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The Rise and the Fall of the Shipping Industry in 2003-2008 and 2009-2018: The Interrelationship of 7 Maritime Markets

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Abstract

The main objective of this work was to present the role of 7 maritime markets together, and especially as they stood during the recent exceptional boom (2003-2008) and the long depression (2009-2018). These markets were: shipbuilding, seaborne trade, freight rate, 2nd hand ship market, demolition, ships laid-up and ports & canals. Usually, maritime economists dealt with one market, or at a maximum with three or four but separately, and so the reader had no opportunity to understand the whole picture. We considered also ourselves lucky to analyze a period where a boom has been followed immediately by a depression! This finding, we believe, will be useful for future as we showed—that the industry is unpredictable as well as cyclical… The world's fleet productivity presented for the first time, and we used it to predict the seaborne trade in 2023. One market which has not received the full attention it deserved, was demolition one—where here it has been analyzed as fully as possible. Finally, we presented the work done by Ports and Canals[1] usually treated separately by the maritime economists! Our method was that of the economic analysis of the Supply and Demand determining whatever price is involved.

Keywords

Seven Maritime Markets, Global Shipping Finance, Timely Investments in New-Buildings & 2nd Hand Ships, Fleet's Productivity, Unpredictability and Cycles in Shipping Industry

1. Introduction

Shipping managers, we believe, have to know—thoroughly—the main Maritime

[1]If "ports & canals" were not included, we could not be justified to use the term **maritime,** but the term **shipping**!

Markets, as well their behavior, during, at least, the recent **20 years**, which was a very fruitful period. It, par excellence, provided a real model, which produced an excellent **boom** (2003-2008: the Rise) and a long **depression** (2009-2018: the Fall), followed by a Pandemic (2019-2022?) and a major war between Russia and Ukraine (2022-)!

Important is also for the managers to **know** which market is more important and why. This will make a manager pay a greater attention to the more important ones, given also the limited time of managers in general, and in shipping, in particular (Robbins & Coulter, 2018: 38).

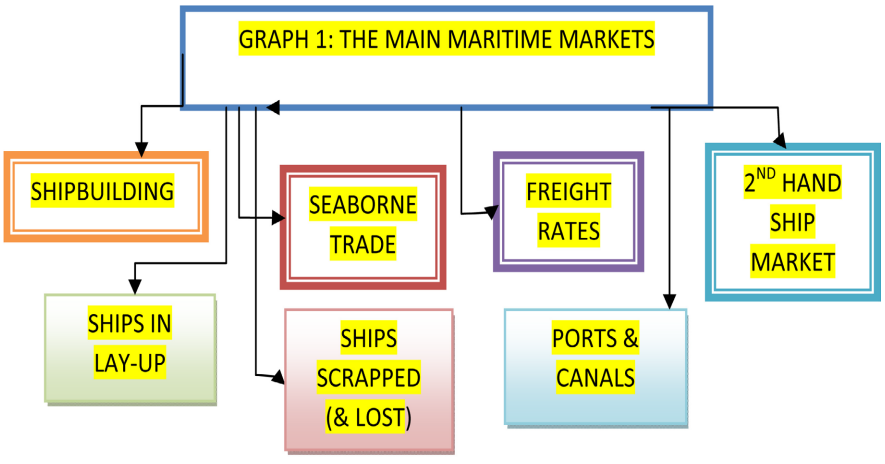
The 7 main maritime markets (**Graph 1**) are.

The **Supply** of ships is determined by the: 1) S*hipbuilding*, delivering the newly-built ships; 2) D*emolition*, scrapping away the unprofitable ships (including, statistically, the "ships lost") and 3) *Ships coming-back from* their *anchorages*, *where they were laid-up*. **Supply has to adapt** to **demand,** in most of the situations. Important, however, is the **time** required for such adaptation… Supply—as this is well known—depends heavily on "costs of production", like: capital, depreciation and fuel oil, to mention only the 3 most important.

The **Demand** for the ship services is determined by *Seaborne trade*, *sea distances*, & the *CIF prices*—to mention again the 3 most important. **Price**—the freight rate—is determined by the **interaction** of Demand and Supply and paid to owners so that Charterers be entitled to hire their ships.

The transfer of ships among ship-owners, (*using the important 2nd hand ship market*), *influences* ***company's*** *supply exclusively*!

All maritime markets are **important**, but *each in* ***accordance*** *with its* ***contribution*** *to* ***total cost***! **Shipping** is a **cost-based industry**, requiring a **diligent**, and a **digital**, **cost-control**[2]! This is the most **important principle** to be **learned**, and **applied** by shipping **managers** every **day** from the **very start**.



Graph 1. The main maritime markets. Source: author.

[2]A price-based company has more tools in its artillery than a bulk shipping one like advertisement to try to differentiate its services and pass from "pure competition" to "monopolistic" one (Goulielmos, 2022a).

The King of all costs, in our opinion, however, has two faces: the "**ship building prices**", and/or, par excellence, the "**2nd hand ship prices**". These two also determine **depreciation**-a major cost.

2. Aim and Structure of the Paper

The paper aims at explaining the role of the 7 main maritime markets: Supply, Demand, Price, Demolition, 2nd hand/laid-up ships & Ports & Canals, during the last very interesting 20 years (2003-2022), under a boom (2003-2008) and a depression (2009-2018), one following the other. This is a unique opportunity.

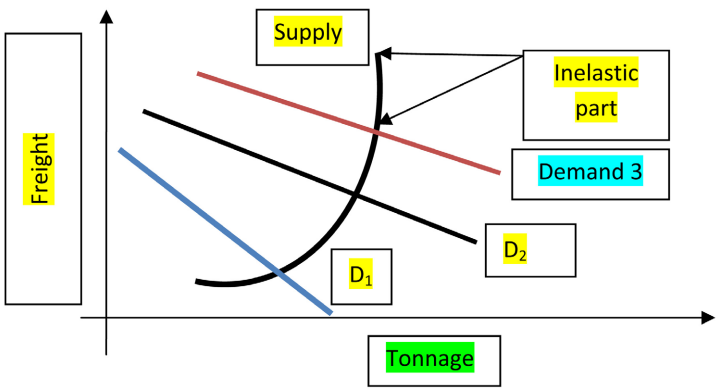
The paper is organized in 10 parts, after literature review, as follows: Part I: **Shipbuilding**; Part II: The **Greek shipping miracle**; Part III: Fleet's Productivity; Part IV: **Demand**; Part V: **Freight Rates**; Part VI: The 2 important characteristics of the Shipping Markets; Part VII: The Ships waiting for the market to improve; Part VIII: The **demolition ship market**; Part IX: The **2nd hand** ship market; Part X: The Ports & Canals. Conclusions finally followed.

3. Literature Review

Koopmans (1939: pp. 57-58), (1910-1985), recognized very early the unique characteristic of the tanker supply, i.e., its *absolute inelastic part* in the medium-term (**Graph 2**). He belonged to the famous "shipping school" of Jan Tinbergen (1903-1994). He explained why very *high freight rates* appear when Supply cannot respond to demand, in the speed required, to avoid them.

Stopford (2009), (Chapter 5), presented only 4 markets of the shipping industry. Heaver (2012) provided a short exposition of the way shipping economics developed. Studying his work, we saw also the research inclination of the maritime economists, since 1982, where "Cruising shipping" was almost **absent**!

Shipbuilding held only 3.5% out of 659 papers (1982-2009), and the dry & tanker markets held only 6.2%. Ports **only *dominated*** in the most of the works with 29.3%! *This is a point for further research. Why Ports put, all other topics, except themselves, in the margin of the scientific investigations? Is there a secret?*



Graph 2. The interaction of supply and demand for tonnage in the medium-term. Source: author.

Shipping economists, since the time of Koopmans (1939) and Zannetos (1966), loved to deal with the "freight rate markets", and by 2012 only Strandenes dealt with them! True is that between 1991 and 2009, 4 **new** research areas emerged—"environment; ships & ports safety & security; short sea shipping (EU coastal shipping); & intermodal/logistics"—which were added to the already traditional 9 research areas—attracting a 23% share out of 458 papers.

Logistics emerged as an urgent need to connect the time and cost of ports with that of container-ships. This is another point of further research, *as to why the above 4 topics became so important suddenly so that to re-orient research away from the classical and important issues of the "freight rate determination" in tankers and bulk carriers*?

Summarizing, the previous literature dealt with only 3 maritime markets-Supply, Demand and Price, following the classical cliché of micro economists. The manner of how the prices of new ships and second hand ones are formed vis-à-vis freight rates and what nowadays scrapping market can contribute to company's revenue are ignored. More important is that the role of ports has been expelled from the analysis, for a long time in the past, where they get more than 60% of ships' revenue! A short attempt is done here.

4. Methodology

This paper is different from any previous ones, we believe, because it analyzes **all the main maritime markets** *together*, as well their *interrelationships*, including the famous **shipping cycle**. This is done over an exceptional best period (2003-2009) and under a long depression (2009-2018), followed by a Pandemic (2019-2022) and a War (2002-)! It also presents the "demolition market" in a greater detail than previous analyses.

The scope of the paper is pedagogical for the future shipping managers, who did not live similar circumstances before in their managerial life. The past can teach—even if not expected to be exact as the future—though this paper showed many similar behaviors in the basic variables over these two decades or so (2003-2022).

5. Part I: Shipbuilding

We believe it is proper to begin with the industry, which provides the capital goods to the shipping companies: the shipbuilding.

5.1. Who Is Who in Shipbuilding, 2000-2020?

Japan established in shipbuilding after the 2nd World War so that by 1975 to have a 53% share in "ships completed" of about 51 m dwt. The Rep. of Korea which emerged later held 28.5 m dwt by 2007 (33%) and almost maintained its share—with 31.5% in 2020 (**Figure 1**)! In 2011, 160 m dwt completed (**a peak within a crisis**) to come down to 75 m dwt (almost ½) by 2020, due to the 2009-2018 crisis. China also emerged to dominate shipbuilding by 2022, as mentioned.

