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A Successful Shipowner Has to Learn How to Face the Shipping Cycles

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Abstract

We presented the theory of the Business Cycle and also the theory of the Shipping Cycle, together with a novel simulation of the last one. Three parts were devoted to the history of the 9 shipping cycles since 1947 in the dry cargo ships and in tankers up to 2025. The very long shipping wave since 1741 presented, lasting about 170 years. We analyzed the way that a shipping manager reacts upon a rise in demand. We have contributed to the existing theory by proposing a number of protective measures against maritime cycles together also with a method for their prognosis based on the forecast OECD world industrial production index.

Keywords

The Theory of the Business Cycle, The Theory of the Shipping Cycle and Its Simulation, The Very Long Wave Occurred in the Dry Cargo Shipping Market Since 1741, How a Shipping Company to Protect Itself from a Cycle, The History of the Maritime Cycles in Tankers and Bulk Carriers Since 1947 till 2025, A Proposed Method for the Prognosis of a Maritime Cycle

1. Introduction

Economists wrote a plethora of pages, in books and articles, to deal with the Business Cycle, including the Nobel Prize winner (in 1970 in Economics), late Prof. Paul Anthony Samuelson (1915-2009).

Managers, therefore, are by now well supplied, we believe, with analytical descriptions of the business cycles, concerning especially their duration. Businesses, nevertheless, need, since then, an accurate method to have the information that a cycle is coming, so that to be prepared—well in advance—to face it successfully…

Reality led us to suggest that when a Manager leaves in a place where frequent

earthquakes occur (read cycles), to learn how to live with them. Though this suggestion is valid, even after reading this work, we have proposed a method to achieve a prognosis of the maritime cycle. This is also the contribution of this work (Goulielmos, 2020).

2. The Structure of This Work

This work is carried-out in 9 parts, after a literature review: Part I, presented the prevailing theory of the Business Cycle; Part II, analyzed the theory of the Shipping Cycle; Part III, dealt with the history of the *dry cargo* ship cycles, since 1947; Part IV, dealt with the history of the cycles occurred in *Tankers*, 1947-2008; Part V, dealt with the very long wave occurred in the dry cargo shipping market since 1741; Part VI, dealt with the way a shipping manager reacts to a rise in demand; Part VII, dealt with a number of preliminary measures that a shipping manager may take to protect his/her company from the cycle; Part VIII, dealt with the history of the period 2009-2025 for tankers and bulk carriers' cycles; Part IX, dealt with how one may make a prognosis of the cycle in maritime markets. Finally, we concluded.

3. Literature Review

Samuelson (1939) combined the theory of the "Consumption Function", due to Keynes, with the "Acceleration Principle". His model produced a self-generating cyclical mechanism. Moreover, Harrod (1936) developed a model in similar lines as those of Samuelson, three years before him. Samuelson made no reference to Harrod's work. Their theory is based on the *assumption* that "enterprises maintain a capital level related to their expected production".

It is further assumed that enterprises want to maintain their capital level, by using their net investment: $It_{\text{net}} = a\Delta P_{t-1(\text{expected})} + R$ (1), where R stands for replacement investment, a is the accelerator coefficient, and $\Delta P_{t-1(\text{expected})}$ is the expected change in production from last period. Shipping companies, we believe, wish to *grow*, by increasing, than by simply maintaining, their capital by building and buying ships p.a. i.e.: $It_{\text{netshipping}} > a\Delta P_{t-1(\text{expected})} + R$ (1a).

The above "Harrod-Samuelson" model can be described as follows: Let economy's Capital Ct be a proportion a of total Consumption K_t, i.e.: $C_t = aK_t$ (2), where a is a constant. Capital increases by Investment: $It = C_t - C_{t-1}$ (3) and $It = aK_t - aK_{t-1}$ (4), from (1), and $It = a(K_t - K_{t-1})$ (5), meaning that "net investment" (the autonomous one), It_{neta}, is a constant proportion a of total Consumption.

As it is known, Kitchin (1923) identified the cycle lasting between 3 and 5 years, known also as "inventory cycle"; Juglar (1862) described the "fixed investment cycle", lasting 7 - 11 years, which seems also to be the "standard" economic cycle; Kuznets (1941) (1901-1985) discovered the "infrastructural investment cycle" lasting 15 - 25 years; Kondratieff (1892-1930?) analyzed the "economic wave" lasting 45 - 60 years and Goulielmos (2017) (1941-) found the "very long wave" in

Shipping (Part V) lasting about 170 years.

Moreover, *seasonality* was the first feature of the cycles identified by Jevons (1875) (1835-1882) in his "sunspot theory". Jevons assumed that the sunspots affect the weather, and the weather influences harvests and the harvests contribute analogously to the economy. Keynes (1936) "grasped" the opportunity to underline the fact that the "fluctuations in *the stocks* of agricultural products influence the rate of current investment" (GT, p. 329).

Hicks (1950)—another Nobel winner in economics in 1972 together with Arrow—produced a work about trade cycles, but he used a linear model to explain a nonlinear one. For Hicks a cycle is the product of 2 mechanisms: that of "the multiplier" and that of "the accelerator". These two create fluctuations around a trend created by an "autonomous investment"[1]. Interesting is that Hicks placed 2 bounds to any investment growth: (1) an upper one, determined by *full employment* and (2) a lower one, determined by *depreciation*.

A change in income, (read National), Y, upon a change in expenditure (read investment), created subsequently rises in income quantified by the "income multiplier" $m = \Delta Y/\Delta I$ (6). Also $m = 1/1 - \text{MPC}$ (7), where MPC stands for the marginal propensity to consume. $\Delta Y = \Delta C + \Delta I$ (8), $\Delta Y = k\Delta I$ (9), $\Delta Y = (1 - 1/\kappa)(\Delta I)$ (10) and $\Delta Y = (\text{MPC})(\Delta I)$ (11); $k = 1/1 - \text{MPC}$ (12).

Keynes (1936: p. 115) introduced k for the first time, inspired by the "employment multiplier" of Kahn in 1931; Keynes named it "investment multiplier". k means that a *change* in income can rise 10 times the *rise* in investment, if MPC = 9/10.

My doctoral student—Psifia (2006)—calculated, in her doctoral thesis, the cycles that have occurred in the dry cargoes shipping markets using nonlinear tools: the "trip dry cargo freight rates", 1968-2003, of 28 months; the "time charters of dry cargoes", 1971-2003, of 32 months; the "trip charter of dry cargoes", 1971-2003, of 4 years and 8 years. Her findings confirmed our "theory" that the duration of shipping cycles, in dry cargoes, is *not equal* to a certain fixed number of years.

Next we will present the business, or trade, cycle theory.

4. Part I: The Theory of the Business Cycle

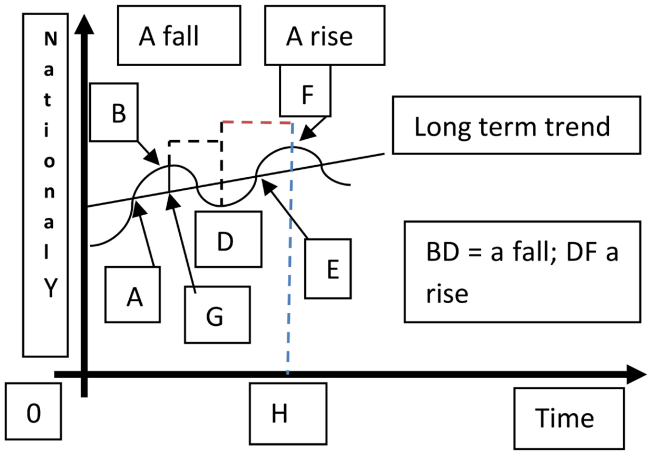
Economists, originally, i.e. before Harrod (1936), Samuelson (1939), Schumpeter (1939) (b. 1883), Hicks (1950) (1904-1989), and others, they did not pay the attention which cycles deserved, because they thought to be a phenomenon like the weather… Economists dealt seriously, and systematically, with cycles after they have found-out that cycles are re-coming, and appear in *businesses*, in T*rade and in the Economy*.

