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# Shipping Industry: Wealth Management and Investment Decisions with Portfolio Management in a Sustainable Environment for a Shipowner

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## Abstract

The purpose of this thesis is to point out the importance the ESG factors and the sustainable investments in the stock exchange markets. To achieve that and match the Master requirements and theme of shipping, we chose to bring out the importance of ESG investments for a shipowner that is a high net worth individual or a very high net worth individual that has capital to make an impact. The thesis will follow the importance of sustainable economy and sustainable finance for that reason. We are going to try and show that such an investment can have a social and environmental impact through an impact investment, green or sustainable investments and create a financial return, through diversification of investments and the reduction of risk, that the future can bring. In the proposal, we crafted there was the idea of doing wealth management for a shipowner. But in the process while studying the bibliography for sustainability and the need for sustainable finance, another interest was created, because as part of the sustainable finance, we found the need to also describe and see the role for impact and green investments. The need rose because of the sector we were are investigating, shipping capital. Due to the relationship of shipping and the environment, and because in Greece shipping is a large part of the Greek and the worlds' economy as Greek-owned fleet represents the biggest of the EU-owned fleet, as Greece remains the world's largest shipowning nations and because shipowners are mostly Very High Net Worth Individuals, we found that suggesting sustainable investments for a shipowner either by venture capital, private equity or investing directly in the stock exchange directly to sustainability companies' stocks for example, linking it with the need for reduction of risk using the factor of diversification in investments, we think it shows great potential.

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# Introduction

There are going to be 3 pieces of information, where an explanation should be given, about why we include them and what is their purpose to the bibliography. The first one is risk analysis and the description of a shipowner (2 types of ship owners). This will give us information on how two different kinds of shipowner from an aspect of size of their companies work, in the side of their assets, the side of their liabilities, and the aspect of how after that their risk profile, is created from a banking institution.

The second part is the investing part and the purpose on doing that in sustainable investments, and whether or not there is a point that in sustainable investments or not, within the prospect of a wealth fund for the ship owners we chose to analyse. The need of sustainable investments from now on is a crucial factor that we will try to dive in against the until recently dominant strategy of higher returns or the tracking/beating an index from an investor, and why SRI and ESG following strategies might be better in the long term. Within this section, we analyse also the reasons on why a shipowner would have a reason to invest in a type of wealth fund.

The third thing is the application of technology in some of the investments chosen in order to see the importance of such an app or site, in the horizon of modern or even avant-garde investing, which will happen as foretold in, sustainable investments.

## How a bank does an annual review for shipowners

The shipping industry is following Basel II and Basel III regulations which has taken a step further the obligations for borrowers asking them to have better fundamentals and increased liquidity due to the volatility of the market and in order to have loans that are performing (avoid NPLs[1]).

[1] Non Preforming Loans

The annual review is based on annual reviews of actual shipowners, given by one of the two students in this thesis, that works in a well-known Greek bank, known for giving loans and having an on-going successful relationship with many shipowners. The procedure will involve the annual review of two shipowners, the one being a "big player" in the shipping industry, and the other one being a "normal" shipowner[2], but they are both considered High Net Worth Individuals (HNWI)or Very High Net Worth Individuals (VHNWI) (Capgemini Research Institute, 2021).

First thing that someone can see in our annual reviews is the family background that happens then there is the description of the group or the persons the shipping company is run by and then of course the owner of asset. Then we see exactly the description of the assets (vessels), the newbuildings and the loans for these newbuildings. The next step is to describe the relationship with all the banks, that the shipowner has or had business with and then the relationship with the bank that is doing the annual review, by showing the loans that exist and interest rates etc. After that we see the amortization, a cash flow analysis, a market review which shows what is the focus of the company (which sector liner or charter, if they own bulkers or tankers etc.). Then we have the financial statements and the risk assessments. The last part if we are talking for two shippers or two shipping companies, there are sometimes comparative contrasts.

## Need of a Wealth Fund for a shipowner

So, the main question to be answered before the rest of the analysis, is why would a shipowner, with a small or a big fleet of ships need a wealth fund to cover his or her needs and what are these needs, while there are significant profits that are generated from the operation of their assets and their trade, investments in alternative assets like real estate and the revenues these assets generate (rent, buying and selling which is similar to asset playing of the vessels), and the asset playing which is why most Greek ship owners are known for (buying low and selling high, while they get returns at the pick of the price[3], like now in 2021 with the container and the dry bulk booms). They can also have great asset management in finance by shorting or putting long in the commodities they know making double profits by buying at the beginning of the curve (during covid-19) and buying at the next boom, which creates also a shortage of ships at the same time (when everyone is buying) forcing prices of second hand ships to go up

[2] The "big player" is described as such because of the many ships, the different sizes of ships and the different sectors he operates in, and the second one is described as normal because of the smaller business he operates in the shipping industry.

[3] The pick of the circle of the demand for ships that the circle of prices and freight rates follow.

and selling higher due to the need for these ships and at the same time the shortage of them, controlling the market. They also make profits during this time by taking the biggest rents/charter prices of the market.

The answer has two parts. The first one is pure financial and answers to the name of diversification. Because while they invest in a wealth fund they put their money in different markets, which is a move that minimizes the risk, and when one market might fall down, the other one (or the industry) may stay put or be even higher. The second reason is the need for the money to be invested for a specified need. The retirement of the shipowner (not probable but it is still a reason), the purchase of ships/instead of loans (we are entering an era that most banks are divesting from the shipping industry and have less percentage of loans of shipping companies to their loan portfolios, one of the exceptions might be the Greek banks that continue to finance the shipping industry as it is with an increasing rate). Or, they might need a trust fund in order to generate clean profits, for their future in order to invest in either vessels or alternative investments. So, in general we have as a priority their personal needs that do not have to do with their core business.

# Chapter 1: Social Responsibility Investments (SRI)

In this section, we are going to describe social responsibility investments, the map of sustainability, ESG and thematic investments. Then We are going to differentiate two types of thematic investments, the impact investments and the green investments, as part of the investment plan of the UHNWI.

## History and the need Social Responsibility ESG and Sustainability

One of the first meeting of minds considering the issues of sustainability was the private initiative called the Club of Rome touched upon the issues of sustainability around the increasing growth of population and the food production until 2100 and not able to reach sustainability after that date. (Meadows *et al.*, 1972). As also mentioned shortly in the book of Schoenmaker and Schramade (Schoenmaker and Schramade, 2019) they examined 5 factors for their models: population increase, food production, non-renewable source depletion, industrial output and pollution generation and they were worried that even the technological improvements won't be enough after 2100.

The definition given for sustainability as most important from (Kotrikla, 2017) for sustainable development is that "*s.d. is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" from (Keeble, 1988),

but we have to also take a look at the quote that used the term: *"Sustainable global development requires that those who are more affluent adopt life-styles within the planet's ecological means - in their use of energy, for example. Further, rapidly growing populations can increase the pressure on resources and slow any rise in living standards; thus sustainable development can only be pursued if population size and growth are in harmony with the changing productive potential of the ecosystem",* use in the report of the Brundtland Commission; named after former Norwegian Prime Minister called upon to chair the committee, also called WCED (World Commission on Environment and Development) (Keeble, 1988).

The next evolution stage of environmental concerns was creating the Earth Summit in Rio de Janeiro where United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty to "stabilize Green House Concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" agreeing in the Paris Agreement in 2015 in to an average increase of temperature on the planet of 2 Celsius degrees (UNFCCC, 2015), derived from a necessity as in the literature Greenhouse Gas (GHG) emissions are an externality, that we in the present suffer from past emissions, and the in the future we might have destructive results, also represent the biggest market failure in the world so far (Stern, 2008).

This leads us to the goals of the Sustainable Development Summit of the United Nations on September 2015, where the 17 goals for sustainable development were created[4] (UNITED NATIONS, 2015).

## Sustainable Finance

We need for a start to acknowledge the difference of terms in this sector, like the sustainable finance, climate finance and green finance and that sustainable finance is a tool during the process of sustainable development(Ryszawska, 2016). Sustainable finance was defined as finance supporting sustainable development through three combined as we will argue later, economic, environmental and social, the definition of which came after the Earth Summit in Rio in 1992 by UN.

This chapter on how to do investments is going to be based at some point to opinions of top managers and senior investors and partners of large firms, because the results cannot be seen yet as it is an ongoing process without literature to be found, and the framework is not yet clarified in all sectors with only some steps to have been done. Larry Fink, the CEO and Chairman of Blackrock, says that

[4] The 17 goals can be found here https://sdgs.un.org/goals.

*"Investing in sustainable companies and a sustainable future, will create jobs and will create a sustainable future for the world."*

In order to assess sustainable investments, we have to also understand the ESG- Environmental Social and Governance Factors. A financial perspective of ESG factors is given below:


*Figure 1:CFA Institute ESG Factors (CFA Institute, 2021)*

We can fairly understand that as big houses, governments and rating houses as well as investing companies use these kind of criteria. Fitch depending on the industry has 14 or 15 criteria according to what industry is the company that the evaluation happens (Fitch Solutions inc, 2021), in order for example to augment transparency, and satisfy analysts on how ESG scores affect credit risk.

Another thing we have to understand and we will analyse later is the difference between sustainable investments, green investments, thematic investments, ESG risks, ESG opportunities etc. Because sustainable finance and sustainable investments and after that thematic investments have to do with the ESG opportunities and the ESG risk management but they are not the same, although in this thesis we won't go to the corporate part requirements but the academic need for such types of investments.

## Sustainable Investments Measurement

There is a need to put into a perspective a certain type of investments, that we are going to use in this paper. These are the Social Responsible Investments (SRIs), *"is an important area for the retail financial sector and may incorporate ESG issues as well as criteria more closely linked to a values-based approach"* (Eurosif, 2008) according to Eurosif, which has different for members during the years, different financial institutions etc[5]. They divide sustainable, ESG

[5] In 2008 they had as members AXA Investment Managers, BNP Paribas Asset Management, Credit Agricole Asset Management, Deutsche Asset Management, HSBC, Pictet Asset Management to name a few of their partners.

(including green) and impact investments as different categories in their evaluations, although, this is different for other authors in the literature as they define impact investments and green investments as part of the sustainability investments. The criteria, though in this research to find the best-in-class investment are not purely ESG driven, but a mix of performance about ESG and financial evaluation (Eurosif, 2018). We can see in their research in 2012 (Eurosif, 2012), that they have seven criteria involving also sustainability themed, exclusions, and ESG integration, and Best-in-Class which is a mix of strategies, impact investing, where we will categorize later the green investments.

| Eurosif | PRI-equivalent[11] | EFAMA-equivalent[12] |
|---|---|---|
| Norms-based screens | ESG Exclusions | Norms-based approach |
| Best-in-Class selection | ESG Positive screening and Best-in-Class | Best-in-Class |
| Sustainability themes | ESG-themed Investments | Thematic approach |
| Exclusions | ESG Exclusions | Exclusion approach |
| ESG Integration | ESG Integration | - |
| Engagement and voting | Engagements (three types) | Engagement (voting) |
| Impact investing | - | - |
| - | Passive ESG tilted indices | - |

*Figure 2: Eurosif Criteria(Eurosif, 2012).*

The following figure will show a picture of how the CAGR of different investments, and what categories Eurosif uses.