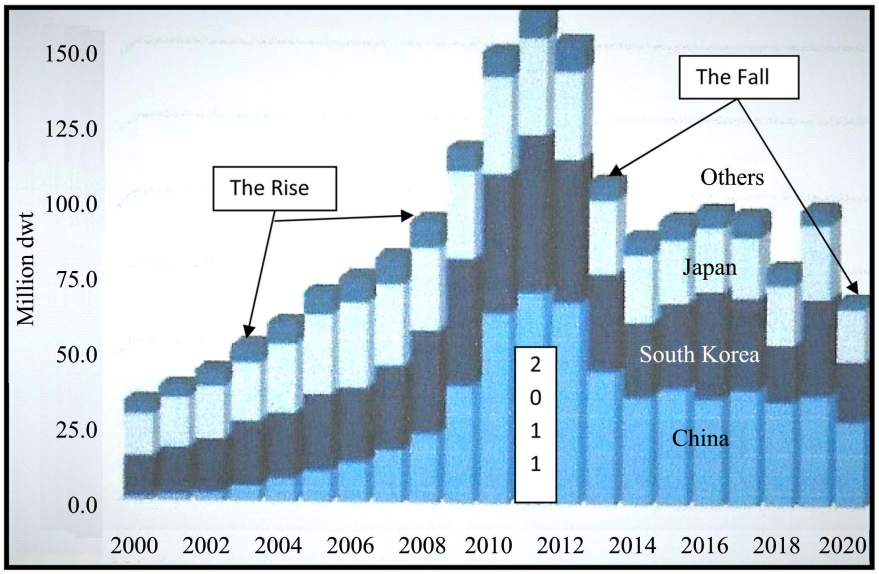


Figure 1. The ships completed worldwide, 2000-2020. Source: modified by adding a frame & labels, from that in ISL, 2021 yearbook (ships > 150 dwt each).

As shown, 3 countries "monopolize" the world shipbuilding: Japan, S. Korea and China. Worth noting is that the *exceptional shipbuilding activity* started in **2003,** at ~50 m dwt, and arriving at ~100 m dwt by 2008 (double)! Strange is that the *ships completed*, **increased** in 2011 (Figure 1), 2 - 3 years **after** the 2009 crisis! Indeed, more than the 1/3 of the existing fleet ordered in 2011 as shown in Figure 2!

As shown, the ship-owners… **continued** to order ships in 2009-2012, up to 35% of their existing fleet (2011)! How can this be explained? One apparent explanation is the prior **excessive tonnage broken-up**. In 2011, however, the ships broken-up were <5% of the existing fleet (+ships lost). As shown in Figure 2, a maximum 7.5% on existing fleet ordered in 2020-2021 during a rather low freight market.

Our **explanation** is that these **excessive orders** (>7.5% on existing fleet), in 2009 and thereafter, **caused** by the **prior excess liquidity** provided by the exceptional good freight market since 2003! This certainly reveals a **myopic** investment[3] policy from the side of ship-owners, who should keep those funds for the coming… depression.

5.2. "Ships on Order"

The "ships completed" are the result of the prior "ships on order", (reduced by ships' cancellations—not shown here), placed certain years **ago** (Figure 3). When we say orders, we mean investments in shipping. And when we say deliveries, we mean the ships to be ready for serving their customers.

As shown, the "orders of ships" exceeded the "ships completed" almost 2 times in 1998, and more than 8 times in 2008! The high freight rates did not

[3]Many times ship-owners were obliged to cancel prior orders at a cost. This is a cost-benefit decision.

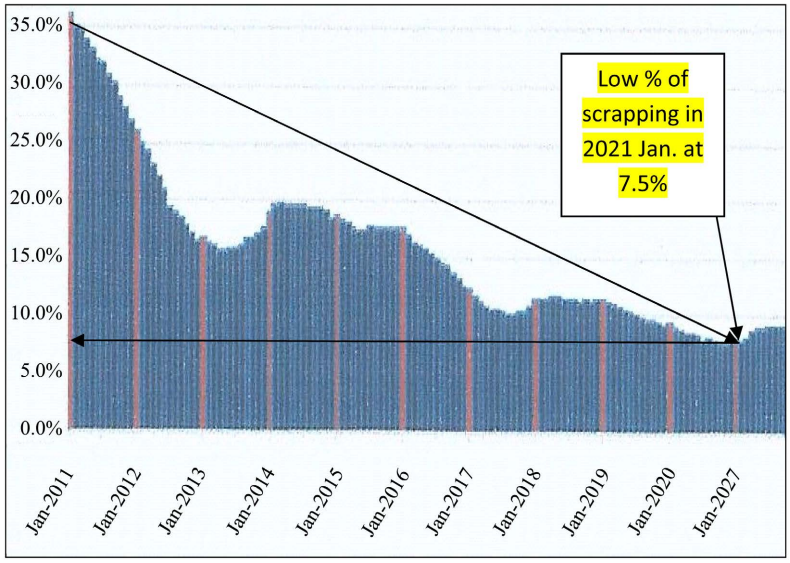


Figure 2. Orders of ships as a % of their existing fleet, 2011-2021 (Jan.). Source: ISL 2021; modified.

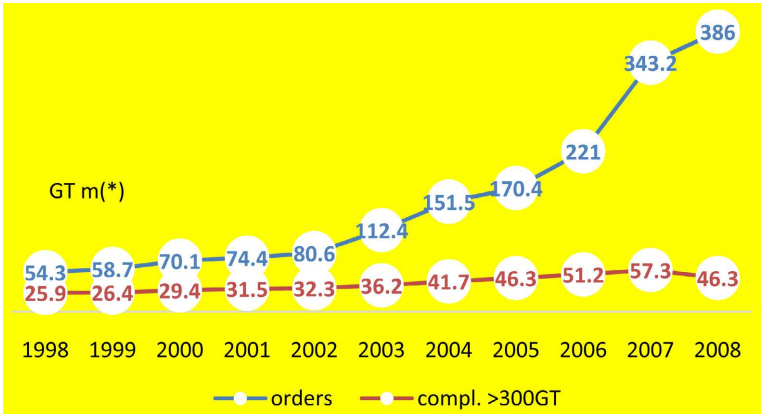


Figure 3. Cargo carrying sips on ODER & completed, 1998-2008. Source: data from ISL 2008 yearbook; we transformed all numbers in GT into dwt, using the rather conservative ratio: 1.5 dwt = 1 GT.

seem to **have motivated** shipyards to produce more ships, because their production followed a rather ***unresponsive*** attitude, while… building prices[4] were increasing! The situation can be presented—in years (Table 1):

As shown, the completion of a ship varied from 2.1 years—the **normal**—in 1998 to 3.1 years in 2003 and 8.3 years in 2008! *Ship-owners must know now that during a top boom they will have to wait up to 6 additional years to get delivery of their ordered ships*! *They have also to think what is going to happen next*?

The "ships on order" (Figure 4 and Figure 5 & Figure 7) motivated by the belief of the ship-owners that the **future** freight market will be **better** in 2003

[4]This is also a cost-benefit issue on the part of the shipyards this time. This means that shipyards have to estimate the cost of building etc. a new berth to serve faster their customers and the **higher price** that they will charge having ship-owners in the **waiting list** as time goes-by!

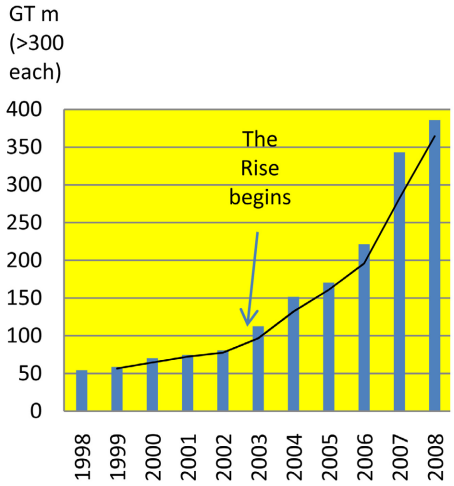


Figure 4. Ships on order, 1998-2008. Source: data from ISL, 2008 & 2021 yearbooks.

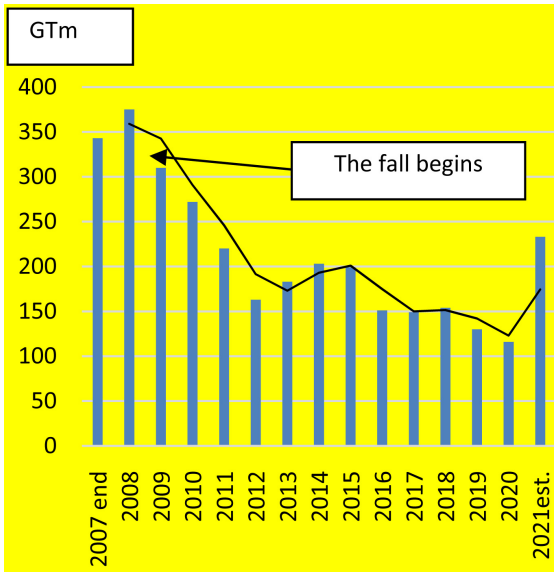


Figure 5. Ships on order, 2007-2021 (>300 GT each). Source: data from ISL, 2008 & 2021 yearbooks.

Table 1. The years a ship needed to be completed, 1998-2008.

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
2.1 Years (the 2 years are normal)	2.2	2.4	2.4	2.5	**3.1 the rise starts**	**3.6**	**3.7**	**4.3**	**6.0**	**8.3!**

Source: author; using data from **Figure 3**.

and thereafter! From where is this coming from? This comes from the **prevailing freight rate** and the **current level of time-charters** in 2003 and thereafter (**Figure 6**)!

Though the signs are **common** to every ship-owner, **all** ship-owners believe that **then** they had to **order**…!

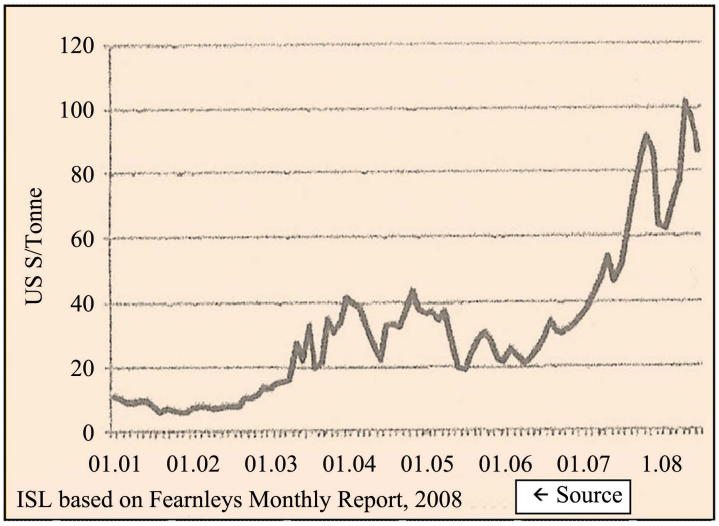


Figure 6. Dry bulk voyage rates, Tubarao (Brazil)-China, 2001-2008 (July).

As shown, (**Figure 4**), the "ships on order" increased from 2003 to 2008 (end). These "ships on order" mobilized by the high expectations, which have been created by the very high freight rates (**Figure 6**).

As shown, an indicative freight rate increased from $10 per ton in 2001 (Jan.) to about $105 in July-2008, for dry bulks from Brazil to China!

5.3. The Current "Ships on Order", 2020-2022

In end-2022, the orders, in numbers of ships, declined for both tankers (down to ~18%) and bulk carriers (down to ~46%). In 2021, ship-owners ordered also 123 Gas carriers, at ~$100 m each, and 116 in 2022, at ~$179 m each!! *The current energy crisis will make some shipyards millionaires, and certain people will become new-poor*!

