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The impact of ESG factors to stock valuations: a comparative analysis of the performance "pre" and "through" COVID-19.

Prof. Marco Morelli

RELATORE

Riccardo Pasqui 722571

CANDIDATO

Prof. Guido Traficante

CORRELATORE

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THE IMPACT OF ESG FACTORS TO STOCK VALUATIONS: A COMPARATIVE ANALYSIS OF THE PERFORMANCE "PRE" AND "THROUGH" COVID-19.

Ai miei genitori.

There are two young fish swimming along.
They meet an older fish coming on the other way.
“Morning”, the older fish says, “Water’s cold today, isn’t it?”
And then He swim off.
The two younger fish watch the older fish swim off.
Then they turn to each other and they go “What the hell is water?”
See, our water is called finance:
You can’t see it, you can’t smell it.
And to most people it’s imperceptible.

-Dominic Morgan. Devils

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INTRODUCTION

The 2020 will be remembered as the year in which the world came to a standstill. Empty cities, closed factories, parked cars, stopped airplanes in hangars; photos of deserted streets have gone around the world showing an apocalyptic scenario, as if the whole humanity had suddenly disappeared.

The lockdowns, put in place by governments of the countries most affected, have been a great opportunity to assess the effects on the environment of a drastic decrease in pollution: satellite thermal images have emerged everywhere, showing the reduction of nitrogen dioxide (NO2) levels; Milan, Madrid, Berlin, Tokyo, New York and other major cities, have seen those "red spots" that are threatening life on Earth, fade away.

So, the pandemic has rekindled the debate on environmental issues and, more generally, on ESG issues and how they can and must be integrated into everyday social and economic life. It is precisely from this premise that the study conducted here begins.

In the first part, a general overview is proposed on the world of socially responsible investments and, consequently, on ESG factors, trying to appropriately define the theme, also due to confusion caused by the lack of taxonomy; furthermore, we wanted to present the sustainability report, a document that companies with certain characteristics have been required to draw up for some years now, in order to underline and demonstrate their environmental, social and governance commitment.

Over the years, responsible investment strategies have been refined, moving from simple exclusion of companies operating in certain sectors (Tobacco, Nuclear, Weapons...) to the so-called "Best-in-class"; in fact, if at first diversification at corporate level referred to whether or not to adhere to sustainable policies, today the question is how much these companies are really responsible.

In second chapter, the main sustainable indices are presented, tracing the history of companies providing financial services and detailing the way in which these indices are constructed; in fact, each company adopts its own selection process based on internal research. It is also presented a risk rating model belonging to the Italian company Etica SGR, which has a probabilistic-statistical approach that is completely different from that of the companies presented previously.

Chapter three presents the second major variable taken into consideration in this study: the pandemic caused by Covid-19. As we have seen, the health crisis has turned with time into a deep social and, above all, financial crisis; markets collapsed, instability and uncertainty were

the only constants of those days, someone even compared 2020 to 2008, the year of the financial crisis that started with the bankruptcy of Lehman Brothers. After an overview of the financial consequences of the pandemic, a study is presented detailing similarities and differences between the two crises.

In chapter four, we get to the heart of the study: starting from the assumptions and conditions mentioned above, this thesis aims to demonstrate that the choice of responsible investment has brought economic benefits to those who have adopted it. Through some financial variables, it will be empirically demonstrated that the selected ESG indices have performed better than their traditional benchmarks over a time horizon ranging from January 2018 to May 2021. This timeframe was chosen because there are numerous studies in literature that, through other types of analysis, demonstrate the thesis for years prior to those considered. In addition, the pandemic has put a strain on the financial sector by representing the so-called "Black Swan," which is why analyzing the performance of these stocks in 2020 represents a demonstration of strength in difficult times, resulting in greater investor confidence to protect their assets.

Once obtained, the results are analyzed, trying to draw conclusions.

CHAPTER 1
GENERAL OVERVIEW OF SRI AND ESG

1.1 SUSTAINABLE AND RESPONSIBLE INVESTMENT:

2008 cause a deep wound to global finance, the seemingly indestructible castle that banks and investors had built turn out to be a fragile fort that suddenly collapsed dragging the certainties of previous years. The aftermath of that crisis is still evident today and the policies for economic recovery seem to be directed, today more than ever, towards "green", sustainable and responsible strategies.
For many years they were part of a niche market, frequented by sporadic and fanatical investors, but today the spotlight is all on the so-called SRI, "Social and Responsible Investment", which more than any other has ignited the public debate on financial matters. Mainly due to a lack of taxonomy, it is often approached with the concept of "green" investments only, when in fact it encompasses a multiform and dense universe, sometimes used as a synonym for Ethical Finance or Sustainable Finance.
In recent years, attempts have been made to define the perimeter within which to enclose all financial products that respond to the theme of sustainable finance; it was only in 2016 that Eurosif, an association that describes itself as "a leader in the promotion and advancement of sustainable and responsible investments in Europe", reached a conclusion accepted by the financial world:

"Sustainable and responsible investment ("SRI") is a long-term oriented investment approach which integrates ESG factors in the research, analysis and selection process of securities within an investment portfolio. It combines fundamental analysis and engagement with an evaluation of ESG factors in order to better capture long term returns for investors, and to benefit society by influencing the behaviour of companies." (Eurosif, s.d.)[1]

[1] "What is sustainable and responsible investment?", Eurosif. http://www.eurosif.org/about-us/

The Forum for Sustainable Finance has appointed a "*Working Group*" to produce a shared definition of SRI, a solution found thanks to a cycle of six meetings held in 2013-2014 that saw the participation of the main actors of Italian finance:

"Sustainable and Responsible Investment aims to create value for the investor and for society as a whole through a medium- to long-term oriented investment strategy that, when evaluating companies and institutions, integrates financial analysis with environmental, social and good governance analysis" (Gruppo di Lavoro, 2014) [2]

University of Cambridge too, in its report "*What is responsible investment*", aligns with definitions cited above:

"Responsible investment is an approach to investment that explicitly acknowledges the relevance to the investor of environmental, social and governance factors, and of the long-term health and stability of the market as a whole. It recognises that the generation of long-term sustainable returns is dependent on stable, well-functioning and well-governed social, environmental and economic systems" (University of Cambridge, s.d.)[3]

What emerges from these definitions is that, in fact, sustainable finance is a model (or mindset) that in a long-term vision takes into account both the financial return, necessary for the satisfaction of the investor, and the creation of a shared social value; this universe includes responsible investments capable of evaluating non-financial indicators, but also sustainable investments that aim to generate a positive impact on society and the environment.

Now it remains to be understood when and how responsible investments entered the world scene and to do so we must go back almost one hundred years, precisely to 1928, in a world culturally very different from the one we live in today, when the first ethical investment fund, "Pioneer Fund", was born in Boston (USA) from an idea of Phil Carret". The fund, as stated in an Amundi note (Amundi, s.d.)[4], intentionally wanted to avoid including in its portfolio

[2] L'Investimento Sostenibile e Responsabile: una definizione al passo con i tempi, Forum per la finanza sostenibile, 2013. https://finanzasostenibile.it/wp-content/uploads/2016/08/140903_Posizione_ufficiale_SRI_FFS.pdf

[3] "What is responsible investment?", University of Cambridge. *https://www.cisl.cam.ac.uk/business-action/sustainable-finance/investment-leaders-group/what-is-responsible-investment/*

[4] Building on our History of Responsible Investing, Amundi. *https://www.amundi.com/usinvestors/Investment-Ideas/Responsible-Investing*

shares of companies involved in the alcohol, tobacco and gambling industries, nicknamed "sin stocks". Until the seventies of twentieth century, responsible investment remained confined to religious operators in the USA, but the war in Vietnam awakened the minds of American university students: as reported in a study published by the University of Parma[5] (Signori S., 2005) they managed to convince universities not to invest in securities of companies involved in the production of armaments necessary for war supplies. Once again, the idea of ethical finance came to the fore, an idea that was seized on by two ministers of the then United Methodist Church, Luther Tyson and Jack Corbett who, having to deal with investments that the church carried out to finance its activities, decided to invest in a fund that was not involved in an industry implicitly responsible for the death of millions of men, but since there was not even one, in 1971 they launched the first best-in-class fund that aimed to select companies on the basis of environmental, social and governance criteria.

This year is also the one of the first case of engagement: in those years South Africa was famous for the Apartheid regime, characterized by racial segregation of white minorities against the "Afro" communities; a native of West Virginia, Leon Sullivan, for about twenty years had been head of the Zionist Baptist Church in Philadelphia and in 1971 he joined the board of directors of General Motors, one of the largest multinationals in America, which employed most of its workforce in South Africa. Sullivan launched a campaign within the board to denounce the segregationist regime, putting pressure on other companies investing in South Africa; the campaign was reinforced by the publication of Sullivan Principles (Sullivan, 1977)[6]:

1 *Non-segregation of the races in all eating, comfort, and work facilities.*
2 *Equal and fair employment practices for all employees.*
3 *Equal pay for all employees doing equal or comparable work for the same period of time.*
4 *Initiation of and development of training programs that will prepare, in substantial numbers, blacks and other non-whites for supervisory, administrative, clerical, and technical jobs.*

[5] I fondi etici: caratteristiche, spazi di mercato, ritorni finanziari. Massimo Regalli, Maria-Gaia Soana, Giulio Tagliavini. January 2005.
[6] Rev. Leon Sullivan. USA, 1977.

5 *Increasing the number of blacks and other nonwhites in management and supervisory positions.*
6 *Improving the quality of life for blacks and other nonwhites outside the work environment in such areas as housing, transportation, school, recreation, and health facilities.*
7 *Working to eliminate laws and customs that impede social, economic, and political justice. (Added in 1984.)*

The consequences of these principles were the abandonment of more than one hundred companies from South African territory and the beginning of the crisis for the regime.

1.2 ENVIRONMENTAL – SOCIAL - GOVERNANCE:

In 2006, UN Secretary-General Kofi Annan convened major players in global finance: institutional investors, journalists and experts with the intent of formally drafting principles explaining how to invest responsibly and sustainably, called Principles for Responsible Investment (PRI).

The six adopted principles are (UN, 2006)[7]:

1. Incorporating environmental, social and governance (ESG) parameters into financial analysis and investment decision-making processes;
2. Being an active shareholder and incorporating ESG parameters into shareholder policies and practices;
3. Requiring reporting on ESG metrics from companies being invested in;
4. Promoting acceptance and implementation of the Principles in the financial industry;
5. Collaborating to improve implementation of the Principles;
6. Reporting periodically on activities and progress in implementing the Principles.

The growing interest in responsible investing, as can be seen in Figure 1[8] (UN, 2020), is due to a number of factors such as the realization that the integration of ESG issues is essential from a financial point of view, the increasing public policy requirements that investors have

[7] Principles for responsible investment. UN, 2006. https://www.unpri.org/download?ac=10948
[8] Growth of PRI initiatives. UN, 2020.

to comply with as holders of securities, the awareness that adopting such issues is not an obligation but a fiduciary duty that the investor has to the client, and the pressure from competitors looking to ESG issues as a way to differentiate themselves.

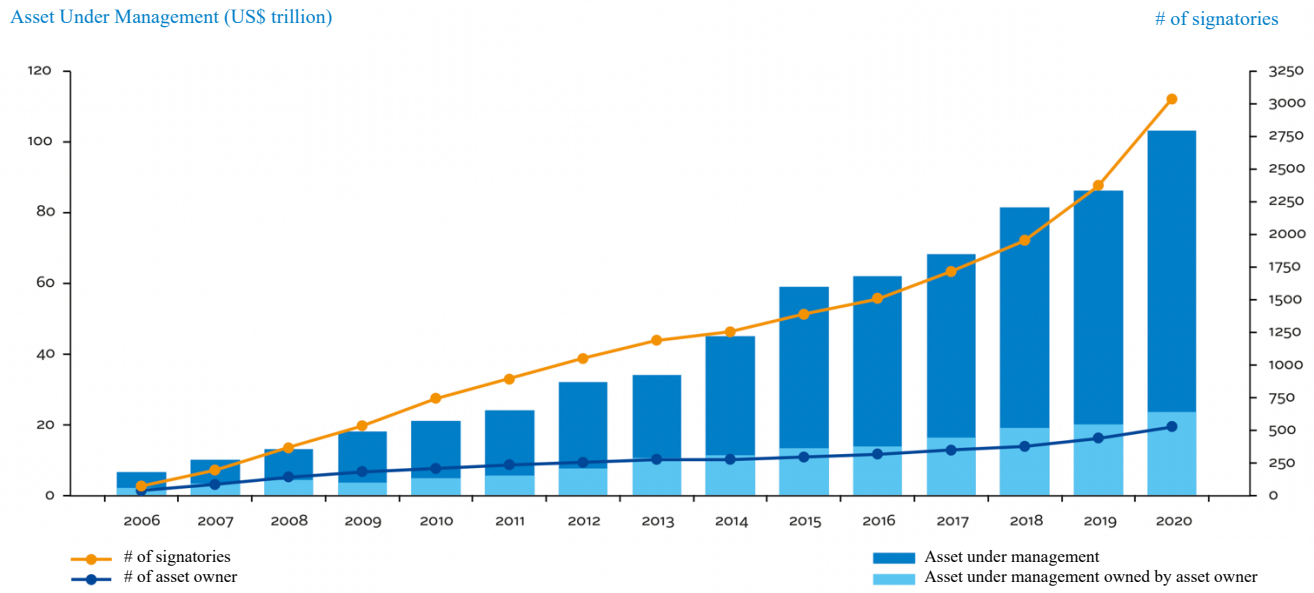


Figure 1: Growth of PRI initiative

According to the Sole 24 Ore report "*Investire Green*", in recent financial history there is one year (2015) and three specific events that have transformed sustainable finance into a mass phenomenon: the first concerns the publication of the encyclical *Laudato Si'* by the highest office of the Christian Catholic Church, Pope Francis, where the Earth is recognized as "Common Home" of all human beings; the second is related to the UN General Assembly announcing the 17 Sustainable Development Goals (SDGs) that all states have committed to achieve by 2030; finally, the third and most important, the Cop21 event organized by the UN, in which 177 states participated and committed to modify their production programs in order to contain emissions and keep temperature rise below a pre-established threshold.

Sustainable investment is the financial segment that has had the highest annual growth margin and still shows the potential to grow so much so that, from a study published in Bloomberg (Bloomberg Intelligence, 2021)[9], by 2025 the amount of dollars invested in

[9] Bloomberg Intelligence February 23, 2021

sustainable funds, assuming an average growth of 15% per year, as in recent years, could reach fifty-three trillion contributing one third of the total global investment; perhaps the most interesting fact is that despite Europe is contributing for 50%, the U.S. has had the highest growth over the past year, in stark contrast to former President Donald Trump's decisions not to comply with the Paris agreements (BBC, 2020)[10]. (Figure 2 and Figure 3) (GSIA, Bloomber Intelligence, 2020)[11]

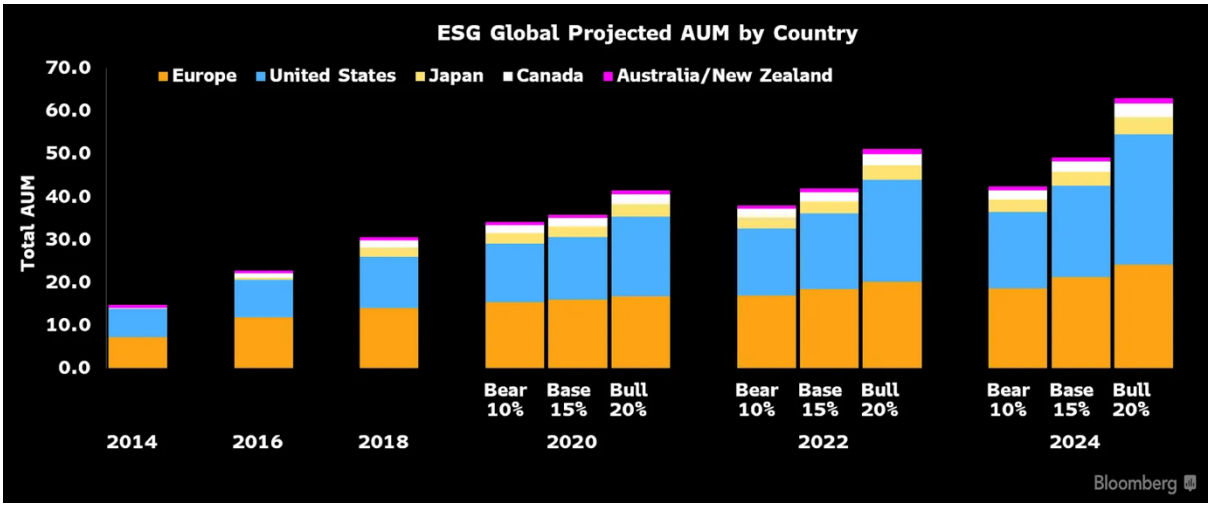


Figure 2: Projected AUM in Global ESG Funds. GSIA, Bloomberg Intelligence.

[10] "After a three-year delay, the US has become the first nation in the world to formally withdraw from the Paris climate agreement" , BBC news, 4th November 2020.
[11] GSIA Bloomberg Intelligence, February 2013. https://www.bloomberg.com/professional/blog/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum/?tactic-page=431091/

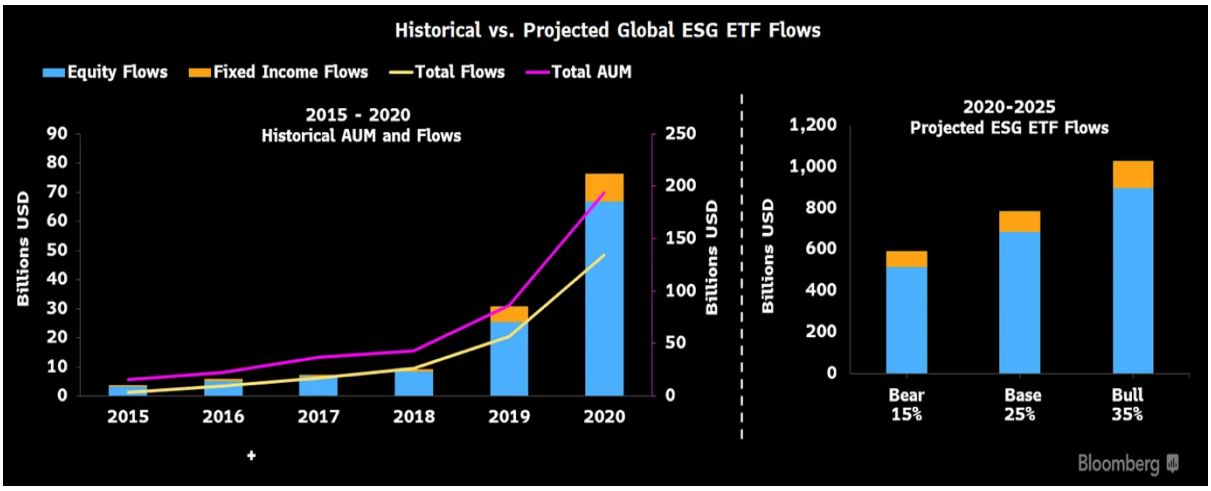


Figure 3: Historical and future projections of AUM in ESG-branded ETFs. GSIA, Bloomberg Intelligence.

