The Tramp Shipping Market

An Update of a Report Prepared for the European Community Shipowners' Association (ECSA)

by Clarkson Research Services Limited (CRSL)

Clarkson Research Services Limited
Date: March 2015
Ref: A3427-2015

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Executive Summary

MAIN CHARACTERISTICS OF THE TRAMP MARKET

1. Globally competitive markets
2. Close to perfect competition model
3. Different sub-market segments in response to customer needs
4. Competition between sub-market segments for cargo
5. Volatile and unpredictable demand
6. Many small entrepreneurial shipping companies
7. Global ship trading patterns including "cross trades"
8. Ease of entry and exit
9. Very cost effective

Background

1. This report is intended to provide a briefing on the organization and competitive economic structure of the tramp shipping industry.

2. The analysis in this report utilizes the Clarkson Research fleet database of self-propelled sea-going Merchant Vessels in excess of 100 Gross Tonnage. This includes vessels deployed in the bulk, specialized and liner shipping sectors, as well as non-cargo vessels such as cruise and passenger vessels. The fleet excludes non-propelled vessels, fishing and military vessels, yachts and fixed or mobile platforms and barges primarily used in the offshore energy sector.

The nature of the world shipping business

3. The international shipping industry transported 10.5 billion tonnes of cargo in 2014 up from 7.3 billion tonnes in 2004 (Table A1.4), with a fleet of 53,101 cargo carrying vessels out of a total of 89,636 deep sea ships (see Table 3 below). In 2014 it is estimated that around 85%% of international trade in terms of tonnage was transported by sea. This is equivalent to 1.5 tonnes per capita, compared to 1.1 tonnes per capita in 2004. With the exception of the cruise and ferry business, shipping companies mainly serve industrial customers not consumers (paragraph 2.1, p9).

4. Merchant Shipping is an international service. The ships, which are the primary business unit, are owned by 22,527 companies with an average of 4 ships each (see table above); registered under 191 different flags; and subject to international and port state regulations. The business is conducted in international market places using the US dollar as currency with has no tariffs or other impediments to free trade.

Table 3a - Cargo fleet by company size

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+	7	2,386	182.2	127.4	341	2	350	23.9	20.4	175
200-299	5	658	23.7	18.5	132	2	179	13.1	11.6	90
100-199	36	3,329	204.0	135.9	92	14	1,422	76.2	54.2	102
50-99	118	5,578	353.3	227.2	47	41	2,190	140.8	91.8	53
10-49	1,019	14,900	600.4	378.0	15	295	5,116	242.6	153.6	17
5-9	1,305	7,242	153.6	96.3	6	294	1,772	61.0	36.9	6
0-4	11,631	16,956	147.6	95.1	1	1,586	2,518	44.0	27.5	2
Unknown		2,052	7.2	4.6			16	0.1	0.1	
Total	**14,122**	**53,101**	**1,672.0**	**1,083.1**	**4**	**2,235**	**13,563**	**601.7**	**396.0**	**6**
% Total						*16%*	*26%*	*36%*	*37%*	

Source: Clarkson Research Services, February 2015. Includes cargo carrying vessels over 100GT in size only, excluding passenger vessels and cargo ships used in the offshore oil and gas industry.

Table 3b - Total fleet by company size (including non-cargo carrying vessels)

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+	8	3,615	184.6	130.3	452	2	1,089	25.3	21.8	545
200-299	6	1,452	25.4	21.2	242	2	459	13.6	13.3	230
100-199	37	4,859	211.7	150.4	131	14	1,806	76.7	55.1	129
50-99	134	8,952	368.2	239.1	67	42	2,733	144.1	95.3	65
10-49	1,359	25,621	622.8	408.4	19	352	6,887	247.9	161.3	20
5-9	1,896	12,256	168.0	110.3	6	387	2,536	68.6	43.4	7
0-4	19,034	28,820	167.0	116.0	2	3,212	4,984	48.8	32.9	2
Unknown		4,061	7.7	5.5			61	0.2	0.1	
Total	**22,475**	**89,636**	**1,755.5**	**1,181.1**	**4**	**4,012**	**20,555**	**625.1**	**423.3**	**5**
% Total						*18%*	*23%*	*36%*	*36%*	

Source: Clarkson Research Services, February 2015. Includes both cargo carrying and non-cargo carrying merchant vessels over 100GT in size.

5. The deep sea trades are served by about 3000 ports and the cargo carried by the shipping industry consists of many millions of separate consignments, of different sizes and with different physical characteristics (Figure 2, p11). Providing an efficient transport service between ports for this wide range of cargo parcels calls for a complex logistics operation, which the shipping industry has developed to handle.

6. The ships themselves are expensive, with some gas ships costing over $300 million each (Table A1.2, p31) and they have an economic life of over 20 years. Earnings are highly volatile and this makes the investment process in shipping both risky and complex. One of the primary functions of shipowners is to manage this investment process.

7. The commodities carried by sea cover energy products; agricultural products; raw materials for the steel industry; forest products; industrial materials including chemicals; textiles machinery and consumer goods (Figure 1, p10).

8. Trade growth is influenced by the world business cycle and is very volatile and unpredictable. Keeping an adequate supply of ships at all times is essential for the free flow of world trade and one of the principal roles of the shipping industry is

to invest in anticipation of future growth. Given the complexity of the cargo flows to be transported, this difficult task is tightly controlled by market forces.

The global sea transport system

9. The transport system the shipping industry has developed to carry this diverse range of commodities involves several separate but overlapping segments of the shipping business, each handling a different group of trades. This specialization is based on parcel size (i.e. the size of the individual consignment of cargo) and the cargo's physical characteristics (section 3.3, p11).

10. The cargo carrying industry can be divided into three broad segments, each of which handles a specific set of cargoes.

    a. *Bulk shipping*; handles large cargo parcels in "bulk carriers" and oil tankers designed for the efficient transport of the very large parcels (10 to 390,000 tonnes) of homogeneous cargoes such as iron ore, coal, grain, oil etc.
    b. *Specialized shipping* transports large quantities of "specialized" trades (e.g. chemicals, gas, motor vehicles, forest products), generally using ships built for the purpose. Although these ships are purpose built, they are often designed to allow the carriage of other cargoes. Specialized cargoes are often subject to competition from both the liner and bulk shipping segments.
    c. *Liner shipping*; specializes in the transport of small cargo parcels, which do not fill the hold of a ship, on regular services. Today most liner cargo is carried in containerships, but some are still transported in multi-purpose vessels or ro-ros.

11. In this report we refer to the bulk and specialized shipping segments collectively as "tramp" shipping.

The "tramp" shipping competitive process

12. Although freight rates are highly volatile, with extremes in both directions, on average transport costs fell by 80 per cent in real terms during the second half of the 20th century (see Figure 5, p16). This demonstrates the long term cost effectiveness of the tramp shipping business.

13. During the 1990s major cargo shippers such as the oil companies and large liner companies progressively reduced their owned fleets (Figure 7, p18), preferring to rely on the tramp market and to charter ships when required. This strategy was partly motivated by liability concerns; but the low return on capital from shipowning (by the standards of international corporations) and the flexibility offered by the charter market were also important. It may be taken, therefore, as evidence of the highly competitive nature of the tramp market.

14. Tramp shipping revenues are determined competitively in the international market place, generally through the well developed network of shipbrokers and agents to transact the business. However the precise nature of the process differs for the bulk, and specialized segments.

15. The *bulk shipping markets* are highly competitive, and satisfy many of the characteristics of the perfect competition model. The commodity is homogeneous; entry costs are very low; many companies are competing for business (arguably each ship is a separate competitive unit); and information flows make the markets very transparent. Business is carried out in four different ways, the voyage charters (Section 9.2, p23); consecutive voyage charters (Section 9.3); contracts of affreightment (Section 9.4); and time charters (Section 10, p25). The freight rates achievable in these markets are highly volatile, depending on market circumstances (Table A1.5, p33). Typically bulk shipping freight rates are twice as volatile as the US S&P 500 stock index.

16. The *specialist shipping markets* generally have fewer customers and fewer shipping companies (Table A1.2, p31). Since the aim is to provide an improved service to these clients, there is sometimes a degree of product differentiation. However there is intense competition between specialized shipping companies, and outside competitors (for example small tankers compete for chemical parcels or containerships competing for reefer or vehicle business).

17. The *liner business* serves a range of clients from substantial shippers who enjoy service contracts to intermediaries which group cargoes to negotiate volume discounts and with whom the liner companies compete for shipper support. As the cargo capacity of containerships has got bigger, there has been intense competition between the liner, bulk and specialized segments for specific commodities, especially reefer cargo.

Commercial organization of "tramp" shipping

18. *General market structure*: The commercial structure of the shipping business is very fluid, allowing free entry and exit of companies. In February 2015 the deep-sea merchant fleet (including bulk, specialized and liner) was owned by 14,122 companies (Table 3). 48 of these companies (0.3%) owned more than 100 ships, with a combined 26% of the total fleet in terms of GT. The average shipping company had 4 ships. The ownership structure of the individual tramp sectors is shows in appendix 2 (p35) and table A1.2 (p30). These ships are often spread over several market segments. Consequently the bulk shipowners are generally in the position of price takers, being too small to influence the overall market. An analysis of 24,000 Dry Cargo fixtures found that the highest market share of any owner was 1.3% and only 25 owners had a market share over 0.5%.. A similar analysis of almost 20,000 tanker voyage fixtures in 2014 found that the highest market share of any owner was 2.2% and around 90% of owners had a market

share of 0.5% or less. In comparison, the top ten tanker charterers were responsible for almost 43% of all reported fixtures in 2014.

19. *Ease of entry:* Tramp shipping has relatively few barriers to entry. New investors require equity, but commercial shipping banks will provide loans to acceptable credits against a first mortgage on the ship. Private equity has also invested heavily in recent years along with export credit agencies and a growing number of Asian banks. There is a comprehensive network of support services to which new investors can subcontract most business functions (subject to sound management controls). Ship management companies will manage the ships for a fee; chartering brokers arrange employment, collecting the revenues and dealing with claims; sale and purchase brokers will buy and sell ships; maritime lawyers and accountants undertake legal and administrative functions; classification societies and technical consultants provide technical support.

20. These services make it easy for new investors to enter segments of the bulk shipping markets during profitable periods (example - two of the largest tanker companies operating today were only set up in 1997). In addition shipowners in one segment will move into new markets if they see an investment opportunity (example - recently several tanker companies have ordered bulkers and gas carriers). However some specialist sectors require specialist expertise which is difficult to acquire quickly.

21. *Information availability*: Information systems in bulk shipping business are very open, giving buyers and sellers of ships, operators and charterers a timely flow of commercial data. Information about revenues and asset prices are published daily and widely circulated in the industry to both shipowner's and charterers by the shipbroking business and information publishers. On line digital systems track the position of ships. These information services ensure a high degree of transparency. In addition the costs of operating different types of ships are well known (several companies publish reports documenting them) making it easy for potential investors to estimate prevailing profit levels.

22. *Shipping pools* operate in every sector of the tramp shipping business, although the total tonnage operating in pools is limited. A "pool" is a collection of similar vessels, under different ownerships, operating under a single administration. The pool managers market the vessels as a single, cohesive fleet unit, collect their earnings and distribute them under a pre-arranged "weighting" system. Pools are generally developed for two reasons. *Firstly* to allow participants to provide the service levels required by their major customers. *Secondly* to improve transport efficiency by special investment and increased ship utilization e.g. by arranging backhaul cargoes more effectively than a small group of ships could do.

Contents Sheet

Appendices

1. Introduction

1.1 Methodology[1]

Since the main purpose of this analysis is to provide a clear basis for discussing competitive conditions in the tramp shipping market, we have structured the analysis to focus on the traditional perfect competition supply/demand model which many economists[2] believe operates in some segments of the tramp market, but not fully in others. The shipping market segments discussed in this paper are summarized in Table 1[3] below. This divides them into three broad groups, Bulk Transport; Specialised transport; and Liner. Although the study is specifically not concerned with the liner business, we have included this segment because there is competition between the segments for some cargoes.

Table 1: Shipping Market Segments by Vessel Type

1. Bulk Transport		2. Specialised Transport		3. Liner Transport
Bulk Carriers Crude Oil Tankers Product Tankers	⇔	Specialised Tankers Chemical Carriers LPG Carriers LNG Carriers Reefers Vehicle Carriers Ro-Ro Ships	⇔	Containerships Multipurpose Ships Ro-Ro Ships

In this paper the aim is to describe the characteristics of the tramp shipping market.

The key issues we focus on are: -

1. Type of product: the aim here is to briefly describe the product offered by each of the 15 segments of the market and how they mutually overlap.
2. Differentiation: the degree of differentiation which exists in the transport product offered (in competitive terms differentiation offers the opportunity to reduce market size).
3. Number of firms: this measures the number of companies in the Segment. The plan in due course is to quantify this column. A point made in the text is that in many cases the competitive unit is, in effect, the ship not the company.
4. Entry Conditions: measures how easy it is for an outsider to become a viable force in the business.
5. Demand curve: one of the competitive requirements for oligopoly is a downward sloping demand curve.

[1] It should be stressed that there is no clear cut distinction between bulk, specialized and liner services. For example companies "specializing" in carrying forestry products and refrigerated cargoes would do so in competition with "pure container line services", and at the same time be competing for other parcel shaped cargoes and also traditional "bulk cargoes" in the tramp market to reposition the vessel.

[2] Shipping is often cited as an industry that displays the characteristics of perfect competition.

[3] It should be stressed that there are differing degrees of specialization of the vessel types listed in Table 1. Ro Ro carriers could be categorized as specialized rather than liner.

2. The product provided by the shipping industry

2.1 The transport service

Over the last decade shipping has been one of the fastest growing sectors of the global economy. In 2014 the shipping industry transported 10.5 billion tons of cargo, 69% more than in 2003 when 6.2 billion tonnes was shipped. This cargo was carried by a deep sea cargo fleet (including bulk, specialised and liner) of over 53,000 ships. During the decade $1 trillion was invested in tankers; bulk carriers, containerships and gas tankers[4]. Europe remains the leading shipowner with a 36% share of the gross tonnage of shipping and investment committed of $41 billion accounted for 40% of the global total.

The wider fleet of vessels of 100 GT and above, including non-cargo vessels, stands at just under 90,000 ships. Another 30,000 service vessels are engaged in fishing, research, port services and the offshore industry. The annual investment in new ships in 2014 was $101 billion, with another $26 billion spent on second-hand ships.

With the exception of the cruise and ferry businesses, shipping serves industrial customers not consumers. The clients include large corporations like oil companies, chemical companies, steel mills, car manufacturers, sugar refiners, traders and a host of other manufacturing companies which source raw materials and distribute their products in the international market. The product sold is sea transport.

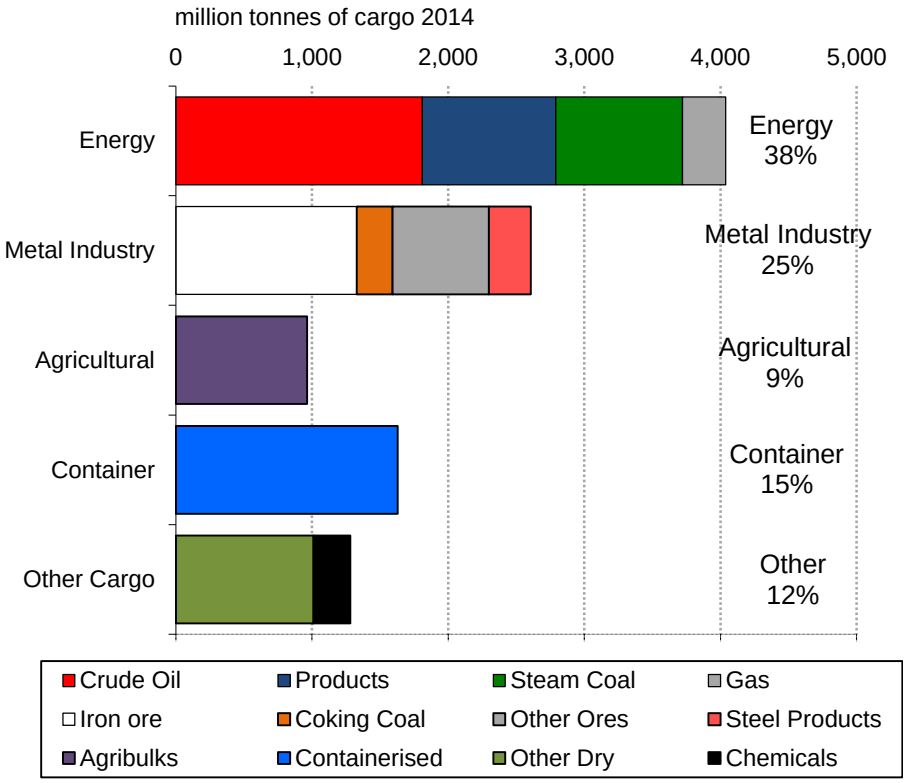
2.2 The commodities traded by sea

The shipping industry transports everything from a 3 million barrel parcel of oil to a cardboard box of Christmas gifts. The main seaborne commodity trades are shown in Figure 1 arranged into five groups reflecting the area of economic activity to which they are most closely related. These groups can be summarized as follows:

1. *Energy trades*: Energy dominates bulk shipping. This group of commodities, which accounts for 38% of seaborne trade, comprises crude oil, oil products, liquefied gas and thermal coal for use in generating electricity.
2. *Metal industry trades*: This major commodity group, which accounts for around 25% of sea trade, including raw materials and products of the steel and non-ferrous metal industries, including iron ore, metallurgical grade coal, non-ferrous metal ores, steel products and scrap.
3. *Agricultural trades*: The products or raw materials of the agricultural industry. They include cereals such as wheat and barley, animal feedstuffs, sugar, molasses, refrigerated food, forest products, oil and fats and fertilizers.
4. *Container cargoes:* This category covers a wide range of manufactures such as textiles, machinery, capital goods, vehicles, consumer goods, etc, as well as semi-finished industrial products. The total tonnage involved in this sector accounts for around 15% of sea trade, but many of these commodities have a high value so their share in value is probably closer to 50 per cent. They are the mainstay of the liner trades and their impact upon the shipping industry is much greater than the tonnage suggests.
5. *Other industrial materials*: There are a wide range of industrial materials such as cement, salt, gypsum, mineral sands, alumina, chemicals and many others. The total trade in these commodities accounted for 12% of sea trade. They cover a whole range of industries.

[4] Investment by sector was tankers $262 bn; bulk carriers $381 bn; gas $114 bn and containerships $229 bn

Figure 1 World Seaborne Trade by Main Commodity Groups



Source: Clarkson Research Services, February 2015

Viewing the trade as a whole, over 60 per cent of the tonnage of seaborne trade is associated with the energy and metal industries so the shipping industry is highly dependent upon developments in these two industries.

These trade statistics convey the scale of the merchant shipping business, but disguise its physical complexity. Cargo is shipped between over eighty countries. Some shipments are regular, others irregular; some are large, others are small; some shippers are in a hurry, others are not; some cargoes can be handled with suction or grabs, while others are fragile; some cargo is boxed, containerized or packed on pallets, while other cargo is loose. The shipping systems have evolved to deal efficiently with this complexity.

3. Organization of the demand for sea transport

3.1 The liner and tramp system

Until the 1950s the sea transport business had two main segments, the network of regular *liner services*, who carried small cargo parcels of cargo on defined routes, and *tramp shipping* which ships to carry irregular cargoes which did not fit in with the regular liner services. These two services were defined by Fayle (1932) as being distinguished by the organisation structure rather than the ships used, as follows:-

"A liner service implies a fleet of ships, under common ownership or management, which provides a fixed service, at regular intervals, between named ports, and offer themselves as general carriers of any goods requiring shipment between those ports. A fixed itinerary, inclusion in a regular service and the obligation to accept cargo from all comers and to sail, whether filled

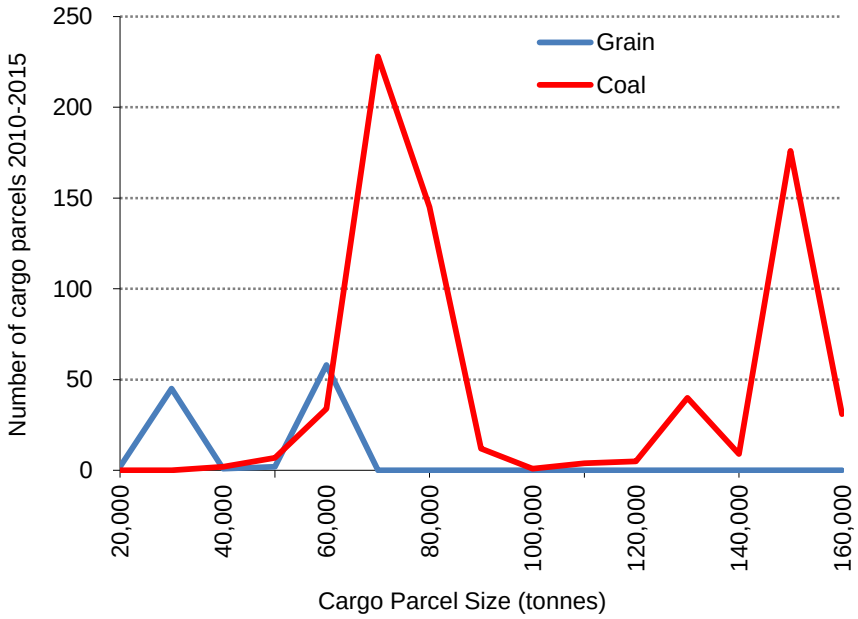
or not, on a date fixed by a published schedule; these, and not the size and speed of the ship are what distinguish the "liner" from the "tramp" – the ship which can be hired as a whole, by the voyage or the month, to load such cargo and to carry it between ports as the charterer may require."[5]

Under this system the ships used by the liners and tramp businesses were of similar size, with multiple decks designed for stacking mixed cargo parcels, or carrying bulk cargo in the bottom hold. A key aspect of the system was the ability of the tramp ships to switch between carrying bulk cargoes such as grain, and being chartered by the liner services when extra capacity was needed. This system was very flexible, but also very labour intensive.

