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Maritime highways of global trade



> The volume of maritime traffic increased significantly over recent decades, but the global economic crisis brought the industry to its knees. Now there are promising signals for a recovery, however, nobody knows what the future holds for the process of globalization, the global imbalances still linger on and the world of finance continues to be in a fragile state. The growing threats of piracy and terrorism could also compromise shipping.



Global shipping – a dynamic market

> Tankers, bulk carriers and container ships are the most important means of transportation of our time. Each year they carry billions of tonnes of goods along a few principal trade routes. Containerization has revolutionized global cargo shipping, bringing vast improvements in efficiency. The maritime boom could continue, despite the economic crisis.

Growth through globalization

Throughout history the oceans have been important to people around the world as a means of transportation. Unlike a few decades ago, however, ships are now carrying goods rather than people. Since the rise of inter-continental air travel, sea travel has become limited to shorter trips (ferry services across the Baltic and North Seas, the Mediterranean, Japan and Southeast Asia) and recreational cruises. The latter have recently experienced a tremendous boom and represent an increasingly lucrative source of tourist income.

As markets became increasingly globalized, shipping volumes soared. From the 1950s to the latest global economic crisis, the growth rate of international trade was almost consistently twice that of economic activity as a whole. From 2000 to 2008 world trade increased by an average 5.4 per cent each year, while economic activity, as measured by the global Gross Domestic Product (GDP), increased by only 3 per cent per annum. Due to the spectacular rise of trade vis-à-vis economic growth, world trade since the 1950s has more than trebled to 45 per cent of the global GDP, while goods destined for the processing industry have in fact more than quadrupled.

With respect to the value of the goods, about 23 per cent of world trade is between countries with a common border. This percentage has remained fairly constant over recent decades. Between continents, however, it differs a great deal depending on their level of development. In Europe and North America the proportion is the highest at 25 to 35 per cent. This trade is predominantly transacted by road and rail. Cargo between countries

without a common border is carried mainly by sea, although increasing quantities of manufactured goods are being forwarded by air. Growth rates for air freight are more than double those for shipping in recent years. Which mode of transport handles how much cargo depends on the (relative) transportation costs and the value-to-weight ratio of the goods – the higher the value per unit of weight, the less significant the cost of transportation. Punctuality and reliability are considered more important for valuable commodities.

According to research by economists, higher-income households purchase higher-quality products. The residents of wealthy countries therefore tend to buy more quality goods. Accordingly, rising incomes influence the demand for transport in three ways. First, quality goods are more expensive. Their value-to-weight ratio is therefore higher and the cost of transporting them is lower compared to their value. Second, as incomes rise, consumers are more likely to purchase certain expensive products and fancy goods. At the same time they expect to receive the articles within a very short time. Third, the delivery period itself is a key element of product quality, having an increasing influence on purchasing decisions; customers are no longer prepared to tolerate long delays. All of these factors have contributed to the even higher growth rates of air freight in comparison to shipping.

What fuels maritime traffic

As mentioned, the main reason behind the massive increase in shipping was the growth in world trade. But institutional and technological factors also had a role to play.

Key economic and business terms in brief

Gross domestic product (GDP):

Gross Domestic Product is a measure of a nation's economic output during a specific period of time. It is the market value of all goods and services produced within a country (value added), provided these are not used as intermediate input for the production of other goods and services.

General Agreement on Tariffs and Trade (GATT):

GATT came into force on 1 January 1948. This international agreement simplified world trade by systematically breaking down customs duties and other obstacles. GATT was replaced by the WTO.

Just-in-time production (JIT):

JIT focuses on producing and supplying a product at exactly the time it is needed. The individual production steps have to be coordinated. The supplier delivers goods and components directly to the production line as and when they are required. Only very small stocks need to be stored directly at the manufacturer's production line, dispensing with long storage periods and related costs.

North American Free Trade Agreement (NAFTA):

NAFTA is an agreement between Canada, the United States and Mexico that established a free trade zone in North America. NAFTA was founded in 1994 with the aim of eliminating or phasing out numerous tariffs.

Organisation for Economic Co-operation and Development (OECD):

The OECD is an international organization of European and non-European nations. It was founded in 1948 to create a joint concept for the reconstruction of Europe. Today it aims to support economic growth, to boost employment and raise living standards in the member states.

Offshoring:

Offshoring is a type of geographic relocation of business functions and processes to another country to take advantage of more favourable conditions, such as lower wages. When this happens the jobs in the home country are lost to locations in the low-wage countries.

Outsourcing:

Outsourcing is contracting with other companies or independent subsidiaries to provide tasks and services otherwise performed by in-house employees. This frequently means outsourcing jobs to cheaper subsidiaries that are not bound by labour agreements.

United Nations Conference on Trade and Development (UNCTAD):

The UNCTAD is a permanent organ of the United Nations General Assembly based in Geneva. Its goal is to promote trade between nations at different levels of development (mainly industrial and developing countries).

