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The New Zero-Emission's Economy Instruments and Pandemic Sustainable Financial Performance

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Abstract. The awareness of environmental sustainability and climate change issues is necessary to change the mindset of the world population from an intensive and linear use of resources to a more responsible and circular one. In the same way, institutional bodies, governments, banks and financial institutions must be lean towards economic and social initiatives policies and funding in line with the objectives of reducing emissions of pollutants into the atmosphere. In this paper are going to be discussed some of the new-born principal methodologies created to help the financing of a zero-impact circular economy and some refined financial instruments modified to incorporate the themes of environmental sustainability and social inclusion. The topic of financial sustainability is under development and constantly evolving. For this reason, some tools will also be reported under the perspective that in the coming years, these will allow to extend the available offering of financial instruments to investors sensitive to environmental issues. Finally, the impacts which these tools may have on the economy and the environment will be observed, with particular regard to the European Community. The improvement of the financial instruments represents an essential and decisive step in order to finance a more sustainable, responsible and inclusive economy. In the long term, this will allow to eliminate the atmospheric polluting emissions and, ultimately, a reversion of climate change.

INTRODUCTION

Financial instruments represent legally binding contracts that incorporate any monetary value and can be traded on the markets, they are bearer contracts and exchanged underpayment of the monetary value of the contract. They can be classified differently according to the asset class to which they belong, equity or debt, or the subject of the contract, cash or an additional financial instrument (derivative).

Financial assets allow capital to be transferred efficiently between surplus and deficit operators. In the field of sustainable and responsible finance, these instruments make it possible to link the monetary value of the contract to the specific purpose of the reduction of the polluting impact of companies. Specifically, they allow the integration environmental and social issues in the economic initiative to which the money will be assigned. The methodologies of transferring financial assets and capital towards environmental sustainability and circular economy are numerous. Some of the most known and used of these financial instruments are going to be described in this chapter. Moreover, some broader green principles can be incorporated into any traditional financial instrument to face them with sustainability issues, without the need to create ad hoc instruments.

Financial Instruments for a Sustainable Economy

Green bonds are financial debt securities issued by a company that intends to improve its environmental performance. Typically, the proceeds obtained from the bond issue are exploited to finance or re-finance

environmental projects, such as renewable energy, energy efficiency, adaptation to climate change, circular transformation of production processes.

The bond market has a higher value than the stock market, \$ 100 trillion versus \$ 85 trillion in 2017 (1). A company should issue debt rather than sell a share of ownership, which would dilute the control of decision-making power. At the same time, for an investor, mainly interested in monetary gain, it would be cheaper to buy debt securities instead of shares, because they are the first to be paid following the yearly revenues' maturation (2).

In 2018, the International Capital Market Association (ICMA) released voluntary guidelines, called Green Bonds Principles (3) (GBP), to help businesses build bonds aimed at sustainability. These guidelines are based on transparency, accuracy and integrity regarding the communication of information relating to the progress of sustainable projects in order to promote the development of the sustainable bond market. The GBP is designed for wide use in the market, as they provide to the issuer, help in launching a credible green bond; to investors, a wealth of information about the environmental impacts of the investment; and to the underwriters, the banks that sell the bonds to the public, assistance in promoting and preparing the market for the issue (4).

GBP is made up of four key components:

1. Use of proceeds

The foundation of green bonds lies in the use of the proceeds to finance sustainable projects, which must be carefully described in the legal documentation. All projects should make clear the possible environmental benefits, which must be estimated and, where possible, quantified by the issuing company.

Suppose part or all of the proceeds of the issue are used for the re-financing of existing projects. In that case, the company must provide an estimate of the amount allocated to the financing compared to the re-financing, and it must specify which investments can be re-financed and the estimated payback period of the investment.

The GBP recognise multiple categories of sustainable projects eligible for the issuance of green bonds that have to contribute to the mitigation of climate change, the prevention and control of pollution or the preservation of biodiversity. Additionally, the related costs of these projects, such as those of R&D, are also included in the documentation.

Among the main projects, eligible for the issuance of green bonds, can be mentioned: renewable energy and energy efficiency; sustainable management of natural resources and the territory; clean transport; adaptation to climate change; circular economy technologies and processes; and others.

2. The process of project evaluation and selection

The issuer of a green bond must communicate to investors the environmental objectives and the processes through which the projects are compatible with the categories identified above. It also has to disclose the eligibility requirements relating to such projects, including, where possible, the exclusion criteria to identify and manage potential risks that may have environmental and social impacts related to such projects. Businesses are encouraged to disclose such information as part of its objectives, strategies and policies regarding environmental sustainability. They are also invited to communicate any environmental practice or voluntary certification that may be required in the project selection process (5).

GBP promotes the achievement of a high degree of transparency and nevertheless recommends the issuer's project evaluation and selection process to be assessed by an accredited external reviewer.

3. The management of the proceeds

Net proceeds from green bonds issuance should be credited to a sub-account, or transferred to a sub-portfolio or, in any case, traced appropriately. The company should control the tracing system, and it should also be documented in a formal internal process connected to the financial operations and the investments of the environmental projects. As long as the obligation is not extinguished, the balance of net revenues recognised should be periodically corrected and modified to con- cur to the allocations intended for the projects to be carried out during that period. The company is required to inform investors on the types of temporary placement of those net proceeds not yet allocated.