Moreover, economists believed (in the 1990s) that the graphical pattern of business cycles is as that shown by **Graph 1**.

As shown, an uprising long trend in the National income passes through a

[1] *Investment not related to income*: public investment; investment due to inventions (like AI, rare earths and energy generated the way Sun does it) and much of the *long range* investment.

course of 2 stages (*of equal duration*): a fall, from B to D, and a rise, from D to F. Cycle's peaks are at B and at F, and cycle's trough is at D. The cycle starts at A and ends at E, or it starts at B and ends at F. BG shows cycle's *amplitude*. The expansion phase *is considered longer* than the contraction phase (but this is not shown). Apparently, Graph 1 does not comply with reality in shipping industry, and I invite reader to figure-out why.



Graph 1. The "Trade Cycle" pattern assumed by economists in the 1990s. Source: author.

We will next present the theory of the shipping cycle.

5. Part II: The Theory of the Shipping Cycle

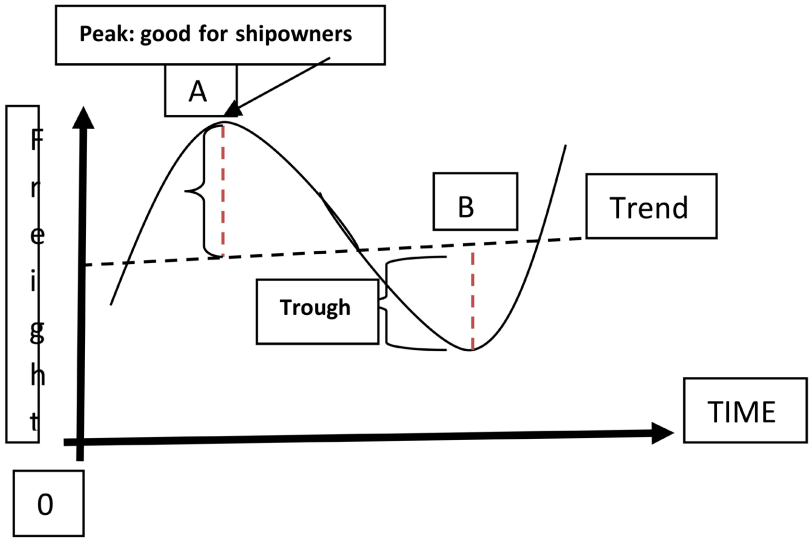
Stopford (2009) devoted a whole chapter (42 pages) to analyze the cycles of the freight rates. He analyzed-out, of course, the *easier* part of them, which was: (1) to find their secular trend, (2) to calculate their duration and (3) to indicate their seasonal behavior. However, we expected from Stopford to tell us "why shipping managers are obliged to have shipping cycles at all", and "why cycles had to visit shipping industry as *frequently as in every 8 years*", and "what can be a reliable method for their prognosis". Surely, these are certain difficult questions requiring obviously also a further research.

In addition, Stopford (2009: p. 133), considered it necessary to define shipping risk, along with cycles, a matter which we consider it to be independent. A shipping risk emerges when an investment in a merchant ship, (plus the return on the capital employed), *is not recovered* by her current owner. In other words, the capital paid for buying/improving a ship is lost in a time of say maximum 25 years (in a rule of thumb used by Greek shipowners), by providing a zero net profit (coming either from operations or from capital).

Goulielmos (2022) showed the fact that a cycle offers also potential benefits, through the rock-bottom prices of the 2nd hand ships and of the newbuildings. This is the essence of the dogma: "learn how to live with earthquakes/cycles". Stopford, moreover, believed that the character of the cycles is *episodic*. An "episodic cycle" is a maritime cycle, which *has to pass* from 4 stages, i.e. episodes,

lasting nowadays a total of 8 years on average…"*Reader must be careful for such statements for cycle's duration as they may be proved to be wrong…*"

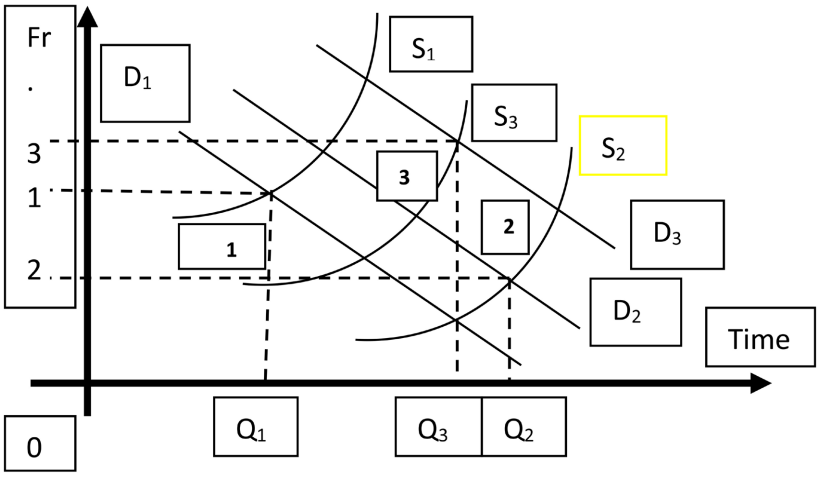
Graph 2 represents Stopford's cycle.



Graph 2. Stopford's cycle. Source: author; data from Stopford (2009: p. 102).

As shown, Stopford drafted 2-equal—*half cycles* faced by 2 participants: the shippers and the shipowners. Obviously the interests here are diametrically opposite, where shipowners are surely happy to be paid a high freight rate (like that at A) and shippers are certainly happy to pay a low one (like that at B). The trend line stands here for a break-even of the costs/benefits between the two participants.

Let us *simulate* a shipping cycle (Graph 3) in an approach more closely to the real behavior of the shipping cycle.



Graph 3. A freight rate market cycle simulation. Source: author.

As shown, a shipping cycle can be simulated by taking-up 3 hypothetical levels

of future demand $D_{1\text{-}3}$ and supply $S_{1\text{-}3}$ (of tonnage), which have determined also 3 future levels of freight rates $F_{1\text{-}3}$, in accordance with the prevailing theory. The D_1S_1 determined the 1st level of the freight rates, i.e. number 1. This caused a reaction of supply, (a rise), from S_1 to S_2, causing a *fall* in the freight rate, shown by number 2.

The above *fall* in the freight rate to F_2, caused a fall in supply to S_3, and given the rise in demand to D_3, a higher freight rate was then finally achieved (number 3). This is the best combination for shipowners: a fall in supply; a rise in demand; a rise in freight rate. In fact, we have so far traced already one shipping cycle: from 1 to 2 and from 2 to 3. The fall from 1 to 2 is *longer* than the rise from 2 to 3, as this is what really happens in shipping markets.

One may criticize the above simulation because it assumed an "active supply" and a "passive demand", something which is against part of the history of the shipping cycles, appeared even in this work. Reality showed that demand (in the form of distances; port congestions; and rises in seaborne trade, and in similar events) used to be active—at certain times and in 2024-2025. In such a case, the supply of tonnage, plus shipbuilding, and scrapping, are the industries, which will adapt/react to such a situation.

The above is a novel framework, not a standard microeconomic model, used as a form of forecasting, based on different assumptions about the future. The exogenous variables here are the demand for ship space and its supply. The freight rate is the endogenous variable determined by the exogenous variables.

Table 1 presents the possible reactions to either a change in demand or to a change in Supply.

Table 1. The way shippers and shipowners are expected to react after the demand for tonnage, or its supply, affected Freight Rates—the Kings in the shipping markets.