Let us now go into detail about the meaning of the three acronyms E, S and G by referring to the text of Fung, Law and Yau (Hung-Gay Fung, 2010)[12]:

Starting with environmental theme, the authors identify three groups:

- **ECO - EFFICIENCY,** referring to the production of products and/or services minimizing the use of natural resources responsible for pollution and waste generation. The criteria for this category are:
  - Minimal water use;
  - Minimal energy use;
  - Minimal waste disposal;
  - Minimal greenhouse gas emissions;
  - Minimal use of transportation during production and distribution;
  - Maximum use of sustainable materials;
  - Maximum use of recycled materials;
  - Maximum use of alternative or renewable energy;
  - Production of durable goods;
  - Production of goods that can be recycled.
- **ENVIRONMENTAL IMPACT,** referring to the effects that activity has on the environment. The criteria for this category are:
  - Pollution of water, soil, air, and groundwater;
  - Loss of biodiversity, decrease in flora and fauna, loss of natural habitats;

[12] Socially Responsible Investment in a Global Environment; Fung, Law, Yau, 2010.

- Impact on economically important resources such as forests or fishponds;
- License to operate in communities that have many natural resources available.

❖ **ENVIRONMENTAL MANAGEMENT,** referring to the company's commitment to environmental impact and responsibility. The criteria in this category are:

- Implementation of robust environmental management systems that document protocols used, results achieved, and monitor environmental impacts;
- Past and current environmental responsibilities;
- Policy statement by company officials about their position on environmental issues;
- Involvement with environmental nongovernmental organizations in funding environmentally focused projects;
- Certifications from industry groups;
- Awards and recognition from independent organizations;
- Establishment of environmental systems throughout the life cycle of goods and services produced;
- Providing employee training and promoting awareness of environmental culture.

In the article, authors identify three categories to encapsulate the "Social" sphere: Labour, Social Development, and Corporate Governance. Since in this study the third category is associated with the "Governance" sphere, we will consider this group later.

Regarding the other two categories we have:

❖ **LABOUR**, whose criteria are:

- Adherence to national and international labor laws;
- Good health and safety documentation and protocols;
- Fair treatment and non-discrimination;
- Fair wage and/or minimum wage and fair trade with suppliers;
- Level of employee benefits;
- License to operate in communities, or positive community relations.

❖ **SOCIAL DEVELOPMENT**, whose criteria are:

- Human rights violations;
- Social programs and investments in developing areas;
- Operations in foreign countries;
- Companies with foundations or authorizations that help poor communities or developing nations;

- Political contributions;
- Engagement in areas of political unrest, social unrest, or failure to adhere to international rights and laws.

We now analyze the third sphere, that of Governance, whose criteria are as follows:

- Level of member rights, member activism, and stakeholder engagement;
- Board structure and composition;
- Independent audit, transparency and disclosure.

As we have seen, in the history of sustainable investments, religious and ethical movements have played a fundamental role, so much that in some texts reference is made to ESG-E criteria where the last letter stands for Etichs; we can therefore consider a fourth and final sphere that refers to criteria of exclusion of the arms industry, nuclear energy, tobacco and in general any product that is harmful to human health, gambling, indifference to animal rights, biotechnology, homophobia.

1.3 THE SUSTAINABILITY REPORT

Regulatory changes have contributed to the spread of this "new" finance, for example by enriching the set of information available to investor, which large companies are obliged to provide, with purely non-financial documents such as the Sustainability Report, also called Social Report. This document becomes mandatory, for companies with certain requirements such as a number of employees over five hundred and whose consolidated financial statements meet certain legal criteria, only from 2017 when Directive 2014/95/EU (European Parliament & Council, 2015)[13] comes into force.

In the directive, the Council of the European Union places the issue of social sustainability in the foreground, making explicit the obligation on the part of companies to operate to the full satisfaction not only of their shareholders, but of all the stakeholders that revolve around its universe (employees, suppliers, customers and many others). The EU has also recognized for the first time the importance of communicating in a clear and understandable way,

[13] Directive 2014/95/UE, European Parliament & Council. https://eur-lex.europa.eu/legal-content/IT/TXT/HTML/?uri=CELEX:32014L0095&from=IT)

information regarding social and environmental factors, in order to increase the confidence of investors and consumers in the company.

Although the European Union has not provided guidelines for the preparation of such a document, major global companies have standardized thanks to the Global Reporting Initiative (GRI):

The Gri model (GRI G4)[14] was born in 1997 from the cooperation between Coalition for Environmentally Responsible Economies (CERES) and United Nationals Environmental Programme (UNEP), over the years has undergone updates and modifications until arriving at the current G4 formulated in 2013. At the basis of this model is the conviction of combining long-term profitability with ethical social behavior that respects the environment and the community.

Sustainability reporting is in fact not just a fad: as the European and Italian authorities have made clear, sustainability reports will be taken into consideration for the issuing of subsidies and low-interest loans in order to give preference to companies actively involved in environmental and social responsibility. The European Council meeting in February 2021 announced that it has prepared 672.5 billion euros in grants and loans for public investment to be divided among the 27 Member States, in order to promote the "green and digital transitions and build resilient and inclusive societies", for this reason at least 37% of the allocation of each country must support green transition and at least 20% digital transformation. Environmental screenings will therefore be key to the admission of projects to European funds, as well as the Recovery Fund from which Italy will receive around 208 billion euros, commented Environment Minister Sergio Costa:

“The missions in the use of the EU Recovery fund cover six main areas of action, which have the environment as a common denominator: Digitization, innovation and competitiveness of the production system; Green revolution and ecological transition; Infrastructure for mobility; Education, training, research and culture; Social, gender and territorial equity; Health. These six pillars are all crossed by a sort of green backbone. But all projects must be

[14] GRI G4, “Reporting Principies and standard disclosures & Implementation manual”, 2016. https://www.globalreporting.org/Pages/default.aspx

environmentally virtuous, not just those of the Ministry of the Environment, so green crosses the entire plan." (Italian Ministry of Environment, 2020)[15]

1.4 INVESTMENT STRATEGIES

A socially responsible investment can be made in different ways that, for simplicity, we will call strategies from now on. To analyze the different strategies, two documents will be elaborated: the 2016 Eurofis report (Eurosif, 2016)[16] and the study "Investire Green" by Il Sole 24 Ore (Il Sole24Ore, 2021)[17].

Eurosif identifies seven different SRI investment strategies:

- ◊ Exclusion of holdings from investment universe: excluding certain companies, sectors or countries considered controversial on the basis of certain principles and values, such as the arms, tobacco and alcohol sectors. In Figure 4[18] (Eurosif, 2016) we can see sectors most affected by the exclusion strategy.

[15] Press release by the Italian Ministry of Environment, 10th September 2020.
[16] Eurosif, European SRI Study, 2016. www.eurosif.org/
[17] Investire Green, Il Sole 24 Ore, February 2021.
[18] Top exclusion criteria. Eurosif, SRI Study. 2016

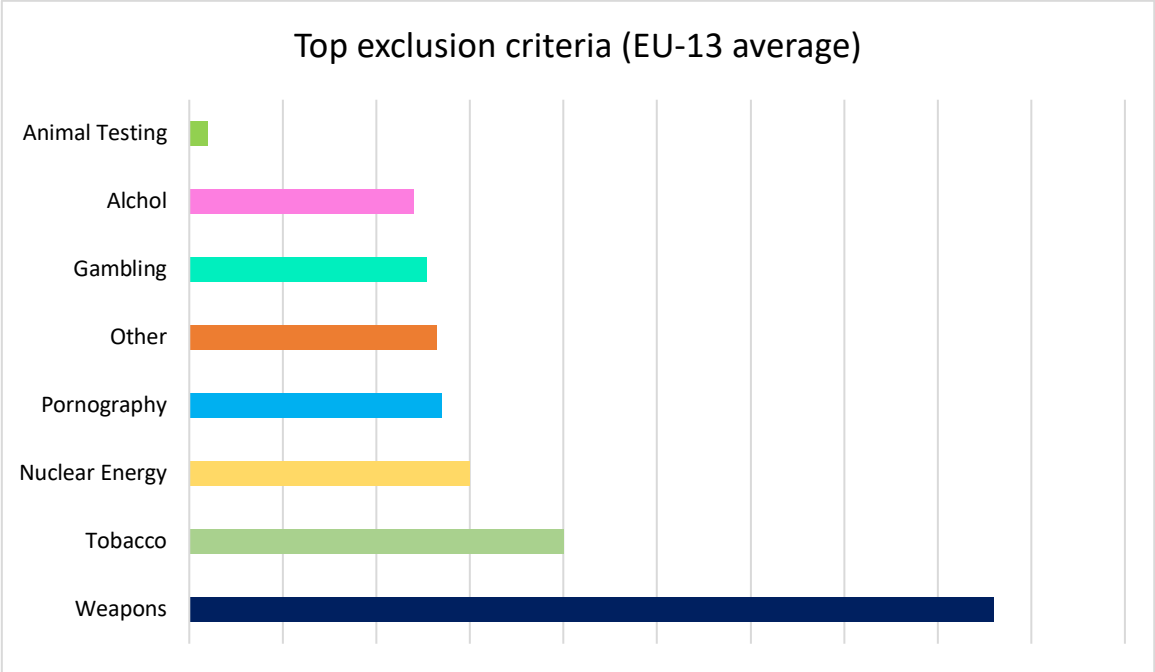


Figure 4: Top exclusion criteria. Eurosif, SRI Study, 2016.

◊ Norms-based screening: this type of screening selects companies that voluntarily adhere to globally recognized norms on issues such as human rights, anti-corruption standards and environmental protection. As Sole 24 Ore specifies, the most widely used norms are those defined by the OECD or UN, such as the Global Compact and the Conventions of the International Labor Organization.

◊ Best-in-class investment selection: a strategy that provides for positive screening, i.e., aimed at selecting only those companies that have proven to be the best (Best-in-class) in terms of their commitment to ESG within their sector or characteristic universe.

◊ Sustainability themed investment: this strategy focuses on very specific ESG themes such as water management. It represents an implementation of the ESG integration strategy, so much so that the two are sometimes merged, but differs from the latter in that it is reserved for niche sectors.

◊ ESG integration: as the term suggests, this means taking into consideration, in the investment evaluation, not only financial factors but also those linked to the three issues discussed above, Environmental, Social, Governance, placing them on the same level as traditional financial indicators.

◊ Engagement and voting on sustainability matters: in this case, a shareholder or investor opens a dialogue with company on sustainability issues and asserts his or her

right to vote at the shareholders' meeting. This is an activity that requires long-term strategic planning and aims to positively influence the behavior of the board and, in general, of the entire company, increasing transparency. As we have seen, the first case of Engagement in history occurred in 1971 with the activity of Reverend Leon Sullivan on the board of General Motors.

◊ Impact investing: investments in companies, projects, funds and organizations created to generate not only a financial return but also a positive and measurable socio-environmental impact; this strategy is mainly implemented in emerging countries. Some examples are investments in microfinance and social housing.

In Figure 5[19] (Sustainable finance forum, 2020), we present a chart created during SRI Week 2020 by the Sustainable Finance Forum, in which data on the implementations of different strategies are displayed. In this case, ESG integration and Sustainability themed investment strategies have been merged under the heading "Thematic Investments". As can be seen, the most widely used strategy is that of exclusion, which continues to have growing percentages.

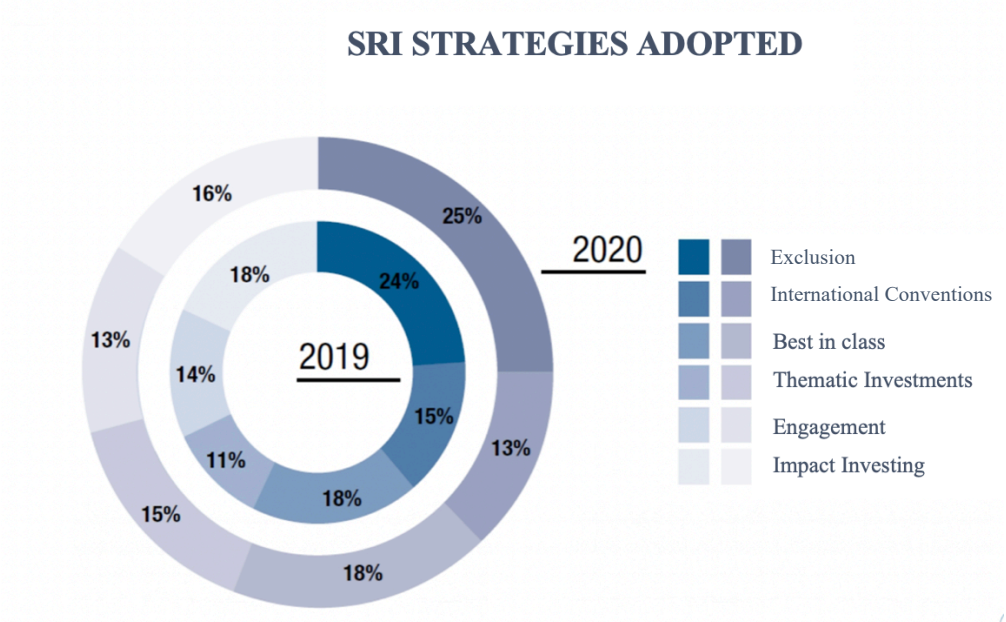


Figure 5: 2019-2020 strategies. Sustainable finance Forum.

[19] 2019-2020 SRI strategies adopted. Sustainable finance forum, 2020.

1.5 A NEW PARADIGM

We can say that what has taken shape in recent years is a real battlefield, where Traditional Finance, interested only in economic aspects, and the so-called "Good Finance" face each other. The former, despite not explicitly declaring attention to non-financial parameters, implies that the creation of shared value is already included in the contractual relationship between investors and financial players. The reality is that public opinion has a very negative view of traditional finance due to the great financial crises, that of 2008 above all, which burned billions in household savings and caused the reputation of financial operators to plummet; in this picture, however, it is not taken into account that share price contains numerous evaluations, above all linked to risk, which make it possible to identify (apart from a few exceptions) the most deserving activities, allowing the efficient allocation of resources. Despite this premise, institutions (above all the European Commission) have launched new measures that will make certain aspects such as the integration of ESG factors in financial products and the advisor-investor relationship more transparent, thanks to the new European directive on financial markets Mifid2 (European Parliament & Council, 2014)[20]: the advisor will have the obligation to investigate the sustainable orientation of his client in order to adequately select the product (ETF, Fund or other) to be included in the portfolio.
The question arises, however, whether responsible investments have higher economic returns than traditional investments simply because they are driven by media and social attention, or whether companies that adopt ESG strategies really manage to outperform their competitors, for example by paying attention to energy efficiency, which leads to the minimization of costs, or attention to the rights of employees who, feeling more protected, improve their work performance. For this very reason, scholars are questioning the phenomenon, wondering whether it is a structural change or a fad: in fact, it is necessary to highlight the presence of opportunistic behavior on the part of issuers who claim to be sustainable when in fact they are not. This phenomenon is called Green-washing or Social-washing (Magali A. Delmas, 2011)[21]:
Firms that adopt these behaviors are characterized by assuming, simultaneously, two antithetical behaviors: a poor ESG performance and an advertising campaign that emphasizes the responsible commitment of the same. For simplicity's sake, we can divide firms' behavior

[20] Directive 2014/65/UE, European Parliament & Council, 15th May 2014.
[21] The drivers of greenwashing, Magali A. Delmas, Vanessa Cuerel Burbano, 2011.

into "socially responsible" (green firms) or "not socially responsible" (brown firms); moreover, we can divide firms into two groups, in relation to their communication, identifying "vocal firms" as those constantly engaged in communicating, through interviews and marketing campaigns, their responsible behavior, and "silent firms" as those who prefer not to communicate their responsible behavior. At this point, four quadrants are identified (Figure 6): of the firms that adopt socially responsible behaviors, those that communicate such behaviors are defined as "Vocal Green Firms" (quadrant II), while those that do not are called "Silent green firms" (quadrant IV); conversely, of the firms that do not adopt socially responsible behaviors, those that adopt communication campaigns in which they self-declare themselves "green" are defined as "Greenwashing firms" (quadrant I), while those that do not adopt them are defined as "Silent brown firms" (quadrant II)*"*.

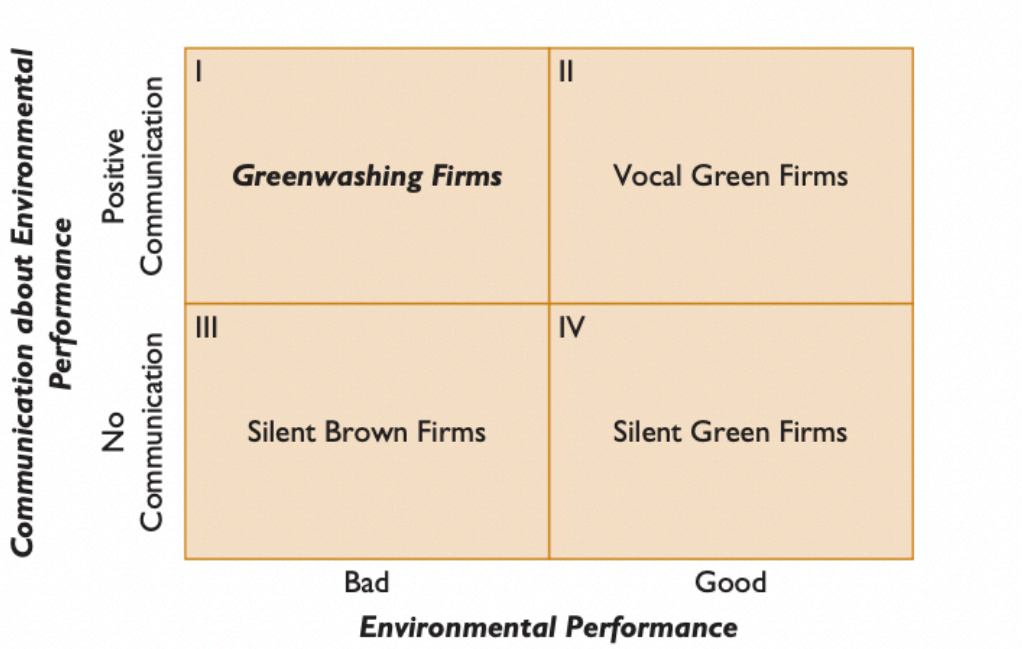


Figure 6: Types of companies based on their behaviors and communication strategies.

The greenwashing phenomenon is widely fought by authorities, especially by the European Commission, which in a study stated that about 42% of companies exaggerate in communicating their socially responsible behavior (European Commission, 2021)[22].

[22] *"National consumer protection authorities had reason to believe that in 42 percent of cases the claims were exaggerated, false or deceptive and could potentially qualify as unfair commercial practices under EU rules."* European Commission, January 2021.

One has to wonder why those companies try to hide their unresponsible behaviors and the reason is to find in "reputation": to improve it, companies implement "Corporate Social Responsibility" (CSR) strategies (Harvard Law School, 2019)[23]. In finance a company with good reputation is seen as less risky that competitors and it could reach more important economic results; reputation is a competitive advantage because it is not imitable and strongly differentiating from others. If this reputation comes from the implementation of CSR, the company could have financial advantages because of the premium price customers would pay to buy its products or services.

In conclusion, we can say that the characteristics of sustainable finance are a valid certification of the fact that this is, more than a trend, a structural change: in fact, it is institutional investors who, reacting to regulatory changes and the new non-financial information available, have begun to adopt investment strategies oriented towards ESG factors. The key is represented by the availability of new information which, from the perspective of an optimal search for the asset to invest in, has been added to the financial indicators; in this context, it is then legitimate to expect that such information sets will be adopted also in the future, bringing sustainable finance to be much more than a fashion within the financial industry.