5.4. The Ships Delivered

The impact of shipbuilding on the **Supply** of ships **does not come** from the "ships on order", but from the "ships delivered" (**Figure 7**), given that there may be cancellations!

In 2007, shipyards had a workload of 85.5 m CGT, vis-à-vis ~20 m in 2020 (4.3 times less). The deliveries, in 2010, concerned orders placed in 2007 (3 years back). Thus, ship-owners are able to bring a crisis on themselves with their extraordinary orders, and the subsequent deliveries, ships which were not required…!

5.5. Is Shipbuilding Ephemeral? Who Is Who in Shipyards[5]?

Let us think if a country remains on the top of shipbuilding nations for long. **Table 2** shows the major shipbuilding nations since 1965. In a period of 70 years,

[5]Stopford (2009: p. 207) estimated there to be 300 major shipyards employing from 200 to 10,000 workers each. The shipyard offering the lower price, the faster delivery, the higher finance and the higher quality will gain the contract.

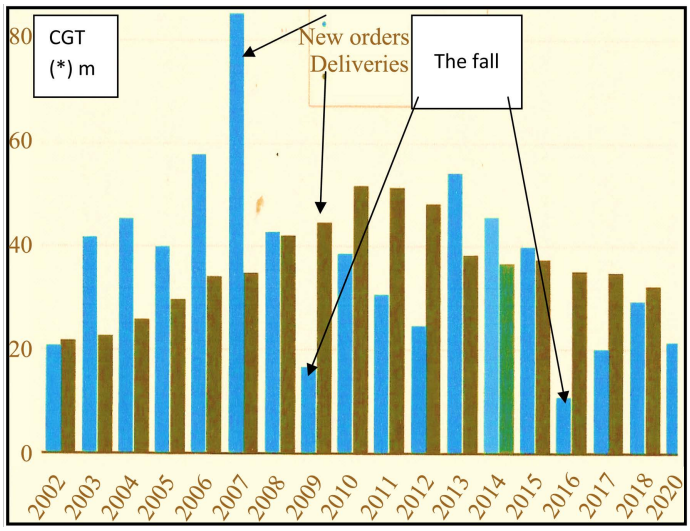


Figure 7. Ship deliveries versus orders, 2002-2020. Source: modified from eu.support@statista.com. (*) CGT = compensated GT = the work load to build a ship, given her size & type.

Table 2. The major shipbuilding nations: 1965, 2007 and 2020.

Country	Completions, 1965% GT	Completions, 2007% GT	Completions, 2020% GT	Remarks
China, PR of		18.4	40.3	Started in 1998
Korea, R of		36.0	31.5	Started in 1974; falling %
Japan	41.5	30.5	22.2	Started in 1950s; falling %
Europe (non-EU countries are shown in bold)	56.4 Belgium, Croatia, Denmark, **Finland,** France, Germany, Italy, Netherlands, **Norway,** Poland, Spain, **Sweden** & UK	07.6 Croatia, Denmark, **Finland,** France, Germany, Italy, Netherlands & **Norway**	02.3 Croatia, **Finland,** France, Germany, Italy, Netherlands & **Norway**	Falling %
US	1.9	0.3	0.1	Falling %
Brazil	0.2	0.1		Falling %
Others		7.1	3.6	Viet Nam (est. 1990) 1%; Philippines (est. 1990) 1.1%
Total	100 UK 1st with 15.3%	100 Germany 1st with 2.4%	100 Italy 1st with 0.9%	18 m dwt (1965); ~86 m dwt (2007); 86 m dwt (2020); 2022 81 m dwt est.

Source: data from ISL, 2008 and 2021 yearbooks.

shipbuilding passed-on from Europe to Japan, to S Korea and to China (1950-2020)!

Moreover, Japan supported its shipbuilding with the supply of steel, and finance, attracting global ship-owners, mainly from the British Shipyards. It dominated up to 1974, when S. Korea appeared. Recently (mid-2021) the LNG carriers built in S Korea accounted to ~14 m dwt (37% of the total order book).

Also, China became world's largest shipbuilding nation with a 40.3% share in orders in 2020, 37% in 2021 and ~54% in 2022 (9 months)! France holds its position in building the "high technology" cruising and passenger ships.

5.6. Did Shipbuilding Cause Shipping Depressions?

Important is that shipbuilding needs an increasing time in order to produce ships, given existing demand. So, shipbuilding intensifies the shipping cycle! This also allows for increasing freight rates. A readily available tonnage can be found only in the 2nd hand ship market, but at a premium, if demand is high—as this happened in 2003, and thereafter, to 2008 (see relevant market below).

Though technological progress adopted also by the shipyards using "mass" and "series" production[6], and robots to carry-out electro-soldering, (unaffected by the weather), the *delivery time* remained very long, given demand (Stopford, 2009: 207)!

The construction time, we do not believe is **responsible** for a shipping crisis, given of course that ships became larger, on average, and their impact is now bigger per unit, and their time of construction is longer! The ***waiting time for a berth*** is responsible, we believe, especially when demand is acute, and shipyards are **reluctant** to construct new berths!

Let us imagine what it would happen if the supply of newly-built ships was extremely more elastic and adapted faster to demand and freight rates cannot but to be lower or prevented from rising! But this would further mean that the "shipping cycle" would become… "a shipbuilding" one! Because, if shipbuilding provided ships on demand, then at certain times, the ships ordered would be *too many*, and at others times, they would be *very few*… This means cycles. So, we return the responsibility to shipowners.

However, what happens if supply is greater than demand (S > D)? *Scrapping* market takes care very slowly to bring a balance! So, the shipping cycle is *inevitable*, **but** its consequences can be **lesser**, if supply *increased in a rather* ***conservative*** *manner*! This needs a global cooperation among **ship-owners**, which has never been achieved (e.g., "scrap 2 ships, build 1") so far. This means to plan orders so that to satisfy demand in a rather accurate way!

5.7. Which Is the Proper Procedure in Building Ships?

When a ship-owner decides to build a vessel, he/she has to determine her specifications, and **here** is the opportunity for a ship-owner to ask for his/her **per-**

[6]Shipbuilders learned a lot from the construction of Liberty ships in 1946 in USA.

sonal *modifications*! These come from experience, especially if the ship-owner comes from the engineering profession (like e.g., the Greek ship-owners Pappadakis N; & the late Chandris A). Shipyards, of course, *do not like* changes in their standard design; the no-change situation provides also a faster procedure and a lower cost for the ship-owner, but ship-owners, we believe, have to look for an improved performance[7] of their vessels.

5.8. Do Shipping Companies Replace Their Ships, with New Ones, Regularly?

Stopford (2009: p. 207) argued that certain UK shipping companies used to replace regularly their vessels, every 12 years. These companies apparently faced expensive repair yards at home, and their crew had specific duties, not permitting maintenance at sea ("job/work agreements").

Goulielmos (1974) (Ph.D.) proved that British used to sell their ships just before reaching the 3rd special, and most expensive, survey (3 × 4 years), and Greeks used to buy them, as having cheaper repair yards at home, and a crew carrying-out most of the repairs at sea! Let us see next this side of the Greek shipping policy, which has created a miracle!

6. Part II: The Greek Shipping Policy—A Diversion

6.1. To Carry-Out Repairs at Sea

This, we believe, was one of the ways by which the Greek shipping miracle made… Especially, during the "sailing ships", in 1840's, Greek crew carried-out **all** required repairs at sea (see also **Picture 2**). This idea led in 1980s to the "educational preparation" of a "multi-talented" crew to carry-out repairs with a limited resort to repair yards!

6.2. Greeks Buy Any Ship Offered for Sale

Japan "benefited" Greek ship-owners, selling to them a great number of 2nd-hand ships, belonging to Japanese shipping companies, which have failed. Greeks proved that to be a ship owner, and stay in such businesses, *is not enough* to have *steel mills*, *shipyards* and maritime *banks*, but to do the shipping job as Greeks do (Goulielmos, 2021a). Let us see, however, this issue of finance.

Greek ship-owners exploited[8] also the "special offers" made by Japanese, mainly in 1975, in lower building prices, in credit facilities, and even in time-charters! A number of 12 New Greek ship-owners created then ("Marmaras"

[7]In the past wider spaces required for the ballast water so that to be visited by crew. Also crew cabins etc. were made for shorter people than the Europeans. Large shipping companies may have a "research & development" department and a "performance engineer", which can contribute towards a more functional vessel during construction.

[8]All along Greeks were present as buyers of ships in all opportunities and par excellence after the end of both the 1st & 2nd World war. Ships built for the wars were laid-up in European rivers in 1919 and in USA shipyards in 1946. Greeks "bought" 107 Liberty type of ships amounting at 1m tons in 1946-re-vitalizing their maritime presence in global affairs after the destruction of their fleet by >70% during the 2nd WW as well in the first.

e.g.). Japanese[9] devoted the money that had to spend for unemployment benefits, for about 300,000 workers, to subsidize shipbuilding prices!

6.3. Where a Greek Ship-Owner Can Find Finance?

Building ships **without** using bank finance is something exceptional given the high amounts involved. This, however, was the weak point of the poor Greek ship-owners, all along—till banks came in Piraeus in 1960s. Greeks had a low propensity to save, and a fear for new-buildings, except Onassis.

As shown, (Figure 8), the shipping finance comes from 40 international banks (~52% in Europe; lending $157 b; and $115 b from "Australian-Asian" banks), since 2007. These, between end-2007 and end-2021, lent from $352 b (2007) to $290 b (2021) to shipping, with a peak in **end-2011** ($455 b).

The maritime banks[10] should have long patience and finance shipping projects, we believe, where large shipping families exist, for a longer presence in shipping!

One good question is: "Did the above finance development follow freight rates?" As shown, from end-2007 to-end-2011, the finance increased… **ignoring apparently the prior "GFC"**—the global financial crisis! Banks apparently followed the "**orders of ships**"…not the **freight rates,** as they **should**! This was a grave mistake of the banks…without having a long patience, which is required in shipping businesses as the paper has showed!

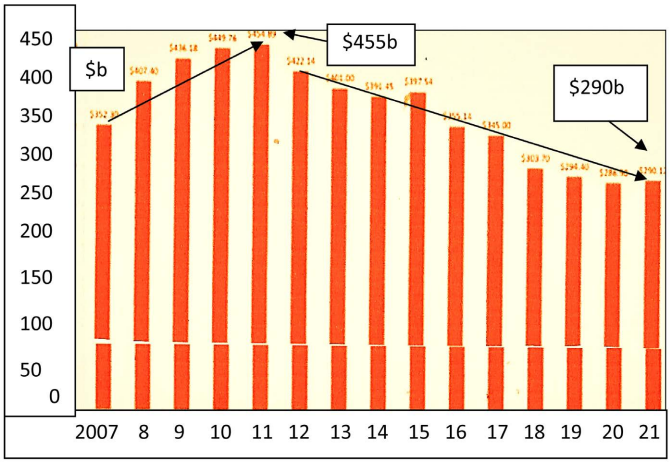


Figure 8. International shipping finance, end-2007-end-2021. Source: Naftika Chronica, 08/09/2022, modified.