A rise in demand is expected to cause a rise in the freight rates—ceteris paribus (given Supply)	A permanent rise in freight rates will cause an immediate rise in orders & a subsequent rise in Supply (after say 11 months)	Deliveries of the newly-built ships ordered will **increase** supply & reduce freight rates—ceteris paribus (given demand)	The continuously falling freight rates will increase ships' laying-ups & scrapping, they will cause lower orders & a fall in supply (given demand)
A fall in supply will cause a rise in freight rates, & a new cycle will begin, ceteris paribus	A fall in demand now will cause a fall in freight rates & a fall in supply, & in fewer orders, in more laying-ups & higher scrapping	One may consult every time the balance between supply & demand of any particular type of ships in such situations Source: author	As shown, we took into our analysis the impact that demand or supply may have on freight rates, because these are those that trigger the beginning of a shipping cycle

Source: author; an analyst begins from the impact that a rise/fall in demand, or a rise/fall in supply, would have *on freight rates*; because freight rates are the *prime indicators* for shipowners; changes in freight rates, and their probable stability up or down, are the causes for shipoweners to take all their subsequent decisions; this further means that shipowners may react with a delay in a rise in demand by waiting, so to say, the rise in freight rates.

Next, we will present the history of the dry cargoes shipping cycles.

6. Part III: The History of the "Dry Cargoes" Ship Cycles Since 1947

"Seaborne Trade" determines mainly the demand for tonnage—as being one of the Kings in the shipping markets. It, between *1950 and 1974*, had a rising trend, but also 3 years of constancy (1957-1959). It rose from 0.60b tons to 3.3bt, where in 1975 *fell*, *for the first* time, to about 3bt. Apparently, Seaborne Trade is also subject to a cycle, which this time lasted 9 years (1975-1983).

The main cause of the 1973 depression was—let us call it—the "law of Price", where in 1973 the 1st oil crisis caused the price of oil to increase about 4 times, to \$11/b, while the 2nd oil crisis—with a further rise in oil price to \$40/b—to follow in 1979. The Seaborne Trade re-took its rising trend after 1984 (to 2005), reaching a final 7.1b tons (an about 2.4 times rise since 1975). Facts have activated the famous law of demand—i.e. "when the price of a good rises, the quantity demanded diminishes", ceteris paribus.

Since 1947, 8 shipping cycles took place. We believe that their history—presented briefly here (and shown in **Figure 1** & **Figure 2**)—may teach shipping managers so that to be more careful, especially concerning their way of forming their "business long term expectations", as Keynes taught us in his GT in 1936.

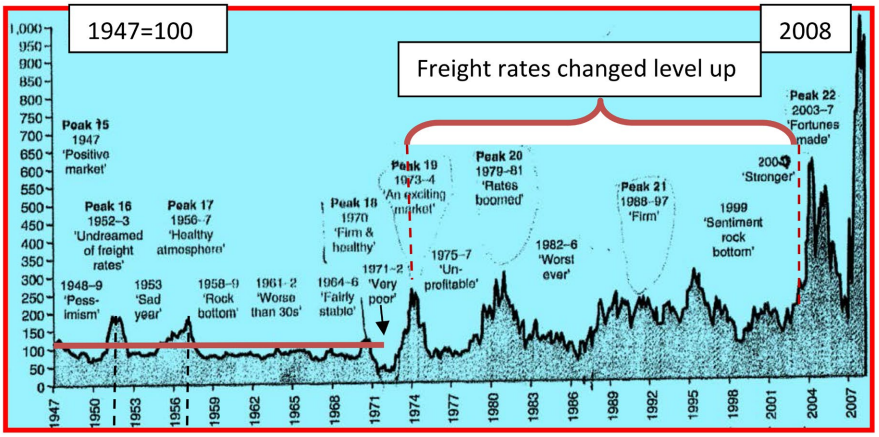


Figure 1. The eight Cycles in the Bulk carrier shipping market, 1947-2008 (61 years). Source: author; data from Stopford (2009).

As shown, the years 1947-1971 produced 2 cycle peaks in 1952-3 and in 1956-7; *rock bottom freight rates*, however, followed, till 1972—*this being a proper opportunity of 25 years for shipowners to buy low priced 2nd hand dry cargo ships, and especially in 1971-2.* During 1973-2003, freight rates showed an improvement in level with 3 peaks, *and 3 periods, when a shipowner could buy again low priced 2nd hand vessels*: *1975-79*, *1982-87 and 1999.* Finally, this period, since 1973, ended in 2008, with an "all times high" freight rates (except that of 1918). The shipowners who took part in this "bulk carrier market" have made a fortune. This fortune helped them to face the troubled years which followed after 2009.

In fact, we underlined above the periods, which offered opportunities for the shipowners to buy and build low priced ships, as an indirect suggestion to shipowners to do that.

In more detail: in 1945, shipping markets destined to have a good start, where both the world fleet, (about 100m GRT), was deficient and the sea transport needs were high—the best combination for shipowners.

As a result, the "1945-1951, 7-yearly cycle", showed several occasions for a rise in freight rates above their pre-war levels. The markets remained firm during 1945-1946, and only in 1947, fell, causing a trough in 1949, when also a rise in supply occurred. The 1950, was a quiet year, but in its autumn a considerable lack of tonnage occurred.

In 1951, *the Korean War* took place, creating a stock building panic, and causing Seaborne Trade to *rise* by 16% in one year... The price of a Liberty, b. in 1944, priced 4.5 times more between June 1950 and Dec. 1951 (i.e. £500,000). The next cycle was shorter, lasting only 4 years (1952-1955), and by 1952 (Spring) the freight rates fell by 70%—and by 1953, the supply of tonnage was rising, while an amount of tonnage was also laid-up, and the world imports restricted by certain countries. The Liberty, mentioned above, priced £230,000 (end-1952).

The freight rate markets went from "bad to worse" (1953-1954)… But by the end of 1954, and in 1955-56, freight rates rose by 30%. *The Suez Canal closed in 11/1956, and this closure sent the ships round the Cape for a rather Good Hope… by boosting the demand for tonnage…*

The next cycle lasted rather many years (i.e. 13 years: 1957-1969). Examples of *rock-bottom freight rates can be found also in this cycle*. All shipowners, and Onassis, did not believe that the closed Suez Canal will be soon open, i.e. in 4/1957, while the longer distances required larger vessels—already ordered—due mainly to higher port dues.

1958, however, was a year of all kinds of developments: stock building (end-1956), over-ordering of ships, a new more efficient tramp vessel destined to replace the Liberties, (larger by 30% and faster by 4 knots), and a rise in world economy… Thus, shipbuilding this time provided economies of scale in dry cargoes shipping for all shipowners. Foreign exchange was scarcer. Countries increased their fleets, and started their shipyards, in an attempt, of those, non-maritime countries, *to obtain self sufficiency in shipping and shipbuilding*. It was then when *Japan* became a substantial supplier of tramp[2] ships. A global recession, which appeared then, however, drove the freight rates below their operating costs.

The OECD industrial production index fell 4% (1958), when the seaborne trade reduced for the first time since 1932 (to about 3 bt from 3.4). The reopening of the Suez Canal reduced demand, (acting now in a reverse order vis-à-vis its closing), while the deliveries of ships (1955-6) increased supply, though demand was not as weak as one could assume, as in 1958. Seaborne trade rose from 990m tons

[2]Ships serving two ports, chosen each time by their charterer. The cargo taxis of the oceans.

in 1959 to 1790 mt in 1966 or 1.81 times rise in 7 years… Obviously the supply of ship space had to be blamed this time for the cycle. The shipping cycles succeed to place the blame of a recession/depression *alternatively* from shipowners to shippers and from them back to shipowners…

The next cycle, 1970-1972, was short, lasting only 3 years, triggered by the "Israel-Egypt" 6-day war (1967), which resulted in closing of the Suez Canal for the 2nd and longer time (8 years and 1 month). Table 2 summarized the main developments during this short period.

