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# Shipping: How a Low-Earnings Industry Has Created Very Rich Owners? The Stopford's Paradox

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## Abstract

Most of the past research dealt mainly with *freight rates*. Here we dealt mainly with shipping earnings. A general opinion is that shipping industry is a risky one, and thus we mentioned the failure of Economics to define risk properly, which we did. We investigated also why shipowners insisted in earning 7.2% return on investment, while S + P 500 provided 14.1% (1975-2001). We showed that Maritime economists are stuck in the belief that the bigger the ship- and more volatile- the more profit…she provides. But maritime literature *proved that the more you risk, the less you get in shipping businesses*! Our method is mainly statistical, and we showed that Stopford in 2009, proved that earnings from ships are *leptokurtic* in their distribution, with a fat RHS tail… Moreover, Stopford worked-out a model of a shipping company, which he called it "perfect". We reviewed this, in 3 aspects, to see its perfection: investment, depreciation and dividend policy. We worked-out a comparison with "a hypothetical *perfect* Greek shipping company". We also presented a new concept: "the customizable supply of ships" to indicate who gains the lot in shipping. Our main conclusion is that neither asset playing or chartering made certain shipowners millionaires like Onassis, but luck!

## Keywords

Shipping Earnings at 7.2% Return on Investment, A Proper Definition of Risk, Big Ships-High Volatility-High Profits? Shipping Monopolistic Competition? Leptokurtosis in Earnings, Perfect Shipping's Investment-Dividend & Depreciation Policy versus a Perfect Greek Shipping Company

## 1. Prelude

Due to the global situation with a war between Russia and Ukraine and an inflation and energy crisis since end-Feb. 2022, which is becoming severe as time goes-by, we decided to provide a prelude instead of the classical introduction.

One hundred and twenty (120) Greek top-managers interviewed[1] about the 2022 situation, after half of the year has passed. All were deeply concerned about the escalation of the *cost of energy*—in multiple forms, the *rising inflation* and the increase in *interest rates*.

Moreover, Europe realized that to depend heavily (40%) on Russia for *oil* and *natural gas*, was a naïve policy, even if it was supported by Germany. The equal in importance mistake of EU was the construction of pipeline(s) (North Stream 1; and 2 under construction), starting from, and passing through, countries, which could potentially "blackmail" Europe in future. Europe forgot the lessons we delivered to our students, as to where and why to build a pipeline!

Russia destroys Ukraine! "Climate" destroys the Planet, including Russia! Climate causes the frequent fires (Portugal, France, USA, Greece, Spain, and elsewhere), the high temperatures, (above 40 degrees C), (UK, Spain, Portugal, France, Italy, Greece, and elsewhere), the floods (India, China, Austria, Italy, Greece, Pakistan, and elsewhere), the lack of water, the unexpected snow, and hail, the heavy rains, the melting icebergs in the North, and the destructive strong rapid winds, or no winds… And all this, upon the dawn of an EU environmental policy, and that of most of the World, including USA.

The events, however, prevented EU from delaying the climatic collapse, and instead of aiming at *FitFor55*, the use of lignite, coal, oil, and other fossil fuels, as well of nuclear energy, has intensively re-begun… A great step backwards as far as Environment is concerned.

North Europe, USA, and Germany especially, are going to freeze during the 2023 winter…where in Germany a tax also imposed on private consumption of natural gas! More dead, due to us, not due to climate or to Pandemic, are expected, especially among homeless. USA voted in August 8th, 2022, to spend a large amount to retard the global climatic collapse, but many argued that this is not enough.

European countries have to expect a rise in global warming, increased air pollution, intensive farming[2], frequent acid rains, and rains, and more ice melting in the North… *Most desirable and urgent are, and will be, the RSE-renewable sources of energy—which by the way have to attract the entire global investment.*

The European farms, and the EU river transport, are already in low level waters, in August 2022. In Italy, Germany, France, Norway and UK, and elsewhere, the potable water is less. The French, Italian and German rivers lost part of their former quantity, and the transport through them, (Rhine; Danube etc.), dimi-

[1]By the weekly journal "Kathimerini".

[2]This is under a question mark due to lack of water. Fishery in the rivers is also under a question mark.

nished. This hit, along the Rhine, 58m workers! Also, 200m tons of cargoes cannot be transported as hitherto there. The only positive outcome of the reduced river water, or of its warming-up, is that they cannot be used anymore in controlling the temperature of the nuclear reactors (France)!

The solution? The reduction of pollution, if accompanied by a cheaper energy, it would achieve an extremely important economic target: "The reduction in the cost of producing the global GDP in favor of the poorer…"

The cost of living escalated in 10 at least categories of basic products[3] (and in Greece), from 3.5% to 27.3% by July, 2022, compared with 12 months ago. The Energy crisis[4], the Pandemic and the Russia/Ukraine War, taught us valuable, but very expensive, lessons, about: how to *save the environment*, how to *fight bureaucracy*, how to *become digital*, how to *do things from a distance*, and how valuable is to *live* and *work* without wars…

Shipping[5]. It is accused for producing 3% of the global carbon dioxide, aiming at 1.5% by 2050, with less carbon intensity, by 40%, by 2030. It is "encouraged" to use *ammonia* and *hydrogen for fuel*.

ESG. All managers by now care about the Environment, the social aspects and the honest corporate Governance (ESG) of their companies… Is this going to save us?

The Pandemic, 2019-2022. It reduced the life of millions of our relatives, but… "suggested" indirectly the use of digital tools! Data in the "Clouds"! "Edge computing", "internet of things", "the 5G networks", "the data analytics" and "the artificial intelligence", which indeed all came-in along with COVID-19! As ancient Greeks said: "Not even one bad event does not bring a positive benefit—something good."

Aim and structure of the paper

The 1st aim is to analyze the *earnings* of the Shipping Industry. The 2nd is to indicate the cleverer, for a shipping company, *investment*, *dividend* and *depreciation* strategy. The 3rd is to review the policies of a shipping company, which created by Stopford, (called the "Perfect Shipping"-PS), against our experience from a large Greek shipping company (=the "Greek Perfect Shipping Company"—GPSC)!

The paper is structured in 2 Chapters and 13 parts, after literature review as follows (**Table 1(a)**).

## 2. Literature Review

Stokes (1997) argued[6] that the financial activities in shipping between 1960 and

[3]Oils & fats, bread & cereals, meat, milk & eggs, coffee-cocoa-tea, other food items, sugar-sweets-ice creams-chocolates, fishes, mineral water-refreshments-juices-beers & vegetables.

[4]The natural gas increased its price 179%, the electricity 56%, the diesel for home heating 65%, the gasoline & diesel 34%. Many gas pipelines from Russia proved to need maintenance and stopped their function!

[5]Transportation became more expensive: air tickets cost more by 62%, taxis by 33%, hotels by 20%, coastal shipping by 25%, the prices of used cars by 16%, theaters-movies by 14%, new cars by 12% and the cost of vacations by 11%.

[6]Supplemented by the Stokes' book review by Lorkin H. (1998).

1980, led to a *severe financial crisis*. The modern shipping history goes back to 1950, when the Greek shipowners, with their 1940s-built "Liberty" ships, made fortunes due to "Korean War"! **Table 1(b)** summarized the developments in shipping industry between 1950 and 1996. These developments closed a whole important chapter of shipping industry for the last 50 years or so, and we believe that the reader must know as a foundation of the shipping developments that followed.

Grammenos & Marcoulis (1996) dealt with the determinants of the returns of 19 shipping companies listed in the US, Norway, Stockholm and London, 1989-1993. They calculated the *betas*[7], related to stock exchange, the *dividends*, the *leverages*, and the fleet's *average age*. They left-out: the *freight markets*, *company's size*, its *chartering policy*, its *sale & purchase decisions* and *company's stock liquidity*…i.e., the most important as admitted by them.

Stokes (1997) characterized the "Colocotronis" shipping company's collapse as a case of bad finance! Colocotronis made a wrong judgement in ordering 2 ships, very costly, in Dec. 1972, for $50m each—a case of bad management.

**Table 1.** (a) The structure of the paper in 2 chapters and 13 parts; (b) a brief history of shipping industry, 1950-1996.

(a)

| Chapter 1: Part I | Part II | Part III | Part IV | Part V | Part VI |
|---|---|---|---|---|---|
| "The definitions which were left primitive" | "Shipping industry: the one providing low returns?" | "The more one risks, the more one earns?" | "The relationship between earnings & volatility" | "Perfect competition or a monopolistic one, in shipping?" | "Leptokurtosis in shipping earnings & freight rates" |
| Chapter 2: Part VII | Part VIII | Part IX | Part X | Part XI | Part XII |
| "Stopford's model of "Perfect Shipping-PS" | "The investment policy of PS" | "Capital gains and losses by PS" | "The depreciation policy of PS" | "The dividend policy of PS" | "Our theory of the customizable Supply of ship services" |
| Part XIII | | | | | |
| "The unanswered question" | Plus→ | Further research | Conclusions | References | Source: author |

(b)

| Cause | Result | Cause | Result | Cause | Result |
|---|---|---|---|---|---|
| The need for bank finance | To look for long-term employment with bankable names | Suez Canal closure (1956) | Technology allowed for larger ships, needing…larger capital! | Expansion of shipbuilding, 1964-1974; 1966-1967 slump | With State aid Due to over-ordering of ships |
| A guardian Angel fed the optimism of the shipowners → | →The 1967 Arab-Israeli war closed the Suez Canal; great boost of shipping businesses due to longer distances | Oil embargo by Arabs due to 1973 Arab-Israeli war→ | Increase in oil prices = a global recession | Banks had financed shipping with more than $25 b! → | But most shipowners became bankrupt |

Source: data from Lorkin (1998).