[9]The Japanese are people of re-forming both economics as well management science. In the past Japanese thought to make "labor" a fixed factor of production by making *all kinds of stocks*, variable applying the "just-in-time" and "door to door" philosophies. Of course their "life-employment" was a strong motive given also the exceptional strong manufacturing companies Japanese created dominating entire geographical areas and providing alternative employments (the conglomerates). Japanese applied the so called "growth pole´ theory due to the French economist Perroux Fr. (1903-1987) ("regional economics" in modern parlance). The author recommended elsewhere to use the above philosophies—using helicopters—as the case may be to provide **spare parts** etc. to ships amounting at $150,000 per vessel!

[10]"PNP Paribas" lent $20 b; "China Exim" $18.5 b & "KfW" about $17 b. The Greek banks gave $12.5 b in 2021. In the past the Royal Bank of Scotland used to be the most open-handed.

6.4. Are Greeks Buying 2nd Hand Ships?

Important is the **competitive advantage**, which can be established by a shipping company, vis-à-vis its competitors, **if** it has the **policy** to own **only** 2nd hand ships! Buying 2nd hand ships—as Greeks do—a company may save of as much as $35 m (1991) per ship (Stopford, 2009: p. 205)! This underlines also the importance of timing in buying ships. Similarly, timing is needed **when** one **builds** new ships. A clever manager had to build ships in 1986, achieving a discount of $60 m ($95 m - $35 m) for a VLCC (from Clarksons 1993)!

The Rise, however, changed the facts we knew, (Figure 9), about the prices of the newly-built ships vis-à-vis their 2nd hand ones.

As shown, the price of an "Aframax" tanker, 5 years of age, from 1989 to 2007, varied from $26 m to $70 m! The price of her newly built sister varied from $36 m to $70 m too. Worth noting is that for the 1st time in shipping history—as far we know—in **2003,** and thereafter, *the 2nd hand ships* ***exceeded*** *those of their newly-built sisters*! *Thus, a good thing is to have 2nd hand ships* ***for sale*** *at such times*!

6.5. The Activity of the 2nd Hand Market of Bulk Carriers in 2022

In 2022 (Oct.) it has been reported[11] that the Chinese were buying 12 bulk-carriers/ month, at about $16 m each. Greeks were spending about $22 m for each

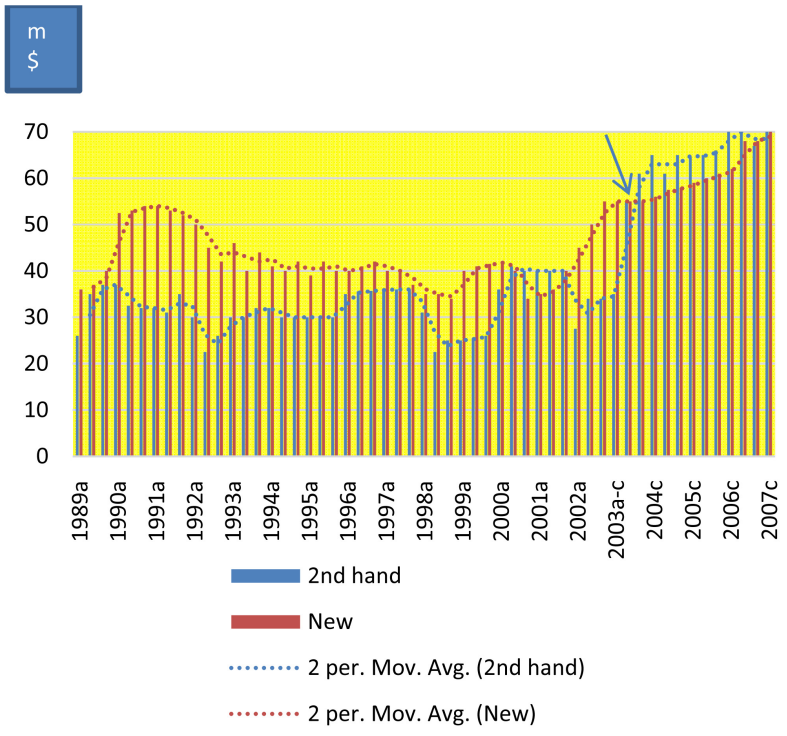


Figure 9. The prices of a 5 years of age AFRAMAX Tanker & her newly-built sister, 1989-2007. Source: data from Stopford (2009: p. 212).

[11]This has been reported by "Allied shipping research". There were sold 59 bulk carriers per month at about $19 m each on average.

bulk-carrier, buying about 10 ships per month. This means that Greeks bought fewer, but younger, and apparently larger, ships. Thus, we reckon that the Greek and the Chinese flags are going to fly in the 2nd hand bulk carriers in 2023 (Scan 1) by majority.

We talked so far about the supply of newly built ships, but we did not have the opportunity to discuss how much productive has become the global fleet, but always look at the tons the fleet has obtained ignoring its speed by doing its job faster.

7. Part III: Fleet's Productivity

Ships became more **productive**, increasing only ~1.9 times, for a trade, which increased ~2.2 times (1987-2007; from 3.5 b tons to 7.6 b)! The **productivity** of the fleet is an important, but a neglected concept (Stopford, 2009: p. 721). The 2005 seaborne trade carried-out by 655 m GT or 10.4 tons per GT. The 2007 fleet of 722 m GT carried-out 10.53 tons of cargo/GT.

The above is mainly an achievement of technological progress (Goulielmos, et al., 2021). Fleet's productivity, between 1987 and 2007, and between 2011 and 2022, was as follows (Figure 10 and Figure 11).

The productivity of the global fleet improved, in 2007, from 8.6 tons (1987) to 10.5 and fell to 8.1 tons in 2020! The "productivity coefficient" can be used also in estimating the *future* fleet or the future seaborne trade! If the fleet, e.g., will be 1500 m GT in 2023 (+2.5% from 2022), then the seaborne trade **will be** 12,150 m tons (8.1 times 1500 m)!

Fleet's productivity depends on the amount of the seaborne trade (numerator) vis-à-vis the amount of the fleet (denominator). The seaborne trade increased **faster** than the fleet in 21 years (1987-2007), from 3.461 m tons to 7.572 m tons, while the fleet in **22** years increased only 1.9 times as mentioned, and, par excellence, during 2004-2008[12].

Scan 1. The prevailing flags in 2nd hand bulk carriers, 2022. Source: from "Naftika Chronica", weekly journal, 06/10/2022, modified.

[12]The global fleet in 2008 was 775 m GT/1162m dwt and increased in 2021 to 1464 m GT/2196m dwt or 1.9 times higher.

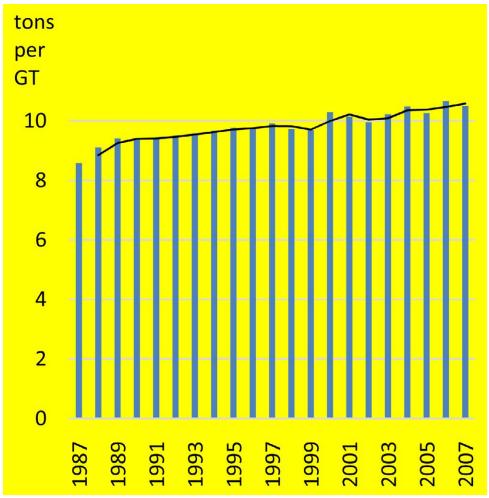


Figure 10. Global fleet's productivity, 1987-2007. Source: data from ISL, 2008 & 2021 yearbooks.

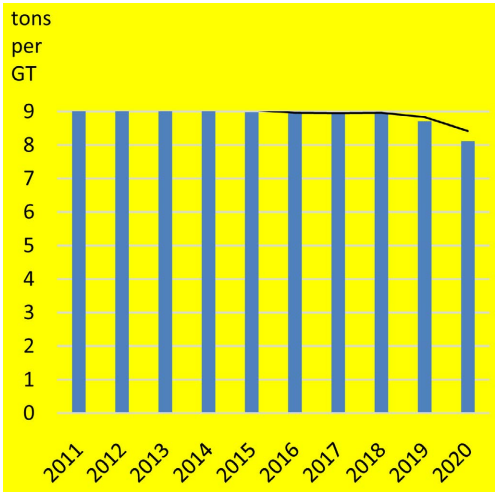


Figure 11. Global fleet's productivity, 2011-2020. Source: data from ISL, 2008 & 2021 yearbooks.

We come now to discuss the most important factor, and market, of all—the King of Shipping and indirectly of all other markets: Seaborne Trade! Without it, shipping has no reason to exist. The demand is derived! Ship-owners have to study, and suggest, how to boost seaborne trade as this is their future. World prices must go down to boost consumption overseas—as the celebrated famous Law of Demand has taught us!

8. Part IV: The Demand

Demand means "sea trade". A great number of factors determine it. The most important are the: demand for sea *imports/exports* (**Figure 12**), the GDPs of the participants, inflation, sea-distances, tariffs, quotas—for any reason and for climatic ones—and CIF prices. The more basic of all the above is the Price at destination.

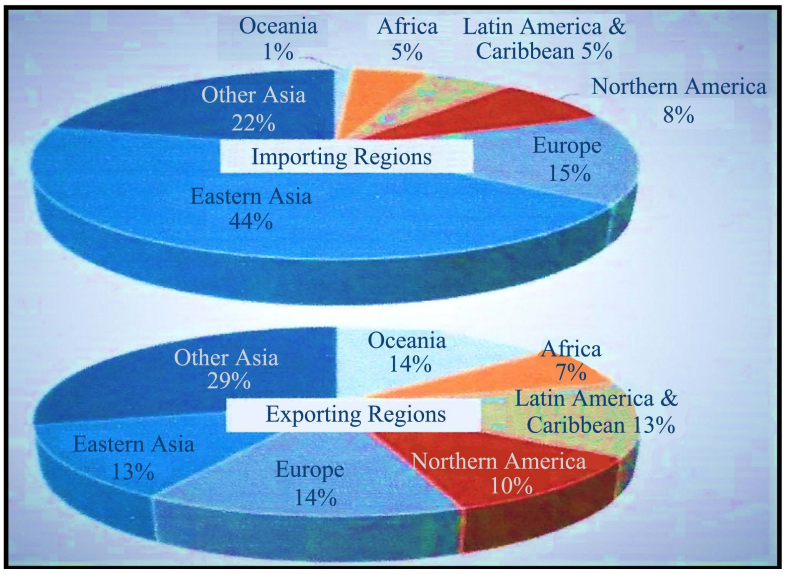


Figure 12. The regions' share in sea trade, 2020. Source: ISL 2021 modified.

