

Master Thesis

Extraordinary up- and downturns in the dry bulk market 2000-2009

By
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This Master Thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn

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Abstract

This thesis studies the extraordinary up- and downturns in the shipping market from 2000 to 2009, with emphasis on the dry bulk market.

The world has experienced extreme financial changes this decade; economies has seen its all time high with higher GDP, growing incomes and higher consumption, but also experienced a total collapse of the financial systems, with companies and even countries declared bankrupt and many on the verge of bankruptcy. One of the industries directly affected by changes in the world economy is the shipping industry. This international industry is driven by events throughout the entire world, making it a very complex industry to study. The shipping industry has gone through extreme up- and downturns this decade, and this thesis study's the factors behind these movements.

There are a few factors that are more important than others and this is where my focus has been; the changes in the world economy, the high demand for international trade, energy prices, the rapid increase of newbuilding orders and high demand for tonnage, but the most important of them all is the rise of China. China has gone through a vast change the past decades, and due to its industrialization and liberalization of trade, is today an important participant in international trade.

The results of this study confirm that China's growth not only has affected the world economy and world consumption, but also affected the seaborne trade of dry bulk commodities.

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Abbreviations

AD:	Anno Domini
BC:	Before Christ
BRIC:	Brazil, Russia, India, China
CIA:	Central Intelligence Agency
DWT:	Dead weight tonnage
GDP:	Gross Domestic Product
IMF:	International Monetary Fund
MBS:	Monthly Bulletin of Statistics
OECD:	Organization for Economic Cooperation and Development
OPEC:	Organization of Petroleum Exporting Countries
TC:	Time Charter
UNCTAD:	United Nations Conference on Trade and Development
US:	United States
WDI:	World Development Indicators
WTO:	World Trade Organization

Thesis outline

The thesis layout is as follows;

Chapter 1 - *Objectives and Background* introduces the thesis topic and the purpose of the study.

Chapter 2 – *International Trade* gives an introduction to international trade and trade theory, as well as describing the development of international trade.

Chapter 3 – *Introduction to Shipping* gives a brief introduction to the shipping industry, geographical patterns and the driving forces of seaborne trade.

Chapter 4 – *Shipping Economics* gives an introduction to the four shipping markets; the freight market, the sale and purchase market, the newbuilding market and the demolition market.

Chapter 5 – *Bulk shipping* introduces bulk shipping and goes deeper into the dry bulk segment.

Chapter 6 - *Cycles*; here cycles and especially shipping cycles are explained, and a brief overview of the up- and downturns in the dry bulk market is given.

Chapter 7 – *Maritime Forecasting* describes different forecasting methods and how cyclical patterns can be predicted.

Chapter 8- *The Transition of the 21st century* gives an analysis of some of the underlying factors of the extraordinary up- and downturns in the dry bulk market.

Chapter 9 –*Conclusion and Summary*, summarizes and concludes the findings.

1. OBJECTIVES AND BACKGROUND

1.1 Purpose of the study

This thesis will try to explain and give an overview of the reasons and factors behind the extraordinary up- and downturns in the dry bulk market from 2000 to 2009.

I would like to emphasize that this thesis is a study of both the long- and short-term trends affecting the dry bulk market, and not a direct study of the US financial crisis. The financial crisis is of course an important factor when discussing the up-and downturns, but it is not the main focus of this thesis.

In my search for explanations behind these changes in the dry bulk market, I started gathering information about the world economy, historical data from the shipping industry and relevant information about bulk shipping. Shipping, as the world's most international industry, is affected by so many different aspects from all over the world.

There are many factors of importance when addressing this topic. In this thesis I restrict to a discussion of what I believe are some of the main drivers behind the extraordinary changes this decade. Through a descriptive research study I have systematically described what is prevalent around the phenomenon "extraordinary up- and downturns", I have performed correlational studies in order to establish or reject relationships or associations between different variables affecting the dry bulk market. By an exploratory research study I try to explain why the events of the bulk market have occurred and which variables have affected each other.

I have managed to find sufficient amounts of relevant data for this study, but in some cases I would have needed more historical data in order to get a better perspective of why cycles have occurred in the past and compared this with the today's ongoing cycle. As the shipping industry is a relatively closed market, a lot of market data is controlled and only available through expensive subscriptions.

1.2 Introduction

The effects and patterns of market cycles have for generations been a hot topic, and as early as in the 1660s, Sir William Petty, noticed a cyclical pattern in corn prices and commented that these movements studied over a 7 year period made up what is referred to as the 'Cycle'. From then on, economists and analyst' have developed and evolved theories of cyclical movements and patterns. Nikolai Kondratieff, a Russian economist, was the first to discuss the impact of long-term cycles, and stated that cycles had a length from peak-to-trough of approx 20-30 years with an overall trough-to-trough of 50 years. There has been developed theories defining the length and the reason for cyclical movements and describing that cyclical behavior will vary according to market segment and that there will be different variables influencing the market both in the short- and long-term (Stopford, 2009).

One of the market segments greatly influenced by cyclical movements is the shipping market. Shipping is a volatile and capital-intensive industry and cycles have pervaded the shipping industry for generations. Documentation of shipping cycles can be traced as far back as to 1741; since then cycles have varied in length, duration and importance. Some effects have been more severe than others. The great depression of the 1930s and the oil shocks in the 1970s and the 1980s all resulted in severe recessions in the shipping market, but never before has the shipping market experienced such up- and downturns as in the first decade of the 21st century.

Throughout time the influential factors of cycles have varied, but the world economy has always been one of the most important determinants of cyclical movements.

This thesis focuses on one of the largest shipping segments; the dry bulk segment, and how different variables have affected this market's cyclical movement in the 2000s decade. Dry bulk shipping is one of the segments I believe is most interesting to study as its main trading commodities of iron ore, coal and grain are important in the industrialization (iron ore) of countries, as a secondary energy source to oil (coal) and as the world primary source for food (grain). It is also a segment that has gone through enormous changes in the 2000s decade.

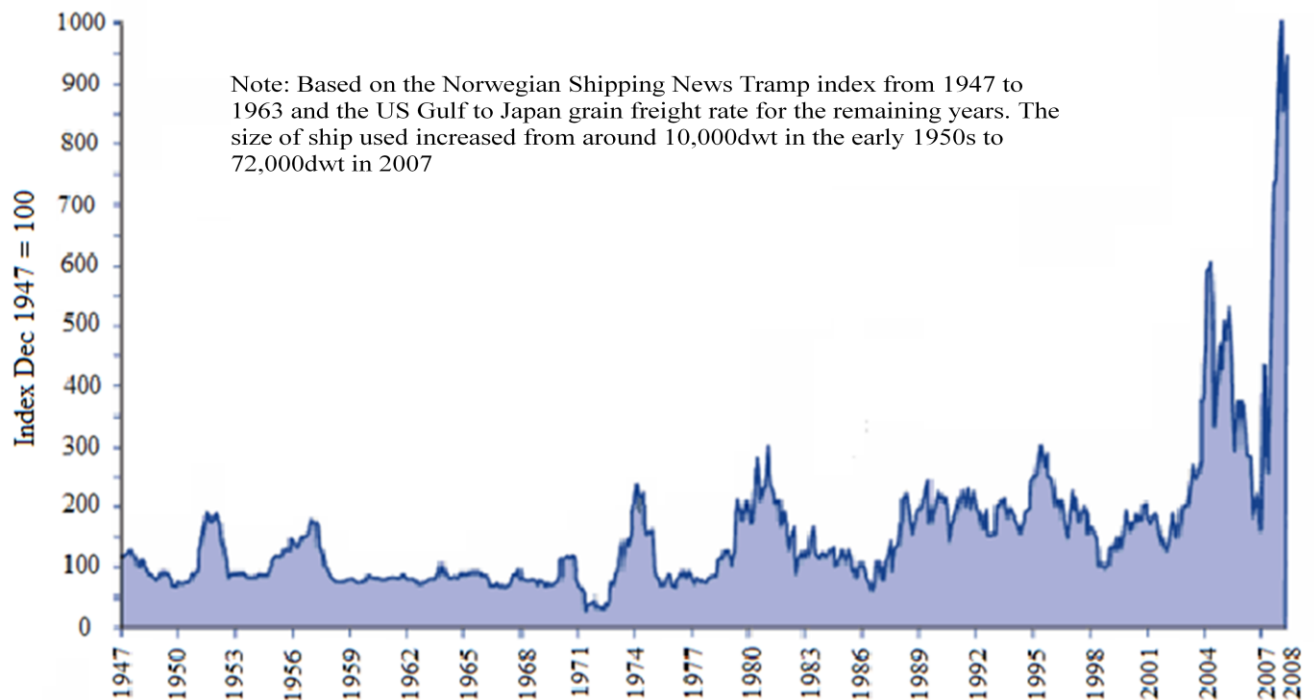


Figure 1.1 Bulk carrier shipping market cycles, 1947-2008

Source: Stopford, 2009

From figure 1.1 we see the movement of bulk shipping cycles from 1947 to 2008. The dry bulk market has had its up- and downturns throughout these years. From 1947 until approx. 2000 the movements were quite regular and consistent, but from 2000 and onwards we see a new pattern, where the movement is greater and much more volatile.

2. INTERNATIONAL TRADE

The first signs of international trade can be found as far back as prehistoric times when there was limited trade between Africa, Asia and Europe (Buckman, 2005). From then on trade theory has evolved and trade between countries is today an important element of the world economy. Shipping as a very capital intensive industry, is one of the most important actors of international trade, and economic trade theory can explain the development of trade and ship demand (Wijnolst, Jensen, & Sødal, 2003). Today all continents engage in international trade, with goods and services crossing boarder lines (Buckman, 2005).

2.1 A theoretical approach to international trade

The basis for trade can be explained by Adam Smith's and later David Ricardo's trade theory. Smith published in 1776 the 'Wealth of Nations' where he elaborated on the benefits of trade between countries. He explained that countries should produce products which they have an absolute advantage in compared to other countries and then import the rest. By definition, when a country can produce a product at a lower cost per unit than any other country, that country has an absolute advantage in the production of that good. Ricardo's contribution to the theory of trade was to show that whether or not countries have any absolute advantage there is always a basis for beneficial trade (Pugel, 2007). In the early 19th century he demonstrated this by explaining the principle of comparative advantage; "*A country will export the goods and services that it can produce at a low opportunity cost and import the goods and services that it would otherwise produce at higher opportunity cost*" (Pugel, 2007, pg. 35).

Ricardo's theory goes under the term Inter-Industry Trade; trade of goods from different sectors. In newer trade theory, also referred to as Intra-Industry Trade, it is shown that trade also occurs between equal countries and within equal sectors (Pugel, 2007). Intra-industry trade is not a result of comparative advantage, but this new trade theory can be explained by the term **economies of scale** and the fact that customers want product variation. By increasing the effective market size, the customers are free to choose between similar but not identical products. This can be characterized as high value products, usually transported in container

vessels or car carriers (Wijnolst et al., 2003). Bulk trade, as a low value and high volume segment, transports goods that are typically more homogenous and often can be explained by comparative advantage, as countries export what they produce at low opportunity costs.

2.2 Development of international- and seaborne trade

Nations are today closely linked together through trade in goods and services, through flows of money and through investments in each other's economies. When countries sell goods and services to each other, the exchange is almost always to their mutual benefit, i.e. there are *gains from trade* (Krugman & Obstfeld, 2009).

Gains from trade:

When both the importing and exporting country benefits more from the transaction of trade than they would from not trading at all.

The structure of world trade has in recent decades changed; there has been a large increase in the share of output sold internationally, the types of goods traded has shifted and the world economic centre has moved towards Asia. According to Krugman and Obstfeld (2009, p. 13) "*There is a strong empirical relationship between the size of a country's economy and the volume of both its imports and exports*". In order to get an overview of who trades with whom, we can use the *gravity model*. The gravity model draws its name from Newton's law of gravity and concludes that trade between two countries, *cet. par.*, is proportional to the product of their GDPs and diminishes with distance. The model relates trade between two countries to the size of their economies.

Due to lower transportation costs and easier communication between countries, international trade is today at record high levels relative to the size of the world economy (Krugman & Obstfeld, 2009).

World trade is moving and the direction and development today is quite different than what it was a generation ago and even more so, a century ago. One of the main trends for this movement is due to changes in technology and newer transportation- and communication methods that have made distances "shorter" by easier access. Political forces have also had an effect to the change of world trade; actually outweighing the effects of technology.

Another recent transformation to world trade is the rise of developing and emerging countries participation in trade, not only in export of primary goods but also in manufactured goods (Krugman & Obstfeld, 2009). The BRIC countries, Brazil, Russia, India and China are good examples of emerging and developing countries participating more in international trade.

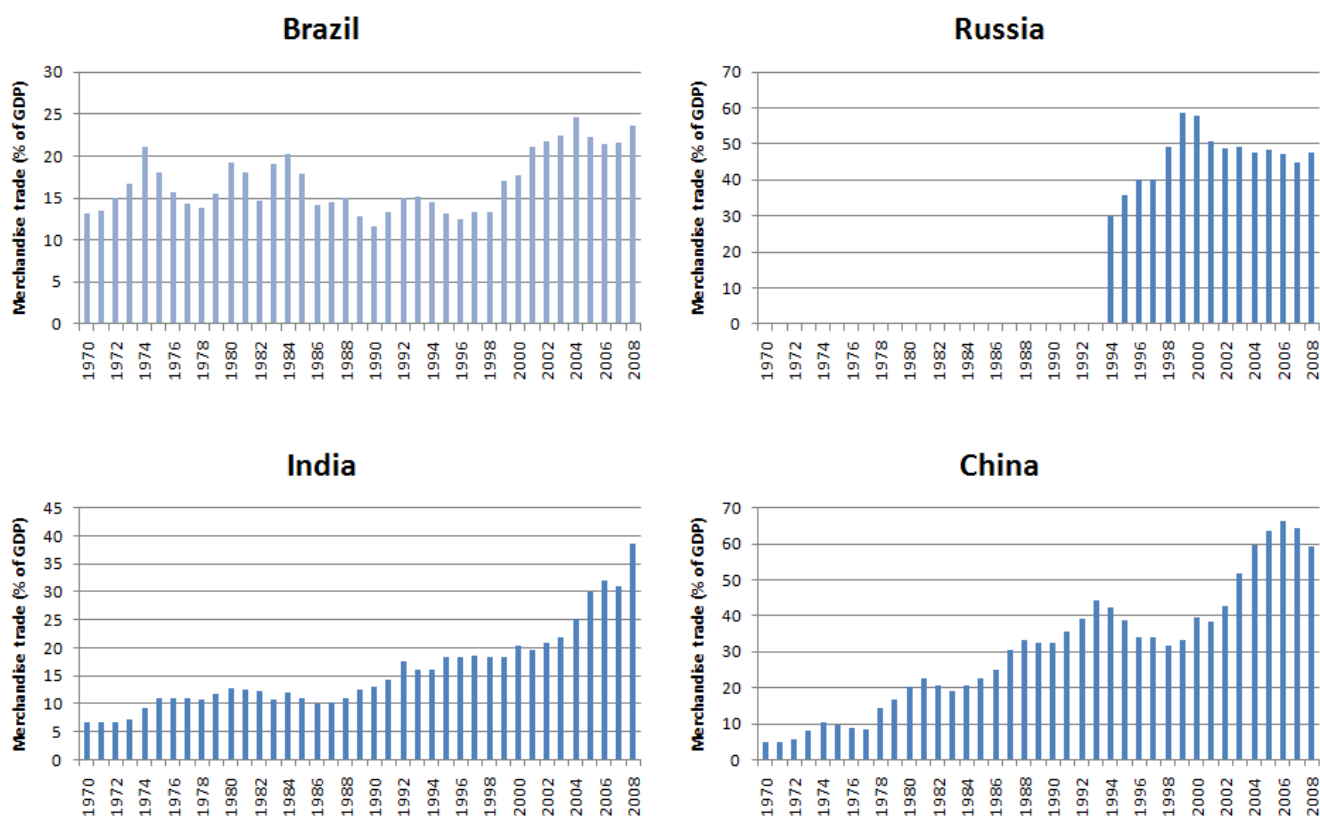


Figure 2.1 Development of merchandise trade in % of GDP, 1970-2008 (BRIC countries)

Source: Author's own, after data from The World Bank Group, 2009

Note: missing data for Russia from 1970- 1993

From the figure we see how the BRIC countries have engaged in trade since 1970. Especially in the case of India and China we see a great increase in merchandise trade in % of their GDP, supporting the statement that developing countries have a growing engagement in international trade.

An important aspect of this development is the industrialization that has taken place in these countries. In order for most countries to reach high levels of economic growth, industrialization is a key issue. Industrialization involves shifting away from agriculture and

moving towards more capital intensive sectors. For developing and emerging countries, expansion of manufactured exports has proven to be an important part of successful industrialization. The domestic market in these countries will on a general basis not be able to produce enough to support the expansion of this increased production. Therefore, in order to be able to produce industrial products efficiently it requires that they get capital by continuing to export traditional primary goods. A good example of this is the East Asian countries, like China, who in order to maintain its rapid growth of industrialization has had an equally rapid growth in the export of labour-intensive manufactured goods (Huges, 1990).

The industrialization of formerly developing and emerging countries has had great effects on the shipping market as supply and demand has grown, and with that, exports and imports have increased at a rapid speed. A very important commodity for China's industrialization is iron ore; this is together with coal used in the production of steel.

International trade, economic growth and political events are all important determinants of seaborne trade (Wijnolst et al., 2003). Shipping is an economic activity directly dependent on international trade, and 90% of world trade is carried by sea (Shipping Facts, 2009).

Economic growth determines consumption- and trade patterns; it also lays the foundation for the development of the maritime industry and the change in market structures and industry production structure. Political events and regulations may have strong effects on the shipping industry and can drive supply and demand to unexpected levels.

3. INTRODUCTION TO SHIPPING

Shipping; the transportation of goods by sea, is an important participant in international trade. Sea transportation is the most effective way when transporting goods over longer distances with regards to costs and environmental impact.

3.1 The beginning of seaborne trade

Shipping can be traced as far back as to 3000BC with its origin in Mesopotamia. By a fictional line called the 'Westline', Stopford (2009) describes the movement of the commercial maritime centers throughout time. Stopford's Westline Theory refers to the fact that the commercial maritime centre has followed a westward path the past 5000 years. Starting in Lebanon in 2000-3000 BC, moving slowly westwards to Rhodes, Crete, Greece, Rome and the Northern Italy. Around 1400AD North West Europe became important with its centres in Antwerp, Amsterdam and London; also East Coast North America became an important participant. By the twentieth century the centre moved even further west into Asia; with Japan, South Korea and China as growing centres.

Over the past 5000 years enormous changes has been made to the small wooden river boat that was once an important transportation utility; today this small river boat has turned into a 300 000 dwt Capesize.

The function of shipping is the conveyance of goods from where their utility is low to a place where it is higher. (...) The factors influencing the shipper's choice of transport mode has changed dramatically during the past decade. Today it is based on the total product concept embracing all the constituents of distribution. These include reliability, frequency, cost, transit time, capital tied up in transport, quality of service, packaging, import duty, insurance and so on (Branch, 2001, p. 2).

Sea transportation exploits an interregional arbitrage and already in 1457, Vasco da Gama understood the profitability of seaborne trade. He bought pepper in India for 3 ducats and then sold that same pepper for 80 ducats in Europe. From then on shipping has become more and

more efficient and by moving goods around the world the opportunities for countries to add value has increased and seaborne trade has grown. Shipping is today a central part in the globalization of the world economy (Stopford, 2009).

3.2 Geographical patterns of trade

Throughout the past 35 years one of the most distinguished features of the development of shipping markets has been the geographical move of market dominance (Wijnolst et al., 2003). The shipping centre has moved from the central regions of Europe and North America and towards Asia. Together these three economic centers dominate sea trade as they control over 90% of the world's manufacturing industry and much of its technology (Stopford, 2009).

Stopford (2009) discusses why countries engage in trade and what the main drivers are. By studying how wealth, size of country and population all influence trade he found that there was virtually no correlation and concluded that the main reason and driver for international trade was the world economy; economic activity is what creates the demand and supply for goods. Countries with higher GDP trade more than other countries. In the table below we find the top 10 countries in the world according to GDP, exports and imports, and as stated above, we see that the countries with highest GDP also in most cases are the countries that engage in trade.

GDP	US\$ bill.	Imports	US\$ bill.	Exports	US\$ bill.
United States	14 093	United States	2 166	Germany	1 465
Japan	4 911	Germany	1 206	China	1 428
China	4 327	China	1 133	United States	1 301
Germany	3 649	Japan	762	Japan	782
France	2 857	France	708	Netherlands	634
United Kingdom	2 674	United Kingdom	632	France	609
Italy	2 303	Netherlands	574	Italy	540
Russia	1 679	Italy	556	Belgium	477
Spain	1 604	Belgium	470	Russian	472
Brazil	1 575	Korea	435	United Kingdom	458

Table 3.1 Top 10 countries in 2008 according to GDP, exports and imports

Sources: Author's own, after data from The World Bank Group, 2009

For countries to voluntarily engage in international trade they have to be able to make a profit (i.e. gains from trade). The explanations for why products produced in a foreign country cost less than the domestic products are differences in manufacturing costs, differences in natural resources and temporary local imbalances (Stopford, 2009).

3.3 Demand for seaborne trade

When it comes to shipping demand there are three dimensions to take into consideration; cargo type, parcel size and the trade route which the cargo is transported. There is a unique trading pattern for every cargo; this is determined by the location of the producing areas (the exporters) and the consuming areas (the importers) (Wijnolst & Wergeland, 1997).

From table 3.2 we see how the growth in volume of merchandise trade is split between the different geographical regions of the world both in terms of exports and imports. We see the effects of the financial crisis hitting in 2007 as all countries imports and exports decreased in 2008. This table also gives a good indication of the rising Asian trade.

Growth in the Volume of Merchandise^a Trade by Geographical Region, 2006-2008

Exports			Countries/Regions	Imports		
2006	2007	2008		2006	2007	2008
8,5	6,0	2,0	WORLD	8,0	6,0	2,0
8,5	5,0	1,5	North America	6,0	2,0	-2,5
7,5	3,5	0,0	European Union (27)	7,0	3,5	-1,0
1,5	4,5	3,0	Africa	10,0	14,0	13,0
3,0	4,0	3,0	Middle East	5,5	14,0	10,0
4,0	3,0	1,5	South and Central America^b	15,0	17,5	15,5
13,5	11,5	4,5	Asia	8,5	8,0	4,0
22,0	19,5	8,5	China	16,5	13,5	4,0
6,0	7,5	6,0	Commonwealth of Independent States (CIS)	20,5	20,0	15,0

a. Trade volumes data are derived from customs values deflated by standard unit values and adjusted price index for electronic goods.

b. Includes the Caribbean

Table 3.2 Growth in the volume of merchandise trade by geographical region, 2006-2008

Source: UNCTAD, 2009, p. 6

Shipping is demand-derived and in order to understand what drives trade, we have to study the world economy. Economists have over the past years developed an extensive set of international trade theories, but international economists and maritime economists approach this theory from different angles and with different focus. While maritime economists focus on the physical quantity of cargo transported, international economists focus on the value of the traded goods. Maritime economists are interested in why trade changes according to economic circumstances and they are not as interested in the different categories of trade as the international economists are. Also, when the maritime economists analyze trade they focus on the geographical regions and not political nation states (Stopford, 2009).

