment installed in a particular port, such as handling facilities, which is expensive to move. Similarly, businesses may have established distribution centres or assembly sites near a particular port, making it difficult for new ports to compete for the business. Most of these customer switching costs apply to those serving the hinterland market. As a result, transshipment customers are likely to face much lower sunk costs when contemplating switching, and this may therefore increase the level of competition between ports and port services.

Summary

Ports face significant geographic challenges, which can offer certain regions or ports substantial natural advantages. Serving hinterland markets and/or transshipment trade poses different competitive challenges, and the success of each is determined by, among other factors, trade patterns and global logistics networks. As such, demand-side drivers present a risk to investment, which can involve significant amounts of capital in 'sunk' or irrecoverable costs. The limited geographic market for hinterland transport means that it seems sensible to

³⁷ See Office of Fair Trading (2006), 'Acquisition by Montauban of Simon Group plc', ME/2500/06.

restrict the assessment of competitiveness to the transshipment of container freight. The key competitor countries for this market are likely to be in Northern Europe.

2.3.3 Business services

The main business services covered in this report are ship broking, maritime insurance, maritime legal services, classification services, and maritime financial services. Where appropriate, these will be considered separately in order to capture the broad range of services within this wider category.

Geographic market

Maritime business services, such as ship financing and insurance providers have historically been clustered near trading centres and large ports. This is due to role of the maritime industry in the origins of financing and insurance services in the seventeenth century, with ship owners and merchants seeking financing to pay for their ships, and insurance for their ships and cargo. These clusters persisted for some time, attracting ship brokers, but also developing other business services such as the stock exchange, which traded marketable securities such as international stock and commodities, as well as wider insurance and financing services.^{38,39} (The role of maritime clusters in business services is discussed in section 2.2 below.)

Product market

Due to the highly specialised nature of the maritime industry, this sector is likely to require maritime-specific business services. Many maritime business services are necessary for the operation of shipping or port services. For example, classification services and ship broking are the only providers of these services. Insurance and legal service providers require specialist knowledge, and thus the product market is restricted to maritime-specific providers.

Supply-responsiveness

Labour is a key input into maritime business services. As a result, there is likely to be some expansionary capacity immediately available to businesses, through staff working overtime and hiring new workers. There may be a lead time to training new professionals, although links with wider business services would minimise this. This could be through joint recruitment and training programmes, or training individuals who are already qualified in a similar profession to specialise in the maritime industry.

Links to wider business services would also help with access to capital (e.g. ship financing and insurance), access to investors (e.g. ship financing), and dealing with new regulatory requirements (e.g. legal services, insurance and ship financing).

There are low levels of physical capital intensity in the general provision of business services, although there are varying levels of financial capital intensity. Ship broking, ship financing and maritime insurance require significant financial capital and capital buffers, particularly in response to regulatory requirements. These capital requirements provide a significant barrier to entry for new entrants,

³⁸ See Aviva, 'Insurance through the ages', available at: <http://www.aviva.com/about-us/heritage/history-of-insurance/>.

³⁹ See London Stock Exchange, 'Our History', available at: <http://www.londonstockexchange.com/about-the-exchange/company-overview/our-history/our-history.htm>.

and also reinforce the links between maritime-specific business services and general business services.

Regulatory and policy context

The broad regulatory and tax environment, rather than maritime-specific regulations, are of most importance for maritime business services. However, certain regulatory requirements affect maritime business services more than the rest of the sector, and increase the administrative burden. In particular, financial regulation, such as lower leverage ratios from Basel III requirements, increases the costs of providing banking services, while Solvency II places similar burdens on maritime insurers.⁴⁰ While these international accords affect all countries, some financial sector regulators may choose to impose even more stringent requirements, which could affect competitiveness in their respective countries.

However, strong regulation and oversight can be a signal of credibility and quality. Rules on capital buffers can assure those seeking financing on the reduced likelihood of loans being recalled early. Strict rules from classification societies can assure customers of a certain level of quality of shipping services. Maritime insurance and legal services must have the appropriate accreditation, which can guarantee a level of service, albeit at a cost.

A stable policy environment can provide businesses with certainty, thereby encouraging investment and expansion. In the case of maritime business services, examples of regulatory requirements include capital requirements for financing companies, and safety requirements for ships.

Relative corporate and labour tax rates may play a substantial role in the location decisions of business service providers. Business services are characterised by high labour intensity and a substantial portion of their costs are therefore labour-related. As such, tax regimes may affect the relative competitiveness of businesses operating in different countries.

Demand-side drivers

Overall growth in the maritime transport sector is the main driver of demand for business services. More cargo being transported implies increased provision of all maritime business services. This requires more insurance and legal services in the short term, and increased ship financing and classification services in the medium term. Ship broking is driven by demand for shipping and increased trade, but also by market liquidity, which can often be driven by levels of uncertainty.

Changes in technology may require more interaction with finance providers, classification societies and insurance providers, affecting demand for a range of business services. External factors, such as changes in climate and conditions, can affect the safety requirements for ships or the level of insurance desired, again affecting the interactions and transactions between ports and shipping companies and maritime business service providers.

Summary

It is crucial to bear in mind the diversity of the businesses operating within the sector 'maritime business services'. These sectors, while distinct, interact with

⁴⁰ Basel III is the latest of a series of banking accords developed by the Basel Committee on Banking Supervision, to strengthen the regulation, supervision and risk management of the banking sector. Solvency II is an EU legislative programme consolidating and strengthening capital requirements in the insurance sector.

each other and produce the phenomenon of a cluster. Links within maritime business services, and also with wider business services, determine the competitiveness and therefore the performance of a cluster, which can also attract and retain a necessary pool of skilled labour. The market for business services in maritime is likely to be wide, with clusters able to serve customers globally. Although, in many cases, the growth of the cluster is underpinned by local demand for these services.

Historical inertia produces benefits such as a well-developed regulatory framework and the presence of a pool of skilled labour. However, the sector is mobile, and the benefits produced by a cluster must be considered alongside the costs, which include regulation and taxation.

2.3.4 Education, skills, training

Maritime education, skills and training most commonly applies to seafarer training. Specialised training is also required for engineers, lawyers and insurers, as well as for those working in ports.

Geographic market

Historically, the largest maritime colleges and training centres have tended to be located near to large ports, with access to facilities and equipment encouraging this trend. Instructors and trainers usually require a minimum of several years' experience in the field, depending on the speciality.⁴¹ The highest concentrations of people with the required skills and experience are likely to be located near ports.

There is a wider trend in education of courses moving online, with either interactive sessions held in virtual classrooms, or seminars and materials that can be downloaded and reviewed at the pace of the trainee. 'Simulation-based' learning—which is already used in other disciplines such as medicine—can replace real experiences with 'immersive' ones, which replicate substantial aspects and interactions of the real world. The combination of online classes and simulation-based learning reduces some of the benefits of proximity to ports, and may promote competition. Some colleges already provide simulators to mirror the bridge of any ship in the world, increasing the variety of training offered and reducing the access required to ships.⁴² The international standard for seafarers set by the International Maritime Organization (IMO) in the Standards of Training, Certification and Watchkeeping (STCW) convention mandates a period of sea service as part of officer training. The mandatory sea service provides an advantage to training providers that have links with ship owners or managers, although this clearly does not necessitate being close to a port.

Training for maritime-specific business services, such as maritime legal services, can be offered as an extension to the training for general business services.⁴³ There is therefore less benefit to being co-located with ports or other providers of maritime business services, although there are benefits to being located near the providers of the respective business services in terms of access to trainers and lecturers, and links with the wider industry.

⁴¹ For example, one year for new mates. See Standards of Training, Certification & Watchkeeping, 'Training Requirements for Existing and New Mariners', available at: <http://www.stcw.org/training.html#Anchor#2>.

⁴² See Scottish Maritime Academy website, available at: <http://www.smaritime.co.uk/>.

⁴³ For example, while most universities offering degrees in maritime law in the UK (e.g. Southampton, Swansea, City University London) also have specialised maritime institutes and are located near maritime centres, this does not seem to be the case for, for example, the University of Nottingham.

Product market

The IMO sets international standards on the level of training required by seafarers and other marine officers, which allow for the international transferability of qualifications.⁴⁴ As such, the product market broadens, as those seeking training can choose between international providers. Some countries, such as the UK, have higher requirements—for example, the education provider must be approved by the national Maritime and Coastguard Agency.

Many maritime colleges, training centres and schools offer further education such as apprenticeships through their links to ports and port services.⁴⁵ Maritime-specific business services education providers are likely to offer similar internships and placements. These links complement the provision of education services, and suggest that those businesses that are able to offer them are likely to benefit.

Supply-responsiveness

In the short term, an increased demand for education services is likely to be met by higher intakes. In the medium term, the supply of trainers and instructors is likely to pose a constraint, due to the qualifications and experience required. Capacity in maritime business services education is likely to be expanded more easily in the medium term.

The physical and financial capital required for this provision is fairly low. The specialist equipment required can be sourced more easily if the education provision is located near existing ports or port services, although with the increase in online and simulation-based learning this is likely to pose only a small constraint.

Regulatory and policy context

As well as seafarers, those working in maritime business services such as finance, insurance and legal services require certain qualifications. The Institute of Chartered Shipbrokers sets the educational standards for the industry.

Education providers that offer maritime officer qualifications that exceed these standards may benefit, as their qualifications will be transferable to those countries that require additional certification. Similarly, standards that exceed the mandated level of certification may be a signal of higher quality, which improves the international competitiveness of the training offered.

Subsidies, grants and student loans offered by national governments can also affect the international competitiveness of education provision.

Demand-side drivers

Demand for education services can come from individuals, but also from the maritime industry as it seeks trained officers.

Individuals seeking education services would consider the wages offered in the maritime industry compared to those of the wider economy. The cost of training,

⁴⁴ International Maritime Organization, 'International Convention on Standards of Training, Certification and Watchkeeping for Seafarers', 1978 and subsequent revisions, available at: <http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-on-Standards-of-Training,-Certification-and-Watchkeeping-for-Seafarers-%28STCW%29.aspx>.

⁴⁵ While termed 'schools and colleges' these are generally further education institutions, including universities.

and therefore grants, loans and fees, may also affect the international competitiveness of education services.

Demand-side drivers from the industry include the overall demand for maritime services. Growth in the maritime transport sector, and growth in trade, can affect the demand for trained seafarers and professional services. Changes in the type of goods transported, such as the introduction of containerships in the 1960s and the associated automation of stevedoring services, have reduced the requirement for skilled labour in this part of the industry.

Summary

Maritime colleges benefit from being located near ports and holding links with shipping companies. However, new ways of learning may challenge this existing model. International levels of mandatory qualifications combined with national support for funding of training courses are likely to provide a supportive environment for maritime colleges to flourish. The demand for a maritime career, from students and prospective cadets, may pose a constraint, which requires colleges to compete to offer a quality training programme.

2.4 Competitiveness in the maritime industry

The nature of the maritime industry—which is characterised by the widespread use of sub-contracting, outsourcing, and highly specialised labour—leads to emergence of three types of clusters. The first cluster is likely to form around shipyards and to include equipment suppliers and classification societies, with the primary benefit coming from reduced transport costs. A second cluster around ports is likely to comprise classification societies, ship repair yards, ship’s agents and providers of port support services, which would all benefit from reduced transport costs and access to a pool of skilled labour. The third cluster is centred on maritime business services, where advantages arise from the concentration of a pool of skilled labour and from sharing financial expertise. It would include ship managers, charterers, legal services, consultants, ship brokers, ship finance providers and all those involved in maritime insurance.

The industry is also characterised by high geographic mobility, hence all activities are subject to international competition. The table below shows the scope of competition for each service category in the industry.

Table 2.3 Competition in maritime services

Sector	Service	Countries/conditions
Shipping	Ship management	All countries can compete
	Ship ownership	All countries can compete
Ports	Port terminals	Neighbouring countries can compete for the transshipment market, although it is ‘bundled’ with other port services Neighbouring countries may be able to compete for the hinterland market, depending on other available freight corridors
	Landside services	Neighbouring countries can compete for the transshipment market, although it is ‘bundled’ with other port services
	Sea-based services	Neighbouring countries can compete for the transshipment market, although it is ‘bundled’ with other port services
Education	Training	Countries have varying requirements, but training can be provided anywhere

Sector	Service	Countries/conditions
Business services	Insurance	All countries can compete
	Finance	All countries can compete
	Legal	All countries can compete
	Classification	All countries can compete

Source: Oxera analysis.

3 Relative performance of the UK maritime sector

This section provides an assessment of the UK's performance in the different maritime sectors, and identifies the key competitor countries for the UK.

3.1 Performance of the shipping services sector

As discussed in section 2.3, shipping services can be provided by owners themselves or via a management company. As ownership and management are both associated with the provision of shipping services, they have economic value. The DfT⁴⁶ and Oxford Economics have both estimated the contribution of different sectors of the maritime industry to the UK. These estimates suggest that shipping services contributed between £4.7bn and £5.6bn in GVA to the UK economy in 2011.^{47,48} The UK's position as both an owner and operator is therefore included in the assessment of the UK's competitiveness. The country of registration is not as clearly linked to the generation of economic value.

The United Nations Conference on Trade and Development (UNCTAD) distinguishes between ownership and management in terms of 'ultimate owner's nationality' and 'beneficial ownership location'. The former refers to the nationality of the owner, while the latter is the location of the company with primary commercial responsibility for the vessel.

Figure 3.1 below shows ownership, management and registration among the largest fleets, based on 2014 UNCTAD data. The data suggests that ship ownership is fairly concentrated among a small number of countries—Greece, Japan, China, Germany, Singapore and South Korea account for 50% of the total deadweight tonnage. Several countries with high levels of ownership are also large ocean-bound trading countries, but others have relatively modest trade flows (such as Greece, Singapore and Norway).

In general, it appears that countries with high levels of beneficial ownership also have high levels of ultimate ownership. However, the relationship with registration is not as strong; with the exception of Singapore, the ten largest ship-owning countries all have less than 50% of their tonnage registered under their national flag. This suggests that, while the drivers of ownership and management might be similar, they do not appear to affect registration. It seems likely that a significant share of this gap can be explained by 'flagging out'. For example, Panama, Liberia and the Marshall Islands account for 43% of the world's registered fleet but less than 0.5% of ownership.⁴⁹

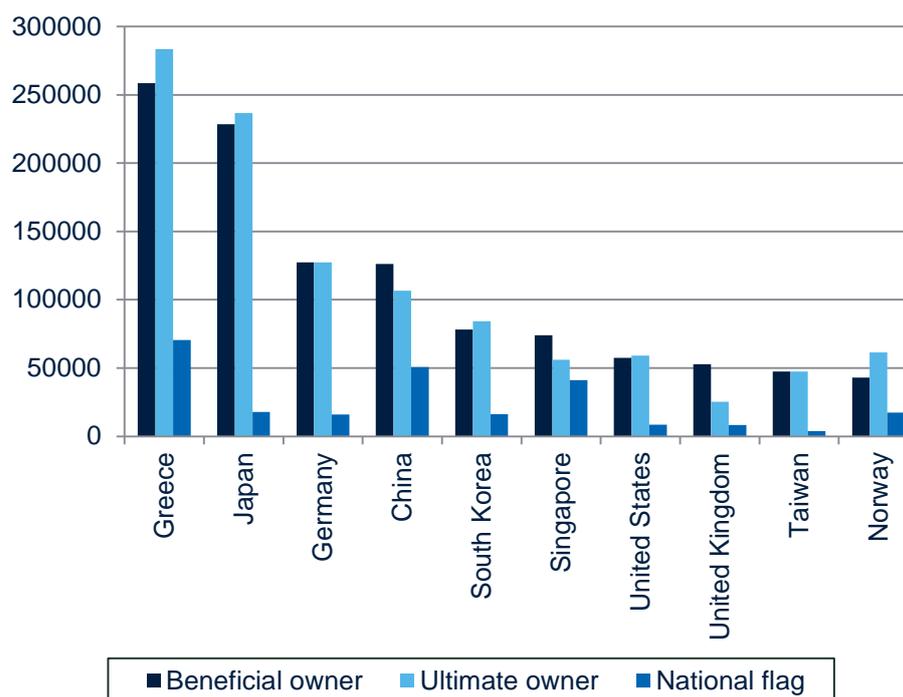
⁴⁶ The DfT estimate of £4.7bn GVA for the UK shipping sector represents the 2011 GVA for SIC 50 taken from the ONS I-O table, plus an estimate for SIC 77.34 based on the proportion of SIC 77 GVA estimated using the share of approximate GVA accounted for by 77.34 in the 2011 ABS. These categories represent water transport and the renting and leasing of water transport equipment.

⁴⁷ The lower estimate corresponds to DfT estimates, the upper estimate comes from Oxford Economics (2013), 'The Economic Impact of the Maritime Services Sector: Shipping', February.

⁴⁸ The Oxford Economics estimate of direct GVA for shipping in 2011 was £5.6 bn.

⁴⁹ Note that the UN data on ownership is only available for 2014.

Figure 3.1 Largest shipping fleets by country, 2014



Note: 'National flag' refers to ships registered under the same national flag as their beneficial ownership location.

Source: UNCTAD.

According to the 2014 data, for 11.8% of the world fleet deadweight tonnage (DWT) the ultimate owner's nationality is different from the beneficial ownership location. Greece is the largest ship-owning country by either definition, although a significant proportion of Greek vessels are operated by companies based in the UK. The UNCTAD also identifies several countries where ship operation is materially greater than ownership (i.e. where there is a higher proportion of beneficial ownership than ultimate ownership). Fleet ownership for these countries is shown in Table 3.1.

Table 3.1 Export of management services, 2014

Country	Beneficial ownership		Ultimate ownership		Net foreign ships managed (share of world fleet)
	DWT ('000)	Share of managed tonnage	Ultimate owner DWT ('000)	Share of ultimate owner tonnage	
Monaco	16,698	1.0%	2,701	0.2%	0.8%
Singapore	74,064	4.4%	56,088	3.4%	1.1%
Switzerland	17,012	1.0%	5,972	0.4%	0.7%
UK	52,821	3.2%	25,261	1.5%	1.6%
Bermuda	36,793	2.2%	10,908	0.7%	1.5%

Source: UNCTAD.

The UK's share of the world fleet, at 1.5% by ownership and 3.2% by management, is lower than that of the leading shipping countries (including economies of a similar size, such as Germany). However, the concentration of the global fleet among a small number of countries means that the UK ranks relatively highly as a ship owner and operator. The leading shipping owners and managers are large trading countries such as Japan, Germany and China.

Greece's large shipping fleet and shipping management sector make it an important country in shipping services, while Singapore has both a large fleet (and fleet under management) and an active fleet management export sector.

Competitiveness indicator: Management and ownership of shipping assets split by actual or likely operations. Some shipping activity is tied to the UK (e.g. short-sea shipping and ferry services with origins and/or destinations in the UK); other activities are not and are potentially more likely to leave the UK.

Box 3.1 The cruise industry

There has recently been a growth in mega cruise ships, which can carry over 6,500 passengers when operating at full capacity. Cruise ships spend on average 7–9 hours in a port, presenting a logistical challenge for port service providers. The market characteristics defining the cruise industry are distinct from those of the freight industry and other passenger markets. This box looks at competitiveness in the cruise industry as whole.

Geographic factors

The geographic features of competition in the cruise industry generally fall into two categories: ports' ability to offer the services required and the desirability of the destination. An average cruise ship serves around 2,000 passengers, and therefore the physical capability of a port can present as a constraint.⁵⁰ As with freight ships, the water depth and turning basin required are relevant factors; although a cruise ship also needs to stay connected to the port over the full tidal range. Dredging can increase the tidal area, but these factors determine whether a port is able to offer the services to cruise ships.

The desirability of the destination as a 'port of call' depends on the location of the port and activities available for passengers—and therefore the overall demand to visit the location, the speed of loading and unloading of passengers, and the distance to other desirable ports to serve the cruise itinerary. Passenger terminals are sometimes built on floating pontoons to allow quicker access to local cities.⁵¹

Product characteristics

Cruise holidays vary significantly, with some liners carrying as few as 170 passengers, and others over 6,500 passengers. Similarly, the onboard facilities and spaces cater for different types of holiday, as well as the different requirements for ships serving different routes—e.g. an Arctic cruise compared with a Mediterranean cruise; or a cruise with many stops, which requires fewer onboard facilities services than one that spends more time at sea. As a result, cruise ships are often bespoke and cruise holidays tailored to different markets.

Port terminals can be used as a 'port of call', which handles transit vessels, or 'turnaround ports' where cruises start and end. The facilities offered differ, and terminal operators generally generate more income from turnaround ports.⁵² The terminal services offered to cruises are distinct from freight vessels, requiring safe and speedy loading and unloading of passengers, as well as facilities for waste disposal and providing potable water, which are both required on a much larger scale than for freight vessels.

The product market can also be broadened to consider the substitution between cruise holidays and other types of holiday. The price and quality of other substitute holidays, for example airfares, can also determine the demand for cruises.

There are a large number of foreign-based ship owners operating out of UK ports, notably American- and German-owned cruise lines. The routes operated from UK ports include the Arctic, Caribbean, North America, Africa and Europe. Given the large geographic area served, UK ports must remain competitive to attract cruise owners, as other nearby ports could present as viable competitors.

Supply-responsiveness

As described in section 2.3.1, the lead time to build a bespoke cruise ship can be up to four years and can cost as much as \$200m. A floating passenger terminal in Liverpool cost £17.8m in 2006, requiring pontoons, bridges, floating roadway to access the terminal and car

⁵⁰ Chanev, C. (2015) 'Cruise Ship Passenger Capacity', available at: <http://www.shipcruise.org/cruise-ship-passenger-capacity-ratings/>

⁵¹ Cass Associates, 'Liverpool Waterfront Passenger Facilities', available at: <http://www.cassassociates.co.uk/project/liverpool-waterfront-passenger-facilities/>

⁵² European Commission (2014), 'State aid SA.35720 (2014/NN) (ex 2012/PN) – United Kingdom Liverpool City Council Cruise Liner Terminal', March.

parking facilities.⁵³ Similar to port infrastructure, the capital investment required for cruise infrastructure can only be recovered in the long term.

Ports can cater to cruise ships alongside freight users, with many ports offering services to both as the terminals and berthing facilities required are different and can therefore be kept separate. However, the cruise passengers require easy access to local towns and cities, beaches or other tourist attractions, whereas the freight users will require access to the transport infrastructure. Passengers may require local bus and taxi services which could compete for space near the port and also contribute to congestion on the immediate transport network. For both types of users to coexist, the local infrastructure needs to support these different uses.

Regulatory and policy context

Many countries operate a head tax on cruise passengers, which often is ring-fenced into a tourism fund or local infrastructure fund. In 2007, Alaska levied a head tax of \$46 per passenger, along with a \$4 state ocean ranger tax, 33% gambling proceeds tax and corporate profits tax on cruise companies and their passengers. The taxes were implemented to cover the infrastructure required for large ships arriving at their ports. Large falls in the number of passengers in 2010—with redeployed ships leading to 140,000 fewer passengers than the year before—led to a reduction in the head tax in 2010, which resulted in many cruise liners committing to return services from 2012.⁵⁴ The UK does not operate a head tax.

The environment standards for the cruise industry are set by the IMO, in line with standards for all commercial vessels to prevent pollution from ships. Relevant guidelines include the cleanliness of wastewater before being discharged into the sea, alongside air emissions.⁵⁵ Passenger ships are also subject to regulations regarding ship construction and operation, also regulated by the IMO. Following recent incidents involving cruise ships, additional safety requirements have been formed, relating to escape routes and life-saving arrangements.⁵⁶

EU legislation on state aid is relevant for this industry. The construction of a cruise terminal in Liverpool came under scrutiny between 2011 and 2014, as state funds were used to construct the passenger terminal. The European Commission concluded the funding in this particular case did not constitute state aid. Although State Aid in ports is much less common in the UK, this remains a key regulatory issue for UK ports.⁵⁷

Demand-side drivers

The main demand-side driver for cruise holidays is the demand for holidays, which is most strongly driven by disposable income and the relative price of cruises compared with other holidays, as further described in section.4.1.5. Other factors, such as the desirability of a cruise holiday, can also play a part, with cruise companies increasingly promoting to dispel the common stereotypes of cruises.⁵⁸

Similarly, the demand for particular ports as a port of call depends on the demand for the activities of the destination served. The demand for a turnaround port would either depend on the local or proximate demand for cruise holidays, or on the ease of access when passengers must travel to the departure port.

Southampton had the highest number of embarking and disembarking passengers in the whole of Europe in 2013. The UK makes up 26.6% of European cruise passengers, with 1.69m passengers in 2013, and 17.1% of embarkation in Europe, but only 2.8% of European cruise passenger visits.⁵⁹ This suggests that the UK is particularly strong in the domestic market, as a departure port, but not as a port of call.

⁵³ European Commission (2014), 'State aid SA.35720 (2014/NN) (ex 2012/PN) – United Kingdom Liverpool City Council Cruise Liner Terminal', March.

⁵⁴ Resource Development Council, 'Alaska's Tourism Industry, available at: <http://www.akrdc.org/issues/tourism/overview.html>.

⁵⁵ Cruise Lines International Association, Inc, 'Regulations and Compliance, available at: <http://www.cruising.org/regulatory/issues-facts/environment/regulations-and-compliance>.