World Trade Organization (WTO):

The WTO is an international organization based in Geneva that regulates trade and economic relationships between nations. The World Trade Organization replaced the GATT in 1995 and currently has more than 150 members representing over 90 per cent of total world trade.

Economies of scale:

Economies of scale occur when the rate of production increases more strongly than the costs of production. In shipping, for instance, economies of scale result from the use of larger ships, which can carry greater amounts of freight, lowering the fixed costs per unit. Rationalizations, such as using standardized containers, can also increase economies of scale.

European Conference of Ministers of Transport (ECMT):

The ECMT was a forum of European Ministers of Transport which aimed to simplify transport, boost efficiency levels and break down barriers. Following a decision in 2006, ECMT was absorbed by an even larger international Conference, the International Transport Forum (ITF). To keep abreast of the increasing globalization of transport, ITF is now open to experts from outside Europe.

Globalization:

Globalization is a process which describes the increasing economic, social and cultural integration of nations, forging a greater interdependence between them. Globalization is responsible for a rise in demand for transportation and especially shipping.

In the past, the liberalization achievements of GATT and its successor the WTO provided a new momentum to world trade. China’s economic opening to the outside world, which led to their admission to the WTO in 2001, was also very significant – its exports quadrupled within 5 years. Another example of integrated markets boosting international trade is a trebling of exports from Mexico to the USA within 6 years of NAFTA being established.

The appetites of the industrial nations and newly-industrializing emerging economies, particularly China and India, for energy and mineral resources led to increasing quantities of goods being transported from far-distant countries.

The information and communications technology revolution dramatically reduced the costs of mobility and accessibility. It allowed new network connections and

production processes such as just-in-time production, outsourcing and offshoring, and provided a tremendous stimulus to logistics.

As a result of rising demand, transportation costs fell. Ships increased in size. Economies of scale were exploited. Furthermore, there were technological advances and organizational improvements in port management – of general cargo traffic, for instance. Of overriding importance was containerization, the greatest transportation revolution of the 20th century.

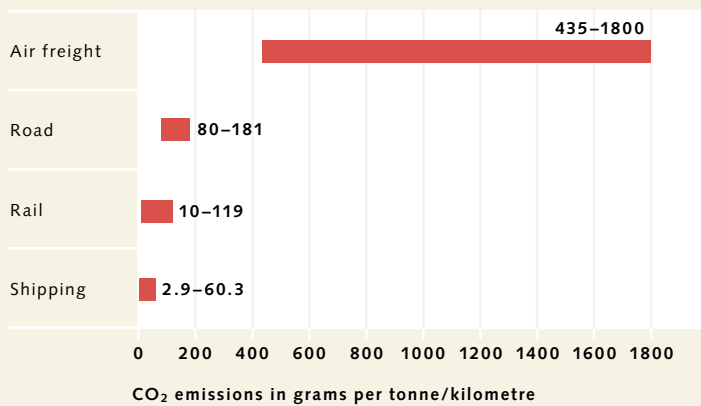
The increasing spread of open ship registries, most notably embraced initially by Panama and Liberia, allowed the shipping companies to combine the relatively low capital costs in the industrial countries with the low labour costs for seafarers from developing countries like the Philippines. It became possible to compensate for sharply rising labour costs, especially in the industrial nations. Furthermore, by changing to an open registry, ship-owners could avoid very costly regulations (such as national labour and employment laws). It is hardly surprising, therefore, that according to UNCTAD, the ten top open and international registries accounted for about 55 per cent of the global merchant fleet in 2008. In 1950 this figure was only 5 per cent. This development has helped shipping to become a genuine global economic sector. As far as ownership structure is concerned, however, it is far less global. A few countries own the bulk of the fleet. About 54 per cent of world tonnage (measured by carrying capacity or “deadweight tonnage”, dwt) is controlled by owners (shipping companies) in Japan (16.0), Greece (15.3), Germany (9.5), China (8.4) and Norway (4.5).

In July 2009 the global merchant fleet consisted of a total of 53,005 vessels, made up of 31 per cent traditional general cargo ships, 27 per cent tankers, 15 per cent bulk carriers, 13 per cent passenger liners, 9 per cent container ships, and 5 per cent other vessels.