Shipping grew thanks, primarily, to the sea imports to Asia (66%)! Also, it grew due to exports (42%) from Asia. Seaborne trade is generated by the demand for the *products carried* by ships (or stored in them, like oil) and not per se, (a **derived demand**).

Sea trade is the **moving power** of all maritime markets, and is affected mainly by international events like: wars, canal closures, OPEC+'s policy, to mention the 3 most important. The distances that have to be covered by ships, are affected by the emergence of *new* supply/demand centers, as this happened with iron-ore (Brazil-Australia) or in refined crude oil (M-East-Europe), in the past. In 1975 demand **reduced** for the 1st time in its history!

The hands of the scissors cut the paper together, and so the hands of the Seaborne trade and the hand of the ships, to transport it where asked, determine the price to be paid to ship-owner to carry-out this task.

9. Part V: The Freight Rates

The strategy of all shipping companies is to look after the **maximum** freight rate! Economists call this "profit maximization". If the freight rate is expected to fall, the owner seeks for a time-charter. If the owner expects that the freight rates for voyages will increase in future, he/she then prefers to be/or stay in the spot market.

If a new-building is involved, financed by a bank credit, then a time-charter is essential for the tenor of the loan. A serious cost item, and a **very volatile** one, is the price of **fuel**, which can be avoided by the ship-owners, if time-charters are agreed.

9.1. Supply & Demand Determine Price

Supply and **demand** determine the **freight rate**, the same way as both hands of a

scissor cut paper, according to Marshall A (1920). But what is a shipping market? "The **shipping Markets** are arrangements, where the **demand** and the **supply** of sea transport services are met, and together determine the price to be paid to ship-owners by the cargo-owners, the charterers".

9.2. The Hiring of Ships Is Done by Brokers

The owners of cargo, and the owners of ships, are not involved **personally** in the chartering of ships, but they employ brokers, who are called "ship-brokers" and "cargo-brokers" respectively. The cargo-brokers receive a commission for their participation, round 2% - 4% on total freight. Certain companies have tried to eliminate this participation using direct contacts over the phone or via internet.

Large shipping companies have their own brokers, who charter company's ships, (the chartering department). A very small competitive advantage can be created by these in-house salesmen, but they **cannot** get freight rates above those determined by demand and supply. The out-house brokers and all brokers, in general, must be **honest** and not to **look after** their **personal interest**.

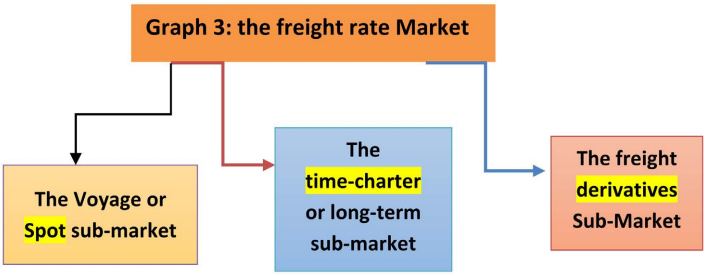
The chartering job is very simple, though a large number of factors must be taken into account. This is like to let a house, and get the maximum possible rent -surely a good prior knowledge of the house (the vessel) is essential, even from a distance.

Essential is also the profile of the tenant (charterer), his/her financial status, so that to be some kind of a guarantee for him/her to pay the rent all along. Many tragedies have occurred here during a crisis (1981-1987).

9.3. The 3 Sub-Markets of the Freight Rates

The freight rate market can be divided into 3 sub-markets (Graph 3).

As shown, ships can be hired for one voyage, and paid the freight, or for a specific period, involving many voyages, and paid the hire. Freight rates can also be used in deals in *forward contracts*, settled against an index (Goulielmos & Goulielmos, 2008). The freight rate market is **of top importance** as this is the main **source of income** for the shipping companies[13].



Graph 3. The freight rate market. Source: author.

[13]The payable interest for loans may be substantial. Thus clever shipping companies find ways to minimize this item. Scrapping money may be high too as ships increased their weight in steel. A ship of 50,000 tons of steel can get up to $30 m!

9.4. How Elastic Is Supply?

The basic fact here is that an increasing demand, waiting for ships to be built for a number of years, creates an extremely high freight rate (Graph 4)!

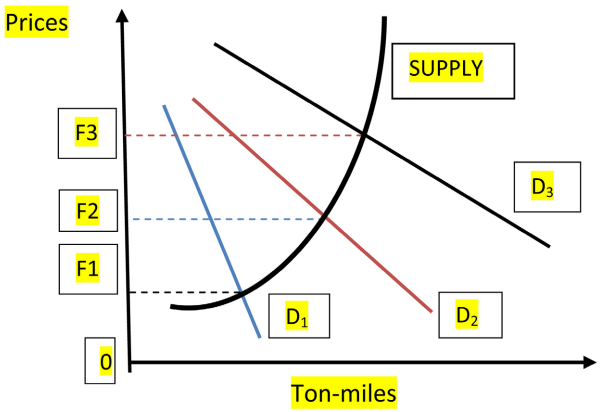
As shown, the Freight rate increased from F1 to F3, due to a non-responding supply to an increasing demand (shifting-up to the right). After the ship construction time, deliveries of the newly-built ships start to satisfy demand. Prior to deliveries, ships from lay-up returned, increasing Supply. The final situation is as follows (Graph 5).

As shown, the increasing supply S1 → S2 → S3 caused the freight rates to fall from position 1 to 2 and to 3. Then a new demand DD will start the cycle from the beginning.

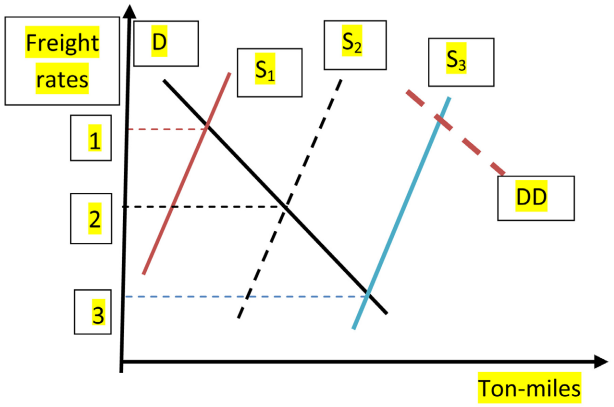
10. Part VI: 2 Important Characteristics of the Shipping Markets

10.1. The Impossibility to Forecast Demand

The demand (or distances) cannot be predicted! Forecasting, when a war will take place or a canal will be closed or when ships will adopt further economies of scale, is impossible!



Graph 4. The demand & supply for ship space during a medium-run. Source: author.



Graph 5. Supply & demand for ship space with a responding supply. Source: author.

Goulielmos and Siriopoulos (2006); Goulielmos & Psifia (2007a, b); Goulielmos (2009, 2010); Goulielmos & Psifia (2011); Goulielmos, Giziakis, & Kapothanasis (2011); Goulielmos (2012, 2017a, b, 2019, 2020), paid a persistent and continuous attention to analyze the shipping cycles, and their forecasting, with a limited success, except in forecasting future ship prices!

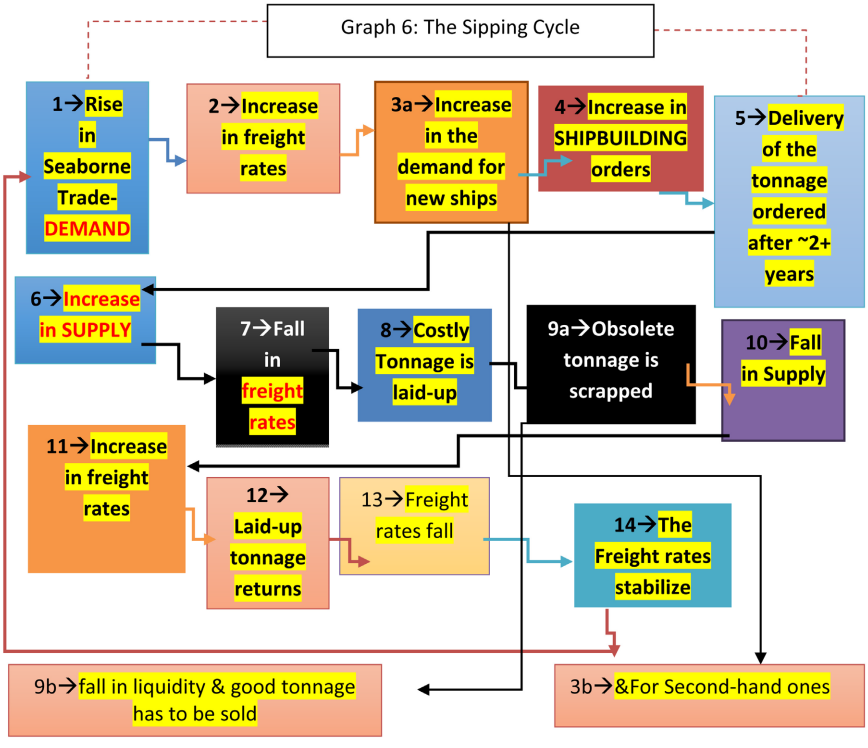
Confusion exists also among ship-owners. If, e.g., one asks one Greek ship-owner as to how long a shipping cycle lasts, one will get 3 different answers: 8 years; or 7 years; or 4 years… But the greater confusion—and crucial on—is that if one asks 3 Greek ship-owners how long a boom lasts, he/she will get one wrong answer: a boom lasts 2 years equal to a trough of 2 years too[14]!

10.2. A Cyclical Industry!

The only thing that we are certain about is that shipping industry is cyclical (Graph 6)!

Cyclicality, however, changes altogether the business framework of the shipping companies! A strategy is needed to carry business in a **cyclical** and **unpredictable** industry, which **only** Greeks found!

Following Graph 6, demand creates the need for more ships, because the existing ones are not enough (D > S). But the new ships have to be built, and at increased prices, and this takes also time. The 2nd-hand ship prices increase also, and…may exceed the new-building ones as shown! The unsatisfied demand for



Graph 6. The sipping cycle. Source: author.

[14]The tragedy of the "Sanko shipping company of Japan" is well known, which made similar assumptions (Stopford, 2009: p. 126).

some time creates further increases in freight rates. When the delivery of the new ships starts, freight rate falls. Costly ships are laid-up and obsolete ships are scrapped. Supply approaches demand (S = D).

Companies' supply is also reduced, if **good** tonnage is sold for urgently required cash, not provided by company's shareholders, or their banks. The gradual reductions of supply bring zigzag increases in freight rates, as certain laid-up tonnage returns, till all of it is finally absorbed. The freight rate market is at final **equilibrium,** if all seaworthy laid ships are employed. This phase closes the shipping cycle, till demand becomes stronger than supply (D > S), *and a next cycle begins*.