[7]The amount by which a stock reacts to the market/economy (Mandelbrot & Hudson, 2006: p. 68).

These ships when delivered, in 1974, faced a crisis! Indeed, in 1973, September, the tanker freight rate index (the "worldscale") was at 313.3 units and by Dec. 1974 fell to 41.4, more than 7 times lower!

Reksten H also, who obtained a $65m loan, suddenly had to provide additional[8] security as the value of his tanker fell from $65m…to $16 (−75%). *The prognosis of most of such cases was*: "*A very severe lack of liquidity leads companies to the sale of modern ships at rock-bottom prices*, *and the future process is bankruptcy*"! Indeed, this happened and among Greek shipping companies.

Glen & Martin (1998) showed that risk increases systematically with *vessel's size*, and in *spot market.* Kavussanos & Marcoulis (1998) analyzed the returns in US listed companies, from 1984 to 1995, focused on those in water transport, using CAPM. The shipping betas were all below the market (1.00), and *thus potential investors had to be attracted*!

Couper (1998) mentioned the collapse of the "Tidal Marine", as an example of "reckless and illegal" market behavior; the company used *fictitious* chartering contracts, and *overvalued* ships, to achieve growth. This case followed by the "Adriatic Tankers" collapse, owning 111 ships, but with a $400m debt. He gave also a brief history of the "shipping decades" called "the crisis ones" (1998: pp. 207-211). *Greeks are well known for their extreme actions both to the left or to the right of the common sense.*

Couper (1999) argued that "Colocotronis" collapsed in 1975 due to the huge liability created by his company's large shipping investment, which subsequently turned-out to be ill-timed (Goulielmos, 2021a). Indeed, company's liquidity problems started when it ordered the 2 ULCCs. The company was not at all negligible among Greek-owned ones, holding the 5$^{th}$ top position, with 50 vessels and 3m tons. Company's weak point was, however, its excessive banking finance of ~$320m. Assuming the value of company's fleet at ~$300m[9], the company had a high *gearing*[10], after British terminology, and a high *leverage*, according to Americans.

Summarizing, the shipping industry, in stock exchanges, is not as *risky as many consider it to be*, and its returns were not so low, among major industries like rail, air as well real property, and others! This, however, is explained, if the "listed water transport companies" were so strong, and so big, so that their *betas* to be insensitive to the market/economy, over those rather troubled 12 years… (1984-1995).

[8]In shipping finance, the value of the mortgaged ship must be 120% of her loan at all times (the outstanding amount plus interest) during loan's tenor. If not, then additional security must be provided usually in cash.

[9]$6m × 50; a 1978 (01/01) price for a 5-years-old bulk carrier of 60k.

[10]Gearing is the ratio of the shareholders' funds to company's long-term debt. Equivalent statements are: "a high debt ratio, or a low interest cover"; "high debt to total capital employed"; "high debt to equity"; "high proportion of fixed assets to total expenses". The popular saying is that a company-with high leverage—"works for the banks". Most of the total earnings of the company are absorbed by repaying loans and interest.

## 3. The Literature's Gaps

As shown, wars and canal closures, increased the wealth of shipowners. Surely shipping companies existed also who committed fatal mistakes, useful for avoidance. Par excellence the 1st Suez Canal closure brought the great shipping economies of scale and the increase in profits per ton-mile.

Maritime economists, however, for decades suffered from the lack of data, and thus their research restricted to data from Stock exchanges, in 1990s. To this helped also the so-called CAPM model using betas as a measure of risk. No one challenged the validity of the tools and methods used like the normal distribution and the standard deviation to present risk.

Stopford in 2009—without realizing it—and Goulielmos prior to Stopford, and mainly in 2022, proved that risk is much greater than assumed, the first in shipping earnings and the second in freight rates. The analysis proved that the bigger the ship, the bigger the risk, but it proved also that the lesser the earnings in line with previous research! We showed, however, that the shipping earnings, depend on a partial demand requiring a combination of ship characteristics from the side of supply. The fewer the ships having those characteristics—given demand—the higher their earnings, no matter size or type.

Maritime economists still believe that the bigger the ship, and if she also works in the spot market, the more risk she encounters, and she is expected to gain more profit… But it did not! Par excellence Stopford (2009) spotted the paradox: "How a low-earnings industry has created very rich owners?" Our answer is that neither risk or volatility or management's skill can achieve that but luck… The rest of the paper (Chapter 2) caries out a comparative analysis between two hypothetical shipping companies supposed to be perfect in their investment, depreciation and dividend policy.

## 4. Methodology

The idea of this paper came from reading in Stopford (2009) about his paradox, where shipowners persist in doing business in a volatile, risky and providing low earnings industry! Thus, we had first to show that these 3 characteristics were true, defining risk first, and differently, than hitherto. We have used information found in Stopford, Lorange and Goulielmos.

The rest of the paper used data from Stopford (2009), and from elsewhere, to review certain policies, adopted by a "perfect" shipping company, created by Stopford, perhaps belonging to British shipowners, and compare them with a Greek shipping company corresponding ones. This last one was based on our experience working for 16 years in a large Greek shipping company.

Chapter 1

Part I: The Definitions Which Were Left Primitive

Certain gaps left unfilled by the science in the past. For example, it failed to

define risk…properly. Risk simply *measured* by the *probability* to lose an amount, as well its volume; but this loss/gain set at a maximum (±3 standard deviations)! We will…"risk" a definition of…risk: "Risk is when a probable outcome moves away from its average, but without limits".

Stopford (2009: p. 343), argued that to run a shipping company is a…risky business. He also (Chapter 8) quoted Churchill saying: "The optimist sees the opportunity in every difficulty". This describes-well Greek shipowners, we believe, but Greek optimism was harmful at times, as Kulukundis M. wrote for Greeks: "It is better to lose money with 5 ships, instead of losing it with 10." Stopford, further argued (p. 320): "But not everyone makes a fortune in shipping", except 11 families…

Stopford also wrote: "shipping companies faced endless recessions, and low average returns", and no one knew when a cycle would end! He, however, excluded Onassis and Fredriksen, who were (are) fabulously wealthy! Stopford called the above "the shipping return paradox"…meaning: "how a poor industry can create very rich shipowners?" This we are going to investigate!

Accountants for example give a clear picture of the term "earnings" unlike economists. We may define *earnings* for shipping as the $ amount obtained by hiring the space of a ship, (belonging to her owner), to the Charterer, (the owner of the cargo), for the transport of it from port A to port B, usually through a Canal[11]. Table 2 clears-out the terminology of shipping earnings, and more important the factors, which reduce them. These factors, an efficient manager must have under continuous digital control!

Part II: "Shipping Industry: Is This the One Providing Low Returns?"

Table 3 presents the returns obtained by shipowners during the 20th century (1864-2004).

Table 2. The earnings of a shipping company and how they are reduced.

| Earnings | Reduced by → | | | | |
|---|---|---|---|---|---|
| The $ amount received from hiring a ship; known also as "*sales revenue*"/"*turnover*" *or* "*hire*"/"*freight*" *etc.* | Chartering brokers commission (*) | The cost to bring the ship services to the condition so that to be hired = Gross Profit (**) – the key for shipping managers | Administration & promotion (***) costs = Operating profit or PBIT[12] (the key for performance in non-shipping companies) | Interest expenses (net) = Profit before taxes | Tax on profits (****) = Profit after taxes |

(*) This must be negotiated to be as low as possible; (**) this cost must be also as low as possible, & lower than company's competitors; (***) the administration cost must be also controlled as it may burden the fleet with $1000 per day per ship; the bulk shipping has a negligible need for advertising; (****) taxes are paid by the vessels called "tonnage tax". In shipping, containerships only have high promotion & administration expenses.

[11]The hire/freight stands for different periods, e.g., for one voyage, for a period or for many years.

[12]Profit before interest & taxes. In shipping important is the cost of borrowing, as large amounts are involved. Clever managers seek cheap ways to finance especially their new buildings and refinance their investments by cheaper schemes, as LIBOR (the shipping cost of capital) is also volatile—as everything else in shipping businesses—($\sigma_{libor}$ = 3.9 according to Stopford, 2009). LIBOR = the London interbank offer rate.