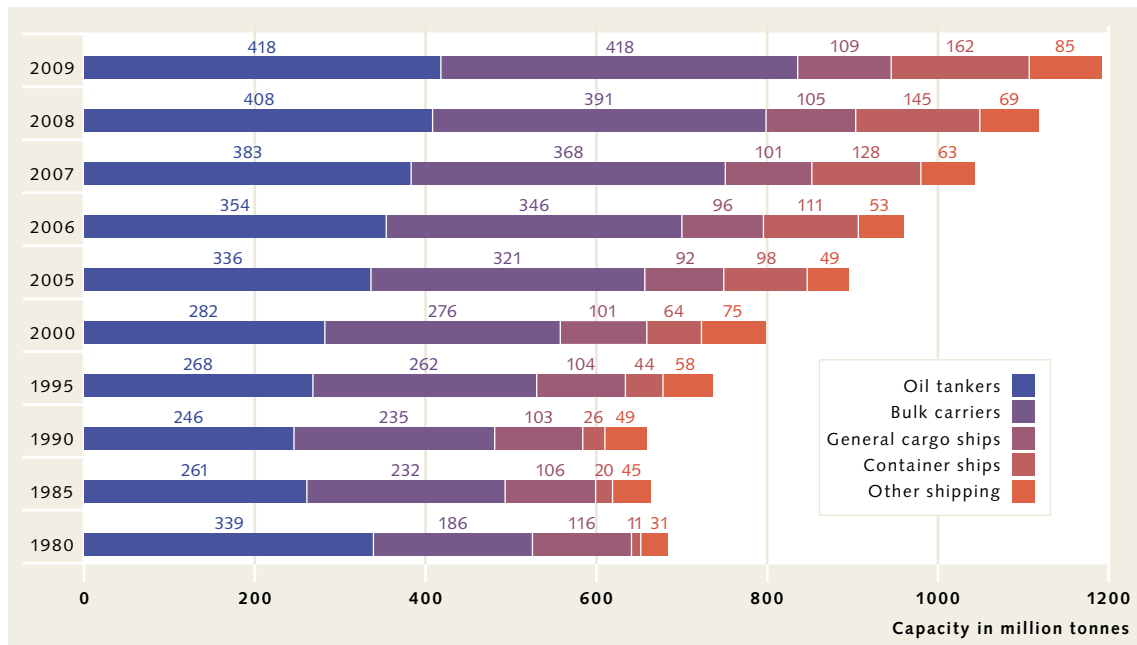
In terms of carrying capacity in dwt, however, the great variation in ship sizes gives quite a different picture. From this perspective tankers and bulk carriers each account for 35 per cent, container ships 14 per cent, general cargo ships 9 per cent and passenger liners less

Shipping and climate change

According to International Maritime Organization (IMO) estimates, world shipping is responsible for about 3 per cent of global CO₂ emissions. Of the total emissions from the transportation sector, shipping accounts for 10 per cent, road traffic 73 per cent and air traffic 12 per cent. Losses from pipelines contribute 3 per cent, and rail traffic 2 per cent. Experts predict that, unless further measures are taken to protect the climate, emissions from the transportation sector will double by 2050. From shipping they could approximately treble.



8.1 > Of all modes of transportation, ships are unbeatable in terms of efficiency.



8.2 > The growth of the global merchant fleet according to type of vessel (as at 1 January).

than 1 per cent. In all, the global merchant fleet has a capacity of just under 1192 million dwt.

Modern ships – large, fast and highly specialized

Marine innovations have helped to fuel the growth of maritime freight traffic. The following are significant:

SIZE: The average size of ships has increased substantially. Larger vessels reduce the shipping costs per load unit for crew, fuel, demurrage, insurance, servicing and ship maintenance. Port authorities must respond to increasing vessel sizes by expanding port infrastructure (wharfage, transport connections inland) and improving port access (e.g. by deepening fairways). Therefore they too face increasing costs. This can bring the owners – usually the State or local authorities – into financial difficulty: the capital investment is usually funded from the public purse, but the full costs are not passed on to port users.

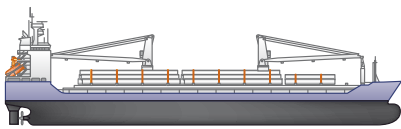
SPEED: The average speed of a merchant ship is about 15 knots (1 knot = 1 nautical mile per hour = 1853 metres

per hour), or 28 kilometres per hour, the equivalent of about 670 kilometres a day. Newer ships are capable of 25 to 30 knots (45 to 55 kilometres per hour). Marine propulsion has improved considerably since the invention of the screw propeller, particularly the double propeller. This development reached its peak in the 1970s. Achieving even higher speeds is a challenge and is likely to prove extremely expensive. Experts are therefore predicting only limited increases to average commercial shipping speeds.

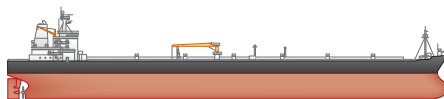
DESIGN: Ship design has changed radically – from timber to steel to vessels built mainly of aluminium and composite materials. Design innovations were aimed at dramatically reducing fuel consumption and construction costs while increasing safety at the same time.