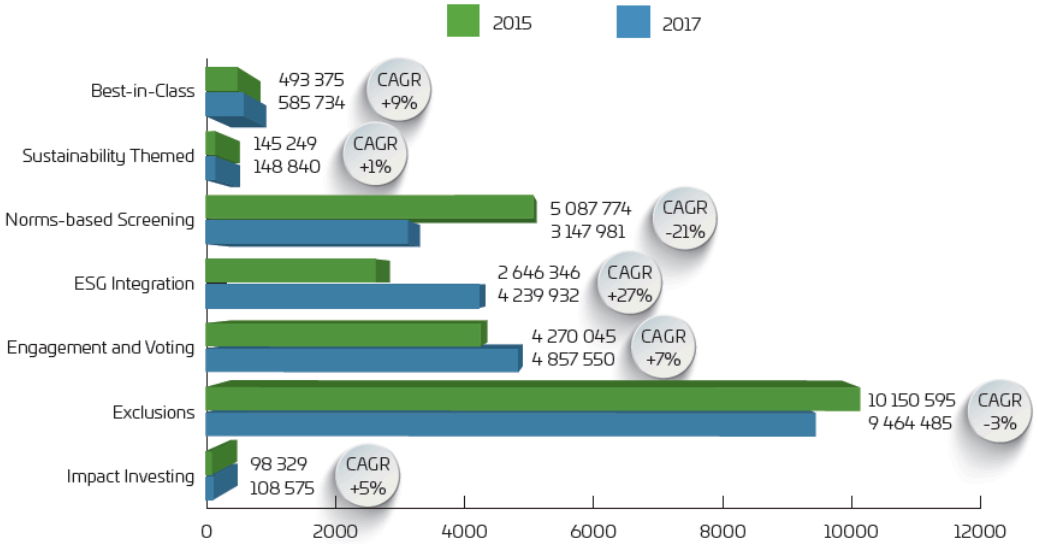


*Figure 3: Overview of SRI strategies in Europe (Eurosif, 2018).*

Figure 2 shows a categorization of investments in, by differentiating Sustainability Themed, ESG integration themed and Impact Investing, or Best in Class than can be partially green.

The old point of view that there is just the need to measure the long-term impact of SRI investments because in investment management we walk the line between two things, to have

the best returns, as the investment managers are getting their salaries and their reputations by having the best returns in the market or their ability to track or beat an index (let's say their performance in numbers) (Chevalier and Ellison, 1999)(Jansson and Biel, 2011). In this questionnaire study by (Jansson and Biel, 2011), to the opinions again of employees in investment institutions, private investors and institutional investors about investing in socially responsible investments, show that at 2011 not all but many investment institutions used to underestimate the importance of SRI investments for their beneficiaries, although for beneficiaries/private and institutional investors were important, and the first ones were concerned mostly about the returns on SRI. This also more of an ethical vs an unethical point of view as shown in (Lewis and Juravle, 2010), rather than a need or point in latest years.

In this thesis, we are going to describe the strong indications mainly of the macro economic factors and the decisions of organizations such as the European Union and the IMO, on how to change the technology or the law the future years, as it happens in all over the world and across all industries. For example, in the maritime industry in order to reduce the climate impact of shipping with the potential role of ammonia as Marine Fuel (Hansson *et al.*, 2020), in the horizon of the 2050 goal of reducing by 50% the greenhouse gas set in 2018 by International Maritime Organization.

Another important example are the 17 sustainability goals given from the United Nations that promote sustainable development. The Investments Leaders Group combined with Cambridge Institute for Sustainability Leadership[6] has combined them for example in an economic attribute in order to create 6 results, that are found when 1 million of US dollars are invested in order to achieve the Sustainable Investment Framework.

We see many financial companies and institutions going also that way with Dow Jones for example present sustainability and ESG friendly indices available to invest[7]. Another one is Euronext that does use and follows the UN sustainable development goals of 2030 Agenda[8] as a partner of the Sustainable Stock Exchange Initiative[9].

[6] https://www.cisl.cam.ac.uk/

[7] 4 groups of ESG indices, the Dow Jones Sustainability Indices(DJSI), the S&P ESG Indices, the S&P Paris aligned & Climate Transition (PACT) indices and the S&P Carbon Efficient Indices. https://www.spglobal.com/spdji/en/indices/esg/dow-jones-sustainability-world-index/#overview

[8] They follow eight Sustainable Development Goals (SDG's): 4-Quality Education, 5-Gender Equality, 9-Energy ,Innovation and Infrastructure, 13-Climate Action, 14-Life Below Water, 16-Peace Justice and Strong Institutions, 17-Partnerships for the Goals.

[9] SSG's: https://sseinitiative.org/how-we-work/

## Sustainable Finance Framework

Sustainability finance has been created as purpose to chase the sustainability for the environmental and the operation in general towards the ESG goals and sustainable development goals UN created. There is one framework that has been created for sustainable finance from (Schoenmaker, 2018). This has 3 versions of sustainable finance. Sustainable finance 1.0, weights the shareholders value and focuses on short term results like the returns of the portfolio for investment managers, while SF 2.0, focuses more on the stakeholders, like the consumers the government, or for example if we have the case of pension fund, the pensioners or the future pensioners. Sustainable finance 3.0 is the most improved version to follow as a company, corporation, or society in general as it is very important to see the system as an integrated social-ecological system perspective (Norström *et al.*, 2014) and that the environmental and social structure is combined with financial course[10]. Sustainable finance 1.0 focuses more on avoiding sin companies with very negative impacts like tobacco companies, gun selling companies etc. while doing at the same time financial value (profit) maximization.

$$maxFV = F(profits, risk) \qquad subject\ to = F'_{profits} > 0, F'_{risk} < 0, SEV \geq SEV^{min} \qquad (1)$$[11]

In Finance 2.0, financial institutions internalise externalities to avoid risk, and they optimize the total or true value of their portfolio, bringing forward in the equation the environmental and the social value.

$$maxTV = F(total\ profits, total\ risk) \qquad subject\ to = F'_{total\ profits} > 0, F'_{total\ risk} < 0,$$

$$SEV^{p}_{t+1} \geq SEV^{p}_{t} \qquad (2)$$

The purpose of companies in Finance 3.0 is to maximize the social and environmental value of the company paying at the same time attention at the financial value, by decreasing risk in investing long term in social environmental horizons, while being subject to a minimum financial value $FV^{min}$.

$$maxSEV = F(impact, risk) \qquad subject\ to = F'_{profits} > 0, F'_{risk} < 0,$$

$$FV_{t+1} \geq FV^{min}_{t+1} \qquad (3)$$

The financial viability or minimum financial value can be presented as follows:

$FV^{min}_{t+1} \geq (1 + r^{fair}) FV^{min}_{t}$, where $r^{fair} \geq 0$ is a fair financial return for one period.

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[10] as for example there is the need to see how the need for something is different in various social scales, because the relevant value and belief systems will be different(Norström *et al.*, 2014)

[11] Where FV = financial value = expected current and discounted future profits, SEV = social and environmental value. $F'_{profits}$ is the partial derivative of F with respect to the first term, and $F'_{risk}$ with respect to the second term. This optimisation can be used by investors in a mean-variance framework to optimise their portfolio and by banks and corporates in a net present value formula to decide on financing new projects.

Due to this financial framework, there are some needs like the need to long-term investments and less short-term pressure like erasing the quarterly. The part of pure SF 3.0 which is the most important target we are trying to show in this thesis is only adopted by a very small percentage of coalitions like the Global Alignment for Banking on Values (GABV), and the Global Impact Investing Network (GIIN) (Schoenmaker, 2018).

## Obstacles of Sustainable Finance

In order to understand sustainable finance and the need for it in our thesis, we need to understand the obstacles of SF, in order to see which ones, we face and which ones we can solve, we can solve with our point In his paper (Schoenmaker, 2018) recognizes three main obstacles: insufficient collective effort, a bias towards the short term and aversion to change, shown more analytically in the table below:

*Table 1: Analytical obstacles by (Schoenmaker, 2018).*

| A. INSUFFICIENT PRIVATE EFFORT | B. SHORT TERMINISM | C. AVERSION TO CHANGE |
|---|---|---|
| 1. Individual companies to internalize externalities | 1. Quarterly financial reporting by companies; | 1. Lobby against change by incumbent companies |
| 2. Divergence between micro and macro efforts | 2. Variable pay systems based on annual results; | 2. Human aversion to change |
| 3. The boundary problem[12] | 3. Monthly or quarterly benchmarks for measuring investor performance | 3. Lack of new frameworks |
| 4. A government/ public sector role to make finance fully sustainable | 4. Long and complicated investment chains | |
| | 5. Marking-to-market of investments | |
| | 6. Supervisory treatment of illiquid investments | |
| | 7. Short political horizon | |

[12] When regulation for one sector is tightened, business will shift to other sectors and countries with fewer or no requirements (Goodhart, 2008).

For a start, there are not enough investments to match the sizes of traditional markets investing, that Schoenmaker offers some solutions. The second thing that all papers suggest is that in order to proceed with this because we are talking about long-term investments is to have 'faith'(Chakrabarti and Sen, 2020), or else a long-term horizon (Schoenmaker, 2018) in these types of investments, so that there are more and more sizeable investments.

## Impact Investments

One solution might be to make impact investments. Sustainability themed investments remain stable, while a more moderate growth than expected in Impact investing. The institution Eurosif is using the Compound Annual Growth Rate as measure for the sectors, or themed investments they categorize. Impact investing being one of them, is now at 108 billion and a positive CAGR at 5%.(Eurosif, 2018), which they separate it from environmental and sustainable investments. Other authors in their papers like (Brandstetter and Lehner, 2014)(Brandstetter and Lehner, 2015)(Barby and Gan, 2014)(Nicklin, 2012), see these two are connected. More precisely there is a map, where impact investing is:

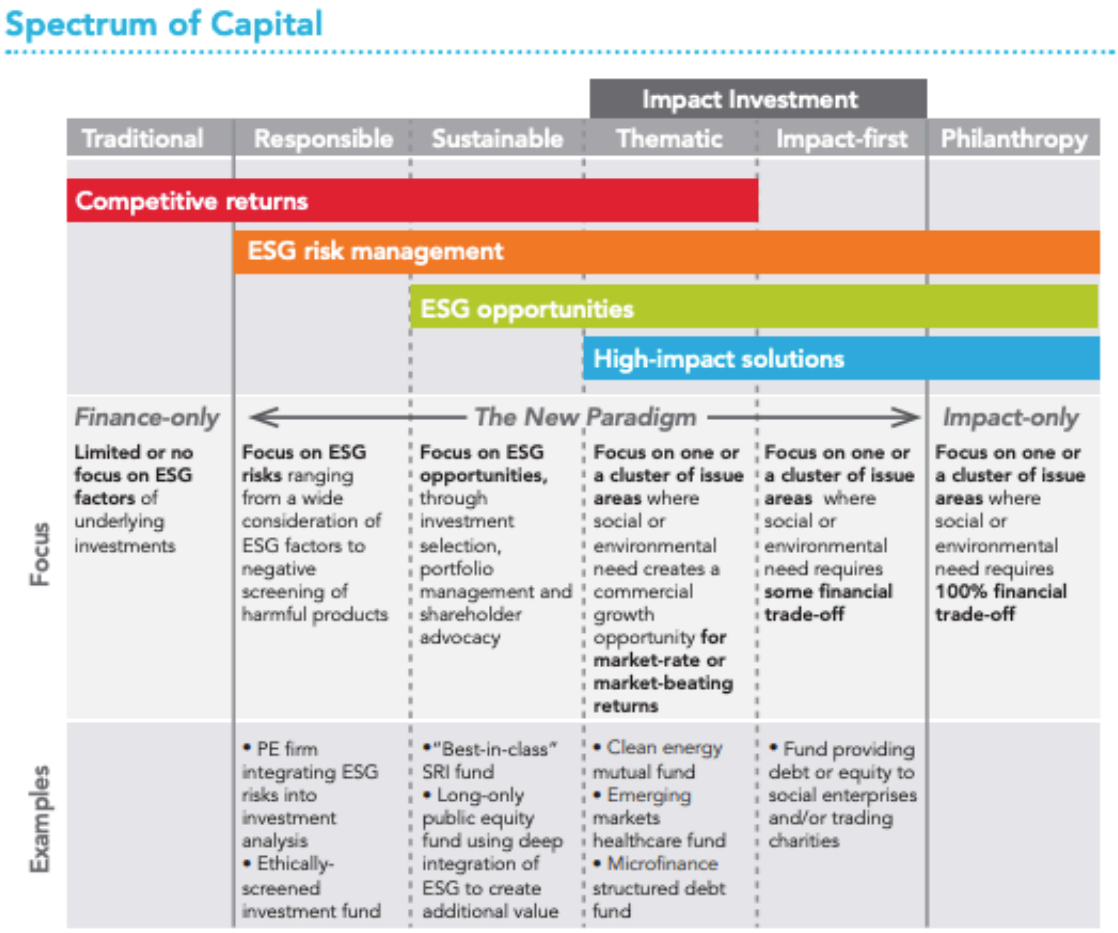


*Figure 4: Map of the spectrum of capital created by Clara Barby in report of (Nicklin, 2012), where we see a simpler variation in (Brandstetter and Lehner, 2015).*

In Figure 4 we see that impact investment is a thematic investment and has as a priority the impact of an investment (impact-first) but with ESG risk assessment and providing also ESG opportunities, like green investments can be described better as responsible sustainable and thematic as we will also see further down.