Shipbuilding and seaborne trade accomplished their job and determined price. But what it happens if a price is below ship's operating cost? They are driven outside the active market enjoying no income!

11. Part VII: Ships Waiting in Anchorages for the Market to Improve

Shipping owns assets with a rather long economic life, approaching 32 years of age, and thus a 2nd hand ship market must exist. Ships laid-up may **come-back** from their anchorages. The laid-up tonnage reached a historical high of 100 m dwt in May 1983. The tankers were the main victims (Figure 13) with about 51 m dwt in about 1982, as a result of the two energy crises.

Supply is reduced, gradually, by the tonnage **scrapped** (following next), which was near 163 m dwt, between **1983** and **1989** (over 7 years)! Scrapping, however, is a very **conservative/slow** action, needing 3 - 4 years to absorb the total laid-up tonnage! As a result, ship-owners cannot expect that their scrapping will *improve* the freight markets at once!

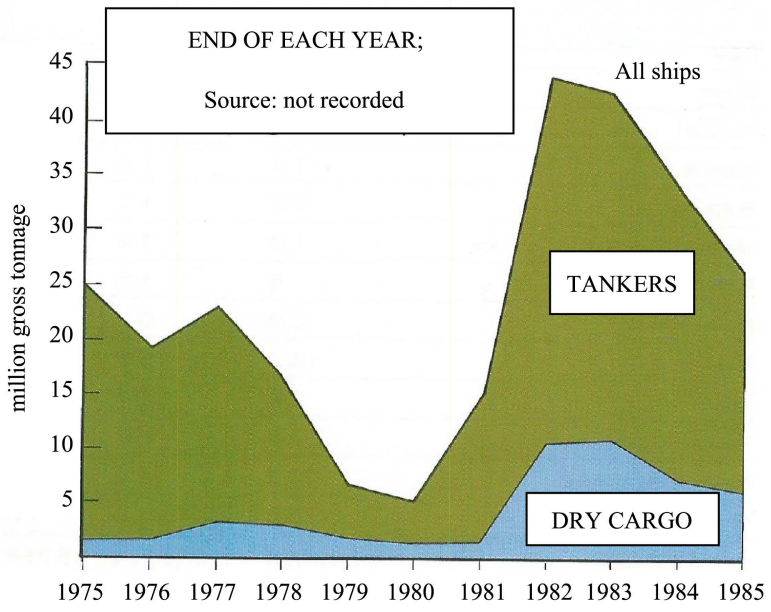


Figure 13. Laid-up tonnage of tankers & dry cargoes, 1975-1985. Source: not recorded.

12. Part VII: The Demolition Market

12.1. Scrapping Yards = The Crematories of Ships!

A scrapping yard… undertakes the **funeral** of the very old ships, (Picture 1), that have died during the crisis, a unique effective way to bring **equilibrium**… between supply and demand for ships!

12.2. The Tonnage Scrapped Since 1983

Demolition, in 1985, reached a peak (42 m dwt) (Figure 14) and in 2012 (59 m dwt) (Figure 15).

As shown, the tankers, (plus combination carriers), broken-up, had a 73% share, due to the 1975 and 1979 energy crises. The tankers scrapped, of about 106 m dwt, needed 7 years (1983-1989). The "dry cargo ships scrapped", peaked-up in 1986, covering 1/2 of the total. The ships scrapped, as a % of the total fleet, considered normal at 4%.

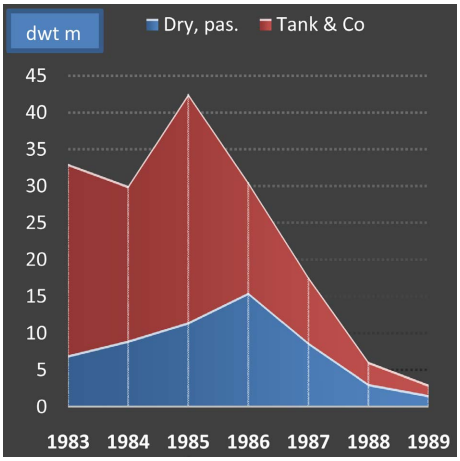
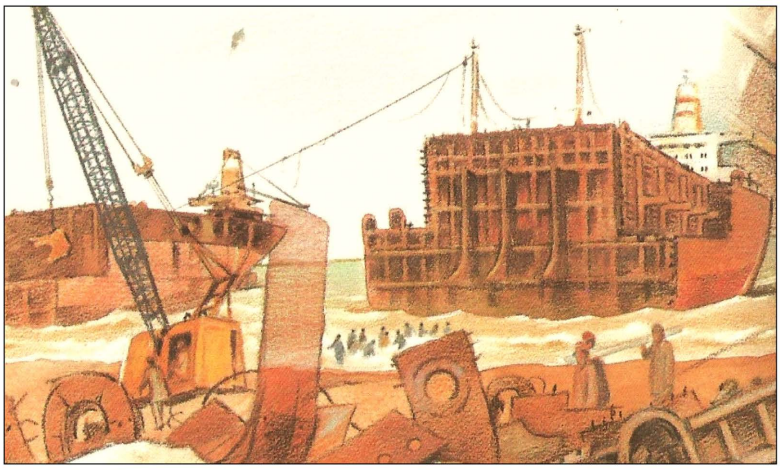


Figure 14. Global demolition, 1983-1989. Source: data from the 1990 "Platou report" and ISL 2021 yearbook.



Picture 1. A demolition yard in action, 1990. Source: modified from that in "Platou" report.

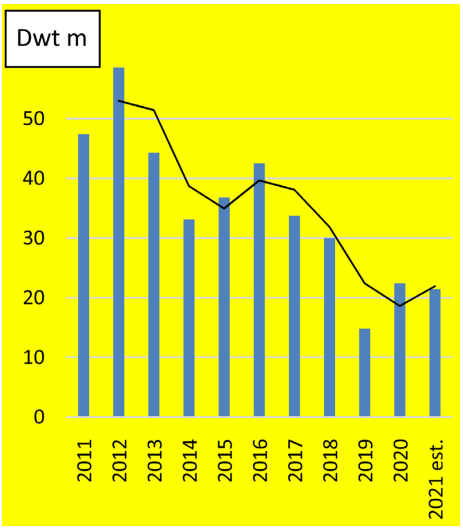


Figure 15. Broken-up tonnage, 2011-2021, (all ships > 300 GT). Source: data from the 1990 "Platou report" and ISL 2021 yearbook.

As shown, (Figure 15), in 2012, demolition peaked-up with about 59 m dwt. During this period (2011-2021; 11 years) 364 m dwt scrapped, confirming that the situation was really bad!

The demand for scrap comes mainly from countries, which use scrap in local markets by mini-mills, or cold rollers, for use in constructions.

12.3. The Ships Lost

In the statistics of the ships scrapped, the tonnage lost in marine accidents is added, varying from 1/2 m dwt to 1.35 m dwt p.a. (Figure 16).

As shown, the ships lost peaked-up in 2001-2002, 2006, 2009-2011. We do not wish to believe that "the fall" caused these higher losses… But a crisis surely reduces the maintenance cost, which is postponed for economy reasons, and thus ships are more vulnerable to marine accidents… we believe.

12.4. The Prices of Scrap

The relationship between freight rates and demolition prices is shown next (Graph 7).

As shown, when freight rates are high (F1), ship-owners keep—at all costs—their ships **in the market**, and the price of scrap is high (P1). As freight rates fall, the supply of scrap increases, and the demolition prices fall-down (to $200).

As "timing" in shipping is the king (Goulielmos, 2021b), also the perfect time to scrap is… when scrap prices are **at a peak** (2021 July). Demolition prices reached the amount of $610/scrap ton in 2021 (July), for dry cargo & crude oil ships (a 13 years high), (Figure 17), from $250 in 2016.

There is, however, a **dilemma**: when scrap prices are **high**, freight rates are also **high**, and **ships are not scrapped**! Then, clever ship-owners **keep** ships in anchorages **waiting** for a high scrap price… in a cost-benefit mentality! This is another asset-play…

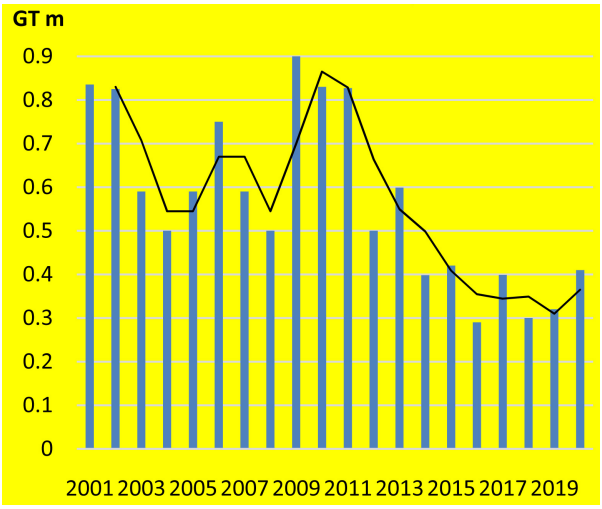


Figure 16. The world ships lost. In marine accidents, 2001-2020. Source: data from ISL 2021 yearbook.

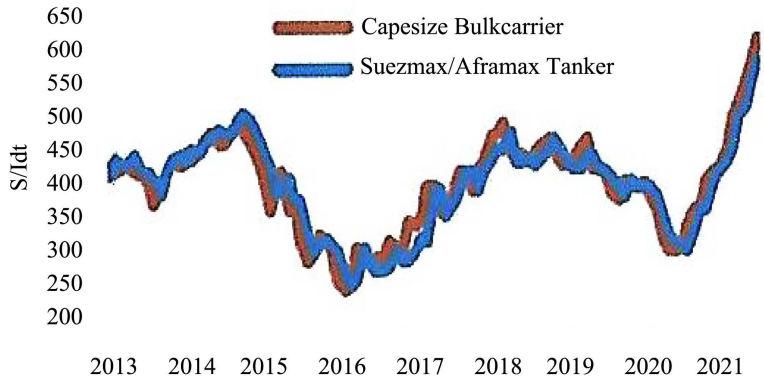
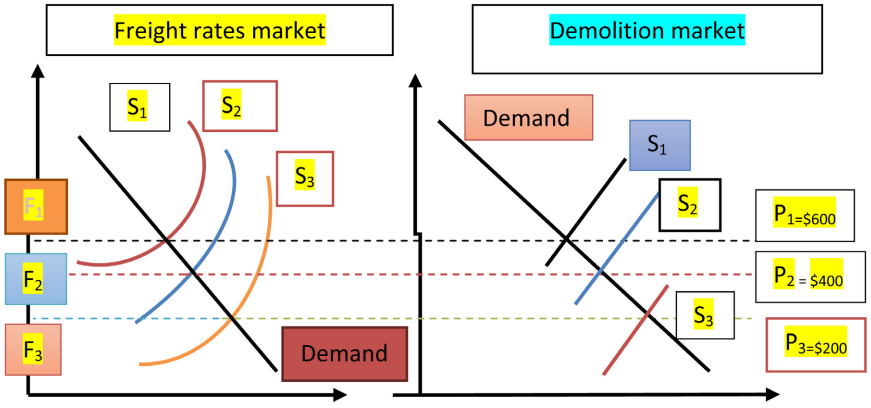


Figure 17. US $ Scrap prices, 2013-2021 (July) per scrap ton (end of the month). Source: ISL 2021 modified.