It seems to be easier to find ESG factors on products specialized in sectors typically related to sustainable topics. Sometimes it is, in fact a fund investing into renewable energy tries to select ex-ante companies involved in the transition to "clean" sources. If we have a look on these funds, we will see that not every "green" company have a high sustainable score: effectively even a waste recycling company could be indicated as "not responsible" because of its bad disposal processes or because of it underpays employees. On the other way, an oil company could be involved in the reduction of environmental pollution by reducing its toxic emission or improving its safeguards to avoid accidents.

1.6 THE REVOLUTION OF INVESTMENT FUNDS

Based on 2019 World Economic Forum data, global risks are changed over last ten years, moving from a prevalence of economic type in 2009 and 2010 to an ever-increasing

[23] "We define CSR as both a firm's *engagement* (voluntarily initiated) in and its *compliance* (legally mandated) to environmental, social, and governance (ESG) issues." Harvard Law School, Febryary 2019. https://corpgov.law.harvard.edu/2014/02/19/the-foundations-of-corporate-social-responsibility/

frequency of environmental and social risks, especially since 2017. The problem is not just that risks are more recurring, but that those risks could cause a more serious damage. Recent events have shown that social and environmental irresponsibility exposes companies to serious risks, such as reputational and operative, that affect financial returns too.
For these reasons, investors started thinking that selecting securities from an ESG point of view could be a successful driver for long-term value creation and to mitigate financial and reputational risks.
At the dawn of 2020, precisely on January 14th, Black Rock CEO Larry Fink publishes his annual letter to investors, a letter that marks a fundamental crossroads for the entire financial landscape interested in responsible investment: for the first time a figure of such resonance openly advocates a new investment mindset aimed at ESG issues. In the letter, in fact, Fink highlights how climate change is forcing investors to revise the fundamental assumptions of modern finance, as the association of climate risk with investment risk will lead to a profound reassessment of assets and risk parameters.
"World's largest asset manager becomes the largest global sustainable investor" (Hale, 2020)[24], according to BlackRock, sustainability is the "new standard" and companies that want to benefit from the inclusion in the investment portfolio of New York-based company will have to adopt strategies to minimize climate risks and other environmental, social and governance risks (ESG).
As you can see from Figure 7[25] (Morningstar Direct Manager Research, 2019), in 2019 alone, sustainable assets invested around the world nearly tripled from just over $40 billion to about $120.

[24] Morningstar, January 2020. https://www.morningstar.it/it/news/198865/esg-morningstar-commenta-la-lettera-di-fink-(blackrock).aspx
[25] Annual European Sustainable Fund flows, 2009-2019. Morningstar direct manager research, December 2019.

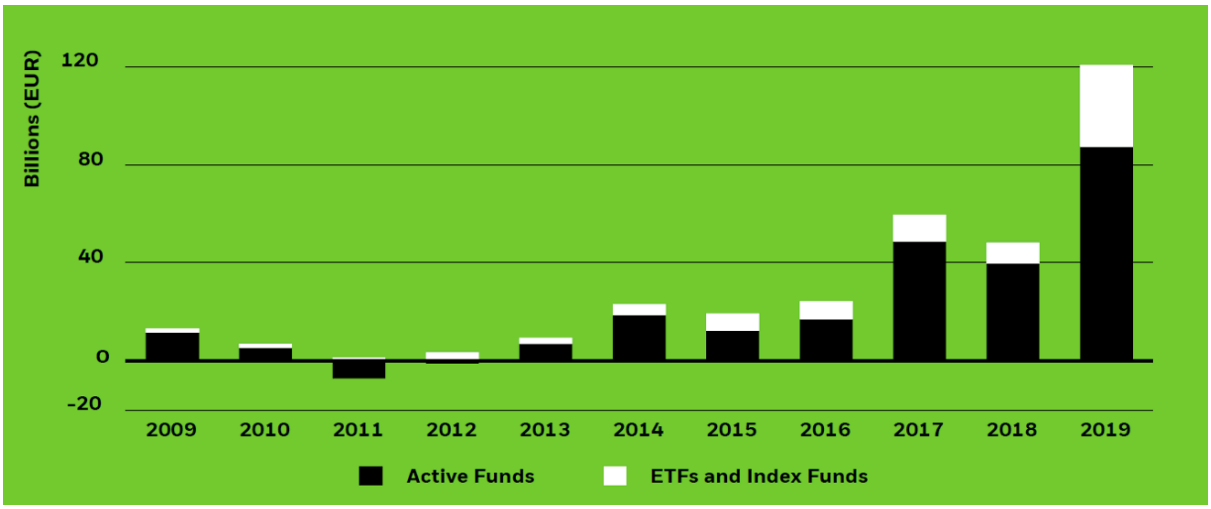


Figure 7: Annual European sustainable fund flows, 2010-19

With regard to Exchange Trade Funds (ETFs), i.e. "funds whose main objective is to faithfully replicate the performance, and therefore the yield, of equity, bond or commodity indices" (Borsa Italiana, s.d.)[26], we can see from Figure 8 (Bloomberg, 2021)[27] that 2020 was the only year in which cash flow invested in ESG-branded ETFs exceeded that of classic ETFs, reaching $45.5 billion.

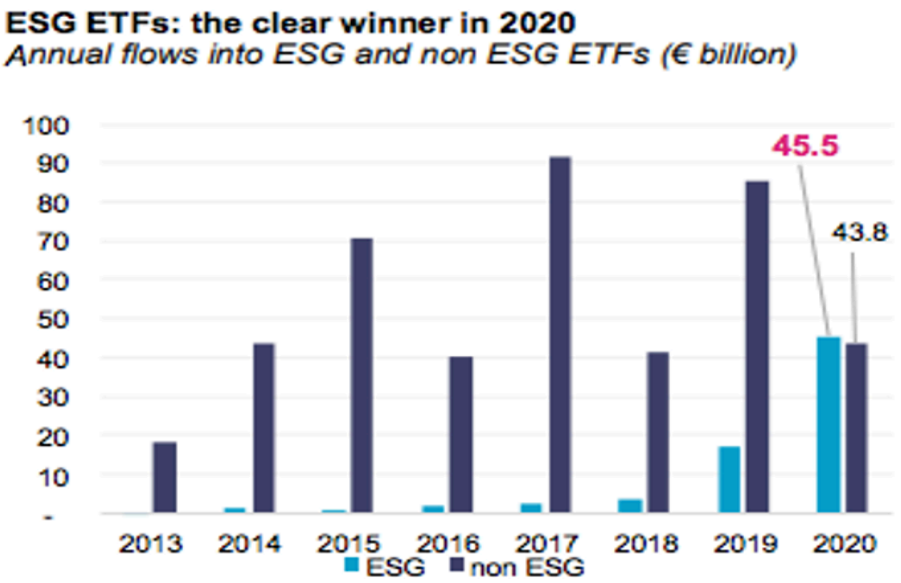


Figure 8: Annual flows into ESG and non ESG ETFs

[26] Cos'è un ETF?, Borsa Italiana. https://www.borsaitaliana.it/etf/formazione/cosaeunetf/coseunetf.htm
[27] Bloomberg, Lyxor International Asset Management, 2021

Blackrock was not the only isolated case to change its investment approach, but it was followed with a cascading effect by the largest financial players; Pictet, a banking group specializing in asset management, is an example:

In a letter published in February 2020, the partners of the Swiss Sgr declare their commitment to the fight against climate change, announcing to zero, by 2021, their exposure in companies involved in the production and extraction of fossil fuels (oil, gas and thermal coal), while committing to adopt ESG criteria for 100% of their investments by 2025.

In Figure 9 we can see the excluded sectors from Pictet's investment portfolio, but also those in which the company has declared its commitment through five guidelines (Pictet Asset Manager)[28]:

1. Integration of ESG factors into all investment processes;
2. Exercise of its voting rights at shareholders' meetings of portfolio companies;
3. Dialogue with companies and governments to raise awareness of ESG issues;
4. Acting as advocates for responsible investment;
5. Transparency with its clients.

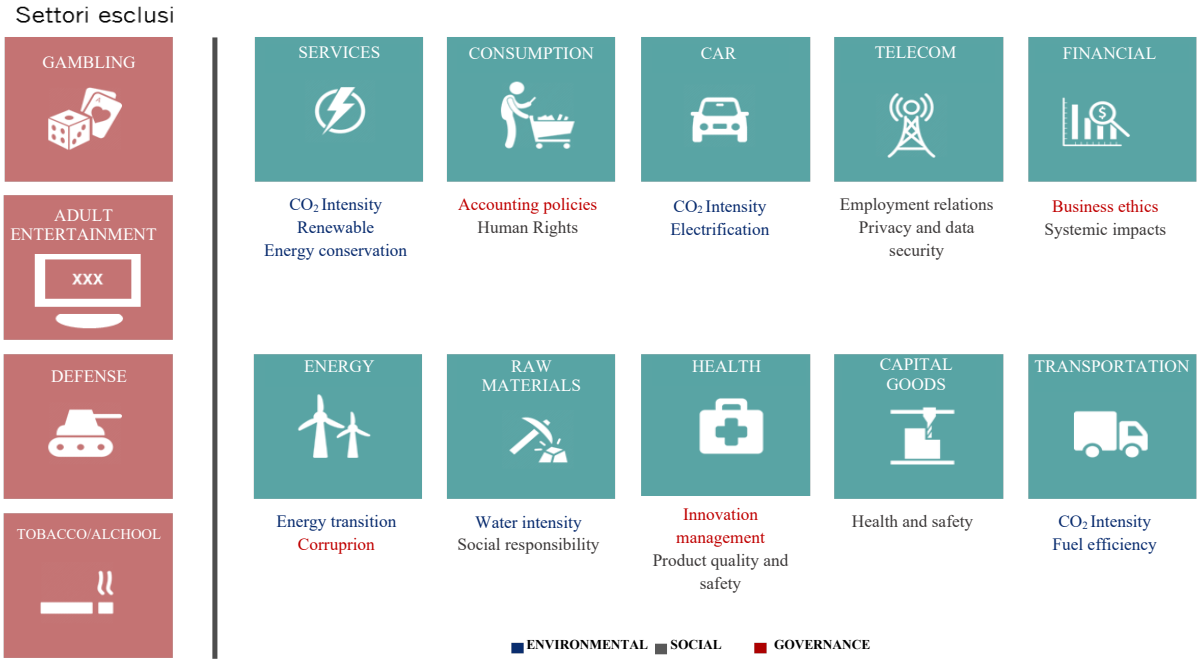


Figura 9: Sectors involved in the transition to responsible investment, Pictet.

[28]Investimento responsabile in Pictet Asset Manager. https://www.am.pictet/it/italy/articoli/home-page/investimento-responsabile

In a broader view, asset manager saw that ESG investing impacts investment performance in two different ways. First, it is a new and alternative risk assessment model, because of its criteria (non-financial vs financial risk) and the time horizon (very long-term vs medium term; using this risk model can demonstrate that portfolios are better managed, implying positive impact on return. Second, ESG is not seen just as a risk model, but it is an investment style: as we have seen ESG generates positive investment flows that on a trickle-down effect impact asset prices and portfolio returns; on the contrary negative investment flows generate a price decrease due to lack of demand.
This is why we can't compare ESG investing with other portfolios' strategies: they are driven by demand and there are reasons to believe that this demand will continue over coming years.

CHAPTER 2
SRI INDICES AND THEIR CONSTRUCTION

2.1 INDICES HISTORY

As we have seen, investors are looking for new parameters, of a non-financial nature, in order to analyze and choose stocks to include in their portfolios; this selection is aimed at obtaining greater security and stability in terms of risk, due to the fact that ESG parameters are now considered as the determinants for a successful long-term strategy within companies.
With the rapid rise of responsible investing and issues such as sustainable finance, so-called SRI indices have emerged, i.e. indices that, in addition to the usual variables of capitalization and liquidity of securities, take into account environmental, social and governance factors. These indices are therefore composed of securities selected on the basis of their performance in the ESG field. There are mainly four selection strategies:

1. Exclusion: consists of the exclusion of individual broadcasters or entire sectors considered controversial such as alcohol, tobacco, weapons, nuclear.
2. Thematicity: "Thematic indices" are defined as those focused on one or more sustainability issues such as energy efficiency, climate change etc.
3. Best in class: selection of the best issuers within a sector or group.
4. Blacklist: in this case the index provider will exclude from the selection those securities that have obtained an ESG rating score below a certain threshold, i.e. those entities that can be defined as insufficient in environmental, social and governance terms.

The difference between the Best-in-class strategy and the Blacklist strategy is therefore in the choice of the reference threshold, which must be high in one case, low in the other.
The birth of these indices has made it possible to carry out analyses and market studies, in particular making it easy to compare companies with similar financial characteristics but very different ESG ratings; these analyses are often carried out by asset management companies to identify, within a group or a sector, if and how much ESG criteria affect the performance of companies, showing the investor whether in that specific market segment, the choice of responsible investment has brought benefits in terms of return. Comparison is made easy by

the fact that sustainability indices almost always have their own classical counterpart, which is why the question is often asked whether, over a defined time horizon, they have performed better, worse or similar to their respective benchmarks.
Now we would like to present the three main SRI indices on the global scene, analyzing their history and their construction:

1. MSCI World SRI Index;
2. Dow Jones Sustainability Index;
3. FTSE 4GOOD.

2.2 MSCI WORLD SRI INDICES

Morgan Stanley Capital International is a U.S. provider of financial instruments, founded in 1969 in New York. Among its work, it calculates and publishes the value of multiple equity indices that are used by leading asset managers (mutual funds, SGRs, ETFs) as benchmarks for their performance. With over fifty years of experience in financial research and data processing, they help investors analyze key drivers of risk and return, maximizing efficiency in allocating stocks in their portfolios.
MSCI is also a signatory to the United Nations Principles for Responsible Investment (UN PRI).
As mentioned before, the company was founded in 1969 and until 2007 the only two shareholders were Morgan Stanley and Capital Group International, but in 2009 the company was listed on the NYSE and became a public company with a broad shareholder base. In 2004, in order to deepen its know-how and expand its services, MSCI acquired Barra, a provider of analytical tools for portfolio risk. In 2010, RiskMetrics Group, a leader in portfolio risk management products and services, was acquired, which in turn-controlled Centre for Financial Research and Analytics (CFRA), Innovest Strategic Value Advisor and KLD Research and Analytics. Leveraging synergies among the various companies makes MSCI the leading group in financial advisory services. In 2010, in response to growing investor demand for transparency in hedge funds, MSCI acquired Measurisk, a provider of tools for risk measurement and transparency in hedge funds. In 2012 MSCI expands its

offerings by entering the real estate market through the acquisition of IPD, a company that dealt with performance measurement in this sector; this acquisition also led to the creation of the first real estate indices that were added to the family of traditional indices. Finally, in 2014, Governance Holdings Co. was acquired, which focuses on disseminating research on corporate governance and ratings to institutional investors, banks, insurance companies and businesses interested in incorporating ESG factors into risk assessments and investment decisions.

To date, MSCI is the most comprehensive company, in terms of range and services, in the entire global financial landscape.

MSCI provides a large number of sustainable indices but, in this research, we will consider the "World SRI Index" provided by MSCI ESG Research (MSCI)[29].

The index is capitalization weighted and includes large and mid-cap stocks across twenty-three Developed Markets (DM) countries. There are three main sources from which they find parameters to implement the index:

1. Macroeconomic data of a specific sector or geographical area built by academic research, governments or non-governmental organizations;
2. Papers distributed from the companies (10-K, Sustainability Reports, Annual General Meetings);
3. Media, governmental database, others.

After the selection process, companies are evaluated continuously every day to be sure they are not involved in disputes or events regarding their governance. More specifically, MSCI checks carefully if a company is violating standards or international principles and attributes it a colour based on five categories (Environmental, Clients, Human Rights, Workers Rights, Governance):

- Red, if company is involved in a very severe dispute;
- Orange, if company was involved in a very severe dispute;
- Yellow, if company is involved in a moderate dispute;
- Green, if company is not involved in dispute.

[29] MSCI World SRI Index. https://www.msci.com/documents/10199/641712d5-6435-4b2d-9abb-84a53f6c00e4

These information are included in weekly reports that are used to modify the ESG rating of the companies; then analysts check how companies have reacted, analyzing the strategies they have implemented and how they are monitoring risks and opportunities.
Let's now find out the selection process.
The research starts from the index's benchmark and MSCI excluded securities that are part of the following sector:

- Nuclear Power
  - Producers
  - Uranium extractors
  - Nuclear reactor designer
  - Companies that obtain at least 15% of their revenues from nuclear industry
  - Companies that use at least 50% of their energetic requirements from nuclear power
- Tobacco
  - Producers
  - Distributors/sellers that obtain at least 15% of their revenues from this industry
- Alcohol
  - Producers
  - Distributors/sellers that obtain at least 15% of their revenues from this industry
- Gambling
  - Companies that obtain at least 5% of their revenues from betting, gambling and casino.

After the exclusion of those companies, a Best-In-Class strategy is used to select, from the remaining securities, those with the highest ESG rating, making up 25% of the market capitalization in each sector and region of the parent index. Currently, companies that are not included in MSCI World SRI Index have an ESG rating above BBB.
In the following figures there are presented the mean features of the MSCI World SRI: there are 357 constituents, and the most represented country is United States with 63,21% of weight.

INDEX CHARACTERISTICS

	MSCI World SRI	MSCI World
Number of Constituents	357	1,583
	Weight (%)	
Largest	12.69	3.98
Smallest	0.02	0.00
Average	0.28	0.06
Median	0.11	0.03

Figure 10: MSCI World indices characteristics.

TOP 10 CONSTITUENTS

	Country	Index Wt. (%)	Parent Index Wt. (%)	Sector
MICROSOFT CORP	US	12.69	3.21	Info Tech
TESLA	US	3.83	0.97	Cons Discr
DISNEY (WALT)	US	2.59	0.66	Comm Srvcs
NVIDIA	US	2.57	0.65	Info Tech
PROCTER & GAMBLE CO	US	2.34	0.59	Cons Staples
HOME DEPOT	US	2.11	0.53	Cons Discr
ASML HLDG	NL	1.83	0.46	Info Tech
ROCHE HOLDING GENUSS	CH	1.76	0.44	Health Care
SALESFORCE.COM	US	1.50	0.38	Info Tech
PEPSICO	US	1.36	0.34	Cons Staples
Total		32.56	8.23	

Figure 11: MSCI World top 10 constituents.