SPECIALIZATION: Specialization in the shipbuilding industry has brought massive changes to ocean shipping. Special ships have increasingly been constructed for different types of freight:

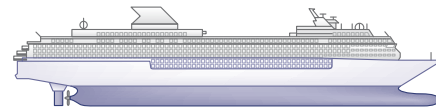
- Tankers for crude oil, petroleum products, chemicals, liquid gas and fruit juice concentrate;
- Bulk carriers for bulk goods such as ores, coal, grain;



General cargo ship



Oil tanker



Cruise liner

Key shipping terms in brief

Gross register tonnage (GRT):

Gross register tonnage or gross tonnage (GT) represents the total internal volume of cargo vessels. 1 GRT = 100 cubic feet \approx 2.83 cubic metres. Although the term contains the word tonne, the gross register tonnage cannot be equated with measurements of weight such as carrying capacity – nor should it be confused with the standard displacement used to rate a warship, the long ton. Gross register tonnage (GRT) and net register tonnage (NRT) have been replaced by gross tonnage (GT) and net tonnage (NT) which express the size and volume of a ship as a simple dimensionless figure. Port fees and charges for canal passages, locks and pilots are calculated according to the GT or NT.

Deadweight tonnage (dwt):

Deadweight tonnage indicates the carrying capacity of a ship in tonnes.

Freight rate:

In logistics, the term “freight rate” is used to indicate the price a carrier charges its customers for transporting goods from one place to another. There are so-called “all-in rates” which include all incidental costs, fees and documentation costs, while other rates cover the costs of transportation alone. Sea freight rates differ greatly across routes.

Tonnage measurements:

Tonnage measurements are used to indicate the technical data of a ship such as the total internal volume, displacement, carrying capacity, draught, length and speed. Ship sizes and performance vary according to function and national unit of measurement.

Register of shipping:

All ships must be registered in a country's shipping register. The ship is then considered part of the territory of the country under whose flag she sails. All the laws and regulations of this country

(employment law, social security law etc.) apply on board the ship. Some nations (such as Panama, Liberia and the Bahamas), however, have so-called open shipping registries, where any ship-owner can register his ship. As the employment and social security laws of many countries do not protect workers as well as those in Europe, and safety practices are far less stringent, labour and thus transportation under these flags is much cheaper (flags of convenience).

TEU (twenty-foot equivalent unit, standard container):

A TEU is the standard container used today to transport goods worldwide. As the term suggests, a TEU is about 20 feet long. A foot is equal to 30.48 centimetres. A TEU measures about 8 feet in both width and height. Not only ships, but also railway wagons and articulated trucks are constructed according to this standard, meaning that containers can be transferred seamlessly between different modes of transport.

Tonne-miles:

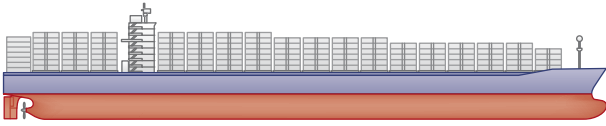
A measure of freight transportation output. A transportation output of 1 tonne-mile is achieved when a tonne of cargo is moved 1 nautical mile (1.853 kilometre).

Dry cargo:

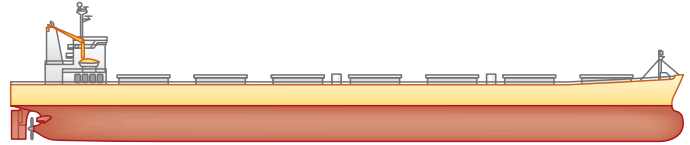
Dry cargo is a collective term for all non-liquid freight. Important types of dry cargo are iron ore, coal, grain, bauxite/aluminium oxide and phosphate.

GPS/AIS:

GPS is a global satellite-based navigation system that provides accurate location and time information. The Automatic Identification System (AIS) used by ships to communicate their positions and other data to each other has been employing GPS for some years now. AIS makes shipping safer and more efficient as it allows the maritime authorities to track and monitor vessel movements.



Container ship



Bulk carrier

- Bulk carriers for large-volume unit loads such as motor vehicles and iron;
- Refrigerated vessels (reefers) for fruit from the Southern Hemisphere;
- General cargo ships;
- Container ships, which are increasingly taking on the tasks of general cargo ships on long-haul routes;
- Ferries for shipping trucks as well as roll-on/roll-off (Ro-Ro) ships, which carry articulated lorries to drive the cargo onto the ship. These two are taking over the tasks of general cargo vessels on short-haul routes.

By speeding up cargo handling, specialization has been responsible for reducing the costs per transported unit. Where special ships can be utilized to capacity, therefore, economies of scale have been achieved.

AUTOMATION: Various automation technologies have been introduced to shipbuilding and ship operations, including self-loading/unloading systems, computerized navigation, and the global positioning system (GPS). Automation has markedly reduced the number of crew needed and at the same time substantially improved safety standards. According to data service provider “IHS Fairplay”, total vessel losses (due to accidents or sinking) have declined from more than 200 a year in the mid-1990s to about 150 now – a remarkable improvement in safety when measured against the sharp rise in fleet numbers. Maritime freight traffic was booming for many years. The amount of cargo transported by sea exceeded the 8 billion tonne mark for the first time in 2007. Global shipping had therefore doubled since 1990 (an average annual increase of over 4 per cent). Transport capacity, too, virtually doubled in the same period to almost 33 trillion tonne-miles.

