

# THE ROLE OF FINANCE IN ENVIRONMENTAL PROTECTION: A REPORT ON REGULATORS' PERSPECTIVE

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## Abstract

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In international contexts, a key role has been assigned to sustainable finance for the achievement of climate change mitigation objectives. In the context of environmental finance, this contribution focuses on the tool of green bonds, framing the regulators' perspective and the principles of (self) regulation that describe the process of issuing, evaluating and reporting for the transparency and efficiency of the financial market. The previous studies, in fact, neglected the theme of the rules despite the numerous interventions of the institutions in this field and despite the fact that the theory of market efficiency underlines the crucial role of the rules for the protection of investors and the transparency of the market. In particular, knowing the regulatory framework makes possible to highlight the system of incentives and protections for issuers and investors in the segment of listing and trading of securities. From our analysis, it emerged that the current voluntary regulatory system is still far from ensuring an adequate level of transparency to investors. However, the report published by the EU Commission, containing the proposal to introduce common criteria for the issuance of green bonds in Europe, seems to promote greater protection for the underwriters, leaving more room for the development of green investments. The present study concerns a preliminary analysis, necessary for subsequent investigations aimed at evaluating the convenience of green bonds compared to other segments of bonds listed on the European market.

**Keywords:** Financial Market, Sustainable Finance, Regulation, Green Bonds, Green Bonds Principles, Climate Bonds Standard

**Authors' individual contribution:** Conceptualization – V.S.; Investigation – B.C.; Resources – B.C.; Writing – Original Draft – B.C.; Writing – Review & Editing – F.D.L.; Supervision – V.B. and V.S.

## 1. INTRODUCTION

The attention to the impact of climate change in economic contexts has grown significantly in recent years. Globally, the 193 UN member states have developed the 2030 Agenda (Engberg-Pedersen & Zwart, 2018), outlining the so-called Sustainable Development Goals (SDGs), as fundamental objectives to be respected to promote sustainable development. Among the most ambitious objectives

is the maintenance of the global temperature increase by 2° Celsius (UNFCCC, 2015). In this context, finance is framed as a fundamental lever to support "responsible" economic actions aimed at protecting environmental balances and the market is considered the key channel for allocating resources to eco-sustainable projects. In particular, among the financial instruments, the green bonds (GB) have assumed a key role in ensuring the achievement of the objectives of the 2030 Agenda. These are bonds

whose issue is linked to the financing of projects that have a positive impact on the environment. From the companies' point of view, green bonds facilitate the assumption of ethical and responsible behavior, towards which managers are increasingly sensitive and who find their first theoretical foundation in the theory of stakeholders. The latter, in contrast to the neoclassical vision, based exclusively on the maximization of profit, believes that the objectives of the company must take into account the interests of all stakeholders, among which is the reference context and, therefore, the environment (Freeman, 1984). With the stakeholder theory, the issue of corporate social responsibility is dealt with for the first time, which is now completely incorporated into corporate strategies. From the companies' point of view, green bonds facilitate the assumption of ethical and responsible behavior, towards which managers are increasingly sensitive and who find their first theoretical foundation in the theory of stakeholders. The latter, in contrast to the neoclassical vision, based exclusively on the maximization of profit, believes that the objectives of the company must take into account the interests of all stakeholders, among which is the reference context and, therefore, the environment (Freeman, 1984). With the stakeholder theory, the issue of corporate social responsibility is dealt with for the first time, which is now completely incorporated into corporate strategies. The relevance of sustainable finance on the international scene is emphasized by the creation of a network (Network for Greening the Financial System) established at the end of 2017 among some of the world's leading central banks and supervisory authorities, with the aim of coordinating the initiatives in theme of environmental and climate risk management in the financial sector.