⁵⁶ International Maritime Organization, 'Passenger Ships', available at: <http://www.imo.org/OurWork/Safety/Regulations/Pages/PassengerShips.aspx>.

⁵⁷ European Commission (2014), 'State aid SA.35720 (2014/NN) (ex 2012/PN) – United Kingdom Liverpool City Council Cruise Liner Terminal'.

⁵⁸ Machan, T. (2013) 'Cruise holidays: a guide for first-timers – dispelling the myths', available at: <http://www.telegraph.co.uk/travel/cruises/9841628/Cruise-holidays-a-guide-for-first-timers-dispelling-the-myths.html>; and Geoghegan, S. (2014), 'Cruise Quick Facts: Breaking the stereotype', available at: <http://www.thomascook.com/blog/cruises/cruise-quick-facts/>.

⁵⁹ Cruise Lines International Association (2014), 'Contribution of Cruise Tourism to the Economies of Europe 2014 Edition'

The UK also serves as an attractive location for turnaround cruising for transatlantic cruises, or as first stop in for Europe-bound cruise passengers from the USA.⁶⁰ Given the UK's strong domestic demand for cruises, this would be a key driver for the UK's cruise ports.

Source: Oxera analysis.

3.2 Performance of the ports sector

Estimates from the DfT and Oxford Economics indicate that ports contributed between £1.4bn and £6.7bn in GVA to the UK economy in 2011.⁶¹ For ports, performance can be measured by levels of activity. In 2012, 14 of the 20 largest ports by total tonnage were in Asia, with nine in China alone.⁶² This is unsurprising, given the large volumes of manufactured goods exported and raw materials imported from these countries. However, the large port capacity in Asia does not mean that any of these countries represents a direct competitor for the ports sector in the UK. That said, growth in port activity could help to underpin growth in business services in the region (as discussed in section 5).

Table 3.2 shows the ten largest freight and passenger flows in Europe. The Netherlands, the UK, Spain and Germany are all large import and export markets. Turkey and Belgium are 'gateway' countries that provide access to land-locked markets in the rest of Europe. Consistent data on global maritime passenger movements is unavailable, although Eurostat publishes this data for the EU-28.⁶³ In the freight sector, there has been an overall increase in the volumes transported by shipping in Europe as economies have recovered from the recession. This is reflected in a general increase in freight landing or departing from most of the largest member states. The UK is one of the exceptions to this, having seen largely stagnant freight traffic. For passenger movements, there has been a steady decline in activity in Europe; although, this effect is somewhat less acute in the UK.

⁶⁰ Cruise Lines International Association (2014), 'Contribution of Cruise Tourism to the Economies of Europe 2014 Edition'

⁶¹ The lower estimate corresponds to the DfT. The DfT's 2011 estimates of GVA use detailed ONS Annual Business Survey approximate GVA values to apportion actual GVA from ONS I-O tables for SICs 52.10/1, 52.22 and 52.24/1. These categories represent the operation of warehousing and unloading of goods or passengers' luggage travelling via water transport and stevedoring, service activities incidental to water transportation and cargo handling for water transport activities. The upper estimate comes from Oxford Economics (2013), 'The Economic Impact of the Maritime Services Sector', February.

⁶² American Association of Port Authorities, 'World Port Rankings 2012'; and World Shipping Council, 'Top 50 World Container Ports', available at: <http://www.worldshipping.org/about-the-industry/global-trade/top-50-world-container-ports>.

⁶³ As well as Iceland, Norway, Montenegro and Turkey.

Table 3.2 Freight and passenger traffic in Europe

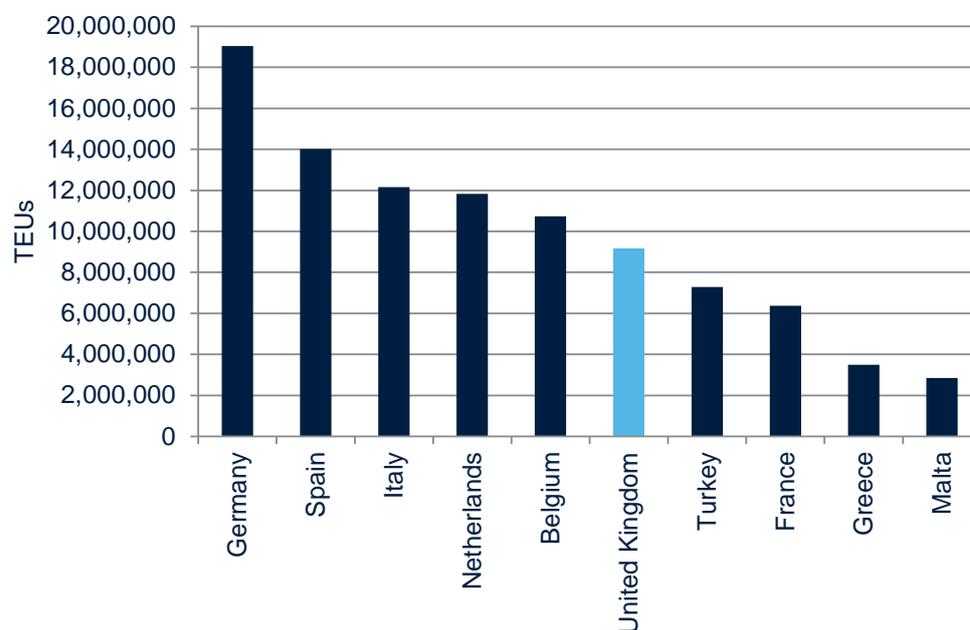
	2012 freight ('000 tonnes)	Change over last five years		2013 passengers ('000)	Change over last five years
Netherlands	549,564	14%	Italy	73,238	-21%
UK	500,860	0%	Greece	72,918	-17%
Italy	476,823	-3%	Denmark	40,968	-6%
Spain	422,152	11%	Germany	29,848	1%
Turkey	374,714	29%	Sweden	29,146	-6%
France	302,997	-4%	UK	27,598	-2%
Germany	298,758	13%	Croatia	27,355	5%
Belgium	223,987	12%	France	25,637	2%
Norway	205,959	15%	Spain	23,253	8%
Sweden	172,976	0%	Finland	18,524	8%

Note: 2012 is the latest available year with full coverage of freight movements.

Source: Eurostat.

Across the EU, the UK ranks sixth in terms of container throughput (see Figure 3.2). With 8% of total volumes, it is in a strong position. In terms of Northern Europe, data from UNCTAD suggests that the Netherlands, Belgium and Germany all have major container port sectors and fall within the geographic scope of competition for the UK.

Figure 3.2 Container port throughput in Europe, 2014



Source: UNCTAD.

The container transshipment market has grown strongly over the last decade, outpacing the overall growth in containerised transport. In a 2014 study for the Commission, Portopia estimated that global containerised transshipment had increased by 459% between 1995 and 2012, with the share of transshipment (as opposed to direct port-to-port) movements increasing from 22% to 28%

over the same period.⁶⁴ While the market in Northern Europe has not kept pace with the Far East, there was still an increase of 131% in the period 2002 to 2012.

In the same study, Portopia estimated the transshipment activity at different European ports. On the basis of these estimates, the major UK ports are some way behind their counterparts in Northern Europe (see Table 3.3). Furthermore, while the largest ports had seen significant growth in transshipment volumes since 2004, the UK's ports had seen stagnation or even a decline. The Portopia study does not include a time series for all UK ports. Of the seven ports covered, only Teesport, Thamesport, Southampton and Felixstowe were studied over time. However, among these the authors estimated a fall in transshipment of 250,000 TEUs, with three of the four ports seeing a decline.⁶⁵

Table 3.3 Estimates of transshipment activity at selected European ports

	Total TEUs 2012	Transshipment TEUs 2012	Transshipment (%)
Antwerp	8,635,169	2,504,000	29%
Zeebrugge	1,953,170	490,000	25%
Rotterdam	11,865,916	4,265,000	36%
Hamburg	8,863,896	2,659,000	30%
Bremerhaven	6,115,211	2,750,000	45%
Felixstowe	3,700,000	305,000	8%
Southampton	1,600,000	88,000	6%
Thamesport	350,000	28,500	8%
Liverpool	650,000	52,000	8%

Source: Portopia.

3.3 Performance of the maritime business services sector

Estimates from Oxford Economics indicate that maritime business services contributed £1.5bn in GVA to the UK economy in 2011. The Oxford Economics study considered five sectors: ship broking, legal services, insurance, classification and financial services. Of the total GVA from these sectors, £785m was estimated as coming from shipping insurance, with a further £339m from ship broking.⁶⁶ Given the prevalence of clustering in maritime business services, it may be more relevant to consider how business services are distributed across cities than across countries. Data on this question is limited, but the World Shipping Register business directory can provide an insight into how businesses are distributed across the major maritime centres. Figure 3.3 below shows the number of businesses operating in the largest business services centres.

⁶⁴ Portopia (2014), 'Deliverable 1.1: State of the European Port System – market trends and structure update Partim transshipment volumes', January.

⁶⁵ The exception was Teesport, which saw an increase of 14,000 TEUs.

⁶⁶ Oxford Economics (2013), 'The Economic Impact of the Maritime Services Sector: Business Services', February.

Figure 3.3 Location of maritime business service providers, 2015



Source: Oxera analysis of World Shipping Register data.

3.3.1 Location of the largest maritime business services centres

In 2011, Jacobs, Koster and Hall assessed factors affecting the location of Advanced Producer Services (APS) in the maritime sector.⁶⁷ The authors defined APS businesses as high-value services such as finance, insurance and consultancy, which broadly matches the shipping business services sector. They used regression analysis to estimate the importance of a number of variables in determining the connectivity and size of the industry at different locations, and concluded that six cities, in addition to London, had 100 or more APS businesses. These were Singapore, Hong Kong, Rotterdam, Piraeus, Hamburg and New York. For maritime services, the regression analysis suggested that the location of customers (ship owners and port-related industry) was the key driver of location for advanced maritime services (but not necessarily port throughput flows).

3.3.2 Maritime financing

The relationship between the maritime financial services sector and a financial services cluster is essential in terms of accessing capital and new financial products. The global ship finance portfolio of the 40 largest lenders remained fairly stable between 2008 and 2011, after which it has fallen steadily, from \$455bn in 2011 to \$391bn in 2014.⁶⁸

London, in particular, has strong capital markets and high levels of available financing, and is well placed to develop new products that are specific to the maritime industry, such as hedging instruments. Recent evidence suggests a possible downward trend in maritime financing: loans from UK financial services accounted for 16% of total loans to shipping companies in 2006, 13% in 2008 and 15% in 2010. In 2012, however, the UK's share of loans fell to 9%.⁶⁹

A survey by Norton Rose Fulbright revealed that London was a key financial services provider to the maritime sector.⁷⁰ 40% of respondents in the shipping sector reported that London was the financial centre most able to meet their financing needs. New York ranked next, with 14% of shipping respondents, with Singapore, Frankfurt and Hong Kong receiving smaller shares at 7%, 6% and 5%, respectively.

3.3.3 Insurance

Data from the International Union of Marine Insurance suggests that the majority of these key maritime financial centres are also the most important insurers to the sector in terms of market share (measured by share of premia).⁷¹ One notable exception is Singapore, with a market share of just under 1%. In 2013, 26%—i.e. the largest global share—of international marine insurance premia were written through London, as shown in Figure 3.4. Figure 3.5 shows the top five countries in terms of market share of maritime insurance premia: Japan's share has declined steadily over the ten-year period shown, as has the USA's, but China and Brazil seem to be gaining ground. The UK has been fairly volatile,

⁶⁷ Jacobs, W., Koster, H.R.A. and Hall, P.V. (2011), 'The Location and Global Network Structure of Maritime Advanced Producer Services', *Urban Studies*, October, 48:13, pp. 2749–69.

⁶⁸ Petrofin Research (2015), 'Trends in global finance in the current market', 22 January, available at: http://www.petrofin.gr/Upload/1stNaftemporikiShippingForum-Ted_Petropoulos.pdf.

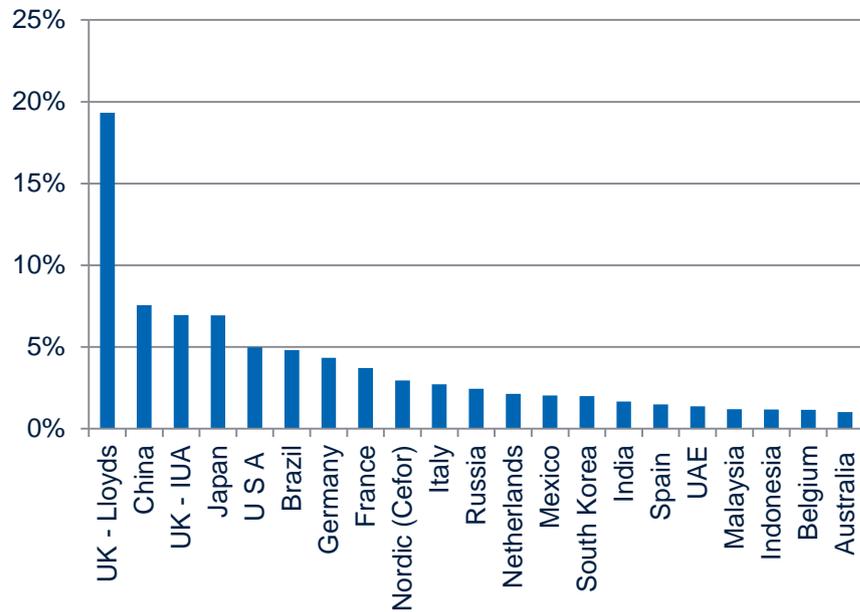
⁶⁹ TheCityUK (2013), 'Maritime Business Services 2013', available at: <http://www.thecityuk.com/research/our-work/reports-list/maritime-business-services-2013/>; and International Financial Services London (2009), 'Maritime Services 2009', available at: <http://www.thecityuk.com/assets/Uploads/Maritime-services-2009.pdf>.

⁷⁰ TheCityUK (2013), 'Maritime Business Services 2013', available at: <http://www.thecityuk.com/research/our-work/reports-list/maritime-business-services-2013/>.

⁷¹ International Union on Marine Insurance (2014), 'Global Premiums 2004-2013 by country', available at: <http://www.iumi.com/index.php/committees/facts-a-figures-committee/statistics>.

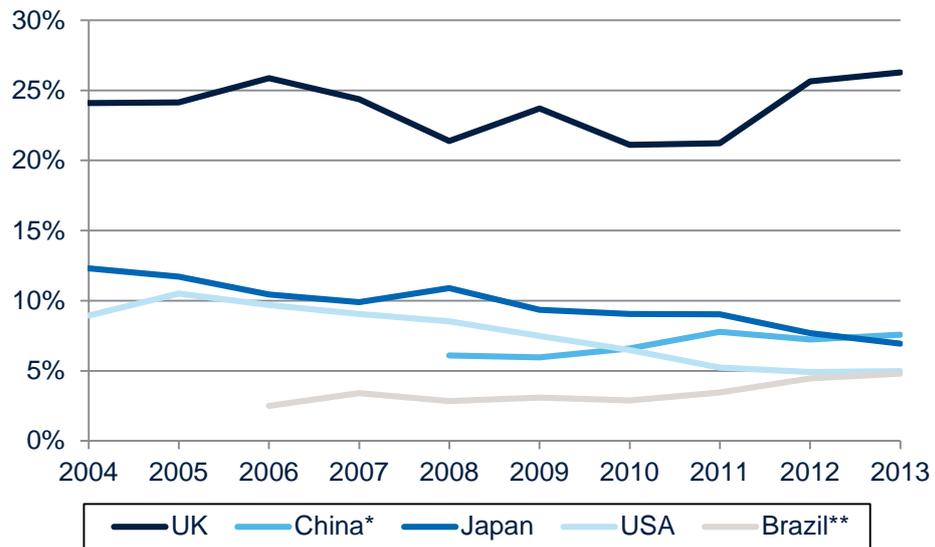
but persistently dominant. In recent years, the UK's market share has been growing.

Figure 3.4 Share of maritime insurance premia by country, 2013



Source: IUMI – International Union of Marine Insurance.

Figure 3.5 Share of maritime insurance premia, top five countries



Note: * No data is available for China prior to 2008. ** No data is available for Brazil prior to 2006.

Source: IUMI – International Union of Marine Insurance.

The International Group of P&I (Protection & Indemnity) Clubs arranges collective insurance and reinsurance for each member of the Group. P&I Clubs deal with a range of liabilities, such as personal injury to crew and passengers, damage and loss of cargo, oil pollution, and wreck removal. The Group is based

in London, and all of but one of its members is based, or has an office, in the UK.⁷² In 2011, the UK market share of international P&I Clubs was 61%.⁷³

Competitiveness indicator: Maritime insurance premia written in London. This would provide an indicator of London's market share in the maritime insurance market. The data is published annually by the IMUI.

3.3.4 Ship broking

London is home to the Baltic Exchange, which is the leading source of market information on trading and settlement of both physical and financial shipping derivatives. Baltic Exchange members include ship brokers, derivative brokers, ship owners and businesses with interests in cargo. Other members include maritime lawyers and arbitrators, insurers, financiers and classification societies. The Baltic Exchange, owned by its members, regulates its members' activities as ship brokers, provides guidance on the impact of legislation, and provides business facilities for its members. The Baltic Exchange has regional offices in Athens, Shanghai and Singapore, reflecting the location of other key centres for ship brokers.⁷⁴ London was home to 400 of the Baltic Exchange's 600 members in 2013.⁷⁵

3.3.5 Maritime law

The large number of firms involved in the maritime supply chain and tendency towards outsourcing (rather than self-supply through vertical integration) mean that maritime legal services provide an important function in advising firms and drafting contracts. In addition, maritime courts hold jurisdiction over maritime contracts, breaches, tort and injuries. Maritime lawyers therefore provide advice for arbitrations and in disputes. The UK is particularly strong in the provision of maritime legal services. One of the key reasons for this appears to be the historical reputation of the English legal system, and specialised maritime courts such as the Admiralty Courts. As a result, the judiciary has amassed a large amount of shipping expertise, which makes the UK an attractive place to hold shipping disputes.

Competitiveness indicator: Number of maritime arbitrations in London. Data on this is not currently collected by the DfT, but could be gathered from a monitoring service and could serve as an indicator of legal activity. This metric would not capture all legal advice.

3.3.6 Maritime governance and regulation

Minimum ship standards are set by the IMO, which is based in London, and international labour standards, including those for seafarers, are set by the International Labour Organization (ILO) in Geneva. The shipping industry also relies on self-regulation. Classification societies set and verify ship and machinery standards, which customers and insurance providers rely on in assessing safety or insurance premia.

The ILO's 2006 Maritime Labour Convention sets the minimum working and living standards for seafarers working on ships flagged in ratifying countries. It

⁷² See International Group of P&I Clubs, 'Group Clubs', available at: <http://www.igpandi.org/Group+Clubs>

⁷³ International Union of Marine Insurance (2013), 'Global Marine Insurance Report', available at: <http://www.iumi.com/images/gillian/AutumnStats2013/160913%20Global%20Marine%20Insurance%20Report%20A%20Seltmann.pdf>.

⁷⁴ For more information see: <http://www.balticexchange.com/>.

⁷⁵ OECD (2013), 'The Competitiveness of Global Port-Cities: Synthesis Report', September, p. 93.

covers almost all aspects of work and life on board ship, and includes construction standards for vessels covering accommodation, recreational facilities, hospital accommodation and catering departments.⁷⁶

The IMO's objectives are to improve safety and security of international shipping and prevent pollution from ships. It is also involved in encouraging the adoption of the highest standards of practice in efficiency and navigation of maritime traffic. The IMO's conventions provide the foundations for much of the existing regulation of the industry, and it is therefore important in attracting representatives from other regulatory bodies and classification services. These include the International Convention for the Safety of Life at Sea (SOLAS), the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and the International Convention for the Prevention of Pollution from Ships (MARPOL). As a result, London remains attractive for global representatives to locate and further contribute to the cluster.⁷⁷

Around 50 organisations provide classification services.⁷⁸ Of these, 12 have formed the International Association of Classification Societies, which is headquartered in London. Most of the leading countries in ship registration also have an office in London to assist with the monitoring and enforcement of the flag's standards. Lloyd's Register accounted for 15% of the world shipping fleet in 2014, making it the third-largest ship classification society in the world.⁷⁹

The UK therefore has an advantage in attracting maritime professional associations, trade associations and NGO's.

3.3.7 Broader business environment

In addition to clustering benefits, the broader business environment will have an influence on location decisions of business services, as well as other mobile maritime activities such as shipping and education. Factors such as the quality of institutions and the size of regulatory and tax burdens vary across countries. Where property rights are poorly enforced or poor-quality institutions are prevalent, transactions are subject to greater uncertainty, thereby increasing the cost of doing business and reducing competitiveness. While measuring these factors is complex and often involves subjective judgement (about either the individual components or the relative importance of different factors), several indices are available for comparing countries and cities.

The World Bank's Ease of Doing Business Index ranks 189 countries based on an average of ten sub-indices, each measuring a different aspect of regulatory burden, the strength of institutions, and entrepreneurial activity. The most recent ranking (2015) suggests that Singapore, New Zealand, Hong Kong, Denmark and South Korea offer the five most favourable regulatory and institutional arrangements. The UK ranks eighth, behind Norway and the USA.⁸⁰

According to the Doing Business Index, Singapore and Hong Kong rank particularly well in terms of enforcing contracts, trading across borders, and dealing with construction permits. Norway and the USA outperform the UK in getting electricity, registering property and resolving insolvency, with the UK

⁷⁶ Australian Maritime Safety Authority (2013), 'Maritime Labour Convention guide', July.

⁷⁷ See The International Maritime Organization website: <http://www.imo.org/About/Pages/FAQs.aspx>.

⁷⁸ See The World Shipping Register website: <http://www.world-register.org>.

⁷⁹ See Lloyd's List top, 'Top 10 classification', available at:

<http://www.lloydslist.com/ll/news/top100/classification/>. The Statistics Portal, 'Number of ships in the world merchant fleet as of January 1, 2014, by type', available at:

<http://www.statista.com/statistics/264024/number-of-merchant-ships-worldwide-by-type/>.

⁸⁰ World Bank Group, 'Economy Rankings', available at: <http://www.doingbusiness.org/rankings>.

scoring higher in getting credit, dealing with construction permits, protecting minority investors, and trading across borders. The Netherlands ranks as 27th, with the UK outperforming it in all indicators apart from starting a business, registering a property, trading across borders, and enforcing contracts.

Along with the business environment, the quality of life offered in a region may be relevant, to attract and retain a skilled workforce. Numbeo presents a quality of life index, which takes into account purchasing power, income relative to prices, safety, health, traffic and pollution.⁸¹ For 2015, Denmark scores sixth and the UK scores 16th. Singapore and Hong Kong rank 34th and 49th, respectively, which suggests that the UK scores fairly well compared with other potential business clusters. However, comparing cities, Singapore ranks slightly higher than London, and both cities rank just higher than Hong Kong. According to this index, therefore, these cities rank relatively closely, which limits the relative benefit or preference of one over another.

3.3.8 Summary

The evidence presented above suggests that the UK, and London in particular, is among the world's leading maritime business services centres. This appears to hold across the majority of sub-sectors including maritime insurance, legal services and finance. Other large maritime business services clusters appear to be present in Singapore, Hong Kong, Rotterdam, Piraeus, Shanghai and Tokyo.

3.4 Performance of the maritime education sector

As with business services, in this report Oxera has used the number of maritime colleges in different countries as an indicator of performance of the sector. According to TheCityUK (2013), there are 24 maritime universities and colleges in the UK.⁸² In order to allow for international comparisons, Oxera has used a broader definition of providers offering maritime training. According to the World Shipping Register, 73 countries offer maritime training.⁸³ This figure includes some institutions that offer only short training courses relating to the maritime sector.⁸⁴ However, the large volume of such training providers in the UK suggests that there are fairly low barriers to entry and that the UK facilitates a desirable environment in which maritime colleges, or providers of maritime training, can locate.

The distribution of maritime training providers is shown in Figure 3.6. The UK has the highest number (99), and the USA the second-highest (54).