**Table 3.** The shipping returns' history in the 20th century, 1864-2004.

| Period | Research by | Remarks | Period | Research by | Remarks |
|---|---|---|---|---|---|
| 1864-1914 | Kirkaldy (for British Shipping) | 1911: best for 10 years; returns equal to those obtained by investing in 1st class securities; at times, however, shipping run at a loss | 1930-1935 (crisis) | "Tramp shipping administrative Committee" | 214 shipping companies had a ROC of only 1.45% p.a. |
| 1950-1957 | "Economist shipping share index" | 10.3% p.a. increase for shipping; 17.2% had all companies | 1958-1969 | "Economist Shipping Share index" | +3.2% up |
| 1958-1969 | "Rochdale Committee" | 3.5% p.a. (very low) for shipping | 1988-1997 | Six bulk shipping companies; 6 liner (*) companies | 7% return<br>8% return |
| 1990-2000 | Oslo shipping shares | A small increase in prices | 2001 | Six public tanker owners | 6.3% on equity |
| 1975-2004 | Stopford (2009: p. 323) | Bulk shipping 7.2% ROI | 1975-2004 | Stopford (2009: p. 323) (**) | 4.9% ROI in tankers |

Source: data from Stopford (2009: pp. 320-321); (*) liners had higher & more stable returns; (**) tankers' ROI was slightly above inflation, but below: treasury bills, long term government bonds, corporate bonds, & S + P 500!

As shown, shipping earnings were indeed low since 1864 to 2004 (138 years, with a max. ROI of 7.2%) (**Figure 1**)…

A shown, the VLCCs—very large crude carriers—earned round $20,000 per day in 1980-1987, except in 1988, 1991 and 1997. However, in 2001, 2004-2006 and in the 2008, earnings exploded!

Part III: "The More One Risks, the More One Earns"…in Shipping?

Stopford tested the "modern finance dogma", without realizing it: "the more you risk, the more you gain" (**Figure 2**)? Consequently, risk sounds as a very strong *motive* for higher profits!

The risk is measured by standard deviation: classical. But, if this model [1] holds, a shipping investment, in the bulk carriers, had to provide: ~22% (17.524% + 4.6943% = 22.22%), given a *volatility* 35% (using regression [1])! Reality, however, gave a 7.2% ROI!! Stopford—without realizing it—proved that "the more you risk, the less you gain" in shipping! This is exactly what Mandelbrot & Hudson (2006) argued (p. 68)[13] for finance.

The theory, (the CAPM), argued that the most important risk managers face, comes from the *change in the state of the market/the economy*. Let a shipping stock reacting to the market by a…coefficient beta ($\beta$), say equal to 1.5, which by the way *shows a high sensitivity to the condition of the market/economy*. The treasury bills paid 6.6% (1975-2001) (Stopford, p. 323). The market's risk premium over those bills, was 17%, according to Stopford. So, the shipping stock had to pay (6.6% + 1.5 × 17% = ~32%), but it paid ~7.2% (4.5 times less)!!

[13]One of our axioms is that what happens in finance, the same happens in shipping, like twin brothers!

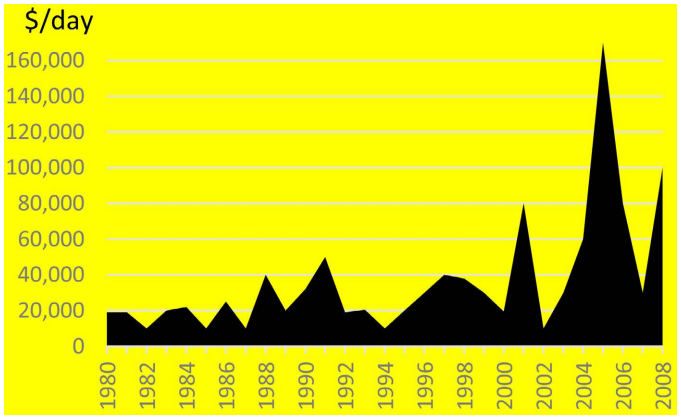


**Figure 1.** The earnings of those owning VLCCs. Source: data from Lorange (2009: p. 17).

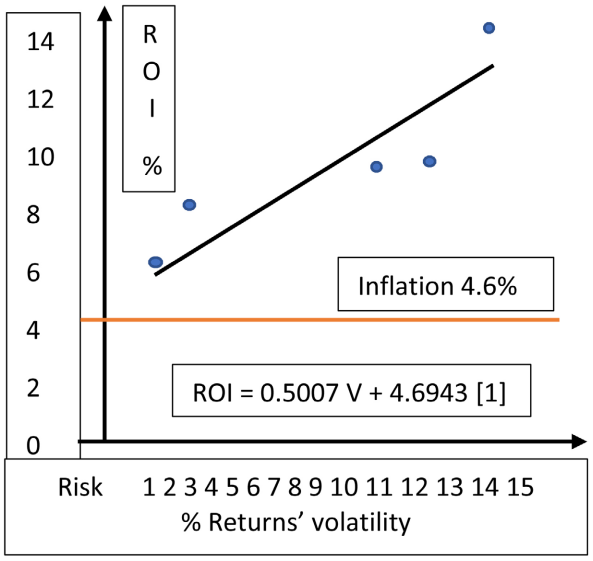


**Figure 2.** The regression between ROI (return on investment) & volatility of returns. Here are shown: the returns from Treasury bills (the safest), (starting from left), the 6-month Libor, the long-term government bonds, the corporate bonds & the S + P 500, the inflation was 4.6%, 1975-2002.

Part IV: The Relationship between Earnings & Volatility

**Figure 3** shows: the types of ships, their sizes, and the years when they *earned* above average, over 16 years (1990-2005). Also, **Figure 4** shows the *volatility* of the same types, sizes and the relevant years.

As shown, the higher earnings obtained by the VLCCs (carrying about 2m barrels; >200,000 dwt), followed by Suezmaxes[14] (tankers). These, however, as shown, were also the more volatile (**Figure 4**)! Four types only of ships earned above average, in 1990-2005, out of 8 (50%). And these 4 had also variations of earnings *above average* μ (all >3 σ)!

The above information—if verified—can be used as an aid to shipowners as to what types of ships to buy, or build, and what level of risk to take, though the

[14]Tankers passing Suez Canal fully loaded with about 1m barrels of oil; carrying 120,000 - 200,000 dwt.

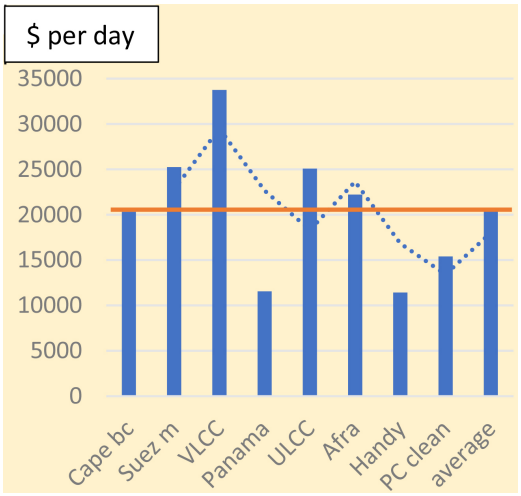


**Figure 3.** Average $ earnings per ship type, 1990-2005. Source: data from Stopford (2009: p. 322).

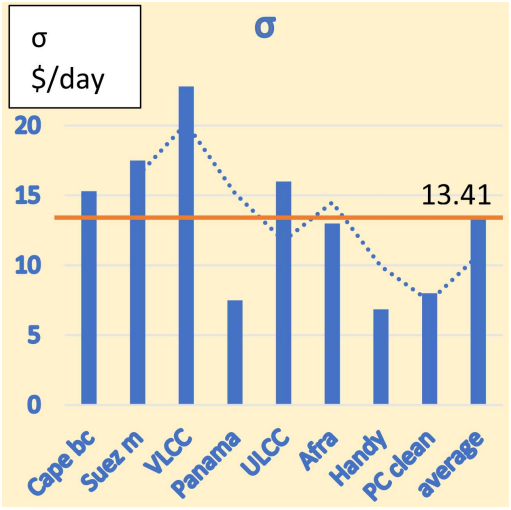


**Figure 4.** Standard deviations per ship type, 1990-2005. Source: data from Stopford (2009: p. 322).

past does not guarantee future in shipping (Goulielmos, 2009)! Worth noting is, however, to say, for the time being, that in other industries, a 10% volatility in earnings, from month to month, is considered extreme, while shipping showed volatilities from 52% to 75% (Stopford, 2009: p. 322)!

According to the "theory of normal distribution", volatility is within certain bounds, with about a 96% probability! Only $\mu \pm 3\sigma$ maximum volatility can be out there. This means that you can gain from shipping a return[15] of say $14,600/day, if $\sigma = 0$, and $22,601 if $\sigma = 3$, and $6599 if $\sigma = -3$! No bad! But if volatility is $-22\sigma$, as happened in the 1987 Dow Jones (Black Monday), the loss would be $44,074 per day!

The important information derived from **Figure 4**, nevertheless, is that the bigger ships (ULCCs, Suezmax-tankers & VLCCs) earned the lion's share, and

[15]Data from Stopford (2009).

that the *tankers earned* more than the *bulk carriers*…! The Panamax (65,000 - 80,000 dwt) and the Handymax (25,000 - 60,000) bulk carriers earned almost the same, while Capes, (80,000 and up to 180,000 dwt by 2009, and increasing), excelled among bulk carriers, one main reason being their trade with China, before 2019. Most interesting is, however, that earnings, as shown, seem to correlate with their standard deviations!