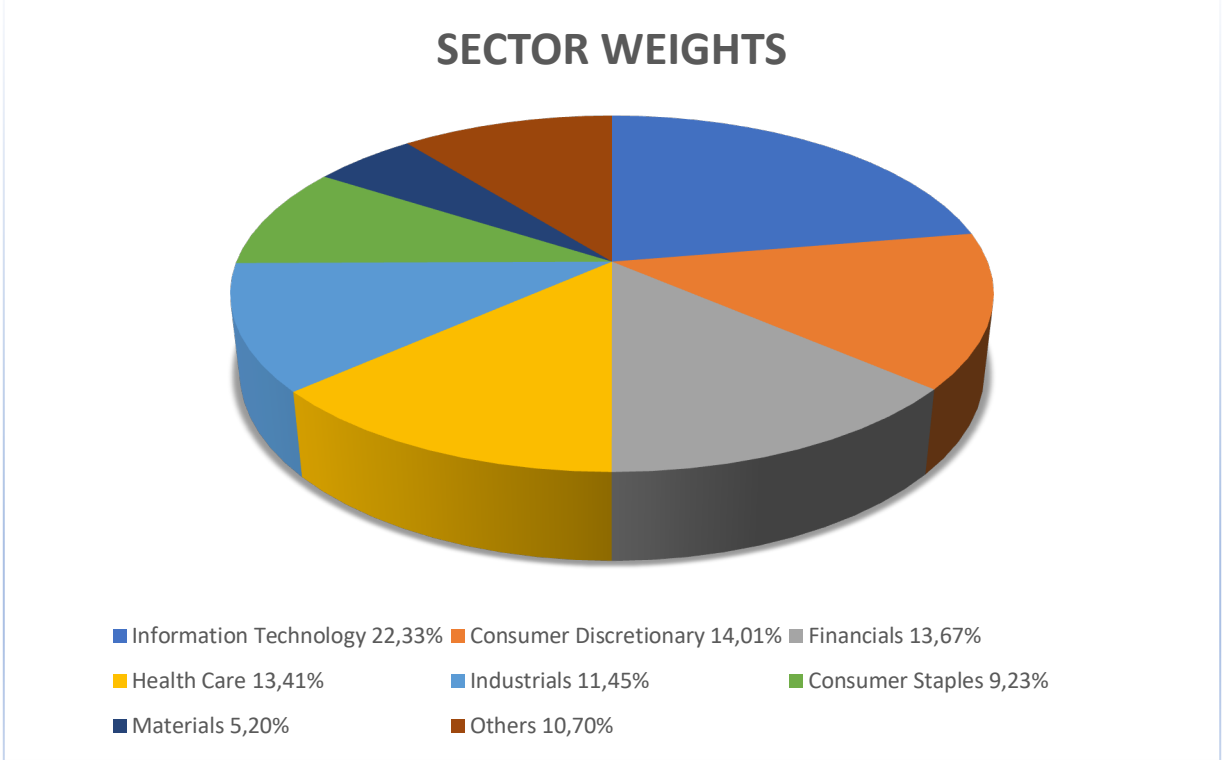


Figure 12:MSCI World SRI Sector Weights.

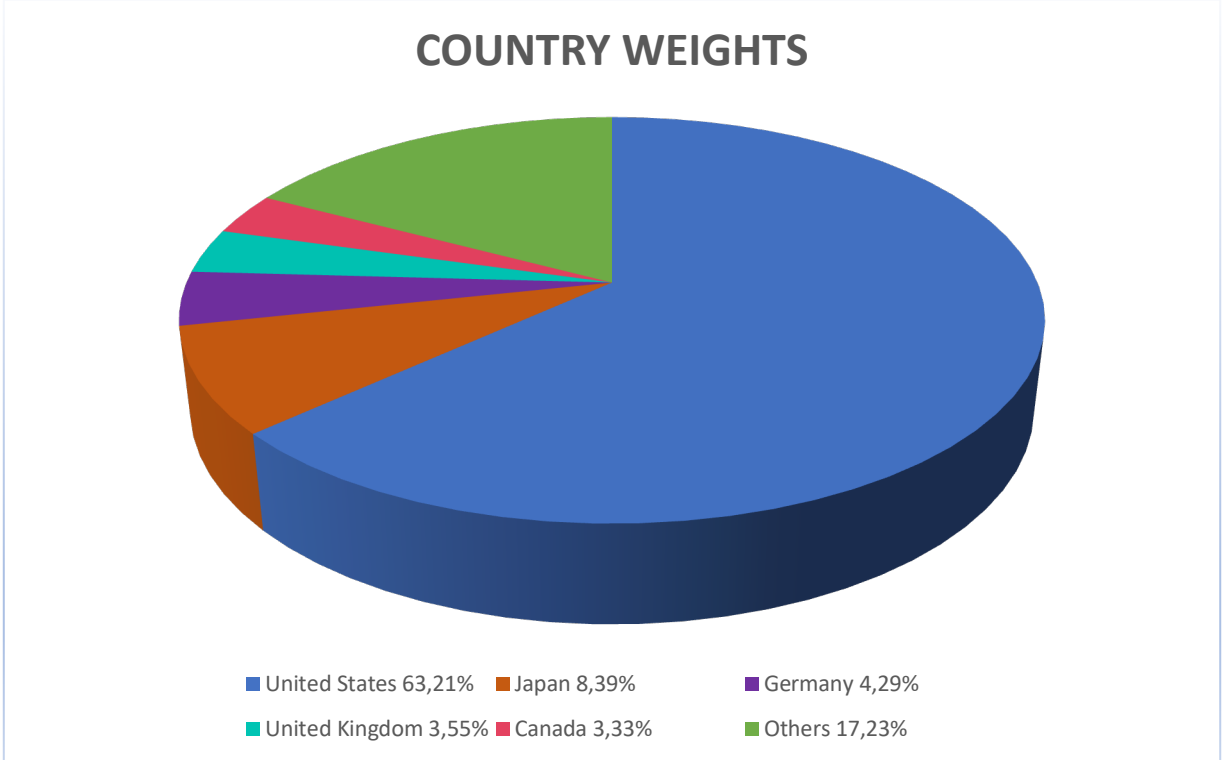


Figure 13: MSCI World SRI Country Weights.

2.3 DOW JONES SUSTAINABILITY INDICES

Dow Jones sustainability indices (DJSI) is the first indices series of history based on sustainability theme, launched in 1999 from the collaboration of Robecco SAM and S&P Dow Jones Indices. S&P Dow Jones Indices is one of the biggest suppliers of indices, data and financial services of the world; Robecco SAM instead was born in 1995 as an agency specialized in sustainable investment. These indices select the most sustainable companies across sixty-one industries, combining the expertise of an index provider and a sustainable investor.

The DJSI applies a strict methodology for the selection process, based on the annual S&P Global Corporate Sustainability Assessment (CSA), that gives to companies a sustainability score.

CSA is a set of questionnaires (one for each sector) that companies are asked to fill: every sector has a different questionnaire based on the "Financial materiality matrix", that helps to highlight the sustainability factors that have the biggest impact on the performance of a business or a company and so those that are more relevant on a long-term financial perspective. Each factor is analyzed and ranked according to the magnitude and likelihood of its impact on the company's business value drivers and financial performance over time.

The factors that appear in the upper right-hand corner of the matrix are the most financially material. We can see in Figure 14[30] (RobeccoSAM) an example of financial matrix used for the pharmaceutical industry; as we could imagine, "Product quality and safety" is the most important factor.

[30] RobecoSAM's Corporate Sustainability Assessment Methodology. https://pdf4pro.com/amp/view/measuring-intangibles-robecosam-5c1b3.html

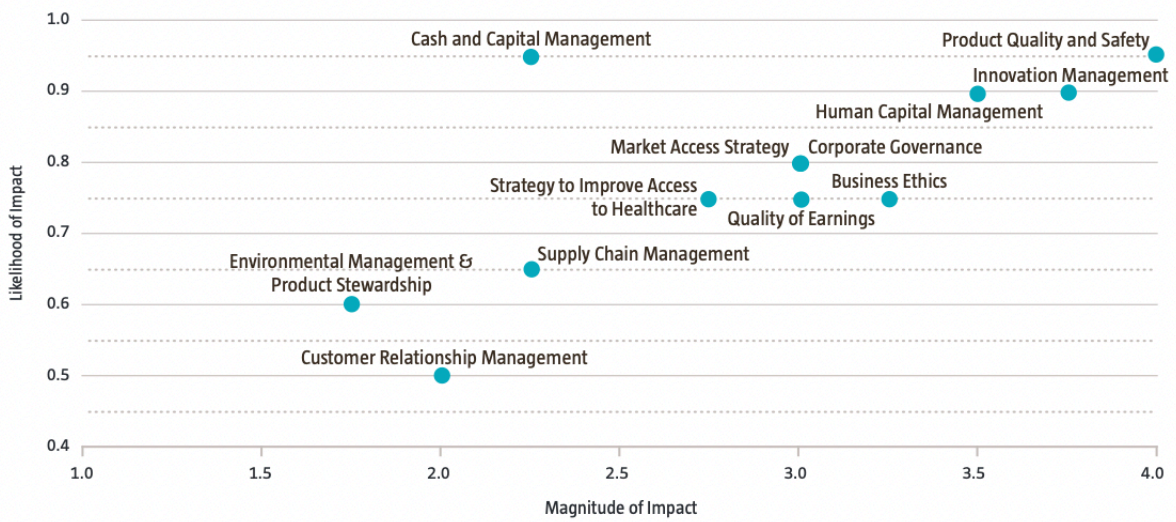


Figure 14: Financial materiality matrix for the pharmaceuticals industry

Thanks to the CSA both general and industry-specific criteria covering environmental, social and economic are captured. "Each of the three dimensions consist of, on average, 6-10 broad criteria and each of these contains between 2-10 questions; there are generally 80-120 questions per questionnaire" (Robecco SAM, s.d.)[31]. A sustainable score of up to 100 is given to every company based on the questionnaire. The following figure 15 represents an overview of the general structure:

[31] RobecoSAM's Corporate Sustainability Assessment Methodology. https://pdf4pro.com/amp/view/measuring-intangibles-robecosam-5c1b3.html

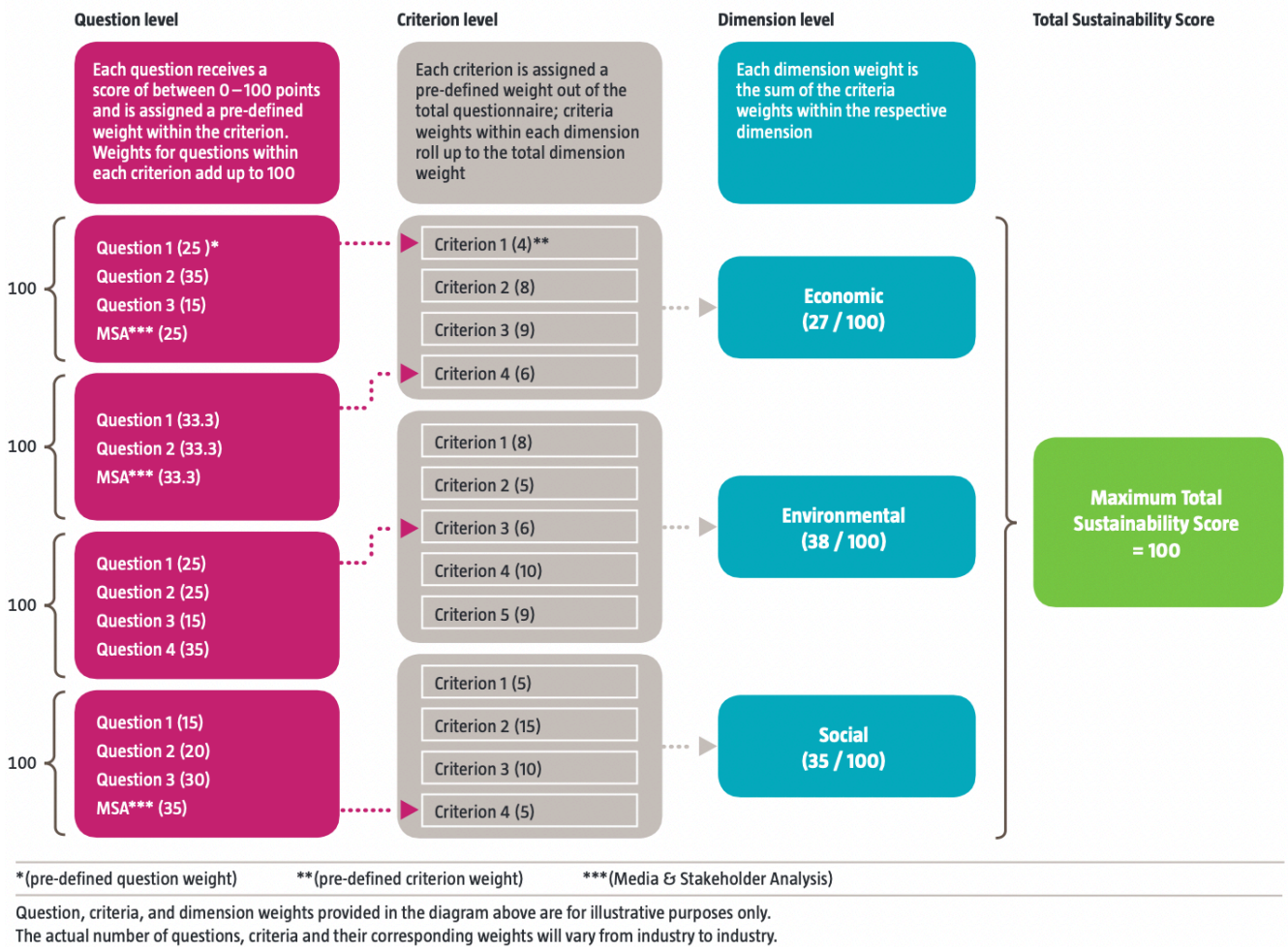


Figure 15: Structure of the RobecoSAM Corporate Sustainability Assessment

RobecoSAM must control the accuracy of the answers given by company with the supporting documentation they have provided, looking at publicly information (financial statement, sustainable reports, managers' interviews) and verifying a company's track record on crisis management with stakeholders and media reports. In addition, RobecoSAM asks third party for an independent assurance, that often is given by Deloitte.

There are not excluded industry and only the top ranked companies of a specific category are included into it.

The starting point of the selection is the S&P Global Broad Market Index, also known as S&P 1200, that contain approximately ten thousand companies; only forty-five hundred companies are invited to the CSA, and once the analysis is complete it takes place a rules-based selection of top 10% most sustainable market caps per industry, based on their

sustainability scores. Every year, in September, based on the annual CSA the composition of the DJSI is reviewed.

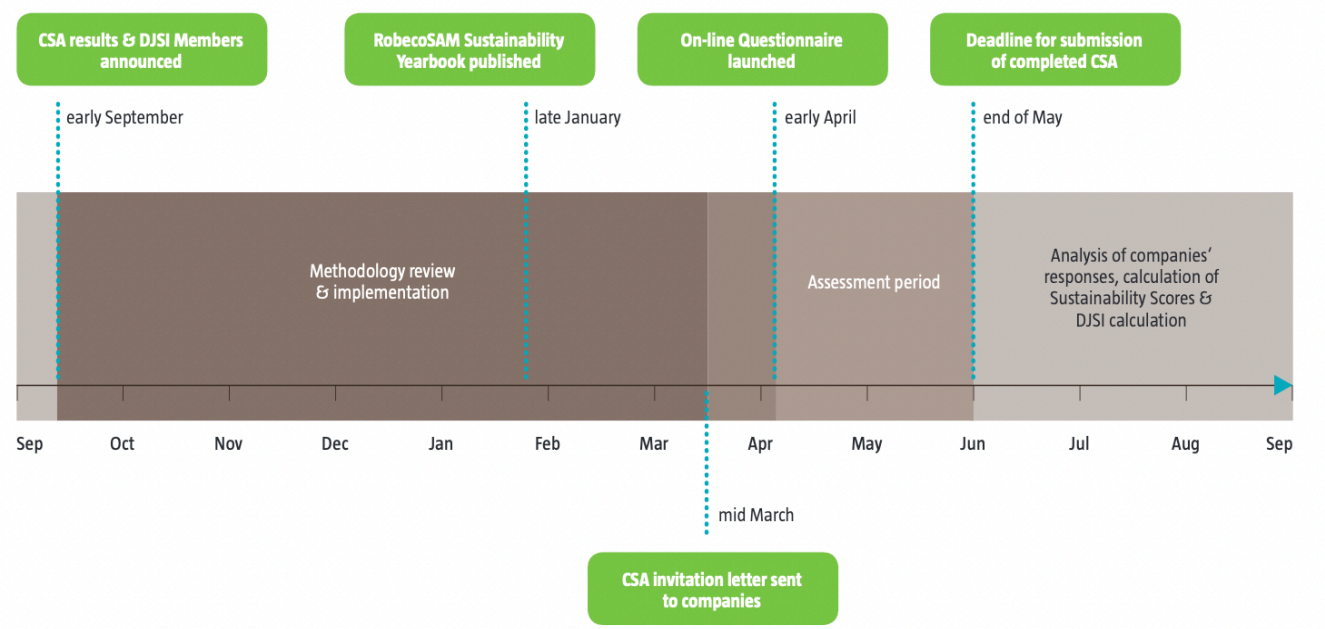


Figure 16: Timeline of CSA process.

After the evaluation done with the questionnaire, analysts select eligible securities following next steps:

1. Remove, from the universe of evaluated securities, those that have a total sustainable score less than 40% of the total sustainability score of the security with the highest score.
2. Make sure that there is a sufficient number of securities, in each sector, with a sustainable score to select at least one security in every sector following the planned rules. If there is not a sufficient number in one or more sectors, these could be united into one single index.

Companies that result from this selection process will compose the "eligible universe". Lastly, from the universe of eligible securities, analysts make the family's indices following next steps:

1. Ranking securities based on their sustainability score, starting from the best;
2. Select companies that compose the eligible universe;
3. Select, from the remaining companies, those that have a sustainable score worse of 0.3 from last selected company;
4. Select, from the remaining companies, those that satisfy at least one of these points:

a. Current components of index in question;
b. Companies that are within a total % of all the invited companies in a specific sector.

Every single index is then weighted based on free float adjusted market capitalization of securities.

"The Dow Jones Sustainability Index Family comprises global, regional and country benchmarks" (DJSI)[32] as shown in the following list:

- DJSI World
- DJSI North America
- DJSI Europe
- DJSI Asia Pacific
- DJSI Emerging Markets
- DJSI Korea
- DJSI Australia
- DJSI Chile
- DJSI MILA Pacific Alliance

In following Figure 17 and Figure 18 we present the composition of the largest index: Dow Jones Sustainability Index World.
DJSI World covers dozens of industry groups and has members in more than 20 nations, led by United States with 42%. Furthermore, the most present sector is IT, followed by Health Care, together they form almost 50%.