Some of the main driving forces behind shipping are according to Wijnolst and Wergeland (1997) energy consumption, the oil price, the business cycle and unexpected political events. (These driving forces will be discussed later in this thesis)

4. SHIPPING ECONOMICS

Shipping is driven by cash flows in and out of the industry and cash is the “stick and carrot”. The market uses cash to drive the shipping activity in the direction required, creating cyclical movements. The market cycle’s main purpose is to remove the weak actors, leaving only the strong to gain market share and also opens up for new entrants. This indulges a continuous movement of companies in and out of the shipping market. Shipping is as international as an industry can get, and in addition, the assets are mobile. This creates a globally competitive market and some shipping segments are very close to what classical economists refer to as ‘perfectly competitive’. To be perfectly competitive the markets have to be homogeneous, this is however not the case in all shipping segments. Over time, several market segments within shipping have evolved, with each segment trading different cargo and having specially built ships for their purpose. Even though the segments vary in character and purpose, they still compete for cargo and they all operate within the Four Markets of Shipping (Stopford, 2009).

4.1 The Four Shipping Markets

There are four markets controlling shipping; the **freight market**, the **sale and purchase market**, the **newbuilding market** and the **demolition market**. Even though each market trade in a different commodity, we find the same shipowners trading in all 4, and their activities are closely correlated. They all respond to cycles in trade, and as shipping companies’ trade in all four markets, the cash flows in and out of the market is what drives the shipping market cycle (Stopford, 2009).

The figure shows how each of the four markets have an effect on shipping companies, and where cash goes in and out of the shipping industry.

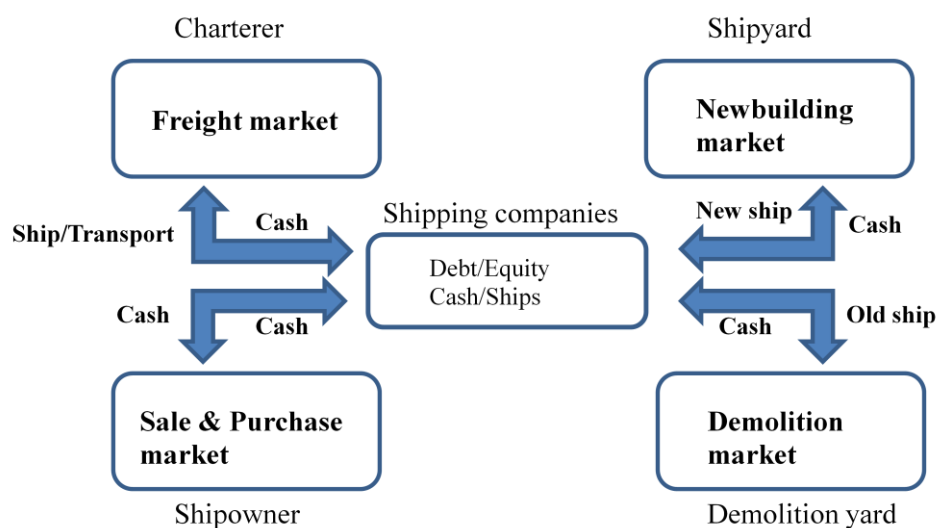


Figure 4.1 The Four Shipping Markets

Source: Author's own, after Stopford, 2009

Below is a brief description of the four shipping markets;

4.1.1 The Freight Market

The freight market can be split into three sectors; the voyage market, the time-charter market and the freight-derivatives market. Together these markets create freight revenues, which are the motivating force driving shipping investors' activity and the main source of cash in the shipping industry.

In this market, which trades in sea transport, cargo holders and shipowners "meet" and the shipowners agree with the cargo holder that they will ship their cargo from A to B at a given price, either according to an agreed future price or on the basis of a freight market index. As there are different markets for different cargo, there are also different freight indices for the different type of shipping segments (e.g. Baltic Dry Index, World Scale) (Stopford 2009).

The three sectors in the freight market have different purposes (Stopford, 2009);

1. The voyage market: trades transport for a single trip.
2. The time-charter market: when the ship is hired out for a specific period of time.
3. The freight-derivatives market: forward contracts settled against an index

Depending on which sector the shipowner and cargo holder meet in, there are different types of contractual agreements used when “sealing the deal”. How the costs and responsibilities are shared between the shipowner and shipper will settle the type of contract to be used (Stopford, 2009).

- Voyage charter: The shipowner transports the shippers’ cargo from A to B for a fixed price per ton.
- Contract of affreightment: The shipowner transports a series of cargo parcels for a fixed price per ton.
- Time charter: The charterer is given operational control of the vessel carrying his cargo while the shipowner still has ownership and control over the management of the ship. This can either be arranged for a single trip or as a period charter.
- Bare boat charter: The charterer has full operational control of the vessel, but does not own it. This is usually arranged for longer periods (10-20 years).
- Freight derivative contract: The contract is arranged against an agreed future value of a freight market index.

4.1.2 The Sale and Purchase Market

In this market second-hand ships are traded between a shipowner and an investor, and with the investor usually being another shipowner, the cash does not leave the shipping industry. In this market sales and purchases of already built and used ships take place. The transaction is usually carried out through a shipbroker. The ships may be for sale because they are too old or obsolete, the owner may be in the need for fast cash or has decided to change shipping segment.

The sale and purchase market is driven by volatile prices and “asset play” is an important part of succeeding; selling when rates are high and buying when they are low, but this can be a risky business. There are several factors determining a ship’s value; age, freight rate changes due to over- and under capacity, inflation and future expectations (Stopford, 2009).

4.1.3 The Newbuilding Market

The new building market brings new ships into the shipping industry and sends cash out of the market as materials, labour and profit (see figure 4.1).

In this market, ships that do not exist are traded; namely ships still waiting to be built.

Shipowners who want a ship of a certain size and specification and cannot find this in the second-hand market will have to contact a shipyard to have the ship built especially for their needs. The delivery time of a vessel can be up to 4 years, and it is therefore important to have good expectations of the future before ordering. When the market is at a peak, second hand prices can be higher than newbuildings prices, therefore owners and investors turn to the shipyards (Stopford, 2009). Below is a figure showing the distribution of new orders within the different shipping segments from 2000 to 2009.

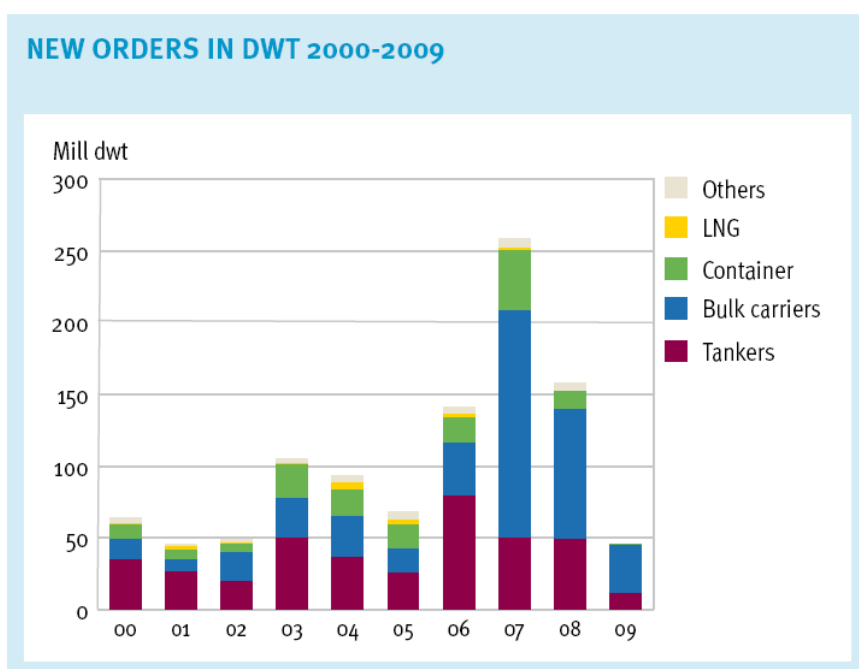


Figure 4.2 New orders in dwt, 2000-2009

Source: Platou, 2010, p. 12

4.1.4 The Demolition Market

The freight market is a source of cash into the shipping market and so is also the demolition market. Demolition yards buy old or obsolete vessels from shipowners. The yard breaks the vessel up into smaller parts and these parts are converted and sold for other purposes in the

steel industry. This is especially an important source of cash in a recession and also in order to keep balance between supply and demand.

This market can be compared to the sale and purchase market, but the difference here is that the buyer is a demolition yard and not a shipowner. When the seller has a ship too old to continue trading, he offers it to recycling; this is usually done through a broker. Most demolition yards are located in the Far East Asia; India, China, Pakistan and Bangladesh. Scrapping prices will depend on the world demand for scrap metal and the availability of ships for scrapping in the market (Stopford 2009).

5. BULK SHIPPING:

There are several different market segments within shipping, all with different features, degrees of competition and intensity. International shipping depends on the transportation of commodities, and there are several different commodities in world trade. The most important are the bulk commodities, both wet and dry (Wijnolst & Wergeland, 2009). The dry bulk commodities accounts for nearly 66% of total world seaborne trade when measured in total volume of cargo carried by sea (UNCTAD, 2009). According to Wijnolst et al. (2003), bulk shipping is considered to be one of the world’s most competitive markets.

Sea transportation of bulk cargoes started in the middle of the nineteenth century, and the structure and size of the fleet has gone through major changes since then with a number of different types of bulk carriers, with different sizes and standards (Wijnolst & Wergeland, 2009).

In 1960 the world fleet consisted of 471 bulk carriers, thirty years later, in 1990, the fleet consisted of 5 087, and in 2009 it consisted of 7 787 bulk carriers (Shipping Facts, 2009). The dry bulk fleet has continued to increase, and the past years this has mainly been due to China’s exceptional growth both in steel production and in imported iron ore (Wijnolst & Wergeland, 2009). The figure shows China’s import and export development from 1970 to 2008, and illustrates a rapid rise since 2000.

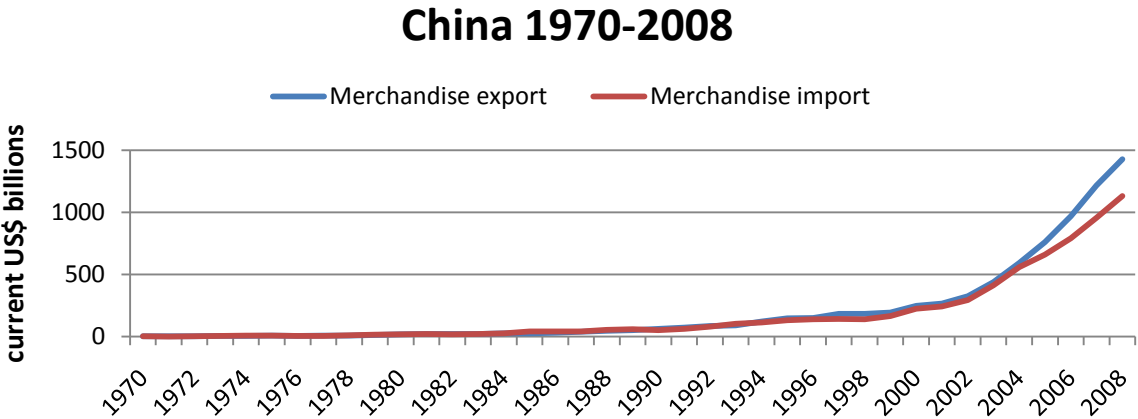


Figure 5.1 China’s exports and imports in current US\$, 1970-2008

Source: Author’s own, after data from The World Bank Group, 2009

5.1 Dry bulk shipping

The bulk fleet consists of dry bulk carriers, tankers and combined carriers (with the capacity to transport both dry- and wet bulk). In the following only dry bulk will be discussed.

Dry bulk shipping is a result of cargo volumes growing so large that the most convenient way of shipping was in large shiploads. Bulk¹ commodities are of low value and therefore the demand for equally low transportation costs grew. This introduced the principle of economies of scale; large loads of bulk cargo are shipped together reducing the transportation cost for each cargo load (Alizadeh & Nomikos, 2002).

According to Stopford (2009) there are four main characteristics to take into account when classifying a product as suitable for bulk transportation or not.

1. There needs to be enough **cargo volume** to fill a ship.
2. The cargo has to be **easy to handle and stow**.
3. The cargo should be of **low value** so it can be stockpiled.
4. The cargo should be a **regularly traded commodity**, as this makes planning easier.

The dry bulk market is remarkably close to what microeconomic theory refers to as a perfectly competitive market. This meaning that the assumptions below have to be fulfilled (Wijnolst & Wergeland, 1997);

- Numerous market agents and small relative to market size
- Market agents cannot influence the market price
- Homogeneous products
- Full information in the market
- Free entry and exit

In the dry bulk market there are a large number of participants, both private- and state owned companies. The products offered and demanded are homogeneous; although there are many producers of grain, grain will still be grain regardless of where it is produced. Another important factor for perfect competition in the shipping market is the mobility of ships. This mobility gives shipowners the possibility to reallocate their vessels according to where freight

¹ 'Bulk' covers both wet- and dry bulk, but in the following thesis, 'Bulk' is used as an abbreviation for 'Dry bulk'.

rates are at its highest; where the demand for sea transport is greatest (Alizadeh & Nomikos, 2002).

The dry bulk trade is divided into *major bulk trades* (iron ore, coal and grain) and *minor bulk trades* (phosphate, bauxite, soya, rice, sugar, fertilizers, metals and minerals, steel products and forest products). The three major bulk trades are the driving force behind the dry bulk market (Stopford, 2009).

5.1.1 Major dry bulk trades

Iron ore:

Iron ore accounts for the largest share of the major dry bulk commodity trades (Stopford, 2009). It is the primary raw material for the steel industry and in the past years we have seen an increasing development in world steel production and therefore iron ore imports. China is one of the leading nations when it comes to steel production and has seen an extreme increase the past decade. The development of iron ore shipments grew by 10% per annum from 2000 to 2007 (Wijnolst & Wergeland, 2009).

Coal:

Coal is the second largest dry bulk trade and is used for two different purposes, as coking coal for steel making and thermal coal for power generation (Stopford, 2009). Coal is like iron ore a growing commodity and has been growing fast since 2002, especially in China.

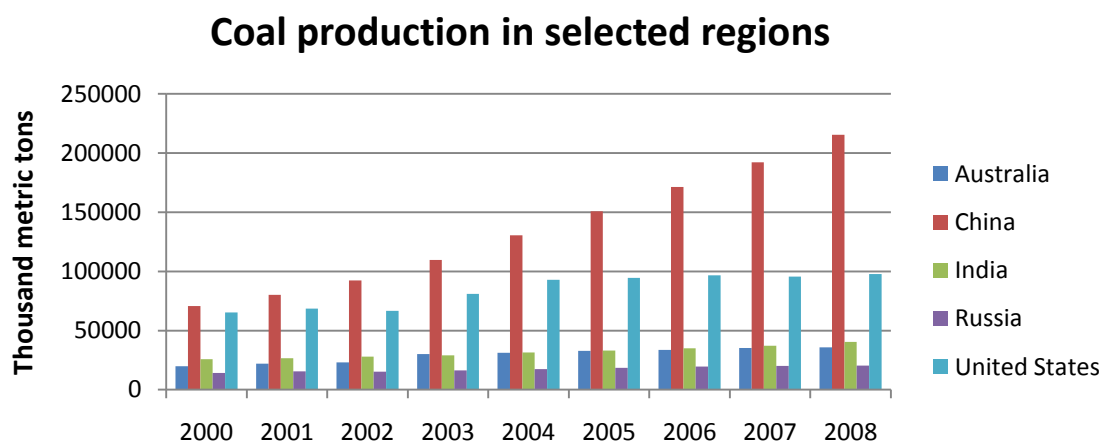


Figure 5.2 Coal production in selected regions, 2000-2008

Source: Author's own, after data from United Nations [UN], 2009

Grain:

Grain, is also a major bulk but differs from iron ore and coal in both economic- and shipping terms (Stopford, 2009). Grain is an agricultural commodity which follows the seasonal patterns in different parts of the world and is therefore sometimes unpredictable (Wijnolst & Wergeland, 2009). The largest bulk carrier can actually carry enough grain to feed nearly 4 million people for a month (Shipping Facts, 2009).

A dry bulk vessel is constructed with only one main deck, making it a versatile vessel with the possibility of multipurpose usage (Wijnolst & Wergeland, 1997).

According to size, length of the haul and the commodity trade patterns, dry bulk shipping can be split into 4 different cargo carrying capacity vessels (Alizadeh & Nomikos, 2002).

Vessel type	Vessel size
Handysize	10,000-39,999dwt
Handymax	40,000-59,999dwt
Panamax	60,000-99,999dwt
Capesize	over 100,000dwt

Table 5.1 Different dry bulk vessels

Source: Stopford, 2009

Note: Dwt is a measure of the total weight of cargo a vessel can carry when fully loaded, this including the weight of fuel, ballast water, fresh water, crew, passengers and baggage.

5.2 Up- and downturns in the dry bulk market

There has been many up- and downturns in the dry bulk market and in the shipping market as a whole since the early 2000s. Below is a brief summary of the years 2000 to 2009, with emphasis on the dry bulk market.

2000:

The year 2000 showed strong economic growth in nearly all geographical regions, this was mainly due to the fact that the US economy had a remarkable growth of 5.2%. World trade grew, this supported by strong growth in both industrial countries and the recovering economies in East Asia. In total, world trade grew by 12.5%, with a growth of 7% in world seaborne trade in terms of tones transported (Platou, 2001).

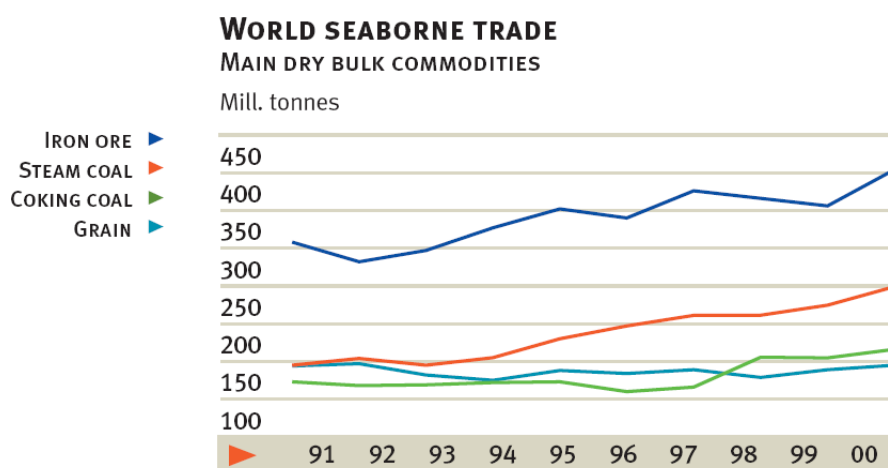


Figure 5.3 World seaborne trade of dry bulk commodities, 1991-2000

Source: Platou, 2001, p. 21

The dry bulk market had a significant recovery from 1999, and the average rate for Capesizes' doubled. The figure above shows the seaborne trade for the main dry bulk commodities, and it shows an increase in all trades from 1999. The demand for tonnage grew by 5% from 1999, and the utilization rate rose from 85% to 88%. The trade of iron ore grew with 12%, with China increasing its imports by 30% and other Asian countries by 7%. Steam coal consumption was on a continuous rise, this mainly as a result of new operational coal burning power utilities in Asia. With a growth of seaborne volumes of about 7%, the main importers were Asian countries. Mainly due to a drought in the Middle East and North Africa early

2000, the traded volumes of grain rose by 3% from 1999. Russia and the Far East Asia recorded higher imports of grain, while the main exporting countries were Argentina, Australia and China. According to Platou's (2001) calculations, the estimated increase in total seaborne trade of dry bulk cargoes was approximately 6% from 1999 to 2000.

2001:

The world economic growth had a sharp downturn, and in nearly all regions the growth slowed down. The growth was estimated to be no more than 2.4%, actually the lowest since 1991 (1.9%). The US went into a recession as early as in March 2001 and with its spillover affects to the rest of the world it created a synchronized global economic downturn. The only exception was China with its continuous growth. World trade increased only by 1%, nearly coming to a complete stop, this compared to 12.5% in 2000 was an extreme change. This miserable trend in the world economic activity obviously had negative effects on the world shipping markets. There were actually reasonable prospects for 2001, but after the tragedies of the terror attack on September 11th, all prospects were gone. For the first half of 2001, the freight market for dry bulk remained steady, but in the second half it weakened distinctively. The need for tonnage grew by less than 1%, and the utilization rate dropped from 88% in 2000 to 85% in 2001. China's economic growth continued, being an important source for the world tonnage demand; China's import of iron ore actually rose by 30%.

According to Platou (2002) the downturn in the market was explained by a long-awaited slowdown in the US economy; higher interest rates, rising energy prices and falling equity markets. Also the collapse in the IT sector and the terrorist attack had a great impact. There had actually not been as low capacity utilization in the US industrial sector since mid 1970s – early 1980s recession. The recession of 2001, was referred to as supply-driven and not demand-driven, and as a supply-driven recession usually is of a longer-lasting nature the recovery was expected to take time.

2002:

The downturn in the global economy in 2001 continued into 2002, with slow growth in almost all regions. Even though most shipping segments weakened from 2001 to 2002, they performed better than the slow global economic growth indicated, and world trade increased by 2.5% in 2002. With a decline in the utilization rate of 1.5%, there was only a moderate

decrease in the shipping markets. Due to low interest rate levels, shipowners still regarded 2002 as a relative profitable year despite the overall weakening of the shipping market conditions.

The dry bulk market was generally weak the first three quarters of 2002, but picked up significantly in the fourth quarter. The dry bulk fleet grew by 3.2%, while tonnage demand increased by 2.7%. The main driver behind this increase in tonnage demand was again China, with a large increase in steel production and consumption. Japan actually increased its steel exports to China with 80% compared to 2001. According to Platou's (2003) estimations, the world seaborne trade of dry bulk commodities grew by 2.5% from 2001 to 2002. The effects of September 11th on business and consumer confidence in 2002 were smaller and shorter than expected. Many multinational companies were more alert to East Asia's cost advantage and shifted their production from the West to the regions of East Asia, mainly China. This showed that in periods of economic downturns, western consumers are substituting expensive goods for less expensive Asian goods.

2003:

Throughout the year of 2003, there was a strong growth in seaborne trade, and the results being serious congestion problems, led to even more demand for tonnage. The tonnage demand was for the second year in a row higher than the world economic growth. According to Platou (2004) this gives a signal that a new period where seaborne trade correlates less with world economic growth had begun. The main explanation was China's growing position in world trade and less in the global economy as such. Both the newbuilding- and secondhand market reached high levels, with the ordering activity at the highest levels since 1973. Seaborne trade grew approximately 6% from 2002, with China accounting for more than half of this growth. Almost all shipping markets experienced a recovery, and combined with the falling interest rates, profitability in markets grew.

Throughout the first three quarters of 2003 the dry bulk market gradually strengthened. In October 2003 the market reached its tall, and over just a few weeks the spot rates doubled, the market was on a level never experienced before. The utilization rate grew from 85% to 93% in 2003. With China's extreme growth in imports; iron ore with 33% and steel products with over 50%, tonnage demand rose by 11% on a world basis. From Platou's estimations, over

70% of this increase in world tonnage demand can be explained by China's expansion (Platou, 2004).

2004:

2004 was an all time high in shipping and according to Platou (2005, p. 2); *"2004 will most likely be remembered for decades as the most profitable year for shipowners"*. In 2004 nearly all shipping market segments had an extreme upturn; in utilization, freight rates, and newbuilding- and secondhand prices. How can this "new turn" be explained? *"Was the transition to a new millennium also a transition to a brand new shipping environment?"* (Platou, 2005, p. 2) There may be several reasons for this; there had been reductions in international trade barriers, and after China joined the WTO in 2001 the country became one of the main contributors to the extreme upturn in the global economy and the shipping market. Due to strong growth in industrial countries and in emerging markets, like China, the global economic growth in 2004 was the highest in 30 years, with a 5% growth.