GBP incentives to achieve a high level of transparency and recommends supplementing the management of the firm's proceeds through an auditor or accredited third party to verify the internal monitoring method and the placement of funds resulting from the use of the proceeds of green bonds (6).

4. Reporting activities

Issuing companies are required to process, maintain and keep up to date the information regarding the use of proceeds annually until full allotment and promptly if there are concrete developments. The annual report should include a list of the projects, a brief description of these and the amounts assigned to each one as well as their expected environmental impact. When non-disclosure-agreements, market valuations or a large number of underlying projects limit the degree of information details that can be made available, GBP still recommends disclosing such information in general terms or based on an aggregate portfolio.

Transparency is particularly useful for the communication of the expected impact of different projects. The GBP recommends the use of qualitative performance indicators and quantitative performance measures, as well as the disclosure of the principal methodologies and estimations for the quantitative determination. Companies that can monitor the environmental impacts are encouraged to include this information in their periodic report.

Issuers are recommended, in the context of a green bond issue, to appoint one or more external auditors to confirm the compliance of the bond with the four core components of GBP described above. There are various methods that issuers can use to obtain such external audits to provide information to the market. An issuer may request advice on issues such as the drafting of information on the bond or the reporting activity. It can also ask for support or consulting services involve cooperation with the issuer and differ from an independent external review. The GBP incentivises the independent review of the environmental characteristics of the assets or activities associated with the green bond.

Independent external audits may vary in scope and may relate to a framework, a single bond issue, the underlying assets or the procedures. Among the main types of external auditing, certifications and ratings are the most known. With the former, an issuer can have its green bonds as well as their reference framework and the use of proceeds verified in order to be compliant with recognised international environmental assessment standards. With the latter, an issuer can have its bonds assessed by rating agencies, and the result can include an in-depth analysis of data related to environmental performance, which may reflect significant environmental risks different from credit assessments.

The evolution of the green bond market has experienced exponential growth in the last decade. In 2019, there has been a 55% increase in global issuance of sustainable bonds, compared to 2018. Moreover, a record amount of \$ 266.1 billion in green bonds have been issued in 2019 (7), of which \$ 116.7 billion by European countries, which are the main driver behind the substantial increase in volumes (8).

For over a year, the whole world has been battling a pandemic that is causing a significant economic crisis, mass layoffs and some business bankruptcy filing. If the forecast at the beginning of the year put forward hypotheses about the achievement of new records in the green bond market, in May 2020 the rating agency Moody's predicted the first reduction in the history of the sustainable bond market due to COVID-19 pandemic. However, the issuance's reduction is not as significant if, additionally to green bonds, social bonds are taken into consideration. These are bonds not linked to environmental sustainability, but the social development of a more inclusive economy.

Although 2020 has been a challenging year, the global cumulative green bond issuance surpassed the \$ 1 trillion milestone (Graph 1)

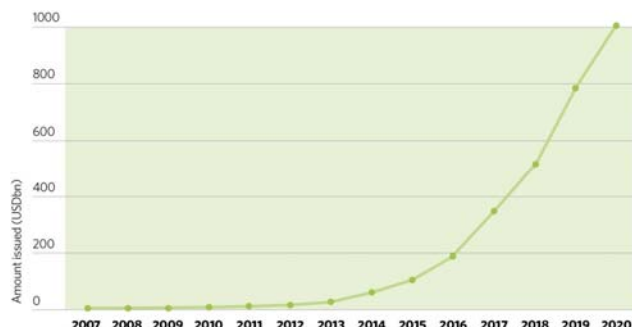


FIGURE 1. The \$ 1 trillion green bond cumulative progression

After a strong first quarter, second quarter green bond issuance was impacted by the COVID-19 pandemic, but a record breaking third quarter ensured a strong finish. Final data from the second half of 2020 is still pending but forecast expect the 2020 figure to be the highest since market inception reaching a record-breaking \$ 269.5 billion by the end of December, just above 2019 final total.

Concerning the 2020 use of green bonds proceeds for sustainable projects and initiatives, graph 3.2 can be examined to acknowledge that investment in Energy Sector comprises the largest component, at \$ 93.6 billion, followed by Low Carbon Buildings with \$ 70.6 billion and Transport in third place with \$ 63.7 billion issued. Combined they account for approximately 80% of all use of proceeds in 2020, which has not changed compared to the previous year (8).

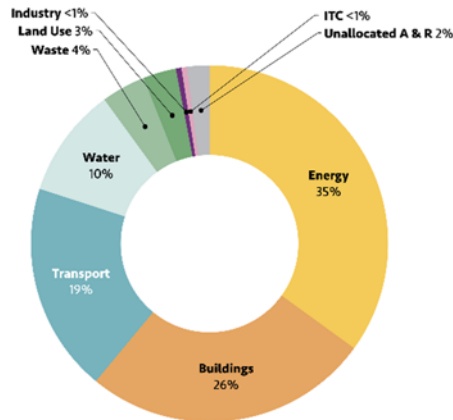


FIGURE 2. 2020 green bonds use of proceed

The impact of COVID-19 in 2020 proved a huge economic and social negative. In that context, the resilience of green finance markets led to a record year of issuance at \$ 269.5 billion, albeit a small increase over 2019. The return of green multilateralism adds momentum to COP and pushes climate higher on the Agenda at G7 and G20. 2021 may enable a sustained resurgence.