3.2 Development of specialized shipping services 1950-2000

As the world economy grew in the second half of the 20th century new trades appeared which could not be handled efficiently by the conventional liner and tramp system. Bulk trades grew rapidly as heavy industry started sourcing raw materials overseas, stimulating the raw materials trades; Semi-manufactured cargoes like chemicals, forest products and liquid gases started to be traded in volume, and the wholesale and retail marketing systems, became much more international and needed a more efficient system for shipping goods between regions. This mix of cargoes and customers defines the market that the modern sea transport industry was developed to serve.

Figure 2 Parcel Size Distribution for Coal and Grain



Source: Clarkson Research Services, February 2015

3.3 The influence of cargo parcel size on ship demand

A key concept in defining the organisation structure which is in use today, and in particular the market segmentation, is the *Parcel Size Distribution* (PSD). A `parcel' is an individual consignment of cargo for shipment and the PSD function describes the range of parcel sizes in

[5] Fayle, Ernest (1932) A Short History of the World's Shipping Industry" George, Allen & Unwin, London page 254

which a particular commodity is transported. For example the PSD function for coal shown in Figure 2 shows that parcels range in size from around 50,000 tonnes to 160,000 tons, with the majority concentrated in the 70,000 tonne and 150,000 tonne ranges. A similar analysis for grain in the same figure shows a very different parcel size distribution, with grain shipments concentrating around the 30,000 tonne and 60,000 tonne ranges.

Most commodities shipped by sea travel in a wide range of parcel sizes. However small parcels call for a different transport system from large parcels, so a single commodity may be carried by ships operating in different segments. For example forest products may be carried in a specially built open hatch bulk carrier with open hatches and cranes, but container carriers also compete for these cargoes and have gained market share in recent years. This means that even where there are relatively few companies in the market there is price competition between market segments as well as between owners within a particular segment.

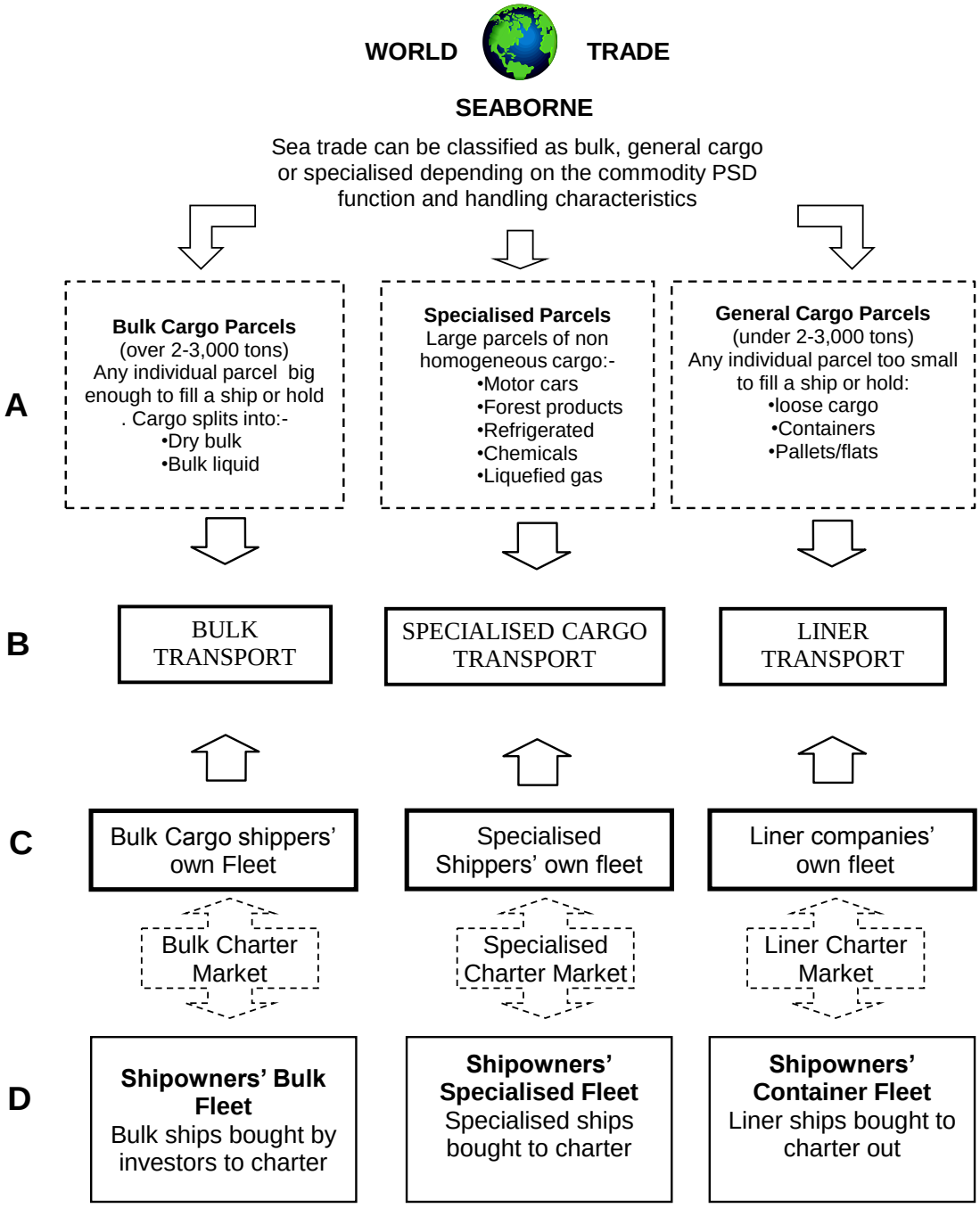
The shape of the PSD for each commodity is determined by the characteristics of demand, including such factors as cargo value, inventory, plant production/consumption levels, port facilities and ship availability and competitive pricing. Since different sizes of cargo parcel require different types of shipping operation, we frequently find the same commodity travelling in different systems. For example forest products travel in bulk carriers, specialised forest products carriers, Ro-Ro / PCTC carriers and containers. Or 500 tonnes of steel products might travel in containers, but 5,000 tonnes in a bulk carrier. For example when the container rates are low there is increased competition from container operators in various specialised segments.

3.4 Parcel size characteristics of commodities shipped by sea

The parcel size distribution provides the basis for explaining the micro-economic organization of the shipping market, the main elements of which are summarized in Figure 3[6]. Starting at the top of this diagram, world trade splits into large parcels and small parcels, depending on the PSD function of each commodity. Large parcels are carried by the bulk shipping industry and small parcels by the liner shipping industry; these represent the two major segments within the shipping industry, whilst difficult cargoes travel in specialised vessels. Bulk, liner and specialised cargoes are defined as follows.

[6] This is a simplified model.

Figure 3 The sea transport system showing cargo demand and three shipping market segments,



Supply Structure: The primary fleet is owned by the primary service operators shown by black boxes (shippers and liner companies). Additional capacity is hired from independent shipowners who buy sips to charter out. The "charter market" arrows go both ways because shippers may charter their ships out as well as in.

Source: Martin Stopford 2009 (Maritime Economics, 3rd Edition P.62, Routledge London).

3.4.1 Bulk shipping

There are three main categories of bulk cargo. *Liquid bulk* includes crude oil, oil products, and "easy" chemicals such as caustic soda and naptha. The size of individual consignments varies from a few thousand tonnes to half a million tonnes in the case of crude oil. *The major bulks* cover iron ore, grain, coal, phosphates and bauxite which can be transported satisfactorily in a conventional dry bulk carriers. *Minor bulks*[7] covers the many other commodities that travel in shiploads. The most important are steel products, cement, gypsum, non-ferrous metal ores, sugar, salt, sulphur, forest products, wood chips and chemicals. At the start of February 2015 the bulk fleet of crude oil tankers, bulk carriers and products tankers consisted of 19,855 ships of 1,257 million dwt (693 million GT). It accounted for 72% of the total merchant fleet of 1,756 million dwt (1,181 million GT). Bulk shipping companies handle few transactions (roughly six to twelve voyages a year per ship), so there are minimal administrative overheads and in competitive terms the business unit is the ship rather than the company. Ownership of the fleet is split between industrial concerns who carry their own cargo (the "shippers") and independent operators (the "shipowners") who trade on the "freight market" or charter their ships for long periods to the shippers. The freight rates are very volatile (see Appendix A1.6).

3.4.2 Specialised Shipping

Specialised shipping (sometimes called "industrial shipping") carries cargoes in the centre of Figure 3, which are shipped in volume, but where transport efficiency can be improved by investment in specially designed ships, terminals and cargo handling systems. The main cargoes are:

1. Refrigerated cargo (frozen meat, chilled produce, fish etc)

Refrigerated cargo is an obvious candidate for specialisation, since it can needs refrigeration. This cargo has traditionally been the subject of intense competition between the liner business and specialised "reefer" ships. Specialised reefer ships have fully insulated cargo holds and refrigeration equipment, trading with a full cargo of chilled or frozen commodities. When necessary they will, however, load other cargoes such as motor vehicles, General Cargo or palletized cargo. The other major source of refrigerated capacity is the containership fleet, which has a greater cubic available than the specialised reefers. The result has been intense competition between these two sectors for the cargo, and large quantities of perishable cargoes have moved to containers which have better control over the atmosphere. As a result there has been little investment in new reefer ships in recent years.

2. Forest products (timber, pulp, paper.)

Forest products consist of logs, packaged timber (often in standard sizes), wood pulp bales, paper and wood chips. All of these cargoes can be carried in conventional bulk carriers, but as the trade developed in the 1960s shipowners started to build bulk carriers with special features designed for the efficient handling and stowage of forest products. The special features included "open" hatches which allowed packaged timber to be dropped directly into all parts of the hold (normal bulk carriers have only a smaller hatch opening) and sophisticated cargo handling gear up to speed up the loading and discharge process. These fleets are included in the specialized sector, though the ships can trade in the bulk market, and are especially useful for carrying

[7] "Minor" bulks is a "mixed" bag requiring generally smaller consignments than major bulks... but considerably larger than per an individual container unit. Many "minor bulks" may also be carried by "specialised" forest product carriers.

non-homogeneous commodities such as empty containers, or steel products. The high first cost of the ships make them more economically effective when used intensively as forest products carriers within a specialized training system, but recently they have been losing market share to container services.

3. Motor vehicles (new and used), trucks, earth moving equipment, farm implements

Motor vehicles can be carried in a wide range of different ship types, , multi-purpose vessels bulk carriers fitted with collapsible decks (no longer used), deep sea ro-ro vessels, in containers on containerships and purpose built vehicle carriers. As the volume of trade increased specially designed pure car carriers (PCC's) were built but subsequent designs have been for more flexible RoRos and pure car and truck carriers (PCTC). These vessels have multiple decks designed for the carriage of cars, and a high cubic in order to maximize the number of vehicles which can be loaded. In order to add flexibility, the vessels are also have adjustable decks which can be adjusted to allow the transport of large vehicles such as earth-moving equipment and project cargoes. They are generally designed with a fast speed and efficient loading and discharge of the cargo. The fleet is currently 770 ships. The vessels operate on regular and frequent transport routes to a multitude of loading/discharging ports/areas. In addition carriers are involved in through transport of vehicles.

4. Gases transported as liquids, including LNG, LPG, ammonia

In order to transport gases by sea they must be liquefied, by pressure or refrigeration and a fleet of specialized Tankers has been constructed for this purpose. There are two main categories of ship. Liquid petroleum gas (LPG) tankers carry propane, butane, ammonia and the number of other chemical gases either under pressure or pressure and refrigeration, or both. The coldest temperatures handled by these vessels is ethylene at -103 degrees centigrade. Liquefied natural gas (LNG) is carried in purpose-built LNG tankers at -163 degrees centigrade. These ships are heavily insulated. Although Gas Tankers are highly specialized, some can trade in oil product's and liquid chemical trades when freight rates make doing so viable. However not all Gas Tankers are designed with this capability. Currently there is a fleet of it 419 LNG tankers and 1,282 LPG carriers.

5. Chemicals.

Chemicals are shipped by sea in many small parcels, typically 3-30,000 tons in size. Many require special storage and handling systems. Traditionally liquid chemicals were carried in drums or special tanks in cargo liners, but this was very inefficient. In the 1950s, as trade volume increased, the industry started to develop special tankers designed to carry up to 40 parcels of different chemicals within a single ship. These "parcel tankers" have separate tanks with independent pumping systems and special coatings such as stainless steel. As the system developed over at the following 30 years, to improve efficiency, liner type services were introduced on some long routes. However liquid chemical transportation is still spread across several different segments of the shipping industry, including smaller tankers (for example a 3,000 deadweight ship carrying a single parcel); tramp ships of 15-25,000 deadweight carrying mixed cargoes on a voyage by Voyage basis; containerships carrying chemicals in tank containers; and Parcel Tankers operating within pools, often on liner services. There are currently a total of 4,097 chemical and specialised tankers, although many of the larger tankers will also be employed on oil products trades.

3.4.3 Liner Shipping

The liner provides scheduled services at a fixed frequency over a pre-determined route, making sea transport available to cargo lots of all sizes. Liner companies have extensive organisations, often in many countries, and the cost of ship operation is a relatively small part of total expenses. The governing freight document is the Bill of Lading or seaway bill, with the number of Bs/L issued per ship and even per container varying very substantially, depending on parcel size.

Containerisation and the dissemination of the just in time approach have subordinated liner shipping within a door to door context of which the sea leg is only part, and not necessarily the most expensive part. Liner shipping caters for cargo of all kinds and, despite the high cost of ships and containers, participation in bulk cargoes is not inconsiderable and rising. Waste paper, is for example, perhaps the biggest single cargo carried in containerships, because of the need to return empty containers to loading areas generating better revenues. A healthy general cargo sector coexists within the liner sector, but, apart from specialist liner services (heavy lift, forest products, cars, refrigerated cargoes), non-cellular general cargo ships tend to operate over routes with small cargo constituencies or in countries with poor port infrastructures, increasingly in short sea trades. In addition cargo liners are involved in through transport of containers.

4. Differentiation of sea transport demand

4.1 Price and service aspects of sea transport demand

There are four aspects to the service offered by the shipping services discussed in the previous paragraphs which allow a degree of service differentiation:

1. *Price*: The freight cost is always important, but the greater the proportion of freight in the overall cost equation, the more emphasis shippers are likely to place on it. For many primary commodities shown on the left of Figure 1 price is the major consideration, but for semi manufactures and manufactures the service elements discussed in 2-4 below are also very significant.
2. *Speed*: Time in transit incurs an inventory cost, so shippers of high-value commodities value speed. The cost of holding high-value commodities in stock may make it cheaper to ship small quantities frequently even if the freight cost is greater. On a three-month journey a cargo worth $100,000 incurs an inventory cost of $2,500 if interest rates are 10 per cent per annum, though in today's low interest environment inventory cost depends more on the less easily quantified value to the business of fast, prompt and predictable delivery of the goods in transit. For example fast delivery may be important for commercial reasons. *Reliability*: With the growing importance of `just in time' stock control systems, transport reliability has taken on a new significance. Some shippers may be prepared to pay more for a service which is guaranteed to operate to time and provide cargo capacity at all times.
3. *Security*: Loss or damage in transit is an insurable risk, but raises many difficulties for the shipper, who may well be prepared to pay more for secure transportation of his product without risk of damage.

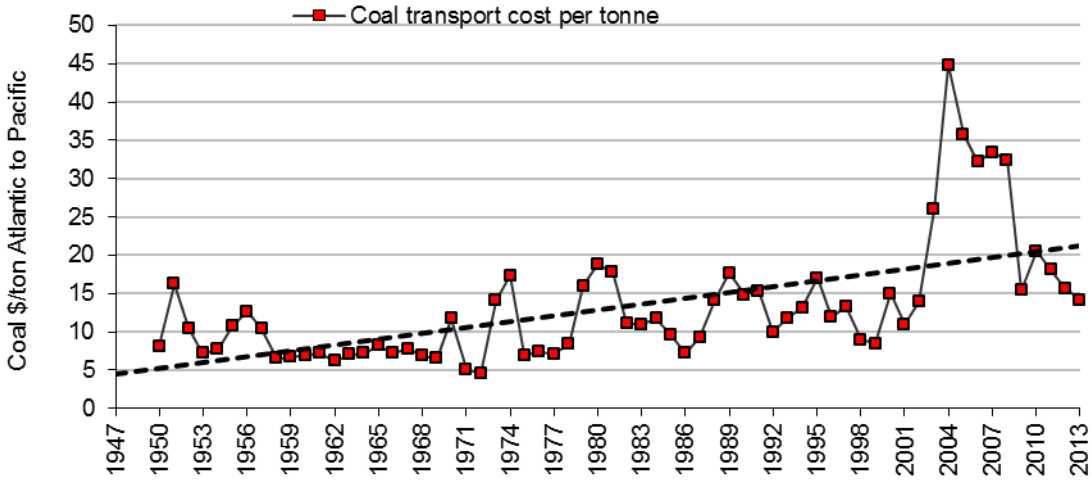
Table 3: Imports, billion tonnes

	2001	2005	2010	2015e	% CAGR 05-15
Europe	1.74	2.06	2.07	2.18	1%
North America	1.01	1.19	0.96	0.82	-4%
China	0.39	0.84	1.66	2.56	12%
India	0.18	0.26	0.45	0.68	10%
Other Asia	2.18	2.38	2.64	3.05	3%
Others	0.81	0.90	1.26	1.68	6%
World Total	6.31	7.64	9.03	10.96	4%

4.2 The cost of freight

Table 3 above shows the growth of total trade since 2001, split by region. Between 2005 and 2015, global trade is estimated to have increased by 4% per annum. According to UNCTAD estimates, freight costs as a % of import value remained steady at around 8% during this period. This period of relative stability in terms of freight costs stands at odds against the long-term trend of falling freight costs per unit value (in real terms) highlighted in figure 5 below.

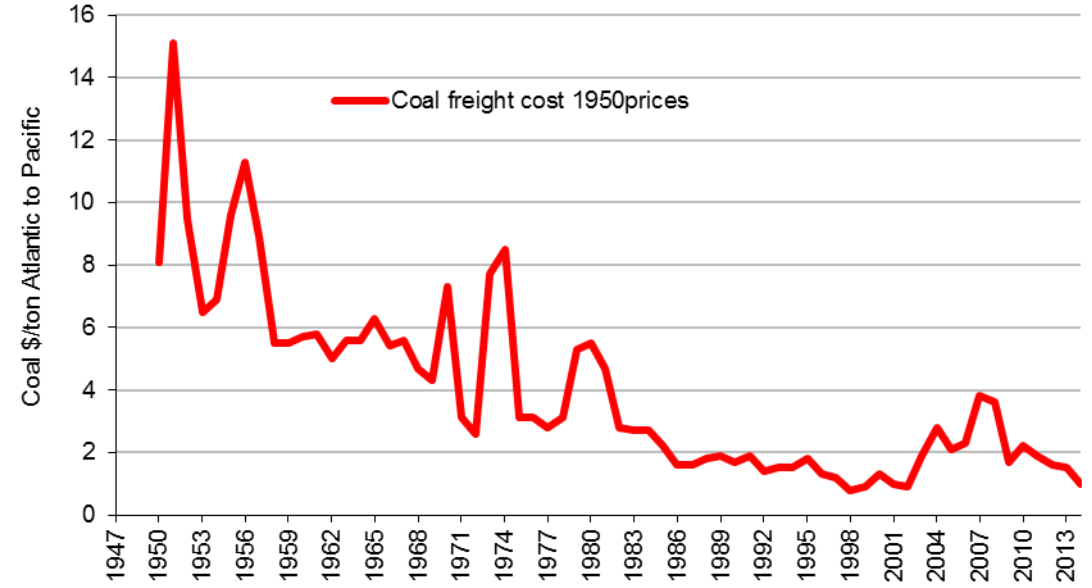
Figure 4 The Cost of Transporting Coal 1947 to 2013



Note: costs based on spot rates for average vessel size at transport date. Tankers increased from 17,000 dwt to 280,000 dwt and dry vessels from 10,000 dwt to 77,000 dwt. Freights are at market prices and are not deflated.

Source: Maritime Economics 3rd Ed, page 74

Figure 5 The Cost of Transporting Coal 1947 to 2013, (1950s Prices)



4.3 Long term trends in the cost of bulk transport

Long term trends in the cost of bulk transport provide an indication of the economic performance of the business. In 1950 it cost about $8 to transport coal from East Coast North America to Japan. In 2014 the trend, which is linear, had increased to $16/ton. Along the way there were seven market cycles, peaking in 1952, 1956, 1970, 1974, 1980, 1989, 1995, and 2004-7 but the average transport cost was $10.9 per ton. The cheapest year for shipping coal was 1972 when it cost $4.5/ton, while the most expensive was 2004 when it cost $44.8/ton. (The oil trade shows the same long-term trend, with transport costs fluctuating between fifty cents and one dollar per barrel. The highest cost was in 2004 when the price went to $3.37 per barrel and the second highest was almost 50 years earlier during the 1956 Suez crisis when the cost went up to $2.1 per barrel. **In five years, 1949, 1961, 1977, 1994 and 2011 it fell to $0.5 per barrel**).

Compared with other sectors of the economy, the transport industry's achievement in reducing costs is exceptional. In market prices between 1960 and 2014 the trend price of freight only increased from $9/ton to $16/ton as shown in Figure 4.(Inflation adjusted prices shown in Figure 5, which is based on 1950 $ prices indicates a reduction from $8.1 in 1950 to $1 in 2014). Over the same period average dollar prices increased sixfold. For example a basic Ford motor car had increased in price from $1,385 to $16,000; the UK rail fare from London to Glasgow from $23.4 to $190; and the price of a barrel of crude oil increased from $1.5 to $60. Another feature over this period has been the increase in the average cargo size- for example the average coal cargo in 1960 was 12,000t, now it is closer to 70,000t.

5 The Supply of Sea Transport

5.1 The world merchant fleet

In February 2015, Clarkson Research had records of 89,636 deep sea merchant ships (bulk, specialised, liner and non-cargo) of a combined 1,181 million GT, covering all self-propelled ships of 100 gross tonnes and above. The cargo carrying fleet of 100 GT and above numbered 53,101 vessels of a combined 1,083 million GT, with the remainder made up of 10,689 vessels supporting the offshore oil industry, 1,911 dredgers, 16,794 tugs and 6,512 passenger vessels. The balance is made up of small ships trading generally on short sea, non-international routes.