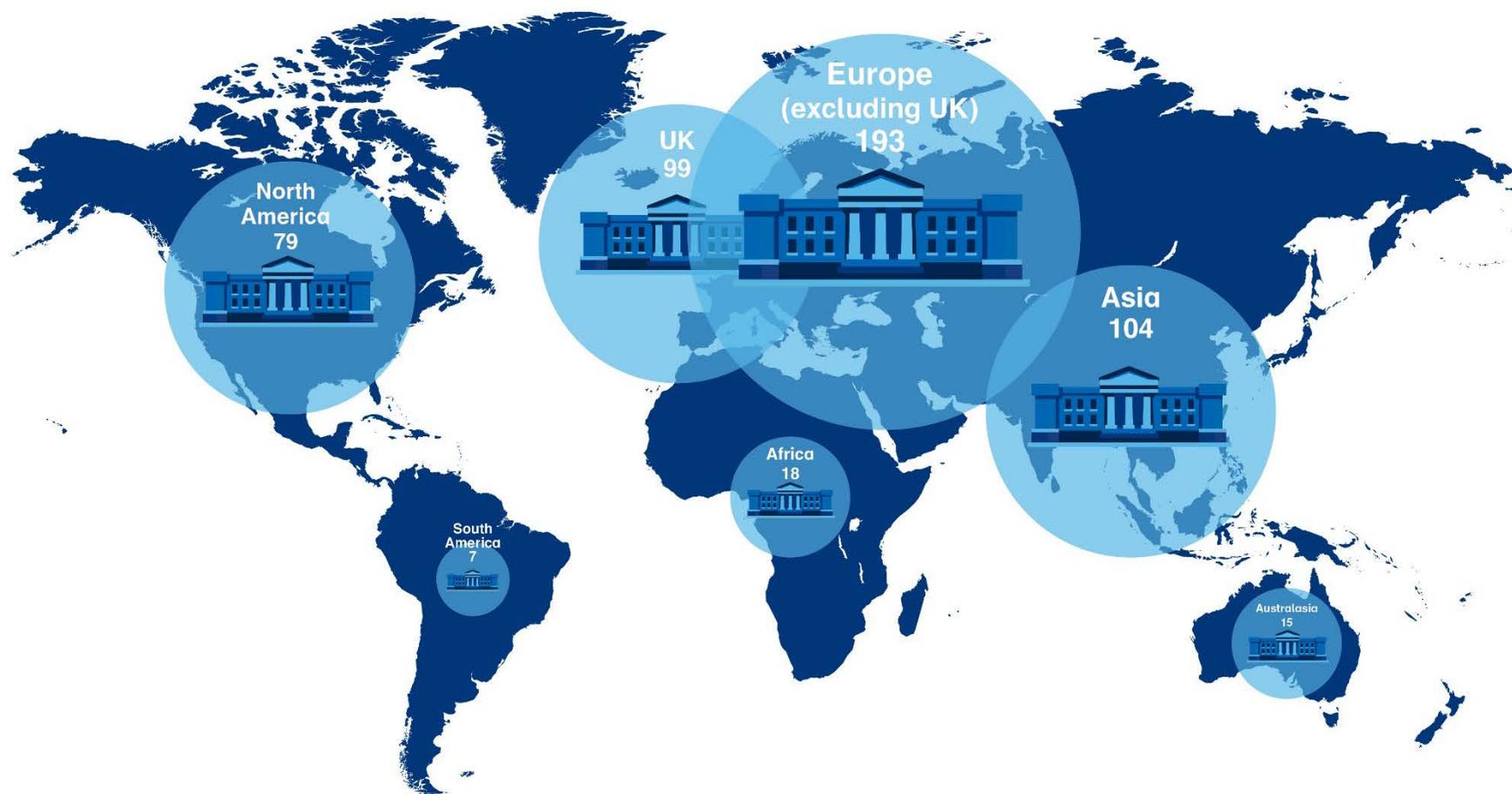
⁸¹ Numbeo, 'Quality of Life Index 2015', available at: <http://www.numbeo.com/quality-of-life/rankings.jsp>.

⁸² TheCityUK (2013) 'Maritime Business Services, September 2013', available at: <http://www.thecityuk.com/assets/Uploads/Maritime-Business-Services-2013-L.pdf>.

⁸³ The World Shipping Register website: <http://www.world-register.org>.

⁸⁴ For example, an engine manufacturing company offering four days' training on the use of engines.

Figure 3.6 Number of maritime training providers by region, 2015



Source: Oxera analysis of World Shipping Register data.

While this data cannot provide a sense of the scale of each college, it implies that the UK presents a favourable choice for the location of maritime training providers.

3.5 Conclusions on maritime performance

The UK's performance in the different sectors of the maritime industry could be broadly characterised as being stronger in respect of service provision (business services and education) than physical maritime activity (ports and shipping).

In the shipping sector, the UK has a strong presence, although the size of the UK's merchant fleet is significantly smaller than those of the market leaders. Oxera has focused on ship management and ownership, as these have clear value attached (the value-added from management services and the returns to asset owners). Management and ownership are closely correlated. Registration is often a focus for the shipping industry; however, Oxera is not aware of any evidence demonstrating the direct economic benefit of this to the UK.

Oxera considers the scope for competition to be narrow in the ports sector, primarily due to the geographic scope for competition. However, transshipment of containerised cargos represents one form of potential competition with major container ports in Northern Europe. Specifically, it seems likely that UK ports would be able to compete with large container ports in Europe by offering an origin–destination transport rather than a hub-and-feeder model involving transshipment via a large port in Northern Europe. The presence of ports more generally may indirectly contribute to other parts of the maritime industry.

In both business services and maritime education, the UK appears to be one of the market leaders.

4 Key factors influencing the international competitiveness of the UK maritime sector

The following section considers the drivers of competitiveness in the maritime sector. For each sector, the market characteristics identified in section 2 are considered, focusing on the extent to which these characteristics could affect the competitiveness of the UK.

At the industry level, factors affecting the competitiveness of UK businesses and the attractiveness of the UK for businesses should theoretically be the same for any geographically mobile activity. That is, any factor that could attract a business should also be improving its competitiveness. The shipping, business services and education sectors would all be geographically mobile over a sufficiently long time horizon. For these sectors, the factors identified here as affecting competitiveness should also be taken as factors affecting the location decisions of businesses.

For each sector, Oxera describes a number of specific areas for each factor affecting competitiveness, identified through research and feedback from the DfT and the industry via the DfT's stakeholder workshops. It is recognised that this is not a comprehensive explanation of every potential driver of competitiveness, although the principles identified in section 3 could be applied to other drivers.

4.1 Drivers of competitiveness in the shipping services sector

4.1.1 Geographic factors

Although the inherent mobility of ships means that there is generally little scope for geographic factors to place a constraint on serving a particular market (as discussed in section 2.3.1), five of the top ten countries by fleet ownership (see Figure 3.1) are islands. A characteristic common to all islands and to many non-island countries in this top ten is a long coastline, which creates the need to develop shipping—Greece, for instance, has 3,000 islands, its coastline is almost half that of Great Britain (and its main islands) for slightly over one-sixth of the UK population, and 98% of its population live within 50kms of the sea.⁸⁵ Maritime shipping is historically important in most of these countries, which may have left a strong maritime culture and traditions, as in the case of Greece.⁸⁶

While the geographic and historical context is outside the stakeholders' control, the UK's geography is an advantage, and this evidence could indicate that nurturing its maritime heritage might be important for the competitiveness of its shipping and ports sectors, for example, by attracting young people's interest for the sector.

The location of ancillary service providers is also very important for ship ownership and management. A strong shipping and maritime business services cluster attracts workers and facilitates ship operators' interactions with the many services they need, as well as their access to market information and industry expertise. Hence, shipping companies' high dependence on ancillary services, subcontracting and specialised labour, means that they must have headquarters in places where these are available, such as London.

⁸⁵ Greece has 15,000kms of coastline for 10.9m inhabitants (as of 1 January 2014). The UK has 64.3m inhabitants (as of 1 January 2014), of which 94% live within 50kms of the sea, while the coastline of Great Britain plus its principal islands is about 31,368kms (the total coastline of the UK was not available). See Eurostat, The British Cartographic Society, Centre for Climate Adaptation (www.climateadaptation.eu).

⁸⁶ Icaza, L., Marzo, S., Popa, T., Sahbaz, U. and Saravelos, G. (2009), 'The Greek Shipping Cluster'. Harvard Business School, 7 May.

4.1.2 Product characteristics

Vessel types and categories

The segmentation of the product market (described section 2.3.1) means that international competition for given cargo types and routes is open only to ship owners that have vessels of the appropriate type and size with free capacity. Hence, maintaining a fleet adapted to the needs of the shipping market is crucial for ship owners, and has been key to the success of Greek shipping companies in recent decades.⁸⁷

While they are constrained by the lifetime of their current fleet, ship owners need to plan for future demand when placing orders for ships or buying them on the second-hand market, especially given the long lead times in shipbuilding (see section 2.3.1). Developments in trade patterns, canal extensions and building, newly opened sea routes, and other ship owners' order books are all relevant in planning.⁸⁸ Accurate forecasting and anticipation may therefore be critical to the success of a shipping industry.⁸⁹ However, the uncertainty over the level and nature of future demand is something that all shipping companies face, irrespective of their location, and therefore may not be a driver of competitiveness.

As shown in section 2.3.1, intermodal substitution is unlikely, on average, to affect the demand for maritime transport, and has little relevance for the competitiveness or performance of British shipping.

4.1.3 Supply-responsiveness

As mentioned in section 2.3.1, supply-responsiveness in shipping is likely to be low in the short and medium term due to long lead times in shipbuilding and the high upfront costs of buying ships. However, the existence of excess capacity in the market the mobility of vessels and global brokerage market could create high supply-responsiveness. While these market characteristics affect the shipping industry globally, shipping companies that are responsive to changes in (anticipated) conditions may be able to take advantage of opportunities in the market (e.g. demand likely to increase post-recession). Alternatively, long-term shipping contracts may reduce shipping companies' exposure to risks such as oversupply in the market, but the downside is that it also reduces their ability to respond to short-term shocks.

The availability of labour is another key supply-side issue in the maritime sector. A skilled workforce provides a direct input for the shipping and ports sector but also a supply of seafarers with relevant industry knowledge for the maritime education and business services sectors. A study by Deloitte and Oxford Economics for the DfT suggests that there is a gap between the supply and demand of trained seafarers despite the support available for seafarer training.⁹⁰ Stakeholders consulted as part of the study indicated that this was a particular issue among officer-level seafarers, since ratings-level staff were more easily

⁸⁷ Thanopoulou, H.A. (2007), 'A fleet for the 21st century: modern greek shipping', *Research in Transportation Economics*, **21**, pp. 23–61.

⁸⁸ For example, the Nicaragua Canal project (<http://hknd-group.com/portal.php?mod=list&catid=35>) and the recently opened Arctic sea route due to the melting ice (http://knowledge.allianz.com/mobility/transportation_safety/?2670/Opening-Arctic-shipping-routes).

⁸⁹ Forecasting other ship owners' order books is challenging, since other ship owners are likely to do the same forecasting exercise. Their expectations would have to be factored into the forecast.

⁹⁰ Deloitte and Oxford Economics (2011), 'An independent review of the economic requirement for trained seafarers in the UK', December

substituted. The supply–demand gap in the maritime labour market is discussed further in section 5.

4.1.4 Regulatory and policy context

Tonnage tax

In the UK, shipping companies are able to operate under the standard corporate tax regime. Alternatively, a company that manages its fleet strategically and commercially from the UK may choose to be taxed under the tonnage tax regime. A vessel's eligibility is subject to a test set out by HMRC, based on the location of certain activities.⁹¹ Tonnage tax regimes operate by charging ships based on their capacity and on the number of days in that year that the ships are within the regime, irrespective of their actual profits and losses. The tonnage tax regime primarily affects the ownership and management of ships (i.e. shipping services).

The tonnage tax regime was introduced in the UK in 2000, replacing the normal charge on profits with a charge calculated on the basis of the size and number of ships operated by the company. The charge is based on the tonnage of the vessel and number of days of operation, as well as the normal corporate tax rate. Shipped activity must be ring-fenced to prevent abuse of the system. The regime also incorporates a training requirement for seafarers or a payment in lieu if this requirement is not fulfilled. Companies are initially required to opt into the tonnage tax regime for a period of ten years, but this can be renewed on a one-year rolling basis thereafter. Management of ships does not necessarily extend to registration of ships under the UK flag. However, a company's ability to opt in is linked to registration within the EU.

Tonnage tax regimes have been adopted by several member states, including some of the UK's main competitors in the maritime sector such as Belgium, Germany and the Netherlands. In the maritime state aid guidance, the Commission expressed the view that tonnage tax regimes are effectively a state aid, but also recognised the benefit that tonnage tax regimes can bring in terms of supporting onshore activity.⁹² The Commission also noted that there is no evidence that these schemes distort competition between member states. More widely, the UK's global competitors in the ship ownership and management sectors have also implemented fiscal incentives for shipping including Hong Kong and Singapore.

⁹¹ HMRC (2005), 'Tonnage Tax Manual'.

⁹² Commission communication C(2004) 43 — Community guidelines on State aid to maritime Transport (2004/C 13/03).

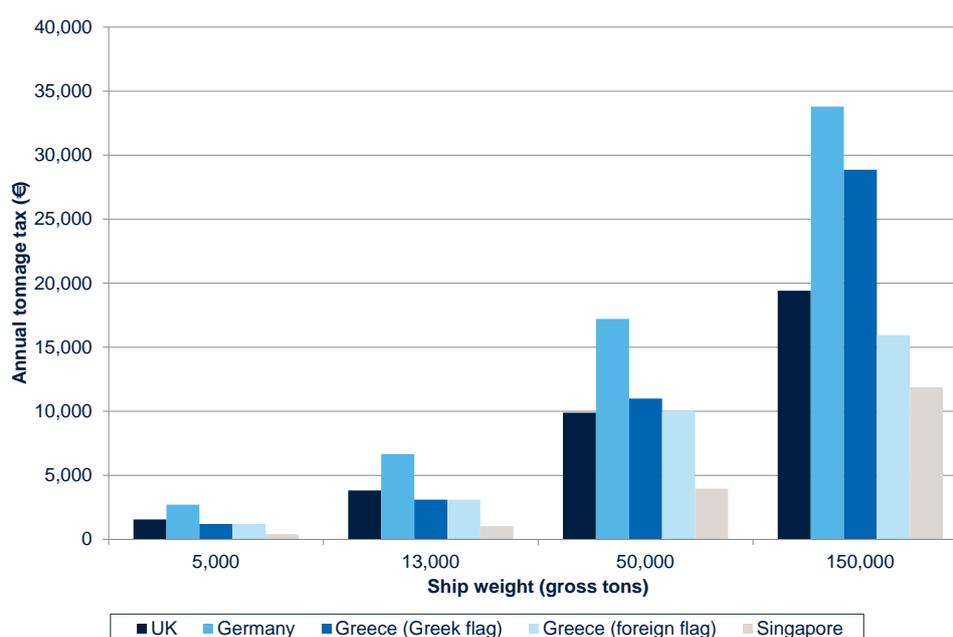
Table 4.1 Taxation of maritime services across selected countries

Country	Tonnage tax regime	Other notable shipping tax policies
Greece	Greek and foreign flagged ships taxed on a gross tonnage basis Includes a coefficient that declines with the size of the ship Charge also varies with age, with lower rates for younger and older ships	Ships that undertake regular voyages between Greek and foreign ports, or exclusively between foreign ports, as well as cruise vessels, are entitled to a 50% reduction on the tonnage tax payable Ships built and flagged in Greece are exempt for six years
Singapore	Ships registered in or operating in Singapore are exempt from the corporation tax regime and instead pay tonnage tax Tax is computed on the basis of gross tonnage	Maritime support services receive a discounted corporation tax rate of 10% (compared with the standard 17%) Ship lessors benefit from concessionary tax rates including a 0% rate for income from financing and leasing ships Bunker fuel incentives
Germany	German registered and managed ships are subject to tonnage tax based on size of ship and days of operation Ten-year opt-in period	40% tax wage tax relief for seafarers aboard German flagged ships
Japan	Tonnage tax regime applies but only to vessels registered under Japanese flag	
China	None	Chinese shipping pays normal business taxes (although these are materially lower headline rates than in the UK) A vessel tonnage tax is levied on ships entering a Chinese port. Based on the nationality of the vessel
Hong Kong	None	Ships registered in Hong Kong are exempt from corporate profit taxes

Sources: Deloitte and Federal Ministry of Transport and Infrastructure.

Tonnage tax regimes modelled on the system introduced in the Netherlands often involve a low effective tax rate, which will decline as the company makes more profit. Conversely, a loss-making company can still incur a liability, although this is generally modest. Figure 4.1 compares tonnage tax for different vessel sizes in some of the countries mentioned above. The UK tax regime appears to be in line with its European competitors. Tonnage taxes in Germany are materially higher than in competitor countries, while Singapore's regime appears to be the most competitive (as well as the simplest, with a flat tax rate per tonne). The Greek regime differentiates between Greek-flagged and foreign-flagged ships for larger ships. The relative attractiveness of a regime varies with ship size, since many of these countries have non-linear tax schedules. Overall, the Greek regime appears slightly more competitive than the British regime.

Figure 4.1 International tonnage tax comparison



Note: The average tonnage for the world fleet is about 13,000 gross metric tons (UNCTAD), while 150,000 gross metric tons is the order of magnitude of the world's largest freight ships (<http://maritime-connector.com/worlds-largest-ships/>). The tonnage tax for the UK, Germany and Singapore is based on vessel net tonnage, while Greece bases its tax on gross tonnage. Oxera assumed net tonnage to be two-thirds of gross tonnage, which appears to be the typical ratio (see Alderton, P.M. (2011), *Sea Transport: Operation and Economics*, 6th edition, Adlard Coles Nautical, p. 18). The tonnage tax rate in Greece varies with the age of the ship; therefore, Oxera used a simple average of the various rates. For ships flying the Greek flag, we applied the 50% reduction, which is valid for vessels that undertake regular voyages between Greek and foreign ports, or exclusively between foreign ports. For ships flying foreign flags, we also applied a 50% reduction, which is only valid to vessels following regular routes.

Sources: Oxera calculations, based on Deloitte (2013), 'Shipping tax guide'; International Bureau of Fiscal Documentation (2013), 'Doing business in Germany 2013', prepared for BDO, March; KPMG; and UNCTAD.

It should be noted that this analysis is intended to give a high-level comparison of tonnage tax regimes. It does not consider ship eligibility to opt into the tonnage tax regime in various countries, nor further taxes that may affect the comparison (for example, ships built in Greece registering with a Greek vessel registry are exempt from tonnage tax until the age of six years).⁹³

Taxation is inherently an area where policy across countries differs, meaning that tonnage tax could be a driver of international competitiveness as well as performance. Oxera is not aware of any comparative studies evaluating tonnage tax regimes. However, there is some evidence to suggest that tonnage tax has had a material impact on the UK shipping industry. A study by Oxford Economics suggested that had the fleet continued to fall in line with previous trends the DWT of the UK-owned fleet would have shrunk to 5m tonnes by 2011 when, instead, the fleet grew to 22.5m tonnes.⁹⁴ The same study by Oxford Economics estimated that the total direct tax contribution from the shipping sector across the main tax bases was £581m in 2011.⁹⁵ Estimates by HMRC suggest that forgone tax liability has fluctuated between £60m and £270m since the tonnage tax

⁹³ Deloitte (2013), 'Shipping tax guide'.

⁹⁴ Oxford Economics (2013), 'The Economic Impact of the Maritime Services Sector: Shipping', February.

⁹⁵ Income tax, National Insurance, VAT and corporation tax.

regime was introduced, including £120m in 2011.⁹⁶ The peak in tonnage tax saving in 2008 appears to be something of an outlier (see Figure 4.2). On the basis of the Oxford Economics estimate, this implies that the tonnage tax regime saved the shipping industry around 17% of its tax liability in 2011, other things being equal. The importance of tonnage tax to the shipping industry has also been cited as a key driver of international competitiveness by the industry.⁹⁷

There seems to be evidence that the introduction of the tonnage tax has materially improved the international competitiveness of the British shipping industry. The introduction of the tonnage tax in the UK in 2000 coincided with an increase in UK-owned ships, following a sustained period of decline. However, in more recent years the UK-owned fleet has continued its decline.⁹⁸ The widespread use of tonnage tax regimes among competitor countries reduces the scope for reductions in tonnage tax to improve competitiveness in the long term. Hence, while taxation is clearly an area where government can exercise a high degree of control, there seems to be little room for improving the UK's competitiveness through tonnage tax, although other fiscal measures may be more effective. It is also important to note that, in Europe, state aid rules place restrictions on the level and nature of government support. While tonnage tax regimes can be justified on the basis of the mobility of shipping, the rationale from a societal perspective is less clear.

Figure 4.2 Reduction in tax payments from UK tonnage tax regime, 2000–14



Note: An estimate for 2012 is unavailable, and estimates for 2013 and 2014 are financial years 2012/13 and 2013/14, respectively.

Source: HMRC, Hansard HC Deb 6 February 2014 c 305W.

As noted in Table 4.5, some countries also have specific tax rules for shipping outside tonnage tax. The same is true of the UK, where UK or EEA resident seafarers are eligible for tax relief on their earnings while working outside the

⁹⁶ Note that this is calculated against an unobserved counterfactual where there is no tonnage tax system. However, given that tonnage tax does increase the amount of ship management in the UK, clearly not all of those revenues would have been collected in the absence of the scheme

⁹⁷ As part of the wider Maritime Growth Study, the DfT hosted a number of workshops with industry and other stakeholders. Oxera has attended several of these events as an observer.

⁹⁸ Department for Transport (2015), 'Shipping fleet statistics: 2014' February.

UK. These tax incentives increase the net wages of seafarers, making the profession more attractive than it otherwise would be (i.e. increasing supply).

The UK's tonnage tax regime includes a minimum training requirement, whereby a shipping company needs to train one cadet for every 15 officers employed on qualifying ships. If a company is unable to meet its training requirement it may either contract out the training or (with the DfT's agreement) make a payment in lieu.^{99,100} This minimum training requirement, intended to maintain a supply of UK national seafarers, increases the costs faced by UK-based shipping companies. This can reduce the international competitiveness of these shipping companies, but may provide wider benefits to the UK maritime sector by providing a stream of experienced seafarers in future years.

European legislation

The shipping industry is affected by legislative changes at the EU level as well as the UK level. In principle, all aspects of EU law apply to the shipping sector.

One of the main areas of EU law focusing on shipping is competition. For example, Council Regulation 4055/86 establishes an EU-wide market for shipping services by preventing member states from placing restrictions based on nationality of shipping companies in other member states.¹⁰¹ While such legislation can have a positive impact for consumers, incumbent businesses that had previously enjoyed market power in their domestic shipping markets could be worse-off as a result of additional competition.

While the EU is itself a legislative body, some regulations are borne out of international conventions and accords. For example, Directive 1999/95/EC,¹⁰² which limits the working hours of seafarers aboard vessels calling at a European port, was derived from IMO and ILO agreements.¹⁰³ One of the most high-profile pieces of legislation in recent times was the EU Sulphur Directive (2012/33/EU).¹⁰⁴ This Directive is intended to comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) and requires ships operating in Northern Europe to make use of low-sulphur fuel or to employ measures to filter sulphur from ship exhaust gases.

These changes are all likely to result in costs to ship owners, either through increased fuel costs or upgrades to vessels, or both. In addition to these costs, the UK government's impact assessment of implementing the regulation¹⁰⁵ suggested that there could be a degree of modal shift away from maritime for part of the journey and also some impacts outside the maritime industry, in particular in the refining sector, although neither is quantified. The impact assessment estimated a cost to the shipping industry of £523m per year in 2013

⁹⁹ HMRC (2013), 'Tonnage tax minimum training commitment', available at:

<https://www.gov.uk/government/collections/tonnage-tax-minimum-training-commitment>.

¹⁰⁰ Watson, Farley & Williams, 'Summary of UK Tonnage Tax Legislation', available at:

<http://www.wfw.com/wp-content/uploads/2009/06/WFW-UKTonnageTaxLegislation.pdf>.

¹⁰¹ European Commission (1986), 'Council Regulation (EEC) No 4055/86 of 22 December 1986 applying the principle of freedom to provide services to maritime transport between Member States and between Member States and third countries', [1986] OJ L 378.

¹⁰² European Commission (1999) Directive 1999/95/EC of the European Parliament and of the Council of 13 December 1999 concerning the enforcement of provisions in respect of seafarers' hours of work on board ships calling at Community ports, [1999] OJ L 104.

¹⁰³ ILO Convention No 180 and the Protocol to ILO.

¹⁰⁴ European Commission (2012), 'Directive 2012/33/EU of the European Parliament and of the Council of 21 November 2012 amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels [2012] OJ L 327.

¹⁰⁵ Department for Transport/Maritime and Coastguard Agency (2014), 'Prevention of Air Pollution from Shipping – Implementation of Directive 2012/33/EU Impact Assessment', September.

prices, based on a scenario in which 90% of vessels comply with the regulations by switching fuel and 10% install scrubbers.¹⁰⁶ The government's expectation is that this cost would be passed on to users of shipping services. Crucially, the Sulphur Directive is area-based and any ships operating in Sulphur Emission Control Areas (SECAs) within EU waters will be captured by the Directive, regardless of nationality. The government's impact assessment noted that:

Provided all Member States implement the requirements of the Directive in a timely manner there will be no impact on competition within the maritime industry as a result of the proposed regulations.¹⁰⁷

The Sulphur Directive could potentially reduce the attractiveness of those UK ports that face onto the North Sea and the English Channel due to the higher cost of operating in UK waters; this would extend to cruises. However, in practice, the UK's main competitors in the transshipment market are also covered by the EU's SECA, and are therefore subject to the Directive. It is also worth noting that the North Sea SECA is one of several such control areas globally. More generally, EU legislation derived from international agreements is less likely to have adverse effects on European or indeed UK competitiveness.¹⁰⁸

In the British Isles, commercial vessels are also subject to light dues that are levied to fund the provision of navigation aids such as lighthouse services and buoys. Vessels are charged on the basis of their net registered tonnage (the charge is capped at 40,000 net registered tonnes). A vessel is charged for each voyage it makes calling at a British port but cannot be subject to more than nine charges per year. On the basis of the current charge of 39p per net registered tonne, the cost is capped at £140,000 per year.¹⁰⁹ In contrast, lighthouse services in continental Europe are often publicly funded, creating a disparity with the UK system. Light dues are levied on ships operating in British waters rather than specifically on British ships. As a result, there is no direct effect on international competitiveness in the shipping sector. However, light dues could have an indirect effect on competitiveness by increasing the cost of calling at a British port. They could, for example, make the UK a less attractive destination as a port of call for cruises.