Part V: A Diversion-Perfect Competition, or a Monopolistic[16] One, in Shipping?

In a market of *monopolistic competition*, an industry works with a large number of firms, as in shipping, producing similar services. Can Shipping be, one day, monopolistic? We believe it might, because the *identicality* of its services can easily be disputed, while the *similarity* of them, can easily be established! But can freight rates be raised by shipowners?

The main factors to differentiate a ship service are: 1) the age of the ship; 2) the level of her safety; 3) the efficiency and effectiveness of her managers; and 4) the size of her company. The model, however, depends clearly on the degree of the differentiation[17] of the services among ships. It depends also on the answer to the question: "Are the services of the shipping industry almost the same or exactly the same?"

For monopolistic competition, a degree of monopoly is required, meaning setting the price by the shipping company. If so, we can introduce a negatively sloped demand curve (**Figure 5**). Remarkable feature of the model is that it allows free entry. If this model holds, all the assumptions of perfect competition are retained, except: *homogeneity*!

As shown, the shipping industry attains equilibrium at E, producing OQ, at a price OPc. Demand, D, touches LRAC at E'. The OPc < LRAC; zero (monopoly) profits are earned. LRAC > LRMC at E', and so production is carried at a higher cost, with excess *capacity*.

This is a suitable model, however, for a vessel in slow steaming. The model shows also the situation that earnings are restricted by demand, where OQ times OPc < OPc times OQ'. Perfect competition determines a higher production, at OQ', and at a cost < $P_N$! According to our experience large shipping companies earned only a very small premium by charterers' brokers above Pc, but not at $P_N$.

Part VI: Leptokurtosis[18] in Shipping Earnings?

Those arguing that risk can be only 3σ away from average, they ignore that the fat tails "claim" exactly the opposite. Stopford (2009: p. 321) presented—without

[16]Professors Chamberlin (1933) and Robinson (1933) advanced this theory to accommodate actual market structures not falling in either monopoly or perfect competition, considered these two to be the polar models.

[17]Differentiation, according to economic theory, is when there is a freight rate at which some charterers prefer to charter vessel X, and others to charter vessel Y (p. 168) (Besanko et al., 2017). For this to happen other factors have to play a role except freight rate, which is assumed to be the same...

[18]Brooks (2014) defined it as when a time series show a higher peak at the mean and fatter tails, compared with a normal distribution, though the mean and the variance are the same!

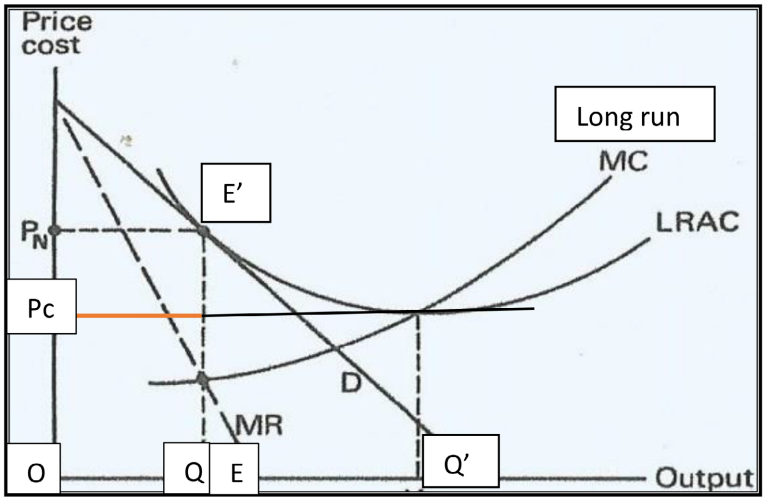


**Figure 5.** Monopolistic competition in shipping? Source: Pearce (1992); modified.

realizing it—the leptokurtosis in shipping earnings, 1990-2005! He showed the clear departure of shipping from "normal distribution", with a very fat right tail (**Figure 6**)!

The above tail obviously caused by the extreme earnings in 2003-2005 (-2008). This confirms that shipping industry shows variations above 3σ, and that risk is many times *greater*! The distribution of shipping earnings over 820 weeks had an average μ = $14,600, with $\sigma_{pop}$ = $2667 (our calculation of σ). The departure from normal, i.e., beyond 3σ, was $43,000 - $22,601 = $20,399! This means a σ = 11 (round.). Also, the −3σ had to be[19] $8001. **Figure 6** represents all 8 types of ships (3 tankers, 3 bulk carriers, 1 containership, and 1 LPG)!

**Figure 7** confirms that what happened to *earnings*, it happened also in *freight rates*, their alter ego.

The main lesson from **Figure 6** and **Figure 7** is that both *earnings* and *freight rates* distributions are *leptokurtic*! In such a case, the tool for risk is not σ, but alpha (*α*) (Mandelbrot & Hudson, 2006: pp. 261-262). Alpha is an exponent measuring how wildly freight rates/earnings vary, and how "fat" the tails of the freight/earnings-change curve are. *Stopford did not realize his discovery so that to relate shipping risk to alpha*!

Chapter 2

Part VII: Stopford's Model of Perfect Shipping

Stopford (2009) argued that "shipping *returns*" are historically low! He calculated the returns on shipping investment[20] over 31 years (1976-2006) (**Figure 8**) of a *hypothetical* (*perfect*) *shipping company*!

[19]We have noticed that the graph of the normal distribution (in **Figure 5**) is drawn wrongly on left side, because if σ is equal to $2667, as it is on the right-hand size, then the −3σ had to be $8001 and not $6000.

[20]ROSI is equal to EVA/NAV = EBID − DEP + CAPP/NAV × 100 (as a %) [3], where EVA stands for the "economic value added" and NAV for the "net asset value". To obtain EVA, one takes earnings E, (before interest I, and depreciation D) (EBID) (=freight rate times net dwt carried), deducts operating expenses (OPEX) and depreciation (DEP), and adds capital appreciation (CAPP).

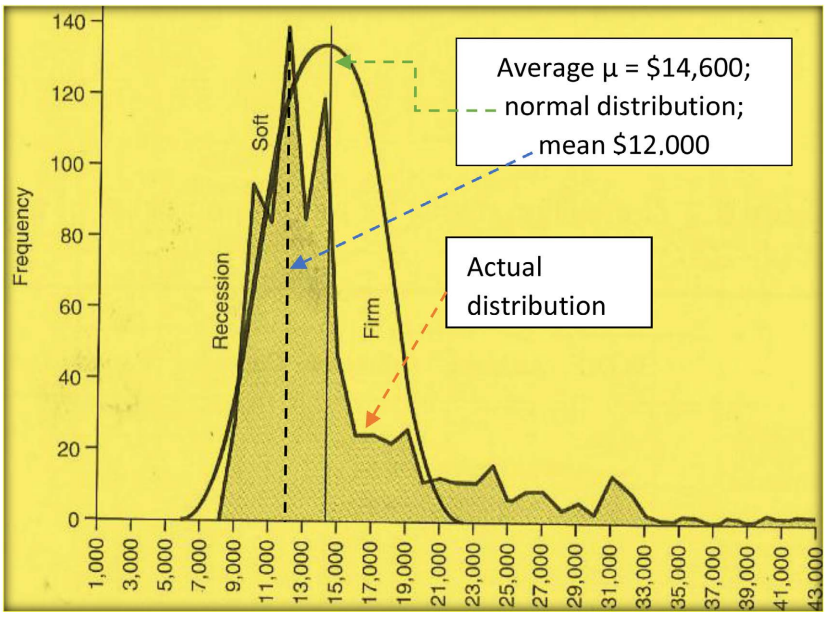


**Figure 6.** Index of weekly shipping earnings, $/day, 1990-2005. Source: Stopford (2009), modified.

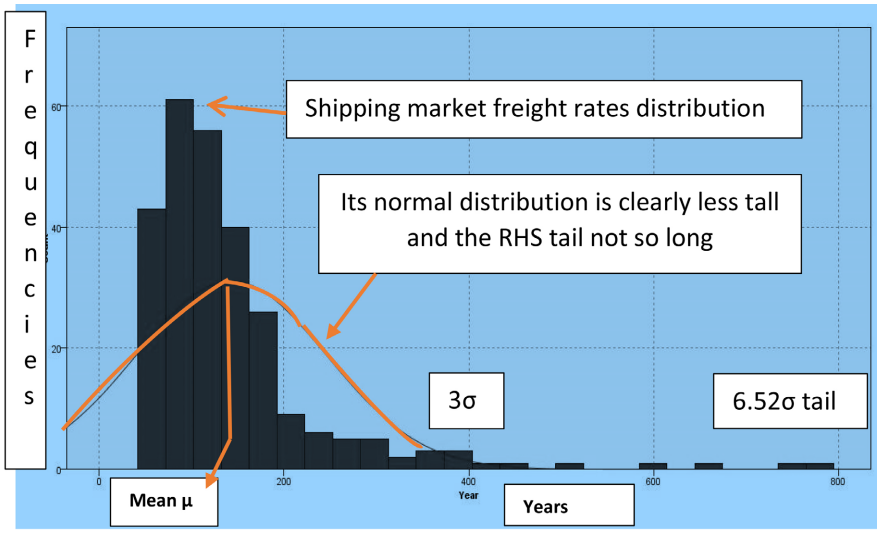


**Figure 7.** "Maritime economics freight rates index" distribution, 1741-2015, vis-à-vis its normal distribution (1741 = 100 = 1947). Source: (Goulielmos, 2022), used by permission. Data from Stopford (2009), amended; using SPSS; skew: 3.2 (round.) >0; kurtosis 13.7 (round.) >3, giving a slimmer, long-tailed distribution with more weight in the center. Kurtosis, (showing a hump), is given by: $k = 1/N - 1\Sigma(Xi - m)^4/(\sigma^2)^2$ [2] for a variable $X$ with a mean $m$.