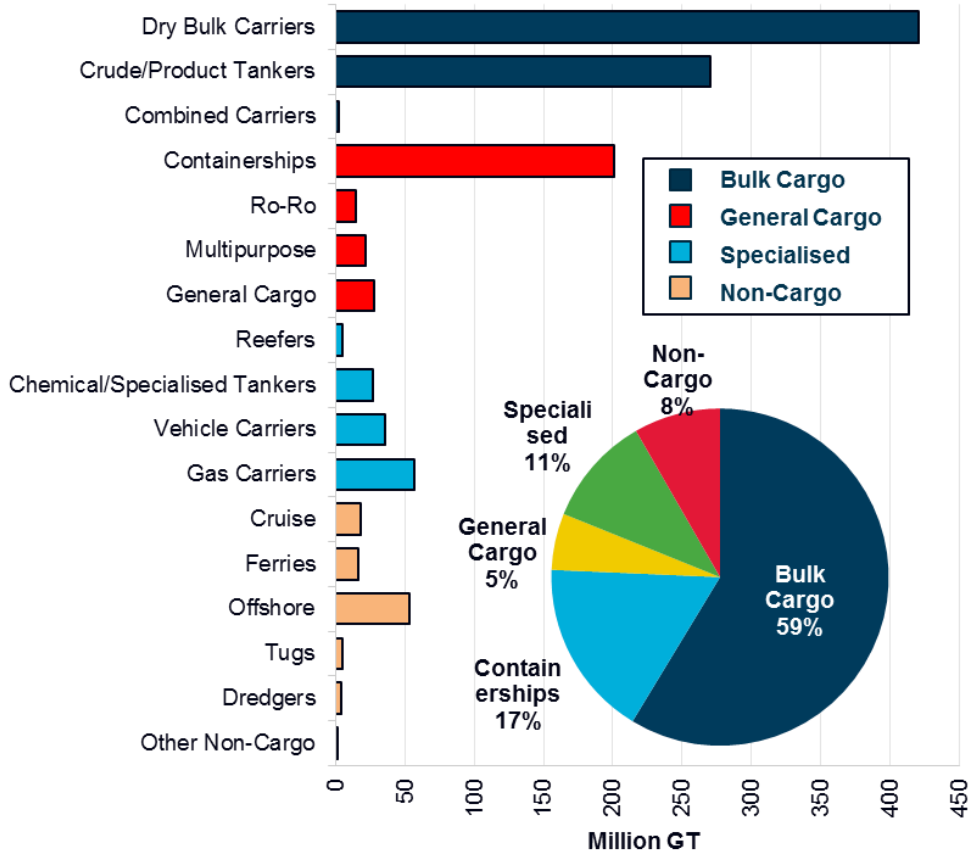
5.2 National registration of the world merchant fleet

One of the major commercial issues in the shipping business is the ownership of vessels. In order to trade any merchant ship must be registered under a maritime flag, and in making this registration the shipowner chooses the legal jurisdiction under which the ship will operate. Because trading on the high seas is less subject to national affiliations than most other businesses, there is a long tradition of registering ships in countries that are not necessarily the owners commercial base, so the fleets registered in a particular country will not necessarily give a true indication of the fleet controlled by nationals of that country.

In February 2015 the 30 most important maritime countries controlled 93% of the world fleet[8] in terms of gross tonnage. Out of a global merchant fleet of 1,181 million GT, 311 million GT was registered under the national flag of the owner, and 870 million DGT was registered under a foreign flag. The world's biggest shipowning nation is Greece, which controls 182 million GT of ships, with 44 million GT registered under the national flag. For Japan the ratio is even greater, with 162 m GT controlled, but only 17 million GT registered under the Japanese flag.

[8] The tramp shipping market is a global business with the international fleet registered in over 19 countries. Table on page 24 shows the top 30 ship owning countries.

Figure 6 World Merchant Fleet



Source: Clarkson Research Services, February 2015

5.3 Competition between types of ship in the cargo fleet

Although some ship types are well defined, it is difficult to divide the fleet into clear categories which provide a sound starting point for analysing market segmentation. Merchant ships are not mass-produced like cars or trucks and few ships in the fleet are precisely the same. Many are designed to meet a specific owner's needs, so classifying ships into types relies on selecting distinctive physical characteristics which serve to identify the `type' of ship when it is built.

In practice there is often considerable scope for competition between different ship types. For example containerships can carry reefer cargo (or reefer ships can carry containers) or in some instances chemical tankers and gas tankers can carry oil products in bulk. The statistical breakdown of the ship segments under discussion is shown in Figure (6) and in more detail in Annex 2.

5.4 The cargo handling economics & competition

One of the major areas where shipowners have sought to establish a competitive advantage is by developing improved cargo handling. In some trades this has resulted in a major change in the design of the ships, for example vehicle carriers and forest products carriers. Because these specialised ships are generally designed to meet the needs of a specific group of clients (for

example car manufacturers[9] etc) there is more focus on marketing and service levels than is the case with homogeneous bulk vessels.

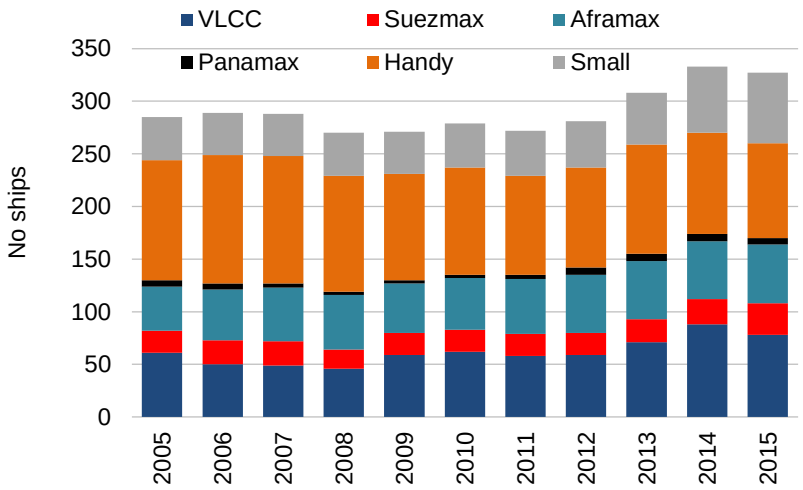
6. Sea Transport risk & investment strategy

6.1 The risk management system

Because shipping is a risky business for both shipowners and cargo shippers (shipping markets are unpredictable and highly volatile), they have developed a system which allows shippers with a future commitment to sea transport to spread their risk by developing a portfolio approach to sourcing transport, using four different approaches- ownership, period timechartering, spot chartering and COA.

1. **Ownership**: companies shipping substantial quantities of bulk materials can run their own shipping fleets to handle a proportion of their transport requirements, though this is less widely practiced that it was 30 years ago. For example, at the start of 2015 oil companies collectively owned approximately 39m dwt of oil tankers, representing only 8% of the tanker fleet. Steel companies in Japan and Europe also run fleets of large bulk carriers for the transport of iron ore and coal. This type of bulk shipping operation suits shippers running a stable and predictable through transport operation, though in practice independent shipowners can often operate the ships more cheaply

Figure 7 Oil Company Owned Crude/Product Tanker Fleets



Source: Clarkson Research Services, February 2015

2. **Period Timecharter (TC)**: companies may charter tonnage on a long-term basis from a shipowner. Some companies place charters for ten or fifteen years to provide a base load of shipping capacity to cover long-term material-supply contracts – particularly in the iron ore trade. For example, the Japanese shipping company Mitsui OSK ships iron ore for Sumitomo, Nippon Kokan and Nippon Steel on the basis of long-term cargo guarantees and operates a fleet of ore carriers and combined carriers to provide this service. In the early 1980s the company was carrying about 20 per cent of Japanese

[9] Car transportation began in conventional vessels, then very specialised pure car carriers (PCC) and now to RoRo/PCTC capable of carrying various types of rolling cargo as well as static and project cargo such as generators, windmills, yachts, trains, airplanes, forest products.

iron ore imports. In such cases, the contract is generally placed before the vessel is actually built. Shorter-term time charters for twelve months or three to five years would be obtained on the charter market.

3. **Voyage and trip charter** (Spot Charter): shippers e and traders with cargo can contract for freight on the spot market, often using a shipbroker to act on their behalf and negotiate a rate. A "voyage charter" is a contract to deliver the cargo for a negotiated price per tonne, whilst a "trip charter" hires the ship for a voyage, leaving the shipper to deal with the details and expense of loading and discharging cargo. . For example in agricultural trades such as grain and sugar seasonal factors and the volatility of the market make it difficult to plan shipping requirements in advance. Or the cargo could be a consignment of prefabricated buildings for the Middle East or some heavy plant. In such cases, bulk or multi-deck tonnage is chartered for a single voyage via some market such as the Baltic Exchange or broker network, where the shipper can hire a shipon a voyage or trip basis. A trip charter hires the vessel on a per day basis for the period of a specific voyage and for the carriage of a specific cargo. The shipowner earns "hire" per day for the period determined by the voyage.
4. **Contract of Affreightment**: the shipper may, normally through an open tendering procedure, enter into a long-term arrangement with a shipowner who specializes in a particular area of bulk shipping, supported by suitable tonnage. For example, Scandinavian shipowners are involved in the carriage of forest products from West Coast North America to Europe and run fleets of specialist ships designed to optimize the bulk transportation of forest products. Similarly, the transportation of motor cars is serviced by companies, which run fleets of pure vehicle carriers and Ro Ros servicing the Japanese car export trade. COAs are also used in other trades such as coal, fertilizer, grain, ore and oil.

7. The companies involved in the shipping business

7.1 Shipping Companies and support services

There are five categories[10] of company involved in the transport chain, two directly and three indirectly. The relevant companies are

1. Cargo owners
2. Traders
3. Shipowners (shipping companies/operators),
4. Ship managers
5. Ship brokers

Each has a different perspective on the business.

An important group of the past twenty years, *cargo owners* have cargo to be moved by sea. They may be primary producers such as oil companies or iron ore mines. Or they may be manufacturers or wholesalers importing raw materials or equipment. A third important group in last 20 years has been traders who purchase commodities on a speculative basis with a view to reselling them, often in a different location, so they become involved in the transport process. Some cargo owners have a very short term approach to the business, and just want to purchase transport when they need it. Others take a more long term perspective, and may become deeply involved in the

[10] Some companies will combine two or more of the listed functions.

transport process. For example oil companies often run their own fleet of tankers, or offer long term time charters.

Table 3a - Cargo fleet by company size

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+	7	2,386	182.2	127.4	341	2	350	23.9	20.4	175
200-299	5	658	23.7	18.5	132	2	179	13.1	11.6	90
100-199	36	3,329	204.0	135.9	92	14	1,422	76.2	54.2	102
50-99	118	5,578	353.3	227.2	47	41	2,190	140.8	91.8	53
10-49	1,019	14,900	600.4	378.0	15	295	5,116	242.6	153.6	17
5-9	1,305	7,242	153.6	96.3	6	294	1,772	61.0	36.9	6
0-4	11,631	16,956	147.6	95.1	1	1,586	2,518	44.0	27.5	2
Unknown		2,052	7.2	4.6			16	0.1	0.1	
Total	**14,122**	**53,101**	**1,672.0**	**1,083.1**	**4**	**2,235**	**13,563**	**601.7**	**396.0**	**6**
% Total						*16%*	*26%*	*36%*	*37%*	

Source: Clarkson Research Services, February 2015. Includes cargo carrying vessels over 100GT in size only, excluding passenger vessels and cargo ships used in the offshore oil and gas industry.

Table 3b - Total fleet by company size (including non-cargo carrying vessels)

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+	8	3,615	184.6	130.3	452	2	1,089	25.3	21.8	545
200-299	6	1,452	25.4	21.2	242	2	459	13.6	13.3	230
100-199	37	4,859	211.7	150.4	131	14	1,806	76.7	55.1	129
50-99	134	8,952	368.2	239.1	67	42	2,733	144.1	95.3	65
10-49	1,359	25,621	622.8	408.4	19	352	6,887	247.9	161.3	20
5-9	1,896	12,256	168.0	110.3	6	387	2,536	68.6	43.4	7
0-4	19,034	28,820	167.0	116.0	2	3,212	4,984	48.8	32.9	2
Unknown		4,061	7.7	5.5			61	0.2	0.1	
Total	**22,475**	**89,636**	**1,755.5**	**1,181.1**	**4**	**4,012**	**20,555**	**625.1**	**423.3**	**5**
% Total						*18%*	*23%*	*36%*	*36%*	

Source: Clarkson Research Services, February 2015. Includes both cargo carrying and non-cargo carrying merchant vessels over 100GT in size.

Shipping companies[11] are equally diverse. In 2015 around 22,000 companies owned 89,636 ships (bulk, specialized, general cargo and non-cargo), with an average of four ships per company (see table 3). Excluding non-cargo carrying vessels, the number of owners stands at closer to 14,000. There are some very big companies, at least when measured by the number of ships owned. 46% of the total GT of the fleet (including non-cargo ships) was owned by 185 companies with over 50 ships 29% was owned by 1,359 companies operating 10 to 50 ships, whilst the remainder is owned by 20,930 companies owning fewer than 10 ships each. These companies are often highly focussed, with tight overheads, for example running a fleet of 100 ships with only 30 or 40 employees and sub-contract many main functions to third parties. The ownership characteristics of the individual tramp sectors are shown in appendix 2.

With so many shipping companies, the market share of individual shipowners is very small. This conclusion is illustrated by an analysis carried out of 24,000 Dry Bulk fixtures (covering various types of dry bulk commodities) between 2010 and 2015. The survey analysed the ownership of each vessel "fixed" and calculated the share of each owner. A total of 1,480 shipowners were

[11] The 22,527 owner companies listed in the table are based on "major group" analysis, that shows the highest level of ownership that we are aware of.

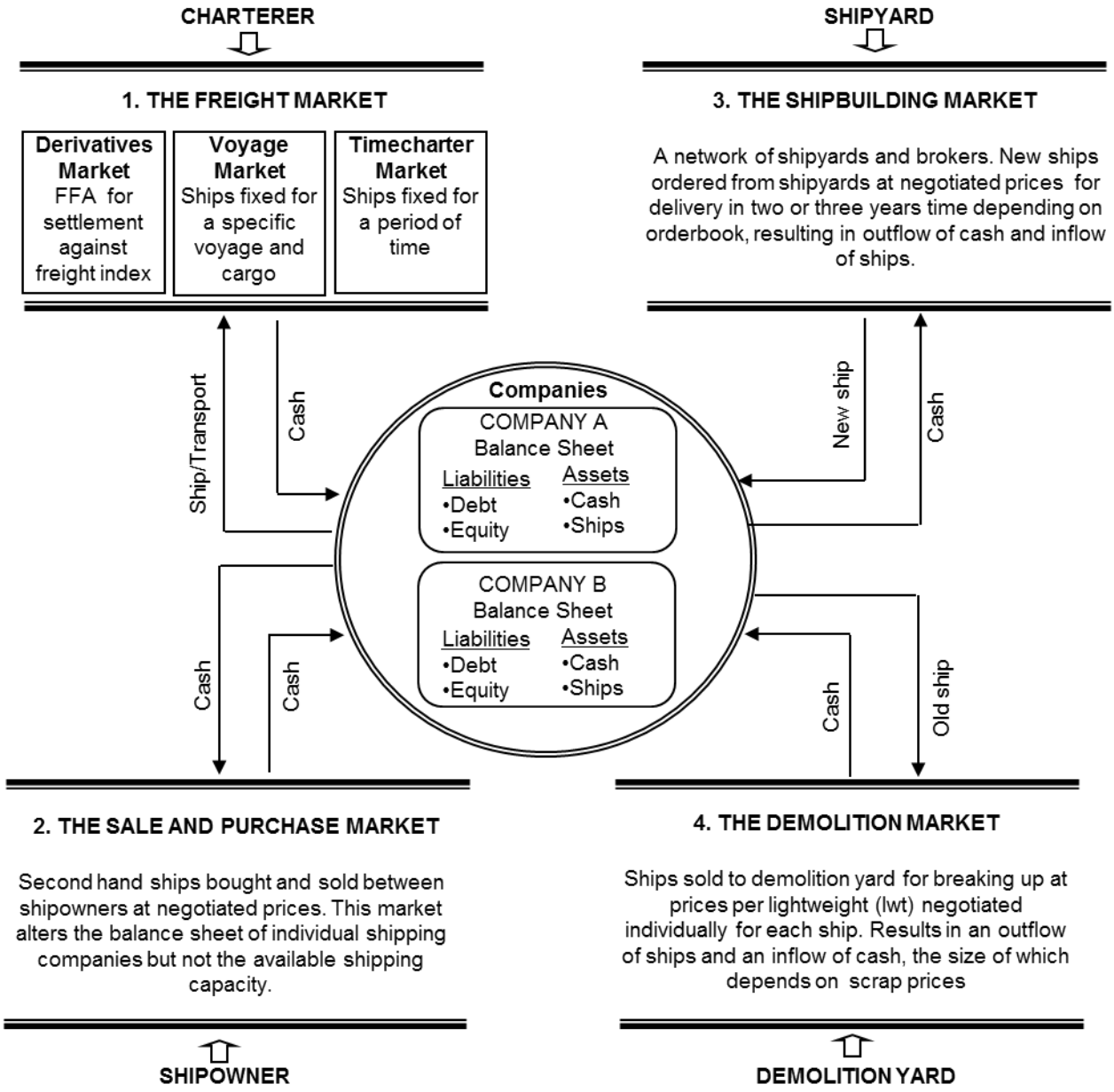
found to be trading during the survey period. Out of this total the largest share was 1.3%. Only ten companies had a share over 1% and another 14 had a share between 0.5% and 1%.

Ship Managers undertake the management (both technical and commercial) of ships on behalf of shipowners, often for a fixed fee. There are a significant number[12] of ship management companies who will undertake the management of the ship on behalf of the client. In addition to tankers and bulk carriers, ship management companies will manage specialist ships such as LPG tankers. This makes it very easy for new companies to enter the business the core management tasks can all be outsourced.

Shipbrokers: There is a worldwide network of shipbroking companies[13] which will undertake all the tasks involved with ordering new ships; buying and selling existing ships; and negotiating charters for vessels in an owner's fleet. They also undertake the post fixture administration of contracts. This makes it relatively easy for a new shipowner to enter the market.

[12] It is difficult to estimate the number of Ship Managers operating globally, and many companies act as both owners and managers of vessels. Clarkson Research estimates that there were around 20,000 companies acting as vessel managers (including owners managing vessels in-house) at the start of 2015.
[13] Shipbroking companies are very competitive and revenue is usually based on a commission fee.

Figure 8 The markets where ships and freight are traded



***Source*: Martin Stopford, Maritime Economics 3rd Edition 2007**

Note: This diagram shows how the four shipping markets are linked together by the cash flowing through the balance sheets of the companies in the middle. The freight market generates cash; the sale and purchase market moves it from one balance sheet to another; the newbuilding market drains it out of the market in return for new ships; and the demolition market produces a small inflow in return of old ships.

8. Definition of the Shipping Markets

8.1 The four markets where cargo and ships are traded

In shipping there are four markets trading in different commodities. The freight market trades in sea transport of commodities; the charter market deals in ships for hire; the sale and purchase market trades second-hand ships; and the newbuilding market trades new ships. Beyond this there is no formal structure.

Because the same companies are trading in all four shipping markets, their activities are closely correlated. When rates rise or fall in the freight market the effect is transmitted into the sale and purchase market and from there into the newbuilding[14] market. The markets are also linked by cash. The relationship is shown graphically in Figure 8. Cash flows back and forth between the industry's bank account (represented by the circle) and the four shipping markets (represented by the squares). The cashflow into the shipping companies' bank account is shown by the light shaded bars, while the black bars show outflows. The hatched bars indicate cash which changes hands from one shipowner to another, but does not change the cash balance of the industry as a whole.

8.2 The role of market cycles in the competitive process

The cash flowing between the four markets drives the shipping investment process. At the beginning of the cycle freight rates rise and cash starts to flow in, allowing shipowners to pay higher prices for second-hand ships. As prices are bid up investors turn to the newbuilding market which now looks better value. But as the ships arrive on the market two years later the whole process goes into reverse. Falling freight rates squeeze the cash inflow just as investors start paying for their newbuildings. Financially weak owners who cannot meet their day-to-day obligations are forced to sell ships on the second-hand market. These sales are often preceded by a, usually prolonged, period of declining rates. As ships are scrapped the supply falls, freight rates are bid up and the whole process starts again.

The cycles create a continuous movement of companies in and out of the market. Market cycles squeeze out the inefficient companies, and allow new and efficient companies to enter the market and gain market share. This is how the shipping industry directs investment and promotes efficiency.

Changes in supply and demand can impact the price paid for freight very quickly.

9. "Voyage Charter" Contract

In bulk shipping, a *voyage charter* allows the shipper to buy transport from the shipowner at a negotiated price per ton of cargo transported. The market contract suits shippers who want to leave the management of the transport to the shipowner, while the time charter is for experienced ship operators who prefer to manage the transport themselves.

Table 4 Type of Charter Arrangement

Type of Charter Arrangement		
Bareboat	**Timecharter**	**Voyage Charter**
Master appointed & directed by:- Charterer	Master appointed by owner, directed by Charterer	Master appointed and directed by:- Owner
Revenue depends on:- Hire rate & duration	Revenue depends on:- Hire rate & duration	Revenue depends on:- Quantity of cargo & rate
Costs paid by owner:- Capital Brokerage	Costs paid by owner :- Capital Brokerage Wages Provisions Maintenance Repairs Stores & supplies Lube oil Water Insurance Overheads	Costs paid by owner:- Capital Brokerage Wages Provisions Maintenance Repairs Stores & supplies Lube oil Water Insurance Overheads Port charges Stevadoring charges Cleaning holds Cargo claims Light dues Canal dues Bunker fuel
Contract of Afreightment (COA): cost profile same as voyage charter		

Source: Clarkson Research Services

[14] There is strong competition between shipbuilding nations and yards within each nation.