Environmental, Social and Governance Criteria (ESG)

The practice of socially responsible investments has long been known in the world of finance. The first examples date back to the 1960s, when it arises the practice of exclusion from portfolios, or in general from investments, of companies in sectors such as tobacco, alcohol, gambling and weapons. The Socially Responsible Investments (SRI) criteria have since become increasingly applied and recognised as a valid discriminating method for investments in line with the highest international standards in terms of human rights, adequate working conditions and, more generally, that creates value for society as a whole (9).

Since the 2000s, in the wake of environmental sustainability, the criteria of responsible investment have expanded, taking into account the externalities created by companies in the environmental, social and internal practices related to corporate governance. The evolution of socially responsible investments generated the ESG criteria. In a nutshell, the ESG approach evaluates the behaviour of companies on environmental and social issues and the policies adopted to manage them. Furthermore, ESG criteria go beyond mere informational significance, as they are based on the assumption that these factors may have a particular financial significance. As cash flows, balance sheets and margins are of primary importance, ESG criteria are of prime importance as well.

With the rise of sustainable investments, the attention paid to environmental objectives and achieved results are continuously increasing. The Task Force on Climate-related Financial Disclosures set up by the Financial Stability Board highlighted the need to standardise information to allow investors to assess appropriately and price risks and opportunities of climate-related financial assets. In March 2019, the European Parliament promoted the report for a sustainable finance taxonomy which favours the establishment of a standardisation framework for sustainable investment. Furthermore, UNPRI (United Nations Principles of Responsible Investments) has a methodology to allow investors to determine the impacts resulting from the integration(n of Environmental, Social and Governance (ESG) criteria on investment profits and to determine the importance of the criteria on the general performance.

According to an MSCI research group (10), there are four different approaches through which an investor can implement ESG criteria depending on the objective of their investment and implementation strategies. It is important to note that these different approaches to ESG investment are not incompatible with each other. Investors may adopt one or more methodologies in the process of allocating capital in their investments (11):

1. Integration or orientation towards ESG

The first approach requires orienting the portfolio or the investment to capture the positive ESG factors while trying to minimise the adverse effects. Selling or not owning specific categories of companies is not always the optimal strategy, especially for financial investors, such as banks. To solve this problem, investors could introduce a methodology through which the capital allocation decision process incorporates ESG criteria.

The final result of the process typically allows companies with high ESG standards to be weighed more and to leave out those with lower performances when other financial evaluations are equal. In some cases, investors could weigh them negatively excluding from their investments those companies that are incompatible with the values sought.

2. Active participation

In certain situations, investors may prefer to have an active approach towards those companies that are less aware of sustainability issues. Active participation and the right to vote in the decision-making process are handy tools for investors oriented towards a strategy that could allow the company to put its efforts, in the long term, towards sustainability.

Active participation in companies is an approach that falls outside the traditional construction of an investment portfolio. However, in some cases, investors could use this methodology in order not to exclude companies with low ESG performance from their investments. Only when active participation has failed will investors exclude the company from their portfolio.

3. Targeted investment

Investors worried about the potential threats from the economic system's externalities could consider investing over a more extended period in companies that produce positive externalities, such as renewable energy, water treatment and zero-emission technology.

A typical implementation of this strategy requires dedicating a portion of the capital to these strategic investments, which is not so far from investing in a long-term insurance portfolio to ensure the sustainability of the investment profits.

4. Cooperation

Some investors believe that investing in the overall improvement of the economic system is the most effective method for achieving long-term sustainable progress. These investors may prefer a collaborative approach with the company's stakeholders. However, this methodology could be more laborious and complicated than the other.

In early 2016, more than 1,600 institutional investors, with \$ 60 trillion of assets under management, signed up to the UN Principles of Responsible Investments, a document that recommends signatories to consider ESG criteria during the capital allocation process for investments. Until recently, there was substantial doubt among investors as to whether high-performing ESG firms could be successful in generating competitive profits for their shareholders, as they considered enterprise's environmental and social activism a cost that would have reduced the value of the investments.

On the contrary, recent research (12) has shown that a company that integrates ESG values into its business can manage its risks more effectively, which allows it to increase its reputation in the market. This enables to attract investors who will be more inclined to request a lower return on their investments, allowing the company to achieve a higher P/E (Price/Earnings). Ultimately, this increases the company's revenues and cash flows, in the short term, and the long-term investor's returns. Furthermore, for listed companies, shares tend to be traded at a higher value, which increases the company's market capitalisation and reduces the risk of bankruptcy thanks to a lower credit default swaps spread. This instrument allows to transfer credit risk to third parties (13).

All businesses provide benefits to society by generating jobs and offering goods and services that can meet the needs of consumers. However, in many cases, companies impose a cost on society which is reflected in environmental degradation and social distortion. More and more, these companies adopt certain commercial practices in response to the continuous pressure from consumers and investors who demand an alignment of the economy with the interests of society and the environment (14).