As shown, earnings were negative in 1977-1978, and low (<40m) over 18 years (1976, 1979, 1982-1987 (depression), 1992-1994, 1996-2002) (i.e., 58% of the time). However, they were exceptionally high in 2003-6 (to 2008-not shown here). Earnings were above $80m p.a. (quasi monopoly earnings)! We assumed that if earnings were up to $40m p.a. from $20m, this would be "normal", arbitrarily, on experience.

Spot earnings vis-à-vis operating expenses

Individual shipping companies have no power to increase their spot earnings (Figure 9), under normal circumstances[21], but they have to accept the rate determined by Demand and Supply.

As shown, there is a rock-bottom rate in the spot market slightly below $3850 per day (=$3814). Comparing Figure 8 with Figure 9, we see that company's earnings mimic spot freight rates. Moreover, when freight rates fall, a GPS company, will try to reduce crew cost. Let us see what PS did (Figure 10)?

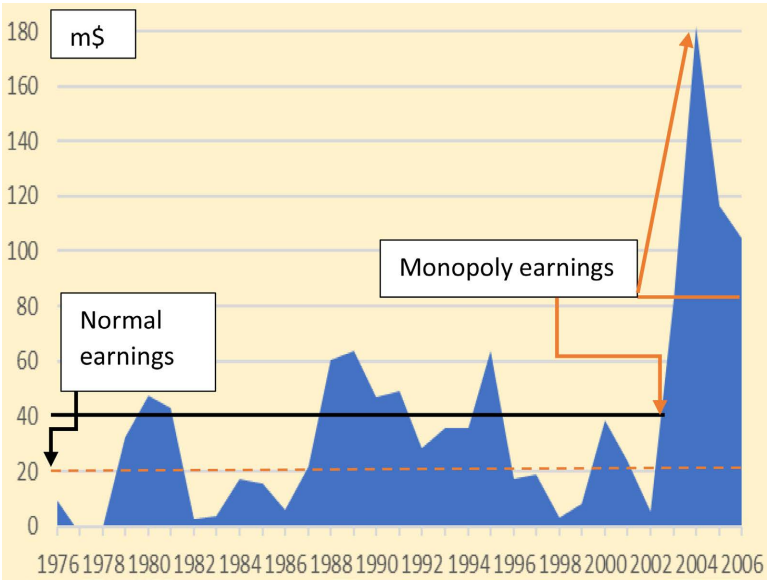


Figure 8. Earnings of "perfect shipping", 1976-2006. Source: data from Stopford (2009: p. 327).

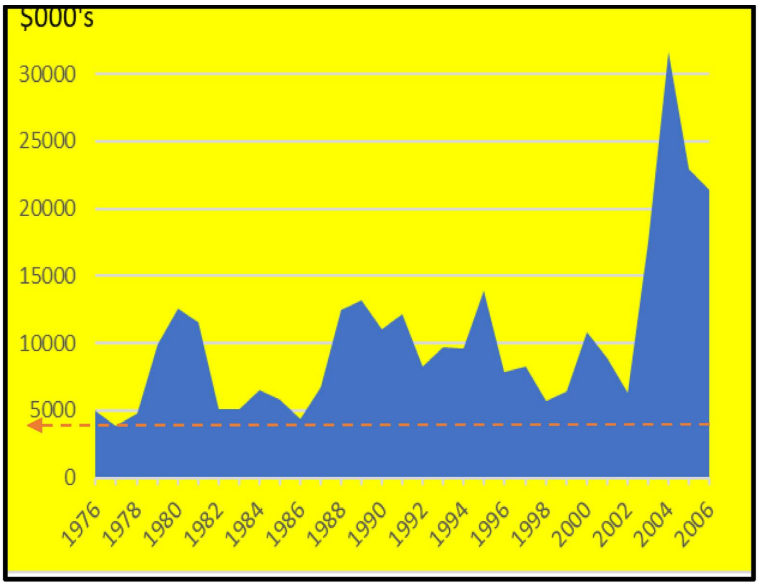


Figure 9. Spot market rates, $ per day, 1976-2006. Source: as in Figure 7.

[21]Shipowners who can negotiate cargo transport directly with cargo owners (giant producers, oil majors, state companies, steel mills, refineries etc.) are excluded.

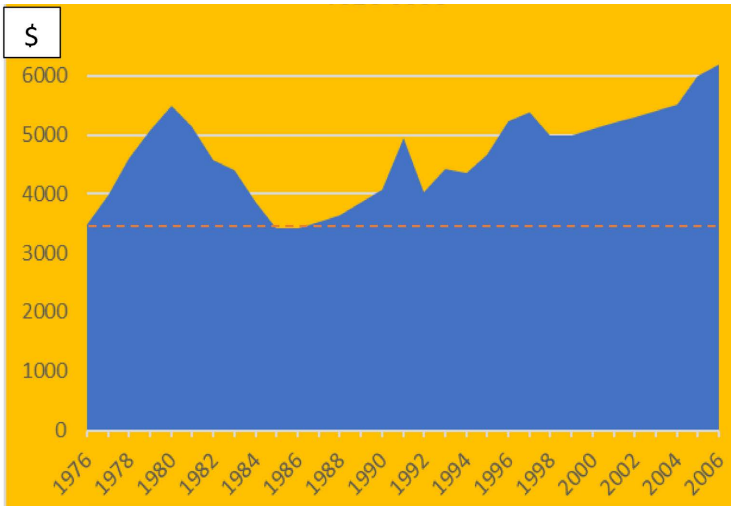


**Figure 10.** Operating expenses per day per ship in $, 1976-2006. Source: as in **Figure 7**.

As shown, the PS reduced its operating costs from a high of $5499/day in 1980 to $3409 in 1985-1986 (−38%). The 1981-1987 depression was indeed severe and lasted six years for dry cargoes, following the long tanker crisis in 1975-1977 and in 1981-1983.

Shipping companies have the practice, when company's earnings are high, to carry-out postponed repairs and to do various payments in a rather relaxed manner. Some say that one may be informed about the state of the freight market, from the mood of the shipowners!

Part VIII: The Investment Policy of PS

Stopford's PS (2009) adopted a *peculiar* investment policy. It decided to own a fleet of only 20 ships during 31 years, and every year—after the 1st—to scrap one—the oldest—and replace her with 1 new-building (shown below)! The initial 20 ships cost $162m in end-Dec. 1975.

| Investment: 31/12/1975 $m | 1976 $m | 1977 $m | 1978 $m | 1979 $m | 1980 $m | 1981 $m |
|---|---|---|---|---|---|---|
| 162 for 20 ships | 16 − 1.3 scrap = 14.7 | 16 − 1.3 = 14.7 | 19 − 1.4 = 17.6 | 26 − 2.3 = 23.7 | 30 − 2.6 = 27.4 | 29 − 1.8 = 27.2 |
| 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 |
| 19 − 1.4 = 17.6 | 18 − 1.5 = 16.5 | 16.6 − 1.7 = 14.9 | 15 − 1.6 = 13.4 | 16.5 − 1.6 = 14.9 | 21 − 2.2 = 18.8 | 26 − 3.2 = 22.8 |
| 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
| 29 − 3.3 = 25.7 | 29 − 3.1 = 25.9 | 34 − 2.3 = 31.7 | 28 − 1.8 = 26.2 | 28.5 − 2 = 26.5 | 28 − 2.1 = 25.9 | 28.5 − 2.3 = 26.2 |
| 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
| 26.5 − 2.5 = 24 | 27 − 2 = 25 | 20 − 1.4 = 18.6 | 22 − 1.9 = 20.1 | 22.5 − 2.1 = 20.4 | 20.5 − 1.7 = 18.8 | 21 − 2 = 19 |
| 2003 | 2004 | 2005 | 2006 | Total | Action | |
| 27 − 3.4 = 23.6 | 36 − 4.9 = 31.1 | 36 − 4.3 = 31.7 | 40 − 5 = 35 | $772m − $72m scrap = $700m | Build 31 ships & scrap 31 | |

Source: data from Stopford (2009: p. 327).

Was really perfect the PS in its investment policy as alleged? 1st, a massive purchase of 20 ships is uncommon, because companies usually start with one ship and gradually build-up their fleet. 2nd, and more important: "Was the timing of the purchases perfect"? Figure 11 will help us to know what prices of ships prevailed at the time company established.

As shown, the **5**-years-old bulk carrier, of 60,000[22] dwt, priced \$6.3m in 01/01/1978, and for 20 ships the cost would be \$126m. Consequently, PS could save \$36m by: 1) simply delaying its establishment by 12 months, and 2) by obtaining 20 younger ships by 5 years[23]! One stone can kill two birds.