9.1 Negotiating & concluding a freight contract

When a ship is chartered or a freight rate is agreed, the ship is said to be `fixed'. Fixtures are arranged in much the same way as any major international hiring or subcontracting operation. Shipowners have vessels for hire, charterers have cargo to transport, and brokers puts the deal together. Let us briefly consider the part played by each of these:

The shipowner comes to the market with a ship available, free of cargo. For example, it may be a Panamax bulk carrier currently on a voyage from the US Gulf to deliver grain to Japan, so it will be `open' (available for hire) in Japan from the anticipated date at which the grain has been discharged, say 12 May.

The shipper has a volume of cargo to transport from one location to another. The quantity, timing and physical characteristics of the cargo will determine the type of shipping contract required. For example, the shipper may have a cargo of 70,000 tons of coal to ship from Banjamarsin, Indonesia to Rotterdam. Such a cargo might be very attractive to a bulk carrier operator discharging coal in Northern China and looking for a cargo to reposition into the North Atlantic, because he has only a short ballast leg from China to Indonesia and then a full cargo back to Europe.

Most often the principal (i.e. the shipowner or charterer) will appoint a shipbroker to act for him. The broker's task is to discover what cargoes or ships are available; what the owners/ charterers want to be paid; and what is reasonable given the state of the market. With this information they negotiate the deal for their client, often in tense competition with other brokers. Brokers provide other services including post fixture processing, dealing with disputes, and providing accounting services in respect of freight, other payments and receipts under the charter, etc. Some owners or shippers carry out these tasks themselves. However, this requires a staff and management structure which only very large companies can justify. Since broking is all about information, brokers tend to gather in shipping centres. London remains the biggest, with other major centres in New York, Tokyo, Hong Kong, Singapore, Piraeus, Oslo, Hamburg, Copenhagen, Bergen etc.

Three types of contractual arrangement are commonly used. Under a *voyage charter*, the shipowner contracts to carry a specific cargo in a specific ship for a negotiated price per ton. Variants on the theme are the *consecutive voyage charter* and the *contract of affreightment*, in which the shipowner contracts to carry regular tonnages of cargo for an agreed price per ton.

9.2 The voyage charter

A voyage charter provides transport for a specific cargo from port A to port B for a fixed price per ton, so in this case the shipowner pays all the costs relating to the ship. For example, a grain trader may have 49,000 tons of grain to transport from Mobile in the US Gulf to Chiba in Japan. So what does he do? He calls his broker and tells him that he needs transport for the cargo. The broker will `fix' (i.e. charter) a ship for the voyage at a negotiated freight rate per ton of cargo, e.g. $25.20. The terms will be set out in a charter-party and, if all goes well, the ship arrives on the due date, loads the cargo, transports it to Chiba, discharges and the transaction is complete.

If the voyage is not completed within the terms of charter-party then there will be a claim. For example, if laytime (i.e. port time) at Chiba is specified at seven days and the time counted in port is ten days, the owner submits a claim for three days demurrage to the charterer. Conversely, if the ship spends only five days in port, the charterer will submit a claim for two days despatch to the owner. The rates for demurrage and despatch are stated in dollars per day in the charter-party.

9.3 The Consecutive Voyage Charter (CVC)

A Consecutive Voyage Charter is similar to a Voyage Charter, but the ship is contracted to undertake a series of cargo carrying voyages on a defined route. This is used when the shipper

has a well-defined schedule of cargoes to transport. To introduce some flexibility and allow for changing circumstances the charter party may incorporate options in terms of loading and or discharge ports, quantities and other contract terms.

9.4 The Contract of Affreightment (COA)[15]

The Contract of Affreightment (COA) is a little more complicated. It is a negotiated contract under which the shipowner agrees to carry a series of cargo parcels for a fixed price per unit/volume, generally without specifying the precise ship in which the cargo will be carried. However, the shipowner will be under obligation to provide the necessary cargo carrying capacity to serve the agreed cargo volume and destinations

For example, the shipper has a contract to supply ten consignments of 70,000 tons of coal from Queensland to Longkou, China, at approximately two-monthly intervals. So he negotiates a Contract of Affreightment with a shipping company which agrees to undertake the transport at an agreed price per ton. Because details of each voyage and the ship used are left to the shipowner, he can increase his efficiency by planning the operating pattern for his fleet in the most efficient manner.

For example by switching cargo between vessels and obtaining backhauls he may be able to reduce his overall cost per ton transported. Because shipowners are aware of the potential value of a guaranteed cargo stream, there is generally intense competition for these contracts, with the result that shippers are able to obtain some of the value added in reduced rates. Companies who specialize in COAs sometimes describe their business as `industrial shipping' because their aim is to provide a service. Since a long-term contract is involved, COAs involve a greater commitment to marketing the service to the shipper and providing an efficient service.

There is some COA business in the dry bulk markets, and this system sees a lot of use in many of the specialised trades, carrying cars from the Far East to Europe, or specialised chemicals within Asia. The problem in negotiating COAs is that the precise volume and timing of cargo shipments is not generally known so cargo volumes may be specified as a range (e.g. `minimum x and maximum y tons[16]') while timing may rely on generalizations such as `The shipments under the contract shall be evenly spread over the contract period.'

9.5 Main contract terms (voyage charter party)

The *freight charters* listed above will all be concluded with a contract drawn up between the shipper and the shipowner, often through the intermediation of a shipbroker. There are various standard contracts in common use. They typically include the following terms:-

- Details of the ship and the contracting parties.
- A description of cargo to be carried, drawing attention to any special features.
- The load and discharge ports.
- The terms on which the cargo is to be carried. This important part of the voyage charter-party defines the commitments of the shipper and shipowner under the contract. This covers:
- The terms of payment.

[15] According to ECSA members, within specialised shipping, the majority of cargo is transported under COA or service contract which are negotiated through an open tender process whereby the customer send out a tender to all carrier within the relevant segment. There is intensive competition among the carriers and extensive negotiations with the shipper until one carrier has been awarded the contract.

[16] If the charter involved the transport of cars, the units involved would be expressed in numbers of vehicles rather than tones.

- Damages for non-performance.
- Administrative clauses, covering matters that may give rise to difficulties if not clarified in advance. These include the appointment of agents and stevedores, bills of lading, provisions for dealing with strikes, wars, ice, etc.

10. "Timecharter" Contracts

10.1 Procedures for time chartering a ship

A *timecharter* gives the charterer the use of the ship, while leaving ownership and management of the vessel in the hands of the shipowner. In this case the shipowner pays the capital and operating costs of the vessel, but not the voyage related costs (see Table 5). The length of the charter may be the time taken to complete a single voyage (trip charter) or a period of months or years (period charter). When on charter, the shipowner continues to pay the finance costs and operating costs of the vessel (i.e. the crew, maintenance and repair) but the charterer directs the commercial operations of the vessel and pays all voyage expenses (i.e. bunkers, port charges and canal dues) and cargo handling costs. With a time charter, the shipowner has a clear basis for preparing the ship budget, since he knows the ship operating costs from experience and is in receipt of a fixed daily or monthly charter rate (e.g. $10,000 per day). Often the shipowner will use a long time charter from a major corporation such as a steel mill or an oil company, as security for a loan to purchase the ship needed for the trade. Shipowners themselves may timecharter vessels for a number of reasons, including if they are not able to finance ownership of more vessels, their own tonnage is committed or they want to spread risk by having a mix of owned / chartered vessels.

Although simple in principle, in practice time charters involve risks for both parties. Details of the contractual agreement are set out in the `charter-party'. The shipowner must state the vessel's speed, fuel consumption and cargo capacity. The terms of hire will be adjusted if the ship does not perform to these standards. The charter-party will also set out the conditions under which the vessel is regarded as `off hire', for example during emergency repairs, when the charterer does not pay the charter hire. Long time charters also deal with such matters as the adjustment to the hire charge in the event of the vessel being laid up, and will set out certain conditions under which the charterer is entitled to terminate the arrangement, for example if the owner fails to run the ship efficiently.

There are three reasons why subcontracting/timechartering may be attractive. *First*, the shipper may not wish to become a shipowner, but his business requires the use of a ship under his control. The shipper may not want to be a ship owner for political, technical or financial reasons (avoding tying up capital for example). *Second*, the time charter may work out cheaper than buying, especially if the owner has lower costs, due to lower overheads and larger fleet. This seems to have been one of the reasons that oil companies subcontracted so much of their transport in the 1960s. *Third*, the charterer may be a speculator taking a position in anticipation of a change in the market.

Timechartering to industrial clients is a prime source of revenue for the shipowner. The availability of time charters varies from cargo to cargo (or commodity to commodity) and with business circumstances.

10.2 The timecharter trip

A time charter trip is the simplest form of time charter. A specific vessel is hired to undertake a trip from a specific starting point (for example Mobile) to the Pacific and back. During the time the vessel is on charter the owner is paid an agreed daily rate, for example $20,000 a day. During the period that it is on charter the vessel is directed by the shipper, who tells it where to load cargo, and where to discharge it. The advantage of the trip charter is that it allows the shipper to

vary his itinerary and provides greater flexibility than a voyage charter under which the contract involves the transport of a specific Cargo Parcel.

10.3 The period timecharter

Under a period charter the ship is a hired out by the "shipowner" to the "charterer" for a period of time specified in the contract ("charter party"). During this period the shipowner provides the crew and maintains the vessel, whilst the charterer directs its operations. Normally the charter party will specify a number of admissible days "off hire" each year for repairs and maintenance, and there will be an agreement in the contract for handling any additional time out of service.
Typically these charters may be three months, six months, twelve months, two years or in a few cases as long as 10 or even 15 years. Time charters have many different uses. The ship may be chartered by a cargo owner, for example an oil company, to carry its own cargo. Or it might be chartered by a shipowner who needs the vessel to meet cargo commitments, for example under a contract of a affreightment. Finally, some shipowner's may period time charter a vessel in the hope of trading it on the voyage charter market at a higher rate.

10.4 Main contract terms (timecharter)

Time charter-parties follow the same general principles as the voyage charter (see paragraph 9.4), but also deal specifically with the ship's performance (i.e. fuel consumption, speed, quantity, trading limits, prohibited cargoes and allocation of voyage costs and prices of bunkers on delivery and redelivery) and equipment, and may exclude the items dealing with the cargo.

11. The Bareboat Charter Contracts

Finally, if a company wishes to have full operational/technical control of the ship, but does not wish to own it, a bare boat charter is arranged. Under this arrangement the investor, not necessarily a professional shipowner, purchases the vessel and hands it over to the charterer for a specified period, usually seven to twenty years. The charterer manages the vessel and pays all operating (including crewing, maintenance, dry docking etc.) and voyage costs and the owner, who is often a financial institution, is not active in the operation of a vessel and does not require any specific maritime skills. At the end of the charter the ship is returned to the owner, although some bareboat charters include an option to purchase the vessel on termination of the charter.

12. Market Reporting & Information Flow

The rates at which charters are fixed depend on market conditions and the free flow of information reporting latest developments plays a vital part in the market. Shipping has one of the most extensive market reporting systems of any capital industry and the network of brokers and information providers ensure a high degree of transparency in all the contract negotiations discussed above.

13. The Sale and Purchase Market

13.1 Procedure for buying and selling a ship

About 1,300 deep sea merchant ships are sold each year, representing an investment of $25.9 billion in 2014. The market is very open, with ship prices freely reported and subject to open competition.

The participants in the sale and purchase market are the same mix of shippers, shipping companies and speculators who trade in the freight market.

Most sale and purchase transactions are carried out through shipbrokers.

13.2 How ship prices are determined

The sale and purchase market thrives on price volatility. Profits earned from well-timed buying and selling activity are an important source of income for shipping investors. Prices are generally determined by supply and demand, which in turn depend on the cashflow pressures discussed in previous sections.

14. Comments on Cooperation in Bulk & Specialized Sectors

14.1 The principles of cooperation in shipping

One of the methods used by shipping companies to improve their efficiency is to form an alliance with other companies. These alliances may take the form of pools, joint ventures, or space charter agreement.

Table 5 Key issues in building shipping alliances

	Joint Venture / Consortia	Pool	Space Charter Arrangements
Capital Investment	Yes		
Marketing & Customer awareness	Yes	Yes	
Chartering Efficiency	Yes	Yes	Yes
Arranging Cargo contracts (COA)	Yes	Yes	
Logistics & vessel productivity	Yes	Yes	Yes
Operating Cost Efficiency	Yes	Yes	Yes
Administrative cost efficiency	Yes	Yes	
Training	Yes		

Source: Clarkson Research Services

14.2 Types of alliances

Table 5 shows three different types of alliance, joint ventures, pools and space charter agreements. Eight areas of potential cooperation are shown on the vertical axis - capital investment; marketing; chartering; cargo contracts; logistics and productivity; operating cost efficiency; administration and training.

The table illustrates in a very approximate sense the range of the activities which may be undertaken in each of the four types of alliance. A joint venture generally covers every business aspect. It is to all intents and purposes a separate company set up for a specific cooperative venture. In contrast "Pools" are usually concerned with marketing and the associated activities of delivering cargo and collecting revenue.

14.3 Joint venture agreements

A joint venture is a business arrangement in which two or more parties undertake a specific economic activity together. They are often bilateral in their nature. Whereas a pool is set up to accept a number of different members, a joint venture is usually restricted to a small number of partners who agree to work together on a specific project, or towards a specific goal. Joint ventures vary considerably in the amount of co-operation undertaken by the two parties.

14.4 Pool arrangements

One of the most common arrangements for working together in the shipping industry is the "Pool". Shipping pools are currently used in almost all segments of the tramp/non-liner shipping market including products tanker business, the chemical tanker business, the LPG business, the bulk carrier business and the crude tanker business. Recently established pools include a capesize bulker pool of over a hundred vessels, while in the tanker sector, at least 20% of VLCCs are understood to be in a pool, and almost a third of all long and mid-range product tankers (this includes all product tankers larger than 45,000 dwt in size).

A shipping pool can be defined as "a collection of similar vessel types under various ownerships placed in the care of a central administration"[17]. Areas of potential co-operation are shown in table 5. Pools are generally developed for 2 reasons. Firstly to allow participants to provide the service levels required by their major customers. Secondly, to improve transport efficiency by special investment and increased ship utilisation e.g. by arranging backhaul cargoes more effectively than a small group of ships could do.

14.5 Space Charter Agreements

In the breakbulk era liner companies operated freight pools, particularly in thin trades, in order to spread operational costs. Containerisation saw the introduction of consortia (sharing administrative and operating costs and revenue) and alliances (sharing vessel operating costs) as carriers sought to drive down operating costs and increase vessel size to access scale. Vessel sharing agreements, today's most common format, operate on the basis of slot swaps between participating carriers with inequalities of provision and usage settled by cash cross-payments at pre-determined prices. In addition, carriers sell slots to third parties, to competing lines without sufficient market support to start their own services, and to lines seeking to supplement their own service capacity as well as to container leasing companies seeking to reposition empty containers. Slot charters are generally on the basis of long term inter-line contractual arrangements, with slot prices set for a fixed duration, but the slot prices for spot arrangements are fixed ad hoc. Needless to say, carriers prefer to restrict slot sales to capacity that they cannot themselves make profitable use of. Instances in which space is subcontracted to cargo interests are extremely rare or non-existent.

Space charter arrangements also exist in some of the specialised sectors. Considering the customer structure and the service requirements they place on the carriers it is a need to optimise capacity utilisation, sailing frequencies and port coverage to the benefit of the customers. Carriers use both irregular ad hoc space charter arrangements mainly to cover short term fluctuations as well as more regular fixed positioning space charters.

[17] William V. Packard 1989 Shipping Pools, Lloyds of London Press Ltd, London p 5

Appendix 1—Summary Tables

A1.1 Cargo Carrying Fleet Ownership Profile

Cargo fleet by company size

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+	7	2,386	182.2	127.4	341	2	350	23.9	20.4	175
200-299	5	658	23.7	18.5	132	2	179	13.1	11.6	90
100-199	36	3,329	204.0	135.9	92	14	1,422	76.2	54.2	102
50-99	118	5,578	353.3	227.2	47	41	2,190	140.8	91.8	53
10-49	1,019	14,900	600.4	378.0	15	295	5,116	242.6	153.6	17
5-9	1,305	7,242	153.6	96.3	6	294	1,772	61.0	36.9	6
0-4	11,631	16,956	147.6	95.1	1	1,586	2,518	44.0	27.5	2
Unknown		2,052	7.2	4.6			16	0.1	0.1	
Total	**14,122**	**53,101**	**1,672.0**	**1,083.1**	**4**	**2,235**	**13,563**	**601.7**	**396.0**	**6**
% Total						*16%*	*26%*	*36%*	*37%*	

Source: Clarkson Research Services, February 2015

Orderbook

Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+	6	196	17.13	13.94	33	21	365	36	21	17
200-299	2	22	1.13	0.71	11	1	11	1.28	1.16	11
100-199	27	293	26.26	19.41	11	10	114	8.07	7.02	11
50-99	55	736	64.94	40.69	13	34	159	9.73	6.37	5
10-49	225	1,190	89.83	56.50	5	78	479	31.62	20.52	6
5-9	86	376	26.20	15.77	4	1	14	0.31	0.19	14
0-4	222	709	45.51	30.58	3	50	182	11.30	6.58	4
Unknown		505	30.08	17.93						
Total	**624**	**4,027**	**301.08**	**195.52**	**6**	**195**	**1,324**	**98.09**	**62.63**	**7**
% EU Owners	*31%*	*33%*	*33%*	*32%*						

Source: Clarkson Research Services, February 2015

Note: Fleet figures relate to vessels operating in bulk, specialised and liner trades.

A1.2 Total Fleet Ownership Profile

Total fleet by company size (including non-cargo carrying vessels)

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+	8	3,615	184.6	130.3	452	2	1,089	25.3	21.8	545
200-299	6	1,452	25.4	21.2	242	2	459	13.6	13.3	230
100-199	37	4,859	211.7	150.4	131	14	1,806	76.7	55.1	129
50-99	134	8,952	368.2	239.1	67	42	2,733	144.1	95.3	65
10-49	1,359	25,621	622.8	408.4	19	352	6,887	247.9	161.3	20
5-9	1,896	12,256	168.0	110.3	6	387	2,536	68.6	43.4	7
0-4	19,034	28,820	167.0	116.0	2	3,212	4,984	48.8	32.9	2
Unknown		4,061	7.7	5.5			61	0.2	0.1	
Total	**22,475**	**89,636**	**1,755.5**	**1,181.1**	**4**	**4,012**	**20,555**	**625.1**	**423.3**	**5**
% Total						*18%*	*23%*	*36%*	*36%*	

Source: Clarkson Research Services, February 2015

Orderbook

Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+	8	264	17.82	14.59	33	2	46	1	1	23
200-299	5	44	1.27	1.42	9	2	10	0.07	0.66	5
100-199	32	422	26.88	21.33	13	11	162	8.23	7.16	15
50-99	84	927	67.83	42.98	11	28	385	36.23	21.24	14
10-49	321	1,548	91.43	60.54	5	93	528	31.99	21.23	6
5-9	134	493	26.91	17.15	4	39	167	9.92	6.68	4
0-4	372	1,066	48.75	34.96	3	73	218	11.55	7.17	3
Unknown		717	30.22	18.15			15	0.31	0.19	
Total	**957**	**5,481**	**311.11**	**211.13**	**6**	**249**	**1,531**	**99.77**	**65.67**	**6**
% EU Owners	*26%*	*28%*	*32%*	*31%*						

Source: Clarkson Research Services, February 2015

Note: Fleet includes all merchant vessels of 100GT and above, excluding fishing vessels, military vessels, yachts and fixed and mobile platforms bad barges primarily used for drilling and production in the offshore energy sector.

A1.3 Fleet Summary

Fleet Summary

	Fleet Size	Ownership			Vessel Acquisition			
	#ships	Owned by Top 20*	Company Size (ave.)	S&P Volume	2014 sales as % fleet	N/B Volume	Orderbook as % of fleet	Asset Value, NB Price $m
Bulk Carriers[1]	10,373	24.7%	6	Very High	3.9%	Very High	18.8%	53.3
Crude Oil Tankers[2]	1,838	44.6%	7	High	9.2%	High	11.3%	96.5
Oil Products Tankers[3]	7,621	27.9%	3	High	2.0%	Medium	5.9%	36.5
Chemical Tankers	3,442	34.1%	3	Medium	4.1%	Medium	7.0%	
LPG Carriers[4]	1,282	46.4%	3	Low/Medium	3.0%	High	17.6%	78.5
LNG Carriers[5]	419	71.2%	7	Low	2.6%	High	39.1%	200.0
RoRo	1,256	58.8%	2	Low	0.5%	Low	2.0%	
PCTC[6]	770	78.3%	7	Low	1.0%	Medium	7.7%	61.5

*Top 20 in terms of tonnage (GT) owned. NB Price Sizes: [1] 180k dwt, [2] 320k dwt, [3] 51k dwt, [4] 82k cbm, [5] 160k cbm [6] 6,000 cars.