Furthermore, starting in 2015, the Financial Stability Board set up a task force on climate-related financial information (TCFD) (FSB, 2016) in order to create information on climate change and promote informed investments. The Junker Commission has also urged the international community to mobilize large volumes of public and private capital in the direction of sustainable development, calculating that, to reach the SDGs by 2030, 180 billion euros a year would have to be allocated to climate and power. In this regard, the European Commission, in March 2018, launched its Action Plan. This plan aimed at defining a strategy that includes finance as a tool to support sustainable growth. In particular, based on the recommendations formulated by the high-level group of experts on sustainable finance (HLEG), the TEG (Technical Expert Group) was appointed in order to support the realization of the following four objectives: a European taxonomy to define what it is sustainable, a benchmark for investment strategies towards low-carbon technologies, a guide to improving corporate communication of climate-related information, an EU standard on green bond. The theme of the GB was treated by the International Capital Market Association, which intervened by introducing some rules of self-regulation at the international level (so-called Green Bond Principles), which do not represent a mandatory normative document. In fact, considering that the risk and return characteristics of green bonds do not differ from those of an

ordinary obligation, they do not represent an autonomous and independent category of instruments with their own discipline. Currently, the international frame of reference, which allows the definition of a "green" bond, is made up of the GBP and the sectoral criteria issued by the Climate Bond Initiative. From an analysis of the literature on sustainable finance and green bond, it was possible to identify three different strands that addressed the topic from different points of view. The first strand of literature, to which the less recent works belong, has dealt with deepening the role of finance in support of the environment, the development of environmental sensitivity in corporate contexts and corporate social responsibility (CSR). These are almost always theoretical studies, which provided the basis for the subsequent development of more detailed studies on financial instruments. A second line, starting in 2010, focused on the analysis of the main features of green bonds, as an opportunity to attract capital to support environmental protection initiatives. Finally, most of the financial literature has developed econometric analyzes aimed at comparing the yield of green securities with that of ordinary bonds. To date, no author has clearly framed the regulatory framework of the green bonds, despite the fact that, for the theory of market efficiency, transparency is fundamental for the protection of investors and to guarantee the efficiency of the market itself. In particular, this theory starts from the study of the speed and accuracy with which information has positive or negative effects on the prices of financial instruments, up to defining three distinct assumptions of market efficiency: strong, semi-strong and weak. Efficiency in a strong form is achieved when market prices fully and instantly any type of information is public or private (Fama & French, 1998).

In this context, the contribution of this study is framed, which aims to define the green bond regulations, the developments that have characterized them and the future developments that are expected, with the aim of providing a complete picture of them.

The following sections are structured as follows: Section 2 describes the review of the literature; Section 3 provides data on the size of the market; Section 4 enters the heart of the topic describing the current self-regulation framework; Section 5 points out the result; Section 6 outlines discussion; the conclusions are presented in the Section 7.

## 2. LITERATURE REVIEW

The first issue of green bond dates back to 2007, it is a recent financial instrument. Consequently, even literature is support only in recent years, deepening some aspects and leaving them totally uncovered by others. The analyzed studies can be divided into two main research areas, centered on the deepening of sustainable finance as a means for environmental protection and on the analysis of the potential of green bonds as financial instruments to support green investments. The second line can be further subdivided into exploratory reports on the characteristics and potential benefits of green bonds and in subsequent studies oriented to the analysis of

investment convenience. Further studies estimate the expected returns of the securities through the Capital Asset Pricing Model (CAPM), using a single determining factor (Sharpe, 1964; Lintner, 1965). An evolution of this model is contained in Fama and French (1988) which extend the factors for estimating the expected return on the securities. However, no empirical studies are available in this context, referable to the green bonds, topic of this paper.

The first studies on sustainable finance investigated the psychological and organizational determinants that impact on businesses and determine their greater propensity to make investments with environmental repercussions.

The authors Cumming and Johan (2007), through a survey subjected to a hundred Dutch institutional investors and a subsequent logit regression, have verified in such a way that the organizational elements present the level of centralization of the investment prospects and the degree of internationalization, influence the choices of capital allocation in responsible investments in private equity. The investment in the institutional investor is worth more than 40-50%. In addition, a subsequent study investigated the psychological and financial determinants of which account the different categories of investors (financial institutions, institutional and private investors) in the choice of socially responsible investments. In particular, it emerged that investment institutions, contrary to institutional and private investors, choose CSR for reasons not related to environmental expenses, but for the possibility of diversifying investments and reducing risks (Jansson & Biel, 2011). Studies of a theoretical nature aimed at a general discussion of sustainable finance as a means of integrating purely financial returns with social and environmental objectives were subsequently analyzed. In particular, starting from the criticism of the profit-oriented economic model in the short term, the role of sustainable finance in guaranteeing the production of wealth in the long term is emphasized (Fatemi, Fooladi, & Kayhani, 2011; Scholtens, 2006). The studies summarized above, although they do not directly address the problem of green bonds, investigate the presence of the premises necessary for their diffusion in company contexts and institutional. The first work on green bond dates back to 2010, three years after the first issue on the market.