### The use, the risks and the picture of Impact Investments

We have to understand first the bigger picture about impact investments in order to understand better, can they be an investment of choice especially for UHNWI, which is the point of this thesis.

In the paper of (Brandstetter and Lehner, 2015), there is board and a description of solutions for the risk assessment of this new portfolio analysis for impact investments. A table that shows the horizon for such risks factors in the bibliography in the previous paper, made by the authors mentioned in Figure 5. The authors Brandstetter and Lehner do an overview of these papers of the risk factors by (Barby and Gan, 2014), (Emerson, 2012), (Laing *et al.*, 2012)(Saltuk, 2012), (Hornsby and Blumberg, 2013), (Puttick and Ludlow, 2012) before making modified Black-Litterman model(Black and Litterman, 1992) to include the Social Environmental Impact Investing factors. Some of these risks overlap as different definitions are given to some risks that can be the same. The scope of (Barby and Gan, 2014) is to de-risk the impact investments having identified five different risk factors using two dimensions in returns the societal and the financial returns, summarizing as impact risk.

Both papers (Hornsby and Blumberg, 2013) and (Puttick and Ludlow, 2012) identify in general the risks of impact generation and impact risk while the second one is identifying the impact generation as impact (of the investments) and the impact risk, to measure the size of uncertainty the proposed impact will be created by the investment of the organization. Although (Puttick and Ludlow, 2012) don't focus on environmental but on ESG and impact based on social and humanity focus investments, we see find interesting that they take interest in creating method of five levels on how the procedure of impact of the underlying investment is done, processing data and difficulties and creating a financially viable solution after the use of these stages. We won't be analyzing more this paper as our concern is to analyse the future and the use of impact investments in a sustainability investment process, and this happens more in Mutual Funds types.

Now in (Saltuk, 2012), they add there are three dimensions: impact, risk and return, that can be divided in two components: appreciation and income for return, process and products for impact and ecosystem and investment for risk, that explain that a set of some combinations of

these components give prices to other components, so that in the end it is ensured that there an impact and financial returns from the portfolio, and here we can see that portfolio diversification plays a significant role as it is also mentioned by (Brandstetter and Lehner, 2015). Also in this paper, we can see the importance of the mission drift that show the risk of traditional investors shifting to more profitable investments that have higher yield, that don't match their mandates to achieve higher returns, leaving the purpose of the impact. Also focusing on the mission of the investment there is the moral hazard that shows the case of investors not showing the underperformance, hiding or delaying to recognize losses, due to the difficulty of using loan covenants from traditional lenders (Saltuk, 2012). This can be shown in the results of the model for impact investments by (Brandstetter and Lehner, 2015). They found that in this BL model the financial return is reduced by 18.05% (from 13.51% to 11.70%), the volatility is also reduced by 11.97%, but the increase of the potential social impact is 40.47% (Brandstetter and Lehner, 2015).

All these authors define the early stages of creating a marker in SRI or impact investments especially (Brandstetter and Lehner, 2015), that needs effort and time in order to work like a traditional market and show the same returns.

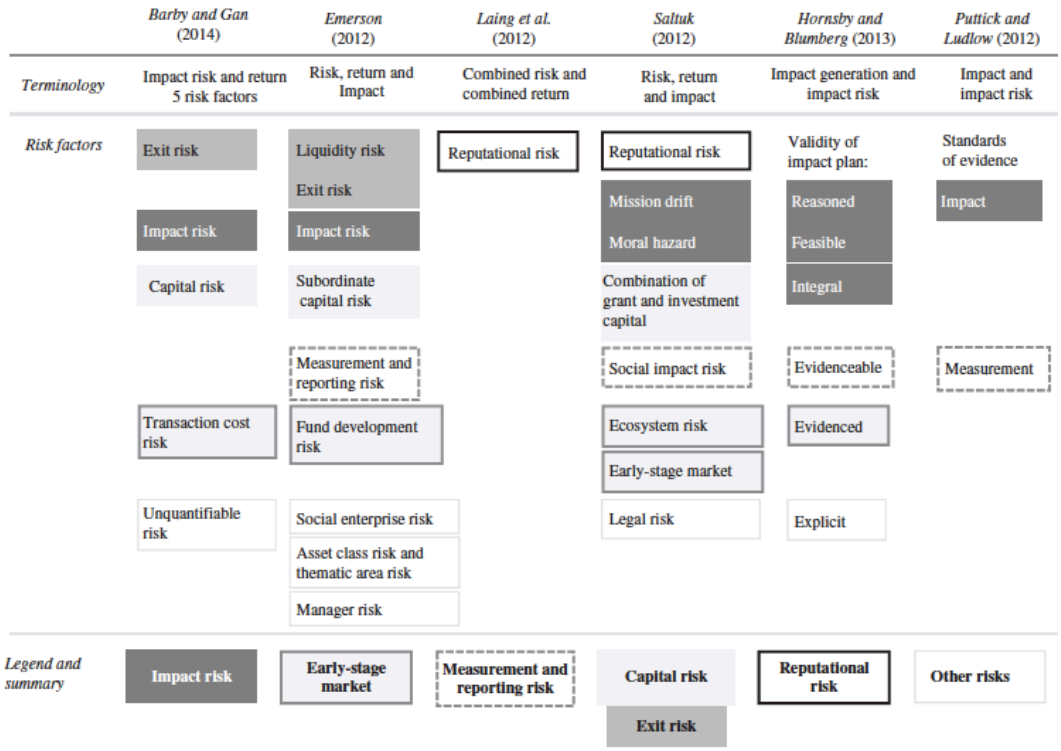


*Figure 5: Risk factors by the authors mentioned in the paper of(Brandstetter and Lehner, 2015).*

## Impact Investments Now

The CAGR of the last six years is very important as a number reaching 52% (Eurosif, 2018)and it shows that from 2016 review it has grown 10%(Eurosif, 2016)

The report of (Eurosif, 2016), shows the importance of the work of the European Commission to the revision of the amendments to the European Venture Capital Funds (EuVECA) and European Social Enterpreneurship Funds (EuSEF). Social impact investing includes governments public finance, philanthropy investing, microfinance and business angels, that has the will to finance these projects, and so far the amounts of investment don't reach the amounts of investments in traditional types of investment, not even green investing so far, but it is increasing.

One solution forward proposed, for this type of investments are the Social Impact Bonds. A SIB has to do with an inclusion of a set of contracts, based on an agreement by government to pay investors for an improvement in a specific social outcome in the case it has been achieved. So, as we see it is indeed based on these predetermined targets that the principal will be reimbursed, differentiating them from classic bonds. Social impact bonds enable government to link payment for the service provided to the community to the results achieved.(Eurosif, 2018)

## Green Investments

After examining the case of impact investment, we now proceed to the case of green investments, in which we are going to concentrate our efforts now for the more practical part of our thesis. A definition of thematic investments is given in (Inderst, Kaminker and Stewart, 2012):

> "*Green investment is another 'thematic' investment, and it is about capitalizing on future trends – identifying (and profiting from) the winners and, just as importantly, avoiding (or underweighting) the losers."*

And of course, we need to present a definition about green investments which is a combination of points of view also in (Inderst, Kaminker and Stewart, 2012), which is described as a part of another bigger segment of investments such as ESG or SRI investments, and the interest of investors about climate change , resource efficiency and green issues in general. These investments are mostly used in equities although it is an up and coming sector and growing

every day. We have for example the initiative of Climate Bonds Standard (Climate Bonds Initiative, 2017), that has been offered as a solution. In 2012

The difference with impact funds is that there is now the environmental performance similar to the impact of impact investments and the financial performance.

## Green investment approaches

Investment managers then implement the strategic decisions in their mandates or funds. The main approaches are: (i) Negative screening, exclusion of undesirable products (e.g. tobacco, palm oil) or sectors (e.g. the arms industry, nuclear industry), (ii) positive screening or selection of assets (e.g. with the help of filters), (iii)investment in "green theme", (iv)engagement, activism, voting (to make companies greener), (v) integration of green / ESG factors in general investment analysis

These approaches should not be seen as mutually exclusive, due to also the fact that investors often use a combination of different green and ESG approaches (Inderst, Kaminker and Stewart, 2012).

## Categories of Green Investments

Green investments are a growing sector in investments but literature divides them into four classes (Voica, Panait and Radulescu, 2015), (i) the financial considerations about them, (ii) the extra-financial considerations, (iii) the reputational issues, (iv) and finally the compliance and fiduciary. These considerations that show the motivations for Green Investing are also depicted in (Inderst, Kaminker and Stewart, 2012):

| *Financial considerations* | *Extra-financial considerations* | *Reputation* | *Compliance and fiduciary duty* |
|---|---|---|---|
| • Standard *return* criteria<br>- expected returns of green companies or assets | • ecological | • reputation of the investor and the investee companies | • domestic law and regulation (e.g. in the form of SRI policy, ESG disclosure)[10] |
| • Standard *risk* criteria<br>- volatility, downside risk, value-at-risk (VaR), default risk, etc. | • scientific | • pressure by politicians, media, NGOs, etc. | • international conventions (e.g. UN Global Compact) |
| • Standard *diversification* criteria<br>- (possibly lower) correlation of green assets with other assets | • ethical, religious | • 'intangible asset', e.g. 'community investing' | • voluntary industry codes and principles (e.g. UN PRI, Carbon Disclosure Project (CDP), Global Reporting Initiative (GRI))[11] |
| • *Long-term risk* consideration<br>- non-standard risk criteria, (e.g. integration of tail-risk or black swan events, reduction of catastrophic risks by reducing long-term carbon emission) | • political, social | • marketing tool | • disclosure regulation |
| • Internalization of (negative and positive) externalities (or 'universal ownership')[12]<br>- via taxes and subsidies<br>- via collective action of investor groups | • other 'norm-based' | | • good governance codes for institutional investors and companies; corporate social responsibility (CSR). |
| | • 'double bottom-line' or 'triple bottom-line' | | • part of fiduciary obligations. |

*Figure 6: Motivation for green Investing shown in (Inderst, Kaminker and Stewart, 2012).*

Many types of investing are growing, like investing in equities with private equity or through investing in the stock exchange actively in companies that there is sustainable or a green

operation of the company, in bonds, in venture capital and private equity directly to companies with an impact either directly or specialized banks, the Green Investment Banks (GIB), that offer multiple and specialized solutions in investing (OECD, 2016). All public and many private institutions and initiatives(Climate Bonds Initiative, 2017) are backing the green bonds like the green bond standard by the EU (Technical Expert Group on sustainable finance, 2019). For example the Climate Bond Standards, that have been created in 2011(Climate Bonds Initiative, 2017), give the answer to the nonexistent until then standards of green bonds, helping the fast pace of growing the green market.

Also, there are instruments like indices, that their main function is not ESG but a part of them is, like FTSE4Good Series and DOW Jones Sustainability Index. There are also more specified indices according to their sector, like energy efficiency, environmental management and others, like FTSE Environmental Market, S&P Eco, Winderhill New Energy Innovation, and even more specialized indices targeting one factor like the S&P Carbon Efficient that, focuses only on carbon emission. Other instruments of green investing are exchange traded funds ETFs, which are connected to indices(Voica, Panait and Radulescu, 2015).