What else a GPS, however, would do? First, *build no new-buildings*[24]! Then it would buy[25] 20 2nd hand ships in 1992 (01/01; 15 years after 1978)—scrapping the 20 older ones—and pay \$320m[26,27]. The scrap money, assumed 5% on original value of \$126m, is \$6.3m. Thus, the amount used by the GPS would be ~\$440m. PS paid \$862m for replacing 31 used ships with new buildings plus \$162m the original investment (\$162m + \$772m − \$72m from scrap)!

The benefit, of about \$422m, comes from the fact that the ships—proposed by us—were younger by 5 years, and thus their replacement was necessary to be done only once, after 15 years. PS with ships 10 years old had to replace them twice. Of course, the greatest benefit came from the lower 2nd hand prices vis-à-vis the prices of the new ones!

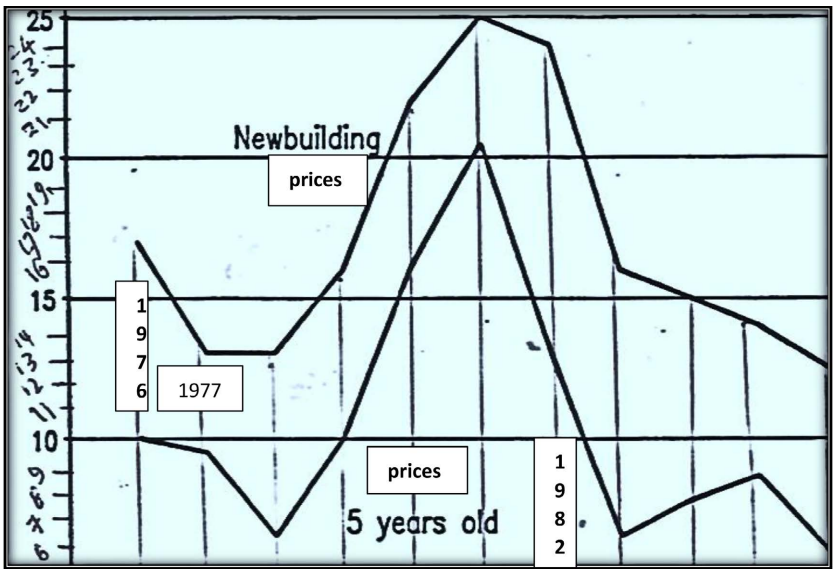


Figure 11. Prices of-new-buildings & 2nd hand ships 5 years old, in million \$, for Bulk Carriers of 60K, 1976-1986. Source: Fearnleys, modified; at 01/Jan. of each year.

[22]We suspect that Stopford based his calculations on a Panamax.

[23]Stopford gives no details about ships' size. We assumed it to be 60,000 dwt. This was a very popular size in 1970s.

[24]The difference in price between the new and the 5 years old ship, may be \$13m max. (1982-1983) or \$260m for 20 ships!

[25]We assume ships' useful life to be 20 years.

[26]Prices from Stopford (end 1991).

[27]The \$320m are for ships 10 years old.

Greek shipowners believe, and they are quite right, we reckon, that a new building, and its sister of 5 years older, provide almost the same quality of service. Because 5 years are not adequate for the ship technology to change drastically…

Part IX: The capital gains and losses

Stopford (2009) (p. 327) calculated the capital gain (and loss) of the PS fleet (**Figure 12**), using the hypothesis that company's 20 ships were all of *10 years of age*.

As shown, the volatility of the value of company's fleet, is intense, reaching reductions of $140m (2005), and appreciations reaching $260m (2006)! This is a result due to the prices of the ships, given that the number of ships is all along the same every year (20). The total capital gain of PS was $578m! This means that shipping has the way to obtain substantial revenue, which can be realized out of the net appreciation of its ships!

We recapitulate the PS's economic status in 31/12/2006.

| Gross earnings (1) | Operating Expenses (2) | Net earnings (3) = (1) − (2) | Net capital gain (4) |
|---|---|---|---|
| $2234m | $1053m or ~47% of (1) (*) | $1181m | $578m = ~49% of (3) |

(*) A large GPS, would have 40% lower expenses than PS, based on experience.

Did the very rich shipowners make fortunes from capital appreciation? No! The "asset game" is a secondary play for shipowners. Transporting cargoes is their main every day endeavor. Asset selling is of course 3 times more profitable than chartering! But it is occasional. It is carried-out, at best, when one buys at rock-bottom prices, and sells at peak ones, if *and when this happens*.

PS worked 31 years—day and night—to obtain $1181m gross profit ($38m/year), and 31 days were adequate to earn $578m ($18.6m/year)! Our suggestion is therefore: do that (chartering), but not abandon and the other (buy/sell assets).

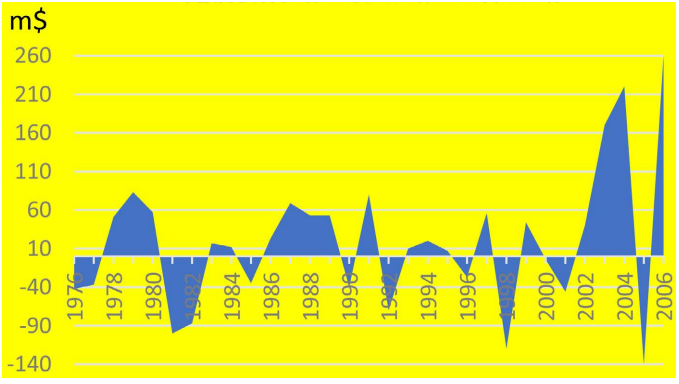


**Figure 12.** PS capital gains and losses, 1976-2006, from year to year. Source: author; data from Stopford (2009: p. 327).

Clearly the capital gain comes from the difference between the price one buys and the price one sells. This is unfair to be taxed, however, as being irregular. Capital appreciation is also helped by inflation. Economists call this *economic rent*. This means that a company receives (or pays) a "bonus" due to the "market of values", *which is not necessary for production*. Even tax authorities consider this as non-income…!

PS was happy with the $1181m *net earnings* in 31 years, and the $578m more value added to its ships. But its accountants subtracted $700m (~$23m/year) to be retained for a 40% *depreciation*! So, company's EVA reached the $1059m mark, and its NAV the $1221m. The ROSI is equal to 8.7%. It has been also calculated, using the internal rate of return method, as equal to 7.3% p.a., with a 40% volatility (Stopford, 2009)!

Finally, PS owners were happy thinking that if risk is the chance of losing the entire money invested, their company was not near it, despite a high volatility! In other words, the PS shipowners—despite a low 7.3% return, almost half of that of S&P 500 of 14.1%—were happy!

Part X: The Depreciation Policy of PS

Most people know that depreciation (Goulielmos, 2021b) is a cost. Ships are expected to lose gradually their value as a result of their *wear* and *tear*—due to age and obsolescence—and despite their planned maintenance and their extension of life. "Economic" depreciation is also possible, if demand, (charterers), *does not need* the particular ships anymore!

The above means that ships are gradually *used-up*, in providing services over 15 - 20 years[28]. The risk, however, of causing a marine accident related to age, limited in recent decades the trading ability of tankers over 15 years and of bulk carriers over 20 years…

So, every period companies charge, exclusively on accounting principles, part of their fixed asset's cost, as "depreciation" expense, in the *profit and loss account. This affects* the NBV-*net book value* of the company, which is accordingly reduced.

Professors, however, failed to clear-up that depreciation is also company's saving, realized out of company's gross profit. Saving improves the strength of a company, no doubt, but it harms economy, if it is not "used" subsequently by investors[29].

A company, and a shipping one, needs different "fixed assets[30]" to carry-out its production, called tangible, where par excellence are the vessels; also, the

[28]The durability of ships, however, may surprise the researcher, as we have found ships to trade aged over 35 years!

[29]In 1925 firms spent 25% of Gross capital formation-GCF for service, repairs, maintenance, depreciation and depletion. In 1933 this arrived at 55%. Certain was also that the GCF fell in 1933 to half of that in 1925 (=$31b). As Keynes (1936: p. 99 and thereafter) argued, the *excessive* saving through mainly depreciation, deprived USA economy from a part of the analogous spending, and contributed to the 1929-1935 depression…

[30]The Companies Act 1985 requires the balance sheets to show the total net book value of the tangible fixed assets. To derive the NBV we write-down the cost of the existing ships at January 1st, plus acquisitions and capital expenditure, less disposals and changes in $ parity. We deduct depreciation at 01/01 plus acquisitions plus charge for the year, less disposals, and the $ parity's changes.

buildings, the fixtures-fittings-tools-equipment and any payments on account, as well the value of the ships in construction.

What economists failed also to mention is the role of capitalism…through depreciation, which is concerned with the survival of companies! If a company has profits, then it has to retain a part of them to enable company to replace capital, as mentioned! Depreciation provides an eternal life for the firms on earth! So, *depreciation* is a mechanism with a double target: 1) to achieve profits (gross) and 2) to obtain capital! This is Adam Smith's genuine "invisible hand", we believe, where by pursuing company's objective, one achieves economy's objective…

Capitalism is a clever system, because if a company has no profits, (after depreciation), is shut down. Capitalism, therefore, is the economic system where profit is the King. In shipping, however, capitalism is fairer, as it allows for young ships to "retire" for a while, and come back when profits appear to be!