Green bonds are considered the means by which the financial market can attract capital and channel them towards initiatives to protect the environment and combat climate change (Reichelt, 2010). Flammer (2018), through a series of econometric analyses, has the environmental and financial advantages generated by the green bonds.

In particular, the environmental advantages proven by the author concerned the improvement of the environmental performance of the issuing companies in terms of overall CO<sub>2</sub> reduction, increase in the number of green patents filed and a greater number of green-oriented investors in the property. Furthermore, from a purely financial point of view, by monitoring the trend of the return on assets (ROA) of the issuing companies, a progressive increase of the same was noted in the years following the issue and the calculation of the CAR (Cumulative Abnormal Return) showed a positive

market response to the announcement of the issue of green bond. A similar conclusion was also reached by a recent study, which investigated the effect generated by the issue of corporate green bonds on the share price of the same issuer and stated that the reactions intensify in the presence of first-time issuers with respect to issues coming from habitual subjects (Tang & Zhang, 2018). However, to encourage the dissemination of these tools it will be necessary to take into account the temporal misalignment existing between the short-term yield objectives of issuers and investors with respect to the long period required to achieve ecological objectives (Demary & Neligan, 2019). The most conspicuous research is characterized by studies carried out using econometric analyzes to compare the yields of green bonds with those of conventional bonds. In particular, in the recent article by Bachelet, Becchetti, and Manfredonia (2019), an analysis is carried out on the performance and liquidity of a sample of green bonds, comparing them with a sample of corresponding conventional bonds and distinguishing between institutional issuers and private issuers. The authors have shown that the green bonds of institutional issuers have higher liquidity than conventional bonds, but negative premiums. On the other hand, green bonds from private issuers have less favorable characteristics in terms of liquidity but have positive premiums compared to their corresponding conventional bonds. In the literature, returns on green bonds have often been compared with those of a conventional bond issued by the same issuer. Ehlers and Packer (2017) and Hachenberg and Schiereck (2018) studied samples of 21 and 63 green bonds aligned with the Green Bond Principles. Ehlers and Packer (2017) focused on the primary market between 2014 and 2017, while Hachenberg and Schiereck (2018) analyzed the secondary market in a semester concentrated between 2015 and 2016. Using a matching procedure and a regression analysis both studies find a negative award but of very different sizes: -18 points the first study and -1 point the second. Karpf and Mandel (2018) and Baker, Bergstresser, Serafeim, and Wurgler (2018) studied a larger sample of US bonds. Karpf and Mandel (2018) focused on secondary market municipal bonds and Baker et al. (2018) analyzed municipal and corporate bonds on the primary market.

By controlling the liquidity of the bonds subject to transactions in the last 30 days, Karpf and Mandel (2018) found a positive premium of 7.8 basis points. On the contrary, using the issue amount as a liquidity proxy, Baker et al. (2018) found evidence of a negative award of 7 points. Zerbib (2019) has identified a lower return on green bonds and shows that this difference is more pronounced for low-rated financial bonds. The literature leaves the study of green bond regulations uncovered, not providing a complete and exhaustive picture of the context of self-regulation to which issuers and investors could turn to stimulate the spread of investments. However, the market efficiency theory underlines the crucial role of transparency in ensuring investor protection and the efficiency of the market itself (Fama, 1970).

Therefore, the present work intends to frame the framework of the rules on green bonds, its evolutions and its future developments.