In addition to specific pieces of legislation, the general cost of doing business in a country will have a significant impact on the competitiveness of the shipping sector and its attractiveness as a location.

4.1.5 Demand-side drivers

Trade

As noted in section 3.1, the largest shipping fleets are owned by countries with large trade flows. Furthermore, analysis by UNCTAD finds a correlation coefficient of 0.57 between countries' trade and fleet ownership.¹¹⁰ This section explores this relationship.

Figure 4.3 displays the correlation between maritime container transport and total trade volume for various countries for the years 2000 to 2013. Maritime container transport data comes from the OECD and accounts for all container transport in and out of the country. Data for bulk transport was not available, therefore Oxera has used maritime container transport as a proxy for maritime

¹⁰⁶ The impact assessment uses a price base year of 2013, although costs are discounted to 2014 values.

¹⁰⁷ Department for Transport/Maritime and Coastguard Agency (2014), 'Prevention of Air Pollution from Shipping – Implementation of Directive 2012/33/EU Final Stage Impact Assessment', September

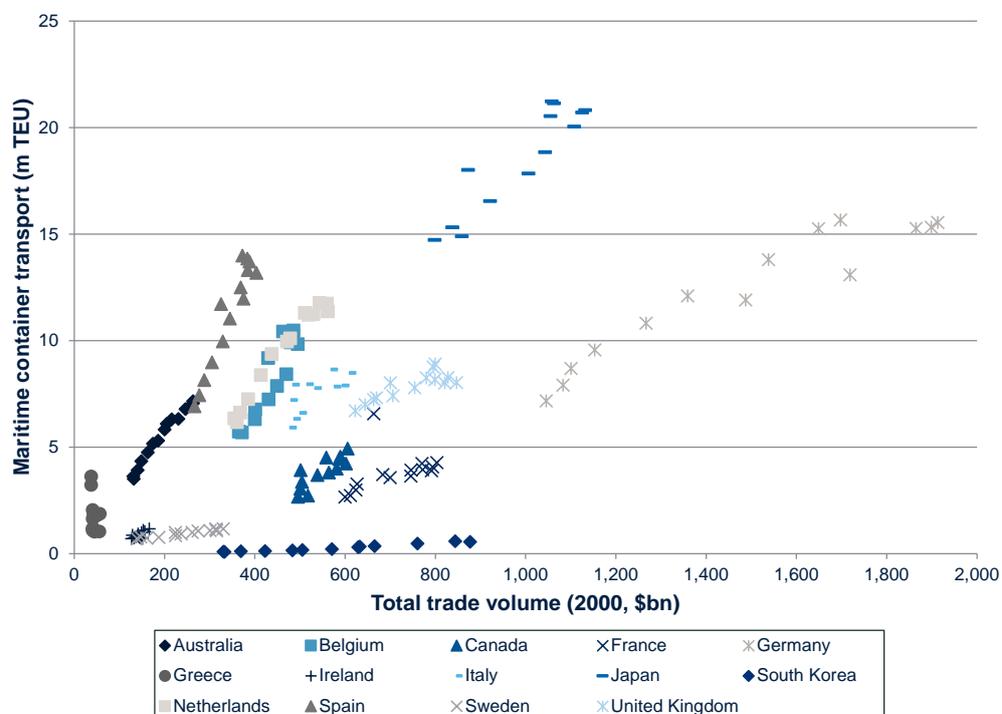
¹⁰⁸ However, there may be intermodal effects and changes to cruise routes.

¹⁰⁹ Maritime UK website: <http://www.maritimeuk.org/2012/01/light-dues/>.

¹¹⁰ UNCTAD (2008), 'Review of Maritime transport 2008'.

transport while keeping in mind the limitations of this (for example, countries that trade large amounts of raw materials). Total trade values for the year 2000 are the sum of countries' goods imports and exports in current dollars from OECD data. For the following years, the 2000 trade values are updated with the IMF change in trade volume data, which measures changes in real terms.

Figure 4.3 Maritime container transport and trade, 2000–13



Note: Some small countries, and the USA, have not been included, as this would have extended the scale of the axes. Maritime container shipping data for China was unavailable.

Source: Oxera, OECD and IMF.

Figure 4.3 suggests a clear positive association between trade and maritime transport in almost all countries. The exception is Greece, where maritime container transports increased by a factor of 3.5 between 2009 and 2013 while trade volumes decreased. This may be partly explained by Greece's efforts in recent years to develop the Port of Piraeus as a regional transport hub, including via a concession agreement with a private operator, which has resulted in a nine-fold increase in container throughput between 2008 and 2014.¹¹¹

The nature of the relationship between trade and vessel ownership is not clear from the data alone. One interpretation of the data is that a country's trade, by creating demand for local ports and local demand for shipping, may contribute to the growth of shipping clusters, including through the growth of port clusters.¹¹² Trade is, however, (largely) outside the maritime industry's and the government's control: studies find that GDP explains between 81% and 92% of the variation in global goods transport, although there seems to be evidence of decoupling in more recent years.¹¹³ However, the Greek example shows that

¹¹¹ National Bank of Greece (2013), 'Container ports: an engine of growth – sectoral report', April, available at: https://www.nbg.gr/english/the-group/press-office/e-spot/reports/Documents/Container_Ports_2013.pdf.

¹¹² Icaza, L., Marzo, S., Popa, T., Sahbaz, U. and Saravelos, G. (2009), 'The Greek Shipping Cluster', Harvard Business School, 7 May.

¹¹³ See Van de Riet, O., De Jong, G. and Walker, W. (2008), 'Drivers of freight transport demand and their policy implications', Perrels, A. and Lee-Gosselin, M. (eds) (2007), *Building blocks for sustainable transport*:

local trade is not necessary for the existence of an important shipping cluster. Shipping is inherently open to global competition: while local companies may have advantages through, for example, local connections, there is scope for foreign companies to gain market shares.

Not all merchandise trade is carried by ship; depending on their characteristics (value to weight ratio, perishability, etc.), goods may be more likely to be carried by air, for example. Furthermore, goods that have a lower value per tonne, such as grain, will require more shipping activity for a given trade value than goods with high value per tonne. Hence, a country's shipping activity is determined by what it trades as much as by its total trade.

As mentioned in the 'Product characteristics' part of this section, there are different types of cargoes typically transported by sea. Table 4.2 shows trade volumes and growth rates for commodity groups corresponding to key broad cargo types (containers, dry bulks, wet bulks and LNG) for the countries identified in section 3 as the UK's competitors in shipping and ports.

Table 4.2 Trade volumes (2013) and average real growth rates (2008–13) per country and commodity group

	Manufactures		Agricultural and mining products		Crude oil		LNG	
	\$bn	Growth rate (%)	\$bn	Growth rate (%)	\$bn	Growth rate (%)	\$bn	Growth rate (%)
Belgium	635	-2	126	-1	31	6	1.9	7
Germany	2,059	-1	309	0	74	1	0.0	-
Greece	40	-12	21	-3	16	8	0.3	-
Netherlands	737	-1	233	0	59	9	0.4	-
China	3,213	8	491	11	221	13	10.7	64
Japan	1,026	0	170	1	146	2	72.3	12
Singapore	516	2	36	4	36	3	0.1	-
UK	786	0	149	1	70	2	3.7	97

Source: Oxera, WTO, UN Comtrade.

To draw parallels between the trade data and ship ownership, Oxera has made the following assumptions:

- containers are generally used for manufactures;
- dry bulks (mostly iron ore, coal, grain, bauxite and alumina, phosphate rock, and forest products) broadly correspond to mining and agricultural products;¹¹⁴
- crude oil is a key wet bulk product;
- LNG is a separate type of cargo that requires specialised tankers.

As mentioned in the 'Product characteristics' part of this section, there are different types of cargoes typically transported by sea. Table 4.2 shows trade volumes and growth rates for commodity groups corresponding to key broad

Obstacles, trends, solutions, Emerald, chapter 5; Tavasszy, L. and Ruijgrok, K. (2013), 'Freight transport demand: indicators, determinants and drivers of change'; Van Wee, B., Annema, J.A. and Banister, D. (eds), *The transport system and transport policy: an introduction*, Edward Elgar Publishing.

¹¹⁴ UNCTAD (2014), 'Review of Maritime transport 2014'. While coal is dry bulk cargo, it is reported under fuels in the data. Oxera has therefore not included it in this commodity group.

cargo types (containers, dry bulks, wet bulks and LNG) for the countries identified in section 3 as the UK's competitors in shipping and ports.

Table 4.2 shows that Germany, China, and Japan to a smaller extent, are all large traders of manufactures. This is reflected in container throughput in ports in these countries, which is twice that of the UK for Japan and Germany, and 19 times that of the UK for China.¹¹⁵ The explanation for Germany's proportionally low ratio of container shipping to manufactures trade may be that a large share of traded manufactures is transported by inland transport.

It also appears from the table that Germany and China transport large volumes of dry bulk cargo, and that China and Japan transport large volumes of both wet bulk cargo and LNG. There is no publicly available data at a country level for dry bulk, wet bulk or LNG shipping volumes. However, it is expected that data on trade volumes for commodity groups will be a good indicator for the corresponding shipping volumes, with the same caveats as mentioned above.¹¹⁶ Since most of the prices for these commodities are global and value to weight ratios are more homogeneous within a commodity group, comparison across countries is likely to hold better than across commodity groups.

If a country's trade drives demand for local shipping companies, one would expect countries with large trade volumes of a given commodity group to have large shipping fleets of the type that carry that particular commodity.

As in the previous subsection, the outlier in Table 4.2 is Greece: the success of its shipping cluster (see section 3.1), despite its very low trade volumes in all commodity groups, relies on its ability to draw on demand from international markets.¹¹⁷ This shows that while trade volumes for cargo types are good indicators of shipping volumes, and therefore of fleet sizes, they are not the only factor at work.

Table 4.3 shows the top ten trading countries for the identified commodity groups. It gives an indication of which countries are likely to be the largest shippers in each market and to have the highest demand for ports, with the same caveats as above (for example, the Russian Federation and Iraq mostly use pipelines for oil transport).

¹¹⁵ OECD data.

¹¹⁶ The caveats include: Germany probably has a higher share of inland transport than the UK or Japan and therefore proportionally lower shipping volumes; differences in prices between countries and between commodities traded within the commodity groups affect comparability; because of differences in value to weight ratios between commodity groups, this data does not indicate, for example, that the UK has twice more dry bulk carrier capacity than wet bulk capacity; differences in trade volumes between countries can also be caused in part by different value-to-weight ratios.

¹¹⁷ Icaza, L., Marzo, S., Popa, T., Sahbaz, U. and Saravelos, G. (2009), 'The Greek Shipping Cluster'. Harvard Business School, 7 May.

Table 4.3 Top ten trading countries per commodity group (in value of trade), 2014

Manufactures	Agricultural and mining products	Petroleum oils and oils obtained from bituminous minerals, crude	LNG
China	China	Saudi Arabia	Qatar
USA	USA	USA	Japan
Germany	Germany	China	South Korea
Japan	Netherlands	Russian Federation	Malaysia
France	France	India	Australia
Hong Kong	Japan	Japan	Indonesia
UK	Brazil	Canada	China
South Korea	Australia	South Korea	Spain
Netherlands	UK	Iraq	India
Italy	Canada	Kuwait	Algeria

Source: Oxera, WTO and UN Comtrade.

If trade patterns are drivers for fleet size and composition, then countries that appear several times in this table should have the largest fleets. Figure 3.1 previously showed the top ten countries by beneficial vessel ownership. Six of these countries (Japan, China, Germany, South Korea, the USA and the UK) appear several times in Table 4.3. Furthermore, while they do not appear in the table, Singapore and Taiwan are 14th and 16th, respectively, in manufactures trade, and Norway is 17th in oil trade.

While it is possible that import and export of physical goods is an important driver of shipping activity, it is also the case that there is little that the shipping industry or government can do to control them directly. However, government policy aimed at fostering trade could provide an indirect channel for encouraging shipping activity.

Competitiveness indicator: Imports and exports of goods for the UK and key rival countries. This indicator is relevant across the maritime sector.

Passenger traffic

Passenger transport is a wholly separate sector of shipping. This subsection concerns passengers travelling with an origin and/or destination in the UK. This is of clear relevance to both ports and shipping activity. While operators of ferries travelling to and from the UK necessarily have a material part of their business based in the UK, this is not necessarily the case for cruise operators. The main companies operating cruises to or from UK ports seem to be mostly based in the UK, although it appears that few register their vessels in the UK and several are foreign-owned.^{118,119} It is worth noting, there is no clear reason for UK owned or managed ships to call at UK ports. Domestic demand for sea travel is likely to be a major driver of the performance of the British passenger shipping sector.

The scope for international competition is likely to be small for passenger travel, since there is generally a single operator per ferry route and limited

¹¹⁸ Stansfield, J. (2014), 'UK Cruise Lines and Ships List Directory', Ship Cruise, 2 February, available at: <http://www.shipcruise.org/uk-cruise-lines/>, accessed 26 March 2015.

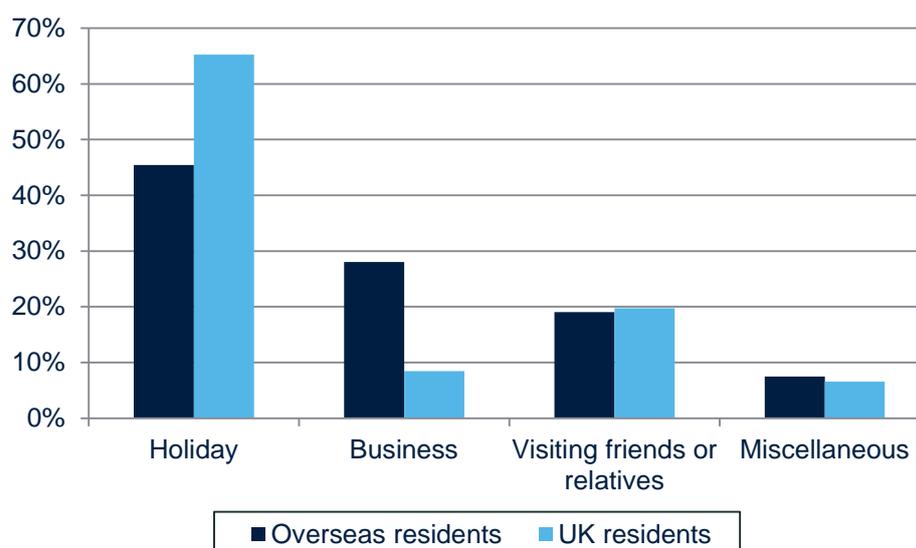
¹¹⁹ Tre, M. (2011), 'A look at cruise ship registry', *Cybercruises.com*, 14 March, available at: http://www.cybercruises.com/CM_Mar14-A-Look-At-Cruise-Ship-Registry.htm, accessed 26 March 2015.

substitutability between routes and modes—for example, travellers from the UK to North America are unlikely to consider sea travel as an option unless the travel experience is the product they are buying. There is more mode-switching potential for short journeys. While passenger surveys indicate that the Eurostar mostly abstracted demand from air and little from ferry,¹²⁰ the Competition Commission's analysis of the market suggested that there was a degree of inter-model substitution with air travel being the least likely to serve as a direct substitute for ferry services.¹²¹

The performance of passenger carriers is more likely to be affected by competition between travel destinations. This section therefore considers the purpose of maritime journeys to and within the UK, and their drivers.

There is a range of relevant empirical literature and survey evidence on why people travel. The Office for National Statistics undertakes a survey (International Passenger Survey) of travellers to and from the UK and estimates the number of travellers by purpose of visit and mode of travel.¹²² Oxera has used this data to compute the share of UK and overseas residents visits by purpose of visit. The results are presented in Figure 4.4.

Figure 4.4 Overseas travel by sea in 2013



Source: Oxera, Office for National Statistics data.

This shows that the great majority of international sea travel starting or ending in the UK is for leisure (holiday or visiting friends/relatives)—64% for overseas residents and 85% for UK residents, and most of that is for holidays—while business travel makes up an important share of visits by overseas residents (28%). Note that these shares have been stable since 2009.¹²³ In terms of order of magnitude, there are about 50% more trips by overseas residents than by UK residents. Further data from the DfT shows that domestic sea trips are around

¹²⁰ Booz & Co. (2012), 'Review of HS1 demand forecasts', February.

¹²¹ Competition Commission (2013), 'Groupe Eurotunnel S.A. and SeaFrance S.A. merger inquiry A report on the completed acquisition by Groupe Eurotunnel S.A. of certain assets of former SeaFrance S.A.', June.

¹²² Office for National Statistics (2014), 'Travel trends, 2013', available at: <http://www.ons.gov.uk/ons/rel/ott/travel-trends/2013/index.html>

¹²³ The largest changes are a four percentage point increase in the share of business for overseas residents and an equivalent decrease in the share of holiday trips for UK residents.

double the international ones in the UK.¹²⁴ Although domestic trips are probably shorter on average and therefore add lower value per trip in terms of fares, they certainly make up a material share of sea passenger revenues.¹²⁵

Demand for maritime passenger travel is likely to increase when passenger travel in the UK across all modes increases. Empirical studies find that income is an important driver of both inbound and outbound passenger travel: estimated income elasticities range from 0.6 to 2.3 for British tourism expenditure overseas, average 1.65 for overseas residents expenditure in the UK, and are close to 1 for British domestic tourism expenditure.^{126,127}

Relative prices of goods are another empirically important determinant of travel in the UK. UK residents appear less (more) likely visit a country (whether their own or a foreign country) when prices in that country increase (decrease), regardless of the purpose of the visit. Overseas residents are less likely to visit the UK for leisure when UK relative prices increase, but slightly more likely when they come for business. The literature on travel decisions suggests that the reason behind the latter correlation might be that higher relative prices imply higher relative profitability for business.¹²⁸ Hence, while fewer UK residents will travel abroad when UK prices drop, more people will travel to and within the UK. The overall effect is likely to be an increase in maritime passenger traffic in the UK, since overseas residents make up a clear majority of overseas maritime passenger travel and domestic travel adds to that.

Global economic growth will increase passenger traffic in all countries, although countries also compete to attract travellers. However, the main drivers of maritime passenger travel in the UK are largely exogenous: domestic GDP and GDP in tourists' home countries, as well as relative prices in the UK. Nevertheless, while evidence on this is lacking, marketing efforts to promote the UK may increase tourism. The processing of ferry passengers at border controls has been criticised by industry in the past and is another possible way to increase passenger travel.¹²⁹

4.1.6 Conclusions

In shipping, the different vessel classes (size and cargo types) effectively segment the market. Combined with the lead times associated with shipbuilding, this means that a major challenge for ship owners is maintaining a fleet that is adapted to the needs of the market.

Fiscal incentives provide a clear way for governments to encourage shipping activity, as demonstrated by the widespread use of tonnage tax regimes. While the introduction of the tonnage tax regime in 2000 seems to have played a role in reversing the decrease in British-owned vessel tonnage, the decline has resumed in more recent years. This may therefore be a long-run trend due to the

¹²⁴ Department for Transport (2015), 'Provisional sea passenger statistics: 2014', 25 February.

¹²⁵ There is no data on the purpose of domestic trips, which may range from daily commuting to domestic tourism.

¹²⁶ Income elasticity measures the percentage increase in spending when income increases by 1%. Oxera has used expenditure abroad or by domestic tourists as a proxy for travel demand. Elasticities are estimated for the various destination countries and by various studies. Oxera has excluded two outliers when giving this range.

¹²⁷ Blake, A. and Cortes-Jiménez, I. (2007), 'The drivers of tourism demand in the UK', Christel DeHaan Tourism and Travel Research Institute, University of Nottingham, for the Department of Culture, Media and Sport, December.

¹²⁸ Blake, A. and Cortes-Jiménez, I. (2007), 'The drivers of tourism demand in the UK', Christel DeHaan Tourism and Travel Research Institute, University of Nottingham, for the Department of Culture, Media and Sport, December.

¹²⁹ See, for example: <http://www.ukchamberofshipping.com/news/2014/02/26/rise-ferry-passengers-despite-uk-border-control-threat/>.

increase in international competition, changes in the location of physical trade activity and the wider adoption of the tonnage tax, which removed the UK's advantage. Most tonnage tax regimes appear to include rules that tie eligibility to the country offering the tonnage tax system, although the mobility of the shipping sector creates significant scope for tax competition across countries. As a result, an individual country seeking to undercut its rivals by offering a more generous tax regime may be successful in the short term, but may also trigger a response by rival countries. EU rules on state aid may also restrict member states (including the UK) in this form of tax competition.

European legislation has also sought to open up the market for shipping across member states. This is likely to benefit consumers and the shipping sectors in countries where domestic demand is relatively low and therefore has a limited market to operate in. Conversely, the previously protected incumbent shipping sectors in larger maritime countries would be made worse off. More recently, environmental legislation, for instance the EU Sulphur Directive, has attracted a significant amount of negative reaction from industry. However, legislation that affects the industry as a whole would not have an impact on international competitiveness.¹³⁰

While a country's trade patterns appear to be important in shaping its shipping fleet, a strong shipping and maritime business services cluster attracts workers and facilitates ship operators' interactions with the many services they need, as well as their access to market information and industry expertise. Hence, due to the high dependence of shipping on ancillary services, subcontracting and specialised labour, their headquarters must be in places where these are available, such as London. However, the lack of qualified seafarers seems to be a key issue threatening the competitiveness of British shipping, as well as British maritime education and business services, since seafarers with industry knowledge are often employed in these industries.

Other key locational factors are the availability of premises in the cluster area and the cost of doing business. Fiscal incentives such as tonnage tax do appear to be significant; however, the mobility of shipping activities and potential for competition between countries will reduce the scope to attract businesses with fiscal incentives alone. In this sense, fiscal incentives could help to create a level playing field with rival nations as locations for ship management, rather than providing the sole means for attracting ownership and management activities. It is also worth noting that any policy changes should be carefully targeted in order to avoid eroding the non-shipping tax base.

Outside taxation, shipping companies are subject to wider business regulations, some of which can impose significant compliance costs. For highly mobile sectors such as shipping, there is a clear rationale to minimise the business impact when transposing legislation from EU primary legislation. However, it is worth noting that not all legislation passed at the European level has a clear impact on competitiveness. For instance, the EU's Sulphur Directive creates a compliance cost for ships operating in a specific area, irrespective of the country of ownership or management.¹³¹

¹³⁰ However, there may be intermodal effects and changes to cruise routes.

¹³¹ However, there may be intermodal effects and changes to cruise routes.

4.2 Drivers of competitiveness in the ports sector

4.2.1 Geographic factors

As noted in section 2.3.2 the geographic market is a key driver of competition across the ports sector to the extent that it effectively defines the scope for a given country's port sector to be competitive.

The demand-side factors identified by the OFT provide some useful considerations for the geographic drivers of competition. It is clear that for an island nation such as the UK the scope for competition is restricted by the cost and availability of onwards transport. While this will differ across different cargos, the scope for demand side-substitution of UK ports for other ports in Europe (and beyond) is limited. As a result, Oxera considers that UK ports could offer an alternative to ports in mainland Europe when serving UK-bound traffic—i.e. a direct-call system rather than a hub-and-feeder one. However, the UK's island status represents a major barrier to the UK serving as a container transshipment hub for Europe, since the additional costs associated with onward transport from the UK to other European countries would be sizeable.

The majority of the UK's containerised traffic comes directly from its largest trading partners such as China and the US meaning that the opportunity to divert traffic is limited. However, a significant minority of container imports are transported from countries with major transshipment operations in the Hamburg-Le Havre region. 16% of the UK's container imports were recorded as originating from countries along this coastline in 2013, equivalent to 670,000 containers.¹³² This clearly represents a worthwhile market for UK ports.

Competitiveness indicator: Container imports from north-west Europe. This could serve as an indicator for transshipment activity. It may also be useful to consider this metric alongside total UK container imports.

Belgium, the Netherlands and Germany have been identified as the main competitors to UK ports.

4.2.2 Product characteristics

Within the transshipment market, the size of the individual ports is an important determinant of a country's attractiveness as a hub, due to the scale requirements for transshipment (as opposed to simply serving a hinterland market). Table 4.4 shows the capacity of the UK's main container ports and some of their competitors. The capacity of Felixstowe, the UK's largest container port by far, is two to three times smaller than its largest competitors in Northern Europe. Again, this supports the notion that UK ports are not necessarily competing directly as a hub with the major ports of Europe, but instead offering an alternative logistics model.

Container ports in the UK have made significant increases in capacity in recent years—most notably, the new London Gateway project, which will add 3.5m TEU per year when complete; while Southampton, Felixstowe and Liverpool are all either in the process of expanding or have expansion projects underway.

¹³² Taken from Eurostat.

Table 4.4 Capacity of UK ports and competitors in million TEUs (year of reference when available)

Port	Capacity
Antwerp	15
Bremen	8 (2011)
Felixstowe	4.6 (2013)
London Gateway	3.5 (projected)
Southampton	2.1 (2013)
Thamesport	0.9 (2013)
Tilbury	0.8 (2013)
Liverpool	0.8 (2013)

Note: Data on the capacity of Hamburg and Rotterdam, which handle similar quantities of TEUs as Antwerp, was not available.