[32] DJSI Index Family. https://www.spglobal.com/esg/performance/indices/djsi-index-family

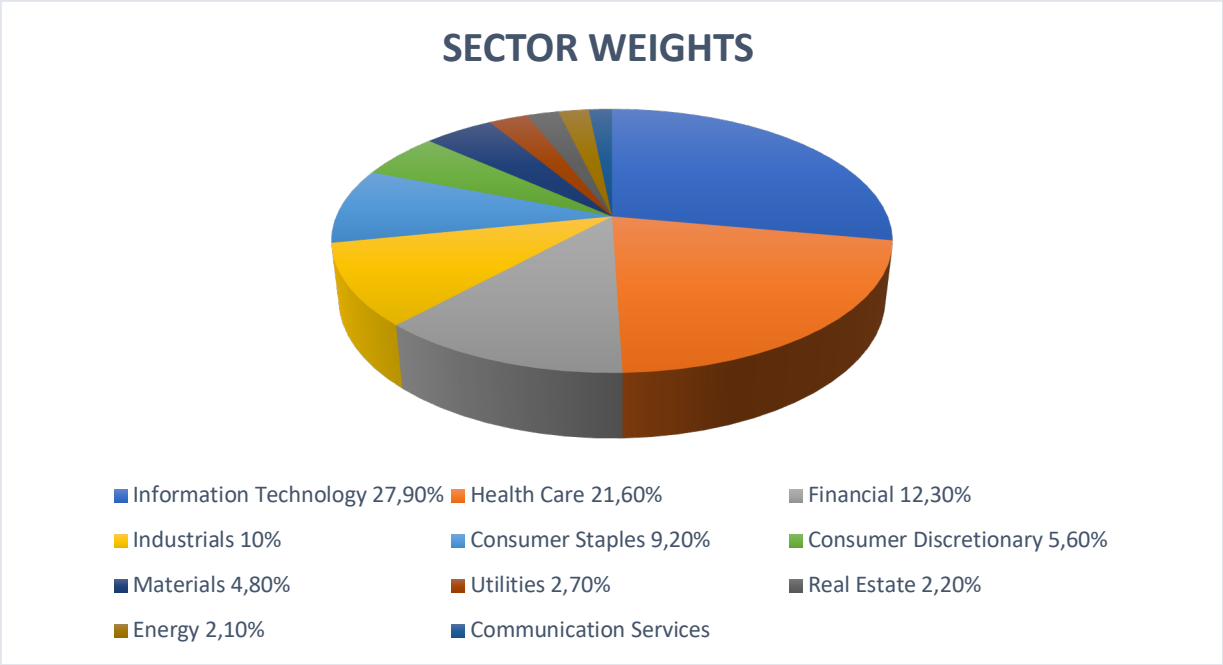


Figure 17: DJSI World Sector Weights.

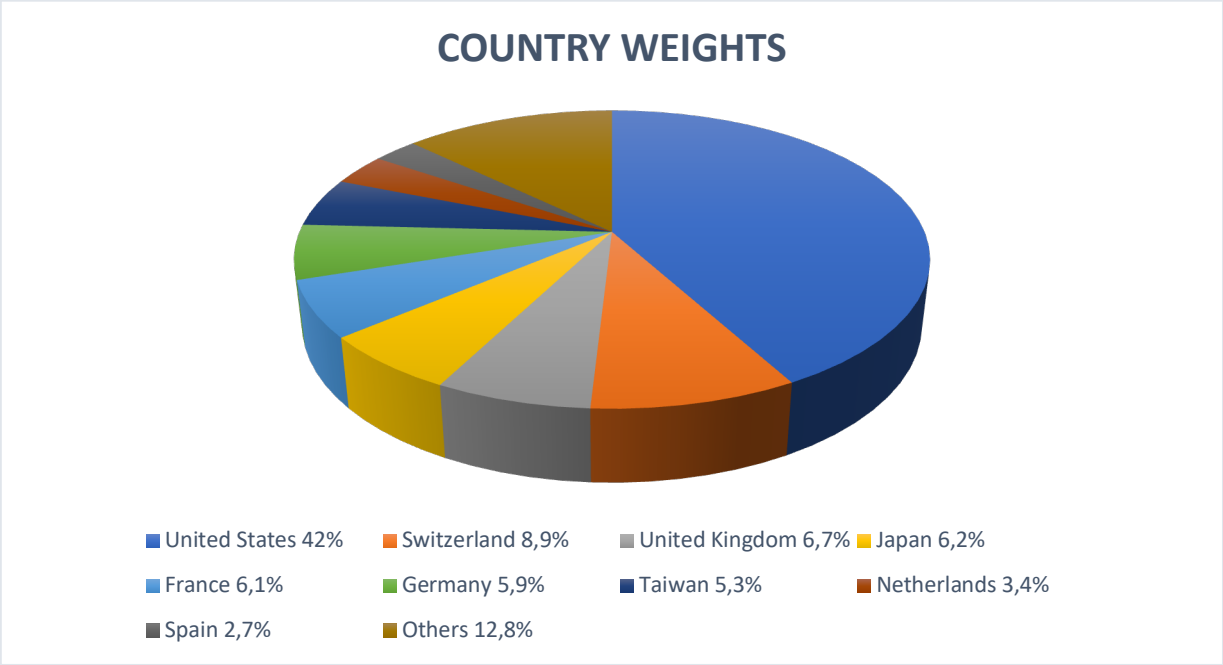


Figure 18: DJSI World Country Weights.

2.4 FTSE4GOOD INDICES

FTSE4GOOD is a series of indices provided by FTSE Russel, one of the most important financial company in the world. Its indices are used globally both from institutional and retail investor and they are designed applying highest standard and transparent methodologies.

As we can see on their website (FTSE Russel, s.d.)[33] the series measure the performance of companies demonstrating strong Environmental, Social and Governance practices. FTSE Russel uses relevant information and accuracy that allow them to propose modern products in step with times, guaranteeing security and scientific rigor.
The company's first index, FT–Actuaries All-Share Index, was launched in 1962 and it was the first version of the modern FTSE UK Index; many years passed and several indices have launched as long as in 1995 a joint venture between Financial Times and London Stock Exchange took place and for the first time the name "FTSE" appeared. In 2001 the FTSE4Good Index Series was launched to measure performance of companies with high social, environmental and governance standards. In 2015 FTSE and Russell merger to become the big company of today.
In FTSE4Goods the selection of companies is based on FTSE Russell's ESG Ratings, that includes over 7200 securities in 47 developed and emerging markets. The rating is calculated from three pillars (Environmental, Social, Governance), each of them divided into fourteen themes built on over 300 indicator that are applied to each company's unique ESG risk exposures. Every pillar, theme or indicator is marked with a score, that is the exposure of the company on it, from 3 to 0:

- 3: High Exposure
- 2: Moderate Exposure
- 1: Low Exposure
- 0: Not Determinable

Furthermore, company is valuated with a score from 5 to 0 based on its practice in that pillar, theme or indicator with:

- 5: Best Practice
- 0: No Disclosure

[33] FTSE4GOOD Indices. https://www.ftserussell.com/products/indices/ftse4good

It is important to say that FTSE Russell uses public information only to increase data credibility (FTSE Russell, 2016)[34].

Let's now see how analysts assign an ESG rating. First of all a "Theme exposure matrix" is built: several data are collected such as geographic positions, any accidents or disputes and they are used as factors. Then, for each of the fourteen themes, as we have seen before, a numerical score from 3 to 0 is assigned. The higher is the score, the higher the indicators for that theme (if a score is 0, company will not be evaluated on that specific theme). Now it is calculated the score of every theme and it depends on two factors:

1. Score percentage obtained by the individual indicators of that theme;
2. Company's exposure on that theme.

	LOW	**MEDIUM**	**HIGH**
0	N.D.	N.D.	N.D.
1	0 - 5 %	1 - 5 %	1 - 10 %
2	6 - 10 %	6 - 20 %	11 - 30 %
3	11 - 30 %	21 - 40 %	31 - 50 %
4	31 - 50 %	41 - 60 %	51 - 70 %
5	51 - 100 %	61 - 100 %	71 - 100 %

Table 1: Theme exposure matrix

To make an example, consider the theme "Human Rights" of a company with high exposure and 68% indicators score; as we can see on the table, for that percentage and exposure the overall score is 4.

At this point, analysts calculate the total score obtained from each of the three pillars E, S, G, as an average exposure of each theme contained in that pillar; then the overall score of the pillar is calculated as a risk (exposure) weighted average of scores obtained in every theme of it.

[34] FTSE Russell, *Index Inclusion Rules for the FTSE4Good Index Series, v1.8*, 2016, in www.ftserussell.com

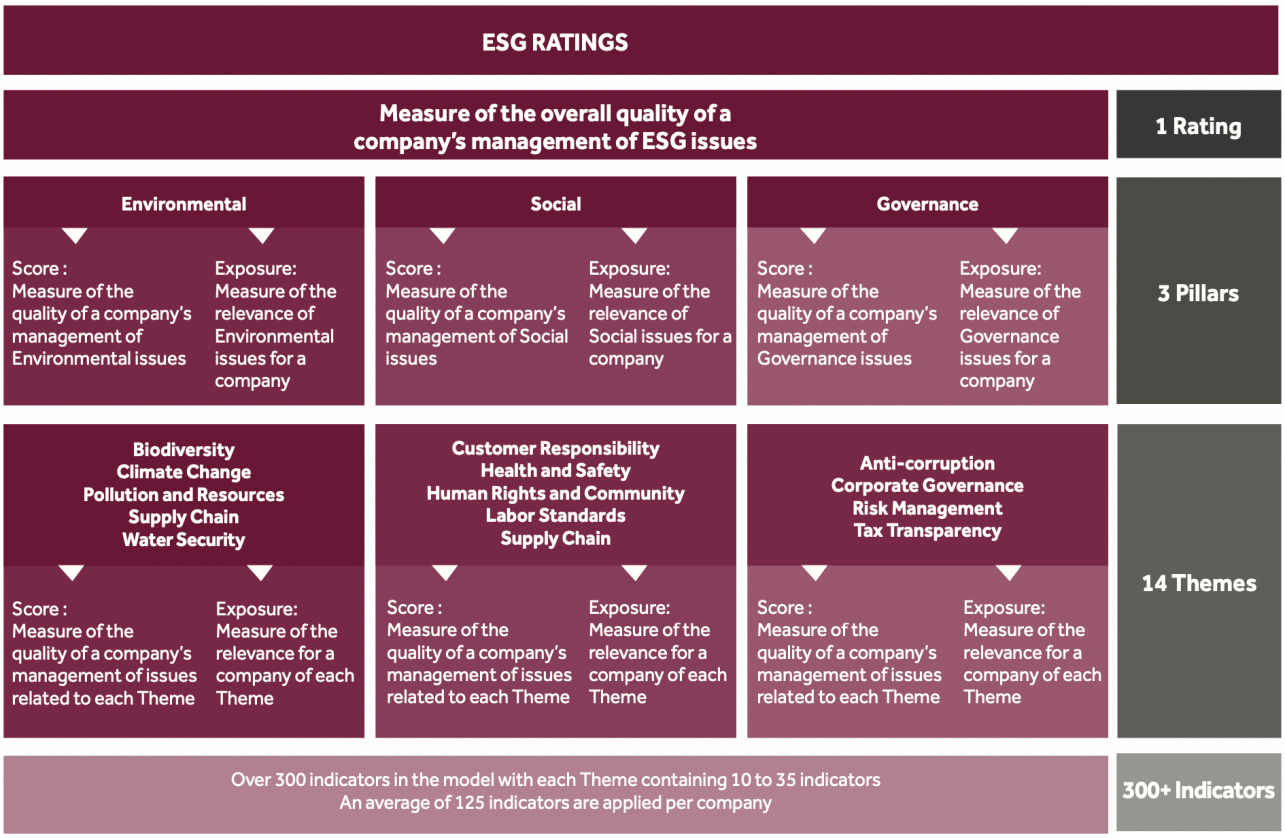


Figure 19: FTSE Russell's ESG Rating construction

Companies that want to be part of the index must respect some conditions (FTSE Russell, s.d.)[35]:

Since June 2016 there are several threshold scores to be included in the FTSE4Good, just as many not to get out of it; analysts divided companies from developed markets and emerging markets. In particular:

- If company comes from a developed country, it must have an ESG Rating of 3.3 or higher;
- If company comes from an emerging country, it must have an ESG Rating of 2,9 or higher.

On the other way, if a company is already included into the index:

- It comes from a developed country and its ESG Rating is lower than 2.5 it could be eliminated;

[35] FTSE4GOOD Brochure. https://research.ftserussell.com/products/downloads/ftse4good-brochure.pdf

- It comes from an emerging country and its ESG Rating is lower than 1.8 it could be eliminated.

In addition to that, companies that have exposure to "significant controversies" are not eligible, and also manufacturers or producers of tobacco, weapon and coal are not considered. There are some exceptions too:

- If a company is a producer or manufacturer of nuclear power, it must satisfy at least 16 of 17 indicators of "Health and Safety" theme to be included into the index;
- If a company is producer or manufacturer of infant formula, it must satisfy at least 19 of 20 indicators of "Customer Responsibility" theme to be included into the index.

Twice a year, in June and December, the series is reviewed and any company with ESG rating below the threshold have 12 months to improve it or it will be deleted from the index.
Let's now see specifically how indices of this series are built (FTSE Russell, 2016)[36]:
First of all, this series is divided into two groups, benchmark and tradable. Every index must follow several rules that are decided and supervised by an "Advisory Committee", made up of independent professional investors with expertise in ESG factors.
Regarding benchmark index, companies that are part of the corresponding traditional could be included only. For example, companies that are included into FTSE Japan Index could be part of FTSE4Good Japan Index too. Each component of the sustainable indices will have the same weight that it has in the traditional reference index, and it could be included into the benchmark only if it satisfies the inclusion criteria seen above. On the other hand, tradable indices are just benchmark indices with specific characteristic; for example, FTSE4Goos UK 50 Index is made up of 50 biggest companies of FTSE4Good UK Index, based on market cap.
We have seen above that twice a year the series is reviewed and there are certain rules for tradable indices: the number of companies included into these must be the same every year so, if the number of entries is higher than the exits, companies in low-ranking position will be deleted; on the opposite way, if the number of exits is higher than entries, it will be included other companies with lower rating. Lastly, if a company is not part of the benchmark anymore, it will be automatically deleted from tradable.

[36] FTSE4Good Index Series, 2016.

In following Figure 20 and Figure 21 we present the composition of one of the most important indices of the series: FTSE4Good Emerging Index.

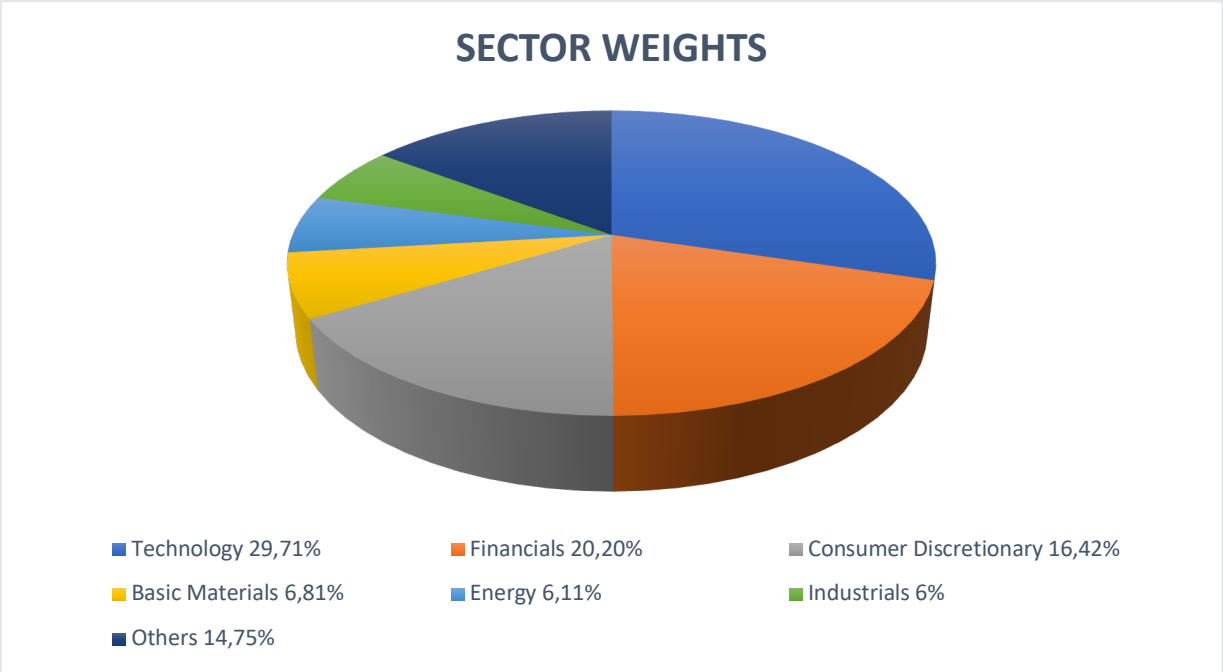


Figure 20: FTSE4Good Emerging Index Sector Weights.

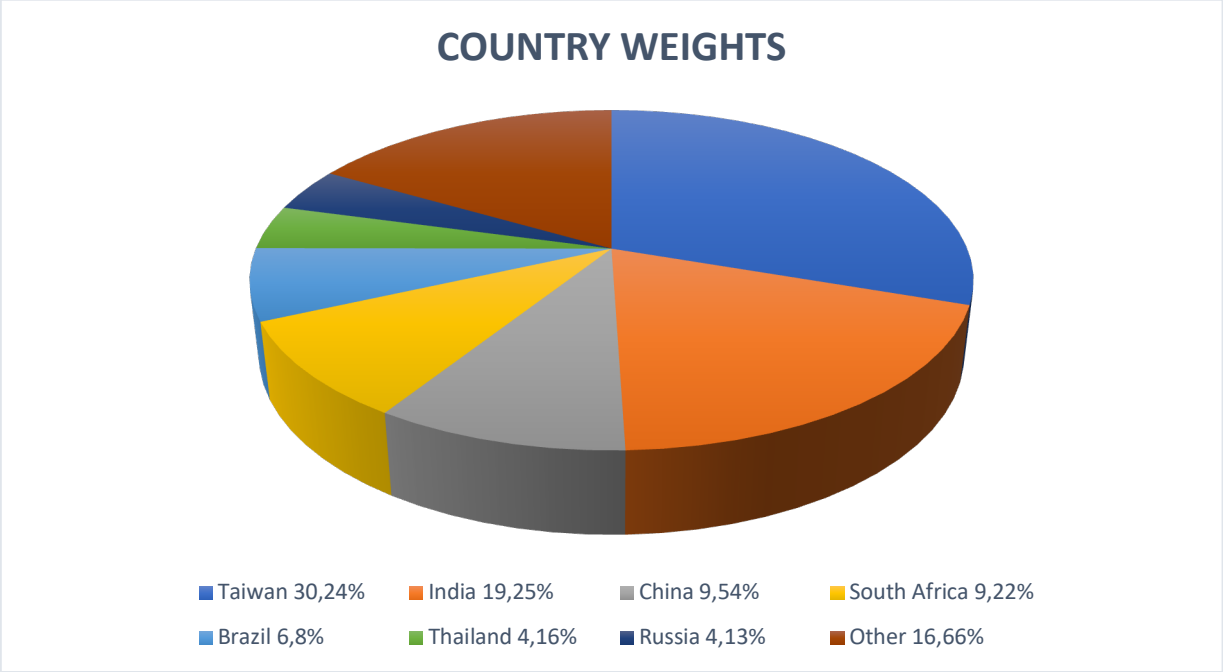


Figure 21: FTSE4Good Emerging Index Country Weights.

2.5 RISK RATING

The financial system, that is always looking for ranking companies, uses ESG Rating to quantify all the non-financial information and to assign a score. For this purpose, new agencies and new operators were born that year after year are improving their technique to make available, for investors, more and more detailed information on securities. As we have seen above, every index provider has an ESG rating methodology that is made up by itself; despite that, often a third-party methodology is necessary to obtain impartiality and to compare every security with the same indicators.

At this moment, there are societies that take information and use them to analyze securities and classify them based on a sustainable view. For example, the data provider Mornistar assigns securities a "Sustainability Ratings" characterized by a score from one to five "globes"; it measures how societies manage risks and opportunities regarding environmental, social and governance. This score is based on the valuations of Sustainalytics, a specialized society of sector, considering incidents and disputes that a society could be involved in.