"2004- The strongest dry bulk market ever" (Platou, 2005, p. 25). The seaborne dry bulk trade in 2004 grew with nearly 8%, and the utilization of the dry bulk fleet was 97%. China had an important role in the growth for seaborne trade, and when it came to the demand for dry bulks, China was one of the main drivers.

2005:

The prosperity from 2004 continued into 2005, making it another excellent year for shipowners. So far this decade the long-term underlying growth in the world economy was a year on average of 3.9% compared to 3.3% in the decade of the 1990s. There had been noticed a positive shift in the relationship between economic growth and seaborne trade, mainly due to the fact that the distribution of growth in the world economy was more favorable for seaborne trade so far this decade.

The world tonnage demand had actually doubled since the 1990s; this could be explained as a result of important structural changes in the world economy and the liberalization of international trade. Another important factor in the expansion of world trade was the development of more efficient sea transportation systems. China with its growing industrialization and its WTO membership was still an important participant in seaborne

trade, and in 2005 contributed to approximately 40% of world growth in tonnage demand, 85% of this was growth in demand for dry bulk tonnage (Platou, 2006).

The dry bulk market continued strong throughout 2005, and according to estimates a 4.1% increase in seaborne dry bulk volumes from 2004, see the figure below.

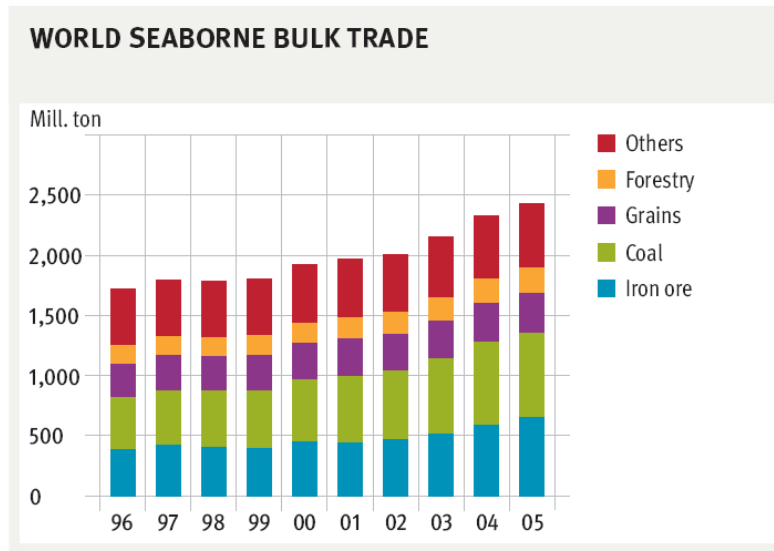


Figure 5.4 World seaborne trade of dry bulk commodities, 1996-2005

Source: Platou, 2006, p. 22

2006:

2006, was considered as a surprisingly good year for shipowners. Due to an unexpected high economic growth the demand for world merchant tonnage was still strong. On an average basis the global tonnage demand increased by 6.3% annually in the first seven years of this decade, this was a doubling of the 1990s trend. Platou's (2007) researchers believed that there were good chances that this was the new growth pattern in the years to come. Even shipyards had adopted this view and they were expanding their shipbuilding capacities quickly. In 2006 the correlation between global economic growth and the growth in tonnage demand was high (see figure 5.5).

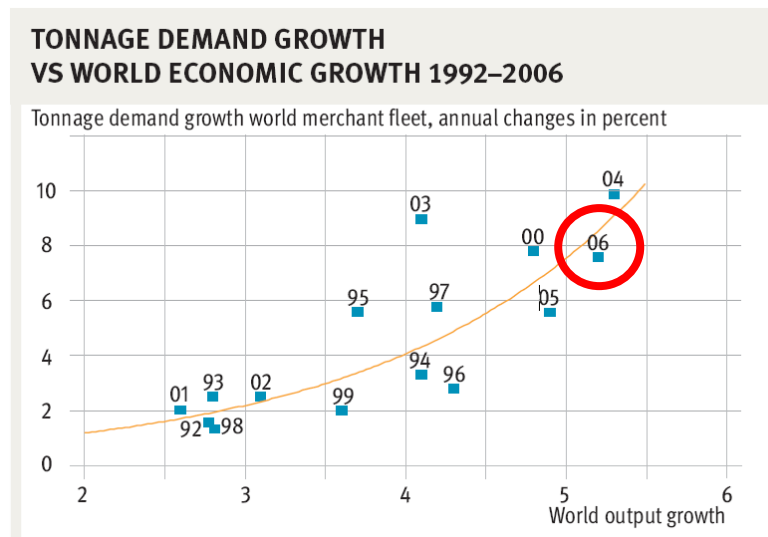


Figure 5.5 Tonnage demand growth vs. World economic growth, 1992-2006

Source: Platou, 2007, p. 3

The total merchant fleet increased as much as 8.4% in 2006 and the world economic growth was even higher than predicted in 2005. The most important driver for world trade and tonnage demand was again China, and nearly 40% of the extra need for seaborne trade was due to China's growth.

The dry bulk fleet rose by almost 7% in 2006, while the fleet utilization actually was reduced from 94% to 93.7% on a yearly basis. China's steel exports in 2006 had a substantial increase, and in the dry bulk segment the most interesting feature was the growth in longer haul destinations in steel products, such as to Europe, the US and the Middle East.

The growth in the years 2004 to 2006 had been exceptionally strong and to find a similar growth period we have to go back as far as to the 1970s. In 2006 forecasters predicted a slower world economic growth in 2007. It was anticipated that US households would increase their savings rate throughout 2007 and also have a reduction in private consumption. This correlation in the housing market had historically led to a recession, but in 2006 forecasters and analysts expected a soft landing. Analysts wondered in 2006 whether this US downturn would have a spillover effect to the rest of the world. Today we know the effects were severe throughout the world. Another question the Platou Researchers asked in 2006 was whether the shipyards over-expanding capacity and shipowners large ordering book would lead to a fleet

growth larger than the growth in tonnage demand, and again, this was also proven to be correct (Platou, 2007).

2007:

As analysts predicted in 2006, the financial crisis was confirmed in the bank and housing sector in the US late 2007, and the effects rippled throughout the world. Even though the crisis was a fact, the shipping markets in 2007 will be remembered for the extremely strong dry bulk market, actually the strongest ever. The world fleet was growing fast as the shipbuilding industry was vigorously expanding its capacity. When the market can absorb such a strong fleet growth it is primarily a sign of a well working global economy. The shipyards order books were stretching out to 2011/2012, so the only insecurity for the shipping markets was the global economy. In 2007 there was a high degree of doubt regarding the outfall of 2008. After five years of high economic growth there were expectations of a slow-down in 2008, this initiated by the subprime crisis in the US. Many macroeconomics were uncertain as to the spillover effects this would have on the rest of the world. As previously mentioned, the dry bulk market was the strongest ever in 2007. Freight rates doubled from 2006 and the fleet grew by 7%. According to Platou's (2008) estimations, the demand for tonnage rose 13% in 2007. This extremely strong dry bulk market and the growth in transport volumes was mainly due to increased sailing distances, more port congestions and longer waiting time for repair of vessels.

The past four years, there had been a undershooting of economic growth; this resulted in a persistent underestimation of the shipping market conditions. The US economic downturn and how serious the effects on the rest of the world would be was one of the uncertainties for 2008. Already in 2007 there was economic data that indicated that there was an increased likelihood for a recession. What would the spillover effects of the financial crisis in the US be on the rest of the world? (Platou, 2008).

The past five years had been the longest unbroken period of high economic growth in 35 years. Not only had the growth been unusually strong, but it had also been shared across many different countries. Developing- and emerging countries accounted for a much larger share of the world economy, reducing the volatility of growth (see figure 5.6).

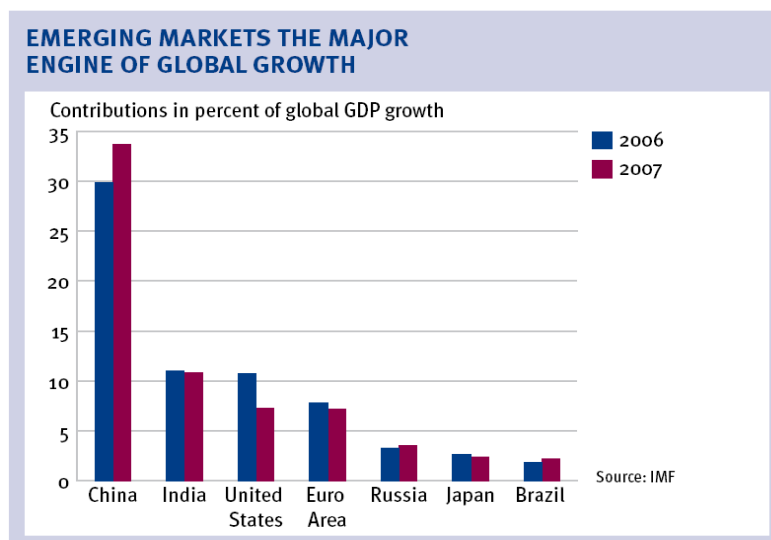


Figure 5.6 Emerging markets - the major engine of global growth

Source: International Monetary Fund [IMF], cited in Platou, 2008, p. 7

The dry bulk market experienced an increase in seaborne transportation of around 7 % from 2006 to 2007. The fleet utilization rate increased by 6% and the freight rates more than doubled compared to 2006. Even the secondhand-prices had a great increase, for 5- and 10 year-old ships the value raised 70-80% from the end of 2006 to the end of 2007. The forecasts for 2008 indicated that there might be strong fluctuations during the year. The most critical scenario for the dry bulk market in 2007 was if the world economy had a more significant setback than expected (Platou, 2008).

2008:

“The exceptionally long shipping boom is over and has been replaced by an unusual uncertainty and a real danger of developing a structural overcapacity” (Platou, 2009, p. 4)

As mentioned, 2007 was considered the strongest dry bulk market ever. This changed in 2008 as this year was considered the most volatile dry bulk market ever. There were extreme fluctuations in the freight market, with Capesize rates down from \$200,000 per day in May to \$5,000 per day in November.

Due to a strong aggravation of the global economy towards the end of 2008 together with a fleet growth of 8% there was a great decline in the utilization rate for most shipping segments.

The financial collapse in the summer of 2007 in the US, took a turn to the worse in September 2008, spreading to the rest of the world, and hitting the shipping market hard.

After 5 years with exceptionally high economic growth, the path of 2008 was replaced with decreasing growth rates in world trade and in seaborne transportation. The financial crises lead to serious problems for funding newbuildings, the purchase of secondhand vessels and payment of cargoes (Platou 2009).

2009:

In late 2008, economists feared that the global economy could actually go into as great a depression as experienced in the 1930s. Luckily, in 2009 there were signs that the world economy was expanding again. The fall in economic activity in 2008 was the greatest since World War II. The main reason for the slow but growing recovery was due to the public interventions both in developed and developing countries. This governmental support would slowly be withdrawn encouraging private consumption and investment to drive the recovery back to more normal conditions.

World shipping is today much more dominated by raw materials than the total world trade. By the emerging countries, with China in particular, the trade of raw materials was well maintained in 2009. With China's GDP growth of 8.7% compared to the OECD countries decline in GDP of 3.5% we can see the trend that emerging countries drive world shipping. With the freight rates in the bulk market falling 60% compared to 2008, the dry bulk market was still stronger than expected in 2009 with freight rates improving throughout the year. The utilization rate for the world merchant fleet fell from 90% in 2008 to 81% in 2009, but the effects on the shipping segments were different. The bulk carriers and tankers, transporting raw materials, had a much better market position than car carriers, transporting manufactured goods (Platou, 2010).

Throughout 2009, there was strong volatility in the dry bulk market. Especially in the Capesize sector; in January the day rates were less than \$5,000 but in June and November the rates rose to \$80,000 per day. In the figure below we see how TC rates for different bulk carriers moved from 2000 to 2009.

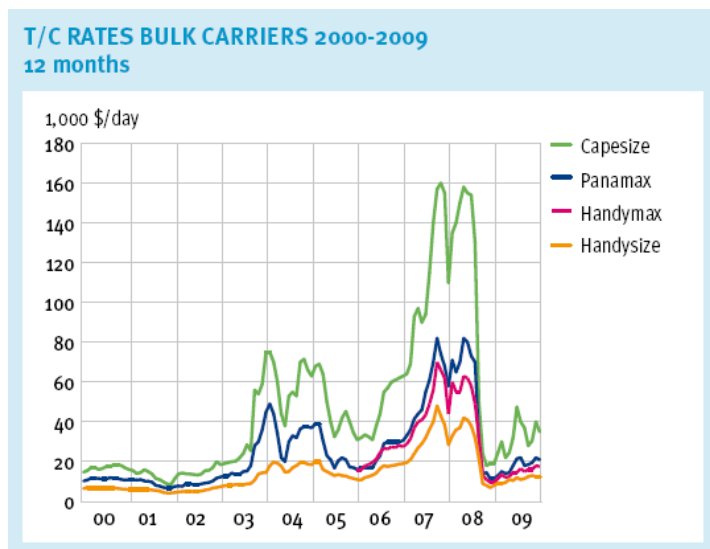


Figure 5.7 Movements in the T/C rates for bulk carriers, 2000-2009

Source: Platou, 2010, p. 21

The main reason for stronger tonnage demand throughout 2009 was the increase in China's imports of raw materials. As the world market commodity prices were low, the incentives to raise imports grew stronger. Especially for iron ore and coal, international prices were much lower than China's domestic prices. In the first five months of 2009 China's total dry bulk imports increased by 28% (Platou 2010). The figure illustrates the dry bulk fleet growth, from 2000 to 2009.

The bulk fleet development 2000-2009

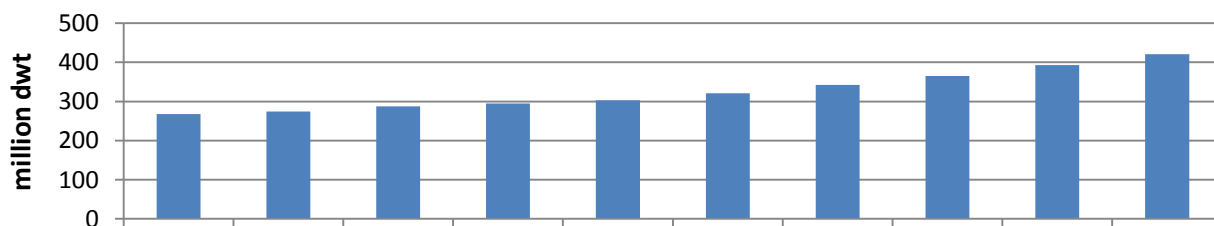


Figure 5.8 The bulk fleet development, 2000-2009

Source: Author's own, after data from Platou, 2010

6. CYCLES:

In 1990, Michael Porter wrote '*The competitive advantage of nations*'; he developed a model that described the process countries go through in their search for wealth. The level of economic wealth will depend on the country's productivity where national resources are used, and their ability to successfully compete with both existing industries and new market segments. Economies go through four stages of competitive development; factor-driven, investment-driven, innovation-driven and wealth-driven. The first three stages are usually associated with a rising economy as the stages involve upgrading and increasing a country's competitive advantages. The last stage will diminish with time and ultimately decline (Wijnolst & Wergeland, 2009).

Innovation is what drives wealth creation and will lead to increased competitiveness which in the end turns to more prosperity. The driving forces behind innovation, at company level, can be explained as the survival of the firm against international competition. If there is no competition there would be no need to innovate. In order to stay ahead of market competitors, a company will always have to work towards increasing the quality of their products and reducing the costs. This continuous search for new technologies and innovation can best be described by the *product life cycle*, a four phase model showing how a product evolves over time; introduction, growth, maturity and decline. Another important model, the *product and process innovation model*, is more technological specified. According to this, as new products emerges the importance of technological development shifts from *product* innovation to *process* innovation. This concept, introduces the issue of fundamental economic changes over long periods of time, creating cyclical patterns. This cyclical process was analyzed by the Russian economist Nikolai D. Kondratiev (1892-1938). He identified three cycles of economic recession, depression, recovery and prosperity over a 55 year period of time; this has later been referred to as the *Kondratiev Waves* (Wijnolst & Wergeland, 2009).

In the past we have seen a relative stable and slow change to the competitive environment, but over the previous century the pace has changed dramatically, with an increase in many sectors. This has resulted in the world economy as we know it today and changes in the

turbulence level of the competitive environment. As we know from the maritime industry, turbulence and volatility are basic characteristics. Both the tanker and bulk market are good examples of this; freight rates in these segments have seen some extreme up- and downturns and have made it clear that these shipping segments are constantly exposed to chaos (Wijnolst & Wergeland, 2009).

Cycles occur in many industries and are not unique to shipping (Stopford, 2009). A cycle is “*an interval of time during which a sequence of a recurring succession of events or phenomena is completed*” (“Cycle”, 2010). According to Lorange (2009, para. 1); “*Virtually all businesses are cyclical and reflect the imbalances between supply and demand among the underlying activities of each given business*”. The length of a cycle varies and it is important to separate a long-term trend from a short-term cycle. The typical time series of a cycle can, according to Stopford (2009), be as a long-term cycle, short-term cycle or as a seasonal cycle.

In the long-run, cycles are driven by economical, technical and regional changes. These changes are hard to detect, and the effects may only be indirect.

Short-term cycles, or also called economic business cycles, can be explained by demand and supply in the market. “*These short cycles ‘shoot up and down’, and are easy, indeed conspicuous to see*” (Stopford, 2009, p. 96). Short-term cycles are said to be “periodic”, consisting of a sequence of phases, but being periodic does not mean that the cycles have to be of equal duration. From the past 50 years of cyclical patterns, future cycles are expected to last between 2.6 and 10.6 years. This wide gap increases the importance of studying each cycle as exceptional and unique in order to try and understand the next (Stopford, 2002). This confirms the statement that shipping is a volatile business and that only the strong will survive.

Seasonal cycles are common in shipping and create fluctuations in freight rates throughout the year. This is usually in response to different seasonal patterns of demand for sea transport, and an important issue for the dry bulk agricultural trades. E.g. in the grain trade, freight rates will differ depending on the time of harvest (Stopford, 2009).

6.1 Shipping cycles

A short-term shipping cycle has four stages, see figure 6.1, first the *trough*; here the market is at its bottom low, and freight rates fall, forcing shipowners to reduce operating speed and put ships in lay-up. Then the *recovery* follows, and the first sign is that freight rates raise. After the recovery, comes the *peak*, here the market is at its best and demand and supply are in tight balance and freight rates are at its highest. Then, as in all cycles, the *collapse* of the market follows. Supply has exceeded demand, freight rates fall and vessels are put in lay-up or scrapped (Stopford, 2009).

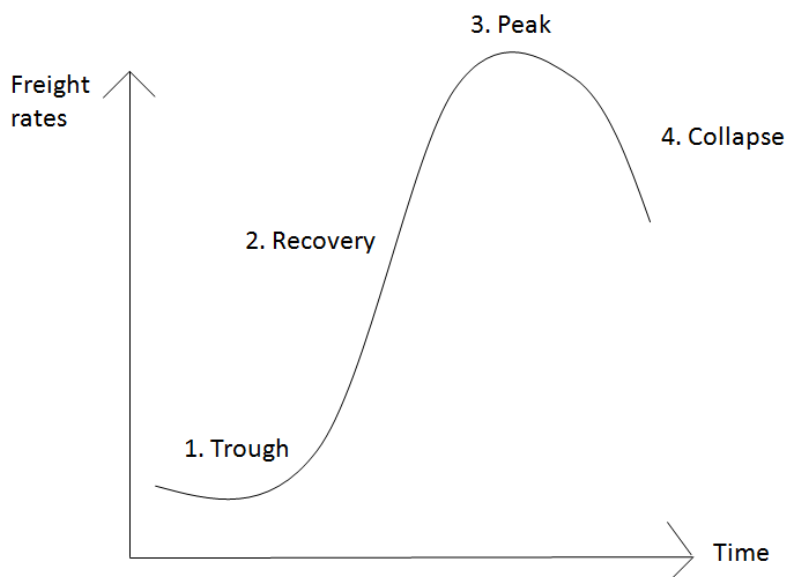


Figure 6.1 Stages in a shipping cycle

Source: Author's own, after Stopford, 2009

Short-term shipping cycles are driven by demand and supply in the shipping market. The interaction between supply and demand determines the freight rates in the market which again has an impact on the course the cycle will take. In order to understand what factors influences supply and demand, we have to take a closer look at some of the variables in Stopford's (2009) 'Shipping Market Model'.

6.2 Shipping Market Model

In table 6.1 we find the variables that contribute to the evolvement of shipping cycles.

Demand	Supply
1. The world economy	1. World fleet
2. Seaborne commodity trades	2. Fleet productivity
3. Average haul	3. Shipbuilding production
4. Random shocks	4. Scrapping and losses at sea
5. Transport costs	5. Freight revenue

Table 6.1 Ten variables in the Shipping Market Model

Source: Stopford, 2009

6.2.1 Demand

The most important and significant influence on ship demand is the world economy, and through business cycles and trade development cycles the world economy may change the demand for sea transport. According to Stopford (2002) there has historically been a close relationship between world industrial production cycles and seaborne trade cycles (this will be further elaborated in chapter 8).

How do these economic cycles occur? To make the explanation easier we should distinguish between external and internal factors. An important internal mechanism that leads to economic cycles is the multiplier and accelerator. When the economy is at its tall, investment increases and income is raised by even a larger amount (investment multiplier). Due to this, there will be an increase in the demand for the product (income accelerator) which then generates demand for more investment, leading to an expansion of the economic system. In the end, labour and capital will be fully utilized, bringing the economy to a halt and reversing the process. This is what Stopford (2009, p. 141) refers to as the “*instability in the economic ‘machine’*”.

Another important factor effecting cyclical fluctuations is time-lags. When there is a delay between decisions and the implementations of these decisions, we see some extreme effects in the market. A very good example of how extreme these effects are can be found in the shipping industry. New ships are ordered, usually during a market boom, with a delivery time of up to 4 years. When it is time for delivery, the market may already have entered a

recession. There is now too much tonnage capacity in the market, making an already large surplus even greater. Time-lags results in more extreme and cyclical recessions and booms (Stopford, 2009).

One of the most important causes for short-term fluctuations in seaborne trade and in demand for sea transport is the world economic cycle, the 'business cycle'. Business cycles, like shipping cycles do not follow a specific path and many factors have to be taken into account. Especially important is to distinguish between business cycles and random shocks. Random shocks have a great impact on ship demand and by upsetting the stability of economic systems, they create cyclical fluctuations. The shocks are unique and may be observed as changes in weather conditions, wars, political events or as commodity price changes. Ship demand has over the past years been affected severely by economic shocks. Economic shocks create sudden changes in demand for sea transport, they are unpredictable and the effects are dramatic. The oil crisis in 1973 and 1979 are good examples of economic shocks creating recession in the shipping market, other examples are the Asian Crisis in 1997 and the ongoing financial crisis.

Seaborne commodity trades elaborate on the relationship between sea trade and the industrial economy by discussing short-term and long-term trends. The seasonality of some types of trades is an important cause of short-term volatility in the shipping market, and the participants operating with these trades usually work in the spot market. In the long-term we have to look for changes in the industries that produce and consume the commodities that are traded, this implies changes in demand, changes in the supply sources, changes in trade patterns due to relocation of the processing plant and lastly, changes in the shipper's transport policy (e.g. closure of the Suez Canal) (Stopford, 2009).