Source: Clarkson Research Services, February 2015

A1.4

Total World Fleet

million dwt

Year Start	Crude Tankers[1]	Prodcut Tankers[2]	Chem/Spec. Tankers[3]	Tankers[4]	Bulkers	Combos	All Bulk	LPG	LNG	Cellular Container	MPP	General Cargo[5]	Ro-Ro	PCC	Reefer	Passenger	Offshore	Dredgers	Tugs	Other Non Cargo	Total
1987	231.7	9.5		**241.2**	196.8	32.2	**470.2**	6.1	3.8	17.0	13.9	46.5	5.8	3.2	6.7						**573.3**
1988	229.7	10.2		**239.9**	196.0	32.6	**468.5**	6.2	3.7	21.3	15.6	36.8	6.2	3.7	6.9						**568.9**
1989	234.4	10.1		**244.5**	197.9	32.2	**474.6**	6.2	3.6	22.8	16.0	33.8	6.4	3.9	6.9						**574.2**
1990	242.3	10.1		**252.3**	203.7	32.1	**488.1**	6.4	3.8	24.7	16.4	31.8	6.5	4.0	7.2						**588.9**
1991	248.2	10.1		**258.4**	211.5	31.1	**500.9**	6.9	3.9	26.3	16.8	30.7	6.6	4.0	7.4						**603.5**
1992	255.9	10.1		**266.1**	214.8	32.1	**513.0**	7.6	4.0	28.3	17.2	29.7	6.7	4.1	7.8						**618.5**
1993	260.2	10.4		**270.6**	215.0	32.0	**517.6**	8.3	4.1	30.7	17.7	28.6	6.8	4.1	8.1						**626.1**
1994	265.4	10.7		**276.1**	219.5	30.1	**525.6**	8.7	4.3	33.2	18.2	27.3	7.0	4.2	8.4						**637.1**
1995	260.7	11.6		**272.3**	228.1	26.4	**526.8**	8.8	4.9	36.0	18.5	25.9	7.1	4.3	8.7						**641.1**
1996	260.5	11.7		**272.2**	243.7	22.0	**537.9**	9.1	5.2	40.0	19.3	24.4	7.1	4.4	8.6						**656.0**
1997	212.9	61.4	15.4	**289.6**	253.7	19.4	**562.7**	9.4	5.7	50.1	21.5	54.2	8.6	4.7	8.3	3.3	17.1	2.6	0.9	0.4	**749.5**
1998	214.9	61.5	16.4	**292.9**	264.7	17.5	**575.1**	9.7	6.1	56.7	21.9	51.3	8.6	4.9	8.4	3.5	18.6	2.6	0.9	0.4	**768.7**
1999	216.9	63.5	17.7	**298.1**	264.0	15.5	**577.6**	9.8	6.4	62.3	22.5	49.0	8.9	5.2	8.4	3.6	21.4	2.7	0.9	0.4	**779.2**
2000	216.2	66.3	19.0	**301.5**	266.9	14.8	**583.2**	10.1	6.7	64.9	22.7	47.1	9.2	5.8	8.2	3.8	23.2	2.9	1.0	0.4	**789.2**
2001	221.8	66.3	20.3	**308.5**	274.6	14.2	**597.3**	10.5	7.7	70.5	23.0	45.1	9.5	6.2	8.1	3.9	24.6	2.9	1.0	0.4	**810.8**
2002	215.4	67.2	21.1	**303.7**	286.7	13.2	**603.6**	10.9	7.8	77.9	22.8	43.0	9.6	6.3	8.0	4.2	26.6	3.1	1.0	0.4	**825.3**
2003	218.9	68.2	21.7	**308.8**	294.4	11.8	**615.0**	10.7	8.6	84.9	22.8	41.4	9.8	6.4	7.9	4.5	29.3	3.2	1.1	0.4	**846.0**
2004	224.2	71.1	22.8	**318.1**	301.6	11.4	**631.1**	11.1	9.6	91.7	23.1	39.8	9.7	6.8	7.7	4.7	32.2	3.4	1.1	0.4	**872.4**
2005	233.4	77.6	24.1	**335.1**	322.2	9.9	**667.2**	11.1	11.2	99.9	23.7	39.2	9.8	7.2	7.5	4.8	36.2	3.5	1.1	0.4	**922.9**
2006	248.2	83.8	26.2	**358.2**	345.0	9.1	**712.3**	11.3	12.6	111.9	24.3	39.8	9.7	7.8	7.5	5.0	39.3	3.5	1.2	0.4	**986.6**
2007	258.9	90.9	28.1	**377.9**	368.0	8.5	**754.4**	11.8	14.8	128.6	25.3	40.1	9.8	8.4	7.4	5.0	43.5	3.6	1.3	0.4	**1054.4**
2008	269.4	100.1	30.4	**400.0**	392.4	7.5	**799.9**	12.4	17.3	144.6	26.6	40.7	9.8	9.3	7.3	5.2	48.4	3.6	1.4	0.4	**1126.9**
2009	273.9	112.3	33.9	**420.0**	418.7	7.2	**845.9**	13.9	22.1	161.6	27.7	41.7	9.8	10.5	7.1	5.3	52.2	3.7	1.4	0.4	**1203.5**
2010	291.2	123.7	36.9	**451.8**	460.8	6.4	**919.0**	14.4	25.8	169.1	27.4	41.8	9.6	10.0	6.7	5.4	55.8	3.9	1.5	0.5	**1290.9**
2011	300.4	130.0	38.8	**469.2**	539.1	8.0	**1016.2**	14.9	28.1	183.7	28.3	42.1	9.0	10.5	6.4	5.5	61.2	4.2	1.6	0.5	**1412.1**
2012	320.7	134.6	40.4	**495.8**	619.5	6.8	**1122.0**	15.1	28.9	196.7	28.8	41.1	8.8	11.2	6.0	5.5	64.6	4.4	1.7	0.5	**1535.3**
2013	336.1	137.6	41.1	**514.8**	685.0	4.7	**1204.6**	15.3	28.9	206.3	29.2	40.1	8.6	11.7	5.3	5.5	66.0	4.8	1.8	0.5	**1628.5**
2014	341.0	141.5	41.7	**524.1**	724.1	4.2	**1252.5**	16.3	30.0	215.9	29.5	39.8	8.2	11.9	5.2	5.5	67.7	4.8	1.9	0.5	**1689.5**
2015	343.0	146.6	42.2	**531.7**	756.1	3.9	**1291.7**	17.0	32.7	227.9	29.2	39.3	8.0	12.1	5.0	5.6	70.8	4.8	2.0	0.5	**1746.6**
Average Growth																					
2013-14	0.6%	3.6%	1.1%	**1.5%**	4.4%	-7.5%	**3.1%**	4.0%	8.9%	5.6%	-0.8%	-1.1%	-2.8%	1.5%	-2.5%	0.9%	4.7%	0.3%	3.3%		**3.4%**
2004-14	3.9%	6.6%	5.7%	**4.7%**	8.9%	-8.9%	**6.8%**	4.3%	11.3%	8.6%	2.1%	0.0%	-2.0%	5.3%	-3.9%	1.4%	6.9%	3.3%	5.5%		**6.6%**

*Data based on the CRSL world fleet of merchant vessels in excess of 100 GT. Please note that figures do not take into account retrospective changes for Non-Bulk Fleets pre-1996, as indicated by the horizontal line. *Data as at start month. 1 Fleet includes crude tankers (uncoated tankers above 60k dwt) and product tankers (all coated non-IMO tankers, all IMO 3 tankers. all IMO 2 takers between 30-60k dwt which have an average tank size >3,000cbm and tanks <75% segregated, and all uncoated non-IMO tankers 10-60k dwt) . 2 Fleet includes all IMO 1 tankers and IMO 2 tankers that do not meet product tanker definition >10,000 dwt. 3 covers all tankers <10,000 dwt. 4 Tankers over 10,000 dwt before 1996. 5 Only includes General Cargo vessels >5,000 dwt before 1996.*

A1.5

World Seaborne Trade

Million Tonnes

Year	Iron Ore	Coal~	Grain*	Bauxite Alumina	Phos. Rock	Major Bulk	Steel Prod.	Forest Prod.	Other Dry Bulk	Total Dry Bulk	Containers	Other Dry	Total Dry	Crude Oil	Oil Prod.	Total Oil	LPG^	LNG	Chemicals	TOTAL	
1980	314	188	198	48	48	796	141	126			99			1,320	384	1,704	19	26			
1981	303	206	206	45	42	802	142	120			110			1,170	373	1,543	21	26			
1982	273	206	200	36	44	759	136	124			114			993	396	1,389	23	30			
1983	257	197	199	36	46	735	145	129	288	1,297	123	458	1,878	930	392	1,322	22	32	73	**3,326**	
1984	306	235	206	46	48	841	158	130	357	1,486	143	439	2,068	871	413	1,284	24	40	77	**3,493**	**5%**
1985	321	272	220	44	46	902	170	131	354	1,557	155	458	2,170	984	401	1,385	25	41	81	**3,702**	**6%**
1986	311	270	187	42	45	855	161	133	360	1,509	167	467	2,143	1,030	387	1,417	26	41	89	**3,716**	**0%**
1987	319	273	211	46	45	894	161	149	358	1,562	185	466	2,213	977	366	1,343	28	44	95	**3,723**	**0%**
1988	357	296	217	49	47	966	167	160	372	1,665	204	466	2,335	972	402	1,373	26	49	98	**3,882**	**4%**
1989	378	306	219	55	44	1,002	169	162	381	1,715	224	480	2,419	1,066	463	1,530	30	52	99	**4,129**	**6%**
1990	360	331	216	55	37	999	168	157	383	1,706	237	633	2,577	1,133	432	1,565	32	58	101	**4,333**	**5%**
1991	366	352	217	53	31	1,019	175	154	372	1,720	259	660	2,640	1,217	390	1,607	34	58	102	**4,442**	**3%**
1992	345	357	224	48	30	1,003	178	151	392	1,724	283	682	2,688	1,339	396	1,736	37	60	102	**4,623**	**4%**
1993	361	358	222	51	27	1,019	181	157	397	1,754	311	697	2,762	1,326	430	1,755	39	62	111	**4,730**	**2%**
1994	387	371	203	49	29	1,039	190	161	442	1,831	345	703	2,879	1,402	427	1,829	38	66	122	**4,934**	**4%**
1995	408	402	213	52	30	1,105	198	167	466	1,935	376	741	3,053	1,455	449	1,904	39	68	127	**5,191**	**5%**
1996	395	421	218	54	31	1,119	200	163	472	1,954	416	819	3,189	1,488	492	1,980	41	74	131	**5,415**	**4%**
1997	429	447	228	55	32	1,191	195	166	492	2,044	454	888	3,386	1,584	488	2,072	42	83	135	**5,718**	**6%**
1998	426	450	227	55	31	1,189	189	156	505	2,038	487	894	3,419	1,537	477	2,014	40	85	138	**5,696**	**0%**
1999	402	458	245	54	33	1,191	174	158	523	2,045	542	874	3,461	1,591	509	2,099	43	93	149	**5,844**	**3%**
2000	450	508	261	54	30	1,303	182	161	548	2,194	607	918	3,718	1,677	572	2,249	45	104	154	**6,269**	**7%**
2001	452	546	264	52	31	1,345	175	164	554	2,237	628	922	3,788	1,667	552	2,218	42	107	156	**6,311**	**1%**
2002	480	557	269	56	30	1,393	194	160	563	2,310	692	975	3,977	1,634	559	2,193	44	113	165	**6,492**	**3%**
2003	516	600	272	60	29	1,477	212	163	599	2,452	802	915	4,169	1,760	587	2,347	47	125	169	**6,857**	**6%**
2004	593	643	273	65	31	1,604	231	166	648	2,649	911	894	4,453	1,848	648	2,497	51	132	175	**7,307**	**7%**
2005	662	673	274	70	31	1,711	238	170	677	2,795	1,002	876	4,673	1,878	711	2,589	52	142	182	**7,638**	**5%**
2006	713	711	292	78	30	1,824	263	174	726	2,987	1,091	865	4,943	1,891	769	2,660	52	160	193	**8,007**	**5%**
2007	777	768	306	93	31	1,975	289	175	779	3,218	1,216	789	5,223	1,912	798	2,709	56	171	203	**8,363**	**4%**
2008	841	793	319	97	31	2,080	287	173	772	3,311	1,271	830	5,412	1,902	823	2,725	55	173	209	**8,573**	**3%**
2009	898	807	321	74	20	2,120	212	155	730	3,217	1,134	811	5,161	1,815	833	2,648	54	183	214	**8,259**	**-4%**
2010	991	930	343	96	23	2,384	248	171	802	3,605	1,291	874	5,770	1,868	888	2,756	55	221	229	**9,031**	**9%**
2011	1,053	1,000	345	113	29	2,540	270	178	854	3,841	1,405	881	6,127	1,851	915	2,766	59	247	241	**9,440**	**5%**
2012	1,110	1,123	374	107	30	2,743	279	185	892	4,098	1,454	909	6,462	1,901	923	2,824	61	242	250	**9,839**	**4%**
2013	1,189	1,179	387	139	28	2,923	288	192	928	4,331	1,531	953	6,816	1,833	959	2,792	64	244	260	**10,175**	**3%**
2014 (e)	1,328	1,196	414	105	29	3,072	307	200	925	4,503	1,629	1,012	7,144	1,809	980	2,789	69	248	271	**10,521**	**3%**
2015 (f)	1,413	1,222	417	108	29	3,189	316	208	955	4,668	1,743	1,079	7,491	1,835	1,013	2,847	74	259	284	**10,956**	**4%**
Average Growth																					
1990-2000	*2.3%*	*4.4%*	*1.9%*	*-0.2%*	*-2.1%*	*2.7%*	*0.8%*	*0.3%*	*3.7%*	*2.5%*	*9.8%*	*3.8%*	*3.7%*	*4.0%*	*2.8%*	*3.7%*	*3.2%*	*6.0%*	*4.3%*	*3.8%*	
2000-2010	*8.2%*	*6.2%*	*2.8%*	*5.9%*	*-2.5%*	*6.2%*	*3.2%*	*0.6%*	*3.9%*	*5.1%*	*7.8%*	*-0.5%*	*4.5%*	*1.1%*	*4.5%*	*2.1%*	*2.1%*	*7.9%*	*4.1%*	*3.7%*	
2010-2015	*7.3%*	*5.6%*	*4.0%*	*2.3%*	*4.7%*	*6.0%*	*5.0%*	*4.0%*	*3.6%*	*5.3%*	*6.2%*	*4.3%*	*5.4%*	*-0.4%*	*2.7%*	*0.7%*	*6.2%*	*3.2%*	*4.4%*	*3.9%*	

**Includes soybean. ~ Includes lignite. ^ LPG trade basis customs statistics for liquefied propane and butane.*

Source : Clarkson Research Services, February 2015

A1.6 *Shipping Market Volatility - Last 7 Years*

Spot Market Rate Volatility - Last 7 Years

	VLCC Tankers	CPP (MR) Tankers	Capesize Bulker	VLGCs	Chemical Tankers*
	$/day	$/day	$/day	$/day	$/t
Mean Average	34,317	12,673	32,120	30,506	65.6
St. Dev.	31,712	5,041	37,938	25,075	12.9
St. Dev / Mean	0.92	0.40	1.18	0.82	0.20
Max	154,919	27,809	188,643	120,540	106.6
Min	2,784	5,254	1,467	2,194	45.0
Range	152,135	22,555	187,176	118,347	61.6

* All units $/day, apart from chemical tankers - based on Houst-F.East 5,000t $/t

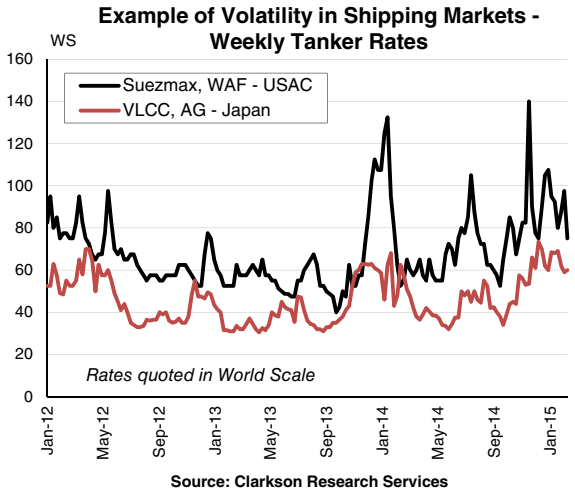
5-yr old Secondhand Price Volatility - Last 7 Years

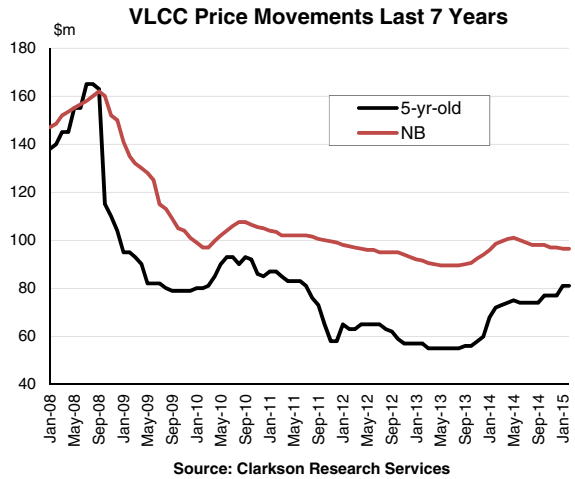
	VLCC Tanker	CPP (MR) Tankers	Capesize Bulker
	$m	$m	$m
Mean Average	83.2	56.1	30.2
St. Dev.	27.4	32.6	8.3
St. Dev / Mean	0.33	0.58	0.28
Max	165.0	155.0	54.0
Min	55.0	32.5	22.0
Range	110.0	122.5	32.0

Newbuilding Price Volatility - Last 7 Years

	VLCC Tanker	CPP (MR) Tankers	Capesize Bulker	VLGC
	$m	$m	$m	$m
Mean Average	109.0	38.2	60.2	77.0
St. Dev.	21.0	6.0	15.5	8.0
St. Dev / Mean	0.19	0.16	0.26	0.10
Max	162.0	53.5	99.0	96.5
Min	89.5	33.5	46.0	69.5
Range	72.5	20.0	53.0	27.0

Source: Clarkson Research Services. Note: NB and SH prices based on end-month assessements





A1.7 Glossary of Chartering Terms

Shipper – Individual or company with cargo to transport.
Charterer – Individual or company who hires a ship.
Charter-party – Contract setting out the terms on which the shipper contracts for the transportation of his cargo or the charterer contracts for the hire of a ship.
Voyage charter – Ships earns freight per ton of cargo transported on terms set out in the charter-party which specifies the precise nature and volume of cargo, the port(s) of loading and discharge and the laytime and demurrage. All costs paid by the shipowner.
Consecutive voyage charter - Vessel hired to perform a series of consecutive voyages between A and B.
Contract of Affreightment (COA) – Shipowner undertakes to carry out quantities of a specific cargo on a particular route or routes over a given period of time using ships of his choice within specified restrictions.
Period charter – The vessel is hired for a specified period of time for payment of a daily, monthly or annual fee. There are three types: time charter, trip charter and consecutive voyage charter.
Time charter – Ship earns hire, monthly or semi-monthly. The shipowner retains possession and mans and operates ship under instructions from charterer who pays voyage costs.
Trip charter – Fixed on a time charter basis for the period of a specific voyage and for the carriage of a specific cargo. Shipowners earns "hire" per day for the period determined by the voyage.
Bare boat charter – The owner of the ship contracts (for a fee, usually long-term) to another party for its operation. The ship is then operated by the second party as if he owned it.
Laytime – The period of time agreed between the party to a voyage charter during which the owner will make ship available for loading/discharging of cargo.
Demurrage – The money payable to the shipowner for delay for which he is not responsible in loading and/or discharging beyond the laytime.
Despatch – Means the money which the owner agreed to repay if the ship is loaded or discharged in less than the laytime allowed in the charter-party (customarily demurrage).
Common abbreviations
c.i.f. – The purchase price of the goods (by the importer); includes payment of insurance and freight which is arranged by the exporter.
f.o.b. – Goods are purchased at cost and the importer makes his own arrangement for insurance and freight.

A1.8 Glossary of Cargo Ship Types

This report utilizes the Clarkson Research fleet database of the World Fleet & Orderbook of Propelled Seagoing Merchant Vessels in excess of 100 Gross Tonnage. This includes the following vessel types:

Bulk Cargo: Oil & Products Tanker, Bulkcarrier, Combined Ore/Oil or Bulk/Oil Carrier
General Cargo: Fully Cellular Containership, Multi-Purpose, Ro-Ro, Other Dry Cargo
Specialised: Chemical Tanker, Specialised Tanker, Gas Carrier, Pure Vehicle Carrier, Reefer
Non Cargo: Offshore, Dredgers, Tugs, Passenger Vessels.

The following vessel types are excluded: Non-propelled vessels, Inland waterway vessels, Merchant vessels of below 100gt, or where gt is unknown, Fishing vessels, Military vessels, Yachts, Fixed and mobile platforms and barges primarily used for drilling and production in the offshore energy sector (with the exception of FPSO & Drillships).

Bulk Carriers - Includes single deck dry cargo vessels in excess of 10,000 dwt.

1. Capesize: Bulkcarriers 100,000 dwt or above, involved in long-haul iron ore transportation on routes such as Brazil and Australia to China, and coal shipments on long-haul routes.
2. Panamax: Bulkcarriers 65,000-99,999 dwt, primarily used for transporting coal, as well as grain, iron ore and some minor bulks. 'Kamsarmax' vessels of around 80,000-89,999 are included in this sector.
3. Handymax: Bulkcarriers 40,000-64,999 dwt, which transport many minor bulks, in addition to some of the major bulk cargoes on relatively short-haul routes. Subsectors include 'Ultramax' vessels of around 60,000-64,999 dwt, and 'Supramax' vessels of 50,000-59,999 dwt.
4. Handysize: Bulkcarriers 10,000-39,999, principally used for transporting a wide range of minor bulk commodities on short-haul routes. Many vessels are equipped to transport specialise cargoes such as logs, woodchips and cement.

Tankers - Crude oil and product carriers over 5,000 deadweight tonnes; all other tankers over 10,000 metric tonnes.

1. Crude: Tankers: Uncoated, 60,000 dwt or above, used for transportation of primarily crude oil and also dirty products.
2. Products: Tankers suitable for the carriage of refined petroleum products. Includes coated non-IMO graded tankers, IMO III tankers, IMO II tankers 30-60k dwt with average tank size >3,000cbm and tanks <75% segregated, and uncoated non-IMO graded tankers 10-60k dwt. Excludes tankers with stainless steel tanks.
3. Chemical: Tankers suitable for chemical trades, including chemical parcel and chemical bulk tankers. Total chemical tanker fleet includes IMO I tankers, stainless steel tankers, tankers of an unknown IMO grade, and IMO II tankers (excluding those 30-60,000 dwt with average tank size >3,000 cbm and tanks <75% segregated, which are classed as products tankers).
4. Specialised: Tankers designed for the carriage of specialist liquids (other than chemical tankers), including asphalt, bitumen and wine carriers.

LPG Carrier - Vessels designed to carry liquefied petroleum gas (propane and butane). A significant number of LPG carriers are also able to transport ammonia and petrochemical gas cargoes such as ethylene, propylene, butadiene and vinyl chloride monomer (VCM).