Table 2. The 1970-1972 cycle.

Improved freight rates in the dry cargo markets, especially those carrying iron-ore	Industrial trade improved	The Seaborne trade rose by ~79% from 1807 mt in 1966 to 3233 in 1973

Source: author; data from Stopford (2009).

Worth noting, during the 1979-1987 cycle, was the decision of "Sanko", a Japanese shipping company, to order, in 1983, secretly, 120 handy sized bulk carriers of about a 3.6m dwt total! This was an attempt—as alleged—of a "counter-cyclical ordering of ships", which occurred also in 1905-1906... This action prolonged and deepened down the prevailing cycle by 18 months into the 2nd semester of 1987…

The above policy of ordering ships, known as "counter-cyclical", as mentioned, means that shipowners order ships during the low phase of the shipping cycle, and at low shipbuilding prices, and by the time they get them, say after 2 years, (which this was the average required time to build them then), the freight market *is expected* to reach its top, due to the absence of supply and also due to the presence of a rising demand… The reasoning was right, but the volume ordered was so high as to increase supply and reduce the already very low freight rates…

The Japanese had their reasons to order those 3.6m dwt—followed also by the Greeks and the Norwegians—as they wanted to balance the losses realized by their company during the previous tanker crisis. The Japanese, contra to the common practice, they owned *only tankers then*. This was another mistake, i.e. to own only tankers, as risk was not spread between the two main markets, tankers and bulk carriers.

The Bulk carriers had a peak in their freight rates in 1989, thus leading shipowners, following their classical way, *to order ships* in 1988-1991 of 24m dwt and thus to cause a recession (and the orders to fall then to 4m dwt p.a. in 1992...). The orders, as a result, peaked again in 1995—except in 1992. Between 1993 and 1995, the ordered ships, however, had to face the 1997 Asian crisis.

Shipowners, however, were indeed **convinced** by a number of factors, summarized in Table 3, which led them to order ships heavily. Shipowners could not resist to these factors below, we believe… These challenges are most probably to appear gain in the future and for this main reason we mention them…

Table 3. The factors which convinced shipowners to order heavily dry cargo ships (in 1983).

The Shipping firms achieved strong Cash Flows due to the 1980 peak	The Shipping banks accumulated substantial amounts of petroleum that had somehow to be lent	Shipbuilding prices were low, and shipyards had overcapacity, also in a period of low orders
A fuel-efficient bulk carrier appeared at the high prevailing then oil prices; heavy deliveries of bulk carriers occurred; a Panamax earned $13,200/d in 1989 vis-à-vis $4400 in 1986	The $/Yen parity was in favor of building ships in Japan; in 1984 world trade rose; speculation on prices was also active; the game of playing with assets frequently played; a 5-year-old bulk carrier could be purchased at $6m (1985), while she cost $28m (1980) (a 4.7 times less)	Shipowners expected the past to continue into the future, and their next cycle to last 4 years, as the one before (1973-76), and shipping markets, therefore, to improve by 1985[3] (1981 + 2 + 2); Keynes' 1936 warnings about the entrepreneurial expectations are worth mentioned here

Source: author; data from Stopford (2009); the Japanese company failed to estimate the impact that the volume of its order would have on supply, and thus on freight rates; they assumed a 4 years uniform cycle with 2 years down (1981-1983) and 2 years up (1983-1985).

Next the cycles occurred in tankers will be presented.

7. Part IV: The Cycles Occurred in Tankers, 1947-2008 (61 Years)

Figure 2 presents the cycles that occurred in the tanker freight rate market between 1947 and 2008, which were shorter, each time, than the dry cargo ones, but they showed higher levels.

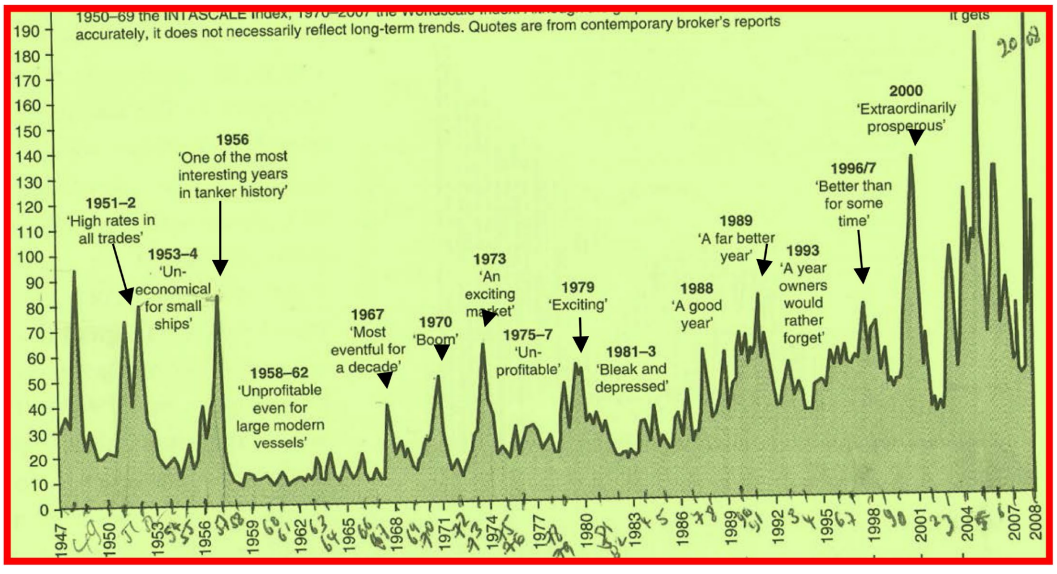


Figure 2. The world Tankers' Freight rates Cycles, 1947-2008, (index: Worldscale). Source: author; data from Stopford (2009: p. 119).

[3]Markets improved in the 2nd semester of 1987, instead of in 1985.

The political developments, however, were the same (Table 4) as those for dry cargoes.

Table 4. The Political developments in the world, 1950-2003.

The Korean War (started early 1950)	Suez Canal's 1st closure; & its nationalization 29/10/1956—short closure→	Suez Canal's re-opening 4/1957—within 6 months
The 2nd closure of the Suez Canal in 5/1967, & reopening in 6/1975—a long closure of 8 years & 1 month	1st oil crisis 10/1973—a rise in the price of oil from a few $s to $11/b.	The Iranian revolution 1979 took place—3.64 times rise in the oil price to $40/b
Iran-Iraq war 1982 Iraq invades Kuwait 1990	Asian crisis 6/1997	Dot.com crisis 2001
China's boom 2003	As shown: 3 local wars occurred; 2 closures of the Suez Canal; & two oil crises	One revolution; two economic crises & one boom

Source: author; as shown international sea transport is vulnerable to frequent local wars, most important are those wars among countries exporting oil and gas; local wars, in our opinion, will continue; if the price of oil did not increase twice, the expansion of the world tanker fleet it would be more spectacular; of course, the importance of oil is by now moderated by the use of gas, but again the ongoing war between Russia and Ukraine dictated to EU and Germany not to rest on Russia's natural gas; this development boosted the demand for LNG/LPG carriers; EU by feeling the potential threat of Russia is going to spend a considerable amount for its defense (the "Safe" program), depriving these funds from its growth/competitiveness; to this one may one add the probable future withdrawal of USA from NATO; shipping industry needs peace in ME and between Russia and Ukraine, and a strong growth in China—above 10% p.a.—to raise its hopes for a 3rd boom, after the current two wars are over.

For tankers, the 1979-1987 cycle, of 9 years, was a *disaster*. It was then when the Iranian revolution tool place, pushing the price of oil from $11 a barrel to about $40, or a 3.64 times rise! This substantial increase in the price of oil activated the *law of demand*, resulting in reducing (36%) the oil trade from 1400 mt to 900 mt or by about 64%.