## Investing in green

There are a number of comparative studies that investigate the performance of green funds. Climent and Soriano in their paper make a comparison of the performance of investments in green mutual funds versus the other conventional counterparts in the USA, and (Chang, Nelson and Doug Witte, 2012) and (Yuan, 2017) do the same for China. While the first two studies found the green funds to underperform, Yuan (2017) found the green funds to outperform the non-green. And even though there is not much literature on green stock performance, (Chakrabarti and Sen, 2020), do this in their paper by doing, time series momentum (TSM) trading in green stocks following the (Moskowitz, Ooi and Pedersen, 2012) model. They show though that green investment while associated with important positive externality might lead to formidable underinvestment. Another conclusion they make from their analysis is that after the crisis the society and investors went towards safer investments, and it can be shown that green investments are more stable so they are more attractive. Based on their data a conclusion they make is that among the three types of strategies they chose the US market green indexes have able to outperform the market. The time momentum strategies that provide profit are less than half both regionally and globally, but still higher number of such strategies for the two diversified portfolios used, for a longer period especially. The portfolios they used, did better in outperforming the buy only strategies than the regional indexes did. Which shows unstable

character for green investments. In general, they showed that there is potential in green investment strategies but there still way to exclude speculators, limit environmental damages and increase returns.

## Investing in Green Technology

As we foretold we are going to focus in the stock exchange tools and especially the green based indices.

| *Provider* | *Index* | *Partner* | *Green Definition* | *Number of stocks* | *Market capitalization (US$)* | *3 largest holdings* |
|---|---|---|---|---|---|---|
| *Dow Jones* | DJ Sustainability World | SAM | top 10% in each sector, of the largest 2,500 companies in the base index based on long-term economic, environmental and social criteria | 342 | 9800bn | IBM, GE, Nestle |
| *FTSE* | FTSE4Good | Eiris | including environmental and climate change factors | 730 (global) | 12900bn | Apple, Microsoft, Nestle |
| | Environmental Opportunities | Impax | environmental business activities, incl. renewable & alternative energy, energy efficiency, water technology, waste & pollution control | 475 | 1593bn | |
| | Environmental Technology | Impax | green technology, renewable & alternative energy, energy efficiency, water technology and waste & pollution control | 50 | 100bn | Novozymes, Stericycle, Pall Corp |
| | CDP Carbon Strategy 350 (UK) | CDP, ENDS Carbon | track base index but reduce exposure to carbon risk | <350 | Similar to FTSE 350 | BP, National Grid, Anglo American |
| MSCI | MSCI World ESG Index | MSCI / RiskMetrics | best-of-class approach relative to sector peers | 790 | 11700bn | IBM, Procter & Gamble, J & J |
| | MSCI Global Environmental | KLD | companies derive over 50% of their revenues from products and services in of five environmental themes: alternative energy, clean technology, sustainable water, green building, and pollution prevention. | 167 | 413bn | ABB, Emerson Electric, Schneider Electric |
| | MSCI Global Climate | KLD | 100 leaders in mitigating the causes or the impact of climate change (Renewable Energy, Future Fuels, and Clean Technology & Efficiency); equally weighted | 100 | 2.4bn | Int. Power, Clean Energy Fuels, Owens Corning |
| *S&P* | Global Eco | | clean energy, water, environmental services/waste management | 40 | 178bn | Waste Management, Danaher, Geberit |
| | Clean Energy | | clean energy producers; clean energy technology & equipment providers | 30 | 60bn | |
| | S&P U.S. Carbon Efficient | Trucost | track base index whilst reducing exposure to carbon emissions by up to 50% | <375 | Similar to S&P 500 | Apple, Chevron, Procter&Gamble |
| | S&P IFCI Carbon Efficient | Trucost | track base index whilst considerably reducing exposure to carbon emissions | >500 | Similar to S&P/IFCI LargeMidCap | Samsung, Itau Unibanco, Vale |
| *BNEF* | Wilderhill New Energy Global Innovation | WilderHill | innovative technologies and services focus on the generation and use of cleaner energy, conservation, efficiency and the advancement of renewable energy in general | 97 | 187bn | Contact Energy, Verbund, Ormat |
| *HSBC* | HSBC Global Climate Change Benchmark | | generate revenues, on a supply chain basis, from the provision of goods, products and services directly linked to the industrial shift towards a low carbon economy | 342 | 682bn | Siemens, ABB, Honeywell |
| | HSBC Investable Climate Change | | climate change related revenue is more than 50 per cent of the total revenue of the company | 50 | 147bn | Waste Management, Fortum, EDF |
| *Markit* | Markit Carbon Disclosure Leadership | CDP | tracks the performance of companies according to the CDP annual scores | 569 (global) | Similar to FTSE All World | Exxon Mobil, Microsoft, J&J |
| *NASDAQ* | NASDAQ OMX Green Economy Index | SustainableBusiness.com | 13 'green economy' sectors (US) | 417 | 1271bn | Cisco, EMC. ABB |

As said already in the introduction (Eurosif, 2012), (Eurosif, 2018) the selection of indices can proceed by screening, best-of-class or re-weighting of stocks, and some providers select them in a qualitative or in quantitative basis for example the percentage of the environmentally-related revenues 20%, 50% or 100% (Inderst, Kaminker and Stewart, 2012).

## Trends and necessity to ESG

The most important reasons to invest in impact investments are social impact, risk diversification, the reasons that they like to invest in new investment categories, the financial return they are going to get according to a comparative study for high net worth individuals in France and the Netherlands totaling a 93% for France and 95% for the Netherlands investors where they asked 961 high net worth individuals (Smeets, 2017). Although in this study investors were HNWI and only 2% were UHNWI (Ultra High Net Worth Individuals).

This indicates that there is greater impact when investing collectively or high net worth funds invest large amounts of money to Impact Investments and ESG Investments. In order to have a sustainable future there according to economic theories there must be investment with respect

to allocation, distribution and scale (Daly, 1992)[13]. A limit to total pollution is set by previous papers of the UN and the EU and all the regulating mechanisms. The argument of Richard Norgaard and Richard Howard in the book of (Costanza, 1991) is that "*excessive scale erodes carrying capacity and inflicts a cost on future generations. Since future generations are different people this is a matter of distribution not allocation. A sustainable scale is nothing other than an intergenerational distribution of the resource base that is fair to the future"* stated in (Daly, 1992) for which he agreed with this statement, so that the conclusion is that this generation has to have the distribution already to get the discount rate to determine the intergenerational distribution – which is mistakenly called an intergenerational allocational. In this chapter by is the need of sacrifices from data that were not sufficient or necessities that did not exist and that we know now from the results of the Paris agreement (UNFCCC, 2015), that have made political intervention a need, will affect future generations(Costanza, 1991). Although the refer to different distributions and different equities (Costanza, 1991), but later (Stern, 2008) finds that the dire need for financial institutions and companies to use a private discount factor should be very small or zero because the government should value current and future generations equally. This again suggests that a solution like wealth management or investment directly to sustainable, and especially green or impact investments, that have a defined result in sustainability is a proposed solution. We see that the largest the investment amount invested and the biggest the market power and the effect of the investment, where even some of the largest asset owners cannot make impact without the banks backing (Bose, Dong and Simpson, 2019) on impact investments.

## Intuitions on why shipowners need to move to SRI and ESG oriented investments

Antonio Guterrez the General Secretary of the UN stated:

> *"Let's be honest. While [UN] member states have made some initial steps through the International Civil Aviation Organization and the International Maritime Organization to address emissions from shipping and aviation, current commitments are not aligned with the*

[13] Allocation refers to the relative division of the resource flow among alternative product uses, the portion that goes to cars shoes, plows, teapots etc. Distribution shows how much goes to you, to me, to others, to future generations. Scale refers to the physical volume of the throughput, the flow of matter-energy from the environment as low entropy raw material, and back to the environment as high-entropy wastes (Daly, 1992).

*1.5C goal of the Paris agreement. In fact, they are more consistent with warming way above 3C"*

and he also called for zero-emission ships to be made commercially available by 2030, and to become the default choice for all companies in order to achieve zero emissions in the shipping sector by 2050. Airlines must start using sustainable aviation fuels now, he said, to cut carbon emissions per passenger by 65% by 2050. So, public /government initiative has come to life by now enforcing and not suggesting any more new types of strategies, making the others maybe riskier and maybe not viable in the future.

## Diversification

The point of using alternative, impact and portfolio investments on sustainable investments due to different thematic sectors. Green investments, are considered for investments diversification from the authors (Miralles-Quirós and Miralles-Quirós, 2019), and show that it is possible to have profits from diversification, as the most strategies processes in their paper outperform the naïve rule, and the Alternative Energy ETFs outperform the Energy ETFs[14], although the results present some biases such as that alternative energy ETFs are a worldwide diverse portfolio and the energy ETFs are companies of the us market and that might affect the results, and a second thing is that the alternative energies are heavily subsidized and this might affect the results when they will not be as much or at all in the future (Miralles-Quirós and Miralles-Quirós, 2019).

[14] The Alternative Energy ETFs are the PowerShares Cleanthech Portfolio (PZD), the PowerShares Wilderhill Clean Energy Portfolio (PBW), the First Trust Global Wind Energy ETF (FAN), the First Trust Nasdaq Clean Edge Green Energy Index Fund (QCLN) and the VanEck Vectors Global Alternative Energy ETF (GEX). The Energy ETFs, are the Energy Select Sector SPRD (XLE), the Vanguard Energy ETF (VDE), the IShares Global Energy ETF (IXC), the iShares US Energy ETF (IYE) and the VanEck Vectors Oil services ETF (OIH).

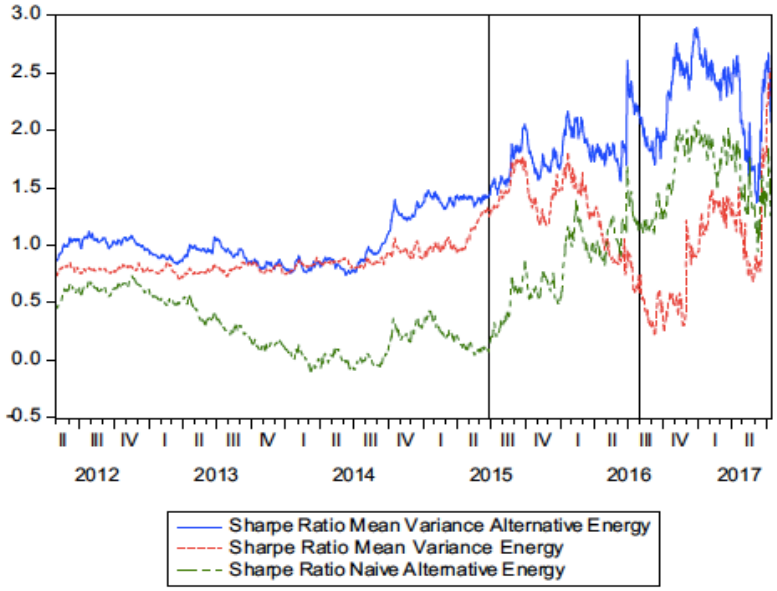


*Figure 7: Evolution of the Sharpe ratios (short-sellings allowed). This figure displays the annualized Sharpe ratios estimated for different samples over the out-of-sample period for the naïve rule and the Mean-Variance (Naive) strategy based on the use of return and volatility forecasts obtained from a VAR-ADCC-GARCH model.*

## Tactical Asset Allocation

Tactical asset allocation can happen is about using different assets classes, where one asset of choice can be the ETFs instead of stocks (Chong and Phillips, 2014). We understand that a shipowner form our case studies of the two shipowners with non-listed companies, where we see a small portion of these UHNWI invested in shipping, and the majority of their fortune to be invested in other assets classes. We can also assume also from (Chong and Phillips, 2014), that using tactical asset allocation in the assets can benefit the assets owners with the diversification, where they rebalance their assets twice yearly instead of quarterly.

Another important issue with the asset allocation is in order to beat the exposure against inflation and hedge it, if someone has long duration liabilities in the future (like a family for their kids) , it is important to have significant allocation to long duration assets (it is not a stand alone portfolio if there are future liabilities), (Chong and Phillips, 2014),where they talk in general, about the optimal allocation by using qualitative and quantitative methods.