In Italy, Etica SGR is a pioneer of responsible investment with twenty years of experience; Building on this experience, they felt the need to develop a proprietary metric to measure, ex ante, the risk deriving from ESG issues. This metric has a statistical and predictive connotation and try to provide the investors a holistic view of the total risk of their investment. Based on its study (Etica SGR, 2019)[37], Etica SGR found that the ESG risk metric contribute to optimize portfolio diversification and to improve the estimate of financial volatility.

Empirical evidence shows that some typical analysis factors have a strong influence on ESG risk, for example we can see a lower ESG risk in:

- Companies with higher market value than competitors;
- Large companies with diversified skills in decision-making processes and with precise methodologies to manage complex decision, that also are willing to invest in innovative, long-term and sustainable strategies;
- Globalized and digitalized companies, that are able to develop competitiveness across national borders and good management of international relations.

[37] Rischio ESG, nuova frontiera nelle strategie di investimento, 2019. https://www.eticasgr.com/storie/approfondimenti/rischio-esg-nuova-frontiera-investimento

Let's now present this new metric (Capelli, 2020)[38]:
The entire study is based on the concept of *Entropy* and has two input that are portfolio weights and ESG Rating of securities. Entropy is the measure of a system disorder that's why it is useful to consider uncertainty. This parameter could be calculated on the distribution of portfolio securities on scoring ESG classes, where frequency comes from their weights. We can say that the more uniform the distribution of ESG scores, the riskier situation is recorded; on the contrary, the more the distribution is focuses on a few classes, the less we risk.
The problem with entropy is that it doesn't discriminate the allocation on high or low classes; for this reason, analysts classify securities in six different classes based on their ESG score: [100;80], (80;70], (70;60], (60;50], (50;40], (40;30].
Now, it is calculated the total entropy of every fund

$$S_{Esg} = -\sum_{i=1}^{6}(p_i \log(p_i))$$

where p_i considers the distribution frequency, on these six-score range: S_{Esg} represents the disorder on the possible different configurations of these six classes. So, disorder depends on how securities weights are distributed over different six potential range. Now, for every range we have to multiply its entropy for reciprocal of the minimum score of range

$$R_{Esg} = -\sum_{i=1}^{6}(p_i \log(p_i) \cdot \frac{1}{\min_{j \in i}(p_j)})$$

With j that is the score from minimum to superior border of every range i.
R_{Esg} is better than S_{Esg} because it attributes more risk to a distribution concentrated on low scoring classes, then (40;30] is riskier than [80;100].

[38] The following metric refers to the paper "*Environmental, Social and Governance Risk: a new measure for funds portfolios", Paolo Capelli, 2020.*

Etica SGR reported last nine months results of its funds (Figure 22), and it is showed clearly the strong statistical correspondence between ESG risk and VaR[39] (Figure 23); this is a relatively important achievement, especially for a company that manages funds built from ethics criteria to select securities. Furthermore, it is a first step toward ESG variables inclusion into investment risk calculation, helpful in the definition of asset allocation and to define new risk/return parameters.

		Stock Ethics	Balanced Ethics	Balanced Annuity Ethics	Ethics Mixed Bonds	Short Term Ethics
31th December 2015	R_Esg	1,88	1,69	1,45	1,22	0,79
	VaR	3,09%	2,07%	1,22%	0,94%	0,23%
29th January 2016	R_Esg	1,87	1,69	1,48	1,24	0,83
	VaR	3,08%	2,11%	1,27%	0,94%	0,22%
29th February 2016	R_Esg	1,90	1,72	1,46	1,24	0,88
	VaR	3,00%	2,07%	1,19%	0,93%	0,24%
31th March 2016	R_Esg	1,93	1,74	1,47	1,24	0,91
	VaR	3,01%	2,11%	1,20%	0,95%	0,24%
29th April 2016	R_Esg	1,86	1,79	1,55	1,33	0,90
	VaR	3,06%	2,20%	1,27%	0,93%	0,26%
31th May 2016	R_Esg	1,85	1,78	1,53	1,32	0,90
	VaR	3,09%	2,24%	1,28%	0,93%	0,30%
30th June 2016	R_Esg	1,86	1,78	1,51	1,27	0,91
	VaR	3,44%	2,35%	1,34%	0,89%	0,32%
29th July 2016	R_Esg	1,85	1,78	1,57	1,29	0,89
	VaR	3,54%	2,48%	1,53%	0,94%	0,24%
31th August 2016	R_Esg	1,86	1,80	1,58	1,30	0,91
	VaR	3,16%	2,21%	1,36%	0,92%	0,26%

Figure 22: Application of ESG risk metric to Etica funds.

[39] Value-at-Risk (VaR), is a statistical measure of the riskiness of financial entities or portfolios of assets. It is defined as the maximum money amount expected to be lost over a given time horizon (usually one day), at a pre-defined confidence level (usually 95% or 99%).

	Stock Market
31th December 2015	0,94
29th January 2016	0,93
29th February 2016	0,93
31th March 2016	0,93
29th April 2016	0,89
31th May 2016	0,95
30th June 2016	0,91
29th July 2016	0,96
31th August 2016	0,93

Figure 23: Spearman correlation between R_Esg and VaR in Etica funds.

CHAPTER 3
COVID - 19: A "GREEN SENSITIVE" BLACK SWAN

3.1 A FINANCIAL PERSPECTIVE OF THE PANDEMIC

It's March 11th 2020, the World Health Organization (WHO) declared Coronavirus Disease 2019 (COVID-19) as a pandemic. It started as an epidemic in China with the focus being firstly reported in the city of Wuhan, but mainly due to the speed and scale of its transmission it became a worldwide problem.

Since that decision, the COVID-19 crisis has significantly damaged the global economy and financial institutions' balance sheets; governments have adopted strict restrictions, some of them still in course, that have affected world economic with declines in output, recession and asset-price crashes.

During the first months of the crisis (February to April 2020), all market index such as FTSE, Dow Jones, Nikkei registered huge fall as the number of cases grew (Figure 24); many people have lost their jobs or seen their incomes cut, as it is confirmed by unemployment rates (Figure 25)[40] (International monetary fund, 2020).

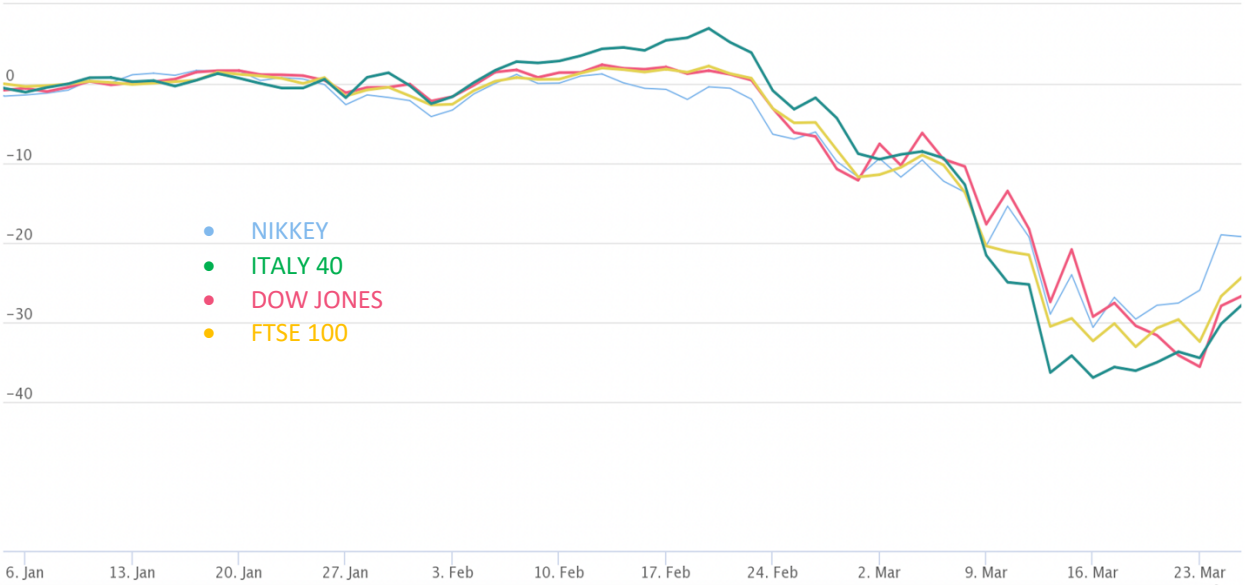


Figure 24: Index chart. Infront.

[40] Yearly unemployment rate change 2019-2020. International Monetary Fund, 2020.

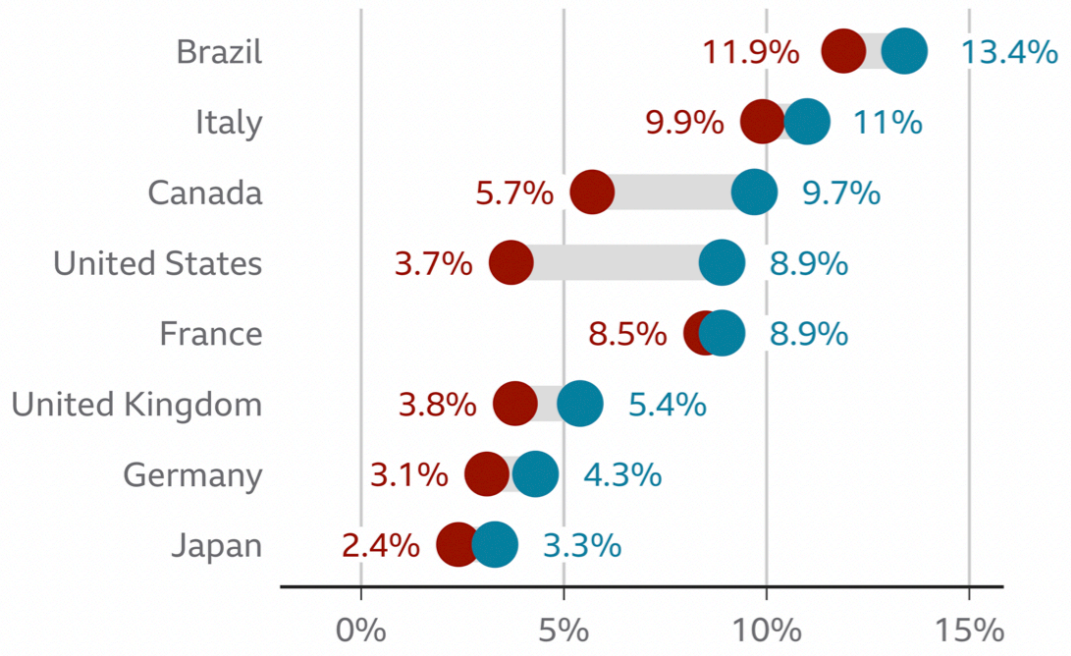


Figure 25: Yearly unemployment rate change, 2019(RED) – 2020(BLU).

Based on McKinsey survey (Euart, 2020)[41] in May a lot of country thought their economics were weak and in all countries of the survey people assessed the current state of their economics more negatively than their own financial situations. The saddest aspect was that they saw a significantly decrease in household income, savings and spending thus leading to missed past loan payments and plans for asset allocation.

Regarding stock market performance, as the infections rise, uncertainty was at its highest level, large and rapid declines across all countries and sectors took place, the downside seemed unlimited. Some helps came from governments with an increase in share price of specific sectors such as pharmaceutical and digital, but others like travel and oil remained down. After ten months from march peak, almost half the sectors had fully recovered losses thanks to the good news of imminent vaccines.

Some analysts describe price movements in stock market as a roller-coaster ride, that brought out resilience and hope, from investor, for a new growth on the other side of COVID-19 "tunnel".

[41] We now refer to "Financial life during the Covid-19", Euart, Ferreira, Gordon, Hilal, White. July 2020. https://www.mckinsey.com/industries/financial-services/our-insights/a-global-view-of-financial-life-during-covid-19#

As the crisis evolved everyone were looking for analogies and difference with 2008 crisis mainly to predict future and possible scenarios. Marc-Oliver Strauss-Kahn tried to illustrate them in his study (M.O., 2020)[42] starting from three main similarities:

1. Uncertainty: the main problem of asset manager and investment companies is that it was very hard to quantify risk as it was untraceable and unpredictable. In 2008 the risk was hidden, with securitization, in financial vehicles so that nobody knew how significant it was. As we can see on Figure 26[43], the World Pandemic Uncertainty Index was at its highest during Q1-2020.

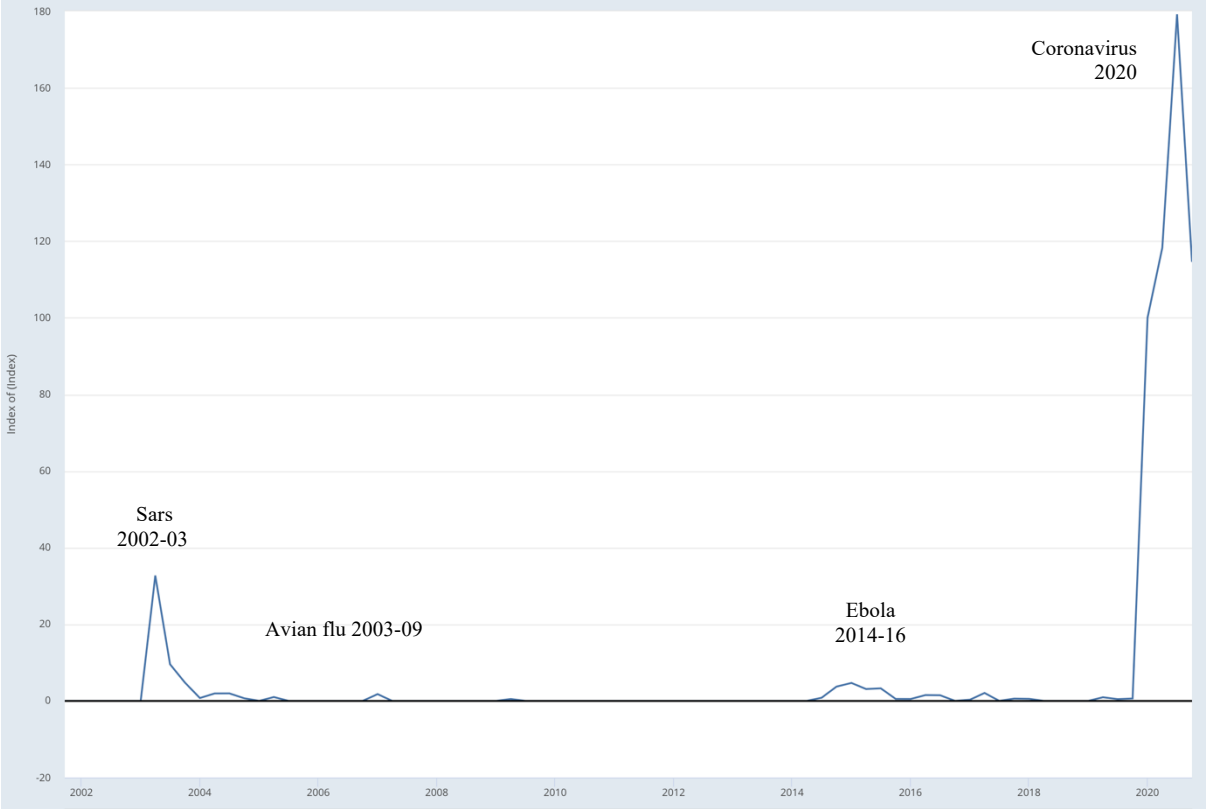


Figure 26: World Uncertainty Index

2. Collapse: Both in 2008 and 2020 the stock exchanges of major countries saw a drop of up to 25% of their valuation, and their corresponding recessions have been declared as the largest since the Great Depression.

[42] "Can we compare the COVID-19 and 2008 crisis?", Marc-Oliver Strauss-Kahn. May 2020.
[43] World Pandemic Uncertainty Index, Fred.

3. Reaction: Countries and central banks have adopted monetary and fiscal policies to provide massive support. Despite some frictions especially in Europe, where wealthy countries did not want cooperative measure, ECB's balance sheet saw an improvement on debts due to several measure like "Recovery Fund" and "Next Generation EU" (European Commission, s.d.)[44]. COVID-19 showed the dependence of wealthy economics on some inputs produced in other countries, as what happened in Germany with automobile sector where managers of BMW, Volkswagen and Daimler were worried about a strict lockdown in Italy and Spain that led to delays in deliveries of car parts.

Let's now consider the four main differences of the two crises:

1. Process: in 2020 the sanitary shock has affected firstly the real sector and the supply of production, then the demand side. On the contrary in 2008 the financial shock affected the demand side first, and then it transformed into recession.
2. Speed and Shape: what we saw last year was a sharper but shorter "V-shaped" shock that allow real GDP to return close to its initial starting point after relatively few months, in contrast with the "U-shaped" shock of subprime crisis that delayed the economic rebound to two years later (Figure 27).

[44] "NextGenerationEU is a €750 billion temporary recovery instrument to help repair the immediate economic and social damage brought about by the coronavirus pandemic. Post-COVID-19 Europe will be greener, more digital, more resilient and better fit for the current and forthcoming challenges." European Commission official website. https://ec.europa.eu/info/strategy/recovery-plan-europe_en

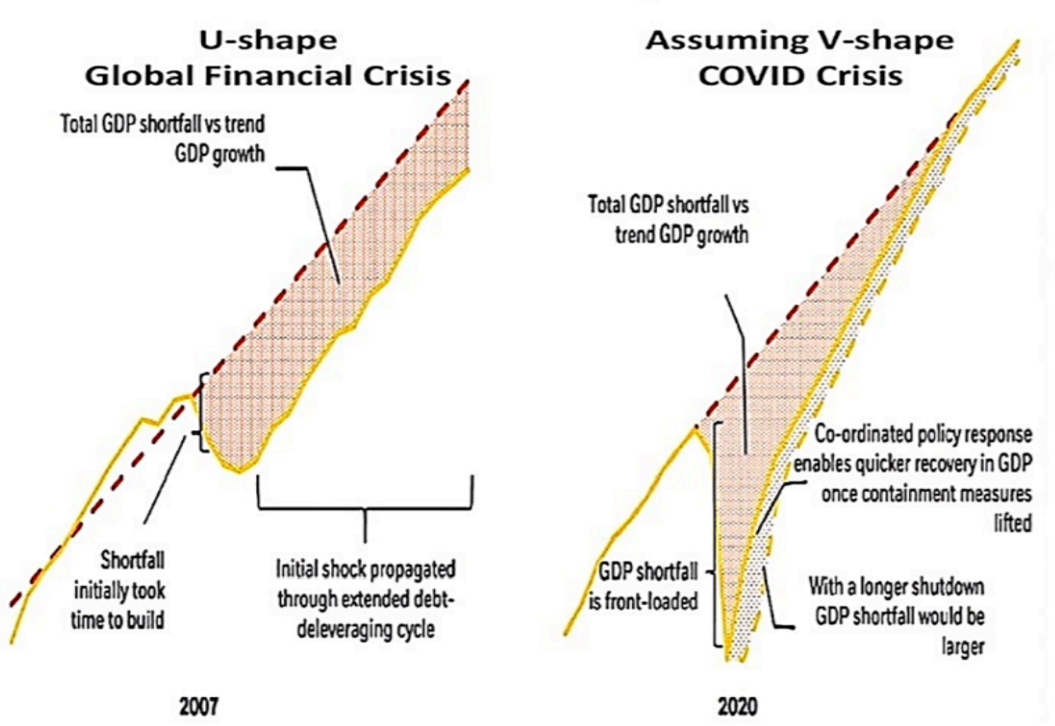


Figure 27: U-shape of GFC vs a V-shape of the COVID-19 Crisis.