But the above was not the only reaction given that, since 1973-4, when the troubles with ME oil *started*, research has been carried-out by Countries in finding their own *sources of energy each*, (*notable*: *UK and Norway*), a fact which for certain countries meant to allow also for an increasing use of coal.

The above developments sound familiar also nowadays as they caused the rise of the prices of gas and oil due to the Russia-Ukraine and Gaza Wars. Certain EU countries (France; Germany) obliged to use more intensively their nuclear producing stations, as well their consumption of coal, resulting to a further deterioration of the global climate. This led USA to intensify its efforts to find further sources of oil (dig, dig, dig) and to supply EU with LNG.

The "law of demand" has been ignored[4] during the above period and the celebrated "elasticity of demand" method has not been applied in the case of the rising price of oil. Moreover, economists considered the oil elasticity of demand to be absolute inelastic for changes in demand, but this were correct for moderate increases in oil prices and not for those large ones, which really occurred.

An interesting question for further research is whether Arabs benefited finally by increasing their price of oil, because by doing so, they increased more also the cost of their imports, as the prices of all goods increased, energy being a serious cost element in production.

In addition, the effect of the use of oil and coal on global climate led countries towards finding an alternative fuel, having a neutral impact on climate, *where the safer hopes* rest on copying Sun in its process to create energy with a zero radioactivity… This will be the future "Energy Revolution", which if managed properly, will lead to the "next very long wave" providing a remarkable welfare to the mankind, given that the other "technological revolution" of AI is on its way, but…its thousand data centers require substantial amounts of energy.

The 1979-1987 cycle now caused a great part of the tankers to be laid-up, i.e. 40m dwt (1982) and 52m (1983) and the tankers' 2nd hand ship prices to fall to their scrap levels. In 1986, the first signs of improvement appeared. Rates increased by 70% and a VLCC doubled her price to $10m (1989 cost $38m). Speculation was also present to benefit from volatility in ship prices.

A new cycle started in 1988 and ended in 2002, lasting a long period of 15 years. This, and the previous cycle, lasted 24 years. The characteristic of this new cycle was that the Tankers behaved differently vis-à-vis that of the Bulk carriers, which they used to react as tween. This long duration of the 2 cycles has come rather as a surprise as one had to expect shorter cycles as time went-by.

Moreover, the tanker shipowners formed 3 long term expectations: (1) that the advanced age of the existing tanker fleet will compel[5] their owners to *scrap* them (after 20 years of operation; i.e. by 1985). (2) The newly-built tankers could not be produced massively, given that shipbuilding capacity fell (between 1980 and 1990[6]). (3) That a growing oil demand will have to be satisfied by the *long-haul* Middle East sources, which, by the way, requiring the VLCCs.

The above expectations led tanker shipowners to *heavy ordering* from 1988 to 1991 of 55m dwt. *None of these expectations*, *however*, *came true*, *and the market*

[4]Arabs formed a cartel on the initiatives of Venezuela: the OPEC (the organization of petroleum exporting countries) in 1960, to control the price of oil by controlling its production (supply). The founding members were 6: Iran, Iraq, Kuwait, Libya, S Arabia and Venezuela. Later 7 countries joined: Algeria, Ecuador, Gabon, Indonesia, Nigeria, Qatar and UAE. Ecuador left. Additional 11 countries joined too by 2025: Congo, Eq. Guinea, Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, Sudan S & Sudan, and Brazil. OPEC is considered an unstable Cartel of *governments* as there are inside it 2 interests diametrically opposite: the low production countries, which look for high oil prices and the large production countries, which look for low oil prices.

[5]Ships are a set of machines, a number of steel plates, of pipes, etc. and their technical life can be *extended* by a number of repairs and improvements, so that, as we found, for a ship to be active another 6 years on average after her technical end. This has happened in last boom 2004-2008.

[6]This confirmed by the fact that, in 1986, a VLCC cost < $40m and by 1990 cost >$90m.

led to a recession (*1992-mid. 1995*). *The t*anker earnings fell below the 1/3 of their June 1997 level (<$10,000 per day).

Keynes (1936) (in Chapter 12 of his General Theory) was very careful in dealing with the "state of the long term expectations" of the enterprises. Keynes argued that "the expectations of the enterprises are based partly on existing facts, which we can assume to be known, more or less for *certain*, and partly on future events, *which can only be forecasted with more or less confidence*" (*italics added*). Keynes paid particular attention on the "state of confidence" (p. 148-9). This chapter of Keynes has to be read by Greek shipowners—considered one of the best chapters of Keynes.

In early 2000, *industrial production* grew faster than ever, i.e. of about 11% p.a., followed by a heavy scrapping par excellence of the VLCCs (built in 1970-1980; i.e. aged 20 - 30 years). These earned $80,000/d by the end of the 2000. The dot.com crisis in 2001 finished, however, this market improvement. VLCCs earned now 1/8 of their previous freight rate and a Cape earned only $6,000/d.

The next cycle had a medium duration lasting 6 years, i.e. between 2003 and 2008, and it was a by-product of the economic development of China, which started in 1997. China employed an "open-market" model and attracted inward investment. Namely, China in 2003 undertook a serious infrastructural development, which required 468m tons a year of steel (between 2002 and 2007) or a 3.25 times rise… This followed by oil imports and exports of minor bulks (2003) till 2008. China achieved *a less than half rate of growth i.e. 5% in 2024* (*3 Qs*) against an 11% on average for 2003 to 2010. *China's cycle has produced the unique boom in the shipping markets after that in 1918*.

Notable is also a possible another "*China's boom*". This means that analysts have to look at China's economy from now on, and on any other large economy, like USA, EU, Germany for their future seaborne trade, because is from them that any new boom for shipping is going to be derived. In the past, analysts used to look at the expected growth rate of such economies, like USA, UK and W. Germany and other large economies, to predict the future economic developments.

8. Part V: The Very Long Wave in the Dry Cargo Shipping Market

Goulielmos (2017) discovered the "very long wave" in shipping, which lasted more than 170 years, i.e. between 1741 and 1914 (173 years; 73 years up and 100 years down). The 2nd very long wave started in 1915, and by 2008, covered its 1/2 distance (93 years up) (**Figure 3**).

As shown, the "Maritime Economics Freight Index", 1741-2022, showed 1 and an 1/2 waves: (1) From 1741 to 1914, i.e. 173 years, made-up by 4 shorter cycles, lasting about 18 years each on average. This wave had a rising period, 1741-1813 (73 years), and a falling period of 100 years: 1814-1914. This confirms those economists, like e.g. Schumpeter, J. (1883-1950), who argued that shorter cycles co-exist inside the longer ones.

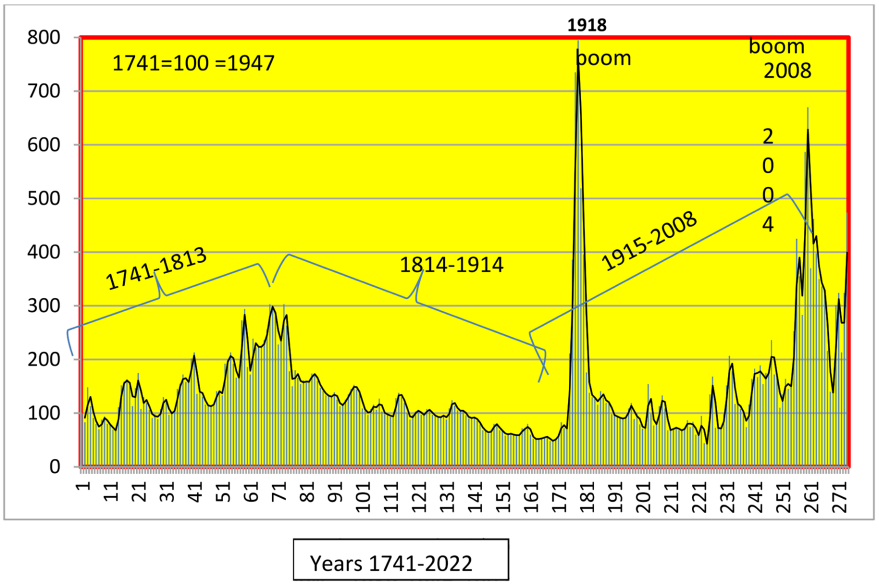


Figure 3. Maritime economics freight index, 1741-2022 (Dry Cargo). Source: Goulielmos (2017); data from Stopford (2009) for the years 1741-2007; 8 years were missing due to the 2nd WW—1939-1946; the numbers for the years 1937-38 found by the author; the figures for 2008-2015 supplied by Stopford's colleagues; the figures for 2016-2022 found by the author; the above figure covers 274 years.