The global recession in 2008/2009 triggered a massive slump in world trade and, accordingly, shipping. Following a modest rise of nearly 3 per cent in 2008 – trade

nosedived by about 14 per cent in 2009. Freight rates fell to historic lows on many sub-markets. As at the beginning of 2009 about 9 per cent of bulk carriers worldwide lay idle, unutilized, in ports, this capacity is coming back only slowly to the market in the 2010 recovery.

What ships carry – Oil, containers, and dry cargo

Ocean shipping can roughly be divided into two sub-markets – on the one hand liquid cargo such as oil and petroleum products, on the other dry cargo. Dry cargo is made up of bulk goods, the five most important being iron ore, coal, grain, phosphates and bauxite. Other dry cargo consists of bulk materials such as non-ferrous metal ores, feed and fertilizers, and particularly a variety of goods packaged in smaller transportation units. The latter are labelled as general cargo and shipped on liners, i.e. vessels with scheduled sailings, chiefly in containers. Liner shipping usually offers its services according to fixed conditions that are agreed on between competitors at so-called liner conferences.

The single most significant type of cargo worldwide is crude oil, which alone accounts for roughly a quarter of all goods transported by sea. The major importers are the European Union, the United States of America and Japan. All three are supplied by the Middle East, the most important oil-producing region. North America also obtains oil from West Africa and the Caribbean, while Europe imports from North and West Africa. The main shipping lanes therefore stretch westward from the Arabian Gulf around the Cape of Good Hope or through the Suez Canal, and from Africa northward and westward to Europe and North America. Others connect the Arabian Gulf to East Asia and the Caribbean to the Gulf Coast of the United States. Of course, crude oil is not the only commodity

8.3 > Most of the global merchant fleet consists of five types of ships: general cargo vessels such as heavy load carriers and multi-purpose vessels that transport machinery parts and even yachts; oil tankers; bulk carriers, which are loaded through hatchways; passenger liners, such as cruise ships; and container ships. All other types of vessels, such as vehicle transporters, together account for only about 5 per cent.

transported by sea. Smaller, specialized ships (product tankers) carry processed petroleum products from major peripheral refinery locations to the consumption areas of North America and Japan. This amounted to about 815 million tonnes worldwide in 2007.

In terms of quantity, iron ore and coal are significant dry-bulk goods. Iron ore is transported over long distances in very large ships, mainly from Brazil to Western Europe and Japan, and from Australia to Japan. The most important coal routes are from the major export countries of Australia and South Africa to Western Europe and Japan and also from Colombia and the East Coast of the United States to Western Europe, as well as from Indonesia and the West Coast of the United States to Japan.

Most of the coal transported is utilized as steam coal to generate electricity in power stations. A third is used as coking coal for smelting in the iron and steel industry.

Dry bulk goods also include grain and oil-bearing seeds (wheat, barley, rye, oats, sorghum and soya beans). Here however, the quantities and direction of transport routes fluctuate much more than other vital commodities depending on harvest seasons and yields. The USA, Canada, Argentina, Australia and France are the major grain exporters. Africa and East Asia are major importers due to frequent local shortages. Although the main grain producers (the United States, Russia, China and India) retain most or even all of their production in their own country, what remains for global trade is still enough to include grain among the bulk commodities.

Increased international division of labour, in motor vehicle production for instance, has led to general cargo such as cars and parts accumulating in such large quantities that entire shiploads can be forwarded on specialized ships outside the scheduled liner services. Large car carriers and special tankers for chemicals or fruit juice concentrate also belong to this special shipping sector, operating on contracted routes.

Today most other dry cargo is transported in container ships. These standardized containers have brought a flood of technical innovations (such as special cranes at transshipment points) and fundamental organizational innovations in their wake. Being standardized, they can be transported with any mode of transport and rapidly transferred to trucks or railway cars fitted with the appropriate equipment. From an economic point of view this has dramatically reduced transportation costs, mainly as a result of faster loading and unloading. Capital investment along the entire transport chain was necessary to ensure the containers were used efficiently, considerably increasing capital intensity. In contrast, labour intensity was sustainably reduced, as fewer dockworkers were needed for loading and unloading.

Since 1985 global container shipping has increased by about 10 per cent annually to 1.3 billion tonnes (2008). During the same period its share of the total dry cargo transportation rose from 7.4 per cent to a quarter. A total of 137 million containers, measured in TEU, were transported in 2008. This quantity, however, decreased again in 2009 by 10 per cent.