## Other Financial Reasons

Investing in green investments like institutions, pension funds etc. could lead to inflation protected returns, for our shipowner (*Institutional Investors and Green Infrastructure Investments: Selected Case Studies*, 2013), and the same report show that insurance companies, that work in a similar way as wealth management companies with Metlife investing in, invests in solar PV power generation in the United States.

The creation of a market will increase the returns. By having larger amount invested in another type of investments, and change the direction from traditional only investing strategies as a start, can only increase the returns, due to technological achievements, less cost, and the combination of the above or more because of the economies of scale. Addition indication of profits from changes in investments, we can also see in this report by OECD (*Institutional Investors and Green Infrastructure Investments: Selected Case Studies*, 2013), that governments can issue financing vehicles like green bonds or support the development of markets for instruments or funds with appropriate risk-return profiles for institutional investors. They can also provide first loss cover, cornerstone stakes, risk mitigation and credit enhancement tools where appropriate. This helps two sectors the creation of the tool, and the enlargement of the market that we need to match the returns of traditional investments.

Also as we see in cryptocurrencies now investing first or of the first in a new typre of investment some times can bring bigger returns.

We have already proposed a number of types of investments, in indices and ETfs in green investments like green equities, green bonds and green funds as well as impact investments and we proposed ways to push forward the impact investments. In this section, we propose some other investments like ETFs.

## Long run Horizon Investments

### Index Funds and ETFs

Investment in ETFs and indices are perfect for the long-run because in order to create value for your investments, time is essential.

Another important factor that might affect trading and might be good for this kind of trading is spurious herding (Sharma and Bikhchandani, 2000).,although herding might cause volatility, and that might avoid results that herding f.ex. rational herding might[15] be caused by imperfect information, concern for reputation and compensation structures. Herding could potentially work for green investments, but creates volatility and is based on non-existant information or asymmetric information about the investments, that can lead to inefficient investments. Herding exists in green investments translated in U.S. energy equities for example, as U.S. energy equities responds to green volatility shocks but not to green return shocks where they compared them with oil investments where herding responds only to oil returns, so strategies in order to invest in older technologies like oil only needs information for returns, whereas

[15] Herding in the stock market clearly leads to correlated trading, but the reverse need not to be true

green that are newer investment opportunities require a better information set (Dragomirescu-Gaina, Galariotis and Philippas, 2021). This however does not include ETF investments, because each sector ETF represents multiple firms in the sector, so investors can gather and aggregate information about the sector from all the firms that consist the ETF, so that investors can decide with precise information, and that leads to a lack of presence of herding in ETF trading (Gleason, Mathur and Peterson, 2004). Lack of herding among ETFs is found also in (Rompotis, 2018), where he studied a more recent period from 2012 to 2016.

## The case studies of the shipowners

From experience, we from working in shipping, proposed to elaborate and create some data based on loans annual reviews in order to create a realistic amount of assets and asset allocation for the shipowners. There was also created an idea of using two shipowners instead of one. One bigger shipowner with different kind of business inside shipping (owning, percentages in ventures and third party management) and the second the smaller only owning and operating vessels. We will use some original ideas in order to make a case for every each one of the two shipowners.

Limits and lines are loans the shipowners have, that we will provide some information in order to be realistic to the story we provide and show that we understand the banking information of a loan and the shipping finance industry, but they will not be accounted in quantitative way, because they don't exactly serve the purpose of this thesis. Other information an annual review might provide are risk assessments of the shipowner, income statements, the relationship they have with the bank and other banks, and market review in the sector they operate and generally all the information about the shipowners and the shipowners' financials.

### AM PAPANTONAKIS GROUP

#### Family Background

GROUP FLEET Group business has traditionally been operated on a conservative basis, concentrating on small-to-medium sized bulk carriers, most of which were acquired second-hand. Between 2007 and 2009, the principals sold 24 vessels (leading to fleet reduction from 35 to just 11 units in 2009) and, in recent years, they launched a fleet renewal program. The age profile of the Papantonakis-controlled tonnage has also improved significantly since 2012, with 5 newbuilding supramaxes joining the fleet in 2012. In 2015, the principals took delivery of 10 second-hand bulkers (mainly comprising supramax/handymax units), deemed as jointly owned by the Papantonakis family, their private equity partners and other third parties.

The Group currently: owns 12 supramax bulk carriers, with total capacity of circa DWT 679,4 K, average age of 9 years old, built in Japan and China and total estimated valuations of circa USD 160M, participates (with JV=JOIN VENTURE agreements) in 14 bulk carriers plus 1 on order, mainly supramaxes and one panamax, with total capacity of circa DWT 896 K, average age of 7 years old, built in Japan and China and total estimated valuations of USD 265 M and a Total in estimated valuations at 300M of owned fleet. They also provide third party management services for 14 b/cs, mainly supramax and one panamax, plus 8 containers, with overall total capacity of DWT 990 K, average age of 14 years old, built in Japan and China and aggregated total estimated valuations of USD 189,4 M. The owners of the tonnage are mainly Greek industrial families that are investing in shipping for risk diversification and entrust the professionalism and transparency of Papantonakis group for running their assets. Newbuildings: The Group had placed 3 newbuilding orders with Nacks shipyard, China for 3 ultramax (DWT 61 K) b/cs at a price of USD 25,7 M each. The first (namely “LYTO KPN") hit the water in May 2018, whereas the second one is expected to be delivered within 2022. In both vessels, AM Papantonakis Group participates through JV agreements.

## DAVV Relationship

The purpose of this memo is to perform the annual review of Bank’s limits to AM Papantonakis Group, currently totaling circa USD 21,000M and consisting of: Line A1: a shipping term loan to GYALOS MARITIME SA with o/s balance of USD 5,5M (41%) secured by the supramax b/c “ANGELOS N” (built in 2009, in IHI, Japan, DWT 56.000, LDT 8.500) valued at USD 13,5M. Line B1: a shipping term loan to TARASO TRANSPORT INC with o/s balance of USD 3,9M (49%) secured by the supramax b/c “TARASO” (built in 2006, in Chengxi, China, DWT 52.400, LDT 10.800) valued at USD 8.1M. Line C1: a shipping term loan to BOW SHIPPING INC, with o/s balance of USD 6M (42%) secured by the supramax b/c “ANDROMEDA” (built in 2012, in IHI, Japan DWT 55.830, LDT 10.900) valued at USD 14,5M.

Lines A1 and C1 are booked in DAVV Greece, while line B1 in DAVV Cyprus with DAVV Greece acting as the Agent. AM Papantonakis Group deposits with DAVV stand currently at USD 3M (out of which c. USD 2.5M with DAVV Greece and c. USD 0,5M with DAVV Cyprus). Information that we take from shareholding All DAVV mortgaged vessels are ultimately owned by majority (of at least 51%) by Papantonakis' families interests as provided for in all loan agreements. More specifically, m/vs "TARASO" and “ANGELOS N” are 100% owned by Papantonakis' families, while m/v "ANDROMEDA" is c.58% owned by

Papantonakis' families, with remaining shareholding being held by group's management, friends, and family (with no one having more than 7%). Controlling votes are 100% owned by Papantonakis' families.

## FRAGKAKIS GROUP

The annual review of 2 existing loan facilities with Fragkakis Group are also conducted, with total outstanding balances of USD 11.521M, secured over 2 b/cs of aggregate values USD 24.3 M namely: -b/c ELPIDA (2011 built, Tadotsu Tsuneishi Shipyard-Japan, DWT 81,100, LDT 11.521) valued USD 16M and -b/c ANEMOS, (2004 built, Oshima Japan, DWT 51.469, LDT 8.521), valued at USD 8.3M. Both loans are serviced promptly, and all loan covenants are in compliance.

### Group Background

Fragkakis family, originate from the island of Amorgos and is considered one of the oldest and most traditional families of the Greek shipping community. Group records show that in the early 1850s the Fragkakis family were master mariners and owners of sailing vessels plying their trade in the Mediterranean, with other 3 notable shareholders are Dimitris Fragkakis. Diamantis Fragkakis and Stelios Fragkakis. The 5, 6 and 7" generation of the family is presently involved in the business and many of them hold prestigious institutional positions in various industry bodies such as Classification Societies, the Baltic Exchange, the Institute of Chartered Shipbrokers, Union of Greek Shipowners, P&I clubs, and the Greek Shipping Cooperation Committee in London.

### Fleet

Currently Group's fleet consists of 4 Bulk carriers with an average age of 14 years and a total market value of USD 51M. B/cs AMAZONA (2003 built, 74.000 dwt) and ANEMOS (2005 built, 51.469 dwt) of total value of USD 21.5M (AMAZONA=11.2M, ANEMOS=10.3M), and b/cELPIDA =16.5M, b/c HOPE =13M

Fragkakis family are operators and asset players at the same time. They buy their vessels or build them under their surveillance and usually operate them for their full trading life, although the last years they did asset trading, which we will show in our calculations later. Thus, principals believe that the extra cost of Greek crew is an investment on their fleet, as it safeguards the operations and ensures top-quality maintenance. The Group is monitoring the dry market and observes a momentum thus believes that the timing is right for few new purchases in order to renew and grow the fleet.

## Banking Relationships

Limit B1where borrower AVIOR MARINE CO- b/c ELPIDA. Following to the great shipping slump of 2016, Group started to monitor the market early in 2017 for a new purchase that would renew and enhance the fleet at a reasonable price. Group requested a hunting license from DAVV which would be provided to them with flexibility to proceed to a swift investment. Group identified the perfect candidate on the Kamsarmax b/c ELPIDA (built 2011, Japan, DWT 81,100, LDT 11.521), which they acquired for USD 20 M. The is also the Limit C1: Borrower BASIN MARITIME SA-b/c ANEMOS (2004 built, DWT 51.469, LDT 8.521), then valued at USD 12M.

## Financials

The Group produces in-house accounts prepared by their accounting department. Group has provided us the combined results for the 4 shipowning companies or year 2018, from which highlights are presented. Balance sheet: Assets' Values amount to USD 59.600.453M (book values), total assets stand at USD 66.180.200M (including vessels' capitalized items), The increment in the equity and the liabilities (long & short-term borrowing) gone down to the purchase of the ship “ONEIRO” at the amount of USD 10.7M.

## Net Worth

The Fragkakis family living in their 7th generation have always been conservative operators, allowing them to gradually build up a significant net worth. Such has been increased substantially by the contribution of the booming period as mentioned above. The principals' net worth understandably also includes other assets of important value (real estate, financial assets, etc.). A rough estimation about the 3 brothers aggregate net worth exceeds USD 520M.

## Compare - Contrast

In conclusion, both shipping groups (Papantonakis’ & Fragkakis’) play an important role not only in the Greek shipping industry and economy, but internationally, as their activities extend to the whole world, a fact that is verified by their strong corporate and operating presence abroad. Regarding of the present report, both groups are aiming to taking a loan to boost their activities, each with a different dynamic.

Papantonakis Group has four times the fleet of Fragkakis Group while at the same time participates in the management of additional ships as a third party, therefore manages more inputs than Fragkakis Group. Consequently, Papantonakis Group exerts more confidence in banks to repay an impending loan, without neglecting the possibility of not being able to meet its obligations and risking the integrity of a large organization, making it clear that

Papantonakis Group is taking a greater risk. As for Fragkakis Group, by purchasing the requested loan it will be given the opportunity to further strengthen its fleet and take advantage of its prospects. Finally, it seems that DAVV is willing to cooperate with both companies, due to their dynamic percentages in the global market. Therefore, granting loans to both Groups is recommended.