LNG Carrier - Vessels designed to carry liquefied natural gas.

Containerships - These are ships designed to carry cellular cargo with a cellular capacity greater than 100. Typically deployed on liner services.

A1.8 Glossary of Cargo Ship Types

Multi-Purpose - A Multi-Purpose Vessel is defined as a Non-Cellular container capable vessel (excluding Barge Carriers and Conbulkers) meeting the following criteria:

1. Any vessel built 1970 onwards with a total TEU capacity of 500 or above; or
2. Any vessel built 1970 onwards with a TEU capacity of 100 or above and a Deadweight to TEU ratio of 45 or less.
3. Non-Cellular means the ship is not equipped with fixed cell guides for containers in all the cargo holds. There may be partial coverage and/or portable guides, or none.

Ro-Ro Vessel - Ships with Roll-on Roll-off ramps for wheeled or tracked cargo, e.g. trucks, trailers and forest products on bogies, with accommodation for less than 50 drivers/passengers.

Other Dry/General Cargo - Other Dry Cargo vessels are dry cargo vessels that do not conform to the bulk carrier, Multi-Purpose or Ro-Ro vessel criteria. This includes Bulkcarriers and Combined carriers below 10,000 dwt, General Cargo Tramp & Liner vessels, Barge carriers, Heavy Lift cargo vessels and Livestock carriers.

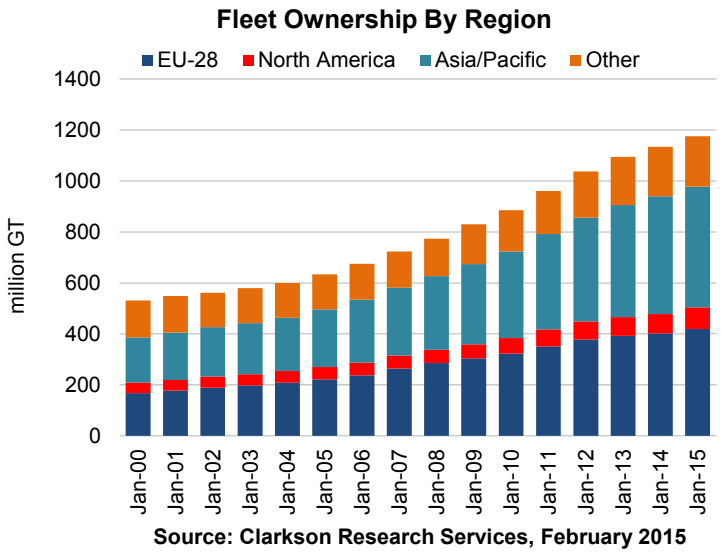
Pure Car Carrier - Car carrying roll-on roll-off ship primarily designed for, or operated in, the motor vehicle trades. This sector includes PCCs (Pure Car Carriers), and PCTCs (Pure Car & Truck Carriers) which are typically characterised by hoistable and strengthened decks to enable the transportation of "high and heavy" vehicle cargo.

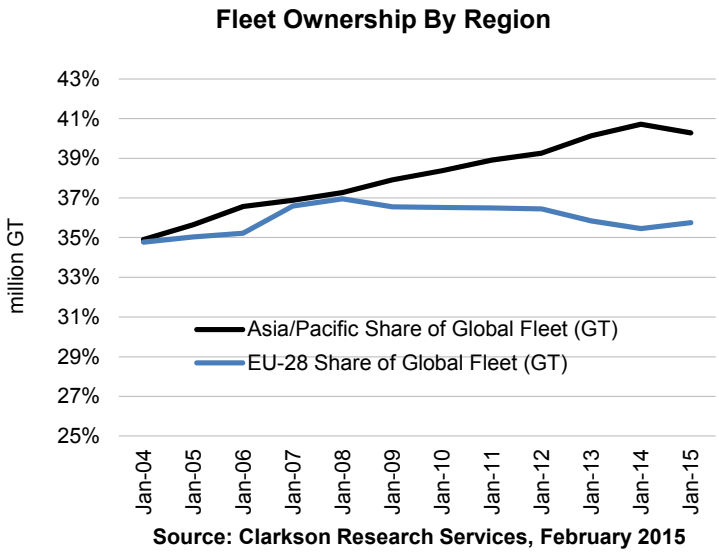
Reefer Ships - Cargo ships with refrigerated holds. Designed to carry perishable goods such as fruit, vegetables, meat and seafood.

A1.9 World Fleet by Owner Country

Owner Country	Fleet			Orderbook		
	No.	m.GT	$bn	No.	m. GT	% of Fleet
Greece	5,057	181.7	99.5	522	30.0	16.5%
Japan	8,568	161.8	105.6	318	17.1	10.6%
China P.R.	6,540	119.8	80.2	634	31.9	26.6%
Germany	4,059	94.0	55.6	257	9.8	10.5%
United States	5,078	59.4	110.0	265	10.3	17.3%
South Korea	2,780	54.9	28.5	121	6.4	11.7%
Norway	2,865	51.2	65.9	295	13.3	25.9%
Singapore	3,669	42.5	36.4	436	11.6	27.2%
Italy	1,901	36.1	30.3	179	9.1	25.2%
Denmark	1,459	30.2	21.9	77	2.4	8.1%
Taiwan	1,093	29.9	15.8	88	4.3	14.2%
Hong Kong	1,118	23.2	12.7	126	4.2	18.1%
Canada	1,051	20.1	15.3	89	6.3	31.1%
United Kingdom	1,373	19.6	23.3	204	7.5	38.5%
Turkey	2,203	17.9	12.3	55	2.1	11.9%
Russia	2,844	16.5	11.0	65	0.7	4.5%
India	1,537	14.4	9.7	45	1.2	8.4%
Indonesia	7,047	13.5	8.3	26	0.2	1.6%
Netherlands	1,927	12.2	14.5	122	2.0	16.2%
Belgium	390	11.9	8.8	20	0.6	5.4%
Total Top-20	62,559	1,010.7	765.8	3,944	171.1	16.9%
Share of World Total	*70%*	*86%*	*84%*	*72%*	*81%*	
World Total	89,636	1,181.1	916.3	5,481	211.1	17.9%

Source: Clarkson Research Services, World Fleet Monitor, February 2015.
Includes both cargo carrying and non-cargo carrying merchant vessels over 100GT in size.





A1.10 European Fleet by Owner Country

Top EU Owners

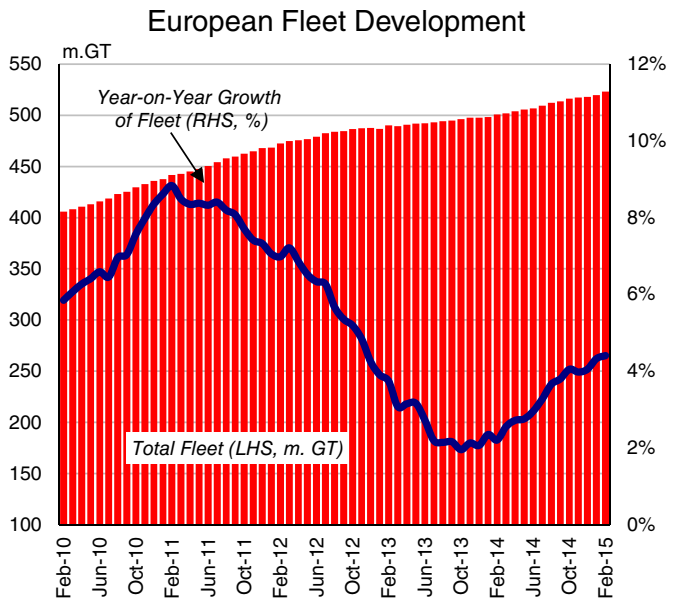
EU-Europe	Fleet				Orderbook		
	No.	m.GT	Age	$bn	No.	m. GT	% of Fleet
Greece	5,057	181.7	15	99.5	522	30.0	16.5%
Germany	4,059	94.0	12	55.6	257	9.8	10.5%
Italy	1,901	36.1	21	30.3	179	9.1	25.2%
Denmark	1,459	30.2	17	21.9	77	2.4	8.1%
United Kingdom	1,373	19.6	20	23.3	204	7.5	38.5%
Netherlands	1,927	12.2	15	14.5	122	2.0	16.2%
Belgium	390	11.9	14	8.8	20	0.6	5.4%
France	858	11.2	16	15.5	44	1.3	11.4%
Sweden	599	7.2	31	8.8	26	0.7	9.8%
Cyprus	210	3.6	20	2.1	5	0.1	3.8%
Finland	307	3.1	33	3.0	6	0.2	5.9%
Spain	557	2.5	24	3.0	9	0.4	17.5%
Poland	282	2.0	29	1.0	16	0.4	19.2%
Croatia	290	1.9	30	1.6	11	0.3	16.2%
Ireland	161	0.9	21	1.0	11	0.2	25.3%
Others	944	3.8		2.7	22	0.6	14.8%
Total	**20,374**	**421.8**	**18**	**292.7**	**1,531**	**65.8**	**15.6%**

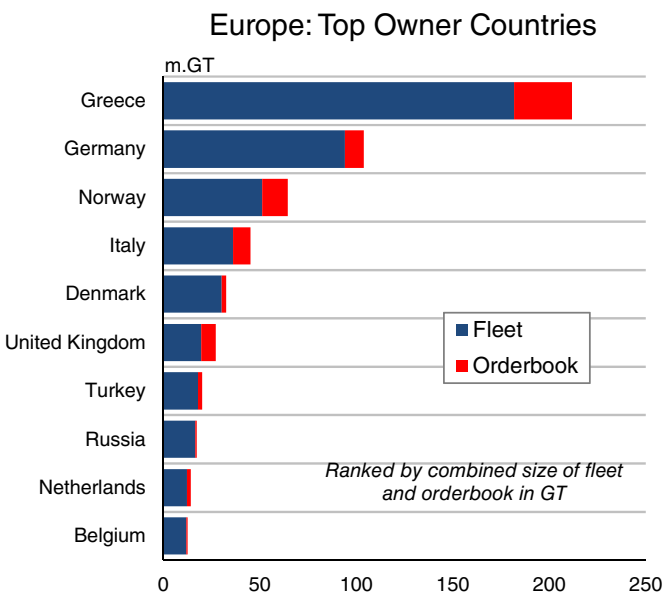
Top Other European Owners

Other-Europe	Fleet				Orderbook		
	No.	m.GT	Age	$bn	No.	m. GT	% of Fleet
Norway	2,865	51.2	19	65.9	295	13.3	25.9%
Turkey	2,203	17.9	23	12.3	55	2.1	11.9%
Russia	2,844	16.5	27	11.0	65	0.7	4.5%
Israel	159	5.7	15	4.0	13	0.6	9.8%
Switzerland	207	3.9	12	2.9	39	1.4	36.4%
Others	1,389	6.0		3.0	41	0.4	7.1%
Total	**9,667**	**101.2**	**24**	**99.1**	**508**	**18.5**	**18.3%**

Source: Clarkson Research Services, World Fleet Monitor, February 2015.

Includes both cargo carrying and non-cargo carrying merchant vessels over 100GT in size.





A1.11 World Fleet by Flag State

Flag State		Fleet, m.GT, end				Feb-15	
		2011	2012	2013	2014	No.	m. GT
Panama	**Open**	215.5	224.1	227.1	227.9	8,348	228.1
Liberia	**Open**	119.9	127.9	129.7	129.9	3,146	130.0
Marshall Is.	**Open**	75.6	85.6	94.6	108.6	2,615	110.6
Hong Kong	**Open**	68.8	79.4	86.6	93.1	2,449	94.2
Singapore	**Open**	52.9	60.3	69.1	76.0	3,696	76.8
Bahamas	**Open**	53.1	54.5	54.9	57.0	1,426	57.2
Malta	**Open**	43.5	44.3	48.8	53.7	1,903	54.2
China P.R.	**National**	42.0	46.7	49.8	49.1	3,936	48.9
Greece	**National**	41.0	41.8	42.3	44.2	1,478	44.4
Cyprus	**Open**	21.1	20.4	20.8	21.6	1,082	21.7
Japan	**National**	14.6	15.5	16.2	17.1	5,229	17.2
Italy	**National**	18.0	18.1	17.8	16.6	1,419	16.6
United Kingdom	**National**	18.1	18.2	15.3	15.2	1,214	15.3
Isle of Man	**International**	13.3	13.8	14.5	14.3	417	14.5
Danish Int'l	**International**	11.2	11.3	12.0	14.2	464	14.2
Norwegian Int'l	**International**	13.5	13.7	14.0	13.8	528	13.8
Indonesia	**National**	10.0	11.2	11.8	12.1	7,439	12.1
Germany	**National**	15.8	14.4	12.8	11.6	640	11.6
Bermuda	**Open**	11.1	11.5	11.3	11.6	160	11.5
United States	**National**	11.7	11.5	11.4	11.4	3,554	11.4
Total Top-20		870.7	924.3	960.9	998.9	51,143	1,004.5
Share of World Total		*84%*	*85%*	*85%*	*85%*	*57%*	*85%*
World Total		1,036	1,093.8	1,133.98	1,175.1	89,636	1,181.1

Source: Clarkson Research Services, World Fleet Monitor, February 2015.

Includes both cargo carrying and non-cargo carrying merchant vessels over 100GT in size.

Appendix 2

Overview of the Tramp Shipping Market Segments

Notes to data

1. ***The following data covers the world merchant fleet, as per Clarksons World Fleet Monitor, February 2015.***
2. ***It is a difficult exercise to accurately report ownership information for the c.90,000 vessels on the Clarkson Fleet Database. In the following data we have used Clarksons Major Group indicator that groups ships under the highest level of ownership that we are aware of. Owner type is based on analysts estimates.***
3. ***Some industry data included in this discussion is based on estimates or subjective judgments in circumstances where data for actual market transactions either does not exist or is not publicly available; the published information of other maritime data collection experts may differ from this data; while we have taken reasonable care in the compilation of the industry statistical data, graphs and tables and believe them to be correct, data compilation is subject to limited audit and validation procedures; Clarkson Research, its agents, officers and employees cannot accept liability for any loss suffered in consequence of reliance on such information or in any other manner; and the provision of such data, graphs and tables does not obviate the need to make appropriate further inquiries.***

A2.1 Bulk carrier Market Profile

	World				EU-28			
	No.	m. Dwt	m. GT	No. Owners	No.	m. Dwt	m. GT	No. Owners
Fleet (Feb-2015)	**10,373**	**761.3**	**420.5**	**1,723**	**3,154**	**229.9**	**126.4**	**551**
Orderbook (Feb-2015)	**1,954**	**162.7**	**89.5**	**305**	**660**	**56.1**	**30.8**	**109**
O'book as % of fleet	18.8%	21.4%	21.3%	17.7%	20.9%	24.4%	24.4%	19.8%
Top 20 Owners' Fleet (Feb-2015)	**1,759**	**193.8**	**103.9**	**20**	**720**	**77.8**	**41.3**	**20**
% of fleet	17.0%	25.5%	24.7%	1.2%	22.8%	33.9%	32.7%	3.6%
Ownership Type (Feb-2015)								
Independent Private	6,611	463.7	257.0	1,439	2,663	192.6	105.9	520
Public Listed	2,328	193.0	105.5	112	348	30.2	16.2	20
State Interests	951	59.7	33.7	98	91	3.4	2.1	3
Cargo Interests	306	30.8	16.6	41	14	1.5	0.8	2
Financial	90	6.7	3.7	16	38	2.3	1.3	6
Oil Company	49	4.0	2.2	4				
Other	38	3.4	1.8	13				
NB Contracts (2014)	**695**	**60.6**	**33.3**					
% of fleet	6.7%	8.0%	7.9%					
S/H Sales (2014)	**405**	**29.0**	**15.9**					
% of fleet	3.9%	3.8%	3.8%					

Entry Conditions. Relatively easy. Vary between the major commodities. Pooling arrangements and high asset costs in the large vessel sectors exist.

Type of Cargo, Charters. COAs, period charters and spot chartering all widely used.

Cargo Volumes (Dry Bulk)		2007	2008	2009	2010	2011	2012	2013	2014
Global Imports, m.tonnes		**3,218**	**3,311**	**3,217**	**3,605**	**3,841**	**4,098**	**4,331**	**4,503**
	growth		3%	-3%	12%	7%	7%	6%	4%
EU Imports, m.tonnes		**629**	**604**	**430**	**485**	**500**	**476**	**473**	**484**
	growth		-4%	-29%	13%	3%	-5%	-1%	2%
Chinese Imports, m.tonnes		**575**	**624**	**925**	**981**	**1,115**	**1,263**	**1,430**	**1,477**
	growth		8%	48%	6%	14%	13%	13%	3%

Source: Clarkson Research, February 2015. Includes vessels in excess of 10,000 dwt.

Bulk carrier Sector Overview

The major bulk cargoes include raw materials (e.g. iron ore & coal), cereal in general, minor ores and phosphates. At an owner level the sector is not highly concentrated, with the top 20 owners responsible for 25% of the fleet (though this does not mean that they have 25% of any particular bulk trade). However, the level of concentration might be seen to be greater looking at the operator level, noting that many ship operators are chartering vessels from across the spectrum of ownership.

Demand for bulkcarriers is spread among utilities companies, commodity producers and traders. The picture is different across cargoes; in the iron ore market activity is focused within a few major Australian and Brazilian players, whilst the coal and grain markets are much more fragmented. A very large proportion of dry bulk demand has been driven, in recent years, by the expanding Chinese steel and construction industry, with China's share of dry bulk imports rising from 18% of all imports in 2007 to a third in 2014. This picture is again different across cargoes, with Chinese imports of iron ore in 2014 accounting for almost 70% of all iron ore imports in that year.

There is some pooling activity in the dry bulk sector, whereby a major shipper can call on a 'pool' of ships taken from a group of shipowners, although it is not as prevalent as in some other shipping markets. A notable development in this regards has been the recent establishment of a capesize pool of around 220 vessels, the first capesize pool since the last closed in 2002. The pool is expected to operate between Bocimar International, Golden Union Shipping, Golden Ocean, Start Bulkcarriers and C Transport Holdings.

Bulk carrier Fleet Ownership Profile

Fleet

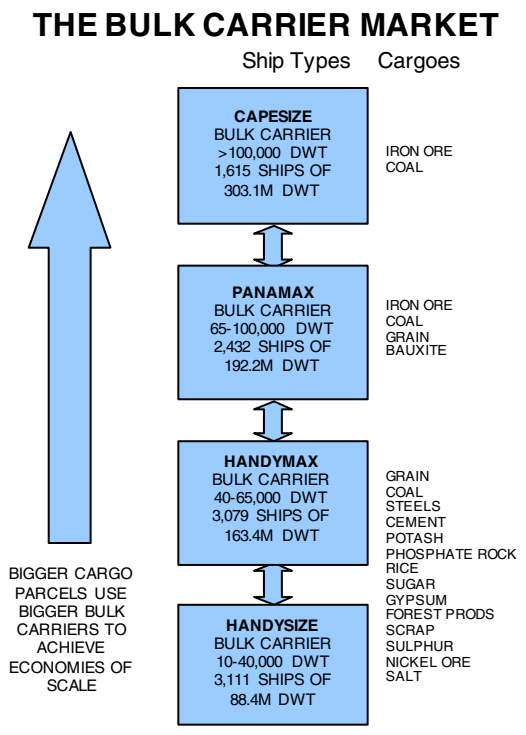
Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299	2	483	42.54	23.30	242					
100-199	3	442	44.75	24.41	147					
50-99	18	1,193	91.17	49.96	66	3	187	15.36	8.27	62
10-49	223	4,176	353.81	193.50	19	80	1,483	124.03	67.52	19
5-9	290	1,847	115.83	64.62	6	120	764	51.24	28.32	6
1-4	1,185	2,205	111.81	63.93	2	348	718	39.19	22.17	2
Unknown		27	1.36	0.80			2	0.11	0.06	
Total	**1,721**	**10,373**	**761.26**	**420.51**	**6**	**551**	**3,154**	**229.93**	**126.35**	**6**

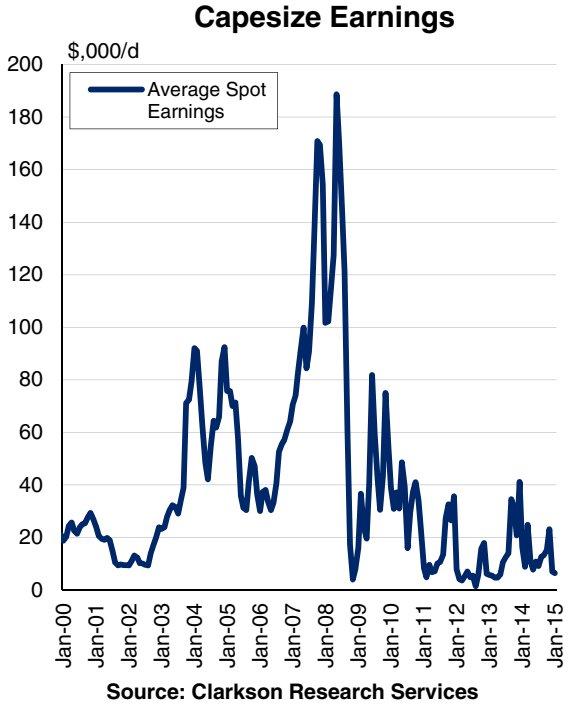
Source: Clarkson Research, February 2015

Orderbook

Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg.Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99	1	81	8.38	4.49	81	1	81	8.38	4.49	81
10-49	38	674	57.17	31.43	18	13	261	23.71	13.01	20
5-9	66	427	37.54	20.50	6	21	135	10.61	5.87	6
1-4	199	452	36.33	20.17	2	74	181	13.17	7.37	2
Unknown		320	23.32	12.90			2	0.20	0.10	
Total	**304**	**1,954**	**162.73**	**89.49**	**5**	**109**	**660**	**56.07**	**30.84**	**6**

Source: Clarkson Research, February 2015





Source: Clarkson Research Services

A2.2 Crude Oil Tanker Market Profile

	World				EU-28			
	No.	m. Dwt	m. GT	No. Owners	No.	m. Dwt	m. GT	No. Owners
Fleet (Feb-2015)	**1,838**	**344.1**	**181.8**	**258**	**676**	**118.2**	**62.3**	**99**
Orderbook (Feb-2015)	**208**	**44.5**	**22.8**	**41**	**62**	**11.2**	**5.8**	**13**
O'book as % of fleet	11.3%	12.9%	12.6%	15.9%	9.2%	9.5%	9.4%	13.1%
Top 20 Owners' Fleet (Feb-2015)	**711**	**154.3**	**81.1**	**20**	**381**	**74.9**	**39.4**	**20**
% of fleet	38.7%	44.8%	44.6%	7.8%	56.4%	63.4%	63.3%	20.2%
Ownership Type (Feb-2015)								
Independent Private	974	169.2	89.4	175	580	99.1	52.3	88
Public Listed	475	95.8	50.5	41	58	12.7	6.6	5
State Interests	172	31.3	16.6	12				
Oil Company	170	36.1	19.1	17	23	3.1	1.7	3
Cargo Interests	17	4.4	2.3	5				
Financial	17	4.0	2.1	4	15	3.3	1.8	3
Other	13	3.4	1.8	4				
NB Contracts (2014)	**84**	**18.1**	**9.3**					
% of fleet	4.6%	5.3%	5.1%					
S/H Sales (2014)	**170**	**35.7**	**18.7**					
% of fleet	9.2%	10.4%	10.3%					

Entry Conditions. Relatively easy. Asset costs depend on size of vessel (current VLCC newbuild price = $96.5m).