The container revolution

Container shipping was first introduced in the USA during the 1960s, expanding to the shipping routes between the USA and Europe and Japan in the late 1960s and early 1970s. The developing countries followed from the late 1970s onwards, having originally balked at the high initial fixed costs. To make full use of the advantages of container transportation requires properly equipped ships and port facilities with special cranes, storage space and railway systems. For this reason container traffic initially became established on the busiest shipping routes. There were ultimately two reasons that the developing countries were hesitant to embark on container transportation: price and the low volume of container traffic. In countries where there is little capital but plenty of labour, the capital cost of constructing a container port is relatively high. The labour costs it saves, however, are relatively low.

Regardless of this, many experts consider container shipping one of the key transport revolutions of the 20th century. The use of standardized containers saves tremendous costs, as the goods are packed only once and can be transported over long distances using various modes of transport – truck, rail, or ship. Time-consuming unpacking and repacking are no longer required, reducing both the direct costs of port charges for storage and stowage, and the considerable indirect costs of demurrage. It is estimated that traditional cargo ships, which need more time to unload their cargo, spend half to two thirds of their operating time in port. The containerization of shipping pays off especially at sea, as the large and fast container ships substantially reduce the cost per tonne-mile between ports.

Typically the cost of transporting a TEU containing more than 20 tonnes of freight from Asia to Europe is roughly the same as a one-way Economy Class flight along the same route. This weight in everyday goods such as electrical appliances in most cases represents a transportation cost of less than 1 per cent of the selling price.

The key shipping routes

If all commercial goods are taken into account it becomes clear that there is a relatively small number of principal transport routes, and these pass through only a few areas of the oceans. The busiest are the approaches to the ports of Europe and East Asia, particularly Japan but also Shanghai, Singapore and Hong Kong, and the United States. The East Coast of the United States in particular is a major sender and receiver of cargo. Narrow straits further concentrate maritime traffic. Bottlenecks include the Straits of Dover, Gibraltar, Malacca, Lombok and Hormuz, and the Cape of Good Hope at the southern tip of Africa. Traffic builds up in these areas, making ships vulnerable to attack by pirates.

Cargo imbalances are a typical feature of the traffic with Asia – depending on the trade balance. Much more cargo is being shipped from Asia than in the opposite direction. This imbalance is particularly notable on the Pacific route, at almost 10 million TEU (2007). From Asia to Europe it is almost 8 million TEU. The North Atlantic traffic between the highly-developed economies of North America and Europe, however, are much better balanced, registering a difference of barely 2 million TEU. The reason for this situation is that since the mid-1980s so many manufacturing processes have been relocated from the traditional industrial countries to the developing nations and emerging economies, particularly China and the countries of South East Asia. With the prevailing exchange rates, China in particular has become the cheap “workshop of the world”.

This process has been promoted by the introduction of the container and the corresponding increase in shipping productivity. The transportation costs between where

The problem of empty runs – unbalanced cargo flows

Even more than container traffic, transport flows in the bulk sector are usually subject to directional imbalance. Mineral resources are often geographically distant from where they are processed. Large ore and coal freighters and crude oil tankers are therefore only transporting cargo in one direction, from the port of shipment to the port of discharge. They usually return empty. In many cases, therefore, the freight rate must cover the costs of returning the empty ship. This partially explains the great disparity of freight rates on individual routes depending on direction.



8.4 > The containerization of shipping has dramatically accelerated the unloading of cargo.

goods are manufactured and where these goods are consumed have been reduced considerably. Dry cargo such as automobile and machinery parts – until now transported by conventional means – has been increasingly containerized, contributing to the growth in container traffic.

Until the global economic downturn the demand for new ships was great, but as the effects of the crisis were felt the tide turned and many companies cancelled their orders. All the same we can assume that even more marine transport capacity will become available in the near future as new ships are delivered, overtaking demand. Freight rates are therefore unlikely to recover from their current all-time lows any time soon.

Obstacles to global shipping: Piracy and terrorism

> Pirate attacks have come to the fore in recent years. The growing threat could lead to higher costs such as increased insurance premiums. Ultimately, however, the risk of falling victim to pirates is relatively slim. Protecting against terrorist attacks, on the other hand, is proving to be an obstacle to international shipping because of the appreciable costs involved.

The return of the buccaneer

As globalization progressed during the 1990s, pirate ships again appeared on the horizon, more than a century after their virtual disappearance. Piracy is an age-old maritime phenomenon, often sanctioned by the state, and in some cases it is even a highly respected profession. The English crown certainly welcomed the treasures explorer Sir Francis Drake (1540 to 1596) brought back from his raids on Spanish trading ships. Privateering was formally abolished by the Paris Declaration respecting Maritime Law issued on 16 April 1856.

Now piracy is on the rise again, mainly off the coast of Somalia and the Gulf of Aden, i.e., along the major trade routes. Piracy frequently goes hand in hand with abject poverty, which drives people into this “line of business”. It is often boosted by the complete collapse of government order in the nations concerned.