Graph 7. The relationship between freight rate and the scrap prices. Source: author.

The demand for scrap has little things to do with shipping. There is rather a national demand for pipe work etc. The demolition knowhow is simple, the tools can be elementary and they can be handled by cheap female labor.

12.5. Which Country Scraps Ships?

India appeared in 1989, (or in 1983 according to other sources), together with Bangladesh, China (early 1980s), Taiwan (soon after the 2nd World War on war scrap) and Thailand. Table 3 presents the demolition production per country in 1986, 2005 and 2020.

12.6. The Reasons for Scrapping

The main reason is that the ship has no further hope to be employed again! The particular reasons may be many, but the main ones are (Graph 8).

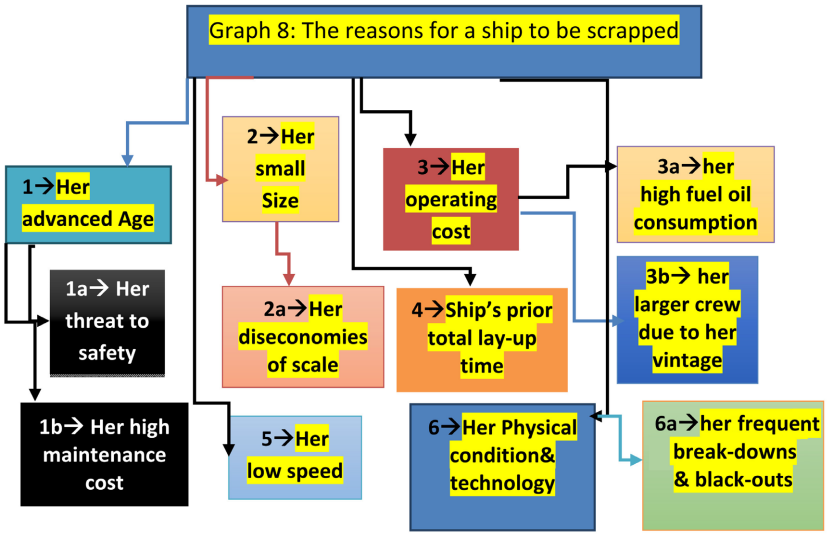
First in importance is ship's cost, which is higher than the prevailing freight rate for some time. In recent decades, the fear for a marine accident—as alleged "prevented" charterers to employ tankers above 15 years of age and bulk carriers above 20. As shown below, this was a myth. No doubt that a high age demands increased maintenance.

The larger ships embody economies of scale, and thus they compete the smaller ones, which need a higher freight rate/per dwt. A ship may have also a lower speed and thus she spends more days at sea than the competing ones. Older ships may have as well larger crews; and they may suffer from frequent

Table 3. Demolition activity by Country, 1986, 2005 & 2020.

Country	Scrap 1986 %	Scrap 2005 %	Scrap 2020 %	Remarks
Taiwan	38			In 1990s the scrap yards closed-up
China	23	3		Early in 1980s
S Korea	13			1980s started; closed-up in end 1980s
Pakistan	4		20.2	In Gadani beach; 250,000 square yards; 15,000 laborers
Japan	4			
India	3	16	24.0	In Alang, 1983, 170 scrap yards; 5 - 10,000 workers in 2006
Spain	3			
Turkey	2		3.5	
Italy	2			
Bangladesh	1	76	37.1	In Chittagong; Dhaka
Others	7	5	15.2	
Total	100 (31 m dwt)	100 (9 m dwt)	100 (22 m dwt)	Ships > 450 dwt each

Source: data from Stopford (2009: p. 650); & ISL 2008 & 2021 statistical yearbooks.



Graph 8. The reasons for a ship to be scrapped. Source: author.

black-outs and break-downs. Older ships may have a bad physical condition on deck, and especially in their hatches. Problems may be also encountered in the hatch covers and in ship's gears (capable of lifting only light cargo) as well as in the electric power.

Of course, important is the main engine, because "engine engineering" responds from time to time to the needs of the ship-owners, like e.g., to have engines facing-out an *excessive fuel price*, as in 1975, 1979 and in 2022. Economical engines needed in the past (performing fewer rounds per minute; and occupying less space, in favor of cargo) provided. Today, ship-owners need **one** new, ecological, fuel (Goulielmos, 2021b), not yet found.

In scrap market the deals are carried-out also by brokers, mentioning ship's lightweight, location and when the ship is available. The price of scrap is negotiable, but there is a demand and supply mechanism as well.

12.7. Shipping Crisis and Scrapping

Figure 18 and Figure 19 show, indirectly, that the freight rates **affect** the scrapping market.

As shown, the tonnage broken-up during 1997-2007 (11 years), peaked-up in 2002-2003, at the same time of the exceptional increases of the freight rates. The years between 2004 and 2007 witnessed the lowest scrapping, as expected. The **tonnage broken-up** peaked-up also in **2012, following not the market,** but the "ships on order"! After the 2009 global financial crisis, **more** ships **sent** to scrap yards. These were by majority dry cargo (2009, 2011, 2013, 2016), and tankers, especially in 2018.

12.8. The Average Age of the Broken-Up Ships

One may be surprised to read the average age of the broken-up tankers, 1997-2007, 2020 (Figure 20)-supposed to be 16 plus years of age!

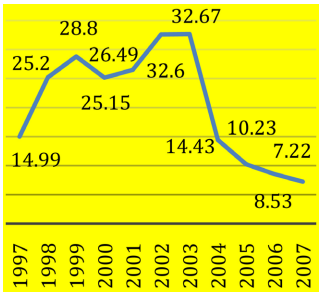


Figure 18. Tonnage broken-up, 1997-2007, dwt m. Source: data from ISL, 2008 & 2021.

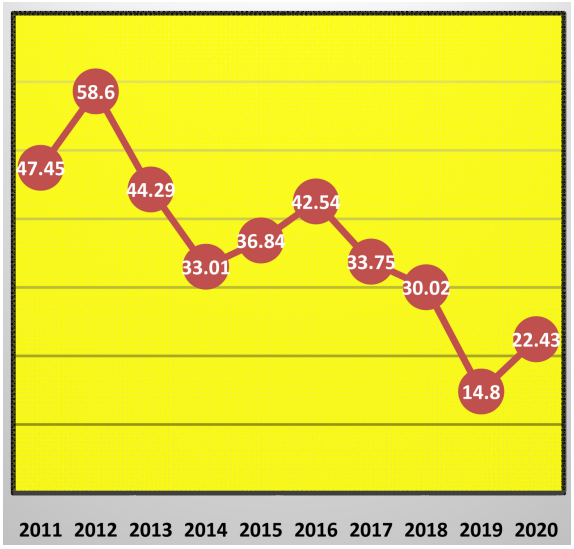


Figure 19. Broken-up tonnage, 2011-2020. Source: data from ISL, 2008 & 2021.

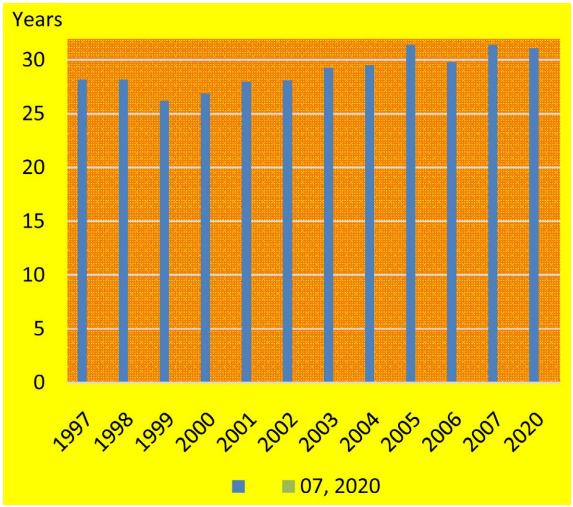


Figure 20. The average age of tankers broken-up, 1997-2020. Source: data from ISL 2008; 2021; ships > 300 GT.

The average age of the broken-up tankers reached 31.4 years in 2007 and 31.1 in 2020! The scrapping age… *gets longer*, if the freight rate market is in a boom by as much as 5 years! Surely, this outcome is achieved by a higher maintenance

cost or policies of extending ship's life. Bulk carriers had an average age varying from 25 years (1999) to ~29 years (2007) and ~28 years in 2020.

12.9. The Size of the Ships Broken-Up

Do the "smaller" sizes contribute more to the breaking-ups? Statistics does not support this (Table 4). This is to be expected as larger ships contribute more by majority per ship.

The bulk-carriers scrapped at a size of over 150,000 dwt at ~77% in 2020!

We showed so far how ships which were not required removed from the market either permanently or temporarily. Of course the decision to lay-ships-up is less sentimental than scrapping them! There are, however, ships which "walk" from a ship-owner to another, to which we come now.

13. Part IX: The Sale & Purchase of Ships

This market is the **most important of all,** in our opinion! One crucial reason is that this makes a ship-owner able to **create** a permanent/temporarily **competitive advantage**, and this is so over the centuries (Figure 21), but also recently (Figure 22).

As shown, the prices of a 2nd hand small *steam* ship (Picture 2) fluctuated violently in 1898-1930! Similarly, in 1976-2007! There are two basic exceptions, however, because the later ship is larger about 10 times (economies of scale & a new fuel)!

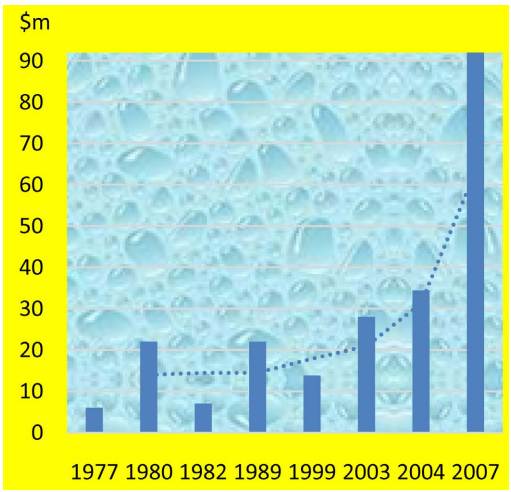


Figure 21. The Price of a Panamax bc, 1976-2007. Source: data from Stopford (2009: p. 202).

Table 4. The tankers broken-up in % per size, 2020.