An important factor effecting shipping demand is the average distance of the haul. This indicates the average distance in miles that one ton is carried and is computed by dividing total ton-miles by total tons of cargo shipped. The average haul may work as a good indicator of the demand for tonnage in the market, and a good example is the closure of the Suez Canal. If the Suez closes, shipments from Asia to Europe have to go around the Cape of Africa, instead of through the Suez Canal. This increases the transportation time by approx 10 days,

and will increase the demand for tonnage considerably as vessels can do less trips in the same amount of time as before the Suez was closed; the result is an increase in the average haul.

The cost of sea transportation is an important factor for shippers deciding to ship cargo. Over the last century, larger and more efficient ships and more effective shipping services have reduced the transportation costs while improving the quality of shipping services (Stopford, 2009).

6.2.2 Supply

The supply of sea transportation is controlled by four main groups of decision-makers; the shipowners, the shippers/charterers, the banks that finance shipping and the regulatory authorities.

The first and most influential driver of ship supply is the world merchant fleet. As of 1.1.2010 the world fleet consisted of 1 218 700 dwt (Platou, 2010). Figure 6.2 illustrates the allocation of the world fleet by ship type.

World merchant fleet as of 1.1.2010

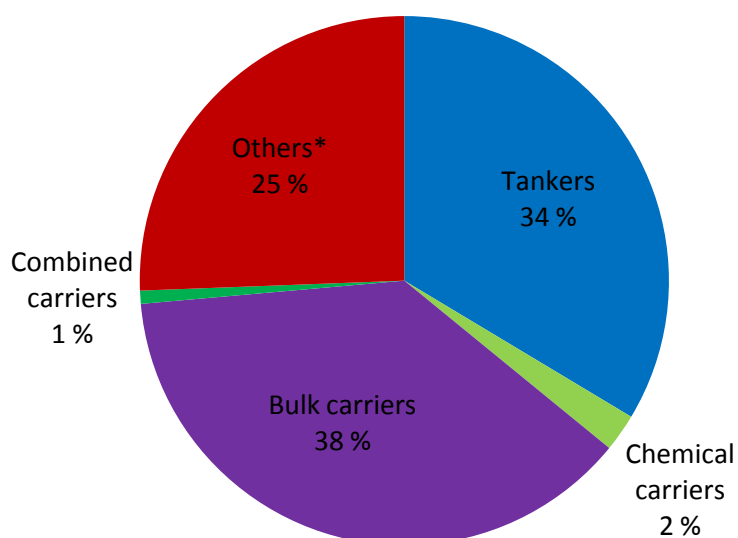


Figure 6.2 World fleet by ship type, measured in % of total dwt

Source: Author's own, after data from Platou, 2010

* Container, Reefer, Cruise, Ro-Ro, Car carriers, LNG, LPG.

The growth rate of the fleet will in the long-run depend on the scrapping and deliveries of vessels.

The current fleet is fixed in size, so the productivity of ships, or also called fleet productivity is what adds the element of flexibility to the supply side of the model. The fleet productivity is measured in ton-miles and depends upon four mechanisms; speed, port time, deadweight utilization and loaded days at sea (Stopford, 2009).

Freight revenues have great impact on the supply of sea transportation, both in the short-term and in the long-term. In the long-term, as mentioned above, the volatility in freight revenue is what determines when to scrap and order new vessels as it contributes to investment decisions of the decision-makers, this is also referred to as the investment cycle. Contrary, in the short-term, freight revenues motivate decision-makers to adjust the tonnage capacity in the market, either by adjusting operating speed or moving vessels in and out of lay-up (Stopford, 2009).

6.2.3 Freight rate mechanism

Supply and demand are linked together through the freight market and according to the balance of available ships and cargo in the market, shipowners and shippers negotiate and try to establish a freight rate which best reflects this; when there is a surplus of ships the rates are low and when there is a shortage of ships the rates are high (Stopford, 2009).

In order to understand how the freight rate mechanism works, it is important to study the supply and demand functions.

Supply function:

For an individual ship the supply function describes the amount of transport the owner can provide at each level of freight rates. Figure 6.3 illustrates how the market adjusts to supply provided by a fleet of ships. In response to freight rates the supply function works by moving ships in and out of service. There are three factors affecting the slope of the short-term supply curve. First, the age of the vessel, an older ship usually has higher operating costs, so lay-up will occur at a higher freight rate than for newer ships. Second, the size of the ship; larger ships have lower transportation costs per ton of cargo. Third, is the relationship between

speed and freight rates, which can be defined from economic theory; if the market is perfectly competitive, the ship will be operated at the speed at which marginal cost equals the freight rate (Stopford, 2009).

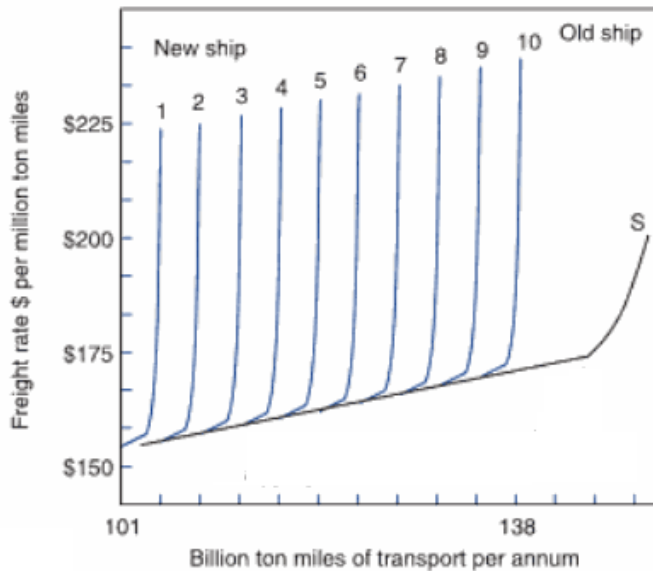


Figure 6.3 Supply curve

Source: Stopford, 2009, p. 161

Demand function:

The demand function shows how charterers adjust to the price changes in the market. The reason the demand curve almost is vertical, as seen in figure 6.4, is due to the fact that there are few competing transportation modes in the market. Shippers have cargo they need to be transported, and as transportation by sea in most cases is the only possible way, they must ship the cargo regardless of cost (Stopford, 2009). It is important to mention that compared to the total cost of the

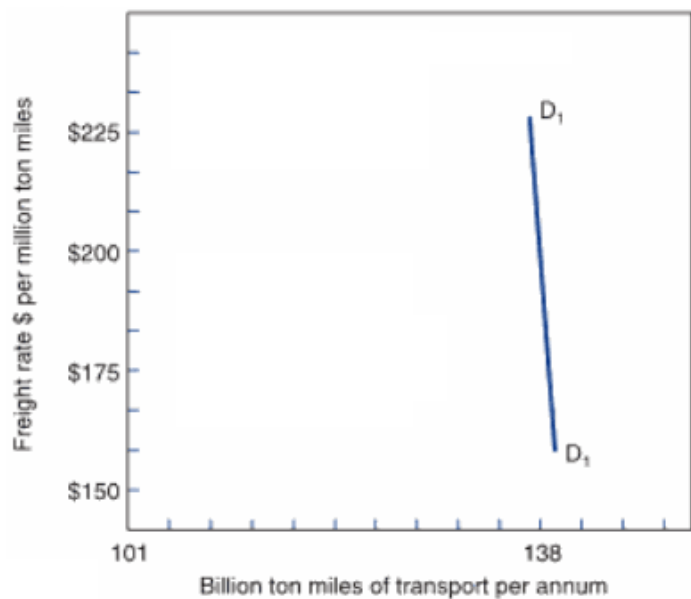


Figure 6.4 Demand curve

Source: Stopford, 2009, p. 161

products transported, transportation cost only constitute a small part and therefore the demand for transportation of goods will not be affected much if freight rates increase. The share of shipping cost compared to the sales price is shown below.

Sea transportation costs, Asia-US and Asia-Europe trade

Commodity	Sales price	Shipping cost
1 TV-set	\$700,00	\$10,00
1 kg of coffe	\$15,00	\$0,15
1 can beer	\$1,00	\$0,01
1 ton iron ore*	\$174,00	\$12,00
1 car	\$30 000,00	\$300,00

Table 6.2 Sea transportation costs vs. Sales price

Source: Author's own, after data from Shipping Facts, 2009 and The Steel Index

*The iron ore price is based on - 62% Fe fines: US\$ 174.09 /dry metric tonne, average rates as of 7 May 2010.

In order to understand why freight rates behave the way they do we have to take a closer look at the time-frame. Market prices evolve from present and future expectations, as well as from long-run and short-run trends. There are three time periods to consider when evaluating freight rates; momentary equilibrium, short-run- and long-run equilibrium. Momentary equilibrium is when a deal has to be made right away, this is done in the spot market, and freight rates are negotiated on a day to day basis. Short-run equilibrium gives the market-actors time to adjust supply by lay-ups, reactivating ships, or speed alteration. In the long-run, shipowners can adjust by ordering new ships or scrapping old and obsolete ones, and in this way control their supply sources.

The purpose of shipping market cycles is to remove the weak actors, leaving only the strong to survive and grow. This will in the long-run create an efficient and competitive shipping business (Stopford, 2009).

6.3 Shipping Cycle Composite Model

In order to analyse the influences on cycles and better make future predictions that actually might turn out to be correct, Stopford (2009) has created the **shipping cycle composite model** and he states that one of the reasons that shipping cycles are irregular is the fact that they are not driven by only one single economic model, but by the interaction of five separate models, see the figure below.

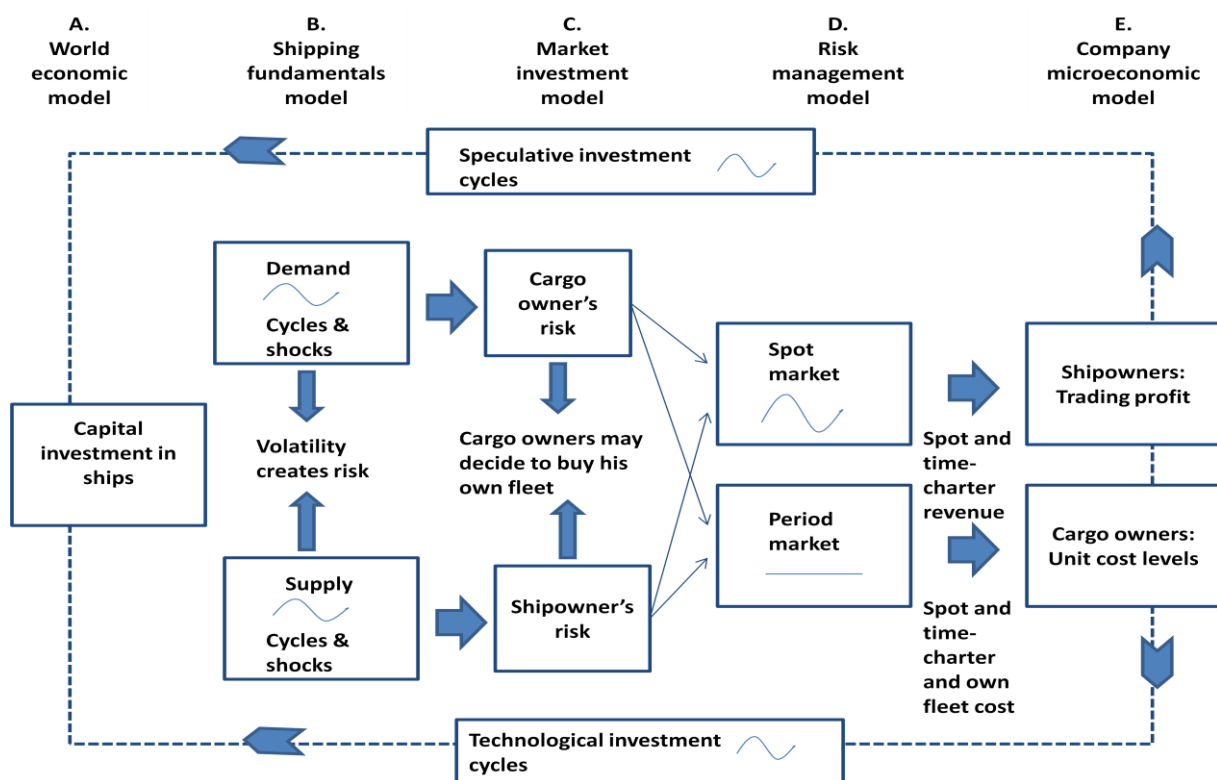


Figure 6.5 The shipping cycle composite model

Source: Stopford, 2009

In the following I will give a brief introduction to the different models and how they all fit into the composite model. (All after Stopford, 2009)

A. World economic model:

This provides the main stimulus to shipping cycles. In order to come to terms with shipping cycles, the factors that may change demand for the product must be recognized.

B. Shipping fundamentals model:

This deals with three types of changes affecting demand; business cycles, economic shocks and secular trends. Business cycles affect the demand for seaborne trade in the short-run. Economic shocks also affect demand for seaborne trade in the short-run, but the changes are often more extreme, as they produce changes of trends. Secular trends are long-run changes due to economic development such as new technology or the emergence of new major regions. These three variables all contribute to the change of seaborne trade and are of importance when studying the shipping cycle.

C. Market investment model:

One of the main business drivers is the economic force making cargo owners and shipowners adjust their behaviour with sentiment in response to market circumstances when reliable forecasts are absent.

D. Risk management model:

The world economy gives no guarantees and generates uncertainty regarding the volumes of trade to be carried in future years; this introduces the question of risk management.

E. Company microeconomic model:

This deals with the effects of cycles on a company level. Shipowners and cargo owners are greatly affected by movements in the shipping market, as profits change for the shipowners and costs of shipments change for the cargo holder.

7. MARITIME FORECASTING:

“For most shipping investors forecasting is not optional. It is how they earn their living.”
(Stopford, 2009, p. 697)

Forecasts of the maritime industry have in the past been very poor and many times turned out to be completely wrong, this due to the fact that many important aspects of the future shipping industry are extremely hard to predict. In order to predict future freight rates, forecasters have to know how many new ships will be ordered and how many will be scrapped, but as these factors are driven by the shipping cycle, the prediction is almost impossible. The same goes for the world economy, which plays a great part of the shipping industry, as business cycles and crises may occur without notice and are far too complex to predict (Stopford, 2009).

7.1 Forecasting and predicting cyclical patterns

The supply and demand model, also called the shipping market model, drives shipping cycles. Therefore when it come to forecasting the future, these variables are extremely important to try to predict. When producing a forecast using the shipping market model there are some variables that are more important than others, and the process should include nine different stages (All after Stopford, 2009).

Stage 1: Economic assumptions:

First, the forecaster has to decide what period the forecast is to cover and then make assumptions about the way in which the world economy will develop within this period. The forecaster also has to decide which regions of the world to take into consideration. Calculating the growth of world GDP and the growth rate for industrial production in the main economic regions of the world, is one of the specific requirements for the forecasting model.

Stage 2: The seaborne trade forecast:

The best way to forecast seaborne trade during the period of review is to use a regression model. An example is to find the linear relationship between world GDP and seaborne trade.

Stage 3: The average haul forecast:

The average haul forecast can be done in two different ways; either by projecting historic trends in the average hauls for each commodity, and then to try and understand which factors may have caused the average haul to increase or decrease. The other way is to analyze the trade matrix for each commodity and then calculate the average haul.

Stage 4: The ship demand forecast:

Ship demand is measured in ton-miles of cargo, and the total requirement for sea transport is calculated by multiplying seaborne trade by the average haul.

Stage 5: The merchant fleet forecast:

The supply side of shipping is influenced by the merchant fleet, and the size of the merchant fleet will depend on new deliveries, scrappings and losses at sea. Since scrapping and newbuildings are behavioral variables depending on the freight rates in the market, it is difficult to do accurate forecasts. Therefore, forecasters usually do their predictions on a year to year basis, using computer models that adjust scrapping and newbuildings with the overall supply and demand balance.

Stage 6: The ship productivity forecast:

A ship's productivity is measured by "*the number of ton miles of cargo carried per deadweight of merchant shipping capacity per annum*" (Stopford, 2009, p. 721). To forecast the productivity, past statistical series of the fleet productivity in tons per deadweight or ton-miles per deadweight should be projected forward. It is important to take into consideration any trend change that might be possible. As the productivity depends on market conditions, the forecaster has to take into consideration that when market conditions improve, the fleet will speed up and vice versa.

Stage 7: The shipping supply forecast:

We know that by definition supply should equal demand, so if supply is greater than demand the supply surplus is assumed to be laid up or absorbed by slow steaming. If supply is less than demand, fleet productivity will increase.

Stage 8: The balance of supply and demand:

As mentioned in stage 7, supply must equal demand. If the forecasted level of supply and demand do not equal, there has to be made adjustments according to the changes the market is believed to make in response to different financial changes such as asset prices or freight rates.

Stage 9: Freight rates:

Forecasting freight rates is very important in order to find which level of freight rates will accompany each level of supply and demand. It is important to remember that as the supply-demand model approaches balance, the freight rates become very sensitive to small changes.

Galbraith (as cited in Roubini, para. 2) stated, "*There are two kinds of forecasters: those who don't know, and those who don't know they don't know.*"

As one cycle is never exactly the same as another, forecasting is difficult and sometimes impossible. "*Cycles are not 'cyclical' if by this we mean 'regular'. In the real world shipping cycles are a loose sequence of peaks and troughs*" (Stopford, 2009 p. 131). Business cycles have historically been between 2.6 years and 10.6 years in length, this is from an economical perspective a too wide range, so forecasters have to look elsewhere for accuracy. The best way to narrow down the possibilities that lie ahead is by closely analyzing the world economy and the shipping investment cycle of deliveries and deletions of vessels. From past event we have experienced that recession in the shipping market usually is due to a global economical recession, e.g. the depressions in 1931 and 1983. So when it comes to predicting shipping cycles, the question of risk management is important. In shipping there will be a winner for every loser, and by engaging in highly complex analysis of the economical and political forces that drives the shipping market, you can use the information in your favor. It is important to see how the competitors are playing the 'game'; this is where mass psychology has its influence. Some economists have stated that mass psychology actually makes cyclical movements more extreme and more intense. When people act in an imitative manner over a period of time, a market trend can build up, affecting the whole economic system. Therefore, market pessimism or optimism can actually create cyclical patterns in the market (Stopford, 2002).

8. THE TRANSITION OF THE 21ST CENTURY

From the shipping market cycle we know that after a peak, follows a collapse, bringing the market into a recession. The severity of the recession and which market segments it will influence varies. When looking back on historical events, it is easy to characterize a cycle's peak, through and collapse, but forecasting when a cycle reaches its peak is almost impossible, even with the most advanced forecasting techniques available.

In order to better understand the shipping market behavior, studying the factors behind the stages of a shipping cycle is a good place to start.

There are numerous factors influencing the up- and downturns in the dry bulk market; there are circumstances we don't even know exist that might have effects on cyclical patterns in the future.

This decade the world has seen some of its most volatile financial markets and shipping markets ever, creating extraordinary up- and downturns. In the following the underlying factors as to why the dry bulk market experienced these changes will be discussed.

8.1 Inter- vs. Intra-Industry Trade

Let us start at the basis of international trade; the trade theory. Many changes have been made to the once so simple theory of Adam Smith and David Ricardo introduced in the 18th and 19th century. From the trade theory of comparative advantage we know that a country will export the goods and services that it can produce at a low opportunity cost and import the rest; this is also referred to as *inter-industry trade*. Throughout the past decades a "newer trade theory" has evolved and we have seen a growing trend in what is referred to as *intra-industry trade*; this is trade between equal countries and equal industries.

Brühlhart (2008, p. 3) states " *In 2006, 27 percent of global trade was intra-industry if measured at the finest (5-digit) level of statistical aggregation, and 44 percent if measured at a coarser (3-digit) level of statistical aggregation*". Since the 1960s there has been a steady growth of world

intra-industry trade, see the figure below, which according to Brülhart (2008) might be a result of economies becoming more similar over time, this especially in the terms of sectoral composition; which is the break-down of economic activity into sectors.

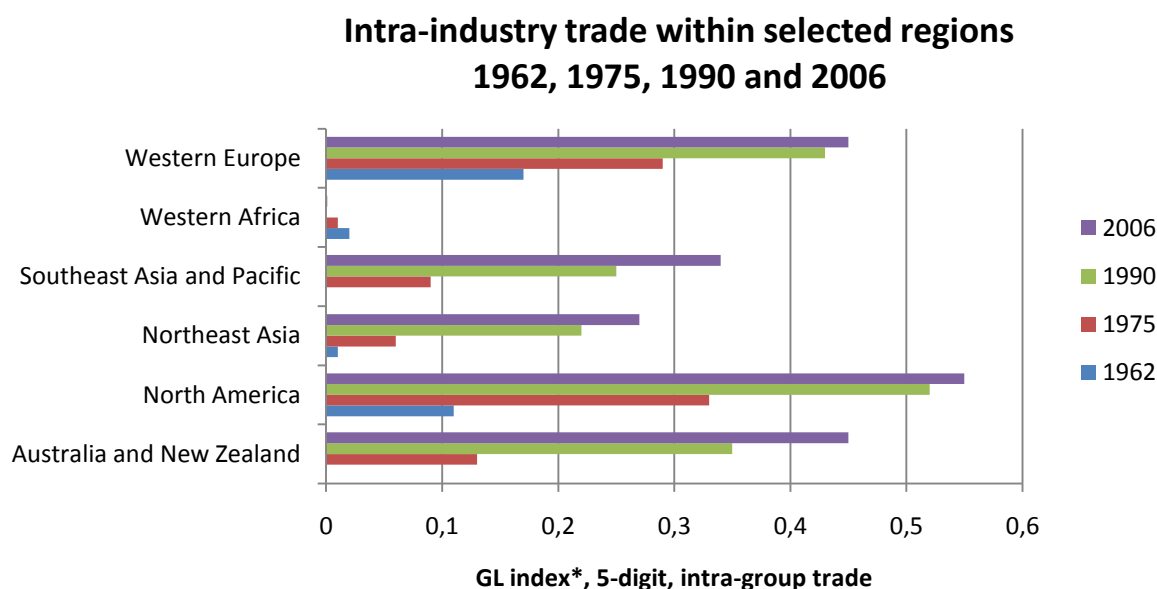


Figure 8.1 Intra-industry trade within selected regions

Source: Author's own, after data from Brülhart, 2008.

*Grubel Lloyd Index expresses IIT as a share of total bilateral trade in a particular industry

Intra-industry trade is mostly found between high-income and middle-income countries, this is also reflected from the figure above. Africa as a low-income country engages little in intra-industry trade, and is still an inter-industry trading country.

This decade there has been an increasing economic growth in many developing and emerging countries, e.g. China and India. These countries participation in intra-industry trade is an increasing trend, as more low- and middle income countries' economies are growing due to industrialization and trade liberalization. After China joined the WTO in 2001, its export- and import growth has had enormous effects on the rest of the world and international trade.

8.2 The rise of the Asian powers

The maritime centre has shifted from Europe and North America towards Asia. Many Asian emerging countries, classified as low- and middle income countries have since the beginning of 2000 seen a remarkable economic growth, their growth even preceded high income economies at one stage. Much of this growth can be explained by the industrialization of these countries, which leads to increased engagement in trade. Figure 8.2 show how these low- and middle income countries² have grown each decade since 1970.