Source: Port of Antwerp website, Germany Trade and Invest 2011 brochure, The Loadstar, London Gateway website.

4.2.3 Supply-responsiveness

As noted in section 2.3.2, ports are characterised by high levels of fixed cost and relatively low operational cost. In the short term, this means that while capacity is available, there is a relatively high degree of supply-responsiveness available. In the longer term, there are numerous barriers to expanding port capacity that could limit new entry into the market. The planning system and availability of sites are covered elsewhere in this report. The cost of constructing or expanding a port and the time delay involved is significant, making entry into the market subject to a time lag.

Land and maritime geography can also play an important role in determining the ability to develop new port infrastructure or expand existing sites. Specifically, the availability of suitable sites presents a major impediment to port development. The UK generally has favourable geography for the ports sector; while there are other factors that determine whether port development is feasible, it is noteworthy that the UK has almost 12,500kms of coastline, which is by far the highest in the EU and many times that of rivals such as Belgium and the Netherlands.

4.2.4 Regulatory and policy context

Planning

The planning process is an important component of the regulatory landscape due to its impact on the development of new and existing ports. In a 2010 study on UK infrastructure markets, the OFT noted that in the ports sector, expansion is usually a more viable supply response than entry, citing the lack of suitable sites, high capital investment costs and high regulatory and planning costs.¹³³ In either case, the planning system is the key area of the existing policy landscape across all ports.

The size of the burden of the planning system on potential developers will vary significantly depending on the circumstances of the case. Submissions to the House of Commons Transport Select Committee suggest that the cost of the planning application for a port of the size of Bristol was of the order of £5m,

¹³³ Office of Fair Trading (2010), 'Infrastructure ownership and control stock-take—final report: case study annexes', December.

making this a relatively small but significant cost in the context of an overall investment that could be hundreds of millions of pounds.¹³⁴ Perhaps more significant are the limitations and time delays that the planning system could place on new developments.

In this context, the Planning Act 2008 introduced a new streamlined process for obtaining planning consent for nationally significant infrastructure projects such as ports. It replaced the need for multiple planning consents with a single 'development consent'. A new body, the Infrastructure Planning Commission (IPC) would take decisions on development consent on the basis of the relevant National Policy Statement. Under the Localism Act 2011, the IPC was abolished and infrastructure planning became the responsibility of the Planning Inspectorate.

There are 12 designated or proposed National Policy Statements, setting out government policy on different types of national infrastructure development. The National Policy Statement for Ports was published in 2012 and forms the basis for decision making on port development consent by the Planning Inspectorate. The National Policy Statement for Ports recognises the key role that port infrastructure plays in the transport system and establishes a high-level framework for assessing the need for new capacity and the case for particular developments.

In addition, planning permission for certain building works is not required if they fall under the port operator's Permitted Development Rights,¹³⁵ which provide ports with flexibility for modest changes within the port by reducing the planning burden for certain changes.

Planning in the ports sector is also subject to environmental legislation from the EU, such as Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora¹³⁶ (the Habitats Directive) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds¹³⁷ (the Wild Birds Directive). In 2012, the government published a review of these Directives, setting out its strategy for ensuring that the legislation did not prevent or unnecessarily delay the construction of important infrastructure projects.

EU legislation

The EU is currently considering a regulatory proposal that would affect ports and (in particular) port services. In May 2013, the European Commission adopted a regulatory proposal to establish a framework for market access to port services and financial transparency of ports in the TEN-T.¹³⁸ The regulations are primarily concerned with allowing market access for port service providers and improving financial transparency.

In the UK, there is no independent sector regulator for ports, and there is no statutory framework for setting the level of port access charges. The main governing legislation, the Harbours Act 1964, covers charges relating to certain

¹³⁴ House of Commons Transport Committee, p. 28.

¹³⁵ Applicable developments are listed in Schedule of The Town and Country Planning (General Permitted Development) (England) Order 2015.

¹³⁶ European Commission (1992), Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora [1992] OJ L 206.

¹³⁷ European Commission (2009), Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds [2009] OJ L 20.

¹³⁸ Proposal for a Regulation of the European Parliament And of the Council 2013/0157 (COD) of 25 May 2013 establishing a framework on market access to port services and financial transparency of ports [2013].

ports and port activities. Section 31 of the Act specifies that customers can appeal to the Secretary of State for Transport against ship, passenger or goods dues, and Section 27 states that all other charges relating to port activities must be reasonable, with a few specified exceptions.¹³⁹ Therefore, there is a form of regulation of the ports sector in the UK, meaning that the incremental impact of the proposed regulations will be significantly reduced. It is worth noting that the existing provisions are relatively 'light-touch' and are based on an appeal to the Secretary of State; however, the OFT noted that the majority of appeals are rejected.¹⁴⁰

The port services regulations would apply to all ports in the TEN-T network. Of these, a total of 43 are located in the UK.¹⁴¹ The Commission's impact assessment for the proposal estimates a compliance cost for business as a whole of €2.2m per year plus a one-off cost of €0.8m.¹⁴² The UKMPG response to the proposals suggests that this might be a significant underestimate, but estimates that, based on the Commission's figures, the cost to the UK could be €275,000 per year and €100,000 in one-off costs.¹⁴³ More generally, the OECD has noted that ownership of UK ports is mixed, with many ports in private sector ownership.¹⁴⁴ Fifteen of the UK's 20 largest ports are privately owned and around two-thirds of traffic transits through private sector ports.¹⁴⁵ Conversely, public ownership is more common in continental Europe and the financial transparency requirements might reduce the scope for direct support of ports by their respective governments.

4.2.5 Demand-side drivers

The demand for ports and port services for the inbound container market is underpinned by UK demand for goods. As discussed in section 4.1.5, both goods imports/exports and passenger travel to/from the UK seem to be highly correlated with both domestic and global income (or GDP). Container traffic and sea passenger traffic flows follow trade and travel as a derived demand. Across ports, the charges for harbour dues, port services and other direct financial costs will have a bearing on the demand for those ports, both within and between countries.

Maritime security could also affect the choice of port. This is discussed in Box 4.1.

¹³⁹ The exceptions are charges relating to the running of a ferry service in or from a harbour, fishing, and water abstraction.

¹⁴⁰ Office of Fair Trading (2010), 'Infrastructure ownership and control stock-take—final report: case study annexes', December.

¹⁴¹ The exact figure is not entirely clear at this stage. The figure of 43 is made up of UK ports in the core and comprehensive networks. See European Commission, 'List of Sea Ports in the Core and Comprehensive Networks', available at:

http://ec.europa.eu/transport/modes/maritime/ports/doc/2014_list_of_329_ports_june.pdf.

¹⁴² European Commission (2013), 'Commission staff working document: impact assessment accompanying the document "Proposal for a Regulation of the European Parliament and of the Council establishing a framework on the market access to port services and the financial transparency of ports"', SWD(2013) 181 final, volume 1, 23 May.

¹⁴³ European Commission (2013), 'Commission staff working document: impact assessment accompanying the document "Proposal for a Regulation of the European Parliament and of the Council establishing a framework on the market access to port services and the financial transparency of ports"', SWD(2013) 181 final, volume 1, 23 May.

¹⁴⁴ OECD (2011), 'Competition in Ports and Port Services Policy Roundtables'.

¹⁴⁵ UKTI (2013), 'The UK Ports Sector: A Showcase of World Class Expertise'.

Box 4.1 Maritime piracy

Maritime piracy has received a significant amount of attention in recent years, both in the media and by international organisations. The UN Operational Satellite Applications Programme (UNOSAT) reports a total of 6,249 reported incidents between 1995 and 15 August 2013, with Southeast Asia, the Western Indian Ocean and West Africa the worst affected areas.¹ Unsurprisingly, the pattern of piracy incidents tends to follow major trade routes.

UNOSAT reports that, having peaked in 2011, the number of reported incidents appears to be declining, with the West Indian Ocean seeing an especially sharp decline. This is consistent with the findings of the anti-piracy foundation, Oceans Beyond Piracy (OBP), which suggests that the cost of Somali piracy fell by 50% between 2012 and 2013.

Despite the falls in the frequency of incidents, the cost can be significant. In addition to increased security onboard ships, increased military operations and insurance costs, many shipping companies reroute ships or increase their speeds when operating in high-risk areas, which increases average fuel consumption. OBP estimates the cost of Somali piracy alone at between \$3bn and \$3.2bn.² Indeed, given that the bulk of the costs estimated by OBP are precautionary, it is quite possible that higher spending on deterring piracy could be part of the reason for the decline in incidents. The cost of piracy in terms of increased risk or preventative measures is unlikely to vary across shipping companies from different countries meaning there would be no effect on competitiveness. It is possible that security threats could change the attractiveness of different ports by changing the cost of using high-risk shipping routes. That said, it is worth noting that piracy is unlikely to affect the choice between different Northern European ports, as most incidents take place outside European waters.

Note: ¹ UNOSAT (2014), 'UNOSAT Global Report on Maritime Piracy a geospatial analysis 1995-2013', p. 12. ² Oceans Beyond Piracy (2013), 'The State of Maritime Piracy 2013', p. 7.

Source: Oxera.

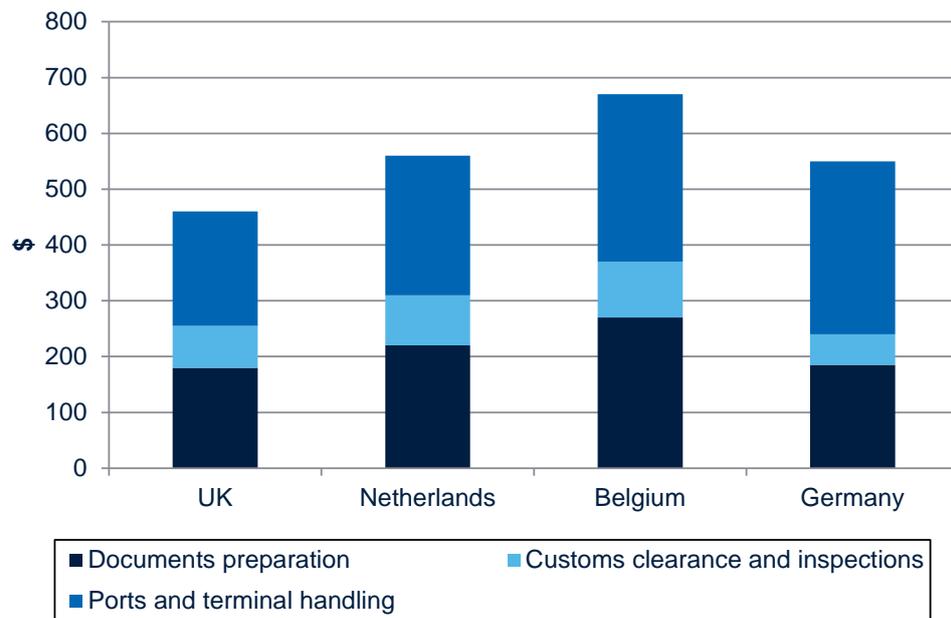
Import and export costs

The cost associated with importing can vary across countries due to differing customs practices, port fees and costs associated with handling. A measure of costs is especially useful, as it incorporates both technical efficiency and other factors such as competitive forces. The cost to import could have a material impact on the attractiveness of different countries as transshipment hubs. Other things equal, a country with a less costly customs requirement, either in terms of financial or time costs, should be preferred. The World Bank's 'Doing Business' report measures the time and cost of import and export of a TEU.¹⁴⁶ The data covers several aspects of the import cost, including document preparation, customs clearance and inspections, and port and terminal handling. This suite of indicators provides a good indication of the cost of using a port in a given country.

Figure 4.5 shows the cost of import across the four countries with largest container throughput in Northern Europe. The World Bank estimates suggest that the UK is the cheapest of the four with a cost of \$455 per TEU, compared with over \$500 for Germany and the Netherlands and \$690 for Belgium.

¹⁴⁶ World Bank Group (2014), 'Doing Business 2015 Going Beyond Efficiency', October

Figure 4.5 Cost of import for a TEU by country, 2014



Source: World Bank.

The World Bank also produces estimates of the time associated with following the various procedures involved in importing, including preparing documents, clearing customs and port/terminal handling. By this metric, the UK performs similarly to the Netherlands and Belgium, where import procedures take a total of six days. By contrast, in Germany the import process is takes slightly longer to complete, at seven days.

Competitiveness indicator: Time and cost of UK container imports relative to ports in north-west Europe. This is a potentially useful metric to measure the relative costs of UK port use against those of Europe.

4.2.6 Conclusions

Oxera considers that UK ports could offer an alternative to ports in mainland Europe when serving UK-bound traffic—i.e. a direct-call system rather than a hub-and-feeder one. However, the UK’s island status represents a major barrier to the UK serving as a container transshipment hub for Europe, since the additional costs associated with onward transport from the UK to other European countries would be sizeable. This potential market accounts for a significant minority of UK container trade.

Irrespective of whether the UK is supplied directly or traffic is fed by larger transshipment ports on the continent, demand for UK port services is underpinned by UK trade in goods, which is largely outside the direct control of UK government and the maritime industry. However, the need for capacity can be indirectly influenced through the planning system, which is critical to creating conditions in which ports can be developed or expanded.

In terms of the efficiency of port services, UK ports compare well against rival countries (i.e. those with large container port activity) based on the financial and time costs of landing cargos. As with shipping services, the EU has sought to open up the market for ancillary services at ports. There is potential for the proposed port services regulation currently being considered by the EU to affect

the costs of landing cargoes at ports. If enacted, this could increase the level of competition among providers at ports, potentially reducing prices to port users. That said, the Harbours Act 1964 provides some 'light-touch' regulatory scrutiny at present, meaning that the incremental impact of the EU regulations would be reduced. It is also worth noting that the regulation would apply to other EU member states, including those competing with the UK.

4.3 Drivers of competitiveness in the maritime business services sector

As described in section 2.3.3, maritime business services compete internationally at the level of the sub-industry—i.e. finance, insurance and law. A key driver of competitiveness is the productivity and efficiency benefit from the geographic clustering of business services.

The factors identified below are the key drivers of the development and performance of clusters in the context of maritime business services.

4.3.1 Geographic factors

Ease of communication—language and time zones

With English being an international language, conducting business in English is valued as a benefit to the maritime industry. Many competitor nations can also provide an English-speaking environment, and the UK benefits from this.

Similarly, the UK's time zone allows it to service key markets in both North America and East Asia, which is particularly relevant given the international nature of the maritime industry.¹⁴⁷ This offers the UK, and other competitors in the EU, a natural advantage compared with competitors from outside the EU.

4.3.2 Product characteristics

Agglomeration benefits

The concentration of economic activity within a cluster, as described further under 'Supply-responsiveness', can increase accessibility to other firms and workers. Therefore, there can be productivity benefits as well as knowledge and technology spillovers.

A way to measure these productivity benefits is using an elasticity of productivity with respect to the employment density from DfT guidance on measuring the benefits of agglomeration in transport assessments.¹⁴⁸ Oxera has estimated that the productivity of labour would be around 5.6% lower if the size of a cluster, as measured by the density of employment, were halved, and all else was equal—i.e. if the activity in the London cluster were spread over two unconnected cities.¹⁴⁹ This estimation illustrates the benefit of geographic clusters, and London's existing advantage in particular. Estimates for productivity per worker

¹⁴⁷ Fisher Associates (2004), 'The Future of London's Maritime Services Cluster: A call for Action', available at: <http://www.fisherassoc.co.uk/dbimngs/Maritime%20Services%20London%20Final%20v2.pdf>

¹⁴⁸ Department for Transport (2014), 'TAG UNIT A2.1 Wider Impacts', available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/370532/webtag-tag-unit-a2-1-wider-impacts.pdf.

¹⁴⁹ The agglomeration elasticity for producer services is given as 0.083. The percentage change labour productivity from a change in a cluster is given by $\left(\frac{\text{employment density}_A}{\text{employment density}_B}\right)^p - 1$ where p is 0.083, A is in the case of the scenario and B is the base case. Therefore halving the employment density in the cluster gives $\left(\frac{1/2}{1}\right)^{0.083} - 1 = -5.6\%$ change in the productivity of labour.

in London in the maritime business services sector would allow a monetary estimate of the labour productivity.

It is worth noting that on the basis of the number of maritime business services firms, Singapore's maritime cluster is approximately half the size of London's. An important caveat is that each country is likely to have a different parameter for the elasticity of productivity, and consistent data on productivity and employment in the maritime business services sector is not available. As a result, Oxera is unable to present a monetary comparison of the labour productivity in different clusters around the world. However, this finding can provide insight into the value of clusters and suggests that the increase in labour productivity is significant.

There are several ways in which agglomeration benefits can occur. For London's maritime business services sector, Oxera has identified the following channels, based on the DfT's stakeholder workshops and economic theory.

Pool of skilled labour

The availability of a skilled labour force is crucial for the development and success of a cluster. The high input costs (i.e. wages) mentioned above can in themselves help attract and retain skilled labour. The cluster of business services also provides the potential for professional development. Various functions in maritime business services require experienced ex-seafarers in an advisory role, including loss adjusters in insurance companies, or arbitrators and expert witnesses in maritime law. These advisers help to maintain the critical mass that is necessary for the maritime cluster to continue its momentum. This can be encouraged through links with education: providing a steady stream of UK cadets is likely to provide UK-based advisers in years to come.

Presence of regulatory bodies and international organisations

The clustering of businesses is inherently self-reinforcing as the productivity benefits from agglomeration encourage more and more businesses to co-locate. This can be strengthened further by the presence of key regulatory bodies or industry bodies. The main regulatory body for the maritime sector is the IMO, which is based in London. Other significant global groups based in London include the International Group of P&I Clubs and the Baltic Exchange.

Historical inertia

The movement of businesses from one maritime cluster to another is unlikely to be costless. For instance, establishing a practice in maritime law or, similarly, expanding an existing insurance firm into maritime provision may be relatively straightforward. However, established firms benefit from their experience and an existing client base. In the UK, the courts have a sophisticated and proven legal process, which has been established over many centuries of activity to support a competitive advantage in maritime law. Similarly, London's historical dominance in maritime insurance has built up a strong knowledge base for insurance and underwriting services.

Links to non-maritime business services

In the insurance and financing sectors, the proximity of the financial services centre in London is helpful for the development of key specialisms in maritime services, although in-depth specialist knowledge of the maritime sector is also essential. London's business services sector, in particular, finance, insurance and legal services, is one of the top centres. The Global Financial Centres Index

estimated by Z/Yen Group shows London losing the top spot to New York in 2014 for financial services as a whole.¹⁵⁰ On this index, London, in second place, is followed by Hong Kong and Singapore.

4.3.3 Supply-responsiveness

Input cost inflation

The benefits of clusters and agglomeration are evident in the business services sector, with many businesses drawn to a single city or region. This competition for land and local skilled labour drives up the price of these inputs. As a result, business services may face high wages and high land costs. This issue is particularly acute for maritime centres that are also the location of other major business centres, such as London and Singapore, and offsets agglomeration advantages.

4.3.4 Regulatory and policy context

Tax regime

Outside the tonnage tax regime, the entire maritime sector is affected by the wider tax system. This includes the personal, business and indirect taxes that will all have an effect on the competitiveness across all parts of the maritime sector. The table below shows the top rate of corporate and personal income tax among the UK's maritime competitors alongside the 'distance to frontier' metric from the PwC Paying Taxes analysis. The distance to frontier indicator measures the distance between a country and the leading country on three indicators measuring the burden imposed by the tax system: the rate, the number of payments and average compliance time. An important caveat to this is that the overall tax system in the country has a large number of facets, and while the headline rates are often a focal point in wider debates on tax competitiveness, other factors such as the allowances, deductions and exemptions are also important in determining the overall tax burden. The UK's corporate tax rate compares well with the majority of its maritime competitors, particularly within Europe, while the personal tax rate is among the higher rates. Overall, the UK is one of the highest-performing countries, and is ranked 16th out of the 189 countries considered by PwC. Hong Kong and Singapore score well in terms of their headline tax rates, and are very close to the highest-performing countries across all three measures covered.

¹⁵⁰ Z/Yen Group and Qatar Financial Centre Authority (2014), 'The Global Financial Centres Index 16', available at: http://www.longfinance.net/images/GFCI16_22September2014.pdf.

Table 4.5 Comparison of tax regimes, 2014

	Corporate tax rate (highest)	Personal income tax rate (highest)	Paying taxes distance to frontier (100=frontier)
UK	21	45	90.52
Greece	26	42	78.30
Germany	29.58	45	77.02
Japan	35.64	50.84	67.19
China	25	45	67.44
Netherlands	25	52	86.76
Belgium	33.99	50	74.18
France	33.33	45	72.12
Hong Kong	16.5	15	98.51
Singapore	17	20	97.19

Source: KPMG and PwC.

The tax regime as a whole represents a major cost to the maritime business services sector and the maritime sector as a whole. Oxford Economics estimates that tax payments from maritime business services were £385m in 2011.^{151,152} This is a significant share of the industry's overall value added of £1.5bn.

Regulation

There are also certain specific issues originating outside the maritime sector that could affect the provision of maritime financial services in particular (e.g. implementation of Basel accords and Solvency Directives). The European Banking Authority's Single Rulebook ensures uniform application of Basel III in all EU member states.¹⁵³

The Solvency II Directive is an EU Directive for insurance companies to ensure they have enough capital to provide reserve funds to cover all insurance claims they are likely to receive. The Directive adopts the UK model of risk-based regulation, promoting stronger standards for policy-holder protection across the EU, and is intended to create a level playing field for insurance companies, with a single rule-book for prudential regulation.¹⁵⁴ The Directive comes into force in 2016, and will impose guidance on capital requirements, valuation methods, governance and risk management and reporting requirements. In the UK, these will be implemented by the Bank of England's Prudential Regulation Authority, and may require more stringent requirements for insurance companies compared with clusters outside the EU. Lloyd's believes that equivalence will encourage non-European countries to move in the same direction as Solvency II, although likely avoiding some of the more onerous requirements. This would reduce the impact of Solvency II on the UK's and the EU's competitiveness.¹⁵⁵ As such, European and global legislation does not necessarily affect the

¹⁵¹ Comprising corporation tax, income tax, National Insurance contributions and VAT.

¹⁵² Oxford Economics (2013), 'The economic impact of the UK Maritime Services Sector: Business Services', February.

¹⁵³ European Banking Authority, 'The Single Rulebook', available at: <http://www.eba.europa.eu/regulation-and-policy/single-rulebook>.

¹⁵⁴ HM Treasury (2015), 'EXPLANATORY MEMORANDUM TO THE SOLVENCY 2 REGULATIONS 2015', available at: http://www.legislation.gov.uk/ukxi/2015/575/pdfs/uksiem_20150575_en.pdf.

¹⁵⁵ Lloyd's, 'Consultation document on Level 2 implementing measures for Directive 2009/138/EC, Lloyd's Response', available at: <https://www.lloyds.com/~media/files/the%20market/operating%20at%20lloyds/solvency%20ii/sii%20level%202%20consultation%20%20lloyds%20response.pdf>.

competitiveness of the UK maritime sector, though this is dependent how it is transposed into UK law.

Competitiveness indicator: Change in domestic regulatory burden. The regulatory burden faced by UK businesses is an important driver of competitiveness.

Government initiatives

Consolidation of maritime promotion and coordination activities appears to be a feature of some of the fastest-growing maritime sectors. In Singapore, the Maritime and Port Authority of Singapore (MPA) was created in 1996 as a statutory board sitting under the Ministry of Transport. The MPA is responsible for both day-to-day management and regulation of the Port of Singapore, as well as the development of the maritime sector more widely.

In Hong Kong, administrative and industrial policies for the maritime sector are split. The Maritime Department acts as the port authority and regulator for maritime transport, as well as having responsibility for procurement and management of the government fleet, while the Hong Kong Maritime Industry Council has responsibility for advising and supporting the government in developing and promoting the industry. In 2014, the Hong Kong Maritime Industry Council published an external research report by BMT Asia Pacific, setting out a series of recommendations for the development of the maritime sector.¹⁵⁶ One of the key recommendations was the establishment of a new industry 'champion', which would advise the government on industrial development, implement new training policies, market Hong Kong as a maritime centre, and coordinate research and development activities.

In addition to shipping tax incentives, the MPA has two key direct initiatives:

- the Maritime Innovation and Technology Fund—aimed at supporting technological development working in partnership with industry. In 2013 funding for this programme was increased from S\$100m to S\$150m as part of a package of support for the maritime sector;
- the Maritime Cluster Fund—seeks to strengthen the maritime cluster through improving productivity, sponsoring and developing training opportunities and support for business development activities. It was established in 2002 and received a five-year extension in 2013.

Oxera is not aware of any formal evaluations of these programmes. The BMT Asia Pacific noted that the impact of the business development activity is as yet unclear, although the approach to marketing Singapore's maritime cluster appeared to be especially aggressive.

In the UK, maritime policy is led by the DfT and the Maritime and Coastguard Agency. That said, the maritime industry itself and its representative bodies are important in promoting the sector; for example, while Singapore Maritime Week is run by the MPA, London International Shipping Week is led by the industry.