Eu Ecolable: The Environmentally Sustainable Quality Label

The European community system for awarding the ecological quality label, known as ecolabel, was established in 1992 through a regulation (13) that promotes "the design, production, marketing and use of products with a lower environmental impact during the entire life cycle of the product and [that can provide] consumers with better information on the environmental impact of products".

Today the trademark is known as the EU Ecolabel, as established by the 2010 regulation (14), and it extends its scope to all goods and services intended for distribution, consumption or use under the community market, both paid or free, except for food products and medical-veterinary devices (15). The trademark promotes the circular economy by encouraging producers to generate less waste and polluting emissions during the manufacturing process. It also encourages the development of products that are durable, easy to repair and easy to recycle (16).

The EU Ecolabel can be granted to products for which specific criteria have been adopted that are defined based on the product's life cycle assessment (LCA). The "from the cradle to the grave" principle allows to detect all significant environmental aspects and any impacts on the environment: from the extraction of raw materials to the manufacturing processes to distribution (including packaging) and use, up to disposal. Among the environmental aspects of a product life cycle there main ones are the total emission released into the atmosphere, the water consumption and discharges into water, the use of toxic chemicals, the production of waste, the consumption and sources of energy, the environmental safety, the noise pollution and the protection of biodiversity. The EU Eco-label has the characteristics of a type I ecolabel, which means that it is voluntary and requires verification by an external body that issues certification according to the regulation provided for by the ISO 14024:2018 standard (17). The operator wishing to obtain the EU Ecolabel must follow a procedural process not different from that envisaged by the EMAS certification (18). It has to send the documentation relating the product and after the verification by the external body, which examines the documentation and carries out an on-site inspection, issues the certification. If successful, the company can use the EU Ecolabel logo on the packaging of the certified product and the information material as well.

As part of a broader effort to guide and promote the transition towards a more sustainable economy, the EU Action Plan, adopted by the European Commission, intends to expand the EU Ecolabel environmental quality label to financial products as well. The goal is to increase both transparency of environmental performance and accessibility of green financial products to a broader audience of stakeholders (19).

One of the critical points of the EU Action Plan is the establishment of standards and trademarks for sustainable financial products, which may be particularly useful for investors who wish to include sustainable companies in their investments. For this reason, the Commission is studying the development of an EU Ecolabel for some financial products that would be exploitable once the European taxonomy for sustainability comes into operation.

According to the current legislation on the EU Ecolabel, the trademark can be granted to both goods and services. Consequently, the environmental quality label would be granted to the financial service carried out by the issuer of the sustainable financial product, rather than to the product itself. The generic definition of financial service must therefore be specified to fall into one of the two groups of financial products that would be eligible for the Ecolabel:

The management service of an investment product that has been offered under Regulation (EU) No. 1286/2014, which guarantees the suitability for the public sale of investment products. These products include stocks, bonds, mixed investment funds and insurance products with an investment component (20).

The management service of fixed-term deposits or savings deposits, as referred to in Article 2, paragraph 1, point 3 of Directive 2014/49/EU relating to deposit guarantee schemes, in order to pay interest on positive environmental externalities arising from economic projects in which the money has been granted.

Financial Ecolabel Criteria

As part of the selection process of the financial services that may fall within the Ecolabel, some criteria have been defined, which are still under development (21). Six areas have been identified in which the EU Ecolabel will increase the environmental benefits of investments:

1. Composition of the investment portfolio, with particular attention to the term green economic activity.

The definition of green economic activities proposed by the European taxonomy is used to facilitate their identification. The term green refers to those economic initiatives qualified as environmentally sustainable. Initially, only those activities that significantly contribute to the mitigation and adaptation of climate change without compromising the achievement of other objectives will be considered (22).

The portfolio choice that includes sustainable economic activities exploits a triple order of possible investments strategies that distinguish companies that invest mainly in sustainable economic activities from businesses that invest in transition activities or businesses looking to diversify. This threefold order is necessary to grant portfolio managers the flexibility to invest in a sustainable transition and on investment diversification.

2. Exclusions based on environmental aspects

The criterion focuses on the potentially harmful effects on the environment of the financed activities, excluding all those companies that invest more than 5%, relative to the company's total revenues, in activities that could significantly cause damage to the environment (23).

Exclusions based on social aspects and corporate governance practices

A due-diligence process will be required to verify and monitor the various risks related to the economic activity, excluding all investments in companies linked to tobacco, alcohol or weapons. At the government level, additional

human rights treaties would have to be ratified, and an upper threshold level of perceived corruption will be established. The criterion envisages a focus on stakeholders' concerns about social issues as well as the mitigation of social adversity's effects on investments. Additionally, companies would be excluded based on corporate governance practices, including diversity and social integration, management responsibility and accounting transparency.

3. Involvement of management

The involvement criterion has been introduced as it can lead to a positive environmental effect deriving from encouraging change in the activities and behaviour of companies. Sustainable investment managers must regularly engage with companies whose sustainable activities are less than 50% of the total.