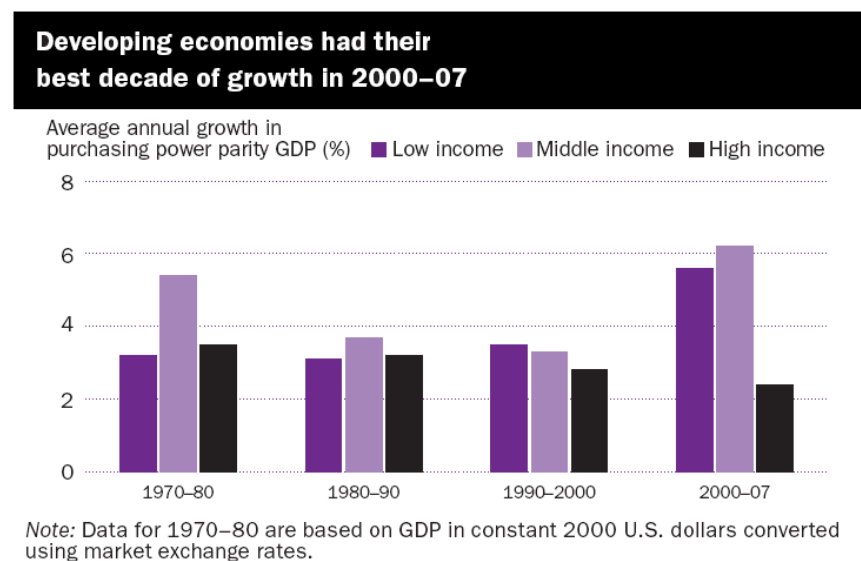


Figure 8.2 The rise of developing economies, 1970-2007

Source: The World Bank, 2009, p.3

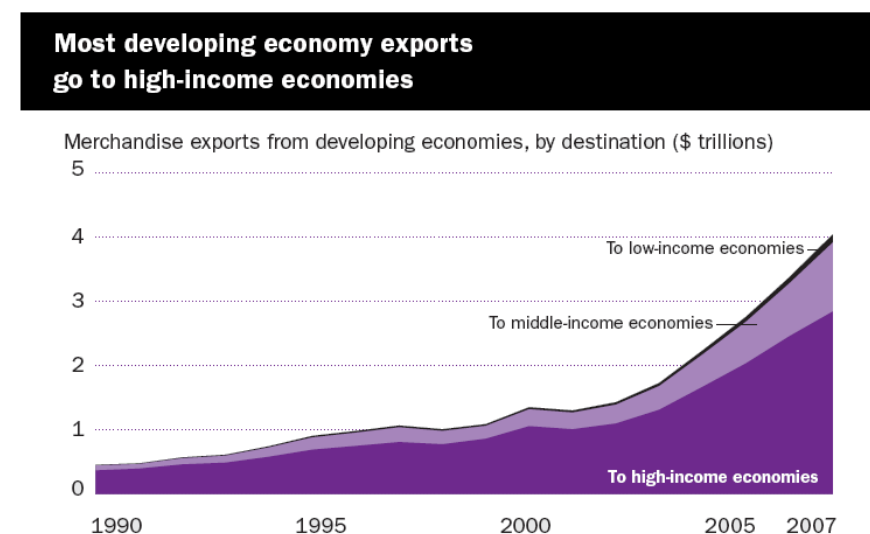


Figure 8.3 Exports from developing economies, 1990-2007

Source: The World Bank, 2009, p. 3

² Classified by The World Bank (2009) as developing economies, see Appendix 1.

Figure 8.3 shows that developing countries mostly export to high income countries³. This gives a good indication that developing countries, both low- and middle income, are producer nations while the high-income economies mainly of the West, are what we refer to as consumer nations. The consumption of Western countries rose due to higher incomes and lower interest rates; this resulted in a growing demand for goods. When the demand for goods rises, so does the demand for seaborne trade.

8.3 Drivers of seaborne trade

The world economy has always been classified as the main and most important driver of seaborne trade. In order to understand what has caused the shipping market to behave in the way it has, we have to go deeper into the events of the world economy.

Figure 8.4 illustrates how world GDP has changed on an annual basis since the early 1960s; throughout the two oil crises, the late 1980s financial crisis, the Asian crisis in 1997, the Dot.com crisis followed by the events of September 11th in 2001 and the financial crisis of 2007. This illustration gives a clear indication that the financial crisis in 2007 without doubt took the greatest fall.

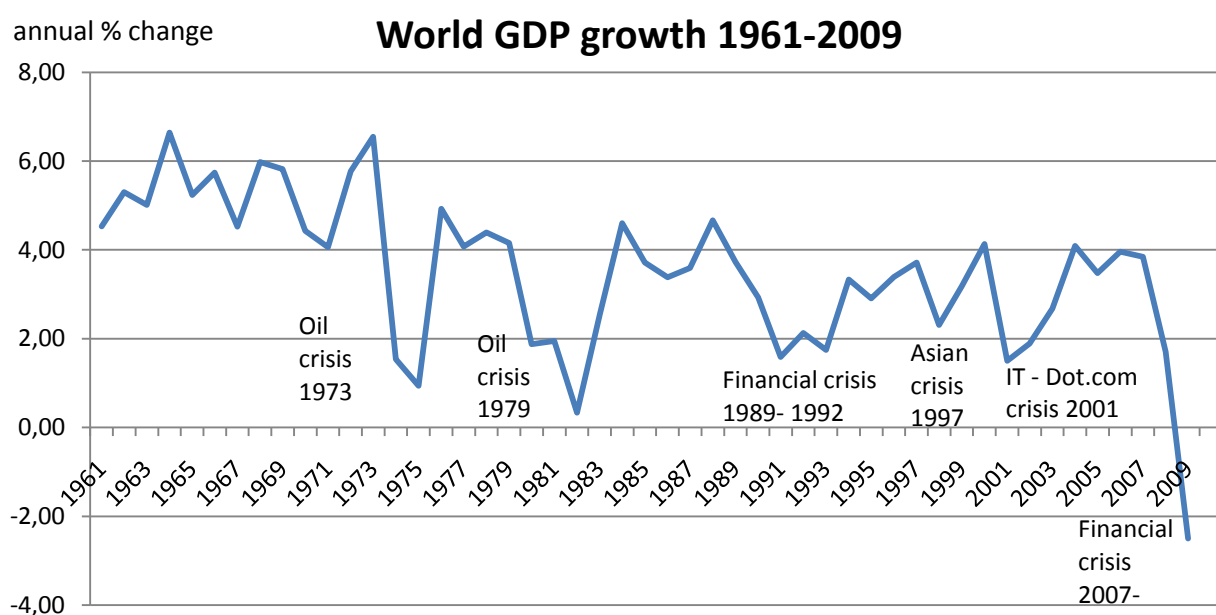


Figure 8.4 World GDP growth (annual % change), 1961-2009

Source: Author's own, after data from The World Bank Group, 2009 and Platou, 2010

³ See Appendix 1.

The change in the world economy has had huge impacts on international trade and with this seaborne trade and the dry bulk market. From 1990 to 2008 there was a close relationship between world seaborne trade and world GDP, the correlation coefficient from 1990 to 2000 was 0.95 and from 2000 to 2008 the correlation was even higher, 0.99, indicating an almost perfect relationship between the two. This gives an indication of seaborne trade being dependent on world GDP, as world GDP is an important driver behind the demand for goods. Growth in GDP often leads to increased demand for goods which increases the demand for seaborne trade.

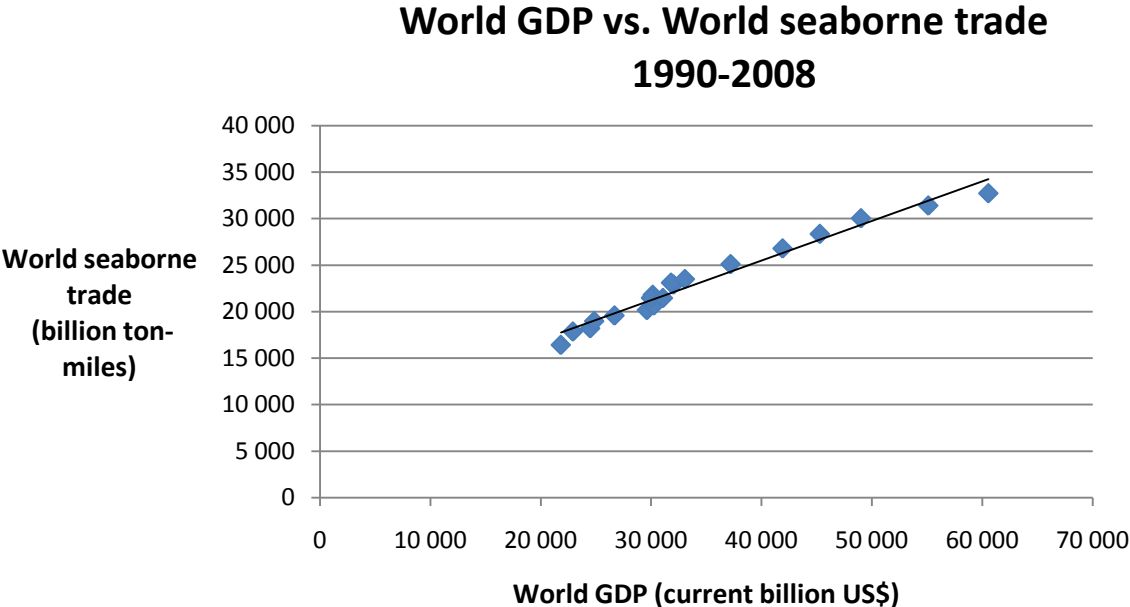


Figure 8.5 World GDP vs. World seaborne trade

Source: Author’s own, after data from UNCTAD, various issues and The World Bank, 2009

Seaborne trade follows the direction of world GDP; this is illustrated in figure 8.6. We see how world GDP (in current US\$) and seaborne trade (in billion ton-miles) have grown from 1990 to 2008. Comparing the two by numbers is hard as GDP is measured in value (US\$) and seaborne trade is measured in volume (ton-miles), but still, we find a growth pattern that moves in an almost parallel direction. This confirms the very close relationship between world GDP and world seaborne trade.

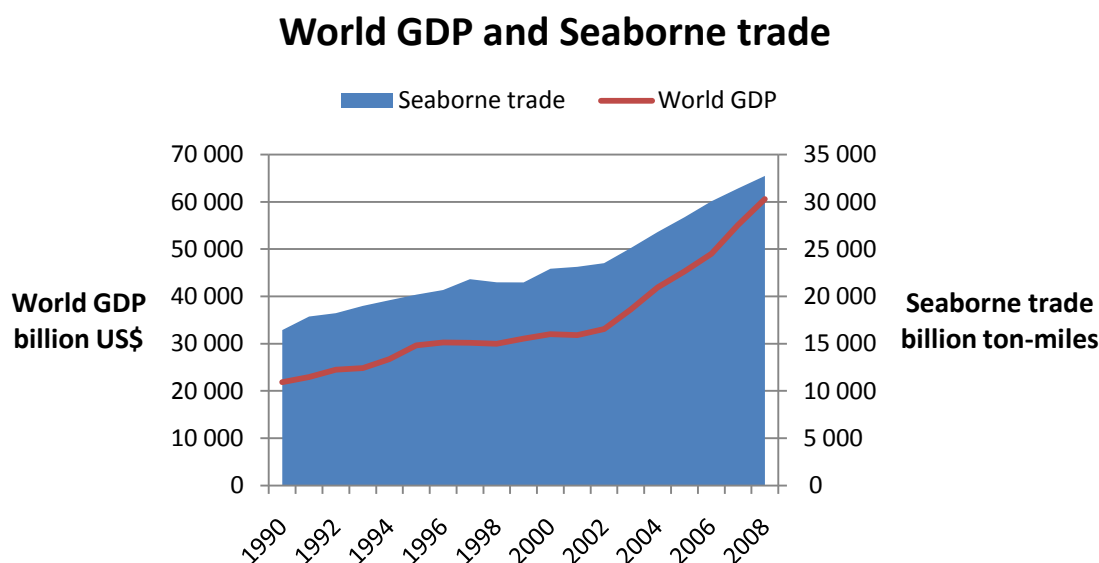


Figure 8.6 World GDP and Seaborne trade, 1990-2008

Source: Author's own, after data from The World Bank Group, 2009 and UNCTAD, various issues

There has been a rise in emerging and developing countries GDP, constituting to the growth of total world GDP. These countries have gone through an extensive industrialization process and their engagement in international trade has increased. Countries like India and China; both emerging economies, today take a big part in international trade. China is an important exporter of goods from the manufacturing sector and India in the service sector. The table below shows the GDP composition of these two countries in 2009.

China	India
agriculture: 10.9%	agriculture: 17.5%
industry: 48.6%	industry: 20%
services: 40.5%	services: 62.6%

Table 8.1 GDP composition in China and India, 2009

Source: Central Intelligence Agency, 2009

These two countries produce goods at low labour costs relative to those of the West, leading to low sale prices which results in a growing demand from the Western consumers.

As this thesis studies the trade of commodities and not the trade of services, the focus in the following will be on the development of China.

From 1997 to 2008 emerging and developing economies total GDP grew by 195% and much of this growth is solely due to China's expansion.

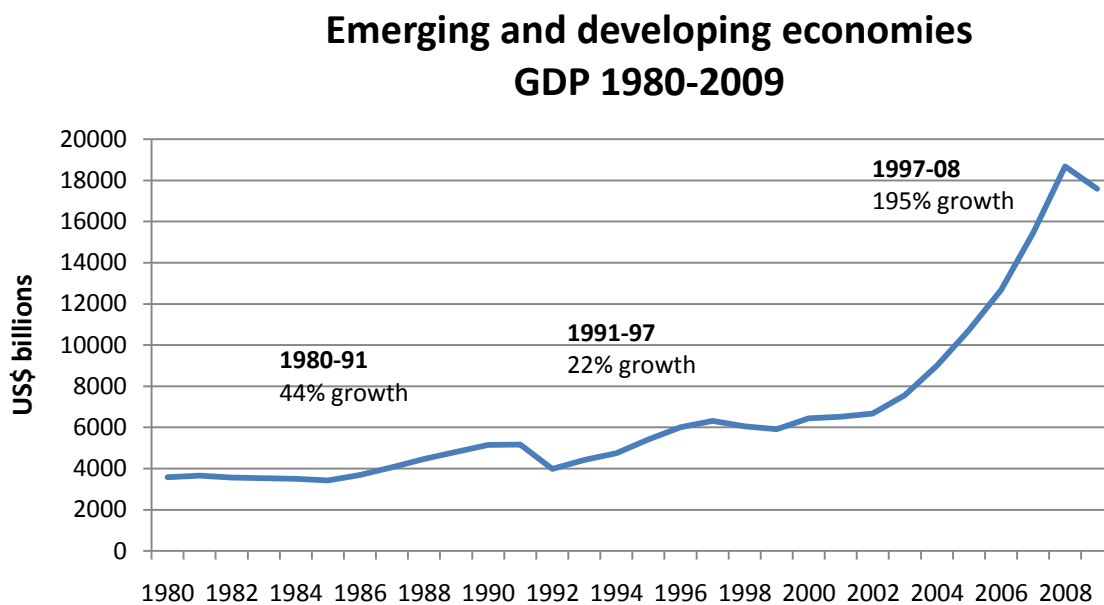


Figure 8.7 Growth in GDP for emerging and developing countries, 1980-2009

Source: Author's own, after data from IMF, 2009

Never before has there been a country of such a size, with the same growth levels as China. China has since mid 1980s gone through an extensive transformation, both on micro and macro level. China's production accounts for a large share of world consumption, but also domestic consumption. In figure 8.8 we see how China's GDP has grown from 1960 to 2008. In 18 years, from 1990 to 2008 China's GDP increased by 1 112%, hardly ever before has a country experienced such a long period of continuous growth. In comparison, the figure also shows how the US' GDP has grown in the same period. Even though the US has a higher value of GDP, the growth from 1990 to 2008 in the US has been considerably smaller than the Chinese growth.

US and China's GDP growth 1960-2008

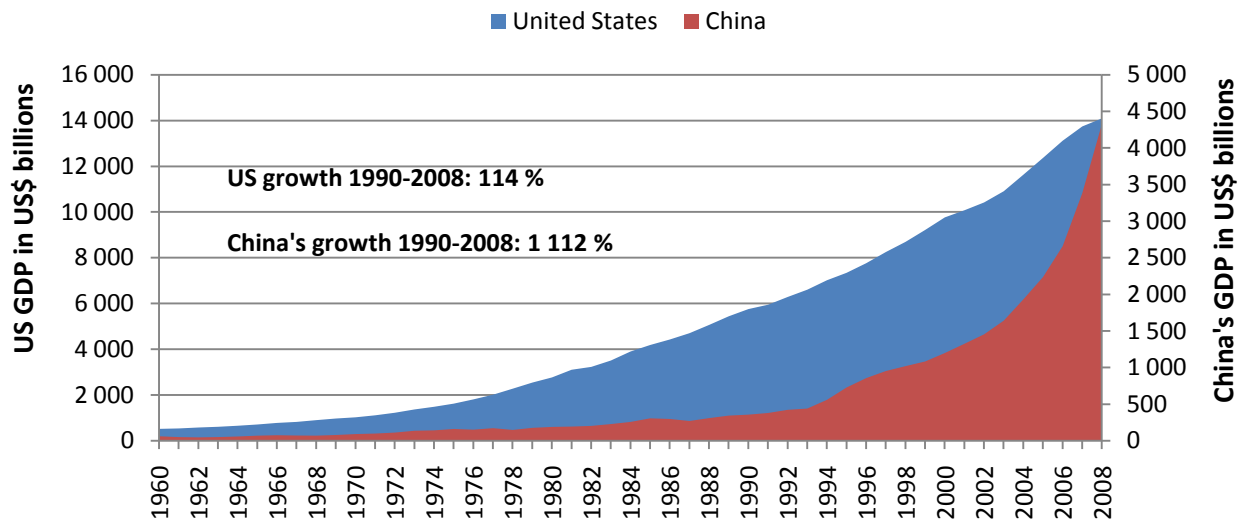


Figure 8.8 US and China's GDP growth, 1960-2008

Source: Author's own, after data from The World Bank Group, 2009

China's extraordinary growth is one of the most important factors when discussing the extraordinary up- and downturns in the shipping market this decade, and in the following, China's transformation and how this has resulted in the remarkable changes of the dry bulk market, will be studied.

China's GDP vs. World seaborne trade 1990-2008

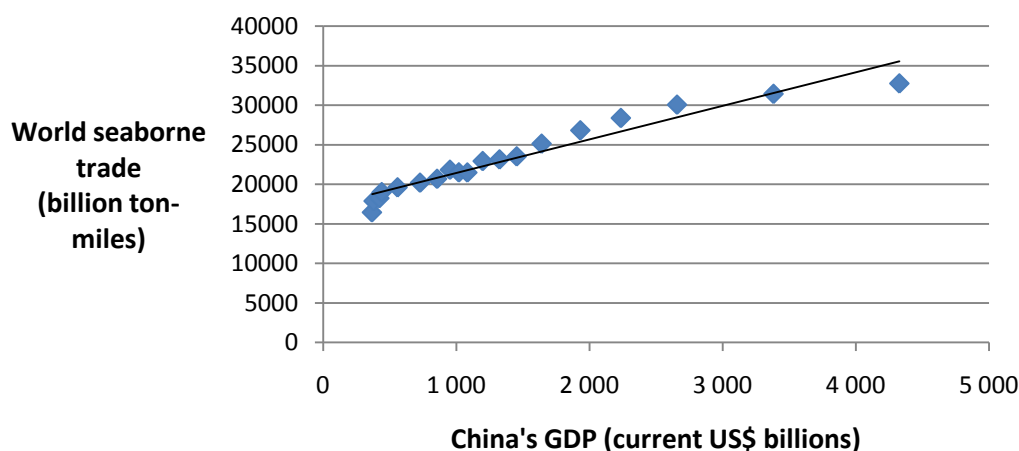


Figure 8.9 China's GDP vs. World seaborne trade, 1990-2008

Source: Author's own, after data from The World Bank Group, 2009 and UNCTAD, various issues

There is a strong and positive correlation between world seaborne trade and China’s GDP. The correlation coefficient from 1990 to 2008 is as high as 0.95 indicating an almost perfect relationship. This supports the statement that seaborne trade is driven by world GDP; in this case it means that the growth of China’s GDP is a main source of shipping demand growth. We saw earlier that seaborne trade has grown parallel to world GDP, and the reason is that when GDP grows, so does the demand for seaborne trade as consumers buy more goods.

It would be interesting to calculate the correlation between world seaborne trade and world GDP with the exception of China. Up-front one could expect the correlation to decrease, but this is not the case; the correlation between the two is equal to 0.99, which shows that there is still a very close relationship, even when China is not accounted for. This does not mean that China’s GDP does not matter for seaborne trade growth, because it certainly does, but it does confirm the statement that seaborne trade will grow as GDP grows.

8.4 World steel production

Due to emerging and developing countries industrialization, world steel production has grown significantly the past decades, resulting in a remarkable increase in the dry bulk trade. An overview of a selected set of countries crude steel production is found below;

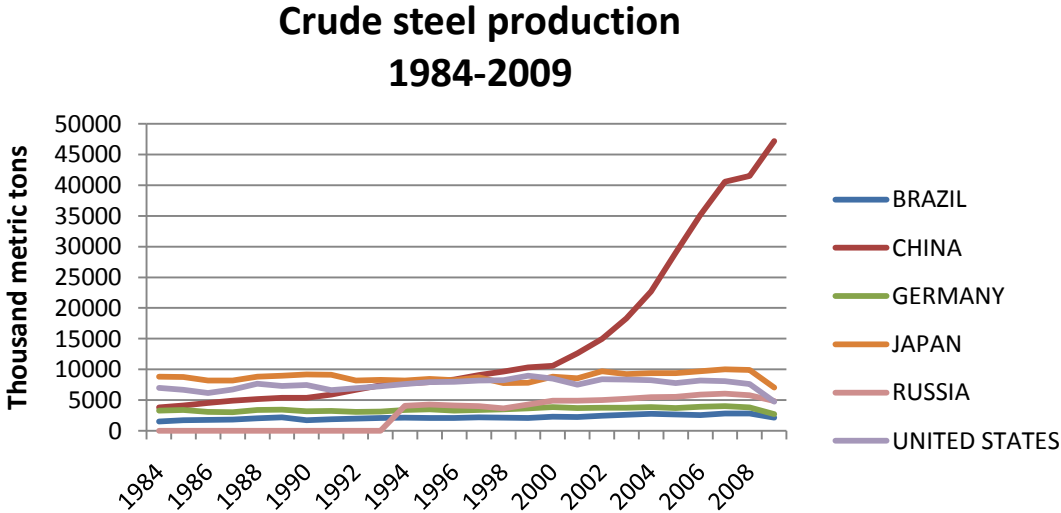


Figure 8.10 Crude steel productions in selected regions, 1984-2009

Source: Author’s own, after data from UN, 2009

Note: Missing data for Russia from 1984-1993

Again, we are reminded of China’s exceptional growth. From 2000 to 2009, China’s steel production grew from 10 603 thousand metric tons to 47 194 thousand metric tons, this is an increase of 345 %. Even in 2008/09 when the rest of the world production collapsed, China continued to grow substantially. The main reason for this increase is China’s industrialization, and a good example can be taken from the construction of new buildings. From 2004 to 2009 the construction of both residential and non-residential buildings in China grew with approximately 65% in total, see figure below. (Not possible to find data for previous years as the United Nations Bulletin of Statistics only have a selected set of reports in their archive)

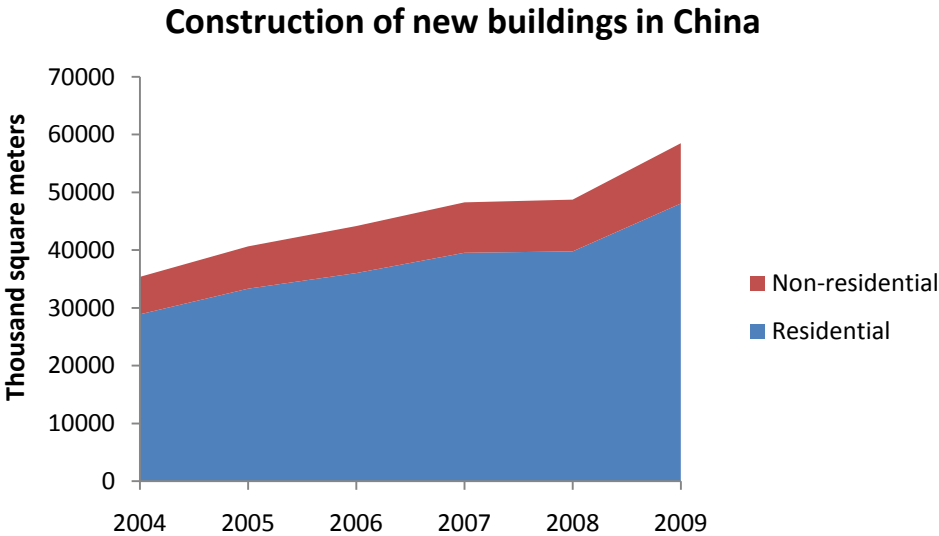


Figure 8.11 Construction of buildings in China, 2004-2009
Source: Author’s own, after data from UN, 2009

In order to give a better perspective of what this actually implies, China’s construction growth has been compared to US’ construction growth in the same period of time. Even though the two are not measured in the same units, we still get a good understanding of how Chinese construction growth has increased while US growth has declined. This again, confirms the exceptional growth of China.