The 2nd half very long wave started in 1915, and ended in 2008, lasting 93 years. This last half very long wave, however, was more beneficial to shipowners by producing 2 maritime booms, in 1918 and in 2008. The first boom was due to the fact that the 1st WW destroyed most of the existing then world fleet, and thus the demand for ships was very strong after its end.

The second boom, ending in 2008, was due to the rising seaborne trade created mainly by China's development—after 2002 (between 2003 and 2008 China achieved a growth rate of ~11.4% p.a. on average) —which halted by the "World financial crisis" —2009-2018, the "Pandemic" 2019-2021, the Russia-Ukraine war (2022-) and the war in Gaza (2023-2026?).

We "expect", of course, a 3rd boom, after the end of the above mentioned 2 local wars, and from the fuller implementation of the AI (Tyulin et al., 2023), *the increased production of the rare earths and the generation of energy the way Sun does it.*

The theory of the long economic waves first advanced by Kondratieff, N., (born 1892, but it is not known when he died; perhaps in 1930). He was a Russian economist, who in 1925 published his work titled: "the long waves in economic life", which in 1961 translated into English and appeared in the "Readings in Business Cycle theory" of AEA. Kondratieff identified long cycles/waves from the end of the 1780s to 1844-51, from 1844-51 to 1890-96 with an upswing from 1890-96 to 1914-20.

Figure 3 confirms Kondratieff's theory, but the shipping very long waves—obviously nonlinear—lasted longer than the ones calculated by Kondratieff for the

Western economies etc. This also means that a 1/2 falling very long wave lasts longer than a rising one, confirming such a *steady feature* we have found in all cycles.

As shown, the two main shipping markets have offered frequent situations where the prices of the 2nd hand vessels, and those of the newbuildings, reached their rock bottom levels. To buy or build ships is only then proper for a clever shipowner. This is a recommended strategy.

An interesting question will occupy us next, what is "the time a shipping manager needs to react to a rise in the demand for tonnage"? This means how fast a shipping Manager orders ships, and then gets them, following a rise in freight rates and in the demand of specific types of ships?

9. Part VI: The Time Needed by a Shipping Manager to React to a Rise in the Demand

What are the steps which a shipping manager most probably will take after a rise in the demand for tonnage? Should the company[7] react immediately (?), given a perfect timing? This decision will determine also ship's profitability, given that the rise might not last for a long time.

Is company going to need a loan for its plan? Are company's bankers willing to provide a loan? Moreover, are one or two shipbuilders willing to implement company's order and when the ordered ship will be delivered? These last two stages require their time which it may be long—especially if the shipbuilding berths are full and ship deliveries are postponed for the distant future.

Lorange (2009: p. 126) argued that in 2009, a VLCC, needed up to 11 months to be built, down by 2 months in 5 years. This development is considered to lead to *shorter peaks* in the freight rates…? Thus the faster the shipbuilding industry delivers a vessel in demand, the longer will be her period of high spot rates, by assuming that demand will not fall in between.

The volume and the speed of adaptation of the total supply, i.e. by all shipowners, in the unit of time, will also play a great role—often ignored—in the determination of the future freight rates. Lorange (2009: p. 119) argued that the Singapore-based consulting firm—called "Worldyards"—provides a web-based analytical system giving information about 280 active merchant shipbuilding yards worldwide… A sensible shipping manager needs information about what the rest of the shipowners order per ship type and as well their expected delivery to estimate a coming supply, which is going to influence the freight markets. Information about prices is also desirable, but this is not always disclosed.

[7]Managers may have to apply for, and negotiate, a loan; they have to collect the amounts shareholders will contribute; they have to add company's retained earnings and depreciation; to choose 1 or 2 shipbuilders and negotiate a building contract with them, etc. All these actions need their time each, which cannot be substantially reduced. Until this time passes, new ships cannot be built and supply will not adapt to the increased demand. The shipbuilding time is also variable, depending on the number, size and type/technology of ships on order and yard's capacity. Also, this depends on the number and productivity of those specializing in building ships like those in demand.

Important, however, is also the "law of Price" not frequently, if at all, mentioned. By this law we mean that shipowners' orders will be influenced by the level of the new-building prices, which will follow after a rise in demand, according to the "law of demand". Enterprises of course consider the price of a new building vis-à-vis the level of her freight rate, as this happened in 2008 boom, in a discounted present value analysis.

As shown in Figure 4, the shipbuilding prices substantially have fluctuated from a low of $90m price in 1985 to a high of $190m…in 2007 and in 2008, *a $100m difference*[8]!

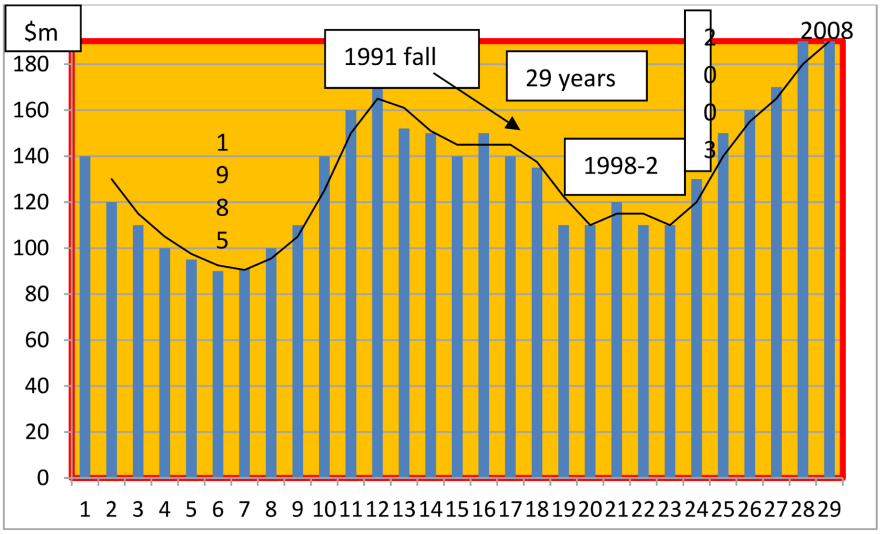


Figure 4. Prices for newbuildings, in China, 1980-2008, in $m. Source: author; data from Lorange (2009) (p. 126).

As the prices of the new ships rise, the fewer new ships would be ordered/built (the "law of Price"), depending, of course, on the level of the freight rates.

Given that shipping is cyclical, thus shipbuilding cannot but to be cyclical too, as shown by Figure 4.

Concluding this part, we understood, afterall, that a vessel has to try to earn her net profits as soon as possible within 4 - 8 yearly-periods—in a total life of 32 or so years on average (4 × 8). Greeks, as mentioned, assumed a ship to be active economically 25 years, or they assumed for her to lose her value at a rate of 4% p.a. in a rule of thumb.

10. Part VII: A Number of Preliminary Measures That Shipping Managers May Take to Protect His/Her Company from the Cycles

The first and most important issue, we believe, is for a shipping Manager to be

[8]This evidence is also the best example of the importance of the *perfect timing* in shipping. It indicates that by properly allocating one's orders, over the maritime cycle, one may save (if he/she was building a ship) $100m, or pay $100m extra to build the same vessel…

convinced that the Maritime Markets are indeed irregularly cyclical[9]. A shipping manager has to expect one cycle every 7 years during nowadays—after, however, a careful examination. The trend, however, is that, as time elapses, so that the overall average duration of the future cycle to fall. This after all is what history tells us… The last cycle assumed to last 7 years on average while the previous one lasted 8 years.