**Table 1.** Summary of the green bonds literature (Part 1)

<i>Author(s)</i>	<i>Year</i>	<i>Sample</i>	<i>Theme area</i>	<i>Research focus</i>	<i>Data and methodology</i>	<i>Results</i>
Scholtens, B.	2006	/	Sustainable finance	The influence of finance (through the stock market, VC and bank credit) on CSR and sustainable economic development.	Theoretical paper	VC and bank credit have potentially a greater impact on CSR than the stock market.
Cumming, D., & Johan, S.	2007	n = 100 Dutch institutional investors	Sustainable finance	Impact of internal organizational factors on institutional investors (level of centralization of the investment decision and degree of internationalization) on their choices of allocation of capital in private equity SR investments.	Survey and logit regression analyses	Socially responsible investment in private equity is 40-50% more widespread when the decision is centralized (deriving from a single chief investment officer). Socially responsible investment in private equity abroad is more widespread among institutional investors with greater attention to initiatives outside national borders.
Reichel, H.	2010	/	Green bonds	The relevance of financial markets in attracting capital to support environmental protection initiatives; analysis of the characteristics of green bonds as opportunities in this area.	Theoretical paper	Greater development of investment opportunities to maximize the efficiency of direct and indirect sovereign credit, in the direction of combating climate change.
Jansson, M., & Biel, A.	2011	n = 60 investment institutions; n = 71 institutional investors/beneficiaries; n = 457 private investors/beneficiaries	Sustainable finance	Psychological and financial determinants of the investment choices of investment institutions, public investors and private investors in the field of CSR.	Survey and ANOVA analysis	Investment institutions take into account factors related to risk reduction. Institutional and private investors take greater account of environmental concerns than investment institutions. Private beneficiaries evaluate financial benefits significantly less positively than other groups.
Fatemi, A., Fooladi, I., & Kayhani, N.	2013	/	Sustainable finance	The new paradigm of sustainable finance as a tool to generate value over the long term.	Theoretical paper	Sustainable finance is considered a necessary means to guide investments over the long term and to integrate financial results with social and environmental benefits.
Torvanger, A., Narbel, P., Pillay, K., & Clapp, C	2016	/	Sustainable finance	Use of the most suitable green financial instruments to generate concrete effects on sustainability in states at risk climate.	Theoretical paper	The case studies show that financial instruments are often used in combination to make a concrete effect on the environment possible.
Ehlers, T., & Packer, F.	2017	n = 21 green bonds in euros and dollars issued from 2014 to 2017	Green bonds yield	Yield on the primary market of a sample of green bonds compared to conventional ones of the same issuer.	Comparison	Negative green bonds performance of 18 points.
Baker et al.	2018	n = 2083 US municipal and corporate bond with a Bloomberg green flag issued from 2010 to 2016	Green bonds yield	Yield on the primary market of a green bond sample compared to conventional bonds from the same issuer.	OSL regression	Negative yield of the US municipal and corporate bonds with Bloomberg green flag of 7 points.
Hachenberg, B., & Schiereck, D.	2018	n = 63 green bonds globally issued from October 2015 to March 2016	Green bonds yield	Yield on the secondary market of a green bond sample compared to conventional bonds of the same issuer.	Matching method + panel regression	Negative yield of 1-point green bonds.