Legal institutions

In addition to the agglomeration benefits from co-location, maritime legal services have ties to the UK due to the widespread use of English law for

¹⁵⁶ BMT Asia Pacific (2014), 'Consultancy Study on Enhancing Hong Kong's Position as an International Maritime Centre: Final Report', April.

maritime arbitration. The London Maritime Arbitrators Association reports that more maritime disputes are referred to arbitration in London than in any other place where arbitration services are offered.¹⁵⁷

Contracting in the maritime sector can be a complex process and covers a range of commercial and non-commercial fields. The maritime sector also involves a large number of specialised businesses, and, consequently, legal services play an important role in formalising relationships between firms and resolving disputes when they arise. Due to the global nature of the maritime sector, disputes often cross jurisdictions. London has been marketed by the UK government as a centre for resolution of international commercial disputes. The government places an emphasis on the enforceability of settlements, a strong regulatory regime for legal services and availability of commercial legal expertise.¹⁵⁸

4.3.5 Demand-side drivers

Trade

The overall level of maritime trade is a key driver of growth in many maritime business services clusters. Changes in trading relationships, logistics and supply chains can drive a shift in the physical location of maritime activity. Surveyors, insurers and lawyers are often located near the site of physical activity. The maritime business services cluster in London has become less dependent on proximity to the port of London as activities become more knowledge based as described in section 2.2. However, for less well developed clusters port and shipping activity can still drive growth in business services. Growth in trade and tonnage in the Far East is also a driver behind Singapore, Hong Kong and Shanghai posing a threat to London's business services cluster.

4.3.6 Conclusions

While the UK's maritime business services cluster has historically been linked to physical activity, this has become less of a key driver over time as the cluster has become more knowledge-based as described in section 2.3.3. That said, physical maritime activity remains an important driver among rival clusters.

Business services such as maritime legal services and ship broking could be considered intermediary services, in the sense that they generate value by facilitating interactions between other market participants. For these businesses, co-location of customers (such as shipping companies) and other suppliers is a major factor in determining the attractiveness of a location. This co-location can generate productivity advantages for all businesses. Agglomeration benefits resulting from knowledge spillovers and access to a large pool of skilled labour have a material effect on productivity, and therefore the competitiveness of maritime business services clusters across countries.

The clustering of businesses is inherently self-reinforcing as the productivity benefits from agglomeration encourage more and more businesses to co-locate. This can be strengthened further by the presence of key regulatory bodies or industry bodies.

The availability of labour is one channel through which agglomeration benefits can arise. This is both an advantage of the London business services cluster and a challenge. The availability of staff with specialist maritime expertise is

¹⁵⁷ See London Maritime Arbitrators Association website: <http://www.lmaa.org.uk/about-us-Introduction.aspx>.

¹⁵⁸ For instance see Ministry of Justice and UK Trade and Investment (2011), 'Plan for Growth: Promoting the UK's Legal Services Sector'.

crucial for offshore as well as onshore maritime activities. The maritime labour pool is discussed further below, although as part of the DfT's Maritime Growth Study, stakeholders have reported particular difficulties in obtaining visas for onshore personnel, which increases the pressure to attract UK or EU nationals.

The general costs of doing business are a very important driver of competitiveness for all types of maritime business services and government has an important role to play in minimising regulatory costs. In terms of policy and regulation there appears to be large scope for differential impacts on countries.

London has other specific advantages as a maritime business services centre. In the insurance and financing sectors, the proximity of the financial services centre in London is helpful for the development of specialisms focusing on maritime services, albeit in-depth specialist knowledge of the maritime sector is also essential. Maritime legal services have ties to the UK due to the widespread use of English law for maritime arbitration.

4.4 Drivers of competitiveness in the maritime education sector

The maritime education sector competes internationally at all levels of training. Maritime schools and colleges generally refer to further education institutions. The factors identified below capture the key drivers of competitiveness between the UK and its competitors.

4.4.1 Geographic factors

Location

Most existing colleges are located near ports. Trainers and instructors are likely to be drawn from a pool of individuals who have worked at sea and on shore and are therefore likely to be concentrated near existing ports. Countries looking to expand their maritime education, such as Malaysia, are island nations or countries with significant coastline. The UK has a large number of ports around its coastline, compared with Germany, which, despite being home to the port of Hamburg, has only 13 maritime training providers. The USA has 54 training providers, and the Netherlands has 28. This is followed by Poland and Norway with just over 20 training providers each. The use of training ships—where the vessel is used exclusively for training—and the increase in simulation-based training reduces the requirement for colleges to be based near ports, which may reduce the reliance on location, although there is likely to be a 'de minimis' level of education that cannot be fully separated from real-world maritime activities.

Entry requirements

The demand for maritime education services is affected by the nationality requirements, particularly for training funding support. Singapore's programme and funding is targeted at permanent residents and citizens, and therefore limits the growth and reach of the colleges and their ability to compete internationally. Similarly, a government grant called Support for Maritime Training (SMarT) is available only for UK residents or those within the EEA. Overseas nationals who are subject to employment restrictions are not eligible for the funding, which may restrict the willingness of carriers to fund cadets from overseas in UK programmes, and could therefore limit the potential appeal of UK maritime courses to overseas students.¹⁵⁹ Maritime training centres attract overseas

¹⁵⁹ Maritime and Coastguard Agency, 'Marine Guidance Note: The Government Support for Maritime Training Scheme (SMarT) - Revised Arrangements from 1 August 2012 to 31 March 2015', available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/282106/mgn455.pdf.

nationals who are willing to pay the full cost of the training, due to the reputation of the education provided.

4.4.2 Product characteristics

Quality and reputation

Maritime colleges compete on the level of training provided and the exposure to different scenarios. Some overseas colleges own or share ships to allow students to learn in a realistic environment. Similarly, colleges, including many in the UK, are increasingly offering full mission bridge simulators, with engine room and ship-handling simulation as well as tugboat-handling through simulators.¹⁶⁰ This can appeal to students seeking quality learning experience, and may also be favoured by shipping carriers seeking to train and recruit cadets.

The increasing use of online-based learning allows existing educational establishments with strong reputations to increase their reach by diversifying into online courses. This is an ongoing trend more widely in education. However, in maritime courses, the use of training vessels and simulators increases the benefit of site-based learning.

Mandatory training requirements

The International Convention on STCW, an IMO convention, sets the standards of competence for seafarers internationally.¹⁶¹ There are 125 countries signed up to the STCW, which specifies minimum training requirements for seafarers.

The European Maritime Safety Agency (EMSA) audits countries which sign up to the STCW standards to ensure that the quality of the training provided is up to the standards set. Countries that operate below the standard can face an EU ban on seafarer recruitment from these countries. From 2010 to 2013, the EU banned seafarers certified by Georgia, illustrating the damage done by a country failing to meet the standards.¹⁶² Similar concerns are currently being raised by the EU against the Philippines, with ongoing rounds of audits.¹⁶³

The UK seafarer training programme has a good reputation, particularly in highly specialised and technical roles.¹⁶⁴ As a result, courses have remained in demand despite the risk that other roles can be replaced by lower-wage competition from overseas.

4.4.3 Supply-responsiveness

Mandatory sea service

Training for seafarers in the UK is funded by shipping companies, with government providing support to the companies. Trainees usually serve in a supernumerary capacity—i.e. the grant offered to shipping companies from the government is withdrawn if trainees are used as regular crew members during

¹⁶⁰ See, for example, South Tyneside College, 'Marine Simulation', available at: <http://www.stc.ac.uk/content/marine-college/maritime-simulation>.

¹⁶¹ International Maritime Organization, 'International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978', available at: <http://www.imo.org/OurWork/HumanElement/TrainingCertification/Pages/STCW-Convention.aspx>.

¹⁶² European Commission (2013), 'Transport: Commission lifts ban on Georgian certified seafarers for EU vessels', press release, available at http://europa.eu/rapid/press-release_IP-13-1152_en.htm

¹⁶³ Hand, M. (2014), 'EMSA, Philippines and STCW, and why has it taken so long?', available at: <http://www.seatrade-global.com/news/asia/emsa-the-philippines-and-stcw-and-why-has-gone-on-so-long.html>.

¹⁶⁴ Gekara, V. (2008), 'Globalisation, State Strategies and the Shipping Labour Market. The UK's Response to Declining Seafaring Skills', available at: <http://www.sirc.cf.ac.uk/Uploads/Thesis/Gekara.pdf>.

training.¹⁶⁵ A tension lies between the industry providing training berths, and funding for the berths, and ensuring that sufficient cadets come forward to fill those berths.¹⁶⁶ As a result, this may restrict the number of trainees a shipping company is willing to take on for sea-based training, and can also restrict supply-responsiveness, as shipping companies may not be willing to expand the number of trainees they have.

In the UK, shipping companies usually pay for a significant proportion of a seafarer cadet's training. When the training is complete, there is no formal mechanism for ensuring that the trainee remains with the shipping company. This, combined with 'poaching' by competitor shipping companies, makes it difficult for the shipping company to recoup its investment in the training.¹⁶⁷ This uncertainty may also restrict the willingness of shipping companies to take on more trainees.

The maritime education sector requires ex-seafarers for trainers and instructors. The availability of ex-seafarers can create a long-term constraint on the responsiveness of the education sector. This requirement links the education sector with the physical maritime sector.

4.4.4 Regulatory and policy context

Cost and funding

The cost of obtaining a maritime qualification is a key driver, and in particular, the cost borne by the student. Government and private funding schemes often bear some of the cost of the qualification, which can improve the attractiveness of a maritime career compared with other careers, as well as the preference for studying in one country over another.

In the UK, a government grant called Support for Maritime Training (SMarT) pays for up to £20,000 of training, which can be up to 50% of costs per cadet for the duration of the training.¹⁶⁸ In total, it contributes £15m per year.¹⁶⁹ The rest of the cost of training cadets is borne by the shipping companies. Cadets emerge from training almost debt-free. As a result, the training cost to the cadet is very attractive. Shipping companies deciding where to train their cadets will take these costs and subsidies into account.

Support for seafarer training varies globally but the support offered by the UK is not unique. In their review of the requirement for trained seafarers, Deloitte and Oxford Economics report that virtually all governments offer some form of support for training.

- In Singapore, the government funds the full cost of the training course fees, and provides additional allowances for the cadets. However, this facility is only available to citizens and permanent residents.

¹⁶⁵ Maritime and Coastguard Agency, 'Marine Guidance Note: The Government Support for Maritime Training Scheme (SMarT) - Revised Arrangements from 1 August 2012 to 31 March 2015', available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/282106/mgn455.pdf.

¹⁶⁶ House of Commons Library (2010), 'Shipping: UK policy', available at: www.parliament.uk/briefing-papers/SN00595.pdf.

¹⁶⁷ Deloitte, Oxford Economics (2011), 'An independent review of the economic requirement for trained seafarers in the UK, based on data from Nautilus International', available at: <https://www.gov.uk/government/publications/an-independent-review-of-the-economic-requirement-for-trained-seafarers-in-the-uk>.

¹⁶⁸ Deloitte and Oxford Economics (2011), 'An independent review of the economic requirement for trained seafarers in the UK', December, Table 6.1.a

¹⁶⁹ Maritime and Coastguard Agency, 'Marine Information Note: Support for Maritime Training (SMarT) – Additional Funds of up to £3 Million', available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/282366/min470.pdf.

- Hong Kong's government subsidises the cost of developing training facilities and provides cadets with a grant of HK\$5,000.
- In Taiwan, the government has provided funding for ships used exclusively for training, while attending maritime schools is free of charge.
- Denmark also subsidises 50% of the expenditure on training, and wages, board and travel of staff on a training programme can often be reimbursed. The government also offers subsidies of DKK20,000 for each three-month period of work experience on ships. In the Netherlands, the government does not offer any direct support, although there is student funding for those who study maritime courses at university.
- Malaysia's Transport Ministry has announced the establishment of a maritime training hub for the ASEAN region, with Malaysian maritime institutes working with Chinese experts to provide training.¹⁷⁰

Tonnage tax regime

As described in section 4.1.4, participation in the UK tonnage tax regime mandates a minimum training requirement. As such, those shipping companies operating under the UK's tonnage tax regime will maintain demand for training courses.

4.4.5 Demand-side drivers

Students' demand for a maritime education ultimately reflects the demand for a maritime career. As a result, the UK maritime education services sector also competes with other education services offered. The attractiveness of a maritime career is determined by the following:

Duration of training

The duration of the training can potentially create a source of competitive pressure, relative to international maritime colleges as well as compared with alternative career paths. In the UK, it takes three years to achieve the STCW Officer of the Watch qualification—i.e. become a junior officer. This is generally considered equivalent to a Bachelor's degree level.

This is not an uncommon period of training. In Denmark, a ratings must undertake 18 months of training, and a junior officer requires four-and-a-half years' training. Following one year at sea, a junior officer can specialise as a Master Mariner or Chief Engineer (or both) after a further one-and-a-half to two years of training.¹⁷¹ In the Netherlands, students achieve a Certificate of Competency and a BSc qualification after three to four years training. A further two to four years of work experience and study is required for Master Mariner or Chief Engineer. Singapore has introduced a Certificate of Competency, which requires 21 months of training. Following two to three years of sea time and further courses, the students can qualify as Master.

Cost of training

The cost of training to become a junior officer is comparable to other courses of a similar level of qualification—a Bachelor's degree can cost students up to

¹⁷⁰ China Daily (2014), 'China, Malaysia to develop maritime training hub', 12 March, available at: http://usa.chinadaily.com.cn/world/2014-12/03/content_19014608.htm.

¹⁷¹ The Blue Denmark, 'Maritime Officer', available at: <http://worldcareers.dk/education/maritime-officer/>.

£27,000 in tuition fees, whereas the Officer of the Watch qualification, when part-funded by the government, and the rest by the shipping company, is effectively free for the student. In the UK, maritime qualifications therefore look attractive compared with some other similar qualifications.¹⁷²

The junior officer training in Denmark is free for EU/EEA students and can cost between €24,000 and €64,000 for international students.¹⁷³ In the Netherlands, the four-year secondary vocational training (MBO) costs approximately €4,400,¹⁷⁴ while students can be paid during their placements.¹⁷⁵

Competitiveness indicator: Cost of seafarer training less funding. Measures the net financial cost of seafarer training. Oxera is not aware of an existing composite measure of course fees for seafarer training, although it is likely to be available directly from most maritime colleges.

Pay and benefits

The compensation package offered to seafarers can attract potential cadets into the profession. The average salary for a master mariner is £54,000–£60,000 for containers, tankers and offshore vessels, based on 2011 data.¹⁷⁶ This can be compared with other career options with a similar skill level—i.e. an undergraduate degree or higher—which shows median annual pay around £42,000 to £46,000 for those with engineering and medicine degrees, and around £21,000 to £36,000 for other degrees.¹⁷⁷ The salaries offered for skilled marine workers look attractive, although this premium can reflect the additional requirements for marine officers, such as extended periods at sea, as well as restrictions on holiday entitlement.

Currently, only UK residents working on UK registered vessels are entitled to the UK national minimum wage.¹⁷⁸ Other seafarers (senior ratings) are entitled to the ILO minimum wage of US\$592 per month (US\$614 from 1 January 2016) for a maximum of 48 hours per week.^{179,180} The UK minimum wage on similar terms is about US\$2,170 per month (US\$2,240 per month from 1 October 2015).¹⁸¹ Hence, it is materially cheaper to hire non-UK residents who are willing to work for slightly more than the ILO minimum wage, which reduces the number of financially attractive work opportunities for UK seafarers. Thus, wages for UK seafarers are driven down towards the minimum wage by non-UK seafarers willing to work for slightly more than the ILO minimum wage.

¹⁷² Other qualifications in the maritime industry require different training. For example, a marine engineer needs a Bachelor's degree, which has the same cost as similar qualifications.

¹⁷³ The Ship's Officer Bachelor's at Svendborg International Maritime Academy consists of eight semesters—i.e. four years. Annual tuition fees for higher education in Denmark range from €6,000 to €16,000 for international students, while higher education is free for EU/EEA students. See Svendborg International Maritime Academy's website: <http://simac.dk/the-ships-officer-programme>; and Study in Denmark website: <http://studyindenmark.dk/study-options/tuition-fees-scholarships>.

¹⁷⁴ This is based on a yearly cost of €1,131 for the four-year maritime officer training at the ROC Kop van Noord-Holland. See ROC Kop van Noord-Holland's website: <http://www.rockopnh.nl/Default.aspx?ID=18&GroupID=GROUP15>.

¹⁷⁵ UKCES (2013), 'The vocational education and training system in the Netherlands: briefing paper', August.

¹⁷⁶ Deloitte, Oxford Economics (2011), 'An independent review of the economic requirement for trained seafarers in the UK', available at: <https://www.gov.uk/government/publications/an-independent-review-of-the-economic-requirement-for-trained-seafarers-in-the-uk>.

¹⁷⁷ Based on 2013 estimates from Office for National Statistics (2013), 'Graduates in the UK Labour Market 2013', available at: http://www.ons.gov.uk/ons/dcp171776_337841.pdf.

¹⁷⁸ Nidirect government services (2015), see: <http://www.nidirect.gov.uk/workers-entitled-to-the-national-minimum-wage>

¹⁷⁹ International Labour Organization (2014), 'ILO body adopts new minimum monthly wage for seafarers', 28 February.

¹⁸⁰ International Labour Organization (2006), 'Maritime Labour Convention', adopted on 23 February.

¹⁸¹ Calculation based on the average USD to GBP exchange rate over the 12 months prior to May 2015.

While the increase in vessel size (and the reduction in crew size) reduces the share of wages in operating costs, the additional cost of hiring British seafarers is likely to be material for most ship managers. Furthermore, a strong pound will widen the gap. This wage gap between different nationalities only starts to converge at higher officer levels. Seafarer wages are likely to be higher in sectors that are less exposed to global competition, such as short-sea shipping and ferry operations.

Competitiveness indicator: Wages of maritime sector workers as a share of UK average. Wages should control for education levels. Adjustments for seafarer tax deduction could also be made to better reflect pay differentials. Data on wages is available from the Office for National Statistics.

The European Community Shipowners' Association has recently highlighted the additional risk of criminalisation of seafarers from maritime accidents and discrimination on shore leave as particular issues deterring people from joining the industry.¹⁸²

Attractiveness of a maritime career

The overall attractiveness of the maritime sector can drive young people to join the profession. In countries or cities where the maritime industry contributes significantly to the economy or the local region, a maritime career may be held in higher regard. The Seafarer's International Research Centre found that a leading cause of seafarers leaving the industry is 'almost invariably because they want to be with their families.'¹⁸³ The long periods of time away from home can dampen the attractiveness of a maritime career.

Industry experts have noted that the perception of the maritime industry, particularly in the UK, may be closer to the historical view of traditional seafaring, rather than the high-tech, high-value industry that it is.¹⁸⁴ As a result, the sector has struggled to attract young people in the UK for a number of years. Key industry players in the UK have noted that the industry and the government could do more to promote the maritime industry in schools.¹⁸⁵

Competitiveness indicator: Number of UK seafarer trainees becoming UK resident seafarers. This metric could be used to monitor the pool of seafarers available to the shipping sector and potentially the wider maritime sector. Oxera is not aware of any existing data sources in the public domain. However, it would be possible to estimate this based on the number of seafarers claiming Seafarers' Earnings Deduction and existing data on newly trained seafarers.

Entry requirements

Demand for maritime education can also come from international students. Those students from outside of the EEA are required to apply for student visas. The UK Chamber of Shipping, representing UK shipping companies, reports

¹⁸² European Community Shipowners' Associations (2015), 'Joint industry statement on the mid-term review of the EU's Maritime Transport Policy', March, available at: <http://www.ecsa.eu/news-and-media/latest-news/9-latest-news/189-joint-industry-statement-on-the-mid-term-review-of-the-eu-s-maritime-transport-policy>.

¹⁸³ Cosmopolitan briefs, 'Seafarer working and living rights', available at: <https://cosmopolitanbriefs.wordpress.com/2014/04/14/seafarer-working-and-living-rights/>.

¹⁸⁴ As part of the DfT's workshops for the Maritime Growth Study.

¹⁸⁵ This view was expressed at a workshop hosted by DfT in support of the Maritime Growth Study attended by industry and other stakeholders. Oxera attended several of these events as an observer.

difficulty and complexity in obtaining student visas, as well as for onshore personnel.¹⁸⁶

4.4.6 Conclusions

In the maritime education sector, the support provided by governments helps to reduce the direct financial cost to individuals materially, and the duration of training is equivalent to similar levels of qualifications. While funding can be an important driver of overall demand for maritime education, and therefore demand is much higher than the number of posts available, it appears to be the case that generous government funding allowances and multi-year training requirements are common across nations. This means that the comparative generosity of support packages is more important in determining the attractiveness of the UK as a provider of maritime education services internationally. However, the relative cost of alternative career opportunities in the UK is also relevant, particularly in the context of rising university tuition fees.

This financial attractiveness extends beyond training costs. Although wages for junior seafarers are driven down by international competition, the maritime sector appears to pay well at higher officer levels compared with similarly qualified jobs in the UK, while tax deductions for UK-resident seafarers also help improve the net financial returns to maritime work. Perhaps the most challenging demand-side issue in maritime education are the perceptions of the maritime sector as a long-term career option involving extended periods at sea. These appear to be having an adverse effect on demand for training and education services in the UK.

On the supply-side, issues like supply of ex-seafarers to serve as instructors and reported difficulties in obtaining work visas for onshore personnel create difficulties for maritime colleges. It is also important to note that the flow of trainees through the UK maritime education system has wider implications throughout the sector due to the need for suitably trained and experienced labour both on- and offshore.

Maritime education institutions are generally located near ports. This is partly because of the practical requirements of seafarer training and creates a further link between maritime education and other maritime services. Technological changes that facilitate distance learning or simulator-based training can undermine this link to an extent, although there is likely to be a minimum level of education that cannot be fully separated from real-world maritime activities. The competitiveness of the ports, shipping and maritime education sectors could therefore be seen as mutually interdependent.

¹⁸⁶ UK Chamber of Shipping (2015), 'Visas Seminar: Addressing the challenges to maritime businesses', available at: <http://www.ukchamberofshipping.com/news/2015/03/13/visas-seminar-addressing-challenges-maritime-businesses/>.

5 Opportunities and challenges facing the UK maritime sector in the short, medium and long term

This section analyses some of the key trends and factors influencing the growth and competitiveness of the UK maritime sector. It focuses on the factors that Oxera considers to be most likely to influence the maritime industry in the future. These cover the four maritime sectors and include:

- vessel size;
- use of alternative shipping fuels;
- government incentives (which will affect all four sectors);
- trade patterns;
- the demand for seafarers;
- the supply of offshore wind.

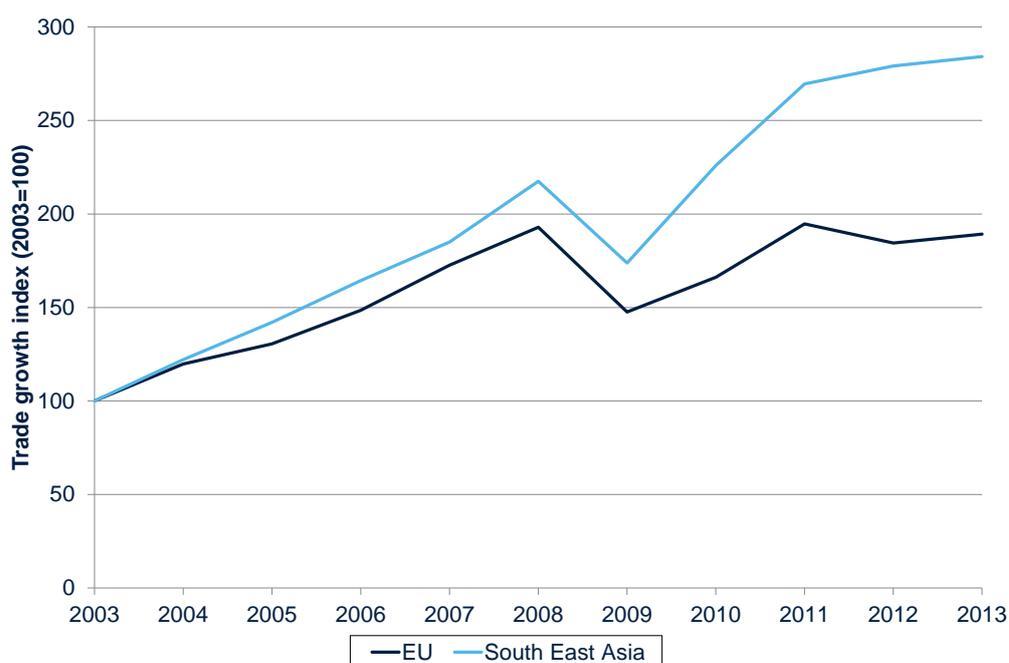
The section also looks at how some of these drivers will differ by country, and how much scope there is for the UK government or maritime industry to influence them.

The issues selected are based on the analysis in section 4. The structure of the section follows the five market characteristics described in section 2.

5.1 Geographic factors

Growing trade in Asia, and particularly South East Asian economies, could benefit some of the UK's competitors in the shipping and business services sectors. Figure 5.1 shows an index of total trade in goods for the EU and South East Asia.

Figure 5.1 Trade growth: EU and South East Asia



Note: The figures represent total imports and exports of merchandise trade.