5. Information for investors

This criterion calls for the annual disclosure of information about the portfolio composition, the engagement of managers with other companies and the exclusion criteria adopted. Additionally, an annual report must be made available to the public highlighting the environmental and social efforts as well as the performance of financial products. The methods for verifying the leading environmental indicators and a benchmark of the financial product will also be disclosed in order to be as transparent as possible (24).

6. Information on the EU Ecolabel

The financial service issuer must correctly follow the instructions relating to the use of the EU Ecolabel logo. Annually, the issuer will have to send the documentation regarding the use of the quality trademark and information about the contribution of the financial product to climate change mitigation. It also has to disclose the avoided investments harmful for the environment and an explanation on how the issuer's engagement has encouraged other companies to adopt more sustainable practices.

The Ecolabel for financial products is part of the broader European taxonomy for financial products that in the future would allow to better finance those companies that actively contribute to the transition for a more sustainable economy as well as the mitigation and adaptation to climate change.

7. Impacts on The Economy and The Financial Markets.

Investing in sustainability and circular economy not only brings benefits to mitigation and adaptation to climate change but also generates value for the economy, businesses and investors. Financial instruments, the principles of sustainable investment and the taxonomy of financial products play active roles in directing funds to those projects that can meet the needs of both the planet and the world population (25). Investors and companies, proactive in adapting their behaviour and economic activities and practices towards sustainability, started a new financial system that aims not only to generate monetary value but also value for the environment and society (26).

The sustainable finance transition is currently under way and as such ESG ratings are an evolving instrument being shaped by industry and expectations. In this regard, the analysis of ESG ratings and related outputs underlines the difficulties faced by investors and how fundamentally different these ratings can be depending on the provider. This is mainly due to methodological differences in structuring the ratings and also on how materiality is incorporated.

Green Bond Advantages

According to an empirical examination by Bloomberg of green bonds issued between 2013 and 2018, it is observed that the stock market responds positively to the issue of this type of bonds, even if in reality they differ little from traditional bonds. According to Lammer130, in a short time window period before the issuance of green bonds, the cumulative anomalous return (CAR) of the shares increased by 0.49% compared to their average value. Furthermore, the yield is higher for those companies that have certified their green bonds with a third-party body and also for companies that issue sustainable bonds for the first time.

A company that issues bonds aimed at reducing the environmental footprint is deemed more credible. In the context of greater confidence in management towards environmental objectives, it can be observed that investors are more likely to invest over a more extended period, compared to the investments in companies that are not attentive to sustainability. Additionally, a company that issues green bonds can expect to become more attractive for investors sensitive to environmental issues (25).

A further reason to believe that the issuance of green bonds is beneficial for a company is given by the fact that the cost of capital is reduced. It is believed that sustainability conscious investors are more inclined to receive a lower return for their investment in favour of the greater good of climate change mitigation. In this way, the company can obtain capital at a lower cost than traditional sources of financing, which should allow a company, ceteris paribus, to generate more value for its shareholders (26).

Companies not wishing to issue green bonds, due to the small business size or the high commitment it requires, can always integrate the general criteria of environmental, social and management sustainability into its business model. The integration of ESG criteria in the economic activities of companies is, according to Mercer (24), mainly dictated by the fact that 69% of the stakeholders are interested in environmental and social sustainability issues. Moreover, 57% of institutional investors believe that the integration of ESG factors in the choice of investments increases the risk-related return.

The development of a new quantitative research model made it possible to relate the performance of 157 best-in-class ESG companies, of the Dow Jones sustainability index, with 809 generic companies. The difference in size was explicitly chosen to allow the representation of the average market performance and in order to achieve some statistical significance, which guarantees a reduced standard deviation of the results (27-28). The model allows to observe that the volatility yield of high ESG performing companies' shares is lower, by approximately 28.67%, compared to traditional companies. This means that, over a reference period, investing in unsustainable companies could be 28% riskier.

Traditionally, a lower risk is associated with a lower return, but this is not always true with sustainable companies. Within the twelve industries taken as references in the model, there is an average positive effect on performances of 6.12%. However, four of these sectors (banking, insurance, automotive, durable goods) experience adverse effects from the integration of ESG criteria. A plausible explanation can be gathered by observing the nature of the investments of these sectors. Companies in the banking-insurance sector are known for their unsustainable management, the automotive and durable goods sectors exploit natural resources intensively, and it does not take advantage of circular processes.

Pandemic Sustainable Financial Performance

The economic crisis resulting from the global COVID-19 pandemic has affected all businesses, but not all businesses have suffered equally. The integration of ESG criteria, or more generally of sustainability, in the business practices and governance of some companies has shown to induce business to be more resilient. The internalisation of environmental and social costs increases the risk management capacity of companies and improves their economic performance, compared to traditional businesses, in times of crisis. Investors are aware of the difficulty of reconciling economic returns with environmental and social ones, as they prefer a lower return on their investment in favour of improving environmental conditions.