Piracy not only poses a threat to the crews of the ships and their cargo. It also makes maritime transportation more expensive. Shippers and ship-owners are feeling the costs of piracy quite substantially. The insurance premiums for a passage through the Gulf of Aden have increased more than tenfold, for example. The optional detour around the Cape of Good Hope takes weeks longer and uses much more fuel. Nevertheless, the risk of falling victim to a pirate attack is quite slim, even at piracy hotspots. Overall annual losses as a result of piracy in the straits are estimated to be 0.001 to 0.002 per cent of the total cargo value involved. According to experts, this amount is by no means alarming. The same applies to the current piracy hotspot, the Horn of Africa

from the Somali coast to the Gulf of Aden, through which about 16,000 ships pass each year.

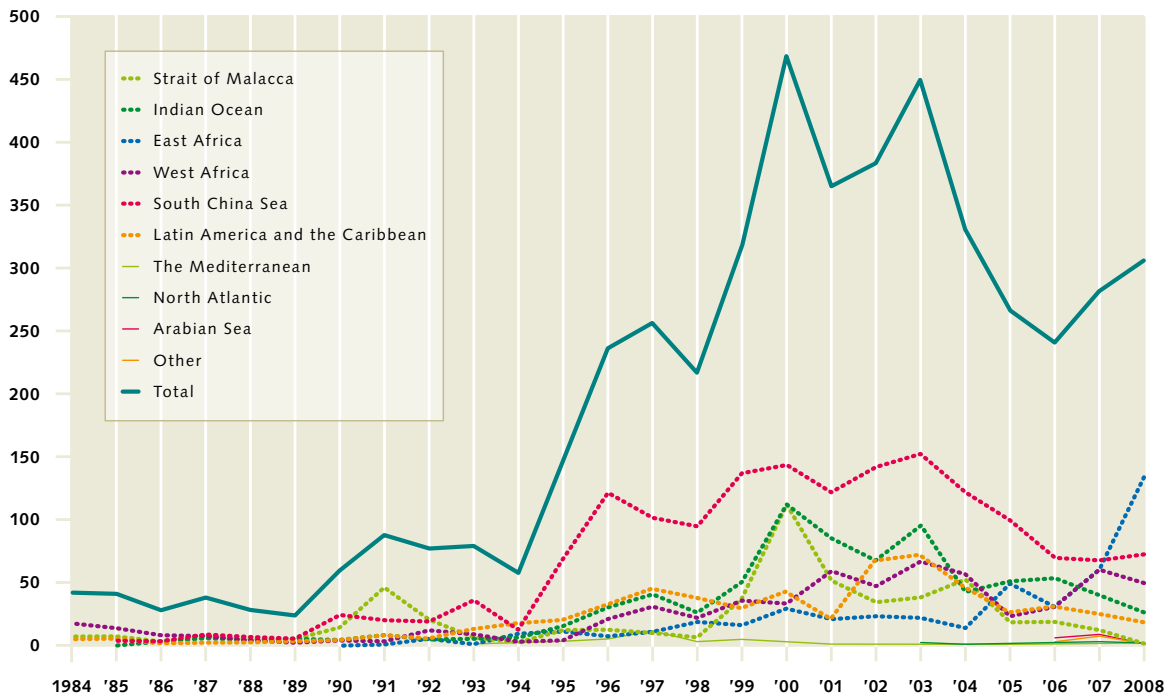
Terrorism – an incalculable risk

Since the terror attacks of 11 September 2001, the “worldwide threat to shipping” has become an increasingly significant topic. The International Maritime Organization (IMO) has adopted a number of binding security measures. The USA has taken the most drastic precautions, including the monitoring of containers during loading and along the entire transport chain. The United States’ most important trading partners comply with these measures to prevent problems with container traffic. On the one hand they are designed to prevent terrorists at sea from acquiring supplies of weapons and materials, and on the other, to avoid ships being hijacked and used as weapons themselves – like the aircraft used in the 9/11 attacks.

Security is a huge challenge for container traffic. The maritime system of container transportation is complex, involving interactions between diverse stakeholders, industries, regulatory bodies, modes of transport, operations systems, legal frameworks and terms of liability. The European Conference of Ministers of Transportation (ECMT) maintains that all stakeholders are responsible for the safety of the container trade. One solitary breach of security can compromise the security of the entire logistics chain. In addition to seaport container terminals, other extremely vulnerable points are marshalling yards, street stops and parking areas. A number of studies have been carried out on the economic consequences of terro-



8.5 > Revered privateer: Sir Francis Drake (1540 to 1596) was considered a hero by the English, but a pirate by the Spanish for his raids on their trading ships. In 1581 he was knighted by the English crown.