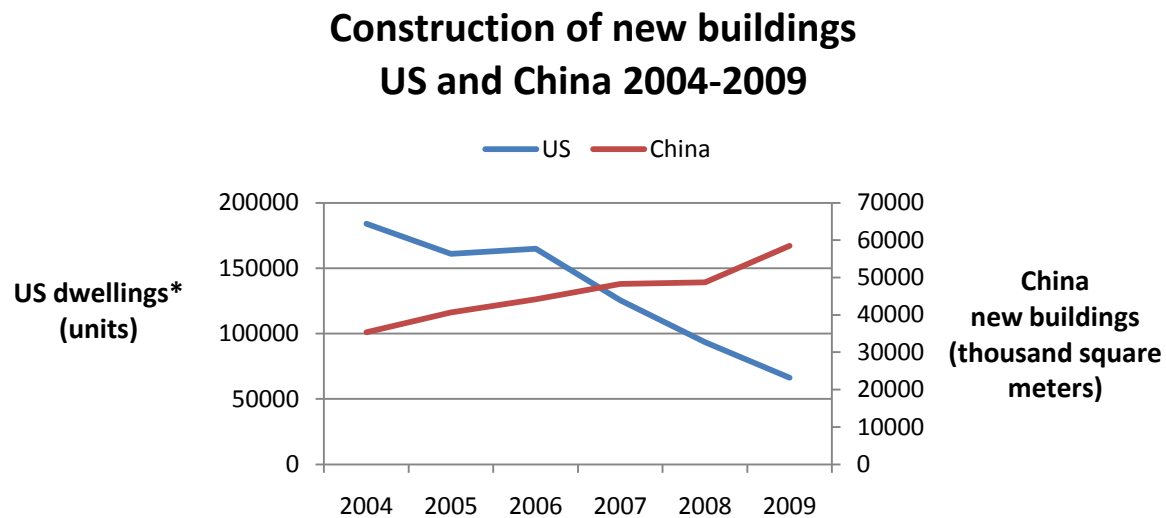


Figure 8.12 Construction of buildings in US and China, 2004-2009

Source: Author's own, after data from UN, 2009

*dwellings: a place of residence

Iron ore and coal, two of the largest commodities in the dry bulk trade, are also the main raw materials used in steel production. Therefore, world production of steel has great impact on seaborne trade of these two commodities. Growth in steel production gives a good indication of the growth of industrialization, and to find the effect industrialization has had on world GDP, I will study world GDP according to steel production. Below is a table showing how steel production of several countries correlate with world GDP over two different periods of time.

Correlation between crude steel production and world GDP

1990-2000		2000-2008	
Brazil	0,83	Brazil	0,84
China	0,94	China	0,98
Germany	0,81	Germany	0,51
Japan	-0,46	Japan	0,79
Russia (1994-2008)	0,50	Russia	0,93
US	0,87	US	-0,36

Table 8.2 Crude steel production vs. World GDP for selected countries, 1990-2008

Source: Author's own, after data from UN, various issues and The World Bank Group, 2009

China's steel production and world GDP correlates strongly in both periods and shows that there is almost a perfect relationship between the two. In comparison, the US has a weaker and even a negative correlation of -0.36 in the 2000s. This gives strength to the statement that world GDP is affected by industrialization, as industrialization usually increases GDP. This can indicate that some of the growth in world GDP this decade can be explained by China's extremely strong steel production growth. From previous calculations we found that as GDP grows, so does the demand for seaborne trade, so when explaining the extraordinary up- and downturns of the dry bulk market this decade, China's industrialization is an important long-term effect.

8.5 Dry bulk commodities

World seaborne trade of iron ore, coal and grain have over the past decade seen an enormous increase, the trade of iron ore increased from 2 545 billion ton-miles in 2000 to 4 894 billion ton-miles in 2008, a change of 92% (UNCTAD, 2009).

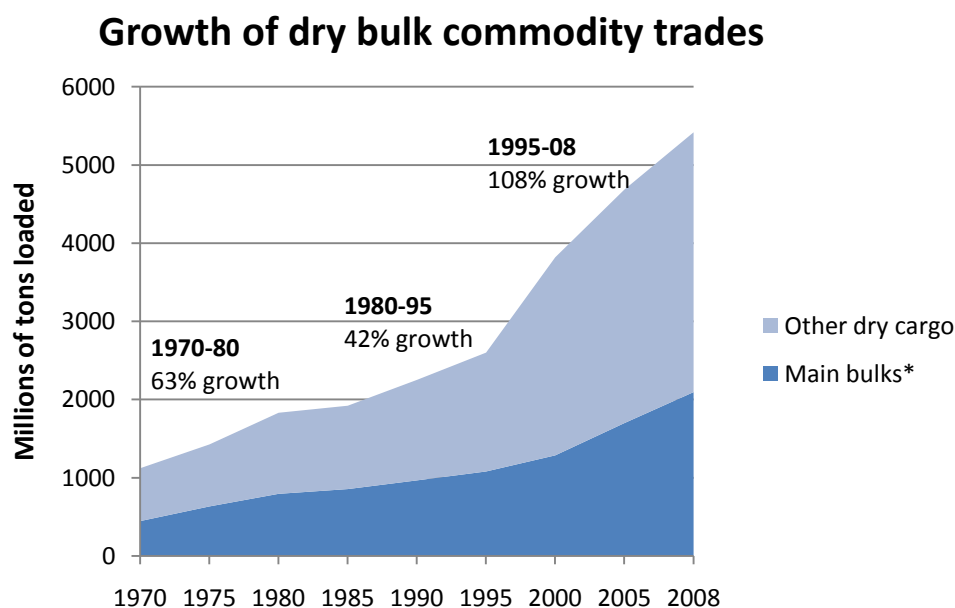


Figure 8.13 Growth of dry bulk commodities, 1970-2008

Source: Author's own, after data from UNCTAD, various issues

*iron ore, grain, coal, bauxite/alumina and phosphate

This compared to the decade of the 1990s is huge, as the iron ore trade only grew by 12% from 1990 to 1999.

When China in 2001 joined the WTO, the country became one of the world's largest producers and consumers of bulk commodities, mainly due to the liberalization of trade and the increasing industrialization of the country. Through China's industrial development, the need for iron ore, steel and coal grew considerably. From 1995 to 2008 world trade of bulk commodities grew by 108%, this compared to previous decades is the longest period of continuous growth registered, and one of the main reasons behind this growth is China's expansion.

Figure 8.14 illustrates how China's GDP, exports and imports have grown in the same direction. China's GDP has grown as a result of the country's industrialization, which has led to increasing import and export.

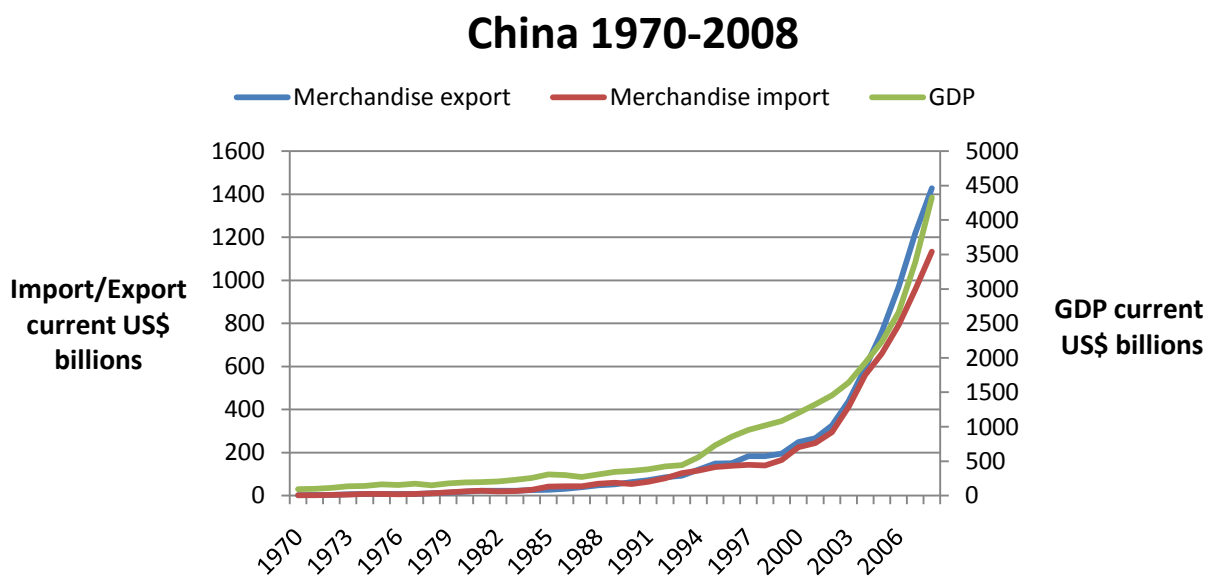


Figure 8.14 China's export, import and GDP, 1970-2008

Source: Author's own, after data from The World Bank Group, 2009

Steel production depends as mentioned, on iron ore and coking coal, therefore the growth of steel production works as a good indication for the demand of the dry bulk trade of these two commodities. Below are some calculations on how Chinese steel production has influenced the seaborne trade of dry bulk commodities.

There is a strong and positive correlation between China's steel production and the seaborne trade of dry bulk commodities, see figure 8.15.

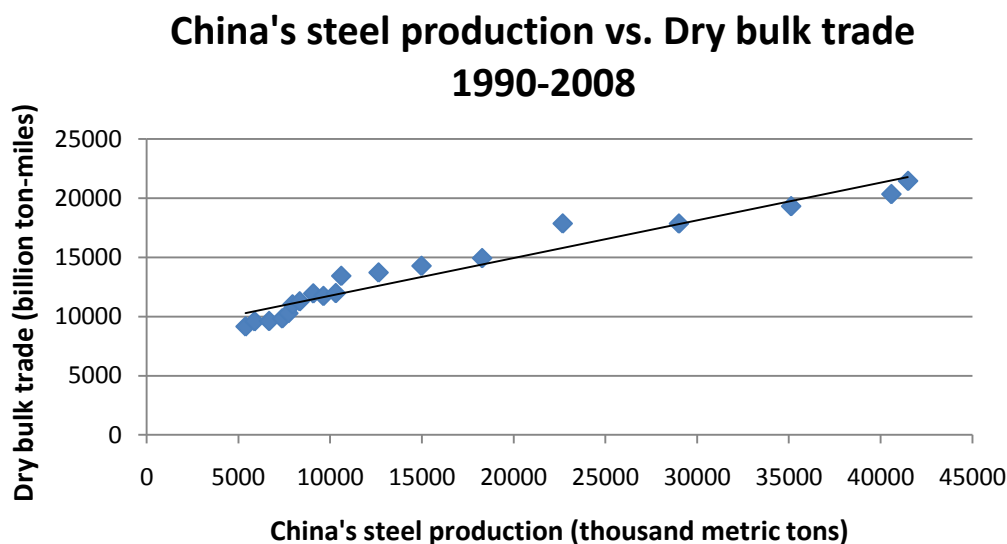


Figure 8.15 China's steel production vs. Dry bulk trade, 1990-2009

Source: Author's own, after data from Platou, various issues and UN, various issues

The correlation between the two variables is high, from 1990 to 2000 the correlation coefficient was 0.95 and from 2000 to 2009 the correlation coefficient was 0.98. When China produces more steel the dry bulk trade increases as imports and exports to and from China increases.

There is also a strong relationship between the growth of the dry bulk fleet and China's steel production; from 1990 to 2008 the correlation was 0.97. This high correlation indicates that growth in China's steel production causes a growth in the development of the dry bulk fleet as demand for tonnage increases.

From the above calculations we have seen that China's steel production has had an impact on seaborne trade of dry bulk commodities, but it would be interesting to see if the growth of US crude steel production has affected the dry bulk fleet in the same way.

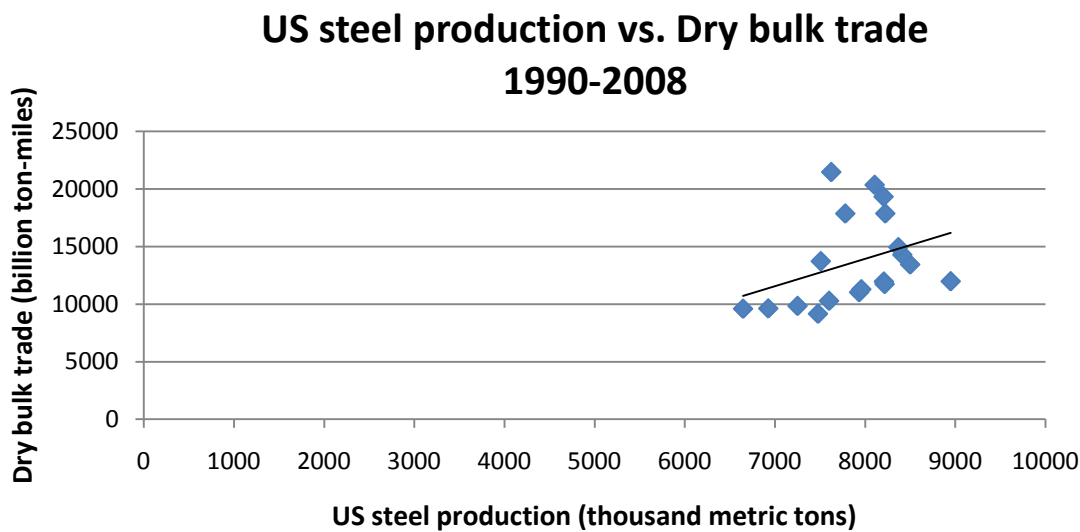


Figure 8.16 US' steel production vs. Dry bulk trade, 1990-2008

Source: Author's own, after data from Platou, various issues and UN, various issues

From the figure we see that the relationship is deviating. When calculating the correlation coefficient, we find that from 1990 to 2009 it was 0.35. On the basis of this number, the steel production in the US does not seem to have a close relationship with the growth in the dry bulk trade.

The same result is also found between the relationship of US steel production and the growth of the dry bulk fleet; the correlation is -0.21.

Even though the calculations seem to indicate that the US has not affected the dry bulk trade, this is not entirely correct. The US may not have produced the same amounts of steel as China, therefore not imported as much iron ore and coal, neither exported as much steel products, but the US has certainly imported large amounts of manufactured goods. The demand for low labour cost products have increased in the West and China's production has grown considerably due to the growing demand from Europe and the US. Even though there is no close correlation between US steel production and the dry bulk trade, the US still plays an important role in the growth of seaborne trade demand, and is one of the contributors to the growing Chinese exports.

The US economy has for a very long time been the world's largest economy and the main driver of the global economy. Economical and political events in the US have had great spillover effect to the rest of the world. Today, even though the US is ranked as number one according to GDP, it is no longer the one and only dominant economy in the world, this especially in terms of international trade. China with its massive growth, is taking up speed with the US. Figure 8.17 gives a good illustration as to the major leap China has made compared to the US' merchandise trade, in % of GDP.

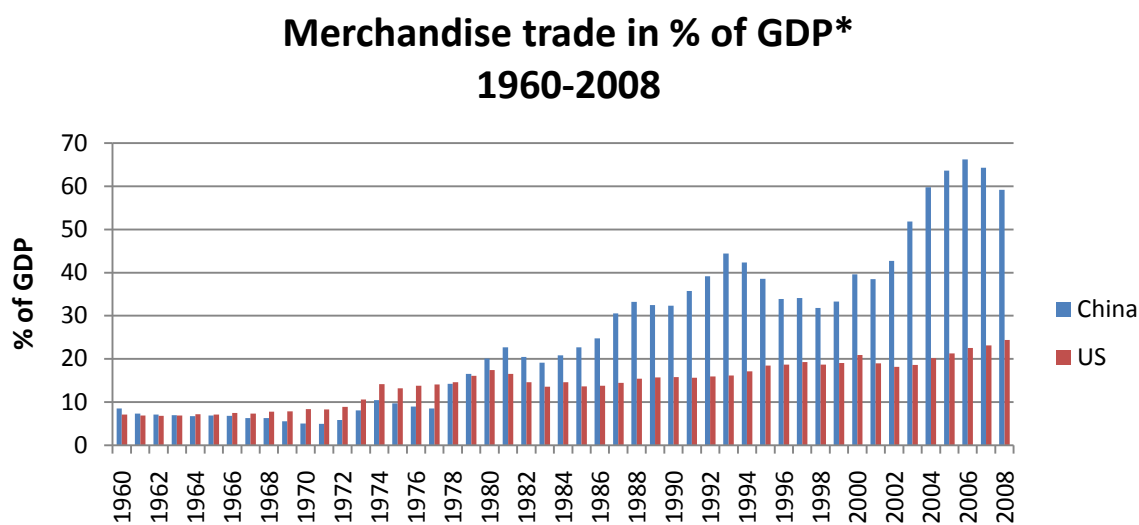


Figure 8.17 Merchandise trade in % of GDP in China and the US, 1960-2008

Source: Author's own, after data from The World Bank Group, 2009

*Merchandise trade as a share of GDP is the sum of merchandise exports and imports divided by the value of GDP, all in current U.S. dollars

Even in the import and export of merchandise goods China has caught up with the US. In 2007 China actually exported more than the US measured in million US\$. It is interesting to see that US imports increased at a higher pace than US exports, and when US imports increased, China's exports increased. This can support the statement above that the US is an important consumer of Chinese goods. It is important to remember that merchandise imports and exports cover all aspects of trade, not only the dry bulk trade. Therefore, it does not give a very good indication as to how the US has influenced the dry bulk trade, but again, it is found that the US has been important in the growth of Chinese exports and thereby it's growing economy.



Figure 8.18 China and US' imports and exports, 1960-2008

Source: Author's own, after data from The World Bank Group, 2009

8.6 Average haul

The demand for seaborne trade is measured in ton-miles. Demand is affected by the distance over which the cargo is transported and if the distance changes, so will the demand for tonnage. The distance over which a ton of cargo is transported will depend on changes in trade patterns and changes in shipping policies, e.g. closure of the Suez Canal.

The distance of a shipment is of importance for tonnage demand; longer transportation distances will increase the demand for tonnage, and in order to transport the same amount as before the distance increased, more tonnage is needed. In this way changes to the average haul might affect the cyclical movements of the dry bulk trade.

As trade patterns change so does the length of the average haul; the length of one shipment will depend on the distance between the producer- and consumer nations. From the table below we see how the average haul has changed over a selection of years.

	Total cargo carried (millions of tons)	Total ton-miles performed (millions of ton-miles)	Average length of the haul (miles)
1987	3505	14298000	4079
1990	4008	17121000	4272
1993	4330	18854000	4354
1996	<i>Growth</i> <i>1987-2008:</i> <i>133%</i>	<i>Growth</i> <i>1987-2008:</i> <i>129%</i>	<i>Growth</i> <i>1987-2008:</i> <i>-1,7%</i>
1999	4758	20810000	4374
2002	5688	21928000	3855
2005	5888	23251000	3949
2008	7109	29094000	4093
	8168	32746000	4009

Table 8.3 Average haul, selected years

Source: Author's own, after data from UNCTAD, various issues and own calculations

From 1987 to 2008 the total cargo carried and ton-miles performed, both increased by approximately 130%, while the average haul had a slight decrease of -1.7%. This may sound strange, but as the cargo carried and the ton-miles performed grew at a parallel pace, the average haul did not change much as there was enough tonnage to support the growing cargo capacity. From this result it can to some extent be concluded that the average haul has not directly affected the shipping market demand this decade. In order to conclude this, it would be relevant to study if the annual change in average haul correlates with the change in freight rates. When the average haul increases, the demand for tonnage increases, and if the supply of tonnage is smaller than demand, the freight rates will increase.

In my calculations I use the average TC freight rates for Handymax, Panamax and Capesize vessels from 1997 to 2008 and the average haul for the same period.

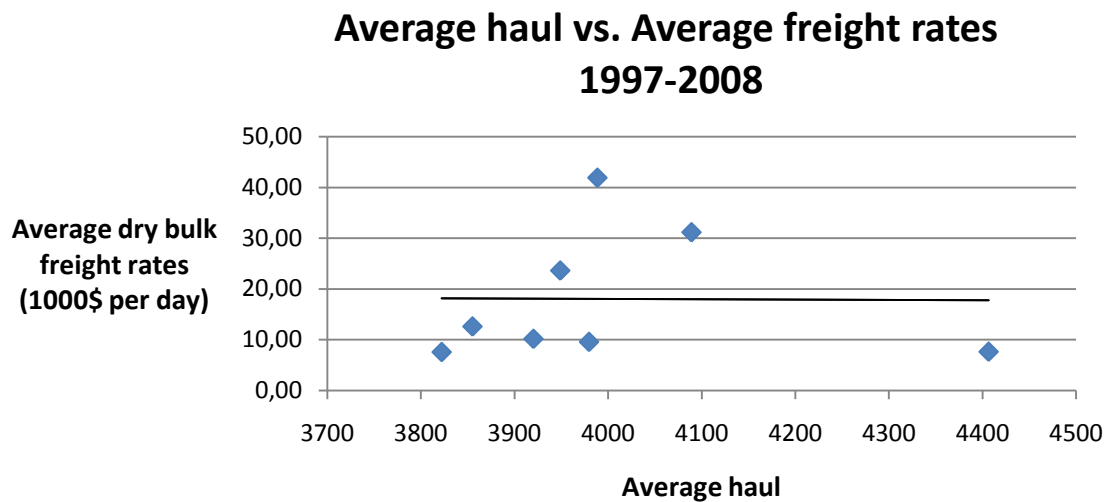


Figure 8.19 Average haul vs. Average freight rates, 1997-2008

Source: Author's own, after data from Platou, various issues and UNCTAD, various issues

The correlation coefficient equals 0.12 indicating that there is no close relationship between the two. On the basis of this result we can conclude that the movement in average haul is not a direct effect of the freight rates changes and thereby not an effect behind the up- and downturns in the dry bulk market this decade.

8.7 The effects of oil

There are many driving forces of seaborne trade, and besides the world economy the world's energy consumption and oil price are important issues in the shipping industry. From figure 8.20 we see the development of the world's consumption of petroleum products. Since 1983 until 2007 there was a steady growth in the consumption of oil. Even though the world encountered economical recession like the financial crisis of the early 1990s and the Asian crisis in 1997 the consumption continued to grow. In 2007 the consumption reached a peak, and in only 2 years it fell by 47%; the long-lasting and steady growth was over.