The pandemic has accentuated, even more, the need to shift investments towards a more resilient economy against the environment that surrounds it. Investors have begun to change their preferences trying to balance their portfolio in such a way as to incorporate a sustainable component. During the first quarter of 2020, as reported by the BlackRock Investment Institute, capital inflows into numerous ETFs (29) have seen a massive decrease in traditional ones in favour of sustainable funds, see chart 3, which continue to increase steadily. Exchange Traded Fund is a type of security that involves a collection of securities that often tracks an underlying index.

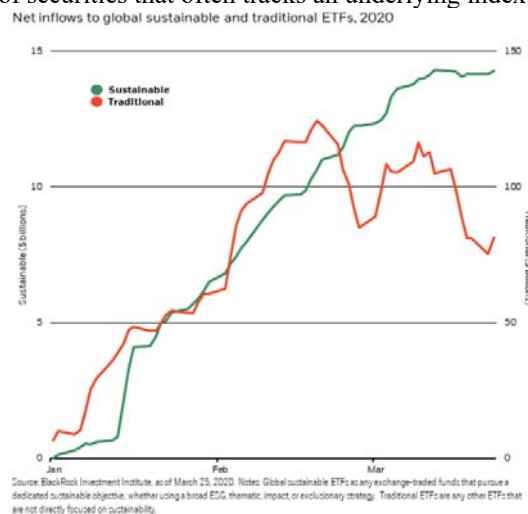


FIGURE 3. Net inflows to global sustainable and traditional ETFs

COVID-19 has demonstrated the vulnerability of the global financial system as the International Monetary Fund (30) estimates the worst economic recession since the Great Depression of 1929. Against this backdrop of current market volatility, many investors are shifting their capital to build more resilient portfolios in order to protect their investments from future economic repercussions resulting from other crises, such as climate change.

There are global benchmarks that can be studied to strengthen the idea that companies environmentally and socially sustainable are more resilient than traditional ones, during a downturn period of the markets. MSCI, leader company for the development of global equity benchmark indices, examined the 2020 first-quarter performance of four sustainability-oriented benchmark indices with explicit ESG objective (SRI, Leaders, Focus, Universal) as well as two climate related indices (Low Carbon Target, Climate Change). It then compares their performance in relation to the market, proxied by the MSCI World Index. The sustainable indices do not demonstrate that investing in sustainability is more profitable, rather that investing with ESG criteria reduces exposure to systemic risk and increases resilience to sudden shocks. Graph 4 shows the relative cumulative performance of sustainable indices, given 100 as the performance of the traditional index.

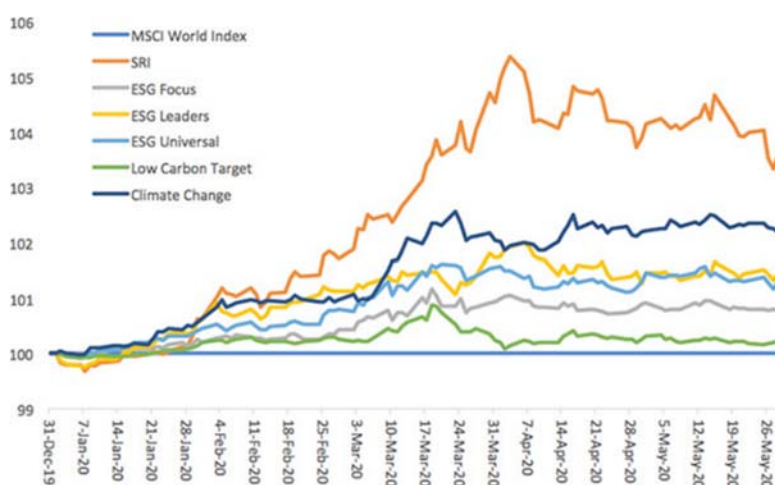


FIGURE 4: Relative performance of select MSCI Indices with ESG and Climate objective.

Fidelity International, a prominent American financial services company, used its ESG rating system to compare 2689 companies against the American market benchmark (S&P 500). The rating system divides companies into five class, from A to E, based on their ESG performance and the corporate engagement on sustainability issues. Over thirty-six days between February 19 and March 26, 2020, the S&P 500 index fell by 26.9%. Meanwhile, the price of a share in companies with a high (A or B) Fidelity ESG rating dropped less than that on average, while those rated C to E fell more than the benchmark (31).

TABLE 1: Attention to ESG earns market outperformance.

Fidelity ESG rating	% of total rated	Stock return (%)	Stock return vs S&P500
A	12%	-23.1	+1.9
B	39%	-25.7	+1.2
C	33%	-27.7	-0.8
D	14%	-30.7	-3.8
E	2%	-34.3	-7.4

source: <https://www.internationalinvestment.net/news/4014022/esg-rating-linked-outperformance-pandemic-fidelity>

A company's focus on sustainability factors is fundamentally indicative of its board and management quality. This leads to more resilient businesses in downturns that will be better positioned to capture opportunities when economic activity resumes, more than earning its place at the heart of active portfolio management.