## Papantonakis Family Investment Yields

The earnings that these shipoewers own are mainly supramax and ultramax and some kamsarmax and Panamax. So, we take the earnings for every type of ships and we made an average out of that so that we can use later.

| Earnings | Average Kamsarmax c. 2015-built (Eco) Earnings | Average Panamax c. 2010-built Scrubber-Fitted Earnings | Average Supramax c. 2010-built Scrubber-Fitted Earnings | Average Ultramax c. 2015-built (Eco) Earnings | Average Earnnings Per Day |
|---|---|---|---|---|---|
| Total Average | 11767,8697 | 11929,54205 | 10685,69181 | 11061,21852 | 11361,08052 |

We took from SIN network Clarksons the data for the average earnings of 4 categories matching and close to the size of the ships the shipowners we examine have. The vessels our shipowners have are Panamax, Kamsarmax and Supramax, so we took also the Ultramax and because the shipowners are on phase of renewing their fleet and because of the great demand for bulk carriers in 2021, so we took these categories and we made the average for the earnings out of these categories. The ships also for both shipowners are of an average of 14 years

## Papantonakis Family Investment Yields

Here we assume because the average age of ship is at around 12-13 years we take a weighted average of the days we as operating days to 344. The operating expenses are again weighted for 12-18 years to a 30% and for the 0-11 years old ships a 70%. And so, the total operating expense are operating expenses per day multiplied by the days we operate.

So we try to analyse the yield between a sustainability index and the shipping operation of ships of the two shipowners.

We assume some yields for the deposits. For example, a yield of deposits which is at 0,01-0,02 for greek banks, other banks give negative returns. A yield for Real Estate from the moment it is bought, until the moment it is sold we assume a yield 6%[16]. A bond might be from 2-5% and a stock might be from 5-35% with a greater risk.

The Papantonakis family is going to invest the following amounts to different sectors of the economy

| **Asset Allocation of Papntonakis** | |
|---|---|
| **Real Estate Greece** | 50.000.000 |
| **Buildings and Logistics abroad** | 50.000.000 |
| **Shares and Bonds** | 100.000.000 |
| **Deposits** | 450.000.000 |
| **Shipping** | 300.000.000 |
| **ETF's or Indices** | |
| **Total Net Worth** | 950.000.000 |

We decide to invest a 5% of his deposits, and a 5% of his already invested amount of money in bonds and shares in ETFs or indices. That equals to $22.500.000,00 and $5.000.000,00, a total amount of $27.500.000,00. We do not tempt to change the percentages on real estate, logistics and shipping, as these are different types of investments and they might provide huge returns after some due diligence they have done, or provide returns for other parts of their fortune and be correlated investments, like logistics with shipping, or real estate with logistics.

## Fragkakis Family Investment Yields

Original assumptions are here, that we assume because the average age of ship is at around 12-13 years we take a weighted average of the days we as operating days to 344. The operating expenses are again weighted for 12-18 years to a 30% and for the 0-11 years old ships a 70%. And so, the total operating expense are operating expenses per day multiplied by the days we operate.

[16] This can be 6 months or 5 years , because the property might need renovation, might be not in a competitive position, might need CapEx to be used in order to take a better shape , for it to be sold.

So, we try to analyse the yield between a sustainability index and the shipping operation of ships of the two shipowners.

We assume some yields for the deposits. For example, a yield of deposits which is at 0,1% for greek banks, other banks give negative returns. A yield for Real Estate from the moment it is bought, until the moment it is sold we assume a yield 6%[17]. A bond might be from 2-5% and a stock price variation might be for example from 5-35% in absolute terms with a greater risk. The Papantonakis family is going to invest the following amounts to different sectors of the economy:

| Asset Allocation of Fragkakis | |
|---|---|
| Real Estate Greece | $90.000.000,00 |
| Buildings and Logistics abroad | $20.000.000,00 |
| Shares and Bonds | $80.000.000,00 |
| Deposits | $250.000.000,00 |
| Shipping | $66.180.000,00 |
| ETF's or Indices | |
| Total Net Worth | $506.180.000,00 |

Let's say he decides to invest a 5% of his deposits, and a 5% of his already invested amount of money in bonds and shares in ETFs or indices., that equal to $12.500.000,00 and $4.000.000,00, a total amount of $16.500.000,00. We do not tempt to change the percentages on real estate, logistics and shipping, as these are different types of investments and they might provide huge returns after some due diligence they have done, or provide returns for other parts of their fortune and be correlated investments, like logistics with shipping, or real estate with logistics.

## Assumptions made for the ships.

The earnings we made in the panel were observed that they were too hig observing the prices of larger shipowners with many ships in their fleet. So, we tried to adjust the earnings to a more reasonable price.

- Although the average days we calculated would 344. The days a smaller vessel that is going to be closed are much less than the official days. The smaller vessels are more difficult in finding cargoes, or changing ports without being chartered. The average

[17] This can be 6 months or 5 years , because the property might need renovation, might be not in a competitive position, might need CapEx to be used in order to take a better shape , for it to be sold.

days we assume would be 3-4 days without finding cargo. This will happen to the 1/3 or ¼ of the trips.

- The trips per year of smaller ships would be 8-12, so the average trips we are going to use are 10 trips per year.
- The average days of going from one port to another without being chartered would be 10 days for example leaving Europe to go to Canada to be loaded with cargo, but this we assume that it is going to happen in the 10% of the trips, so for this assumptions, it is going to be for two trips so it is going to be for 10 days a year.
- 3-4 days per trip so let's assume 4 days for 1/3 of the trips, it is going to be for 3 trips, so 12 days less of operating. So, in the end we are going to use: 344-10-12= 322 days of usage of ships.

### Assumptions made for the earnings

We adjusted the earnings we took from SIN database of Clarksons[18] for the year 2010-2019. Because the ships are used for similar purposes (Panamax, Kamsarmax, Supramax), and similar loads, we use the same prices almost with some small adjustments. We use the same prices for Kamsarmax and Panamax (the price of Kamsarmax 2015 eco multiplied by 100%, because they are newer 5 years, but the charter are almost identical. We multiply by 90% the prices of Supramax, reducing 5% for the size and 5% for the age of the ships that are 5 years older. The earnings for the chartering of the ships are counted as 100% of the earnings for the owned ships, 50% for the joint ventures of ships, and 10% for third party management of ships for Papantonakis, while we have only 100% of earnings for the owned ships of Fragkakis.

### Assumptions made for total earnings

The assumptions made for the returns according to (Kavussanos and Visvikis, 2016) are total returns equal to total earnings from vessels, that include the earnings from sales of ships that are being purchased , and the earnings that are created from the vessels. We could use a first assumption are going to use the earnings from the ships, that we got from Clarksons and we are going to assume earnings from sales of ships of 20%, for the 25% of the fleet.

- Average years they hold the ship are 20-25 years before scrapping if they hold the vessels, so 22,5 years on average.
- We assume they sell at 15 years of age at 20% profit calculated as price above the market value that we assume it is equal for second hand and newbuilt in the good periods of shipping, divided by 7,5 years, it's 2,67% return, per year.

[18] https://sin.clarksons.net/

- So, we assume that the total returns are the earnings of each shipowner plus a 2,67% return on the capital invested on ships, for the 20% of the fleet.
- We also remove the earnings from third party services, because they don't invest capital, for earnings and we add them in adjusted earnings.

But here we will be talking about some essentially riskless returns, or at least with a lower risk returns, which might be the ETFs and/or index funds that are trackers of indices that provide returns without backfire on average from the years they started to operate. We proposed some of them already and we are looking now at the return of Sustainability World Index of Dow Jones.

| Effective date | Dow Jones Sustainability World Index | Year Annual Average | Returns | Earnings |
|---|---|---|---|---|
| 30/6/11 | 1102,79 | | | |
| 31/12/11 | 944,15 | 966,7316216 | | -158,64 |
| 31/12/12 | 1060,31 | 995,5950546 | 3% | 116,16 |
| 31/12/13 | 1265,52 | 1149,119516 | 15% | 205,21 |
| 31/12/14 | 1252,25 | 1286,758774 | 12% | -13,27 |
| 31/12/15 | 1168,8 | 1233,547893 | -4% | -83,45 |
| 30/12/16 | 1223,49 | 1154,952031 | -6% | 54,69 |
| 29/12/17 | 1519,31 | 1383,706231 | 20% | 295,82 |
| 31/12/18 | 1354,54 | 1494,266015 | 8% | -164,77 |
| 31/12/19 | 1681,58 | 1522,615287 | 2% | 327,04 |
| 31/12/20 | 1894,41 | 1647,306973 | 8% | 212,83 |
| 29/7/21 | 2139,32 | 2023,9798 | 23% | 244,91 |
| Total Average | | | **8,1%** | |

As we see we are talking about an average of 8%, which is a yield that is provided and it is bigger, that all the rest of the investments, except infrastructure, and stocks, that might provide better yields. Here though we only talked about the financial outcome. Here we should remind that, we invest in a sustainability stock Index and not a non-sustainable or non-green index, or ETF.

## New Asset Allocation

| **Asset Allocation of Papantonakis** | **Asset Allocation** | In Indices or ETFs | New Asset Allocation | Original Percentage Allocation | Final Percentage Allocation |
|---|---|---|---|---|---|
| **Real Estate Greece** | 50.000.000 | | $50.000.000,00 | 5% | 5% |
| **Buildings and Logistics abroad** | 50.000.000 | | $50.000.000,00 | 5% | 5% |
| **Shares and Bonds** | 100.000.000 | $5.000.000,00 | $95.000.000,00 | 11% | 10% |

| | | | | | |
|---|---|---|---|---|---|
| **Deposits** | 450.000.000 | $22.500.000,00 | $427.500.000,00 | 47% | 45% |
| **Shipping** | 300.000.000 | | $300.000.000,00 | 32% | 32% |
| **ETF's or Indices** | | $27.500.000,00 | $27.500.000,00 | 0% | 3% |
| **Total Net Worth** | 950.000.000 | | $950.000.000,00 | 100% | 100% |

| **Asset Allocation of Fragkakis** | Asset Allocation | In Indices or ETFs | New Asset Allocation | Original Percentage Allocation | Final Percentage Allocation |
|---|---|---|---|---|---|
| **Real Estate Greece** | $90.000.000,00 | | $90.000.000,00 | 18% | 18% |
| **Buildings and Logistics abroad** | $20.000.000,00 | | $20.000.000,00 | 4% | 4% |
| **Shares and Bonds** | $80.000.000,00 | $4.000.000,00 | $76.000.000,00 | 16% | 15% |
| **Deposits** | $250.000.000,00 | $12.500.000,00 | $237.500.000,00 | 49% | 47% |
| **Shipping** | $66.180.000,00 | | $66.180.000,00 | 13% | 13% |
| **ETF's or Indices** | | $16.500.000,00 | $16.500.000,00 | 0% | 3% |
| **Total Net Worth** | $506.180.000,00 | | $506.180.000,00 | 1 | 100% |

# Sharpe Ratio

We took the sharpe ratio, in order to calculate the excess return over the risk free rate, we want for certain amount of risk. Sharpe ratio is the measure of risk-adjusted return of a financial portfolio. A portfolio with a higher Sharpe ratio is considered superior relative to its peers.

## Sharpe Ratio of the shipping business

We use the earnings provided by earnings of chartering the ships of the fleet, the adjusted earnings include the sales of ships, divided in per year earnings, and the double adjusted for Papantonakis, that give the adjusted Sharpe ratio, for the shipping business. Because we do not take the assumption that the vessels increase in value and the value they offer are from ship trading and, the earnings from chartering, to the total capital cost we used for the fleet, so we take the return on capital.

*Table 2: Papantonakis Earnings and Returns from shipping*

| | | Returns Percentage |
|---|---|---|
| Current value of Investments | $300.000.000,00 | |
| Earnings 25 years | $1.674.397.408,59 | 22% |
| Total Earnings 25 years | $1.874.647.408,59 | 25% |
| Adjusted Earnings 25 years | $1.802.829.324,48 | 25% |
| Earnings from ships sales per year | $200.250.000,00 | 2,67% |
| Total Earnings Adjusted | $2.003.079.324,48 | 27% |
| Sharpe | 2,907 | |
| Sharpe adjusted | 2,899 | |

*Table 3:Papantonakis Earnings and Returns from shipping*

| | | Average Returns Per Year Percentage |
|---|---|---|
| Current value of Investments | $66.180.000,00 | |
| Earnings | $360.137.545,83 | |
| Returns from ships sales per year | $44.175.150,00 | 2,67% |
| Total Earnings | $404.312.695,83 | 24% |
| Sharpe | 2,93438763 | |

We assume that the capital used for the investments are 300M and 66,180M and from now on the capital invested remains the same as the capital to reinvest is made through sales of vessels, as both shipowners are traders of ships as a part of their business, and as we said we assume they do it with profit.