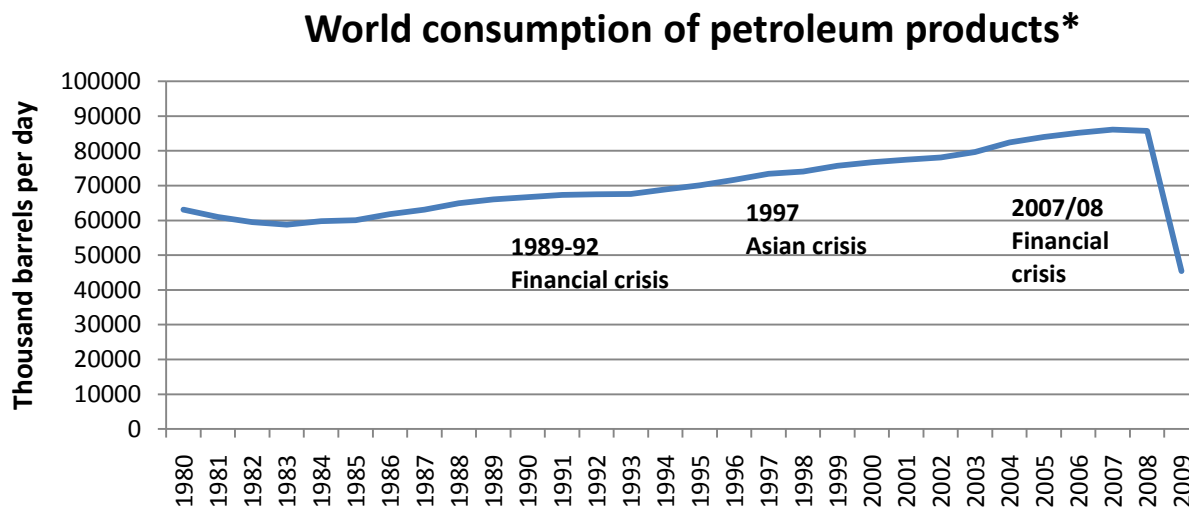


Figure 8.20 World consumption of petroleum products, 1980-2009

Source: Author’s own, after data from US Energy Information Administration, 2009.

* Total Petroleum Consumption includes internal consumption, refinery fuel and loss, and bunkering. Also included, where available, is direct combustion of crude oil.

Even though world consumption of oil declined by 47% from 2007 to 2009, the world supply of oil was only reduced by 0.3% in the same period, see figure 8.21.

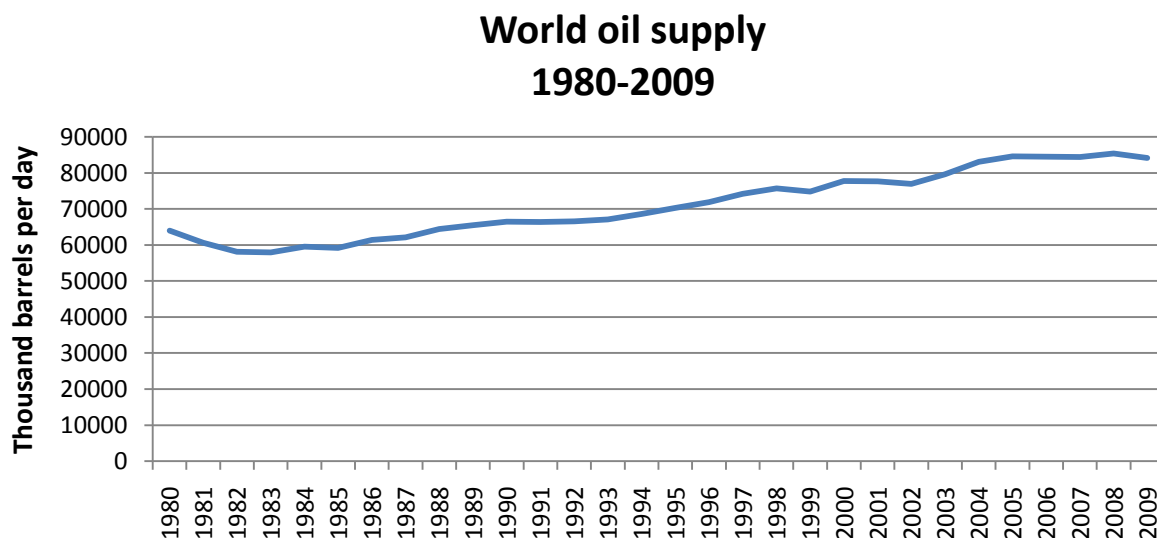


Figure 8.21 World supply of oil, 1980-2009

Source: Author’s own, after data from US Energy Information Administration, 2009

The correlation between supply and demand of oil was close to 1 and almost perfect until 2005. From 2005 to 2009 the relationship between the two started to deviate and the correlation decreased to 0.54. As energy prices rose and world GDP decreased, the consumption had to take a fall.

The decrease in oil consumption was not due to low supply; there was actually more supply than demand of oil from 2007 and onwards. The important aspect here is the oil price. After the financial crisis hit US households in late 2007 and the rest of the world in the months that followed, the results were higher interest rates and lower incomes, and with high oil prices, consumers could not afford to keep up their consumption. The annual average growth of the WTI spot price from 1987 to 1999 was 3.8% while the annual average growth rate from 2000 to 2009 was 16%. In 2008 one barrel of oil cost 99 US\$, this is the highest WTI spot price the world has ever seen, so no wonder oil consumption fell.

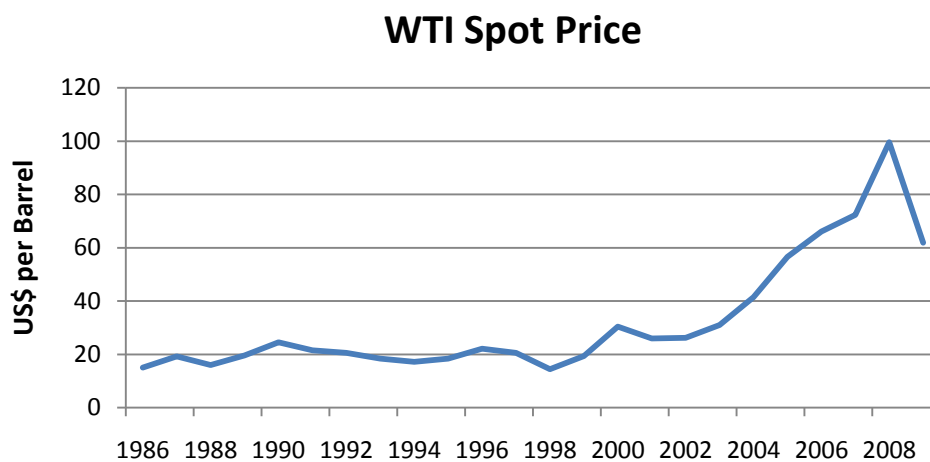


Figure 8.22 WTI Spot price, 1986-2009

Source: Author's own, after data from US Energy Information Administration, 2009

One of the reasons the oil price remained so high even when demand was low is due to the policy of OPEC. OPEC controls and coordinates the oil price, and even though demand was low, the price was kept high in order to preserve the reserves of oil.

How the oil price has affected the dry bulk market, can be studied by analyzing the relationship between the dry bulk freight rates and the WTI oil price movement. The

correlation between the two is 0.82, indicating a strong and positive relationship and that the oil price has effects on the freight rates. From the standard deviation we see that they both deviate nearly equally as much from the mean, indicating that they move at equal pace; when the oil price is high, so is the freight rates.

	Correlation coefficient (r)	Mean (average)	Standard deviation (σ)
Average freight rates* 2000-2009	0,82	32	21
WTI spot prices 2000-2009		51	24

Table 8.4 WTI spot price vs. Average freight rates, 2000-2009

Source: Author's own, after data from Platou, various issues and US Energy Information Administration, 2009

*calculated from Handymax, Panamax and Capesize trip charter rates

8.8 The Four Shipping Markets

From section 4.1 we know that the shipping industry is controlled by four different markets; the freight market, the sale and purchase market, the newbuilding market and the demolition market. The way these markets have behaved recently is important when discussing the up- and downturns in the dry bulk market.

In order to give a good explanation of the changes in these four market segments we have to start with an introduction to growth pattern of demand for seaborne trade of dry bulk commodities. Measuring the demand for seaborne trade in ton-miles gives the best indication as this takes account for the tonnage of cargo shipped times the distance over which it is transported.

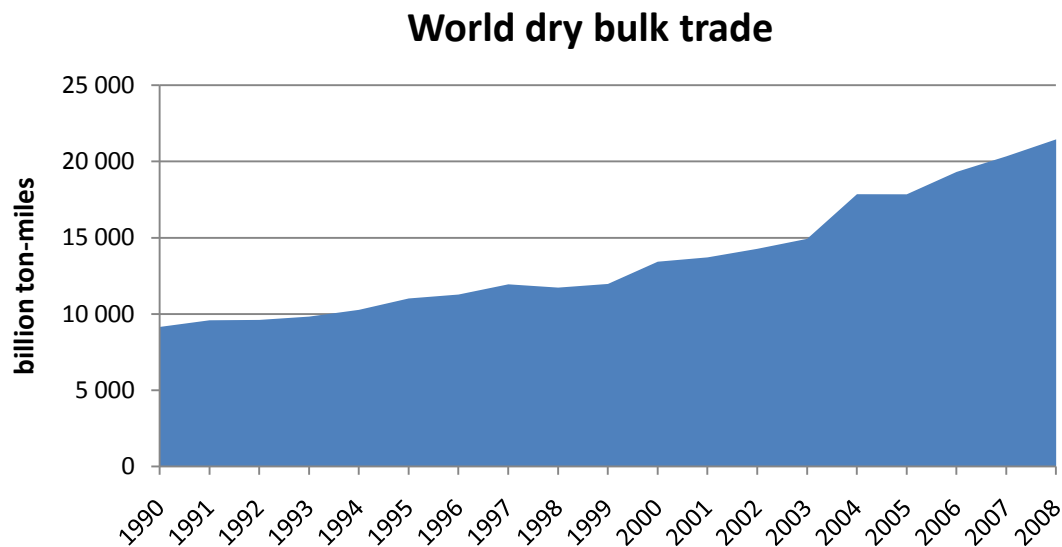


Figure 8.23 World demand for dry bulk trade, 1990-2008

Source: Author's own, after data from UNCTAD, various issues

Figure 8.23 illustrates how the demand for dry bulk commodities has had an upward sloping growth curve since 1990.

Due to the increased demand for seaborne trade of dry bulk commodities, the dry bulk freight rates have experienced great volatility since the early 2000s. 2004 was in its days classified as the best dry bulk market ever, but the rates grew even higher and in mid 2008 they were at the highest level ever.

The previous sections of this chapter have studied how the demand factors behind seaborne trade have behaved this decade. In the following, some of the factors affecting the supply side of seaborne trade will be discussed. The balance between the supply and demand is what drives the freight rates, and with that creates cyclical patterns.

From the figure below we see how the Baltic Dry Index has moved from 1985 until 2009, and the figure gives good indication of the extraordinary up-and downturns in the 2000s.

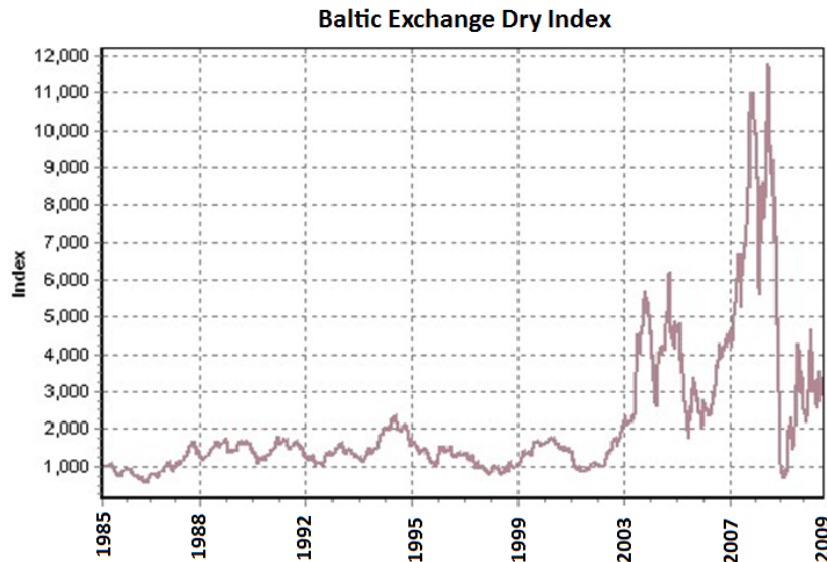


Figure 8.24 The Baltic Exchange Dry Index, 1985-2009

Source: The Baltic Exchange, 2009

Below we find the trip charter rates for Handymax, Panamax and Capesize vessels (In the following calculations, the average rate of these three will be used).

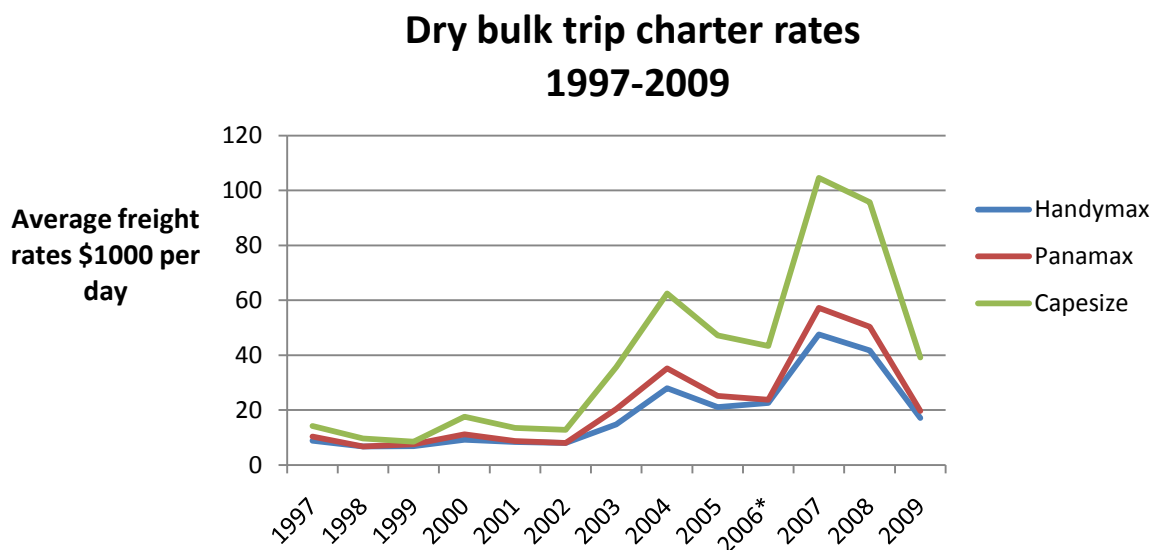


Figure 8.25 Dry bulk trip charter rates, 1997-2009

Source: Author’s own, after data from Platou, various issues

The shipping market was stronger than ever before and many believed the prosperity would last, indicating how in the short-run mass psychology plays a huge part in shipping. Market confidence was high and shipowners believed that the strong market from 2004 would continue even though some analysts were skeptical. The demand for sea transportation did continue to grow for some years due to increasing world GDP. Dry bulk freight rates rose throughout 2006 and with an all time high in mid 2008. When the financial crisis was a fact in 2007, world economies declined due to the spillover effects from the US downfall and this resulted in a substantially lower demand for seaborne trade. In late 2008, the crisis hit the dry bulk market; Handymax rates decreased nearly 60% from 2008 to 2009.

The secondhand market this decade experienced extreme fluctuations compared to previous decades; in 2008 the price of a 5 year old Capesize increased by 73%, while in 2009 it fell by 65%, creating the cyclical movements in figure 8.26

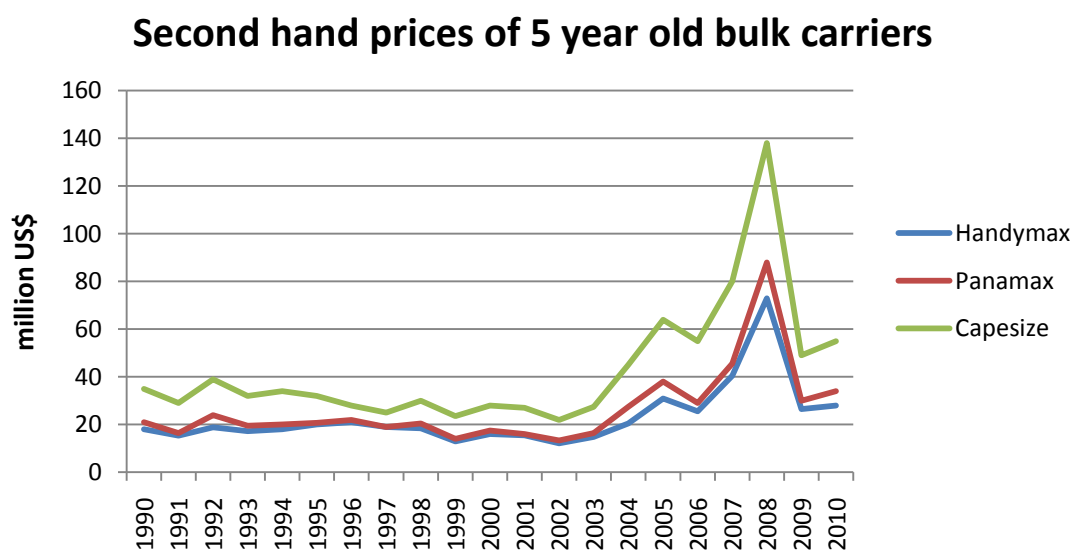


Figure 8.26 Second hand prices for bulk carriers, 1990-2010

Source: Author's own, after data from Platou, various issues

When calculating the standard deviation of the 1990s and the 2000s second hand prices, we find that the 2000s decade experienced a much higher deviation than the 1990s, see table 8.5. This implies that the second hand prices in the 2000s deviated much more from the average price than the prices did in the 1990s; indicating a very volatile market, and confirming the up- and downturns in figure 8.26.

Standard deviation (σ)	Handymax	Panamax	Capesize
1990-2000	2,25	2,74	4,51
2000-2010	17,25	21,08	33,27

Table 8.5 Standard deviations of second hand prices, 1990-2010

Source: Author's own calculations, after data from Platou, various issues

The past years the shipping market has experienced extremely strong growth and as discussed, due to high demand, freight rates reached higher levels than ever before; this raised the second hand prices of bulk carriers so high that they even exceeded new building prices.

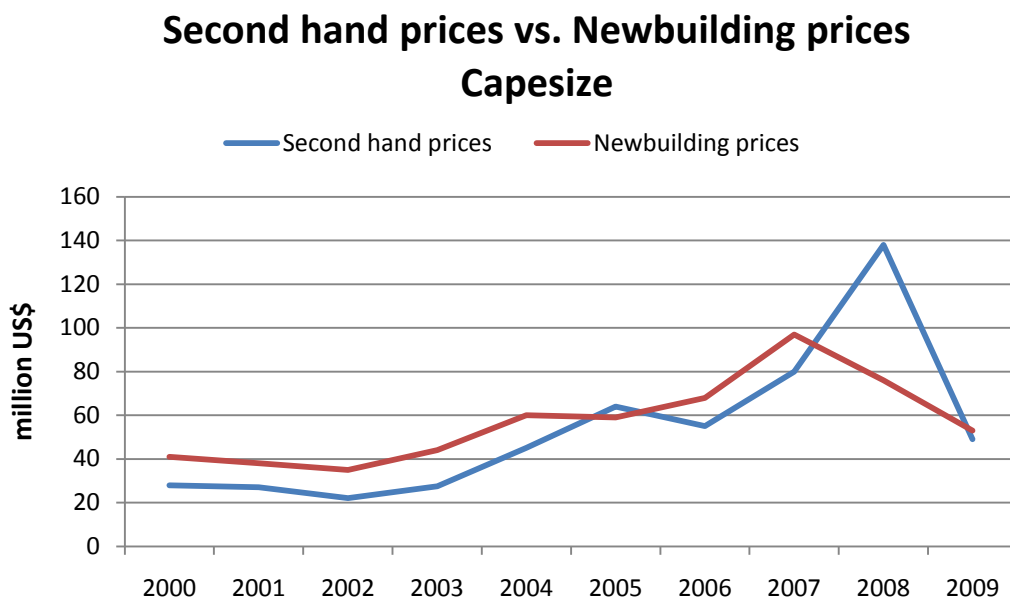


Figure 8.27 Second hand prices vs. Newbuilding prices for Capesize vessels, 2000-2009

Source: Author's own, after data from Platou, various issues

The 2000s started out with newbuilding prices higher than secondhand prices, as what we can expect in a “normal” market where supply and demand almost balance, but this changed in 2006/2007. As demand exceeded supply, second hand prices grew at an incredible speed, far outpacing newbuilding prices. Due to increased demand for seaborne trade, the dry bulk freight rates rose at a quick pace, reaching levels never seen before. Shipowners needed more vessels in order to get all the cargo in the market shipped, and the easiest and fastest method to get new carrying capacity, was to turn to the second hand market. Second hand vessels

were ready for prompt delivery. Newbuildings had a lead-time of a couple of years, making second hand vessels much more attractive and driving the prices to high levels. Shipowners demand for secondhand vessels rose and the shortage of these vessels soon became a fact; therefore the prices accelerated and reached sky high levels in 2008. More shipowners turned to the shipyards to place new orders, resulting in an enormous growth of the order book, and from 2004 until 2009, the order book increased by 492%.

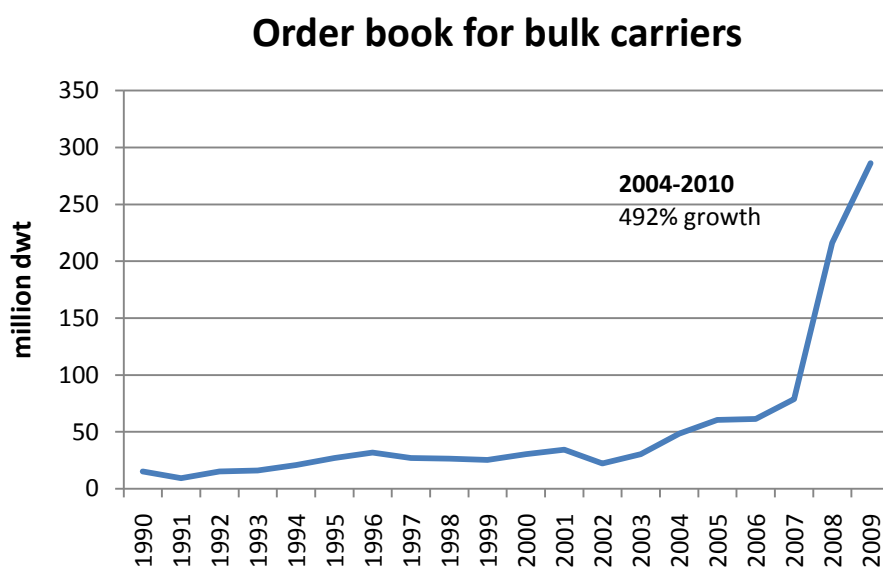


Figure 8.28 Order book for bulk carriers, 1990-2009

Source: Author's own, after data from Platou, various issues

Very high freight rates and high secondhand prices throughout the 2000s also resulted in high newbuilding prices. In a market where demand and supply almost are in balance, newbuilding orders placed would be reduced when the building prices rose, but not in the mid 2000s, even though prices for a new vessel were higher than ever before, shipowners kept on ordering at a fast pace. To illustrate this we see from figure 8.29 that when newbuilding prices (average of Handymax, Panamax and Capesize) were at its highest, so was the amount of new orders placed. This indicates the extremely strong shipping market at the time.