Type of Cargo, Charters. Homogeneous cargo encourages competition between vessels of different sizes. Long-term contracts, period charters and spot chartering all widely used. Main charterers are oil majors/traders.

Cargo Volumes		**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Global Imports, m.tonnes		**1,912**	**1,902**	**1,815**	**1,868**	**1,851**	**1,901**	**1,833**	**1,809**
	growth		-1%	-5%	3%	-1%	3%	-4%	-1%
EU Imports, m.tonnes		**527**	**527**	**478**	**476**	**457**	**490**	**459**	**437**
	growth		0%	-9%	0%	-4%	7%	-6%	-5%
Chinese Imports, m.tonnes		**149**	**164**	**184**	**221**	**230**	**246**	**255**	**281**
	growth		10%	12%	20%	4%	7%	4%	10%

Source: Clarkson Research, February 2015. Uncoated tankers, 60,000 dwt or above.

Crude Oil Tanker Sector Overview

The crude oil tanker fleet incorporates 1,838 vessels ranging from 60,000-450,000 dwt. It covers four major sectors: Panamax (uncoated, 60-80,000 dwt), Aframax (uncoated, 80-120,000 dwt), Suezmax (uncoated, 120-200,000 dwt) and VL/ULCC (200,000 dwt+). The size of vessels used on a particular route is usually determined by cargo size, but since these vessels carry predominantly crude oil (a number of uncoated Panamax tankers are also deployed on deep-sea fuel oil trades), there can be significant competition between the size ranges, with, for example, Suezmaxes switched into Aframax trades as long as port facilities can handle bigger vessels.

Demand for crude oil tankers is centred on the major oil companies. Historically, oil companies played a significant role in the ownership of the fleet, although this has diminished and they now only account ownership of only 9% of the crude tankers in the fleet. The majority of the fleet is currently owned by independent owners. The top 20 owners account for around 45% of the fleet by dwt, though ownership in the larger sectors is more concentrated. Owning and operating the largest tankers requires considerable capital investment.

Over the past few years ownership has been characterised by growing consolidation, particularly in the VL/ULCC sector, with the Chinese owned fleet in particular, expanding rapidly. The picture in Europe has been mixed, with some owners aggressively expanding their fleets, while at the same time, players such as Maersk have made widely publicised exits from the market.

Crude Oil Tanker Fleet Ownership Profile

Fleet

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99	4	252	40.90	21.94	63					
10-49	48	938	193.29	101.65	20	20	394	72.00	38.01	20
5-9	53	355	59.79	31.65	7	27	179	30.29	15.87	7
1-4	153	284	48.24	25.60	2	52	103	15.86	8.44	2
Unknown		9	1.84	0.98						
Total	**258**	**1,838**	**344.06**	**181.82**	**7**	**99**	**676**	**118.15**	**62.31**	**7**

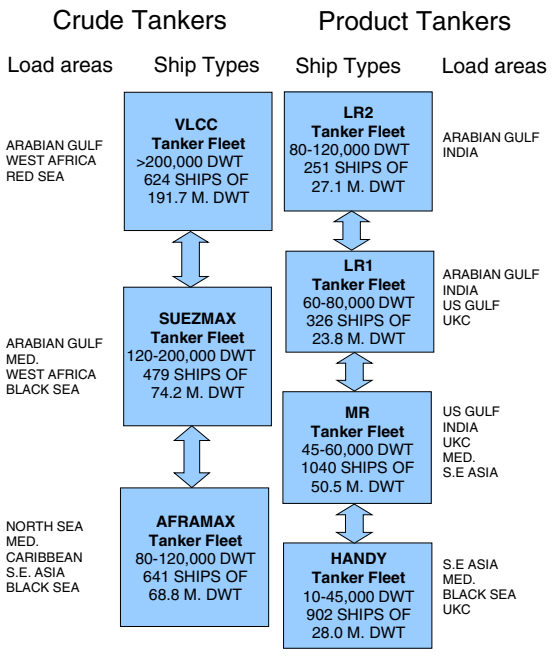
Source: Clarkson Research, February 2015

Orderbook

Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99										
10-49	5	74	14.58	7.44	15	2	24	2.91	1.55	12
5-9	8	56	15.18	7.79	7	2	14	3.74	1.93	7
1-4	28	69	13.20	6.81	2	9	24	4.53	2.36	3
Unknown		9	1.54	0.80						
Total	**41**	**208**	**44.49**	**22.85**	**5**	**13**	**62**	**11.18**	**5.85**	**5**

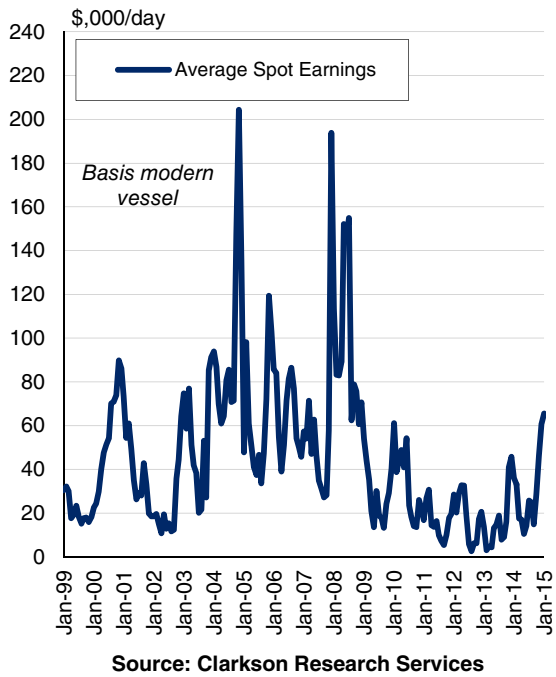
Source: Clarkson Research, February 2015

THE TANKER MARKET



Source: Clarkson Research Services

VLCC Earnings



Source: Clarkson Research Services

A2.3 Oil Products Tanker Market Profile

	World				EU-28			
	No.	**m. Dwt**	**m. GT**	**No. Owners**	**No.**	**m. Dwt**	**m. GT**	**No. Owners**
Fleet (Feb-2015)	**7,621**	**147.6**	**88.4**	**2,856**	**1,805**	**70.6**	**41.9**	**451**
Orderbook (Feb-2015)	**451**	**24.0**	**14.0**	**93**	**176**	**10.5**	**6.1**	**36**
O'book as % of fleet	5.9%	16.2%	15.8%	3.3%	9.8%	14.9%	14.6%	8.0%
Top 20 Owners' Fleet (Feb-2015)	**1,145**	**41.8**	**24.7**	**20**	**549**	**31.0**	**18.2**	**20**
% of fleet	15.0%	28.3%	27.9%	0.7%	30.4%	43.9%	43.5%	4.4%
Ownership Type (Feb-2015)								
Independent Private	6,162	98.6	58.7	2,634	1,488	56.8	33.6	420
Public Listed	670	28.7	17.1	82	275	12.3	7.3	18
State Interests	471	11.6	7.2	93	11	0.1	0.1	5
Oil Company	211	5.3	3.4	18	13	0.6	0.4	2
Cargo Interests	35	2.1	1.2	12	2	0.0	0.0	1
Financial	16	0.8	0.5	6	14	0.8	0.5	4
Other	56	0.5	0.3	11	2	0.0	0.0	1
NB Contracts (2014)	**107**	**6.5**	**3.7**					
% of fleet	1.4%	4.4%	4.2%					
S/H Sales (2014)	**150**	**8.3**	**4.9**					
% of fleet	2.0%	5.6%	5.5%					

Entry Conditions. Capital costs are relatively low compared with larger crude oil sectors. Several major pooling arrangements are in operation.

Type of Cargo, Charters. A wide range of cargoes (fuel oil, gas oil, gasolene, jet fuel, naphtha). Long-term contracts, period charters and spot chartering all widely used. Main charterers are oil majors/traders.

Cargo Volumes		**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Global Imports, m.tonnes		**798**	**823**	**833**	**888**	**915**	**923**	**959**	**980**
	growth		3%	1%	7%	3%	1%	4%	2%
EU Imports, m.tonnes		**255**	**263**	**276**	**297**	**304**	**305**	**316**	**321**
	growth		3%	5%	8%	2%	0%	3%	2%
Asian Imports, m.tonnes		**263**	**281**	**289**	**311**	**326**	**334**	**353**	**354**
	growth		7%	3%	7%	5%	3%	6%	0%

Source: Clarkson Research, February 2015.Tankers suitable for the carriage of refined petroleum products. Includes coated non-IMO graded tankers, IMO III tankers, IMO II tankers 30-60k dwt with average tank size >3,000cbm and tanks <75% segregated, and uncoated non-IMO graded tankers 10-60k dwt. Excludes tankers with stainless steel tanks.

Oil Products Tanker Sector Overview

For the purposes of this review the oil products tanker fleet is defined as; *all coated non-IMO tankers, all IMO 3 tankers, all IMO 2 tankers between, 30-60k dwt which have an average tank size >3,000cbm and tanks <75% segregated, and all uncoated non-IMO tankers 10-60k dwt, excluding tankers with any stainless steel tanks.*

These ships carry a spectrum of cargoes, ranging from diesel oil and jet fuel through to fuel oil or vegetable oils. Vessels that trade at one end of this spectrum are unlikely to be able to switch easily to the other end, and "last cargo" regulations ensure that dedicated fleets become established for some cargo types. At the most sophisticated end of the fleet there is an overlap with the chemical sector, with a significant volume of "swing tonnage" that can operate in either CPP or vegoil/ easychems depending on market conditions. From start-2007 onwards, regulatory changes to the International Bulk Chemical Code reduced the number of specialised chemicals that could be carried on an IMO III vessel (such as vegetable oils), and yards started to market "MR" sized product tankers with IMO II graded tanks. This ensured that many newer product tankers retain their ability to "swing" between markets as demand requires.

The ownership structure is relatively diverse. According to our database 2,856 companies own a total of 7,621 product tankers. The top 20 owners account for ownership of 28% of the total dwt of the fleet.

Oil Products Tanker Fleet Ownership Profile

Fleet

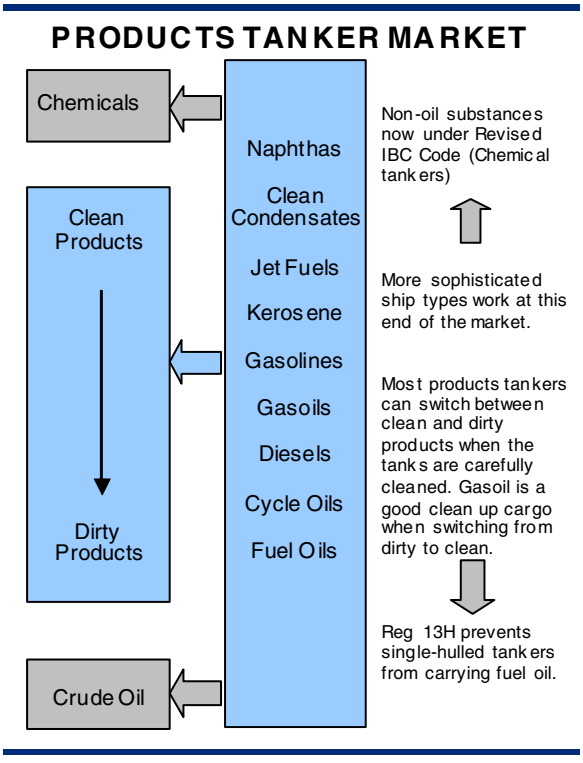
Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99	7	438	14.40	8.76	63	2	128	7.11	4.24	64
10-49	117	2,049	71.56	42.68	18	49	841	39.28	23.39	17
5-9	174	1,090	25.01	14.92	6	41	263	11.46	6.76	6
1-4	2,552	3,646	35.36	21.26	1	359	571	12.73	7.51	2
Unknown		398	1.29	0.79			2	0.01	0.00	
Total	**2,850**	**7,621**	**147.61**	**88.41**	**3**	**451**	**1,805**	**70.59**	**41.89**	**4**

Source: Clarkson Research, February 2015

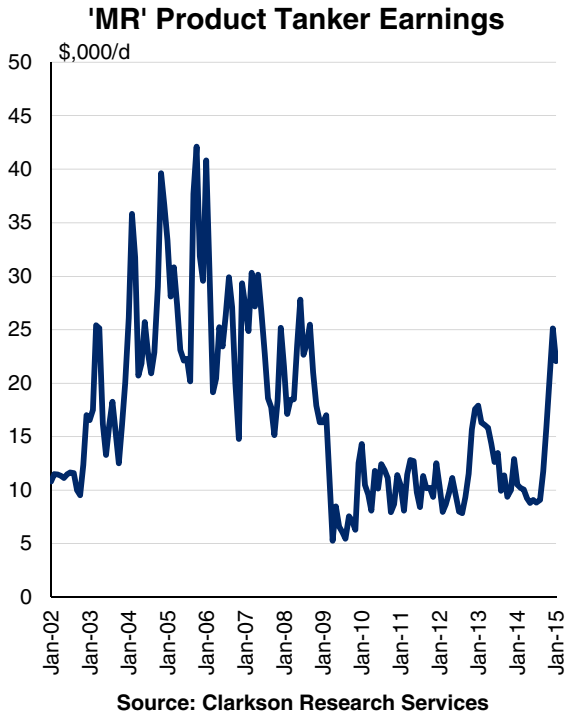
Orderbook

Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99										
10-49	9	151	10.54	6.08	17	4	61	3.48	2.05	15
5-9	14	90	4.34	2.60	6	10	66	3.57	2.12	7
1-4	70	149	7.11	4.14	2	22	49	3.44	1.93	2
Unknown		61	1.98	1.18						
Total	**93**	**451**	**23.97**	**14.00**	**4**	**36**	**176**	**10.49**	**6.10**	**5**

Source: Clarkson Research, February 2015



Source: Clarkson Research Services



A2.4 Chemical Tanker Market Profile

	World				EU-28			
	No.	**m. Dwt**	**m. GT**	**No. Owners**	**No.**	**m. Dwt**	**m. GT**	**No. Owners**
Fleet (Feb-2015)	**3,442**	**38.8**	**24.8**	**1,164**	**762**	**9.3**	**6.2**	**184**
Orderbook (Feb-2015)	**242**	**5.3**	**3.3**	**49**	**24**	**0.5**	**0.3**	**8**
O'book as % of fleet	7.0%	13.6%	13.3%	4.2%	3.1%	5.3%	4.9%	4.3%
Top 20 Owners' Fleet (Feb-2015)	**641**	**13.4**	**8.4**	**20**	**271**	**4.1**	**2.7**	**20**
% of fleet	18.6%	34.5%	34.1%	1.7%	35.6%	43.6%	43.6%	10.9%
Ownership Type (Feb-2015)								
Independent Private	2,720	24.9	15.9	1,049	703	8.1	5.3	173
Public Listed	458	10.3	6.5	47	48	1.1	0.7	8
State Interests	103	1.2	0.8	39				
Oil Company	97	1.1	0.7	13	8	0.1	0.1	2
Cargo Interests	27	0.9	0.5	6	3	0.0	0.0	1
Financial	9	0.2	0.1	2				
Other	28	0.3	0.2	8				
NB Contracts (2014)	**121**	**2.8**	**1.8**					
% of fleet	3.5%	7.3%	7.1%					
S/H Sales (2014)	**140**	**2.0**	**1.2**					
% of fleet	4.1%	5.0%	5.0%					

Entry Conditions. The small number of owners and charterers present higher barriers to entry. The ownership structure is highly concentrated with pooling arrangements in place.

Type of Cargo, Charters. Owners operate liner-type parcel services based on COAs with a small number of major industrial charterers. There is a larger proportion of spot trade in the smaller sectors.

Cargo Volumes	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
World Imports, m.tonnes	**203**	**209**	**214**	**229**	**241**	**250**	**260**	**271**
growth		3%	2%	7%	5%	4%	4%	4%

Source: Clarkson Research, February 2015.Tankers suitable for chemical trades, including chemical parcel and chemical bulk tankers. Total chemical tanker fleet includes IMO I tankers, stainless steel tankers, tankers of an unknown IMO grade, and IMO II tankers (excluding those 30-60,000 dwt with average tank size >3,000 cbm and tanks <75% segregated, which are classed as products tankers).

Chemical Tanker Sector Overview

The chemical tanker fleet includes chemical parcel and chemical bulk tankers. For chemical parcel tankers, over 75% of tanks are segregated with an average tank size <3,000cbm and / or stainless steel tanks. In chemical bulk tankers, less than 75% of tanks are segregated with an average tank size <3,000 cbm and not stainless steel. Chemical bulk also includes all other tankers below 30,000 dwt with IMO grade 2.

This sector carriers a very diverse range of specialised chemicals, ranging from "easy chemicals" such as aromatics, to highly specialised inorganic acids requiring stainless steel tanks. There has been a growing base of exporters, particularly in the US and in the Middle East. The former has benefited from the growing availability of cheap feedstocks for the petrochemical sector thanks to the shale gas boom, while in the latter, countries have been looking to add value to exports and diversify away from predominantly crude export focused economies.

Owners typically operate liner-type parcel services based on Contracts of Affreightment with a small number of major industrial charterers. The sophisticated end of the chemical tanker market can be characterised as an "industrial shipping" sector. The operation of chemical parcel services, with many different cargoes loaded into a single vessel with as many as 30-40 tanks with separate pumping arrangements, is highly complex and requires a high degree of skill / experience to ensure high utilisation levels are achieved.

Chemical Tanker Fleet Ownership Profile

Fleet

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99	3	187	3.65	2.25	62					
10-49	51	859	13.88	8.93	17	16	264	3.19	2.15	17
5-9	129	839	9.07	5.84	7	37	249	3.31	2.19	7
1-4	979	1,460	11.81	7.48	1	131	248	2.82	1.82	2
Unknown		97	0.44	0.28			1	0.00	0.00	
Total	**1,162**	**3,442**	**38.85**	**24.78**	**3**	**184**	**762**	**9.32**	**6.17**	**4**

Source: Clarkson Research, February 2015

Orderbook

Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99										
10-49	3	50	1.56	0.98	17					
5-9	13	91	2.17	1.34	7	2	11	0.27	0.16	6
1-4	33	65	0.95	0.60	2	6	13	0.22	0.14	2
Unknown		36	0.60	0.38						
Total	**49**	**242**	**5.28**	**3.29**	**4**	**8**	**24**	**0.49**	**0.30**	**3**

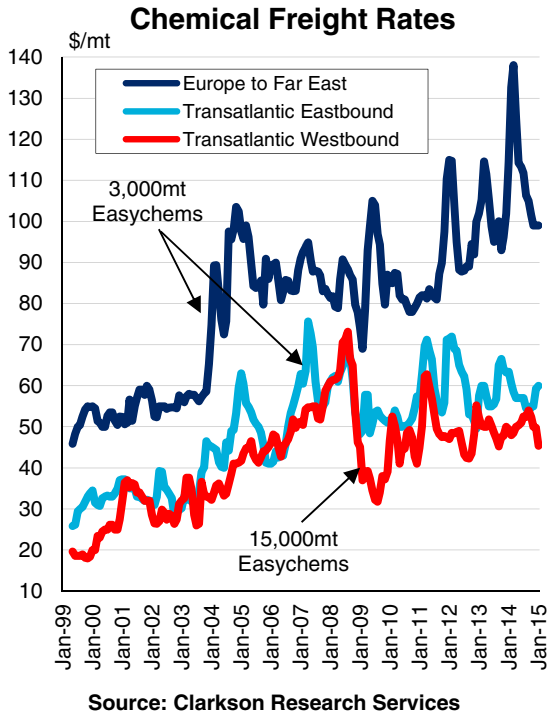
Source: Clarkson Research, February 2015

CHEMICAL TANKER MARKET

IMO GRADE	CARGO TYPE	DESCRIPTION
I	Sophisticated Chemicals, e.g. butyl benzene Category "X"	Modern fully segregated Parcel Tankers sometimes with fully stainless steel tanks or Marineline coating.
II	Bulk Chemicals, e.g. Veg Oils and FAME Category "Y"	Modern segregated chemical tanker with sosphisticated coatings. Some IMO III may carry Veg Oils with exemptions.
III	Easy Chemicals, e.g. MTBE Category "Z"	Chemical/Product tankers, also involved in non-oil trades.
None	Category OS cargoes (e.g. Molasses)	Older Chemical/Product tankers in non-oil trades. No longer able to carry Veg Oils.

MARPOL Annex II Categories: X = major hazard, Y = hazard, Z = minor hazard, OS = Other Substances.