The above means that any shipping company's cash flow is subject to substantial fluctuations, say a 60% fall, or even greater, and thus *management* has to be prepared, including company's *shareholders*, *and why not*, *also*, *company's bankers*. These three have to be seen as partners serving the same interests. The above three participants must be prepared to provide extra liquidity/cash. It is also suggested that the company's shareholders to accept the above commitment in writing, at the time of buying company's shares, so that not to deny it latter, when the need will arise for extra cash.

To face cyclicality, author's first suggestion is to create a fund from gross profits, and let us call it apropos a "fund for facing a shipping depression"—FFSD[10]. Moreover, shareholders must be chosen so that to have a financial strength[11], and also to be satisfied to earn a dividend % just above bank's interest rate for a 12 month deposit including risk $\%_s$.

We want company's bankers to be committed to provide a "credit line", so that this line to be used by the company during a cycle. Let call this a "shipping cycle credit line"—SCCL. This to be equal to company's working capital at least. The above measures, we believe, set a safe environment for a shipping company to start its businesses with confidence and re-pay its long term debt.

Management, of course, has 3 at least ways to build-out company's liquidity/stand-by cash, apart from the above suggested FFSD by: (1) company's retained earnings; (2) its depreciation and (3) a further increase in company's equity. These three sources of funds, however, all depend on the condition that the company had profits.

The more company's shareholders contribute for the purchase of company's ships, the less the company has to borrow from its bankers, and the more comfortable will be, when company will be called to pay-back part of its long term debt.

From our archives, we saw a shipping company to buy in 1985 (perfect timing) a number of 2nd hand vessels worth $30.43m and to decide to depreciate them by $11.58m, for the next 18 months, *meaning a heavy 38%* (*on the cost of the vessels*). Shareholders contributed $9.94m or 33% to buy the ships and the bank lent 11.85

[9]The reader must be warned that the exact duration of a future shipping cycle *cannot be known in advance*. Stopford (2009) (p. 106) found that the cycles between 1947 and 2007 varied from 3 years (1970-1972) to 14 years (1956-1969) and 15 years (1988-2002)...

[10]Author is entitled to give advices to shipping companies according to his working experience with American Express in charge of bank's shipping finance department in the 1970s.

[11]Given that the main Greek shareholders will come from owner's family and from his/her relatives and friends.

(39%) (a total of $33.37m). The company borrowed from the bank also an amount for improving the 2nd hand vessels bought of $2.94m ($30.43 - $33.37).

However, the more a company borrows, the more this *benefits* company's shareholders, *if the* "*lending interest rate*" *is lower than the* "*net profit rate*", which will also determine the dividends to be paid… The danger of the inability of the company to repay its long term debt, however, *must be watched-out* as bankers may proceed to a foreclosure, if the debt concerning them is not served. It is true that Shipping companies have to do everything to have its bankers satisfied. Greek shipping companies by mobilizing mainly family's funds may encounter a liquidity problem, par excellence, especially in company's early stages.

Let us complete the history of the shipping cycles in tankers and dry cargoes by telling their last part from 2009 to 2025.

11. Part VIII: The History of the Shipping Cycles 2009-2025 (16 Years)

By 2008, shipping markets topped in their cycle since 2003. Then a recession followed in early 2010 and till 2020, with lower freight rates and an oversupply of ships (the classical situation). Shipowners believed that the previous boom will continue into the future. True is that by 2015, a commodity boom took place with a strong demand for iron ore and coal (especially shipped to China) raising dry bulk carriers rates together with an upturn in tankers' freight rates.

The COVID-19 Pandemic, between 2019 and 2022, halted any economic improvement initially, but the growth of economies and their development, raised substantially the demand for goods transported by container ships, while oil also had to be stored as its future supply and price were uncertain.

In addition, geopolitics caused volatility in freight rates following the escalating tensions in Ukraine and in Red Sea, which reshaped the sea routes, increased the costs and changed the hitherto supply chains... For 2024-2025, a strong demand for coal, grain and fertilizers in 2024 favored the dry bulks. Tankers rates were also surging in mid-2025 as a result of the Middle East conflict.

Figure 5 shows the growth rates of the Seaborne Trade—the demand for ship space, between 2009 and 2025 (est.).

As shown, the maritime trade in tons reduced its growth rate after the 8.5% high in 2010, with also certain *negative* ones in: 2009, 2020, and 2022, and very low ones in 2019, 2022 and 2025. However, familiar developments took place, like those told in our above history, where the attacks in the Red Sea forced for longer routes around Africa for the tankers.

The really new element was, however, the rise in the USA tariffs and their impact on prices of goods, which most probably will reduce imports. World in the meantime has become more hungry for energy, and for food. Maritime markets in the last future years will produce their familiar freight rates volatility though at higher rates than during the crisis years after 2009. Shipping managers have to be prepared to gain from volatility as argued by Goulielmos (2022).

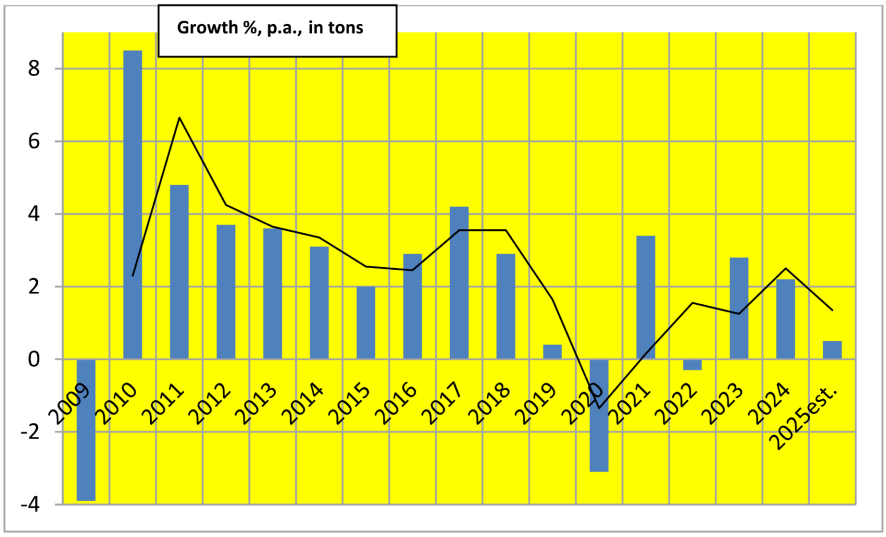


Figure 5. Growth rates per annum of the maritime trade, in tons, 2009-2025. Source: author; data from UNCTAD.

Concluding this part, Figure 5 indicates that we had a rather falling seaborne trade cycle lasting 15 years, 2011-2025.

12. Part IX: The Prognosis of a Maritime Cycle

In this part we will examine which of the 4 published indices represents better the "dry cargo market index", so that to be used for a prognosis. The four indices are: "the world merchandise Trade"; "the world Seaborne Trade"; "the world GDP" and "the OECD industrial production" (Figure 6).