As an addition research purpose, we found the sharpe ratios for both shipowners in order to compare their mini investment portfolios (deposits, shares & bonds, Index Funds), where the reallocation of assets has happened.

We removed 5% from deposits and 5% from shares & bonds of their valuation in dollars, in order to reallocate them to an investment in an index fund where we calculated the returns for the Dow Jones sustainability Index fund, where we could invest somewhere like Vanguard, where the commission for this purpose is at a height of 0,04% (we did not include the commission fees in this). The investment will happen in one time, in a lump sum way (it must be noted that the reinvestment, if we calculated these amounts would be free of charge so it would at the same way we calculate without fees). It is a passive investment like ETFs and unlike Mutual Funds[19], where there is an active manager in the last type. The investment plan will be for 25 years.

## Methodology

In order to calculate the sharpe ratios we used the type of the sharpe ratio which is the following:

$$Sharpe\ Ratio = \frac{Return\ of\ the\ Portfolio - Risk\ Free\ Rate}{Standard\ Deviation}$$

In order to calculate the returns of the portfolios, we took for the deposits a 0,01-0,02% returns, but due to the amount of the deposits we assumed a 0,04% return. For the bonds, we assumed

[19] In Mutual Funds the commission fee is something between 1% and 2%, because it follows the way of an active management, where the financial managers are paid more for their services, due to the strategy the create and follow. In the passive management the fee is smaller, due to the fact they follow indexes for example in index funds. One other difference between ETFs and Index Funds, are that index funds are traded one time per day usually, while ETFs can be traded throughout the day.

for the shares the ½ of 5% and 35%, assuming an equal allocation amount between shares and bonds of 50% equally, then we took a 2,5% return for bonds, we added these two in an equal weight of 50% and we divided it by 2. The we calculated the new returns and then the sharpe ratios for using the average returns of the portfolios of each shipowners. The purpose of the 5% is not remove, little liquidity in order not to disrupt their loans, or their investment strategies at once, and give a realistic strategy that an investor would follow, so that they don't risk their business as it is, now , but provide an extra added value.

For the sustainability index returns, we took the returns between starting from the period between 2012 and 2011 and we went until 2021 July 29th, taking the return until that point as the prices for 2021, which could be even higher, as the ESG criteria and sustainable and green investment are growing rapidly. In the end, we calculated and used the average return if these years as a return for each year forth from now.

This number is has a return of around 8,1% at an average. We used the average return, because we want to show as previously mentioned in our thesis the long run returns for long run investments, because this is the only way these investments can work efficiently and not in the year-by-year, horizon because someone can be tempted to de-invest, due to the gambling character of people when found in an investment environment.

For the risk free rate we used the return of the 30 year US treasury bond, which has a yield of 1,98%, because our investments will follow the investment strategy of a wealth management plan of 25 years.

We calculated them differently for the bigger shipowner (Papantonakis) and the smaller shipowner (Fragkakis). The way we calculated the sharpe ratios is as follows, we started calculating the sharpe ratio for each year and we kept the sharpe ratios for each year after using standard deviation for 10 years and returns for 10 years, we saw that the sharpe ratio tends to equal to the one for the 25 years, so we used this one to compare the portfolio.

## Papantonakis Allocation

*Table 4: Old Allocation with deposits and shares & bonds for Papantonakis*

| Years | Shares & Bonds | Deposits | Total Investments Old Allocation | Returns | Sharpe Ratio |
|---|---|---|---|---|---|
| 0 | $100.000.000 | $450.000.000 | $550.000.000 | | |
| 1 | $111.250.000 | $450.180.000 | $561.430.000 | 2,08% | |
| 2 | $123.765.625 | $450.360.072 | $574.125.697 | 2,26% | |
| 3 | $137.689.258 | $450.540.216 | $588.229.474 | 2,46% | |
| 4 | $153.179.299 | $450.720.432 | $603.899.731 | 2,66% | |
| 5 | $170.411.970 | $450.900.720 | $621.312.691 | 2,88% | |

| | | | | | |
|---|---|---|---|---|---|
| 6 | $189.583.317 | $451.081.081 | $640.664.398 | 3,11% | |
| 7 | $210.911.440 | $451.261.513 | $662.172.953 | 3,36% | |
| 8 | $234.638.977 | $451.442.018 | $686.080.995 | 3,61% | |
| 9 | $261.035.862 | $451.622.594 | $712.658.457 | 3,87% | |
| 10 | $290.402.397 | $451.803.243 | $742.205.640 | 4,15% | |
| 11 | $323.072.667 | $451.983.965 | $775.056.631 | 4,43% | 1,52 |
| 12 | $359.418.341 | $452.164.758 | $811.583.100 | 4,71% | 1,52 |
| 13 | $399.852.905 | $452.345.624 | $852.198.529 | 5,00% | 1,52 |
| 14 | $444.836.357 | $452.526.562 | $897.362.919 | 5,30% | 1,51 |
| 15 | $494.880.447 | $452.707.573 | $947.588.020 | 5,60% | 1,51 |
| 16 | $550.554.497 | $452.888.656 | $1.003.443.153 | 5,89% | 1,51 |
| 17 | $612.491.878 | $453.069.812 | $1.065.561.690 | 6,19% | 1,51 |
| 18 | $681.397.214 | $453.251.040 | $1.134.648.254 | 6,48% | 1,51 |
| 19 | $758.054.401 | $453.432.340 | $1.211.486.741 | 6,77% | 1,52 |
| 20 | $843.335.521 | $453.613.713 | $1.296.949.234 | 7,05% | 1,52 |
| 21 | $938.210.767 | $453.795.158 | $1.392.005.926 | 7,33% | 1,52 |
| 22 | $1.043.759.478 | $453.976.676 | $1.497.736.155 | 7,60% | 1,53 |
| 23 | $1.161.182.420 | $454.158.267 | $1.615.340.687 | 7,85% | 1,54 |
| 24 | $1.291.815.442 | $454.339.930 | $1.746.155.372 | 8,10% | 1,54 |
| 25 | $1.437.144.679 | $454.521.666 | **$1.891.666.346** | 8,33% | 1,55 |

And the new allocation can be found below:

*Table 5: New allocation with deposits, shares & bonds and investment in Index fund (Dow Jones Sustainability Index), for Papantonakis*

| Years | Shares & Bonds New Allocation | Deposits New Allocation | Index Fund New Allocation | Total Investments New Allocation | Returns | Sharpe Ratio |
|---|---|---|---|---|---|---|
| 0 | $95.000.000 | $427.500.000 | $27.500.000 | $550.000.000 | | |
| 1 | $105.687.500 | $427.671.000 | $30.021.348 | $563.379.848 | 2,43% | |
| 2 | $117.577.344 | $427.842.068 | $32.773.866 | $578.193.278 | 2,63% | |
| 3 | $130.804.795 | $428.013.205 | $35.778.750 | $594.596.750 | 2,84% | |
| 4 | $145.520.334 | $428.184.411 | $39.059.138 | $612.763.883 | 3,06% | |
| 5 | $161.891.372 | $428.355.684 | $42.640.290 | $632.887.346 | 3,28% | |
| 6 | $180.104.151 | $428.527.027 | $46.549.781 | $655.180.958 | 3,52% | |
| 7 | $200.365.868 | $428.698.437 | $50.817.714 | $679.882.020 | 3,77% | |
| 8 | $222.907.029 | $428.869.917 | $55.476.955 | $707.253.901 | 4,03% | |
| 9 | $247.984.069 | $429.041.465 | $60.563.381 | $737.588.915 | 4,29% | |
| 10 | $275.882.277 | $429.213.081 | $66.116.157 | $771.211.515 | 4,56% | |
| 11 | $306.919.033 | $429.384.767 | $72.178.041 | $808.481.841 | 4,83% | 1,98 |
| 12 | $341.447.424 | $429.556.520 | $78.795.712 | $849.799.657 | 5,11% | 1,94 |
| 13 | $379.860.260 | $429.728.343 | $86.020.126 | $895.608.728 | 5,39% | 1,91 |
| 14 | $422.594.539 | $429.900.234 | $93.906.913 | $946.401.686 | 5,67% | 1,88 |
| 15 | $470.136.424 | $430.072.194 | $102.516.803 | $1.002.725.422 | 5,95% | 1,86 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 16 | $523.026.772 | $430.244.223 | $111.916.094 | $1.065.187.090 | 6,23% | 1,84 |
| 17 | $581.867.284 | $430.416.321 | $122.177.163 | $1.134.460.768 | 6,50% | 1,82 |
| 18 | $647.327.354 | $430.588.488 | $133.379.021 | $1.211.294.863 | 6,77% | 1,81 |
| 19 | $720.151.681 | $430.760.723 | $145.607.926 | $1.296.520.330 | 7,04% | 1,80 |
| 20 | $801.168.745 | $430.933.027 | $158.958.043 | $1.391.059.815 | 7,29% | 1,79 |
| 21 | $891.300.229 | $431.105.400 | $173.532.170 | $1.495.937.800 | 7,54% | 1,79 |
| 22 | $991.571.505 | $431.277.843 | $189.442.532 | $1.612.291.879 | 7,78% | 1,79 |
| 23 | $1.103.123.299 | $431.450.354 | $206.811.641 | $1.741.385.293 | 8,01% | 1,79 |
| 24 | $1.227.224.670 | $431.622.934 | $225.773.243 | $1.884.620.847 | 8,23% | 1,79 |
| 25 | $1.365.287.445 | $431.795.583 | $246.473.346 | **$2.043.556.375** | 8,43% | 1,79 |

We see as a result that Papantonakis has financial gain with our assumptions of $151.890.029 which is more than half of the shipping vessels they own in value.

## Papantonakis Sharpe Ratios

As we already said his sharpe ratio, will tend to be the same as the 25$^{th}$ year sharpe ratio calculated below.

*Table 6: Sharpe ratio with the old portfolio allocation of Papantonakis*

| | |
|---|---|
| **Avg Return 25 years** | **5,08%** |
| **σ old allocation** | **2,00** |
| **US Treasury 30 years** | **1,98%** |
| **Sharpe** | **1,551** |

As we see with the new allocation the sharpe ratio of the mini-portfolio of the shipowner, increases, by 0,238, tending to reach the price of 2, which means that it is tending to be a very good portfolio.[20]

*Table 7: Sharpe ratio for the new allocation for Papantonakis*

| | |
|---|---|
| **Avg Returns 25 New** | **5,41%** |
| **σ new allocation** | **0,0192** |
| **US Treasury 30 years** | **1,98%** |
| **Sharpe New** | **1,789** |

## Fragkakis Allocation

*Table 8: Old Allocation with deposits and shares & bonds for Fragkakis*

| Years | Shares & Bonds | Deposits | Total Investments Old Allocation | Returns | Sharpe Ratio |
|---|---|---|---|---|---|
| 0 | $80.000.000 | $250.000.000 | $330.000.000 | | |

[20] Here we have used the risk free rate of 1,98% and not 3,5% to 5%, that usually is. Still the numbers of the sharpe ratios are increasing which is a good sign no matter the price of the risk free ratio.