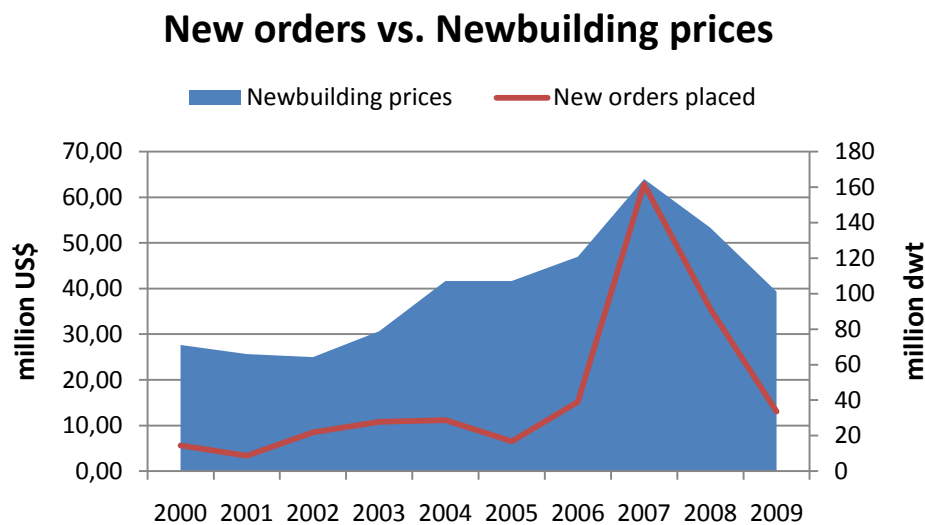


Figure 8.29 New orders placed vs. Newbuilding prices, 2000-2009

Source: Author’s own, after data from Platou, various issues

From figure 8.30 we see how the building prices for bulk carriers were steady throughout the 1990s and until 2003; that is where the market took a turn. Newbuilding prices rose at an incredible speed. Prospects of the shipping market were high and due to high market confidence shipowners and speculators believed that the upturn would last. On the basis of these predictions the fact that the ordered vessels would not be delivered before earliest 1 to 2 years after the order was placed was not an issue. It was not until the bulk market collapsed in late 2008 that this overcapacity became a severe problem. During the good years of the 2000s an extreme amount of newbuildings were ordered, and with several years lead-time there are vessels still waiting to be delivered today.

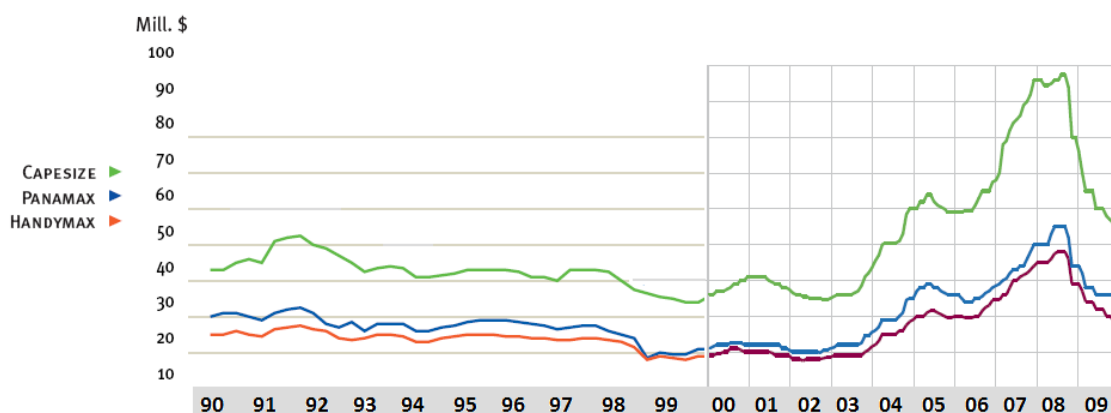


Figure 8.30 Building prices for bulk carriers, 1990-2009

Source: Platou, 2000 and 2010 (Compound of two graphs)

An important issue when addressing the newbuilding market is time-lags. Building a vessel normally takes between 12-18 months, depending on the order book of the shipyard, but from 2004/05 this time-lag increased to approximately 4 years as shipyards' were overbooked due to the extreme amounts of orders placed.

The impact of time-lags is illustrated below.

	Average freight rate (\$1000 per day)	New orders placed (mill dwt)	Delivered vessels (mill dwt)
1997	11,1	17,9	18,6
1998	7,7	10,4	11,5
1999	7,6	18,5	13,5
2000	12,6	14,5	13,6
2001	10,2	8,7	20,6
2002	9,6	21,9	13,6
2003	23,6	27,9	11,8
2004	41,9	28,8	18,3
2005	31,2	16,8	22,3
2006	29,9	39	25,5
2007	69,8	161,6	28,6
2008	62,6	91,4	32,6
2009	25,3	33,6	48,3

Table 8.6 Average freight rates, new orders placed and delivered vessels, 1997-2009

Source: Author's own, after data from Platou, various issues and own calculations

To give an example, when freight rates increased from \$9 600 in 2002 to \$23 600 in 2003, 27.9 million dwt was put in order. These vessels would earliest be delivered in the beginning of 2005, therefore when calculating how deliveries of bulk carriers correlate with the average bulk freight rates we have to take account for the time-lag perspective.

When calculating the relationship between average freight rates from 2000 to 2009 and the deliveries from 2000 to 2009, the correlation coefficient is low at 0.4. Interestingly, when taking account for the time lag encountering with 2 years, and using the freight rates from 1998 to 2007 and deliveries from 2000 to 2009, the correlation coefficient equals 0.9 showing that there is a close relationship between the two. From these calculations we can state that the increase in freight rates this decade has resulted in a high number of newbuildings delivered,

if we take into account the issue of time-lags. Time-lags equal higher risk, and the increase in newbuilding orders raised the uncertainty for shipowners. Taking this risk may either result in high returns or the total opposite, great losses; this is just what happened with many shipowners of the 2000s decade.

Another important aspect of the dry bulk market in the 2000s was the extremely low rate of scrapping. Freight rates were so high that shipowners continued trading with older vessels which in another setting most probably would have been demolished. Normally, old vessels are demolished when they reach a certain age, as operating costs exceed earnings and the shipowner makes no profit. In this way, the market avoids extreme tonnage surpluses; this did not happen in the 2000s decade. Even old vessels made high profits and the shipowners believed the market prosperity would continue, thereby needing all tonnage available.

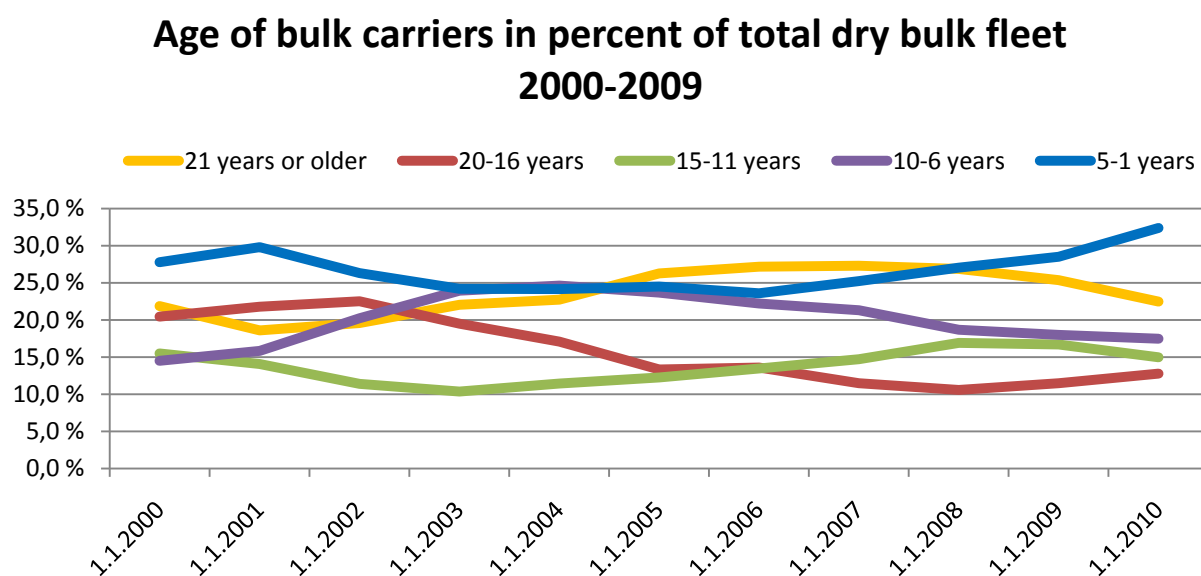


Figure 8.31 Age profile of the dry bulk fleet, 2000-2009

Source: Author's own, after data from Platou, various issues

The figure shows the age distribution of vessels in percent of the total dry bulk fleet. In 2000 the share of vessels over the age of 20 moved in opposite direction as to the share of 5-1 year old vessels, indicating that as new vessels were delivered, older vessels were scrapped. This pattern changed throughout the decade, and from 2005 to 2007 the total dry bulk fleet had the highest share of vessels over the age of 20. From 2008 we see a new change; the share of 5-1

year old vessels increased due to delivery of newbuildings, while vessels over the age of 20 decreased, indicating that the market was trying to compensate for the extreme tonnage surplus encountered.

When calculating the standard deviation of the age distribution for a selected set of years, we find an interesting result. The deviation has changed considerably since 2000, and the allocation of the age distribution of the bulk fleet deviated much more from the average mean in 2009 than it did in the 2000, giving support to the fact that the allocation between the age groups changed. It would have been interesting to calculate the standard deviation for the 1990s decade, but unfortunately this data is not available.

The table below shows the standard deviation for a selected set of years.

Bulk fleet in million dwt	1.1.2000	1.1.2001	1.1.2003	1.1.2005	1.1.2007	1.1.2009
21 years or older	58,4	51,3	65,2	84,2	99,6	104,3
20-16 years	54,6	60,2	57,7	42,8	41,9	47,2
15-11 years	41,4	38,8	30,6	39,3	53,7	68,6
10-6 years	38,7	43,7	70,8	75,9	77,8	73,9
5-1 years	74,3	82,3	71,6	78,6	92,1	117,2
Total bulk fleet (mill. dwt)	267,4	276,3	295,9	320,8	365,1	411,2
Standard deviation	14	17	17	21	25	28

Table 8.7 Standard deviations of different age profile for selected years

Source: Author's own, after data from Platou, various issues

The high newbuilding growth and the low rate of scrapping are important aspects as to why the shipping market experienced such a severe recession after many prosperous years. When the world economy collapsed, the demand for seaborne trade was reduced as world consumption of goods decreased. For shipowners this was the worst thing that could happened; as a result of decreasing demand, freight rates fell and the number of vessels needed to transport goods took a considerable fall. Due to the extreme newbuilding ordering and low rate of scrapping the years prior to the financial crisis, supply soon exceeded demand. Shipowners were left with severe amounts of excess tonnage, resulting in a high rate of lay-ups, slow speeding and scrapping.

In 2004 only 800 000 dwt of the dry bulk fleet was deleted and in 2007 only 700 000 dwt. To put this in perspective, let us say the average dry bulk vessel is approx 100 000dwt; in 2007 only 7 vessels were deleted, while 286 vessels were delivered, this increased the total dry bulk fleet with 279 vessels just this one year

The table shows how the dry bulk fleet changed on a yearly basis with regards to newbuildings delivered and vessels deleted. From 2002 the change kept on growing, indicating that there were much more deliveries than deletions. This resulted in an upward sloping curve of the merchant fleet as shown in figure 8.31; supply was growing at a quick pace.

Bulk fleet -end of year change (million dwt)	
1999	4,1
2000	9,2
2001	13,4
2002	7,6
2003	8,3
2004	17,5
2005	21,1
2006	23,3
2007	27,9
2008	27,9
2009	38,4

Table 8.8 Annual changes in the bulk fleet, 1997-2009

Source: Author’s own, after data from Platou, various issues

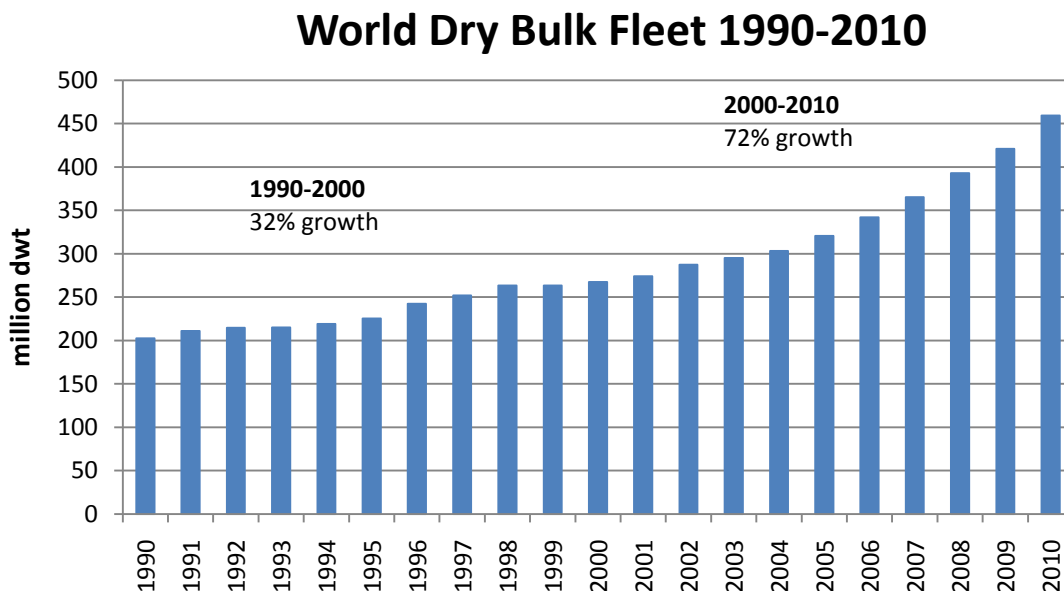


Figure 8.32 World dry bulk fleet, 1990-2010

Source: Author’s own, after data from Platou, various issues

Note: 2010 figures are as of 1.1.2010

From the above discussion we have studied many different factors affecting the dry bulk market in the 2000s, some effects more serious than others. This decade the relationship between supply and demand has been very unbalanced, creating volatile freight rates which has driven the shipping cycle's up- and downturns. The financial crisis has definitely been an important determinant, but it is important to remember that the financial crisis is a short-term factor contributing to the up- and downturns in the late 2000s. The shipping market volatility started years before the crisis hit, therefore what is interesting, are the long-term effects, like industrialization, and which way these factors will continue affecting the dry bulk market in the years to come.

9. CONCLUSION AND SUMMARY

This thesis aimed to investigate the extraordinary up- and downturns in the dry bulk market from 2000 to 2009. The factors affecting the dry bulk market are many and complex and it is therefore hard to draw any final conclusions.

Throughout this thesis the focus has been on what I believe are some of the most important factors influencing the behaviors of the dry bulk market. The results have shown that some factors have influenced the movement of the dry bulk market cycle heavier than others. Several important observations have been made, but the long-term perspective of China's industrialization and liberalization is of particular interest.

The movements in the dry bulk market this decade can be explained by the long-term growth driven by industrialization of emerging Asian countries, while in the short-term, by the economic shocks of the US financial crisis.

There has been a rise of Asian countries and due to high industrialization emerging countries like China and India are growing. These countries have shifted from primary production to manufacturing and service production, and due to this, the world engages in more intra-industry trade than ever before. These countries continued to grow throughout the 2000s and the industrial production of the world reached levels never seen before.

Western countries of Europe and the US have due to growing GDP and lower interest rates seen an increase in incomes, and the buying behavior of the West has changed; the result being higher demand for goods. Western countries have increased their consumption of goods produced at low labor costs in the Far East, increasing the demand for seaborne trade.

This study's results have confirmed that seaborne trade grows in the same direction as world GDP, and that there is a close relationship between the two. World GDP is the main driver of world consumption, and as consumption leads to higher demand for international trade, this has great effects on seaborne transportation.

The industrialization and liberalization of China has resulted in economic levels never experienced by a country before. Exports and imports have increased at the same pace as GDP. China is the world's largest steel producer, and the steel production is an important source in the dry bulk trade. China's steel production this decade is found to have high correlation with the growth of seaborne trade of dry bulk commodities. As a result of steel production, China both imports and exports more than ever, and as steel production is an outcome of industrialization it can be stated that the dry bulk trade has grown due to China's industrialization. Much of China's growth is also thanks to its importing countries, and this decade the US has had major impacts on the Chinese exports growth. The US has experienced a growing demand for products produced at low labor costs in the Far East, and the imports of these goods have increased considerably.

There has been a rise in the trade of dry bulk commodities, mainly due to increased demand from the West and production from the East. In the long-term, increased production and more engagement in international trade are the main drivers of demand for seaborne trade.

There is found to be a close relationship between the oil price and the freight rates in the dry bulk market and it can be stated that the volatility of the oil price this decade can be one of the reasons behind the just as volatile freight rates.

The trade pattern has changed, and seaborne trade is more centered round the regions of Asia. As trade patterns change we might also see effects on the average distance of the haul. From this study it was found that the average haul only changed minimalistic this decade, as tonnage capacity and cargo grew at nearly equal pace. With this result, it was stated that the distance of the average haul has not had any direct effects of the up-and downturns in the dry bulk market. Even though the average haul has not increased much, it would have been interesting to know how the value of each ton carried has changed, but as the demand for shipping is measured in volume and not in value this question is not relevant when discussing the effects on cyclical movements.

The demand for seaborne trade this decade reached new levels, and as the tonnage capacity for a long time had been on a relative steady level, demand soon exceeded supply; this

resulted in high freight rates. Due to high demand and equally high freight rates, the supply started growing and the fleet quickly expanded.

Secondhand prices rose so high they even exceeded newbuilding prices at one point. This resulted in an abnormal increase in newbuilding orders; the order book grew so large that even the lead-time changed from around 1 year, up to 4 years. This is where the important aspect of time lags is brought into play. As demand for tonnage grew, shipowners kept on ordering newbuildings even though these vessels would not be ready before in a couple of year's time. When the market collapsed, many vessels were scheduled for delivery.

The age allocation of the bulk fleet was analyzed and it was found that in the mid 2000s there was a larger share of vessels over 20 years than any other age group, indicating that the rate of scrapping had almost come to a halt. This extremely low rate of scrapping resulted in more tonnage capacity in the market, which was a good thing for shipowners when demand was high. Mass psychology played a big part in the short-term this decade, and shipowners believed that nothing could stop the great ride of the 2000s.

High freight rates indicate high returns, but it also indicates high risk. This decade gives a good indication of how taking a risk may affect the shipping industry. When the financial crisis was a fact in 2007 and world economies collapsed, so did the demand for goods. When hitting the dry bulk market in 2008 the demand for seaborne trade dropped to dramatic low levels and so did the freight rates. The extreme tonnage overcapacity soon became a fact, making the recession even worse.

This brings us to an important question, what could the banks and financial institutions have done differently, could they have foreseen the extraordinary market shocks about to come? Or more importantly should they have foreseen them? With so many newbuildings on order, it appears to have been no restriction policy as to who received loans and who did not. It seems that the banks, like the shipowners, were paralyzed by the belief that the market high would continue forever.

Forecasting cyclical patterns is almost impossible, and the events of the 2000s decade were hard to predict. The world had never experienced such growth levels before, and at such high growth levels the need for accuracy is very important, as only small changes can have severe effects. This is exactly what happened, and when the effects of the financial crisis reached the dry bulk market, supply quickly exceeded demand and the dry bulk market collapsed.

What stage the shipping market cycle could have been at today if the US recession had not encountered is interesting to take into consideration, maybe the peak could have continued even higher? This type of speculations is exactly what makes the shipping market so exiting, but also so volatile and risky. If the shipping industry has learned anything from this decade's up- and downturns it is to always expect the unexpected. With a country like China on the rise nobody knows what the years ahead will bring for the shipping market. The shipping industry may be heading for a new trend in the years to come.

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APPENDIX 1

Figure 8.2 and 8.3

Low-income economies (43)

Afghanistan	Guinea-Bissau	Rwanda
Bangladesh	Haiti	Senegal
Benin	Kenya	Sierra Leone
Burkina Faso	Korea, Dem Rep.	Somalia
Burundi	Kyrgyz Republic	Tajikistan
Cambodia	Lao PDR	Tanzania
Central African Republic	Liberia	Togo
Chad	Madagascar	Uganda
Comoros	Malawi	Uzbekistan
Congo, Dem. Rep	Mali	Vietnam
Eritrea	Mauritania	Yemen, Rep.
Ethiopia	Mozambique	Zambia
Gambia, The	Myanmar	Zimbabwe
Ghana	Nepal	
Guinea	Niger	

Lower-middle-income economies (55)

Albania	Honduras	Paraguay
Angola	India	Philippines
Armenia	Indonesia	Samoa
Azerbaijan	Iran, Islamic Rep.	São Tomé and Príncipe
Belize	Iraq	Solomon Islands
Bhutan	Jordan	Sri Lanka
Bolivia	Kiribati	Sudan

Cameroon	Kosovo	Swaziland
Cape Verde	Lesotho	Syrian Arab Republic
China	Maldives	Thailand
Congo, Rep.	Marshall Islands	Timor-Leste
Côte d'Ivoire	Micronesia, Fed. Sts.	Tonga
Djibouti	Moldova	Tunisia
Ecuador	Mongolia	Turkmenistan
Egypt, Arab Rep.	Morocco	Ukraine
El Salvador	Nicaragua	Vanuatu
Georgia	Nigeria	West Bank and Gaza
Guatemala	Pakistan	
Guyana	Papua New Guinea	

Upper-middle-income economies (46)

Algeria	Grenada	Peru
American Samoa	Jamaica	Poland
Argentina	Kazakhstan	Romania
Belarus	Latvia	Russian Federation
Bosnia and Herzegovina	Lebanon	Serbia
Botswana	Libya	Seychelles
Brazil	Lithuania	South Africa
Bulgaria	Macedonia, FYR	St. Kitts and Nevis
Chile	Malaysia	St. Lucia
Colombia	Mauritius	St. Vincent and the Grenadines
Costa Rica	Mayotte	Suriname
Cuba	Mexico	Turkey
Dominica	Montenegro	Uruguay
Dominican Republic	Namibia	Venezuela, RB
Fiji	Palau	
Gabon	Panama	

High-income economies (66)

Andorra	France	Netherlands Antilles
Antigua and Barbuda	French Polynesia	New Caledonia
Aruba	Germany	New Zealand
Australia	Greece	Northern Mariana Islands
Austria	Greenland	Norway
Bahamas, The	Guam	Oman
Bahrain	Hong Kong SAR, China	Portugal
Barbados	Hungary	Puerto Rico
Belgium	Iceland	Qatar
Bermuda	Ireland	San Marino
Brunei Darussalam	Isle of Man	Saudi Arabia
Canada	Israel	Singapore
Cayman Islands	Italy	Slovak Republic
Channel Islands	Japan	Slovenia
Croatia	Korea, Rep.	Spain
Cyprus	Kuwait	Sweden
Czech Republic	Liechtenstein	Switzerland
Denmark	Luxembourg	Trinidad and Tobago
Estonia	Macao SAR, China	United Arab Emirates
Equatorial Guinea	Malta	United Kingdom
Faeroe Islands	Monaco	United States
Finland	Netherlands	Virgin Islands (U.S.)