Source: World Trade Organisation.

As discussed in section 2.2, there are different levels of cluster development. Arguably, the only 'node four' cluster in the world—which is the most advanced type of cluster—is London.¹⁸⁷ However, it is possible that one of the 'node three' clusters in Asia (e.g. Singapore, Hong Kong) could become a node four cluster. This would initially be facilitated by further increases in trade leading to more activity in the shipping and business services sectors to develop these ports as node three clusters. However, for one of these ports to become a node four cluster, substantial agglomeration effects would need to take place in order to support continued growth of maritime business support services, which are not entirely dependent on trade growth. Given the favourable regulation policies and tax regimes in Hong Kong and Singapore, which encourage growth in business services, it is possible that one of these maritime clusters may become a 'node four' cluster in the medium to long term.

An advanced, knowledge-intensive maritime cluster in South East Asia represents a challenge to London in the maritime industry and to business services in particular. The UK's ability to respond to this challenge would be limited, as a key driver of the Asian cluster's performance is trade growth in South East Asia, which is largely outside the influence of the UK government and the UK maritime industry. However, the UK government may have a role in continuing to encourage the development of the London maritime cluster.

5.2 Product characteristics

Online learning and simulation training

Developments in information technology have led to online learning becoming more prominent in the education sector over the last 10–15 years. This is also evident within the maritime sector, where the development of web-based applications has led to wider distribution of course content for seafarers.¹⁸⁸ This represents an opportunity for UK maritime education institutions, as they can potentially increase distribution through the provision of online courses.

Educating seafarers is a very expensive process due to the amount of theoretical and practical knowledge that must be attained in order to become qualified. One way in which costs have been reduced is the use of simulator training. It is also argued that simulator training allows for certain situations to be recreated in a safe environment.¹⁸⁹ Furthermore, studies argue that the use of school ships can provide excellent training opportunities for basic seamanship skills, and, along with simulator training, could reduce the length of time cadets need to spend completing their seagoing service. This is important, as it has been commented how students can experience difficulties when re-entering into the teaching programme after completing their seagoing service.¹⁹⁰ The greater provision of simulation training therefore represents a potential opportunity to increase the effectiveness of maritime training within the UK.

Vessel size

The changing size and shape of vessels is a defining feature of freight shipping, and the average size of container vessels continues to increase, following a long-term trend for larger ships. This trend has a direct effect on the shipping

¹⁸⁷ On the basis of the classification system developed by Lam and Zhang (2011).

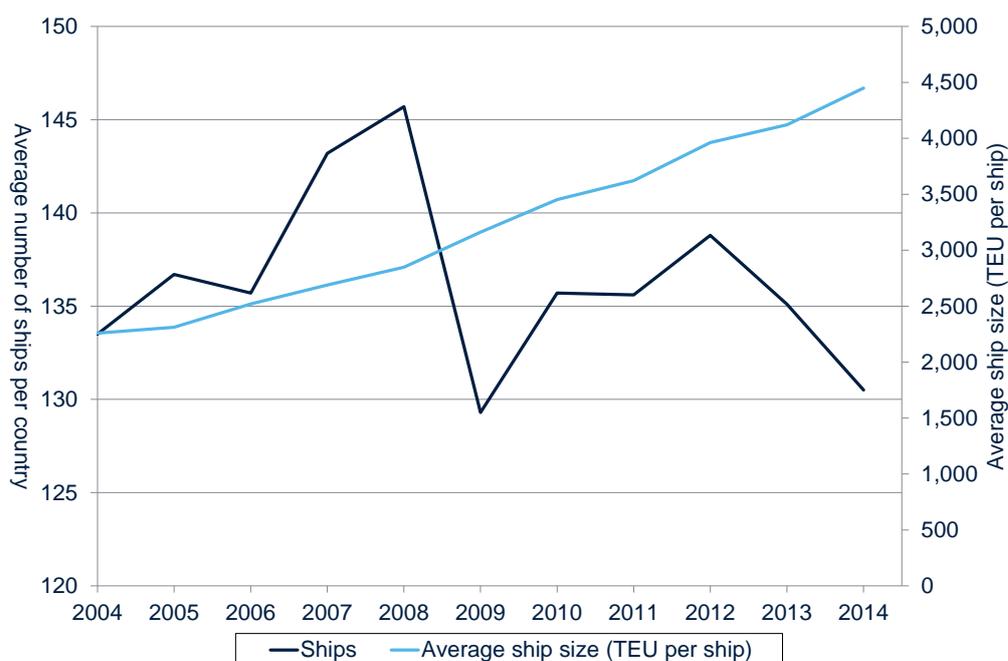
¹⁸⁸ Albayrak, T. and Ziarati, R. (2010), 'Training: Onboard and simulation based familiarisation and skill enhancement to improve the performance of seagoing crew', June, p.18.

¹⁸⁹ Albayrak, T. and Ziarati, R. (2010), 'Training: Onboard and simulation based familiarisation and skill enhancement to improve the performance of seagoing crew', June, pp.15–16.

¹⁹⁰ Albayrak, T. and Ziarati, R. (2010), 'Training: Onboard and simulation based familiarisation and skill enhancement to improve the performance of seagoing crew', June, p.16.

and ports sectors, as well as on support activities. In shipping, larger vessels can increase efficiency at the cost of lower flexibility for routes and destinations, due to size constraints at ports and shipping bottlenecks such as the Suez Canal. For ports, a need to accommodate larger (and wider) vessels might require new investments to reconfigure berths in order to remain competitive. While the number of ships per country is similar to a decade ago, the average ship size has almost doubled from 2,259 TEUs in 2004 to 4,449 in 2014 (see Figure 5.2).

Figure 5.2 Fleet deployment per country: total number of ships and average size per ship



Note: Container ships are used as a proxy for all ship types.

Source: UNCTAD.

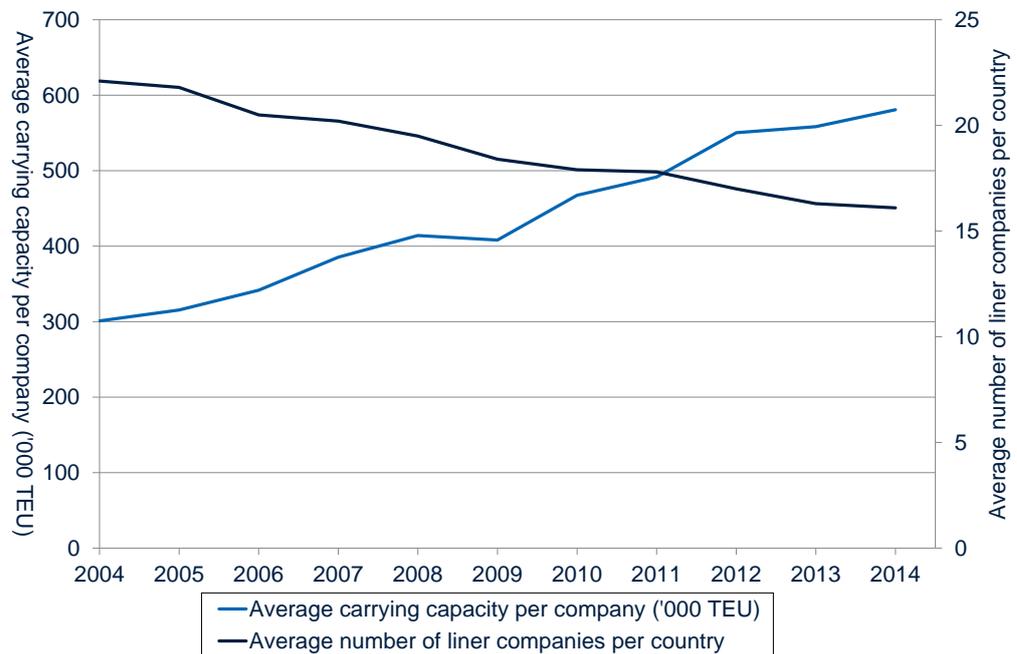
The economies of scale in maritime transportation are a key reason for this. For example, data compiled by UNCTAD shows that larger ships can have up to 60% lower unit costs than smaller ships.¹⁹¹ In addition, while charter rates for all ship classes have fallen over time, the unit cost of charter for the largest vessel classes has fallen significantly faster (over 50% compared with an 18% fall for smaller ships), increasing the scale advantages of larger vessels.¹⁹²

This has been mirrored by consolidation at the firm level in the shipping sector; for example, the average number of liner shipping companies operating in each country has decreased from 22.1 in 2004 to 16.1 in 2014, despite an overall increase in activity. This reduction in the number of shipping companies has led to container shipping activity per company doubling, on average, as shown in Figure 5.3.

¹⁹¹ This was calculated by comparing average container-ship time charter rates between 2002 and 2013 for the smallest geared ship in the sample with those of the largest geared ship. UNCTAD (2014), 'Review of Maritime Transport 2014: Chapter 3 – Freight rates and maritime transport costs', p. 54.

¹⁹² The figures used for this comparison are based on comparing the smallest geared ship in the sample with the largest geared ship. The average charter rate between 2002 and 2007 was compared against the average for 2008 to 2013. UNCTAD (2014), 'Review of Maritime Transport 2014: Chapter 3 – Freight rates and maritime transport costs', p. 54.

Figure 5.3 Presence of liner shipping companies: average number of companies per country, and average container-carrying capacity deployed per company



Note: Container ships are used as a proxy for all ship types. Liner companies are used as a proxy for all types of shipping companies.

Source: UNCTAD.

This trend is largely outside the government's control, as it is primarily driven by incentives to increase commercial efficiency, and most of the UK's largest ports are privately owned. However, government policies to facilitate larger capacities among strategically important containerised ports could be beneficial in supporting competitiveness. The continued trend for larger vessels and larger individual cargos could support the transshipment market (potentially at the expense of hinterland transport) by favouring large ports with higher capacities, a wider set of inland transport links to onward destinations, and the ability of ports to accommodate larger vessels. However, while this represents an opportunity for the transshipment market in general, it is potentially a challenge for the ports sector in the UK, whose ports are poorly located to act as a hub for Europe and may instead face greater competition for UK-bound traffic. The need to accommodate larger numbers of larger vessels also creates challenges for ports if they do not have the capacity to accept larger ships. Larger cranes are needed to deal with the larger ships (vessel width is likely to increase faster than length due to the stability problems caused by long, narrow ships), and other on-site infrastructure will inevitably need to adapt.

Use of alternative shipping fuels

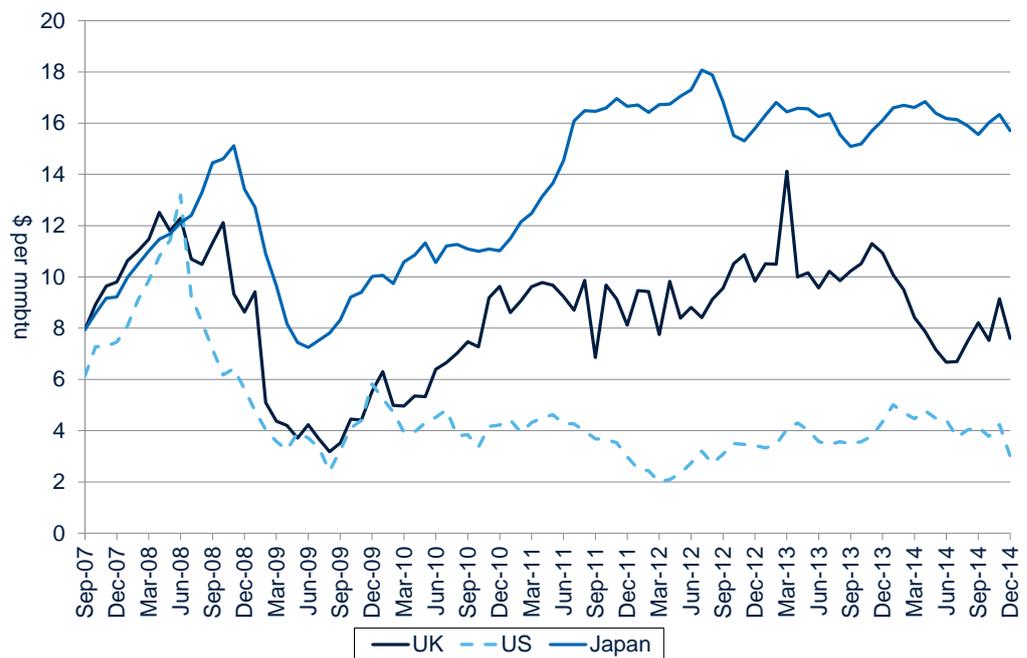
Alternative fuels could also lead to major changes to shipping and associated services such as bunkering, due to both the investments required and the ongoing costs of ship operations in different regions. One of the main drivers of potential changes in maritime fuel is likely to be regulatory pressure. The IMO's MARPOL is the key international convention covering prevention of pollution of the marine environment by ships due to operational or accidental causes. Annex VI of MARPOL has led to the enactment of the Sulphur Directive in the EU, with a corresponding regulation coming into force in the UK in December 2014, as

discussed in section 4.1.4. While the UK government’s impact assessment assumed that compliance with the regulation would largely come through the use of low-sulphur fuel oils (and, to a lesser extent, the installation of scrubbers), it is also possible that methanol or LNG could help ship operators with compliance.

More broadly, long-term increases in oil prices (and therefore fuel oil) could also encourage this form of switching, particularly for shorter voyages, which are more suited to LNG use (e.g. short-sea shipping and ferries). LNG-fuelled ships are currently uncommon and largely restricted to LNG tankers themselves, for which the benefits are obvious. Widespread switching to alternative fuels would require significant investment by both ship owners and bunker fuel suppliers, presenting a large investment challenge but also a significant opportunity for service providers.

Importantly, while oil is a globally integrated market, natural gas is characterised by a number of regional markets with varying degrees of integration. This can be seen from the divergence between wholesale gas prices in the USA, Europe and Asia (see Figure 5.4). As a result, wider use of LNG as a shipping fuel could create competitive differentials across countries, as countries with lower gas prices would be more attractive as bunkering locations for LNG. For the wider shipping sector, however, it will be the region of operation that is crucial for the incentive to switch rather than the country of ownership.

Figure 5.4 Wholesale gas prices



Source: Oxera analysis of Bloomberg and Datastream data.

Greenhouse gas emissions

MARPOL also deals with greenhouse gas emissions, and work on reducing emissions is being led by the IMO’s Marine Environment Protection Committee (MEPC), which directly affects the shipping sector. MEPC’s most recent sessions, held in 2014, focused on the introduction of guidelines on fuel efficiency, with additional discussions on technology transfer and data

collection.¹⁹³ Given the international scope of potential future measures to curb greenhouse gas emissions in the maritime sector, it does not seem likely that this will have an impact on competitiveness. However, the ongoing question of the inclusion of international shipping emissions in the UK's Carbon Budgets has the potential to be more significant for both ports and the UK shipping sector. This is because if the Carbon Budgets were at risk of being breached it may lead to carbon abatement through emissions reduction policies (or purchase of emissions permits). Some of the burden of this could affect UK shipping companies, although it is also possible that the abatement policies could be targeted elsewhere. Emissions from international shipping fuel are not currently covered in the Carbon Budgets, but Section 30 of the Climate Change Act (2008) left open the possibility for their inclusion and required the government to make a decision by the end of 2012.¹⁹⁴ The government's decision notice deferred this decision and explained that this issue would be revisited when it comes to set the fifth carbon budget.¹⁹⁵

5.3 Regulatory and policy context

This subsection examines the potential for changes to the regulatory environment and their implications for UK maritime competitiveness.

As discussed in section 4.1.4, tonnage tax can play a significant role in influencing competitiveness in the shipping sector. Historically, the UK has had an advantage, since it introduced this tax incentive earlier than some other countries, although it is now available in many countries. Looking forward, the scope for the UK and other EU member states to provide favourable tax systems to support parts of the maritime sector is likely to be limited due to EU state aid guidelines, which theoretically limit the amount of support that a government can give ports (in practice, government support for ports is not uncommon in member states). Countries outside the EU, and therefore not subject to the guidelines, are likely to continue to offer incentivised and flexible tax rates to shipping companies and ports. For example, in his 2015 budget speech, Singapore's Finance Minister announced further support for Singapore's maritime hub, which will affect the shipping sector and also the maritime business services sectors by extending a number of the initiatives currently in place. This included allowing favourable tax rates, which are currently in place for ship operators, maritime lessors and providers of certain shipping-related support services, to be extended to cover certain finance leasing activities.¹⁹⁶ This contrasts with the UK, where changes to the tax treatment of lease financing may have led to financing activity moving away from the country in recent years, which therefore poses a challenge to the UK maritime sector in the medium term.

More generally, this relates to how governments can create incentives to help improve competitiveness across all sectors of their maritime industries. Several of the DfT maritime workshops highlighted the need for a collective voice to help promote maritime interests, and also to promote the sector internationally.¹⁹⁷

¹⁹³ Marine Environment Protection Committee (MEPC), 67th session, 13 to 17 October 2014, available at: <http://www.imo.org/MediaCentre/MeetingSummaries/MEPC/Pages/MEPC-67th-session.aspx>; and Marine Environment Protection Committee (MEPC), 66th session, 31 March to 4 April 2014, available at: <http://www.imo.org/MediaCentre/MeetingSummaries/MEPC/Pages/MEPC66.aspx>.

¹⁹⁴ UK government (2008), Climate Change Act 2008, available at: <http://www.legislation.gov.uk/ukpga/2008/27/contents>.

¹⁹⁵ Department of Energy & Climate Change (2012), 'International aviation and shipping emissions and the UK's carbon budgets and 2050 target', December.

¹⁹⁶ Swine, M. (2015), 'Singapore extends maritime tax incentives', *Tax-News.com*, 25 February, available at: http://www.tax-news.com/news/Singapore_Extends_Maritime_Tax_Incentives___67367.html

¹⁹⁷ As part of the wider Maritime Growth Study, the DfT hosted a number of workshops with industry and other stakeholders. Oxera attended several of these events as an observer.

Therefore, there are some areas where the government could help the UK maritime sector to grow, such as by implementing flexible initiatives and setting up a collective voice to promote the sector's interests. However, the government is also constrained in how far it can deliver some of these incentives due to EU regulation and directives.

The Commission's proposed regulation for port services is discussed in section 4.2.4. In addition, there is the potential for new state aid guidelines for ports, although no draft document has yet been published. However, the existing rules for airports provide some insights into the principles that the Commission may adopt, both in terms of assessing existing cases and when potentially drafting guidelines for ports. This is something that the industry would welcome, as the guidelines could help to reduce uncertainty for port owners that receive support from their respective governments. In terms of the impact on UK ports, given that the guidelines would be applicable across Europe, they should capture all of the UK's main competitors. The extent to which they would benefit the UK relative to these competitors will depend on their precise details, although it seems reasonable to expect them to place limits on subsidies and support, giving ports the opportunity to compete with less state support. There is, however, direct EU support for port investment, including an EU initiative aimed at improving port operations, which includes a commitment to provide up to €26bn for the period 2014–20. 329 seaports (including 42 UK ports) will be eligible to receive these funds.¹⁹⁸

5.4 Demand-side drivers

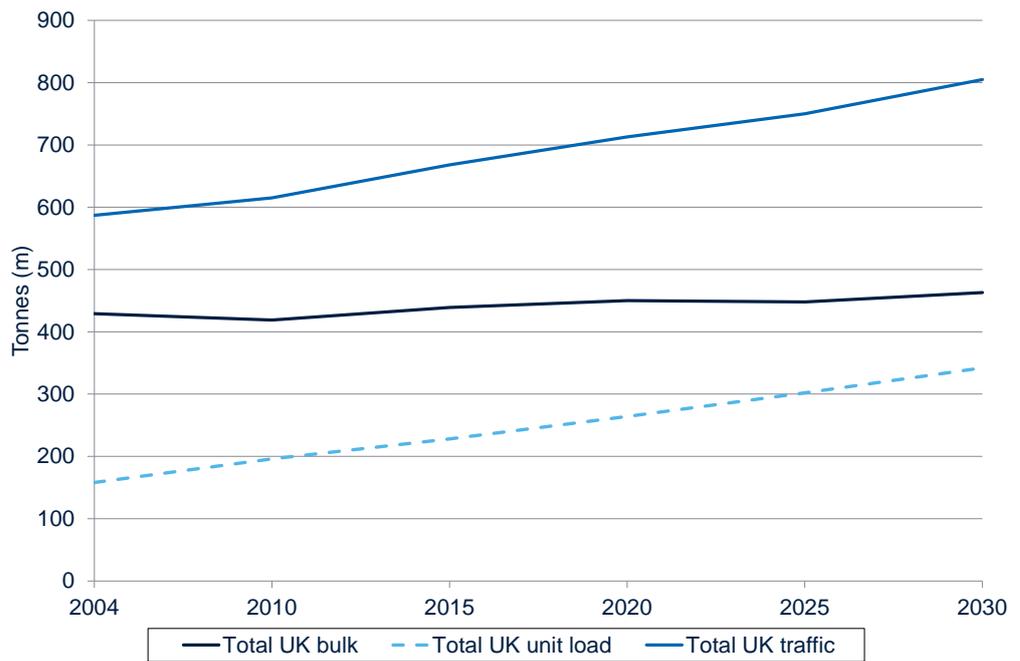
Trade patterns

As identified in section 4, one of the key factors that will influence growth in the UK shipping and ports sector is trade patterns between the UK and other countries. Given the importance of trading patterns in driving demand for shipping, developments in trade have implications for demand for services across the maritime sector both directly (in terms of ports and shipping services) and indirectly (in terms of ancillary services and business services).

The two figures below illustrate the trade that is forecast to enter/leave the UK via ports in the next 15 years.

¹⁹⁸ See European Commission statement on ports available at: http://ec.europa.eu/transport/modes/maritime/ports/ports_en.htm.

Figure 5.5 Total UK ports traffic forecasts, 2004–30

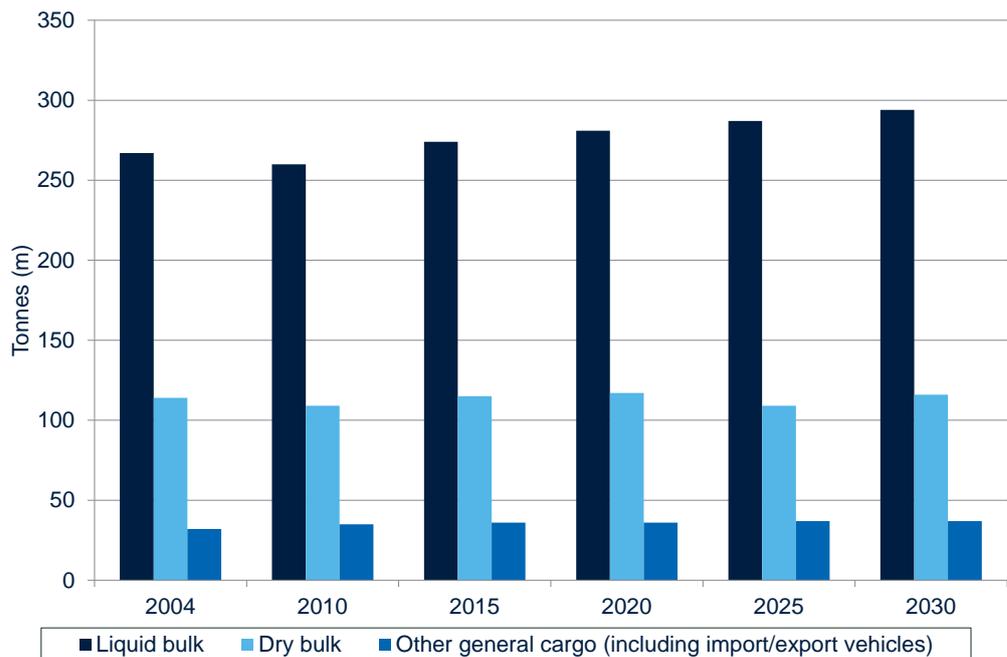


Note: These forecasts were produced a decade ago. However, the UK government still refers to them in its 2012 National Policy Statement for Ports. The government's view is therefore that the long-term effect of the recession will be to delay the traffic level by a number of years, but not ultimately reduce the eventual levels of demand for port capacity, in particular for unitised goods, predicted in the forecasts.

Source: MDS Transmodal.

Figure 5.5 illustrates how the majority of future growth in total traffic is due to occur in container traffic as opposed to bulk traffic. Figure 5.6 displays bulk traffic forecasts split by liquid bulk, dry bulk and other general cargo.