| | | | | | |
|---|---|---|---|---|---|
| 1 | $89.000.000 | $250.100.000 | $339.100.000 | 2,76% | |
| 2 | $99.012.500 | $250.200.040 | $349.212.540 | 2,98% | |
| 3 | $110.151.406 | $250.300.120 | $360.451.526 | 3,22% | |
| 4 | $122.543.439 | $250.400.240 | $372.943.680 | 3,47% | |
| 5 | $136.329.576 | $250.500.400 | $386.829.977 | 3,72% | |
| 6 | $151.666.654 | $250.600.600 | $402.267.254 | 3,99% | |
| 7 | $168.729.152 | $250.700.841 | $419.429.993 | 4,27% | |
| 8 | $187.711.182 | $250.801.121 | $438.512.303 | 4,55% | |
| 9 | $208.828.690 | $250.901.441 | $459.730.131 | 4,84% | |
| 10 | $232.321.917 | $251.001.802 | $483.323.719 | 5,13% | |
| 11 | $258.458.133 | $251.102.203 | $509.560.336 | 5,43% | 2,30 |
| 12 | $287.534.673 | $251.202.644 | $538.737.317 | 5,73% | 2,24 |
| 13 | $319.882.324 | $251.303.125 | $571.185.449 | 6,02% | 2,18 |
| 14 | $355.869.085 | $251.403.646 | $607.272.731 | 6,32% | 2,14 |
| 15 | $395.904.357 | $251.504.207 | $647.408.565 | 6,61% | 2,10 |
| 16 | $440.443.598 | $251.604.809 | $692.048.407 | 6,90% | 2,07 |
| 17 | $489.993.502 | $251.705.451 | $741.698.953 | 7,17% | 2,05 |
| 18 | $545.117.771 | $251.806.133 | $796.923.905 | 7,45% | 2,03 |
| 19 | $606.443.521 | $251.906.856 | $858.350.376 | 7,71% | 2,01 |
| 20 | $674.668.417 | $252.007.618 | $926.676.035 | 7,96% | 2,00 |
| 21 | $750.568.614 | $252.108.421 | $1.002.677.035 | 8,20% | 1,99 |
| 22 | $835.007.583 | $252.209.265 | $1.087.216.847 | 8,43% | 1,99 |
| 23 | $928.945.936 | $252.310.148 | $1.181.256.084 | 8,65% | 1,98 |
| 24 | $1.033.452.354 | $252.411.072 | $1.285.863.426 | 8,86% | 1,98 |
| 25 | $1.149.715.743 | $252.512.037 | **$1.402.227.780** | **9,05%** | **1,98** |

*Table 9: New allocation with deposits, shares & bonds and investment in Index fund (Dow Jones Sustainability Index), for Papantonakis*

| Years | Shares & Bonds New Allocation | Deposits New Allocation | Index Fund New Allocation | Total Investments New Allocation | Returns | Sharpe Ratio |
|---|---|---|---|---|---|---|
| 0 | $76.000.000 | $237.500.000 | $16.500.000 | $330.000.000 | | |
| 1 | $84.550.000 | $237.595.000 | $18.012.809 | $340.157.809 | 3,08% | |
| 2 | $94.061.875 | $237.690.038 | $19.664.320 | $351.416.233 | 3,31% | |
| 3 | $104.643.836 | $237.785.114 | $21.467.250 | $363.896.200 | 3,55% | |
| 4 | $116.416.267 | $237.880.228 | $23.435.483 | $377.731.978 | 3,80% | |
| 5 | $129.513.098 | $237.975.380 | $25.584.174 | $393.072.652 | 4,06% | |
| 6 | $144.083.321 | $238.070.570 | $27.929.868 | $410.083.760 | 4,33% | |
| 7 | $160.292.695 | $238.165.799 | $30.490.629 | $428.949.122 | 4,60% | |
| 8 | $178.325.623 | $238.261.065 | $33.286.173 | $449.872.861 | 4,88% | |
| 9 | $198.387.255 | $238.356.369 | $36.338.028 | $473.081.653 | 5,16% | |
| 10 | $220.705.822 | $238.451.712 | $39.669.694 | $498.827.228 | 5,44% | |
| 11 | $245.535.227 | $238.547.093 | $43.306.825 | $527.389.144 | 5,73% | 2,69 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | $273.157.940 | $238.642.511 | $47.277.427 | $559.077.878 | 6,01% | 2,60 |
| 13 | $303.888.208 | $238.737.968 | $51.612.075 | $594.238.252 | 6,29% | 2,52 |
| 14 | $338.075.631 | $238.833.464 | $56.344.148 | $633.253.242 | 6,57% | 2,46 |
| 15 | $376.109.140 | $238.928.997 | $61.510.082 | $676.548.218 | 6,84% | 2,41 |
| 16 | $418.421.418 | $239.024.569 | $67.149.657 | $724.595.643 | 7,10% | 2,36 |
| 17 | $465.493.827 | $239.120.178 | $73.306.298 | $777.920.303 | 7,36% | 2,33 |
| 18 | $517.861.883 | $239.215.826 | $80.027.413 | $837.105.122 | 7,61% | 2,30 |
| 19 | $576.121.345 | $239.311.513 | $87.364.756 | $902.797.613 | 7,85% | 2,27 |
| 20 | $640.934.996 | $239.407.237 | $95.374.826 | $975.717.059 | 8,08% | 2,26 |
| 21 | $713.040.183 | $239.503.000 | $104.119.302 | $1.056.662.486 | 8,30% | 2,24 |
| 22 | $793.257.204 | $239.598.801 | $113.665.519 | $1.146.521.524 | 8,50% | 2,23 |
| 23 | $882.498.639 | $239.694.641 | $124.086.984 | $1.246.280.264 | 8,70% | 2,22 |
| 24 | $981.779.736 | $239.790.519 | $135.463.946 | $1.357.034.200 | 8,89% | 2,22 |
| 25 | $1.092.229.956 | $239.886.435 | $147.884.008 | **$1.480.000.399** | **9,06%** | 2,21 |

Fragkakis has a gain of $77.772.619, which is more than the amount invested now in vessels at 6/5 of the vessels' value/ capital spent on ships.

## Fragkakis Sharpe Ratios

*Table 10: Sharpe ratio with the old portfolio allocation of Fragkakis*

| | |
|---|---|
| **Avg Return 25 years** | **5,98%** |
| **σ old allocation** | **2,01%** |
| **US Treasury 30 years** | **1,98%** |
| **Sharpe** | **1,984** |

Also, here we see an increase in the sharpe ratio of 0,283, which is around the same difference as we saw before, but smaller, so we see that for the portfolio of Fragkakis that for the original allocation and the amount of wealth he has in deposits and shares & bonds makes a different number.

*Table 11: Sharpe ratio for the new allocation for Fragkakis*

| | |
|---|---|
| **Avg Returns 25 New** | **6,20%** |
| **σ new allocation** | **1,91%** |
| **US Treasury 30 years** | **1,98%** |
| **Sharpe New** | **2,212** |

The number is explained because Fragkakis has bigger percentage of the portfolio in shares and bonds total of 80M than Papantonakis, and the shares and bonds with our assumptions have greater return that the type of SRI investments we chose. Given that they can invest more from their deposits in the sustainable index funds, the bigger the sharpe ratio will be towards a

positive change and better excessive returns in their investments. If the static 5%, we took from deposits and shares and bonds can be bigger in deposits, the sharpe ratio, will be greater. We although, that they provide an extra added value to their investments.

Given that we don't calculate their personal consumption that we assume that it must be an huge amount but we take it into consideration in our inclusions , their further investments into different sectors, or the bad economy or the bad investment decisions they might do, throughout the years, the amount they make in added value from change of static deposits and the transition from traditional investments, to a sustainable index, the gains they have let the bigger shipowner renew the 1/2 of his fleet at once, given the different environmental regulations there might be in shipping in 25 years, and let the smaller shipowner either renew the whole of the fleet, or renew and increase the fleet, given they have the same amount of vessels in 25 years, introducing to the conversation, an SRI business hedging strategy, through wealth management.

## Conclusions

First of all, with external help of a friend we created a simple program in Python as promised in the proposal, for portfolio management, but we won't use it, or present it, due to the lack of different data and because this is a masters' thesis, and the sectors we investigated are already many. After that we started by showing the history of sustainability and the history along with the importance of sustainable finance. We divided the two types of themed investments, green and impact, along with the sustainability character investments and the ways these might be the same.

We also saw the concept of inter-generation investments. Also, we see the need invest for their future generations so that future generations will still have their wealth levels at hand and also let the UHNWI consume in the present. Wealth funds and wealth management plans is way that we propose in order to address these types of problems, by using an amount of investments for consumption is the present and by investing and saving another part for future generations. So, on the one hand that leaves shipowners to deal with the future generations allocation of capital that has to be efficient at least, but on the other hand still their investments alone cannot be enough to make a change. So, another thing we propose are pools of sustainable and thematic investments, with public structure and support to achieve long-run efficient and better results and returns, where "faith" plays a big role especially on impact investments, where investments are smaller.

We have two point, the financial returns, and the financial profits for an UHNWI and the qualitative community results for the future of an UHNWI individuals for the environment, the future and the community, we have done a static analysis, for past prices , without involving inside our analysis, the environmental risks, that might increase and generally other risks that are not financial, in a quantitative way. We just make suggestions, according to the literature, and the solutions big organizations can provide, like Eurosif, the European Union and their commissions, the OECD, etc.

The financial returns, like the yield of the investment, the strategy that the pension funds follow, by protecting themselves from the inflation.

We choose impact investments and green investments and generally sustainable investments, in order to push forward into a new market that as we see now has lower returns, but some we see that they can outperform traditional investments of the same type, but with the creation or the completion of a market with the same size as traditional investments and investments that Given that these indexes and these types of investments, weren't created until some years ago, they don't have enough, power in all cases to beat all strategies in traditional types of investments. But with the regulation of the investments, the new ESG rules and the increase of the market in sustainable, green, impact or thematic investments, the returns will continue to increase. We assume and we see in the data that index investments are the safer and that in the long run for now and they provide average positive returns for every, and they serve their purpose to use them in the long run, because only this way can a SRI have an impact, in order to exclude gambling, short run gains, and short run investors that can disrupt an investment and the result this may have.

We show that these investments could be used for SRI business hedging, for their companies and their personal portfolios, by sacrificing a small percentage of deposits and shares & bonds in traditional investments, that we consider it does not disrupt their strategy nor their business as is. They can continue when they exit the investment by reinvesting one percentage again in sustainable investments at that point. Having an amount of wealth that either way is not invested in sustainable investments, gives them time to change the horizon of the company, by renewing a large percentage of their fleet, or enhancing and enlarging their fleet, with new vessels, increasing and improving the percentage of new technology vessels, in an improved sustainable percentage [21]. We also propose for a future research investing other sectors of the financials like the consumption of the UHNWI and not only loans or taxes that we have already

[21] Because all vessels will be at that point in 25 years, or in a very large percentage sustainable.

papers in the literature, and have more accurate data, and a further investigation on how diversification can be better only with SRI investments, in order to hedge perfectly a today's non-sustainable business plan in the future by using wealth management plans.

# APPENDIX

**CAGR:** Compound Annual Growth Rate

**ESG:** Environmental Social & Governance

**HNWI:** High Net Worth Individual, above USD 1 or 3 million net worth.

**GABV:** Global Alignment for Banking on Values

**Grant Investments**: Investment that receive grants as capital for a certain purpose for their investments.

**GIIN:** Global Impact Investing Network

**Markowitz diversification:** A strategy that seeks to combine in a portfolio assets with returns that are less than perfectly positively correlated, in an effort to lower portfolio risk (variance) without sacrificing return. Definition is given by Nasdaq.

**Naive diversification:** A strategy whereby an investor simply invests in a number of different assets in the hope that the variance of the expected return on the portfolio is lowered. Definition is given by Nasdaq.

**Perceived Risk**: Perceived risk is the uncertainty an investor has when investing, he or she has certain doubts about the product, especially if the product in question is highly priced. Perceived risk is defined as an action taken by a consumer which will cause an unpredictable and uncertain consequence, and the result may be unpleasant and has 5 different categories that can define it: financial, performance, physical, psychological and social risk and an overall combination of them in the end. The price of an asset may be greater or less than the intrinsic or real value of an asset. The difference between the real risk and perceived risk determines whether the price of the investment is higher or lower than the real value.

**PRI**: Public Responsible Investments

**SFDR:** Sustainable Finance Disclosure Regulation

**SRI**: Social Responsible Investments

**TCFD:** Taskforce for Climate-related Financial Disclosures

**UHNWI:** Ultra High Net Worth Individual with a net worth above USD 30million or USD 50 million in other cases.

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