8.6 > Modern piracy: Following a steep increase in piracy at the start of this century, the number of attacks has now declined again world-wide. The exceptions are the waters off East Africa, and particularly Somalia.

rism on maritime traffic, most of which relate to US American ports. Their aim is to determine the total material losses in the event of a terrorist attack and subsequent port closures. Simulations, for instance, were used to calculate the economic damage of an attack on the port of Los Angeles with a radioactive “dirty bomb”. As a result of the attack all US ports would be closed for a week; clearing the resultant container congestion would take 92 days. The overall damage is estimated to be USD 58 billion. This purely economic study did not take into account the number of people who could potentially be killed or the damage to buildings. The consequences would nonetheless be disastrous.

If it were to occur in one of the world’s largest ports (to compare container turnover in 2007: Los Angeles handled 8.4 million TEUs, Hamburg 9.9 million TEUs and Singapore 27.9 million TEUs) the impact would be even more severe. However, as yet there are no reliable estimates of likely preventative costs or how these stack up against the potential damage of terrorist attacks. Preventative costs include the purchase of specific equip-

ment to monitor cargo shipments (such as X-ray facilities) and the assignment of very highly qualified personnel. On the one hand private stakeholders such as the shipping companies themselves invest in such security measures. On the other, countries stipulate certain requirements. The OECD has estimated the initial cost to shipping companies for implementing the security measures at USD 1.3 billion, and subsequently USD 730 million a year. These increased costs are reflected in higher prices and/or lower profit margins, at least in the short term, and thus tend to decrease maritime traffic. Then again, the measures could in the long term help to reduce costs in various ways – by cutting delays and speeding up processing times, for instance. It is also conceivable that the improved monitoring in handling and loading equipment, the greater use of IT and resulting lower personnel costs, fewer thefts due to improved security, and the lower insurance premiums as a result of greater security could cut costs in the long run.

In spite of these potential reductions, experts believe that overall the higher security standards have driven up

8.7 > For fear of pirate raids, big guns are deployed in the Gulf of Aden. Japanese marines are among those hunting the freebooters. During a manoeuvre, the destroyer "Ikazuchi" goes alongside the supply vessel "Mashu".



transport costs substantially. The OECD estimates that the threat of terrorist attacks in the United States has cancelled out about half the productivity gains in logistics of the past 10 years. Fears have even been voiced that the permanent terrorist threat is compromising the entire globalization process of the past 3 decades. The consequences to the organization of production are not so easy to quantify at present. Will it be possible to maintain just-in-time production in the future? As an initial reaction to insecurity caused by the terrorism threat, some manufacturers no longer rely only on just-in-time consignments.

The price of fear

A comprehensive economic analysis of the overall costs and gains of the security measures has yet to be carried out. The question at what stage the cure becomes more costly than the disease cannot yet be answered. Nobody knows exactly when the costs of the extra safety will surpass the costs of potential damage and devastation caused by actual terror attacks. Nightmare scenarios of hijacked ships being blown up and triggering gigantic explosions in vital ports cannot be completely ruled out, but are considered by experts to be extremely unlikely.

CONCLUSION

A look at the future

The recent global economic crisis precipitated a sharp slump in world shipping. Yet the global economy rebounded in 2010. Global trade, in decline until the spring of 2009, has increased markedly since the summer of that year. On the other hand, the economic situation will continue to be depressed for some time yet. From a global perspective, Germany's major economic think tanks state in their autumn 2010 outlook that the 1 per cent decline in world production in 2009 is likely to be followed by an increase of 3.7 per cent in 2010 (2011: 2.8 per cent), driven mainly by rapid recovery in a number of newly industrializing economies and in China and several western European nations. World trade fell sharply by 11.3 per cent in 2009 but will grow about 12 per cent in 2010 (2011: 6.8 per cent). This has bolstered demand for transport somewhat. It remains to be seen whether market globalization will continue as before or will change tack. Fears that the financial crisis could compromise the international division of labour and thus world trade and shipping are not yet fully dispelled. The container success story came to an

abrupt end in 2008 with the slump of the global economy. A.P. Moller-Mærsk A/S, owners of the largest container fleet in the world, estimate that container handling fell by 10 per cent in 2009 – the first decline since containers were introduced on global shipping routes in the 1970s! Following its many years of success, container shipping will also come under pressure from forthcoming fleet expansions. A great number of extremely large ships will be completed in the near future, which will have a negative impact on the recovery of freight rates.

The extent to which climate change will affect shipping is difficult to foresee. Extreme weather conditions such as gales could impair transport and navigation conditions, increase the risk to ships and cargo and complicate loading and unloading operations. Sea freight transport, the world's most important medium of transportation, could become more expensive. On the other hand, if the Arctic polar ice cap melts new shipping routes could open up, providing considerable savings in time and energy. It is conceivable, for instance, that the Northwest Passage and the Northern Sea Route could be open to shipping for several weeks or even for months each year (Chapter 1).

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