3. Policies: during COVID-19, due to a deeper shock, authorities seemed to have less reaction margins, this is why the speed and size of measures have been without precedent drawing lessons from the 2008 great financial crisis; in addition to that, in 2020 central banks were short of ammunition, as the interest rate were already very low and outstanding liquidity was abundant.
4. Multilateralism: last year we faced a huge international and regional coordination between governments and central banks.

We now say that there are more differences that similarities, as a proof that history does not repeat itself, but it could have some analogies; the role of governments and bank is to learn from it and better prevent or limit future crisis.

3.2 DIFFERENCES FROM SRI AND TRADITIONAL INVESTMENT

One year have passed since that stock market peak and that experience has revealed us some trends acceleration, propelling some companies forward a record speed. It is the case of SRI trend that now more than anytime is in the spotlight: even if ESG criteria existed before 2020,

especially about the environment, the pandemic has changed the investors' decision in relation to "Social" and "Governance". It is important to understand if these assessments reflect the growing awareness of the potential that economic actors engaged in the ecological and social transition could benefit from or, on the contrary, if we are in front of another financial bubble as happened in '20s with "new economic". That time every internet company was valuated much more than its real value (Corporate Finance Institute, s.d.)[45]. Financial analysts think that ESG trend is different, due to the magnitude of the phenomenon that justify the valuations increase and the birth of the so called "sustainable economic"; we have to mention the political support too that, with appropriate incentive maneuvers, is pushing toward this transition. Another reason of differentiation from '20s start-up is that almost all green companies demonstrate their capacity to generate positive cash flows from environmental activities; the differences of these cash flow compared to those of non-green companies were, in 2020, much bigger than ever.

The value and/or the price of a securities could be also affected by the ways a company manages environmental and social variables, in fact it is used as indicator for management and reputational quality: an environmental negligence could imply economic losses for companies and, of course, for their investors' portfolios.

Before internet and social media, it was very easy for a company to hide its unlawful conduct, because of the slowness of information flow and the difficulties in reaching huge audience; even if authorities found out some irregularities, the reputational damage would be insignificant. Now, on the contrary, news and images could go around the world in few seconds and so market capitalization could fall very quickly. There are some examples of activists that undertake boycott campaigns against "bad" companies or awareness campaigns with events around the world; the most important figure in this way is Greta Thunberg, a Swedish environmental activist that in 2018 started challenging world leaders with a movement (founded by her) called "Friday for future".

[45] "The dotcom bubble is a stock market bubble that was caused by speculation in dotcom or internet-based businesses from 1995 to 2000. The companies were largely those with a ".com" domain on their internet address. NASDAQ Composite Index rose by 582% from 751.49 to 5,132.52 from January 1995 to March 2000. Then it fells by 75% from March 2000 to October 2002, erasing most of the gains since the bubble started building." Corporate Finance Institute. https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/dotcom-bubble/

Last but not least we have to consider social variables: analysts and rating companies look into protection of human rights, non-discrimination and avoiding child labour in companies they rate.

COVID-19 pandemic highlights leaks in traditional investing system and it has penalized companies that were out of date. From a political point of view, governments have declared that subsidies and finances for economic recovery will be given only to companies that implement strategies for digital and "green" transition. When a market trend is reinforced by political operations a mix is generated and it will make ESG investment grow more and more; nevertheless, when there is a strong market trend everyone tries to be part of it and several risks could occur: people and companies could conceal or hack their information. This could boost the gap between companies' market value and fair value, and so investors' risk will increase.

During 2020 crisis we saw that companies with higher sustainability rating can manage crisis and risks better than their competitors, so they will grow up much more in long-time horizon; in future real virtuous companies will only exist, while those who implement greenwashing strategies will fail.

CHAPTER 4
EMPIRICAL ANALYSIS

4.1 VARIABLES PRESENTATION

In literature, there are many studies conducted on the topic of sustainability and how it impacts the stock market. Since this topic is relatively new, the available data may not be sufficient and doing a long-term analysis may lead to incorrect results. What we try to do here is to demonstrate a simple hypothesis, using empirical data from the recent past, starting from the assumption that ESG investment should not be justified only by the economic benefit of financial instruments: integrating these factors into investment strategies is part of a broader social vision that is based on key principles such as respect for the environment, social inclusion and fairness in governance operations.
In this study we want to demonstrate that, during COVID-19 pandemic, SRI have performed better than traditional investments; to do so we would like to consider SRI indices mentioned above and their traditional benchmark instead of SRI funds, because the latter could be influenced by lots of factors such as managers' skills in screening and scheduling and the type of fund (passive or active management). Moreover, using funds, it is impossible to consider all the costs that influence their rewards. For these reasons we will consider MSCI Global SRI index, FTSE4GOOD Emerging Index and Dow Jones Sustainability World Index.
We want to introduce several variables that helps us to confirm this hypothesis:

- **SHARPE RATIO:** designed in 1966 by Professor William F. Sharpe, it is the expected excess return over a risk-free asset on the index standard deviation. The higher the Sharpe Ratio, the more efficient the index that offer the best trade-off between risk and return.

$$S = \frac{R - rf}{\sigma p}$$

Where:

- R = portfolio return
- rf = risk-free asset return
- σp = portfolio standard deviation

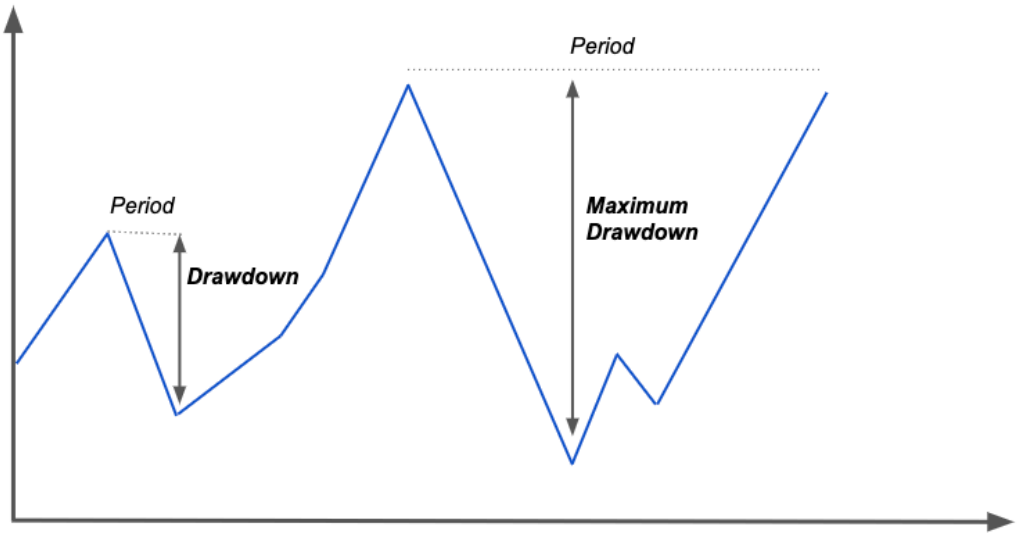
In this study we will consider the risk-free rate as zero; in fact, nowadays risk-free assets have negative short-term rewards: EURIBOR[46] 1Y is -0,477% and LIBOR[47] 1Y is -0,493%.
Sharpe Index could present a critic in this study: standard deviation is useful as a risk measure if profits and losses are distributed as a Normal Distribution, otherwise it is an inadequate measure.

- **MAXIMUM DRAWDOWN:** it is the maximum loss from a peak to a trough of a portfolio during a specific period. It can identify the downside risk over a specific time period. This measure presents a critic: it will be greater for a longer time series, but it does not affect our analysis because we consider an equivalent time series for both SRI and traditional indices.

$$MDD = \frac{Trough\ Value - Peak\ Value}{Peak\ Value}$$

[46] Euribor is short for Euro Interbank Offered Rate. The Euribor rates are based on the interest rates at which a panel of European banks borrow funds from one another.

[47] LIBOR is short for London Interbank Offered Rate. The Libor rates are based on the interest rates at which a panel of banks from London Market borrow funds from one another.



- **VALUE AT RISK (VaR):** it is a statistical measure that helps investors to know the potential loss of a portfolio and the probability that this loss will occur. Note that these measures can't say what could be the maximum loss. In this study we will use "Variance-Covariance approach":
    1. Calculate return of daily price;
    2. Calculate the mean;
    3. Calculate the standard deviation;
    4. Use "NORM.INV" function with its three parameters probability, mean and standard deviation. Since we want to calculate VaR(95) and VaR(99), we will use 0,05 and 0,01 respectively in probability.

- **SAMPLE MEAN:** we will use "continuous" return formula $Rt = \ln \frac{Pt}{Pt-1}$ so we will calculate sample mean as following:

$$\overline{R} = \frac{1}{T} \sum_{t=1}^{T} Rt$$

Where:

- Rt = portfolio return in a generic period t
- T = total number of periods considered

- **STANDARD DEVIATION:** it is a symmetric measure of dispersion.

$$\sigma p = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}(Rt - \overline{R})^2}$$

Note that we will divide data so as to consider three market phases:

1. The first, regarding the behavior of those indices before the spread of Covid-19 pandemic (1st January 2018 – 21st February 2020);
2. The second, regarding the behavior of those indices during the spread of Covid-19 pandemic, until Medicines and Healthcare products Regulatory Agency (MHRA) gave temporary regulatory approval for the Pfizer-BionTech vaccine, so that United Kingdom became the first country in the Western world to approve a Covid-19 vaccine. (21st February 2020 – 2nd December 2020);
3. The third based on the behavior of those indices during the post-pandemic phase, until nowadays. (2nd December 2020 – 30th April 2021).

In this analysis data are taken from Refinitiv Workspace[48]. Refinitiv is one of the most important market data providers, and it is part of London Stock Exchange Group (LSEG); it has a workspace from which we can take data of all existing indices. Then these data are imported on excel, where they are elaborated to obtain variables presented above.

[48] https://www.refinitiv.com/en

4.2 FTSE4GOOD EUROPE VS FTSE EUROPE

Here we want to present the difference between two indices of the FTSE Russel's set: FTSE Europe, that comprises large and mid-cap stocks in the developed and advanced emerging markets in Europe; FTSE4GOOD Europe, that implements the FTSE4GOOD selection criteria, seen above, to its benchmark FTSE Europe.

Let's start the analysis from the study of the chart: as we can see, the two indices move in a similar way, even if the sustainable index seems to anticipate the movement of the traditional one by a few days. Although the traditional index was moving at a higher price level, when the pandemic hit the stock market, the vertical drop led it to the same level as the sustainable one, confirming a much steeper and faster descent; during recovery the indices have instead moved together, overlapping for some periods, with a moment of the year 2020 (October) in which it seemed that the sustainable one could tear upwards and create a positive gap with the counterpart. The latter part of the year and for the first four months of 2021 saw a recovery of the traditional that closed the analyzed time horizon with a slight advantage, however losing much of that difference present at the beginning of 2018.

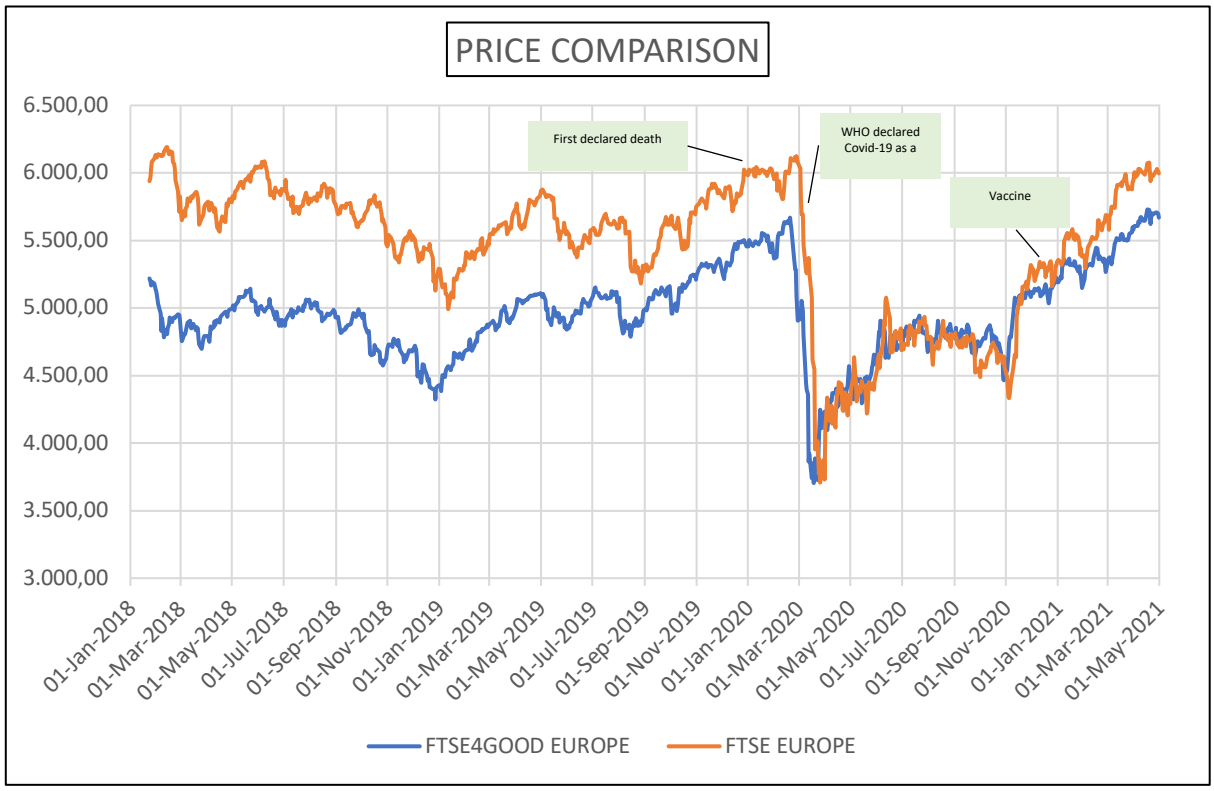


Figure 28: Prices of FTSE4GOOD Europe and FTSE Europe

The analyzed variables confirm what has been said: as far as returns are concerned, they were around 8 percentage points lower in the traditional index in the pre-covid phase, in addition, portfolio losses in the year of the pandemic were almost double those of a socially responsible portfolio. The recovery has seen a more positive trend for the traditional, which outperforms the sustainable by over 200 basis points, although this is not enough to close guaranteeing a superior long-term return. The standard deviation is almost similar, but it has a decisive influence on the Sharpe Ratio, which over the entire time horizon is better (in relative terms) in the sustainable index. Also the data on Maximum DrawDown (both daily and weekly) confirm the "victory" of the FTSE4GOOD index in all the periods considered. Finally, the Value at Risk differs between the two indices by less than 1 percentage point in all periods, a sign that at a statistical/probabilistic level investor expect, in the short term, to have the same losses in the portfolio.

As we have seen, the data presented confirm the initial hypothesis: the FTSE Russel selection model, which identifies socially responsible companies within the traditional FTSE Europe index, grouping them into an independent index, has demonstrated that the choice of companies to adopt ESG standards in their strategies has represented, and continues to represent, a winning choice.

FTSE EUROPE			
	Before COVID-19	COVID-19 Peak	COVID-19 Recovery
Return	1,57%	-9,43%	12,59%
Standard Deviation	0,78%	2,29%	0,87%
Sharpe ratio	2,01	-4,11	14,50
Max DD Daily	-3,24%	-13,06%	-2,94%
Max DD Weekly	-5,06%	-20,91%	-3,39%
VaR 95%	-1,28%	-3,81%	-1,30%
VaR 99%	-1,82%	-5,37%	-1,89%

Table 2: Analysis of FTSE Europe's variables

FTSE4GOOD EUROPE			
	Before COVID-19	COVID-19 Peak	COVID-19 Recovery
Return	10,04%	-5,11%	10,41%
Standard Deviation	0,73%	1,90%	0,71%
Sharpe ratio	13,70	-2,69	14,75
Max DD Daily	-3,04%	-11,45%	-2,43%
Max DD Weekly	-5,06%	-20,91%	-3,39%
VaR 95%	-1,19%	-3,15%	-1,06%
VaR 99%	-1,69%	-4,45%	-1,54%

Table 3: Analysis of FTSE4GOOD Europe's variables

4.3 DOW JONES SUSTAINABILITY INDEX WORLD VS S&P WORLD BMI

Here we want to show the performance of S&P Global BMI and its relative benchmark Dow Jones Sustainability World Index. First of all, the former is an index based on more than 11.000 stocks from 50 countries (divided in developed and emerging), with a market cap greater than 100 million USD; we have chosen this index because of the country weight: United States is the most represented country with 56,4% of weight (Japan is the second with 7%), for this reason we can say that it is influenced mostly from US fluctuations.

Dow Jones Sustainability Index World takes place from there and it represents the top 10% of the 2.500 largest companies of the former identified through the Corporate Sustainability Assessment (CSA), the set of questionnaires (presented in Chapter 2.3) that gives companies a sustainability score.

	FTSE EUROPE	FTSE4GOOD EUROPE
Return	0,94%	11,47%
Standard Deviation	1,31%	1,12%
Sharpe ratio	0,72	10,26
Max DD Daily	-13,06%	-11,45%
Max DD Weekly	-20,91%	-18,22%
VaR 95%	-2,15%	-1,82%
VaR 99%	-3,04%	-2,58%

Table 4: Variable comparison of the entire time horizon.

As before, let's start the analysis from the study of the chart: as we can see the two indices are on very different price levels, for this reason we wanted to add an abscissa axis on the right that refers to the price of the S&P Global BMI; as far as the trend is concerned, the two charts behave identically, with a drop in 2018 (a critical year for all markets) and a recovery at the beginning of 2019 culminating with the beginning of the pandemic that made the quotes plummet. From the low point both indices recovered very well, closing 2020 at an even higher level than they had reached in the last pre-covid quarter.