Proactive companies on climate change issues and those that intend to be on the frontier of the transition to a zero-impact economic system need large amounts of capital for sustainable investments. The financial system must serve the needs of these companies by creating the next generation of financial instruments. Green bonds, ESG criteria and, soon, the EU Ecolabel are sources of financing through which companies will be able to mobilise capital from investors concerned on sustainability issues. It is shown that these tools are rapidly expanding and that they can reliably achieve both environmental advantages with a good economic performance. However, these investors are willing to sacrifice a portion of profits for the environment's well-being. On the one hand, companies and investors are more aware of the problems linked to climate change. On the other, governments and institutional investors have to create a framework, through policies and reforms focused on sustainability, in order to transition from traditional investing practices to sustainable ones. Since the beginning of its existence, the European Union has embraced environmental and social sustainability: the Kyoto Protocol was adopted a few years after the birth of the Community.

The latest European frontier of sustainability is represented by the community emissions market (EU ETS). Companies from a variety of sectors are obliged to a maximum limit of polluting emissions they can emit. The European cap-and-trade market represents the first market of its kind and a prideful example from which the world can learn. The proposal on the European taxonomy for sustainable activities, approved by the Commission in June 2020, calls for the creation of a quality trademark for financial services, based on the well-known EU Ecolabel. A voluntary certification granted to those best-in-class financial services, which have passed a scrupulous environmental and social sustainability selection. All these initiatives, both from companies and institutions, will facilitate the financing of a transition that soon will allow the exploitation of only alternative renewable power sources for electricity generation and even more. Hydroelectric, wind and solar photovoltaic represent the trident of the energy production for a future with zero emissions. Over the last few years, these renewables have experienced an exponential growth in investments and a record production of electricity.

CONCLUSIONS

Over the years, new research demonstrates the correlation between global economic activities, air pollution and climate change. The economic system, very slowly, is understanding the negative impact it has on the environment and the society. Only recently, companies, stakeholders and investors have understood the need to change their modus operandi in carrying out economic activities. Not only taking into account the risks related to an economic activity, but also those of the surrounding environment. The new sustainable investment strategies, and the criteria associated with them, represent the tool through which the economic system can initiate the transition to a circular, resilient and inclusive economy. Sustainable bonds are the critical tool to finance this transition through the use of the capital raised to reduce a company's ecological footprint or increase its social inclusion with all stakeholders.

The theoretical foundations upon which sustainable investments developed are the ESG criteria. Economic activities can incorporate the "sustainability tirade" into their strategy environment (E), society (S), and management (G) to help transition the economic and financial systems to the future. Internalising these risks in the business strategy allows to increase a company's ability to respond promptly to sudden shocks, such as the COVID-19 pandemic, and to become more resilient. The data show that companies active in the sustainable field have suffered less damage than traditional ones, both considering the value of market capitalisation and the levels of economic activity. Even before the economic system can begin the green transition, people around the world must change their view on sustainability and their capitalistic needs. Without the engagement of all stakeholders and substantial funding, mitigating climate change will be inaccessible. As Larry Fink, President and co-founder of BlackRock, explains in his 2020 annual letter to customers "Climate change has become a defining factor in companies' long-term prospects [as it] will impact both our physical world and the global system that finances economic growth. While government must lead the way in this transition, companies and investors also have a meaningful role to play. Every government, company, and shareholder must confront climate change" (32). Again in 2021, Larry Fink, in his letter to CEOs, stated "I believe that the pandemic has presented such an existential crisis – such a stark reminder of our fragility – that it has driven us to confront the global threat of climate change more forcefully and to consider how, like the pandemic, it will alter our lives".

During the global pandemic resulting from COVID-19, the production of European renewable energy has surpassed that of the energy from fossil fuels for the first time in history, allowing to glimpse the sought-after future. The epidemiological crisis has also demonstrated the fragility of the global economic system to the risks associated with nature. In the broader debate on reforms to revive the economy, issues of sustainability and climate change mitigation play a crucial role. The funds allocated by the European Commission envisages that 30% of the proceeds are to be allocated to move the economy towards a more efficient and widespread use renewable energy sources and a less intensive exploitation of the planet's available resources.

The results of this work allow to understand the actuality and severity of the change the world's climate is going through and its effects on the economy, the environment and the population. Sustainability plays an increasingly important role in the decision-making processes of companies' investments strategies and future policies from governments. The transition to a sustainable, circular and inclusive economy needs the contribution of all interested parties, therefore, including each individual who, in his small way, will allow to achieve the most ambitious goal.