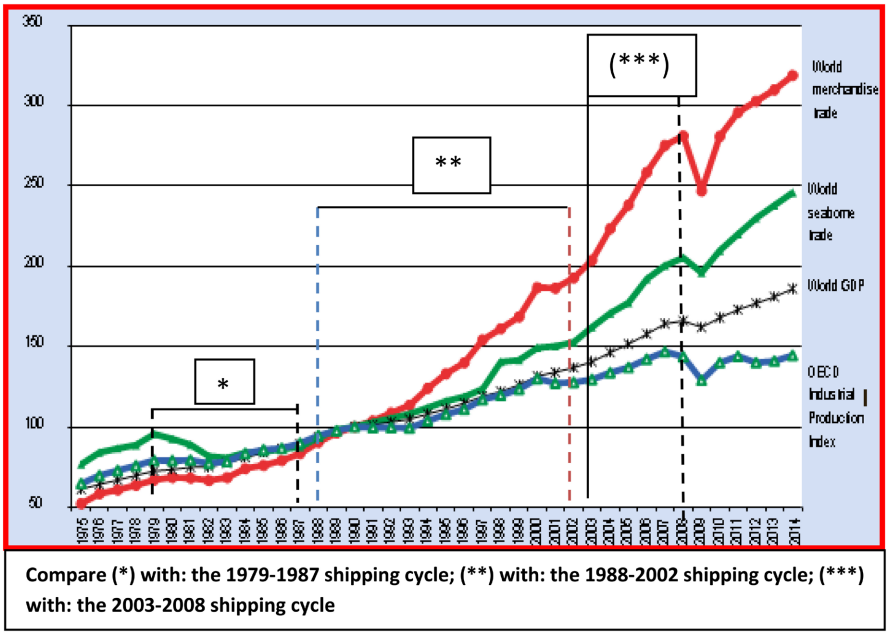


Figure 6. OECD industrial production index, and other indices, 1975-2014. Source: author; data from OECD, 2025.

Our suggestion for a prognosis of the next shipping cycle is based on the assumption, verified in the past, that the pattern of the peaks and the troughs of the freight rates *coincided* with the fluctuations of the "OECD industrial production index" (as argued by Stopford, 2009: p. 123). Thus, this index can be used by the shipping enterprises, in our opinion, to expect the coming of a shipping cycle, if we know also its forecast... Stopford (2009: p. 123) *wrote that the OECD industrial production index fell by 4% in 1958 producing the first decline in seaborne trade since 1932.*

The OECD index of the world industrial production monitors the changes in the production of Manufacturing, Mining and Utilities, and shows also the business cycle trends. In Mining are also included oil and gas and in Utilities are also included gas, electricity and steam.

Figure 7 presents the dry cargo freight rates index from 1975 to 2014, i.e. over the same period as the OECD index in Figure 6, so that to make a visual comparison between the two.

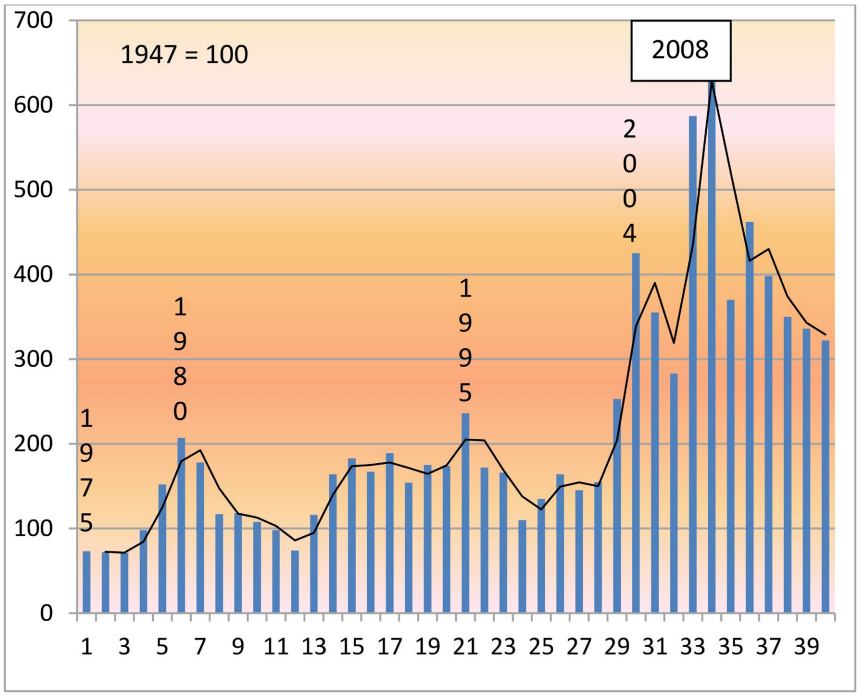


Figure 7. The dry cargo index, 1975-2014. Source: author.

As shown in Figure 7, in 1980 shipping markets topped, and returned almost to the same point in 1995. The shipping index was almost constant from 1982 to 1985, from 1988 to 1994, and between 2001 and 2002; and the great fall in 2009, followed by a fall for 5 years, till 2014.

As shown, the OECD industrial production index showed a behavior closer to the shipping cycles than the other indices, presented in Figure 6, including the index for the "World Seaborne Trade"… This means that the OECD industrial production index expresses better shipping and can be used for a prognosis of the

2nd, taking into account the forecasting of the first.

13. Conclusion

"*When one works in a place where frequent… earthquakes occur* (*read*: *shipping cycles*)", one has to "*learn to live with them*". Shipowners faced 22 shipping cycles from 1741 to 2007 (267 years) of an overall average duration of about 12 years.

Stopford distinguished, wrongly, we believe, the 3 shipping eras: the "Sail", 1741-1871; "the Tramp", 1871-1937, and the most recent period, of 1947 to 2007, called "Bulk era"… A more useful distinction we reckon is to distinguish the shipping eras in accordance with the prevailing "main engine technology" like e.g.—Air, Steam, Oil and…New Fuel.

Technology and maritime cycles is an important chapter which, however, has to be re-written more clearly than hitherto. If technology creates the shipping cycles (?), then technology is not a good thing as believed.

We do not agree, with any stylizing of the shipping cycles, however, that may lead shipowners to take wrong future decisions. We want shipowners to approach the issue of the maritime cycles fully open-minded each time with the knowledge *that out there anything can happen*.

It is fatally wrong to derive, and to believe, in fixed patterns in shipping cycles—even if this is most desirable. There are no previous patterns, e.g. concerning cycles' future duration, cycles' durations of their peaks or of their troughs; there are no reliable conclusions, which have been reached saying that the cycles affect only older, or solely smaller, or only newly-built, ships, or that cycles concern only tankers or only dry cargo ships, and so on... We saw all possibilities to happen out there. The decisive factor is its type's demand and supply.

A shipping cycle is the mechanism "obliged" to bring equality between supply of tonnage and its demand, whenever this, and as long as this is required… The larger the volume of supply of tonnage vis-à-vis its demand, the longer will be the time to achieve a balance between the two, and the rarer will be the opportunity of the freight rates to rise, and vice versa.

We saw that as time went-by, cycles *lasted less* (on average). An explanation of this particular pattern we consider it to be a good issue for a further research. What, however, we found, as a rather standard pattern, was the time which "average peaks" last, which we saw them to become shorter, vis-à-vis the "average troughs", which we saw them to become longer, and in all 3 eras mentioned above… We saw also cycles' durations to become shorter as time passed-by, but this is what we dispute to be taken as a fixed and repeatable pattern…

We have to admit—something plausible—that *supply became more adaptive to demand as time has elapsed, and this can be expected to hold also for the future, given any imbalance between demand and supply*. This sound to us more probable as meaning that the rise in supply will affect the freight rates, but not demand, at first, while a rise in demand will affect first supply and then freight

rates…

One may also admit that a success in shipping businesses depends, certain times, on random circumstances like those of the closures of an important Canal, determining the distances that ships have to cover… The first closure of the Suez Canal boom destined to be followed by a serious depression, proving also the *impossibility of predicting the maritime*[12] *markets* (*1957*). It is hoped that the use of the forecast OECD industrial production index will help shipowners towards a better prognosis of their maritime cycles. But who is able to predict a local war or a local revolution?

Conflicts of Interest

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

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[12]The term "maritime" is broader than the term "shipping", which includes Ships and Shipbuilding, by taking into account also Seaports.

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