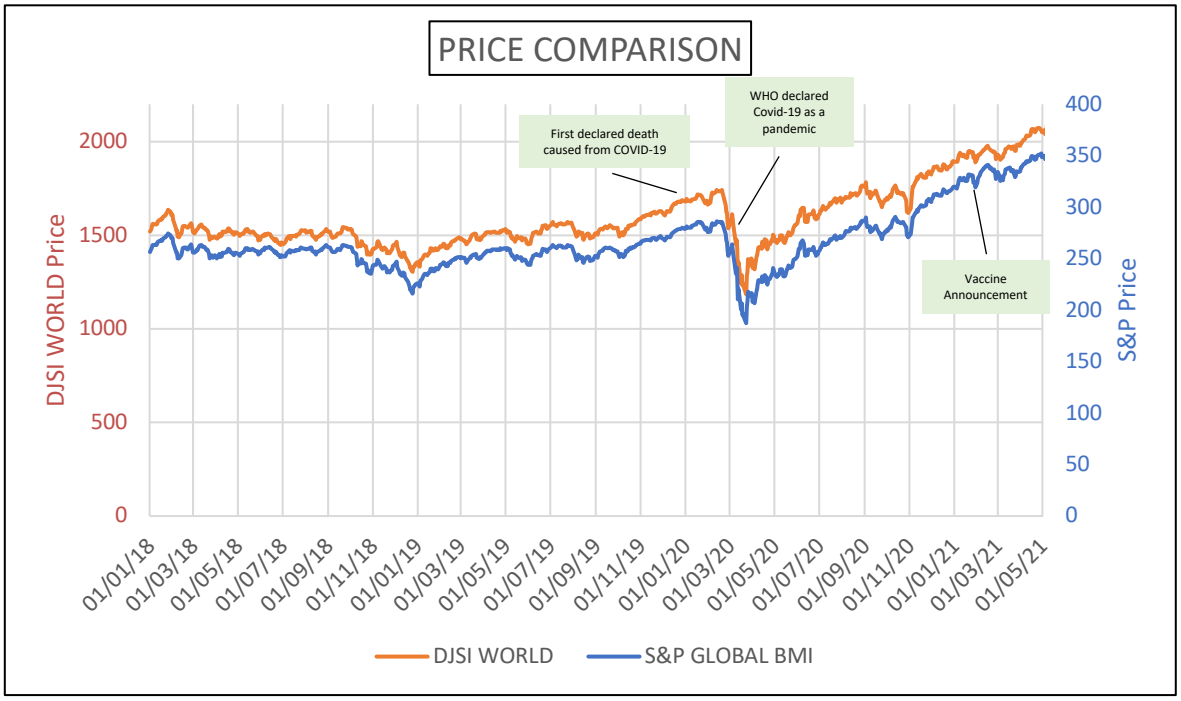


Figure 29: Prices of DJSI World and S&P Global BMI

In order to have a more detailed study of the performance of the indices under consideration we must therefore necessarily refer to the variables analyzed: with regard to the return we can see that in the pre-covid phase the choice of a sustainable strategy has rewarded investors, while the outbreak of the pandemic and the subsequent recovery have seen an advantage of the traditional index; however we must take into consideration the fact that the volatility (consequently the risk) of the latter is higher in the periods in which the return is higher, a situation confirmed by the data on the sharpe ratio. We can therefore confirm that, analyzing the risk/return trade-off, the sustainable index represented the best choice in the construction of an investment portfolio. Moving on to the analysis of the Maximum Drawdown, we can say that the two indices behaved in a similar way, with a slight advantage for the sustainable index which, however, recorded the most important daily loss (-10.61% on 12 March 2020); despite this, the Value at Risk confirms that at a statistical

level investor who choose the traditional index record greater, albeit minimal, losses for the same risk.

S&P GLOBAL BMI			
	Before COVID-19	COVID-19 Peak	COVID-19 Recovery
Return	9,58%	11,92%	12,30%
Standard Deviation	0,68%	1,93%	0,69%
Sharpe ratio	14,00	6,16	17,92
Max DD Daily	-2,95%	-10,03%	-1,99%
Max DD Weekly	-5,34%	-22,67%	-3,99%
VaR 95%	-1,11%	-3,14%	-1,02%
VaR 99%	-1,57%	-4,46%	-1,48%

Table 5: Analysis of S&P Global BMI's variables

DOW JONES SUSTAINABILITY INDEX WORLD			
	Before COVID-19	COVID-19 Peak	COVID-19 Recovery
Return	12,22%	10,61%	12,22%
Standard Deviation	0,68%	1,89%	0,59%
Sharpe ratio	17,90	5,62	20,74
Max DD Daily	-2,58%	-10,61%	-1,86%
Max DD Weekly	-5,22%	-22,34%	-3,28%
VaR 95%	-1,10%	-3,07%	-0,86%
VaR 99%	-1,57%	-4,36%	-1,26%

Table 6: Analysis of DJSI World's variables

Taking into consideration the entire time horizon, we can see that the sustainable index wins the comparison with the traditional benchmark in all areas, with the exception of Maximum Drawdown which, however, must be framed in a combined study with Value at Risk, as discussed above.

From the analysis conducted, we can affirm that, also in this case, the implementation of ESG criteria and consequently the choice to invest in "sustainable portfolios", guarantees economic benefits for the investor. In particular, we must point out that the selection criterion for sustainable companies, CSA, used in the construction of the DJSI World index is valid.

	S&P GLOBAL BMI	DJSI WORLD
Return	31,30%	31,97%
Standard Deviation	1,11%	1,08%
Sharpe ratio	28,28	29,60
Max DD Daily	-10,03%	-10,61%
Max DD Weekly	-22,67%	-22,34%
VaR 95%	-1,78%	-1,74%
VaR 99%	-2,57%	-2,48%

Table 7: Variable comparison of the entire time horizon.

4.4 MSCI EMERGING MARKETS ESG VS MSCI EMERGING MARKETS

The third and final study concerns the indices of the Morgan Stanley Capital International (MSCI) company. In particular, after having analyzed the behavior of a pair of European indices and that of a pair of North American-dominated indices, we now want to study the emerging markets sector. Let's consider that emerging markets refer to countries that are transitioning from the "developing" phase to the "developed" phase (Corporate Finance Institute, s.d.)[49], that present a massive potential growth. Investors select this type of countries because of their higher rate return even if they are much riskier.

Emerging markets refer to countries of Latin America (especially Brazil, Colombia, Mexico), Asia (China, India) and some countries of South Africa; they present several characteristics:

- Market volatility, due to political instability and supply-demand shocks caused by natural calamities.
- Growth and investment potential, due to the high return on investment they can provide to attract foreign investors and their competitive advantage in several industries that increase GDP and stock prices.
- High rates of economic growth, in fact government of those countries try to favor industrialization and economic growth implementing policies for unemployment, better infrastructure and higher investment.

[49] "What are Emerging Markets?", Corporate Finance Institute. https://corporatefinanceinstitute.com/resources/knowledge/economics/emerging-markets/

- Increase of income per capita, that led to higher GDP and economic growth.

For this purpose, we have considered the MSCI Emerging Markets ESG Focus Index, that is based on MSCI Merging Markets Index, but includes some features designed to maximize exposure to positive environmental, social and governance factors for a target tracking error budget set to 100bps under certain constraints; in addition to that, Tobacco, Controversial Weapons, Producer of or ties with Civilian Firearms, Thermal Coal and Oil Sands are not eligible for inclusion (MSCI, s.d.)[50]. Regarding country weights, China dominates with 35.7%, followed by Taiwan (15.9%), South Korea (13.5%), India (9.2%), South Africa (4.2%) and others.

As above, let's start the analysis from the graph:
As we can see, the two charts move in the same way, despite having two different initial price levels. In two years from the beginning of 2018 to the beginning of 2020, the trend was almost linear, with a slight positive trend (+11% for ESG and +9% for traditional); but it was the recovery from the "shock" caused by Covid that the two indices showed their strength: given that the expansion of the virus started from the city of Wuhan in China, it was to be expected that the index of an emerging market, especially this one that has a significant weight of Asian countries, would register a deep collapse. In spite of this, the social policies adopted during the emergency by these countries, combined with economic maneuvers of recovery, have meant that in a few months the prices of indices returned to pre-pandemic levels, surpassing them after just under a year.

[50] MSCI Emerging Markets Extended ESG Focus Index, MSCI.

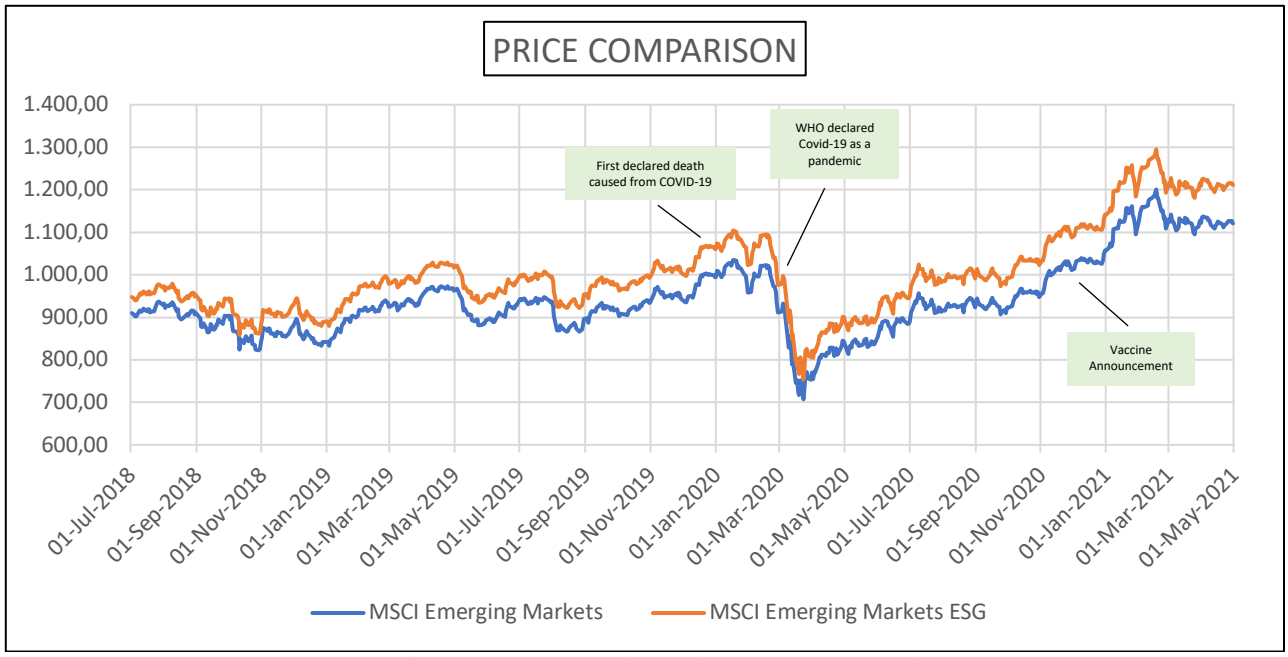


Figure 30: Prices of MSCI Emerging Markets and MSCI Emerging Markets ESG

Let us now try to analyze the comparison by giving voice to the numbers and variables presented:

As far as return is concerned, the sustainable index presents itself as the most profitable choice for an investor's portfolio, which would find itself "supporting" a risk almost identical to what it would have sustained in case it had chosen the traditional index; in fact, we can see how the Sharpe Ratio is higher in all three periods considered.

Moving on to the short-term analysis, the data confirms what was said in the study of the graph: the indices have recorded a very similar Maximum Drawdown, both weekly and daily, with a few percentage points of advantage for the traditional index; even at a statistical/probabilistic level investor expect the same loss in the portfolio despite the fact that since the beginning of the pandemic the sustainable index seems to be more unstable.

MSCI EMERGING MARKETS			
	Before COVID-19	COVID-19 Peak	COVID-19 Recovery
Return	9,41%	4,20%	9,38%
Standard Deviation	0,87%	1,59%	0,97%
Sharpe ratio	10,81	2,64	9,66
Max DD Daily	-3,89%	-7,67%	-2,56%
Max DD Weekly	-6,49%	-17,63%	-4,64%
VaR 95%	-1,41%	-2,60%	-1,50%
VaR 99%	-2,00%	-3,68%	-2,16%

Table 9: Analysis of MSCI Emerging Markets' Variables

MSCI EMERGING MARKETS ESG			
	Before COVID-19	COVID-19 Peak	COVID-19 Recovery
Return	12,19%	4,85%	9,69%
Standard Deviation	0,87%	1,61%	0,98%
Sharpe ratio	14,07	3,02	9,93
Max DD Daily	-3,89%	-7,46%	-2,56%
Max DD Weekly	-6,20%	-18,08%	-4,88%
VaR 95%	-1,39%	-2,62%	-1,50%
VaR 99%	-1,98%	-3,72%	-2,17%

Table 8: Analysis of MSCI Emerging Markets ESG's Variables

Once again, the analysis conducted confirmed the initial hypothesis: in fact, even in emerging markets, an investor's exposure to sustainable securities represents an advantage over the choice of "ESG-neutral" securities. The characteristics of this market (above all the high volatility) can be seen in the study of the entire time horizon, which does not see a clear victory, as in previous cases, for the sustainable index; however, the model for selecting sustainable securities adopted by MSCI is valid and allows for higher returns in the portfolio.

	MSCI EMERGING MARKETS	MSCI EMERGING MARKETS ESG
Return	20,87%	24,50%
Standard Deviation	1,126%	1,132%
Sharpe ratio	18,53	21,65
Max DD Daily	-7,67%	-7,46%
Max DD Weekly	-17,63%	-18,08%
VaR 95%	-1,818%	-1,822%
VaR 99%	-2,585%	-2,593%

Table 10: Variable comparison of the entire time horizon

CONCLUSION

The purpose of this paper was to demonstrate that the choice of a "responsible" investment was guided not only by ethical-moral implications, but mainly by the higher returns that an individual expects to receive by selecting instruments that adopt socially responsible policies, with particular attention to ESG factors.

The theme of responsible investment has grown a lot in recent years, initially seen mainly as a modus operandi confined to lovers of the environment, has had a considerable boost thanks to institutions that through regulations and treaties have forced the integration of ESG-based information to facilitate individuals in their investments.

The bankruptcy of Lehman Brothers and the subsequent financial crisis that hit the world in 2008 proved that the control metrics of that period were not enough to avoid financial disasters, which surely contributed to look for a different way and to give a new imprint to the whole financial world; in such a context ESG factors fit perfectly, giving a real alternative to a world that is now past.

As can be imagined, the world of this "new" finance, made up of qualitative judgments and non-financial parameters, immediately clashed with the traditional counterpart, which does not accept the idea of valuing securities without resorting to those financial metrics that have always been used since the birth of the companies themselves. The truth lies in the middle: non-financial parameters are excellent tools for integrating a classic analysis, providing information that until a few years ago was accessory but today, thanks also to the regulations in force, they have become an integral part of corporate analysis as they are indicators of the risk that the individual sustains when investing.

Over the years, this growing attention towards responsible investments has made it possible for all companies to strive to bear the label of "sustainability", sometimes even lying about their work and hiding their real market strategies; in this context it is clear that an investor may find it difficult to choose the assets to be included in their portfolio, for this reason rating companies have been created which, through their models, are able to give simple and easy to understand non-financial judgments able to help the investor in his investment choice.

At the same time as the rating agencies, the various strategies available to an individual who decides to follow the path of sustainability have been refined: they range from the simple exclusion of certain sectors considered "irresponsible" (such as tobacco, alcohol and nuclear

power) to the best-in-class which identifies, within a basket, the best instruments from a responsible point of view.

One of the main consequences of this incredible expansion is that, to date, there is no standard metric that can assign a fair and globally recognized sustainability score; for this reason, the major financial providers have decided to adopt their own and to place side by side, to their traditional indices, sustainable counterparts composed of a series of instruments that meet certain conditions.

Precisely because of the above-mentioned problem of a lack of universal metrics, this thesis attempts to prove its initial hypothesis by comparing the indices (traditional and sustainable) of these financial providers, obtaining the clear distinction between the returns that responsible instruments have compared to the total.

In literature there are numerous studies on this topic, that's why the choice of this paper, in the search for originality, has fallen on the analysis of the historical period we are living, characterized by the manifestation of what in finance is called "Black Swan" and that, in reality, is materializing with the COVID-19. The analysis of the indices starts from January 2018 until May 2021; as far as the choice of the initial year is concerned, on the one hand we have tried to avoid too remote data in order not to contaminate the analysis with other variables, on the other hand we wanted to avoid starting the study from 2019. As it was the year of records for the financial markets, there was a risk of altering the analysis as all the main investment classes went through a bullish phase.

Thanks to the use of Refinit platform, we have obtained the daily quotes of the six indices, which have been processed using an Excel spreadsheet; for the analysis we have used quantitative financial variables such as the yield and the sharpe ratio, to which we wanted to add statistical-probabilistic tools in order to have a complete view.

The conducted study confirmed the truthfulness of the initial hypothesis: the choice of a responsible investment rewards the investor who, in the long term, will obtain higher returns in portfolio compared to those she/he would have obtained without considering the sustainability rating when selecting the instruments to be included in the portfolio.

As can be seen, the behavior of the three indices has been almost homogeneous: the return of the responsible indices has been, in all the periods considered, greater than that of their traditional counterparts, despite maintaining a lower volatility that justifies an overall lower perceived risk for the investor. Confirmation for the above conclusions comes from the results of Value at Risk, a statistical variable that can be considered as a measure for an

investor's risk management: in all three cases and for each confidence level, the choice of a responsible investment protects the individual who will bear an overall lower risk.
The obtained results confirm the initial hypothesis but do not specify the reasons why ESG factors generate value for companies, which often translates into an appreciation of valuations. We can imagine that this value is the sum of two corporate spheres: the internal one, which refers to production processes, and the external one concerning the network that a company is able to create with all its stakeholders.
On the operational side, the decision to implement ESG factors leads to an increase in efficiency through cost reduction: the commitment to reduce waste of raw materials, water, carbon and energy starts from a reformulation of products and production processes that appear in this way more innovative and attractive to the consumer. An example of this type is the transport company FedEx, which has the objective of replacing its entire fleet of 35,000 vehicles with electric and/or hybrid ones; for the moment, through the "FedEx Fuel Sense" program and 30% of the vehicles replaced, the company has been able to save over 250 million gallons[51] (FedEx Corporation, 2021).
Reducing costs is not the only factor that can increase efficiency, in fact a focus for ESG factors could attract quality staff, increase motivation within the company and maintain a high level of employee satisfaction; according to a study by London Business School, companies contained in the *Fortune* list of the "100 best places to work" have generated a higher financial return ranging from 2.3% to 3.8% compared to the others, in the last 25 years[52] (Edmans, 2012).
The advantages that can be obtained with sustainable strategies also concern, as mentioned, the network of relations that a company has with all its stakeholders, especially relations with government authorities that may prefer companies with a high sustainable rating, allowing them access, licenses and approvals regarding new growth opportunities; we have seen how main government and community measures for the recovery of economy in the post-pandemic period (such as non-refundable support, cash injections, the Recovery Fund) are aimed at those companies that exceed certain sustainable thresholds.
From a regulatory perspective, adopting responsible standards protects a company from regulatory pressures by avoiding penalties that can damage its image. Obviously, this aspect

[51] FedEx Annual Report, 2020.
[52] "The link between job satisfaction and firm value, with implications for corporate social responsibility". Alex Edmans, 2012.

is more significant in some sectors than others, for example in those that depend heavily on government subsidies such as aerospace and automotive they are prevalent, while in the pharmaceutical and healthcare sectors they may be less invasive.
Those presented are the reasons that we believe can influence the valuations of companies, impacting the performance of investors who include them in their portfolios; it remains to be considered how the situation will evolve in the future, especially the scenarios that arise if companies choose to adopt greenwashing strategies.
The positive trend underway that has brought the theme of responsible investment to the levels of attention we see today is certainly not over, on the contrary, it is reasonable to think that this could become a must for companies, also in relation of the long-term objectives set by the major world authorities, such as the 17 Sustainable Goals of the European Union to be achieved by 2030. The choice not to adapt to ESG standards could cause the loss of any competitive advantage gained by companies, resulting in their exit from the market in medium to long term.
In addition, the blockchain technology that is increasingly used especially in industry, which involves collecting data and information in a way that makes it difficult to modify or hack them, and certifies the authenticity of them, will make it impossible to implement greenwashing strategies. This new technology would bring greater trust and transparency to supply chains in all sectors, especially when multiple parties are involved; for example, it could be applied to tracking the origin of products, its changes in ownership, monitoring production systems, and certifying that a given product has been manufactured and managed in a compliant manner.
We conclude this thesis with the understanding that ESG factors and, more generally, responsible investments are the protagonists of future finance, generating competitive advantage for the companies that will implement them and for investors who will take them into account when structuring portfolios.

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TABLE OF FIGURES

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