However, any capital good to be obtained by depreciation will be most probable more expensive than the one to be scrapped. This depends on the phase of the shipping cycle, of course. However, a company has to save for the "new ship", as this is the spirit of depreciation, and not to pursue a historical cost… Capitalism cares also for companies to adopt the *latest* technology!

The accountants (Reid & Myddelton, 2005: p. 140) define depreciation as the *method* to allocate the original cost, (price etc.), of a fixed asset (a ship), less her scrap value, against profit[31], matching expenses against revenue. Of course, accountants live in their own world, and ask from the companies two impossible answers: "what will be ship's useful life?" and "what will be her residual value, after 15 - 20 years?"

The stranger issue is, however, that while the gross earnings—as shown—depend on freight rates, depreciation is not! Thus, our 1st suggestion is to depreciate the price of company's new-buildings, and of company's 2nd hand ships, after constructing an index of company's earnings, like the one we prepared (**Table 4**) here on the basis of the rates prevailing in the spot market for company's ships.

As shown, the proposed depreciation policy achieved the same amount as that of PS, ($700m in 31 years), but calculated it *in accordance with company's freight rates*. Four years applied zero depreciation (1976-1978 & 1986) and 4 years, plus 2, applied a rather heavy depreciation (2003-2006) (1980-1981).

These two different approaches are shown in **Figure 13** and **Figure 14**.

As shown, PS took a deep breath in 1976-1977-1978, from a zero depreciation, and in 1986, when freight rates were very low.

Part XI: PS's Dividend Policy

Dividend is a *payment* made to shareholders. Important is that this payment, if in cash, is done out of company's profits (after corporation tax). "Ordinary" shareholders are paid after "preference" ones, though they are those holding the

[31]We modified their definition to apply to shipping.

**Table 4.** A depreciation index based on freight rates, 1976-2006.

| Year | Spot Rate, $/day | Index | Depreciation % on $700m | Year | Spot Rate $/d | Index | Depreciation % on $700m |
|---|---|---|---|---|---|---|---|
| 1976 | 4964 | 100 | 0 0 | 1992 | 8243 | 166 | 3 21 |
| 1977 | 3814 | 77 | 0 0 | 1993 | 9702 | 195 | 3 21 |
| 1978 | 4759 | 96 | 0 0 | 1994 | 9607 | 193 | 3 21 |
| 1979 | 9888 | 199 | 4 28 | 1995 | 13,934 | 281 | 4 28 |
| 1980 | 12,534 | 252 | 5 35 | 1996 | 7881 | 159 | 3 21 |
| 1981 | 11,540 | 232 | 5 35 | 1997 | 8307 | 167 | 3 21 |
| 1982 | 5121 | 103 | 3 21 | 1998 | 5663 | 114 | 2 14 |
| 1983 | 5129 | 103 | 3 21 | 1999 | 6370 | 128 | 2 14 |
| 1984 | 6493 | 131 | 3 21 | 2000 | 10,800 | 218 | 4 28 |
| 1985 | 5803 | 117 | 3 21 | 2001 | 8826 | 178 | 3 21 |
| 1986 | 4389 | 88 | 0 0 | 2002 | 6308 | 127 | 2 14 |
| 1987 | 6727 | 135 | 3 21 | 2003 | 17,451 | 351 | 5 35 |
| 1988 | 12,463 | 251 | 4 28 | 2004 | 31,681 | 638 | 6 42 |
| 1989 | 13,175 | 265 | 4 28 | 2005 | 22,931 | 462 | 6 42 |
| 1990 | 10,997 | 221 | 4 28 | 2006 | 21,427 | 432 | 6 42 |
| 1991 | 12,161 | 245 | 4 28 | - | - | - | - |
| Total | - | - | - $315m | - | - | Total overall | $385m = $700m |

Source: author; data from Stopford (2009: p. 327) for spot rates; average of 1 year time-charter till 1989, and average weekly earnings for a 10-years old ship thereafter; index below 100 allowed zero depreciation.

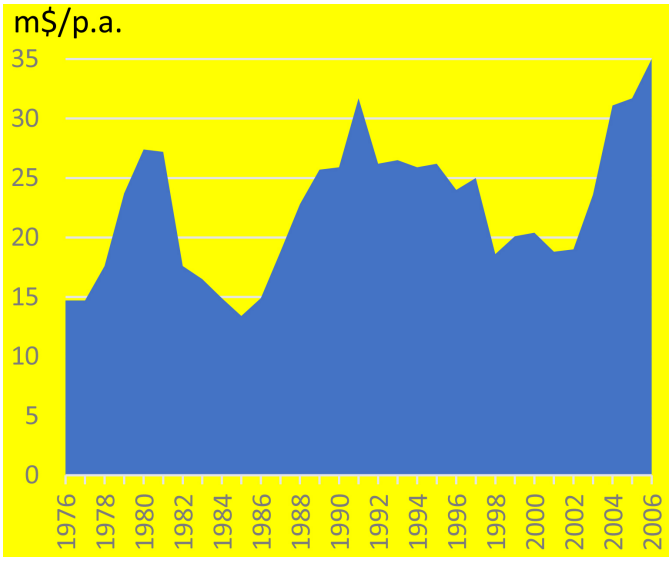


**Figure 13.** Depreciation run by PS, 1976-2006. Source: data from Stopford (2009: p. 327).

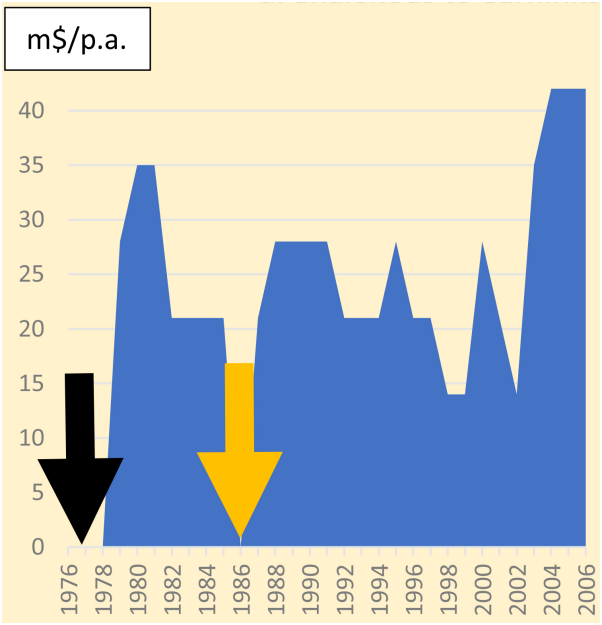


**Figure 14.** Depreciation suggested, analogous to earnings, 1976-06. Source: author; data from **Table 4**.

shares making-up company's equity (issued capital). Clarly their treatment is not fair as they are ranked third in receiving dividends!

Our policy is against paying excessive dividends, and…high corporation taxes, and any other cost, so that to diminish the financial ability of the company to build-up funds to order ships, and especially to buy used ones (at rock-bottom prices). Moreover, the retained profits can be used to avoid *liquidity problems*. In fact, we suggest to the shipping companies to adopt an anticycling policy smoothing-out the downs and ups in the freight markets, with the ups and downs of the retained profits (**Figure 15**).

As shown, the loss of the 1st period can be offset by the high profit of the 2nd period, and part of it, can offset also the loss of the 3rd period. This policy is required, we believe, if an industry is cyclical. This is also a good lesson for the banks, which see only the red parts, and in particular the 1st one, and they cannot see the blue one.

The dividends can be determined by what we may call the "opportunity benefit" of the shareholder. This means to pay shareholder a % per share that corresponds to the interest, which could be gained by them if an equal amount was deposited in a bank for 12 months, plus a % for risk. Shareholders are not interested in *volatile high dividends*, but in a steady adequate amount p.a.

Part XII: Our Theory of the Customizable Supply of Ship Services

Let us assume that one part of the total supply of ships is made-up by having six[32] common characteristics: *type*, *size*, *age*, *demand* for the products they carry, *distances*, which are able to cover, and most important: their *total number in the*

[32]Perhaps other maritime economists would add and other factors like ship's flag or crew's nationality.