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REFERENCES

1. <https://www.sifma.org/wp-content/uploads/2017/08/US-Fact-Book-2018-SIFMA.pdf>.
2. P. Milazzo, M. Sgandurra, A. Matarazzo, L. Grassia and A. Bertino, The New Iso 14001:2015 Standard As A Strategic Application Of Life Cycle Thinking, *Procedia Environmental Science, Engineering And Management*, **4**, 119-126, (2017).
3. G. Peters, G. Marand, C. Le Quéré, T. Boden, J. G. Canadell and M. R. Raupach, Rapid growth in CO₂ emissions after the 2008–2009 global financial crisis, *Nature Climate Change*, **2**, (2012).
4. <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-Principles-June-2018-270520.pdf>.
5. J. Sachs, G. Schmidt-Traub, C. Kroll, G. Lafortune, G. Fuller and F. Woelm, The Sustainable Development Goals and COVID-19. *Sustainable Development Report 2020*, Cambridge University Press, Cambridge, (2020).
6. G. Munda and A. Matarazzo, On the Impossibility of Using "the Correct" Cost-Benefit Aggregation Rule, *Journal Of Economic Studies*, **47** (5), 1119-1136, (2020).
7. https://www.climatebonds.net/system/tdf/reports/2019_annual_highlights-
8. A. Matarazzo and L. Baglio, The modern pillars of Circular Economy, *Archives Of Business Research*, **6**, 228-240, (2018).
9. https://www.moody's.com/research/Moodys-Coronavirus-shrinks-green-bond-issuance-while-spurring-social-bonds--PBC_1227042.
10. O. Taaffe and E. Corley, *Banking on Change: The Development and Future of Financial Services*, John Wiley & Sons Ltd., Hoboken, 2019.
11. <http://www.eurosif.org/wp-content/uploads/2018/11/European-SRI-2018-Study.pdf>.
12. G. Serafeim, E. Kaiser and J. Linder, *The Role of the Corporation in Society. Implications for investors*, Calvert Research and Management, Boston, 2017.
13. Council Regulation (EEC) No 880/92 of 23 March 1992 on a Community eco-label award scheme, published in O.J. L 099 I, 11 April 1992.
14. Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel, published in O.J. L 27, 30 January 2010.
15. C. Ledda, F. Carrasi, M.T. Longombardo, G. Paravizzini, V. Rapisarda, SARS-CoV-2 Seroprevalence Post-First Wave among Primary Care Physicians in Catania (Italy), *Tropical Medicine and Infectious Disease*, **6** (1), (2021).

16. A. Roggenbuck, Doing the same thing and expecting different results? Analysis of the sustainability and transparency of the European Fund for Strategic Investments, CEE Bankwatch Network, Luxembourg, 2017.
17. UNI EN ISO 14024:2018, Environmental labels and declarations - Type I environmental labelling - Principles and procedures.
18. Regulation (EC) No. 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No. 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC, published in O.J. L 342 I, 22 December 2009.
19. . Climate Analytics - NewClimate Institute, Warming projections Global Update: Governments still showing little sign of acting on climate crisis, Climate Action Tracker, 2019.
20. C. Ingraio, F. Scrucca, A. Matarazzo, C. Arcidiacono and A. Zabaniotou , Freight transport in the context of industrial ecology and sustainability: evaluation of uni- and multi-modality scenarios via life cycle assessment, *the International Journal Of Life Cycle Assessment*, **26** (1), 127-142, (2021).
21. S. S. Fichera, S. Arfö, Y. L. Huang , A. Matarazzo and A. Bertino, Circular Economy And Technological Innovation In Steel Industry, *Procedia Environmental Science, Engineering And Management* , **7** (1) 9-17, (2020).
22. C. De Camillis, A. Mazzi, I. Arzoumanidis, A. Matarazzo, L. Petti, S. Toniolo and A. Raggi, Some lessons learned and highlights from the working group on tourist services to position the Italian LCA Network in the context of SDGs. *life cycle thinking in decision making for sustainability: from public policies to private business*, **1**, 325-333, frascati: ENEA (2018).
23. C. Flammer, Corporate Green Bonds, in “Journal of Financial Economics”, **5**, 2021.
24. <https://www.mercer.com/content/dam/mercer/attachments/global/investments/responsible-investment/Global-Insights-ESG-in-Alternative-Investing-2015-Mercer-LGT.pdf>.
25. E. Barbier and B. Burgess, The sustainable development goals and the systems approach to sustainability, *Economics*, **1**, 2017.
26. G. Bruno, T. A. Vazzano, A. Matarazzo, V. Del Fiume and S. Pulvirenti, Decarbonizzazione del settore industriale cementiero – produzione di combustibile solido dai rifiuti non pericolosi, Il ruolo della simbiosi industriale per la prevenzione della produzione di rifiuti: a che punto siamo?, Symbiosis Users Network - SUN Proceedings of the fourth SUN Conference, November 4th, 2020, Edited by Tiziana Beltrani and Marco La Monica, ENEA, 81-83 (2021).
27. W. Leal Filho, S. K. Tripathi, J. B. S. O. D. Andrade Guerra, R. Giné-Garriga, V. Orlovic Lovren and J. Willat, Using the sustainable development goals towards a better understanding of sustainability challenges, *International Journal of Sustainable Development and World Ecology*, **26**, (2), 179-190, (2019).
28. N. C. Ashwin Kumar, C. Smith , L. Badis , N. Wang , P. Ambrosyn and R. Tavares, ESG factors and risk-adjusted performance: a new quantitative model, *Journal of Sustainable Finance and Investments*, **6**, 4, 292-300, 2016.
29. <https://www.blackrock.com/corporate/literature/market-commentary/weekly-investment-commentary-en-us-20200330-shift-to-sustainable-investing.pdf>.
30. <https://www.imf.org/en/News/Articles/2020/04/14/tr041420-transcript-of-april-2020-world-economic-outlook-press-briefing>.
31. <https://www.theasset.com/article-esg/40257/esg-proves-its-resilience-in-the-fastest-bear-market-in-history>.
32. <https://www.blackrock.com/corporate/investor-relations/blackrock-client-letter>.