Size, dwt	% Broken	Size, dwt	% Broken
25,000 - 40,000	7.52	40,000 - 100,000	32.10
100,000 - 150,000	24.23	150,000 and over	20.75

Source: author, on data from ISL, 2021.

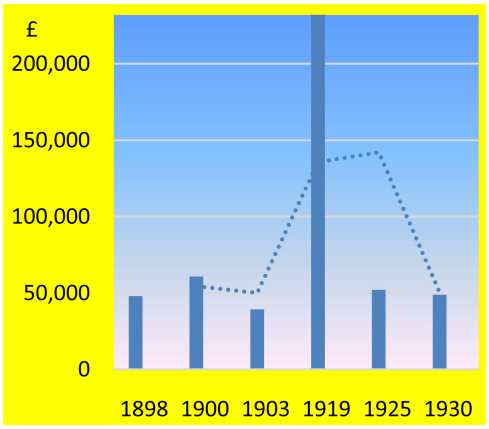
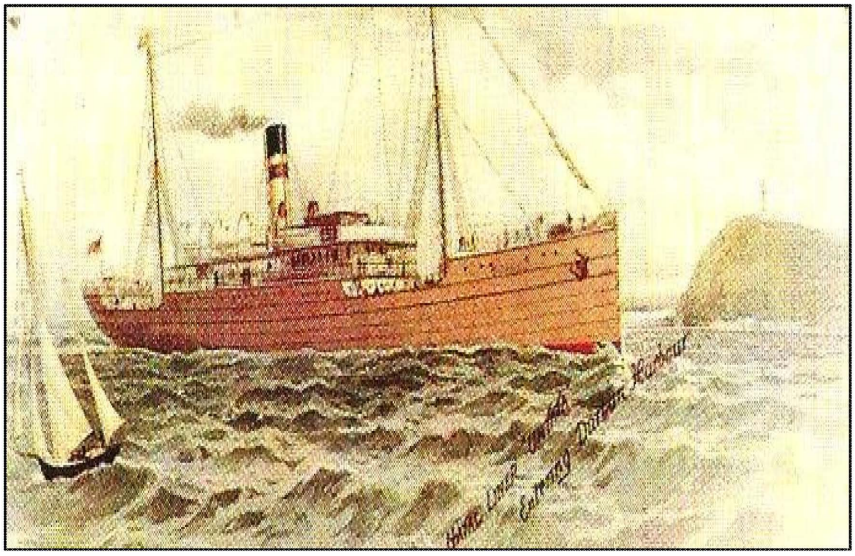


Figure 22. The price of a new 7500 tons steamer, 1898-1930. Source: data from Stopford (2009: p. 202).



Picture 2. A steamer in 1900's. Source: The "Natal line of steamers".

A clever ship-owner will buy (**Figure 21**) a number of bulk carriers just after Jan. 1978, and in 1983, 1986 par excellence, 1999, and 2002, obtaining discounts in the purchasing average price from **32%** to **60%** (Stopford, 2009: p. 203)!

14. Part X: The Market of Port Services and Canals

Important component in the transport chain is the market of Port **services** & Canals, which **have to** be provided to ships in certain **quality**, **cost** and **time**. Ports and canals became, from the beginning, "partners" of ships, and in certain ports, ships pay lion's share to them!

Canals served 1061 m tons of bulk cargoes (2007). Via the Suez Canal passed 710 m tons (67%); via Kiel, 100 m; Panama, 208 m and St. Lawrence, 43 m. As far as the global Ports are concerned, the 10 top ports in 2007—in **Asia**—handled 1189 m tons of cargo! The American ports, 273 m, the European 184, the African & Oceania 310 (a total = 1956 m tons).

More important, however, is the cost of providing port services, which we consider it high, both for the ships and the seaborne trade! We understand that ports are monopolies in certain countries, but there had to be **a world control** for uniform port charges for similar services. We believe it is not fair for ships to pay more than 60% of their revenue to ports… Reducing port costs to 50% of ship's income, one may boost seaborne trade more effectively than reducing trade tariffs (globalization)!

Larger ships "need" **longer** distances and **fewer** port visits, and canal crossings, as they pay on their volume (GRT/NRT). But they need also larger unit loads, not always available. Thus, Ports and Canals penalize the big ships, as the bigger the ship, the more she has to pay to ports and canals, even in ballast! Port charges had to be based on ship's dwt, minus 3% - 5%, and when in ballast to pay nothing, we believe. Also, one cannot understand the extremely different port charges among different ports… for the same ship and for the same service!

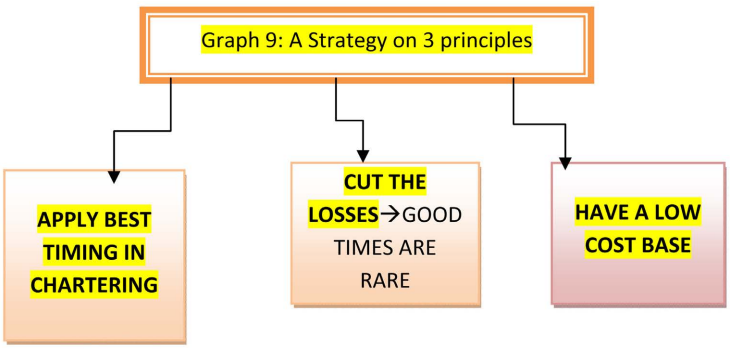
15. Conclusions

Lorange (2009)—a Professor and a Ship-owner—wrote in 2009 (p. 15) reflecting our conclusions: while *cyclicality* and *turbulence* characterize much of the shipping industry, successful ship owners see these as opportunity. Taking advantage of the opportunity, however, requires the ability to **understand** and **execute** an effective strategy… resting on the following 3 principles (Graph 9).

If a company wishes to become competitive, we conclude that one or more 5-years of age ships can achieve it! It is better to avoid a new-building with a bank credit.

A **permanent** competitive advantage can **easily** be obtained—as Greeks do—by pursuing the strategy: "buy ships at rock bottom prices, larger and younger, and sell older and smaller" (Stopford, 2009: p. 179). This strategy, as shown by Goulielmos (2022b), can be better applied if freight rates are **volatile**, as they are!

Shipping industry has the mechanism to bring supply to **equilibrium**. The important factor, however, is not the mechanism, but the time each factor needs to adjust to the other! This means that shipping companies must be prepared to survive during the harmful years (the fall[15]), so that to collect the gains of the



Graph 9. A Strategy on 3 principles. Source: author (inspired by Lorange (2009)).

[15]In the appendix, we recorded-down the values of the main indices in November 2022.

good years (the Rise). This is something ignored by both banks, stock exchanges and shipping companies! A clever shipping company **is prepared** for the above by building-up reserves for a rainy day, as in shipping there are inevitable cycles, as shown. It is not strange that maritime countries with tradition in shipping and long-term family successions get the best of all worlds. Long-term patience is rewarded in shipping.

Certain main cost items determine decisively supply, like *capital* and *fuel oil.* Clever managers control—as much as they can—these 2 cost items by having ships in time-charters, and applying perfect timing in building ships, and par excellence, in buying them.

The first action of the ship-owners in a crisis is to send their unprofitable ships to world anchorages, and after certain years—even up to 3 - 4 years—to scrap them, but in a less *intensive* and more *conservative* manner. This is to be expected as the ships in lay-up, and their owners in shore offices, maintain their hope for one day to come-back...

16. Policy Recommendations and Suggestions

1) To the shipbuilding nations we recommend that their plants be able to carry-out also ship repairs as well as and any alternative endeavors-mechanical/ of steel/engines etc.—except ships (e.g., Navy ships), as there is the possibility for another nation to diminish their share. The shipyards would be better one day to be sold to ship-owners, to build their ships there. We do not believe that a nation-expanding will succeed to keep *shipbuilding cost* down for ever and below its competitors.

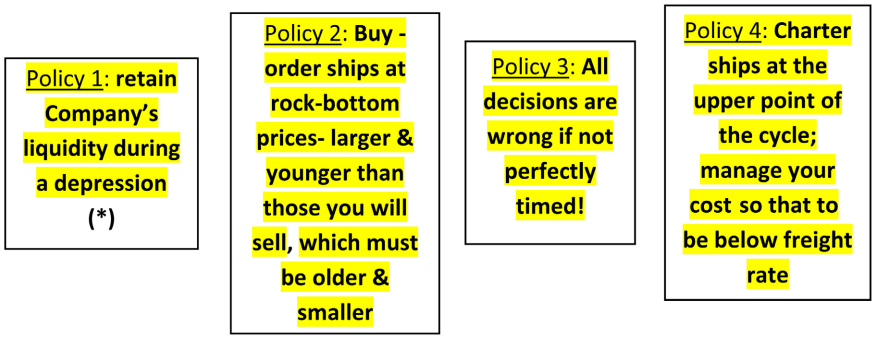
2a) To ship-owners we recommend to avoid building new ships with bank credit during the up-rising of the shipping cycle, and either to put there their own money, or secure a very long time charter. It is recommended to buy only 2nd hand 5-years of age ships—maintaining last technology—at rock-bottom prices, larger than hitherto.

2b) The timely renewal of the fleet makes the champions in shipping, coupled with liquidity built-up from prior profits. Surely, to be in the market as long as possible, manage your total cost and prepare successors from within your family for 3 - 5 generations.

3) The 2nd hand market, will make a ship-owner rich, not the 1st. If a ship-owner wishes to order ships, order them timely, and if one arrives at a shipyard last, then he/she will have to wait at least 8 years. Booms (6 years in 2003-2008) last less than crises (10 years in 2009-2019…).

4) This a suggestion to everybody, and especially to my colleagues economists of Marine Economics: "Do not try to forecast freight markets, but if you do, and you fail, consider what an economist should recommend to those people awaiting from us to help them? We have to tell them: Mate, your industry is unfortunately unpredictable and … **fortunately** cyclical!

A cycle tells you that in my lowest point, you better buy ships larger and younger and even carefully order ships. In my highest point, charter ships and



Graph 10. A fourfold policy to be a successful shipping company. Source: author. (*) It is not certain during a depression for the shareholders of the banks or Stock Exchanges to be willing to help.

sell the older and smaller ships. Economists call the 1st policy "economies of scale", and we call the 2nd "economies of …age", where both contribute to company's competitive advantage, if combined with the 3rd policy the "perfect timing"!

But the above threefold policy cannot be implemented if capital is missing, or is inadequate, as a crisis always drains cash, which existed from the good times, and which perhaps made excessive dividends or untimely orders and acquisitions! Thus as shown (Graph 10), the policies are 4 for success.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

The values of the main indices in Nov. 1st, 2022, for Dry Cargo ships.

BDI 1377 −6% over 7 weeks for **bulk carriers**	BCI 1388 −11% due to China's low demand for iron ore for **Capes** & low coal imports	BPI 1696 8 weeks low for **Panamax**
BSI 1389 for **Supramax**		