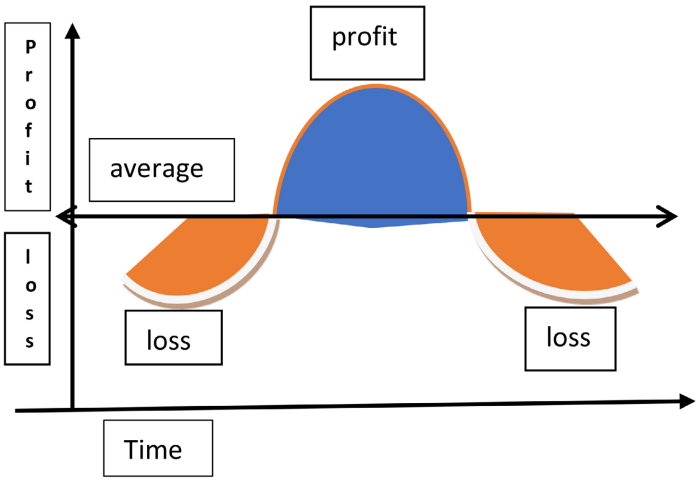


**Figure 15.** A graphical mechanism to retain profits to face low earnings. Source: author.

*group*… Also, let us imagine a partial demand for them. The interaction of the above "customized" supply and demand, determines the earnings for the particular family! The above ships will most probably be recorded in freight rate statistics only by type, size, and perhaps distance! The history of shipping taught us, however, that if the supply of a part of ships, is higher than its demand, family's earnings will be low, regardless of what is happening to the remaining fleet.

Because, if the size alone played a decisive role in earnings, then ULCCs, (which appeared in 1976), had to gain more than the VLCCs, as larger, but they did not (see **Figure 3**)!

Part XIII: The Unanswered Question

"How Onassis, and others, became very rich?" The answer is given by Stopford himself who asked it! "Onassis (Goulielmos, 2021c, 2021d) was ideally placed to take advantage of the 1956 boom"—meaning having laid-up tanker ships facing freight rates…15 times higher than the $4/ton of hitherto!! "In 6 months Onassis made-up a profit of up to $80m, which is $1.5 billion in 2005 prices!" How? By luck (Stopford, 2009: pp. 319-320)! Economists do not believe in luck as a strong economic factor, as only Keynes (1936: p. 288) recognized it!

## 5. Further Research

The proposed subjects for further research are shown below.

| | | | |
|---|---|---|---|
| The construction of a multivariable model to determine how earnings are co-related to ship's size, type, distance, own demand, & numbers in the group, & over such times like 2003-2008 | The "capital gain/loss" (*) -not only to determine if capital gains should be taxed, as hitherto, but also for certain important shipping practices (**). We may call it: "the value of a company's fleet issue" | The introduction of monopolistic competition into shipping industry is done for the first time, and perhaps has an interest for further research | Maritime economists dealt so far mainly with ship's size, and not so much with ship's type, vis-à-vis volatility. It is advisable to research further the question "why & how certain ship types earn more than others?" |

**Continued**

| | | |
|---|---|---|
| (*) Keynes (1936), p. 288, wrote: a windfall gain will accrue only to those entrepreneurs who own products (read: assets); the inevitable price instability, due to change, directs a *de facto* windfall of wealth into the laps of the lucky ones (bolds introduced)! | (**) The value of assets in a shipping company is used for obtaining a loan, and securing it; it is on them that an insurance cover/claim is based. The values will perhaps determine the sale price, the scrap money, the depreciation etc. Certain indices are also based on them | Source: author. |

## 6. Conclusion

Stokes (1997: p. 115) wrote wisely: "Blame will be attributed to the *volatility* of the shipping markets…but the real reason why *lenders* and *investors* lose money in shipping, is that they fail to analyze the risks involved sufficiently thoroughly" (bolds added)!

| | | |
|---|---|---|
| 1st principle: Keep, at all times, the *digital* way, company's cost below the prevailing freight rate | 2nd principle: always manage the big items of cost, by priority, & then go down the list | 3rd principle "Stretch one's feet so that to be covered by one's quilt" |
| Know that a certain important cost item is capital, *which determines also depreciation* | Onassis showed that the real fast growth of a company is by using other people's money, through banks! | Shipowners became victims of the optimism created by…their new buildings! |
| No one can guarantee that a prosper situation will continue for the entire life (15 - 20 years) of a newly-built vessel | Traditional Greek shipowners as a rule- & for a quite long time- did not order newly-built ships, & those who did, they were called "adventurers". This rule violated by Onassis | Onassis, before the 2nd World War, in 1938, made the assumption that the demand for oil will be continuous & rising, & he built tankers embodying the maximum economies of scale, allowed by shipbuilders & his persistence. He proved to be right, but for a time, till end-1973. Onassis, however, proved right in his above assumption, till Arabs put an end for a cheap- & abundant-oil forever; gas destined to follow |
| Onassis broke the principle of the traditional Greek shipowners, which was to "use past profits to buy a 2nd hand ship, and get no loan". So, the traditional growth of companies was slow, given also the cyclical character of the industry. As he died early in 1975, we do not know what he could do during the tanker crisis… Niarchos, however, being 13 years younger than Onassis, experienced & faced the tanker crisis (Goulielmos, 2021e) the hard way by reducing his crew wages by 20% | When freight rates fall, a GPS will try to charter its ships in time charters, before this happens. E.g., in 1976 for 3 years; in 1981 for 6 years; in 1997 for 3 years; and in 2002 for 2 years! While the time charter rate is lower than the spot one, when market rises, and difficult to obtain a time charter for long periods, it nevertheless protects the company from the very low future spot rates. Moreover, it protects the company from sudden increases in bunkers' cost (bunkers are payable by the Charterer in time charters) | The shipping pattern suggests a specific policy, meaning to put aside part of the good earnings for a rainy day. In PS case-study we could keep $421m, (calculated from the PS earnings above $40m), so that to face-out/fill the lower earnings at other times! |

Capital cost is formed mainly, if not exclusively, at times of prosperity! During this period, capital cost can be easily neglected. Moreover, at times of prosperity, *shipbuilding prices* are at their top level. Many authors reported shipowners to become bankrupt after delivering ships from the shipyards, and the market to turn-down!

When spot earnings improve (1980-1981) (1988-1991) (2004-2006), the companies' expenses increase! This is usual, as companies try to postpone repairs, maintenance, etc. and increases in crew wages, (as far as are allowed by the class and sea labor unions), when spot rates are low. Companies adopt also a relaxed cost policy during prosperity given that the international inflation normally is about 5% p.a. But, the price of oil is something to be excluded from conservative estimations…

Shipping companies must be careful, because when their company needs additional funds, it is not certain that its shareholders will respond. This presupposes clever depreciation-dividend, as well as, investment policies from the side of the shipping company, like the ones suggested in the text.

The history of shipping, when written, it will have to indicate the managerial mistakes of its managers so that the new managers, who follow, to avoid them. A dangerous mistake is the dogma: "economies of scale always pay". The 1963-1973 shipping boom e.g., led to exceptional economies of scale, so that a tanker named "Globtik Tokyo", in 1973, to be 493,664 dwt! "Economies of scale" is a good thing, if there are first cargoes available of a comparable size.

The freight rates, and the shipping earnings, as shown, behave identically. Earnings, however, were *more volatile* than freight rates ($\sigma = 11 > 6.5$ round.)! This means that companies were not synchronized with the market, for various reasons, or companies are slower than the market.

A portion of ships can be in long term employment. In 1977, 125m dwt of tankers, out of 210m, were in period charter (59.5%), while in 1973 this was 20m dwt (spot) to 100m dwt in period (80%) (Stopford, 2009: p. 185). In 2007, the proportions were 50m out of 195m (26% in period chartering). When ships are chartered-especially in time—they are unable to react. They are locked-in, according to Chaos theory.

When a newbuilding is decided, a shipowner must have negotiated in advance a time-charter as long as loan's tenor. If this is not possible, then company's liquidity must be sufficient to support the potential lay-up of the newbuilding, and cover its obligations to the bank for the laying-up time. The perfect situation is of course to finance a newbuilding by 100% own funds. The safest situation (ideal) is to order at rock-bottom prices and to get delivery of the ship when freight rates become top! If none of the above holds, a newbuilding order is best to be postponed.

The profits derived in 2003-2008 rejected the view that shipping industry provides low earnings in its entire history! Also, there is a number of reasons not to believe that big ships provide big revenues, per mare per terra, because are big,

and because their earnings are more *volatile*, if they are more than needed!

*However, for one to become a millionaire from shipping, he/she needs luck, according to Keynes. And according to us to dispute the wrong slogans*: "*the more you risk, the more you are going to get*", *and the* "*risk is maximum 3σ in shipping…*" *Good luck*!

## Policy Recommendations

The 1st is to understand what risk is, and from where it comes from. Risk, as shown, comes from having more ships than needed, in any particular part of the supply! The 2nd is to adopt policies which are valid for the long-term: minimum operating cost, always below the prevailing freight rate, the digital way. The 3rd is to "buy cheap and sell dear", meaning to buy ships at rock bottom prices, larger and newer than those sold. The 4th is to avoid new-buildings unless financed by own funds, having also enough liquidity for a depression. Better prefer 5 years old ships.

The 5th is to create reserves systematically for a rainy day, as cycles exist round the next corner. These funds, from the rare, but very good times, will provide liquidity for the bad times, to buy opportunities—due to volatility—to survive for the next good day etc. For this last recommendation it is a prerequisite to adjust policies accordingly for devoting funds to obtain more ships, to distribute money to shareholders, and to adjust depreciation the proper way.

The 6th is to survive, because the long-lived companies, which survived the 1981-1087, the 2009-2018 crises, and the Pandemic, 2019-2022, caught the billion $ in 2004-2008! To become an Onassis, none of the above, however, is enough except luck, as Lord Keynes argued!

## Conflicts of Interest

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

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