Source: Clarkson Research Services



Source: Clarkson Research Services

A2.5 LPG Market Profile

	World				EU-28			
	No.	**'000 cu.m**	**m. GT**	**No. Owners**	**No.**	**'000 cu.m**	**m. GT**	**No. Owners**
Fleet (Feb-2015)	**1,282**	**22,598**	**14.8**	**378**	**312**	**4,909**	**3.5**	**44**
Orderbook (Feb-2015)	**226**	**10,372**	**6.2**	**52**	**89**	**3,901**	**2.4**	**13**
O'book as % of fleet	17.6%	45.9%	41.8%	13.8%	28.5%	79.5%	69.3%	29.5%
Top 20 Owners' Fleet (Feb-2015)	**242**	**11,272**	**6.9**	**20**	**247**	**4,526**	**3.2**	**20**
% of fleet	18.9%	49.9%	46.4%	5.3%	79.2%	92.2%	90.6%	45.5%
Ownership Type (Feb-2015)								
Independent Private	850	11,460	7.8	277	282	4,033	3.0	39
Public Listed	266	7,375	4.7	39	24	616	0.4	2
State Interests	69	441	0.3	30				
Oil Company	68	2,797	1.7	16	3	250	0.1	1
Cargo Interests	19	335	0.2	11	2	7	0.0	1
Financial	4	165	0.1	3	1	3	0.0	1
Other	6	25	0.0	2				
NB Contracts (2014)	**109**	**6,035**	**3.5**					
% of fleet	8.5%	26.7%	23.4%					
S/H Sales (2014)	**38**	**1,151**	**1**					
% of fleet	3.0%	5.1%	4.8%					

Entry Conditions. Quality and operational standards required by the industry present a barrier to entry. Generally barriers to entry are perceived to allow relatively easy entry to the market place.

Type of Cargo, Charters. Propane & Butane (LPG), Ammonia, Ethylene, Chemical Gases, VCM. Charterers include Oil Majors, Chemical Companies.

Cargo Volumes		**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Global Imports, m.tonnes		**56**	**55**	**54**	**55**	**59**	**61**	**64**	**69**
	growth		-1%	-2%	2%	8%	3%	4%	8%
EU Imports, m.tonnes		**12**	**12**	**10**	**11**	**12**	**11**	**12**	**13**
	growth		-3%	-12%	2%	15%	-8%	12%	8%
Asian Imports, m.tonnes		**30**	**30**	**31**	**32**	**34**	**37**	**38**	**42**
	growth		-1%	4%	3%	8%	7%	3%	11%

Source: Clarkson Research, February 2015. Vessels designed to carry liquefied petroleum gas (propane and butane). A significant number of LPG carriers are also able to transport ammonia and petrochemical gas cargoes such as ethylene, propylene, butadiene and vinyl chloride monomer (VCM).

LPG Sector Overview

Liquefied Petroleum Gas (LPG) is the generic name given to the commercial gases, propane and butane. LPG is typically extracted as a co-product to crude from oil fields, and is also produced as through the refining process. In addition to these cargoes, a significant number of LPG carriers are also able to transport ammonia and petrochemical gas cargoes such as ethylene, propylene, C4 olefins such as butadiene and vinyl chloride monomer (VCM).

In the LPG sector, strong trade growth has supported a dramatic improvement in Very Large Gas Carrier (VLGC - 60,000+ cbm) market conditions (see graph opposite). Primarily, this is a result of the continued expansion of US LPG exports, driven by further growth in shale production within the country. Greater US exports have also helped to support Mid and Handy-sized vessel demand. On the demand side, LPG imports into Asian countries has been the primary driver for trade growth. In 2014, total LPG trade reached 69 million tonnes, of which 42 million tonnes was attributed to imports from Asian countries.

The LPG fleet numbered 1,282 vessels of a combined 22.6m cu.m. at the start of February 2015. Given the firm market conditions, the newbuilding market has been exceptionally active, particularly for the VLGC sector. The current orderbook for these vessels is equivalent to almost 46% of the fleet in terms of cubic capacity.

LPG Fleet Ownership Profile

Fleet

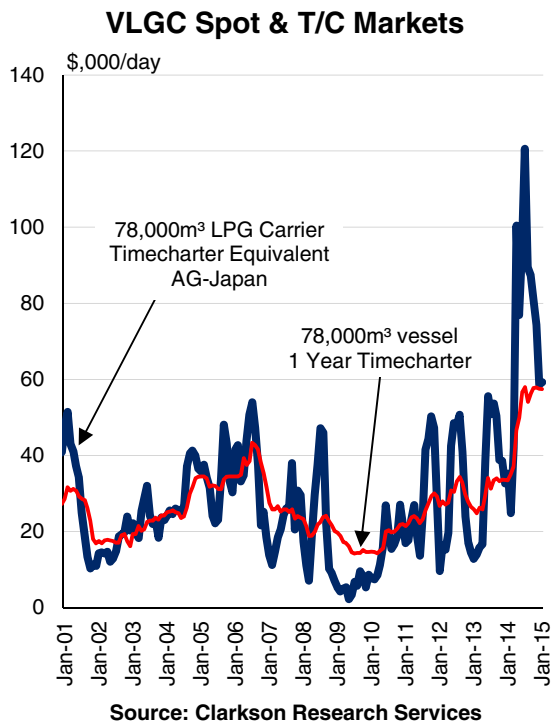
Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. cum	m. GT	Avg. Ships	# Companies	# Ships	m. cum	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99										
10-49	32	522	9.97	6.71	16	11	206	2.32	1.84	19
5-9	37	234	5.83	3.70	6	7	49	1.50	0.96	7
1-4	309	507	6.76	4.40	2	26	57	1.09	0.72	2
Unknown		19	0.04	0.03						
Total	**378**	**1,282**	**22.60**	**14.84**	**3**	**44**	**312**	**4.91**	**3.52**	**7**

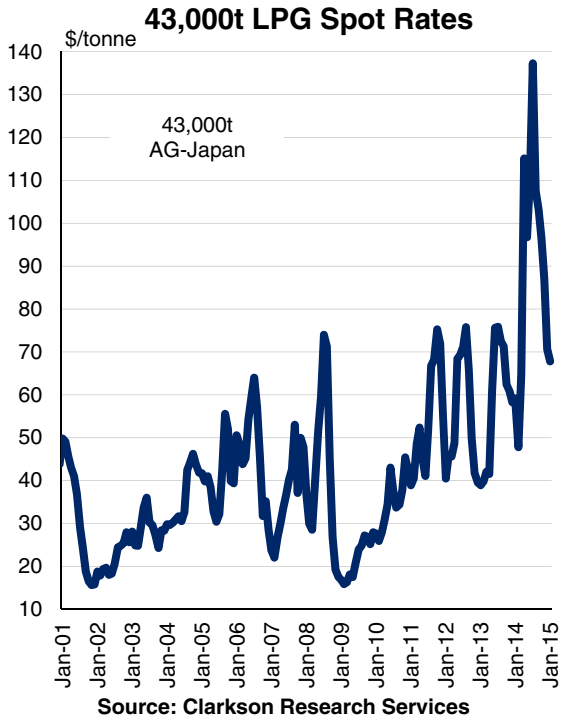
Source: Clarkson Research, February 2015

Orderbook

Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. cum	m. GT	Avg. Ships	# Companies	# Ships	m. cum	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99										
10-49	5	72	3.09	2.01	14	3	61	2.79	1.77	20
5-9	14	92	4.82	2.69	7	1	8	0.31	0.15	8
1-4	33	62	2.47	1.50	2	8	20	0.80	0.51	3
Unknown										
Total	**52**	**226**	**10.37**	**6.21**	**4**	**12**	**89**	**3.90**	**2.44**	**7**

Source: Clarkson Research, February 2015





A2.6 LNG Market Profile

	World				EU-28			
	No.	**m. cu.m**	**m. GT**	**No. Owners**	**No.**	**m. cu.m**	**m. GT**	**No. Owners**
Fleet (Feb-2015)	**419**	**61.1**	**42.3**	**62**	**97**	**13.8**	**9.3**	**18**
Orderbook (Feb-2015)	**164**	**24.9**	**16.2**	**44**	**51**	**7.2**	**4.7**	**11**
O'book as % of fleet	39.1%	40.8%	38.2%	71.0%	52.6%	52.4%	50.5%	61.1%
Top 20 Owners' Fleet (Feb-2015)	**284**	**43.7**	**30.1**	**20**	**97**	**13.8**	**9.3**	
% of fleet	67.8%	71.6%	71.2%	32.3%	100.0%	100.0%	100.0%	
Ownership Type (Feb-2015)								
Public Listed	172	23.5	16.4	16	32	4.8	3.1	4
Independent Private	107	15.5	10.5	26	40	6.0	4.0	9
Cargo Interests	61	11.3	7.7	8	2	0.1	0.1	2
Oil Company	47	6.1	4.4	7	23	2.9	2.1	3
State Interests	20	3.0	2.1	3				
Financial								
Other	12	1.6	1.1	2				
NB Contracts (2014)	**75**	**11.2**	**7.2**					
% of fleet	17.9%	18.3%	17.0%					
S/H Sales (2014)	**11**	**1.6**	**1.1**					
% of fleet	2.6%	2.6%	2.5%					

Entry Conditions*. Asset costs are extremely high - current NB prices are $200m. LNG transport by sea also requires substantial investment in liquefaction and cargo handling facilities. More specialised technical knowledge to operate.

Type of Cargo, Charters. LNG (Methane). Typically newbuildings built against long term contracts but a small spot market has developed, and average contracts have reduced in length.

Cargo Volumes		**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Global Imports, m.tonnes		**171**	**173**	**183**	**221**	**247**	**242**	**244**	**248**
	growth		1%	6%	21%	11%	-2%	1%	2%
EU Imports, m.tonnes		**36**	**39**	**48**	**59**	**63**	**45**	**34**	**31**
	growth		7%	24%	23%	5%	-28%	-25%	-7%
Asian Imports, m.tonnes		**112**	**119**	**114**	**133**	**154**	**167**	**174**	**178**
	growth		6%	-4%	17%	16%	8%	4%	2%

Source: Clarkson Research, February 2015. Vessels designed to carry liquefied natural gas.

LNG Sector Overview

The problem of moving "stranded" gas to points of demand is that it is a highly capital intensive, technologically sophisticated and expensive. That much of the surplus of natural gas supplies is also in remote and lesser-developed parts of the world has merely compounded the problems. The supply chain involves: Gas field production and pipeline, Liquefaction plant and storage, Shipping, Re-gasification plant and storage, Distribution and marketing.

Natural gas liquefies at –162C (-260F) at atmospheric pressure, with a volume 1/600th of its gaseous state. Transportation and storage of the LNG is then viable in insulated cryogenic tanks. After transportation the LNG has to be re-gasified before being marketed. In a typical split of the costs of such an LNG supply chain, the biggest costs are the development of the gas field and building the liquefaction plant (each around 40%); shipping, re-gasification and marketing having nearly equal shares of the balance.

The LNG industry has traditionally been tied to long term contracts of 20 years or more. Due to the cost of building facilities, finance was only available if banks could see long term guarantees of a project's viability. The supply chain was characterised by fixed contracts with destination clauses to prevent cargoes being diverted into alternative markets. Specific import terminals serviced specific contracts, with shipping capacity contracted for specific routes. Whilst this is still the dominant structure, the growth of the industry has led to a rise in excess capacity above that demanded by long term contracts. As a result, a growing proportion of trade is now done on ether the spot market or

LNG Fleet Ownership Profile

Fleet

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. cum	m. GT	Avg. Ships	# Companies	# Ships	m. cum	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99										
10-49	12	223	34.22	23.48	19	3	40	5.72	3.93	13
5-9	17	114	17.09	11.92	7	5	32	4.88	3.23	6
1-4	33	82	9.77	6.87	2	10	25	3.23	2.11	3
Unknown										
Total	**62**	**419**	**61.09**	**42.27**	**7**	**18**	**97**	**13.83**	**9.28**	**5**

Source: Clarkson Research, February 2015

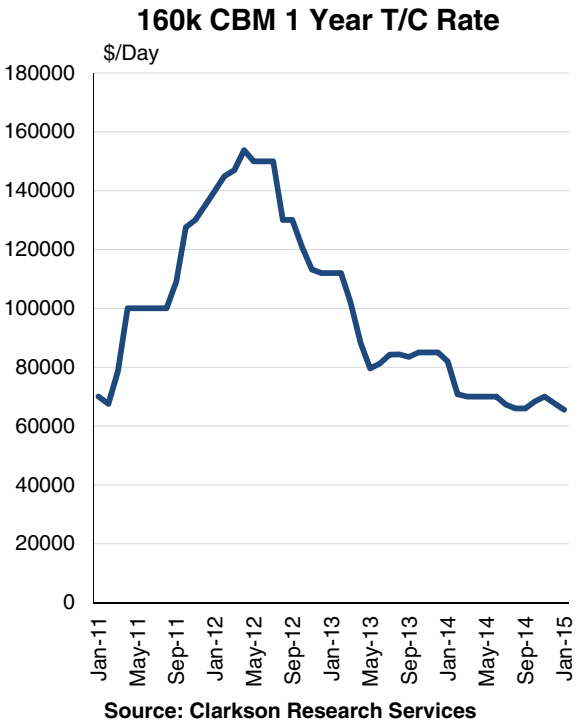
Orderbook

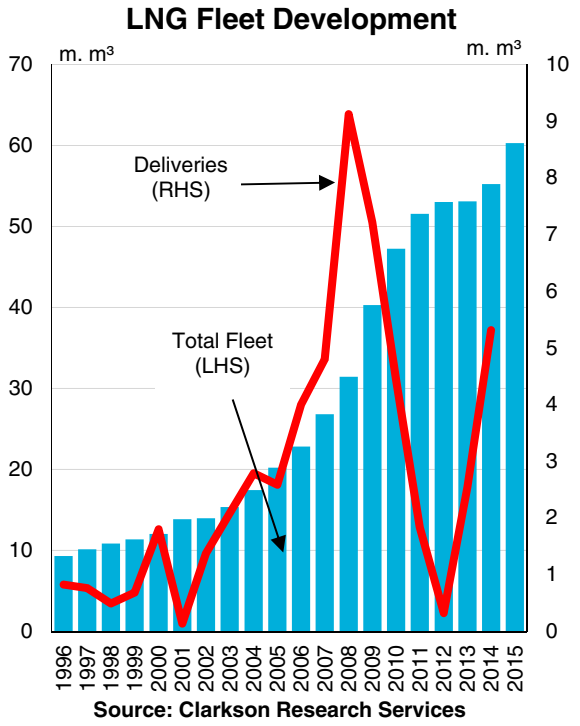
Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. cum	m. GT	Avg. Ships	# Companies	# Ships	m. cum	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99										
10-49	3	43	7.28	4.72	14	1	19	3.23	2.06	19
5-9	8	52	7.68	4.91	7	3	23	2.81	1.83	8
1-4	33	62	8.78	5.78	2	7	9	1.20	0.79	1
Unknown		7	1.19	0.75						
Total	**44**	**164**	**24.94**	**16.16**	**4**	**11**	**51**	**7.25**	**4.68**	**5**

Source: Clarkson Research, February 2015

(Continued from page 58)

using LNG vessels chartered on short term basis, with 28% of total LNG volumes traded in this manner in 2013.





A2.7 Ro Ro Market Profile

	World				EU-28			
	No.	**'000 Dwt**	**'000 GT**	**No. Owners**	**No.**	**'000 Dwt**	**'000 GT**	**No. Owners**
Fleet (Feb-2015)	**1,256**	**7,996**	**14,737**	**606**	**438**	**4,035**	**8,177**	**154**
Orderbook (Feb-2015)	**25**	**623**	**1,091**	**11**	**13**	**491**	**874**	**3**
O'book as % of fleet	2.0%	7.8%	7.4%	1.8%	3.0%	12.2%	10.7%	1.9%
Top 20 Owners' Fleet (Feb-2015)	**260**	**4,279**	**8,665**	**20**	**234**	**3,261**	**6,653**	**20**
% of fleet	20.7%	53.5%	58.8%	3.3%	53.4%	80.8%	81.4%	13.0%
Ownership Type (Feb-2015)								
Independent Private	1,029	5,967	10,979	536	387	3,556	7,159	140
State Interests	119	830	1,566	38	11	61	123	7
Public Listed	100	1,188	2,155	26	38	411	863	6
Cargo Interests	3	8	33	2	2	7	31	1
Oil Company	3	1	3	2				
Financial								
Other	2	1	1	2				
NB Contracts (2014)	**2**	**9**	**25**					
% of fleet	0.2%	0.1%	0.2%					
S/H Sales (2014)	**6**	**26**	**73**					
% of fleet	0.5%	0.3%	0.5%					

Entry Conditions.

Type of Cargo, Charters. Type of cargo very varied including HGVs, containers, wheeled traffic, OOG, awkward loads. Deep sea and short sea trades are very different in nature.

Source: Clarkson Research, February 2015. Ships with Roll-on Roll-off ramps for wheeled or tracked cargo, e.g. trucks, trailers and forest products on bogies, with accommodation for less than 50 drivers/passengers.

Ro-Ro Sector Overview

The Ro-Ro fleet is diverse and very elderly with an average age of 21.2 years at the start of February 2015. The RoRo fleet offers unconventional flexibility which allows it to carry whatever type of cargo is offered, and to serve ports where access might otherwise prove a problem. Typical trades include intra-European routes carrying freight in the form of trucks or unaccompanied trailers. Ro-Ro vessels are equipped with ramps to allow wheeled cargo to drive on-board. There is still a surplus of ships in service built in the mid/late 1970s (272 RoRos built during or before 1980 are still in operation). Ownership is very fragmented, with 606 owners and an average company size of only two vessels. Both newbuilding and secondhand activity has been very low recent years,

Analysis of the RoRo fleet is complex due to the diversity of the fleet and as a result it is a difficult sector to define. There are 1,256 ships in the RoRo sector, averaging 6,367 dwt, and 21 years of age. 828 of these vessels we define as “RoRo freight” which predominantly serves the commercial freight market. Other subsectors include Ro-Ro/Freight/Passenger (Ro-Pax), Ro-Ro/Lo-Lo and Ro-Ro/ Containerships.

Given the vessel sector’s reliance on short-haul trades in Europe and Asia, this sector is greatly affected by the stringent restrictions of Emissions Control Areas (ECAs), and this is expected to be reflected in any new orders for these markets going forward.

Ro Ro Fleet Ownership Profile

Fleet

Company Size	World Fleet					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99	1	80	1.52	3.29	80	1	80	1.52	3.29	80
10-49	10	159	1.44	3.24	16	6	94	0.69	1.67	16
5-9	33	194	1.86	3.07	6	12	73	0.91	1.43	6
1-4	562	779	3.13	5.08	1	135	191	0.91	1.78	1
Unknown		44	0.05	0.05						
Total	**606**	**1,256**	**8.00**	**14.74**	**2**	**154**	**438**	**4.03**	**8.18**	**3**

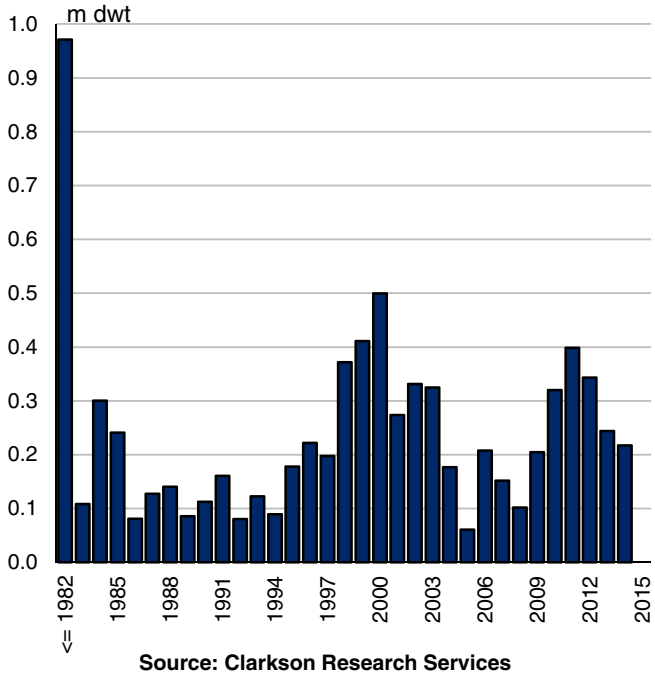
Source: Clarkson Research, February 2015

Orderbook

Company Size	World Orderbook					European Union (EU-28) Owners				
	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships	# Companies	# Ships	m. Dwt	m. GT	Avg. Ships
(# owned vessels)										
300+										
200-299										
100-199										
50-99										
10-49										
5-9	1	9	0.35	0.70	9	1	9	0.35	0.70	9
1-4	10	16	0.27	0.40	2	2	4	0.14	0.18	2
Unknown										
Total	**11**	**25**	**0.62**	**1.09**	**2**	**3**	**13**	**0.49**	**0.87**	**4**

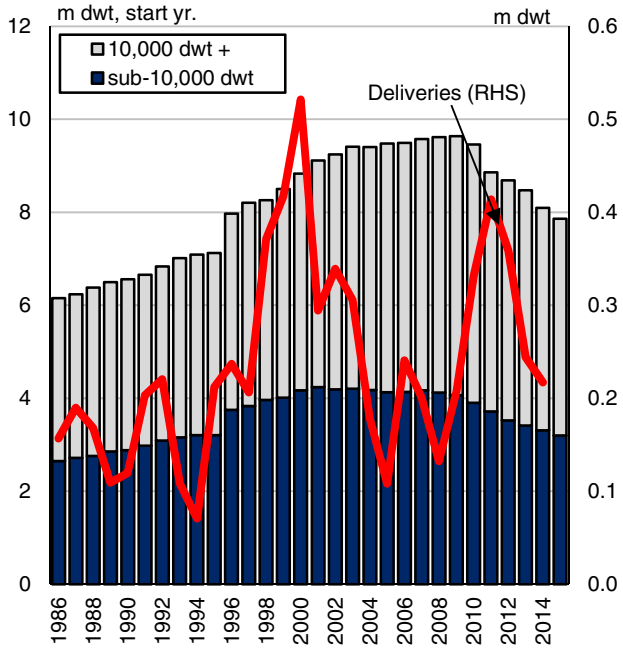
Source: Clarkson Research, February 2015

Ro-Ro Fleet Age Profile (excl. PCCs)



Source: Clarkson Research Services

Historical Ro-Ro Fleet (excl. PCCs)



Source: Clarkson Research Services