Figure 5.6 Bulk traffic forecasts for major ports, 2004–30

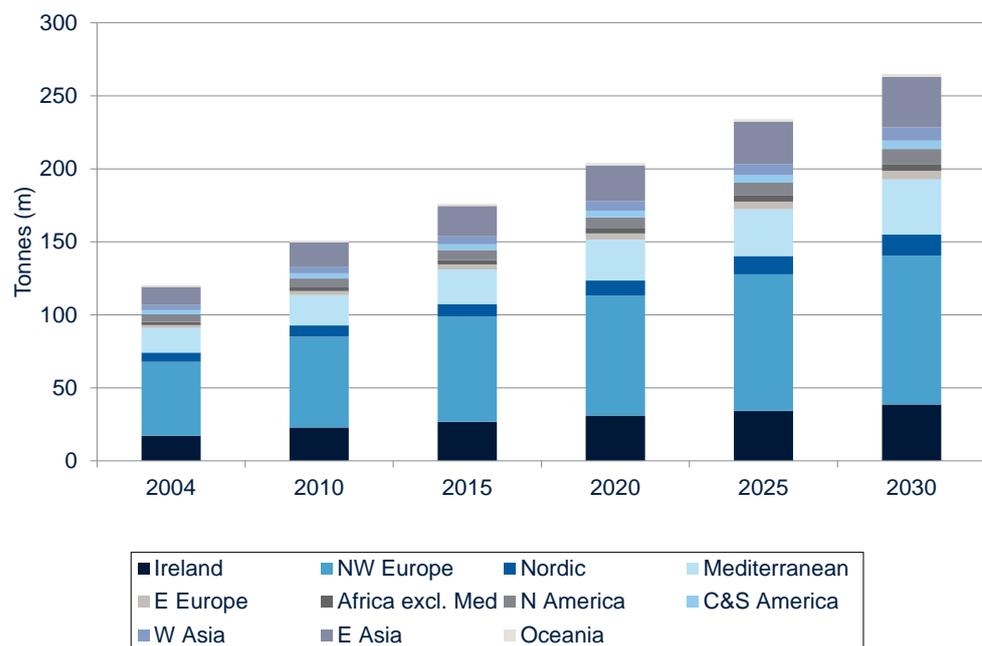


Source: MDS Transmodal.

Figure 5.6 shows that the levels of traffic for dry bulk and other general cargo are forecast to remain at similar levels over the next 15 years. However, there is forecast to be a gradual rise in liquid bulk traffic from 2010 onwards. This gradual rise may be due to the UK increasing the amount of fossil fuels it imports. Based on current emissions targets, the UK government projections suggest that imports of oil and gas will increase from just under 50m tonnes of oil equivalent to over 90m by 2025.¹⁹⁹

Container traffic is driving growth in imports and exports that pass through UK ports. Figure 5.7 compares UK trade patterns with other regions in terms of container traffic.

Figure 5.7 Forecast UK containerised tonnes, 2004–30, by world region



Source: MDS Transmodal.

Figure 5.7 shows that container port traffic is forecast to grow by over 50% between 2015 and 2030. This is forecast to be driven by increases in shipping of container traffic between the UK and several other regions, including the Nordic countries, the Mediterranean, Eastern Europe and Asia. The growth in traffic between the UK and the other European regions listed above is primarily driven by increases in ro–ro traffic, which is feasible due to the geographic proximity of these regions. The container traffic could be served by direct-call shipping into the UK or by hub-feeder transshipment via continental ports. Growth in this market segment will increase the size of the market in which the UK competes for traffic with major ports in north-west Europe.

Finally, it should be noted that controlling trade patterns is largely outside the UK government’s control. The government can create policies to influence trade patterns, but these are likely to be part of a larger macroeconomic plan. For example, there is potential for the UK government’s climate change policy to

¹⁹⁹ DECC UKCS Oil and Gas Production Projections, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/287002/production_and_demand_projections.xls.

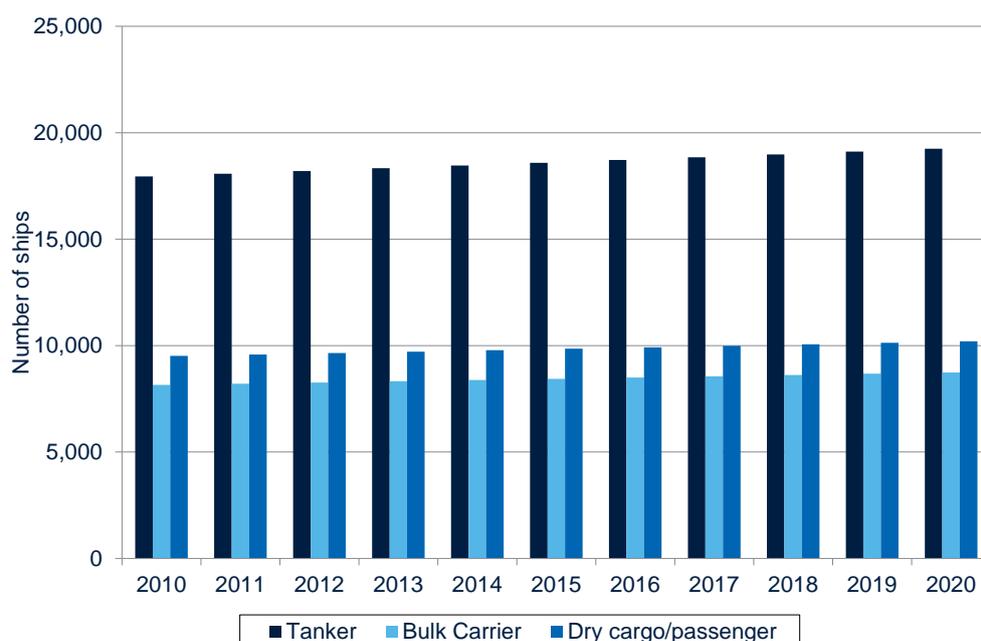
influence future shipping volumes through the carbon budgets set up to 2027.²⁰⁰ However, research by the Committee on Climate Change found that fuel efficiency has increased significantly—for example, ships built in 2000 are over twice as ‘efficient’ as ships built in 1940 (i.e. they use only half as much fuel per tonne-mile).²⁰¹ Therefore, the forecasts in Figure 5.7 could depend on how much fuel efficiency continues to improve in order for the UK government to meet any internal and/or international carbon reduction targets that are set in the future. More generally, despite the UK’s position as an island nation, the UK economy is heavily dependent on services that are inherently less supportive of the shipping sector.

Demand for seafarers

A number of the DfT workshops highlighted how the UK was highly competitive in terms of training, but that there were some factors that could influence the competitiveness of this training—in particular, promotion and financial assistance. DfT stakeholders have also commented that the supply of trained seafarers is potentially a major challenge for the sector as a whole, albeit this view does not appear to be universally shared.

Figure 5.8 illustrates forecast trends in the world fleet up to 2020.

Figure 5.8 Future number of the world fleet



Note: ‘World fleet’ refers to the total number of commercial ships, which are 2,000 gross tonnage or greater.

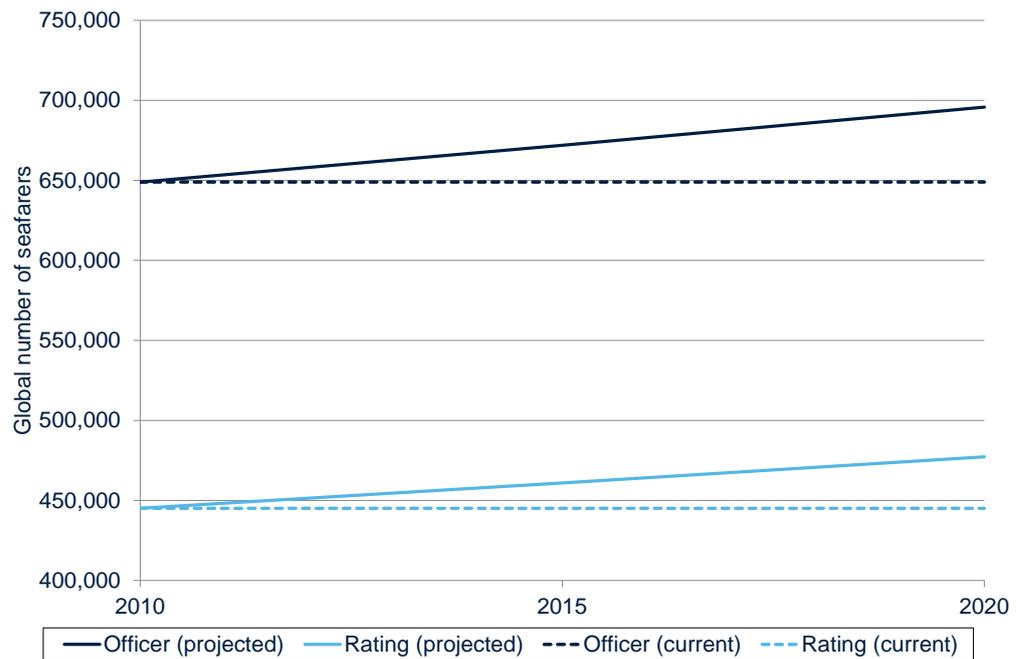
Source: Japan International Transport Institute and The Nippon Foundation.

Figure 5.8 shows that the number of fleets is forecast to increase from just under 37,000 in 2015 to over 38,000 by 2020. This will lead to a corresponding increase in demand for seafarers. Figure 5.9 compares the number of seafarers in 2010—i.e. the ‘current supply’—and forecast demand for seafarers, which is derived from the future number of fleets illustrated in Figure 5.8.

²⁰⁰ Department of Energy & Climate Change (2012), ‘International aviation and shipping emissions and the UK’s carbon budgets and 2050 target’, December.

²⁰¹ Committee on Climate Change (2011), ‘Review of UK Shipping Emissions’, November.

Figure 5.9 Current supply and forecast demand for seafarers



Source: Japan International Transport Institute and The Nippon Foundation.

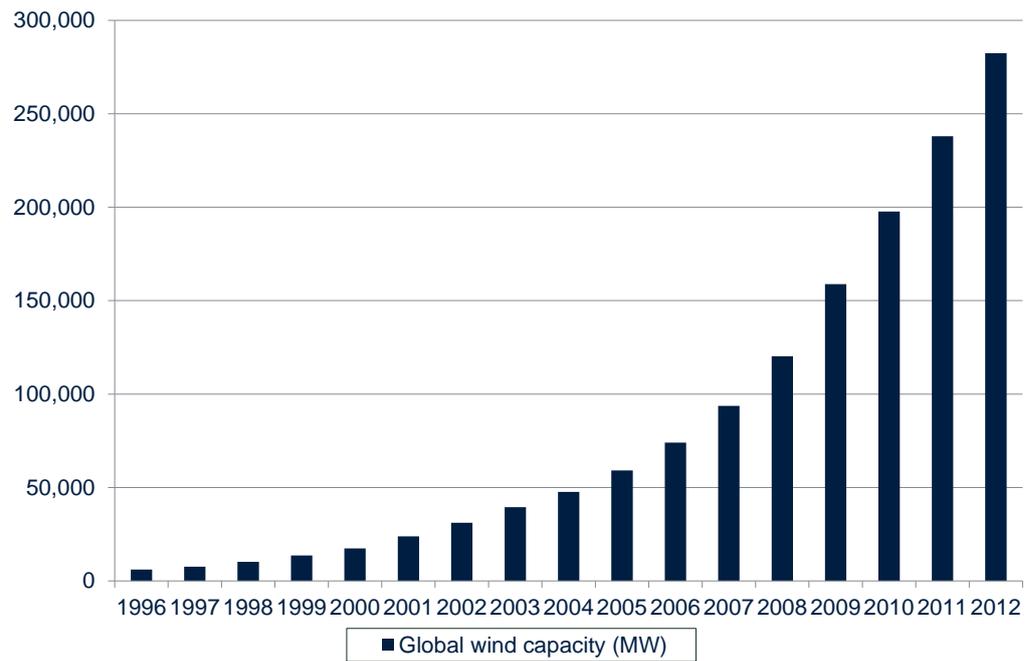
Figure 5.9 shows that, if the future supply of seafarers does not increase from the number in 2010, there will be a shortfall of around 80,000 seafarers by 2020.

The data suggests that future growth in demand for seafarers could present a significant opportunity for both UK seafarers and the training institutions that accredit them in the medium and long term. The UK is already very competitive in terms of training, but the analysis above demonstrates the existence of opportunities for further growth. For maritime education institutions in the UK, one option could be the more widespread use of accreditation schemes for overseas maritime colleges, although the direct value created by this is likely to be lower than that from the training activities themselves. That said, if this supply shortfall is not met, it could present significant challenges in the shipping sector and maritime business services, both of which rely on seafarers or ex-seafarers for labour.

Energy

The energy sector provides an important source of demand for the UK maritime sector, and particularly the ports sector, which supports the production of offshore wind energy. Historically, this has involved building and maintaining offshore oil and gas fields with corresponding services onshore. However, the decline in North Sea oil and gas production and government interventions in the electricity generation market are likely to shift the emphasis away from hydrocarbons in favour of renewables. Globally, the amount of energy generated from wind has increased significantly over the last 15 years, as shown in the figure below.

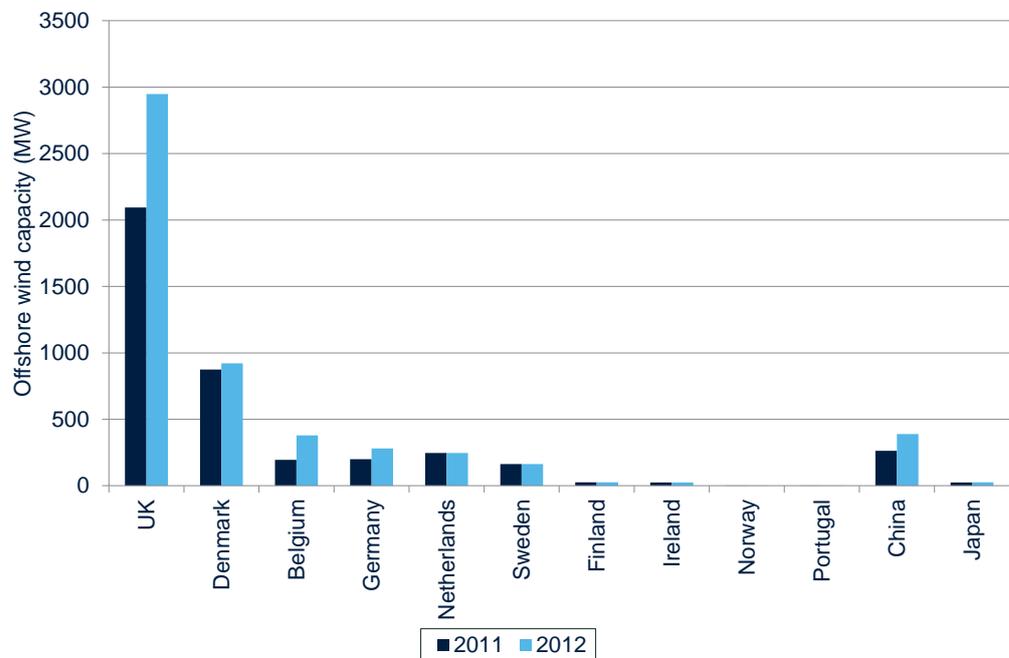
Figure 5.10 Global wind capacity (MW), 1996–2012



Source: Global Wind Energy Council.

Offshore wind is a significant opportunity for UK energy ports in the long term. A breakdown of the leading countries' offshore wind capacity for 2011 and 2012 is shown in Figure 5.11.

Figure 5.11 Offshore wind capacity (MW), 2011 and 2012



Source: Global Wind Energy Council.

The figure illustrates how the UK is the world leader in terms of offshore wind capacity, but also that it has increased its capacity by significantly more than the other countries considered. This presents a significant opportunity for UK ports and shipping in terms of marshalling (consolidating parts), maintenance, and

housing manufacturing facilities. The UK's strategy for meeting its emissions targets suggests that this opportunity will continue to grow. National Grid calculates that the UK had an offshore wind capacity of 3GW in 2012, which is forecast to increase to 12GW by 2020 and over 35GW by 2035.²⁰² In addition to the large increase in UK offshore energy generation, this market could be a major source of growth globally. The Global Wind Energy Council expects offshore capacity in Europe to double or treble to 2030, depending on the extent of climate change policies.²⁰³ As such, UK ports could potentially become suppliers for a much wider market, but, equally, there is potential for competition from other ports for activities such as manufacturing of parts and assembly activity.

Finally, the UK government's commitment to a Carbon Budget could affect and potentially reduce the level of fuel imports, which would pose a challenge for the shipping industry. For example, if adhering to the Carbon Budget leads to shale gas development, this may lower fuel imports.²⁰⁴

5.5 Conclusions

Trade patterns are a key factor which will influence all four sectors either directly or indirectly. In particular, changes in trade patterns are likely to directly influence physical activity (ports and shipping) and indirectly influence service provision (business services and education).

There is a strong correlation between trade patterns and a country's shipping fleet, with trade patterns being one of the key factors affecting the competitiveness of a country's shipping sector. The UK's continued transition away from manufacturing and towards services clearly represents a challenge.

Forecasts of maritime activity suggest growth in total UK ports traffic and particularly container traffic. The container market is an area where UK ports may need to compete with the transshipment hubs of north-west Europe, although a growing market clearly represents an opportunity for the UK in the medium to long term. Growing trade in Asia, and particularly South East Asian economies, could benefit some of the UK's competitors in the shipping and business services sectors. Furthermore, while London is a market leader in maritime business services, there is a possibility for one of the clusters in Asia, such as Singapore or Hong Kong, to overtake London as growth in maritime activity in the region spurs growth in maritime business services.

Regulation and policy context

Changes to the regulatory environment are likely to be a challenge in the future for the UK maritime sector. It is not possible to form a sensible prediction of the future policies of the UK government (or those of other countries). However, there are some potential challenges affecting the maritime sector that should be highlighted. First, there is the potential for further regulation in the EU (such as new state aid guidelines and the ports services regulation). Such regulation may reduce the competitiveness of the member states' ports sectors, although the impact on competitiveness is heavily dependent on the details of the legislation, as well as its application in UK law. Second, there has been a recent historical trend of governments in South East Asia, such as Singapore and Hong Kong, adopting policies to help grow their shipping and maritime business services

²⁰² National Grid (2014), 'Electricity Ten Year Statement 2014', November, p. 37.

²⁰³ Global Wind Energy Council (2014), 'Global Wind Energy Outlook 2014', October, p. 24.

²⁰⁴ Committee on Climate Change (2015), 'Fourth Carbon Budget Review—part 2: Chapter 4', p. 63.

sectors.²⁰⁵ As a wider point, the primacy of the maritime sector in policy development in these countries is in contrast to the approach in the UK, where maritime is not perhaps afforded similar levels of priority in national policymaking.

Labour supply

The labour market in the maritime sector presents a significant challenge to the shipping sector and maritime business services, both of which rely on seafarers or ex-seafarers for labour, while also representing an opportunity for the maritime education sector. Growing demand for seafarers and the existing demand–supply gap in the UK could mean that even a successful maritime education sector in the UK might not produce enough UK-based seafarers to support the continued success of the UK maritime business services sector.

Efficiency of ports and shipping companies

Changes in vessel size present challenges both for ports and for shipping companies. Increases in vessel size present various challenges for the ports and shipping sectors, with the economies of scale in maritime transportation being a key reason for this. This trend is potentially a challenge for the UK, since the economies of scale of the hub-feeder model would benefit from increasingly large vessels driving down costs. This would increase the competition for UK-bound traffic from larger ports on the continent. The need to accommodate greater numbers of larger vessels also creates challenges for ports if they do not have the capacity to accept larger ships.

Air quality and greenhouse gas emissions

Alternative fuels could also lead to changes to shipping and associated services such as bunkering, due to both the investments required and the ongoing costs of ship operations in different regions. Environmental legislation on air quality and differentials in gas prices across regions could create differing incentives for ship operators to switch to LNG. Legislation on carbon emissions could also have a significant impact on the shipping sector. If the government were to include international shipping emissions in its Carbon Budgets, there could potentially be a cost for shipping companies associated with reducing emissions or purchasing emissions permits, if the Carbon Budgets were at risk of being breached.

Energy ports

The renewable energy sector presents a potential opportunity for the ports sector as the production in hydrocarbons in the North Sea falls. The UK is the world leader in terms of offshore wind capacity and has seen significant growth in recent years. This presents a significant opportunity for UK ports and shipping in terms of marshalling (consolidating parts), maintenance, and housing manufacturing facilities. The UK's strategy for meeting its emissions targets suggests that this opportunity will continue to grow.

The table below highlights opportunities and challenges for the UK, and provides an estimation of the potential timescales based on Oxera's judgement and consideration of the evidence presented in this report.

²⁰⁵ See, for example: Swine, M. (2015), 'Singapore extends maritime tax incentives', *Tax-News.com*, 25 February, available at: http://www.tax-news.com/news/Singapore_Extends_Maritime_Tax_Incentives____67367.html.

Table 5.1 Opportunities and challenges

	Timescale	Opportunity/challenge
The possibility of an advanced cluster in South East Asia	Medium to long term	Challenge: Growth in demand for business services in Asia supported by physical maritime activity would represent a challenge to London's maritime cluster, and for the business services sector in particular
Online learning and simulation training	Short to medium term	Opportunity: This would affect the maritime education sector in the UK. Online learning could lead to a wider distribution of courses, while simulation training could increase the effectiveness of seafarer training
Increases in vessel size	Medium term	Challenge: This could be an opportunity for transshipment business in Europe, and therefore a challenge for UK ports aiming to compete for UK-bound traffic. It also represents a challenge for ports in terms of accommodating larger vessels
Use of alternative fuels	Medium term	Opportunity: This could be an opportunity for certain shipping operations (particularly shorter voyages) to reduce fuel costs while adhering to the Sulphur Directive. It also presents an opportunity for bunkerers
Greenhouse gas emissions	Medium to long term	Challenge: This could present challenges for the world fleet, depending on whether all countries are bound to an emissions reduction, which will determine how great an impact this has on the competitiveness of the UK relative to the other countries
Government support to the maritime sector	Short, medium and long term	Challenge: More supportive legislation and regulatory environments in some Asian economies will promote the competitiveness of those countries' maritime sectors relative to the UK and EU's more stringent systems
New EU state aid guidelines	Short to Medium term	Opportunity: The extent to which new guidelines support the UK relative to its competitors will depend on the precise details. However, it would be reasonable to expect them to place limits on state support for ports. The state aid guidelines for airports provide insights into the Commission's approach for existing cases/principles for draft ports guidelines
Trade patterns	Medium to long term	Opportunity: Growth in trade patterns represents an opportunity for the shipping and ports industries in the UK, although the UK government cannot control this directly. This would be a major opportunity for providers of highly mobile services such as shipping and business services, which could serve customers globally
Demand for seafarers	Medium to long term	Opportunity/challenge: Future growth in global demand for seafarers could present a significant opportunity for both UK seafarers and the training institutions that accredit them. For the rest of the maritime sector, a shortage of UK-based seafarers would present a challenge for the sector. This includes physical activities but also business services, which depend on a supply of ex-seafarers.
Offshore wind energy	Medium and long term	Opportunity: The UK is currently a world leader in the supply of offshore wind energy, and can continue to develop its offshore wind capacity going forward. This presents a significant opportunity for UK ports to become 'energy ports',

Timescale

Opportunity/challenge

supplying both the UK and other countries with offshore wind generation capacity

Source: Oxera.

6 Indicators of UK maritime competitiveness

Oxera has compiled a set of potential metrics that could be used to monitor different aspects of maritime sector competitiveness (see Table 6.1). These should be seen as supplemental to the DfT's existing statistical publications on maritime.

The indicators have been chosen on the basis that they act as a metric to measure either performance of the maritime sector as whole (or a relevant sub-sector) or a particular aspect of competitiveness. Oxera notes that, theoretically, there are many ways to measure performance or competitiveness. For practical reasons, we have restricted these recommended indicators to information that is both readily available (either through existing statistics or with a small amount of collection) and regularly updated.

Table 6.1 Maritime competitiveness indicators

Sector	Indicator	Suggested data source	Notes
All	Imports and exports of goods for the UK and key rivals	IMF	Trade is a key driver of demand, either directly or indirectly, across the maritime sector
All	Change in domestic regulatory burden	BIS Growth Dashboard	The regulatory burden faced by UK businesses is an important driver of competitiveness, and especially relevant to mobile activities such as shipping
All	GVA	Annual Business Survey and ONS Input-Output tables	The contribution of the maritime sector to the UK economy is a proposed metric for measuring activity over time. This is currently produced ad-hoc, but could be estimated annually with the suggested data sources
Shipping	Management and ownership of shipping assets	IHS	Consider splitting total owned/managed capacity according to actual or likely operations. Some shipping activity is subject to European competition, while other activities are subject to global competition and are potentially more likely to leave the UK
Ports	Volume of container imports from north-west Europe	Eurostat	Could serve as a proxy for transshipment activity
Ports	Time and cost of UK container imports relative to ports in north-west Europe	World Bank Group	Measures efficiency of UK ports
Maritime business services	Number of maritime arbitrations in London	MLex or other monitoring service	Could serve as an indicator of legal activity. This metric would not capture all legal advice
Maritime business services	Maritime insurance premia written in London	International Union of Maritime Insurers	Indicator of insurance activity and market share
Maritime education	Wages of maritime sector workers as a share of UK average	Office for National Statistics	Wages should control for education levels. Adjustments for seafarer tax deduction could also be made to better reflect pay differentials
Maritime education	Cost of seafarer training less funding	Maritime colleges, Maritime and	Measures the net financial cost of seafarer training

Sector	Indicator	Suggested data source	Notes
		Coastguard Agency data on funding support	
Maritime education	Number of UK seafarer trainees becoming UK resident seafarers	Not currently collected. HMRC data on seafarers claiming tax deduction is one possible source	The aim of this metric is to monitor the pool of seafarers available to the shipping sector and potentially the wider maritime sector

Source: Oxera.