**Table 1.** Summary of the green bonds literature (Part 2)

<i>Author(s)</i>	<i>Year</i>	<i>Sample</i>	<i>Theme area</i>	<i>Research focus</i>	<i>Data and methodology</i>	<i>Results</i>
Karpf, A., & Mandel, A.	2018	n = 1880 US municipal bonds with a Bloomberg green flag issued from 2010 to 2016	Green bonds yield	Yield on the secondary market of a green-labeled bond sample compared to conventional bonds from the same issuer.	Oaxaca-Blinder decomposition	Positive green bond yield of 7.8 points.
Flammer, C.	2018	n = 368 corporate green bonds from Bloomberg datasets issued in the 2013-2017 period	Green bonds yield	The environmental and financial advantages of corporate green bonds.	OLS regression; CAR calculation; verification of ROA trends; verification of the company environmental score (ASSET4); verification of changes in CO2 emissions; calculation of the LT Flammer and Bansal index, 2017.	Financial advantages: <ul style="list-style-type: none"> <li>the stock market responds positively to the announcement of the issue of green bonds (CAR = 0.67%);</li> <li>the issuing company's ROA grows in the years following the issue.</li> </ul> Environmental advantages: <ul style="list-style-type: none"> <li>increase in the environmental score of the issuing company;</li> <li>reduction of CO2 emissions;</li> <li>increase in the number of green patents filed (no greenwashing);</li> <li>an increase in long-term orientation (and an increase in long-term investor ownership and green investors).</li> </ul>
Tang, D. Y. & Zhang Y.	2018	n = 1881 green bond from CBI dataset issued in the 2007-2017 period n = 1510 green bond from Bloomberg datasets issued in the 2007-2017 period	Green bonds	Empirical analysis of the effects generated on the market by the issue of green bonds.	Construction of a dataset including all the corporate green bonds globally issued in the 2007-2017 period; panel regression; matching sample; diff-in-diff analysis.	Effects generated on the market: <ul style="list-style-type: none"> <li>the prices of the shares of the issuers increase following the announcement of the issue of green bond;</li> <li>market reactions are greater for first-time issuers than for routine issuers and stronger for corporate issuers than for financial institution issuers;</li> <li>better liquidity of the shares on the market after the issue of green bonds;</li> <li>in general, the shareholders present on the market obtain positive effects following the issue of green bonds.</li> </ul>
Bachelet et al.	2019	n = 89 pairs of bonds: greens selected from those listed in the Climate Bonds Initiative website; conventional, selected from those of the same issuer and having the same currency, same rating, and same fixed rate structure	Green bonds	Performance, liquidity and volatility analysis of a green bond sample compared to conventional bonds.	Matching method, OLS regression, FE (Fixed Effects) approach.	Green bond positive yield between 2.06 and 5.9. Greater liquidity of the green bonds compared to the corresponding conventional bonds (about 5 bpt). Reduced green bond volatility compared to the corresponding traditional bonds.
Zerbib, O.	2019	n = 110 green bonds issued from July 2013 to December 2017	Green bonds yield	Yield on the secondary market of a green bond sample compared to conventional bonds of the same issuer.	Matching method, OLS regression	Negative green bond yield of 2 points.

Source: authors' elaboration

### 3. GREEN BONDS: A EUROPEAN PHENOMENON

Green bonds are bonds whose issue is linked to the financing of projects that have a positive impact on the environment. Like other debt securities, they are characterized by coupons, duration, expiry, and the issue price depends directly on the match between supply and demand expressed by the market. The green bond market was born in Europe in 2007 with the first issue by the European Investment Bank. Initially, the bonds came from supranational financial institutions, such as the World Bank or European Investment Bank, but, starting in 2013, bonds issued by individual companies, municipalities, and state agencies also came on the market.

In 2017 the green bonds represented only a small portion of the bond market (around 3%) but, considering their recent birth, it is possible to understand the relevant extent of the phenomenon (CBI, 2017). Characterized initially by small transactions, the green bond market experienced a period of exponential growth in 2013 thanks to a process of differentiation in terms of issuers, currency, ratings and financed projects (CBI, 2013). 2014 is considered a decisive year as it coincides with the publication of the first rules on green bond (the Green Bond Principles), which were followed by an increase in the volume of investments. After the growth known in 2017, the year in which the emissions grew by 78% compared to 2016, 2018 has experienced a slowdown growing only by 3.4% (CBI, 2018). The main reason lies in the global financial situation characterized by a general slowdown in the bond market, a rise in interest rates and greater volatility. Furthermore, the current absence of clear and homogeneous reference legislation that would encourage the spread of green bonds also among private individuals could also be considered influential.

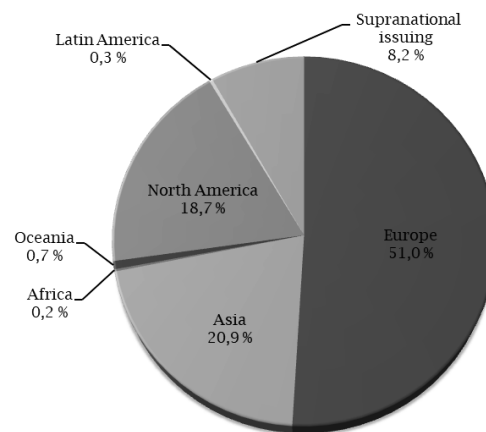
The 2019 trend appears different, having recorded an increase in the volume of green bond issues in the first quarter of 2019 of 42 % compared to 2018 and marking a clear upward trend (CBI, 2019). The increase is driven above all by the business world, which accounts for a third of investments. However, there are significant differences between the EU member states in terms of spreading green bonds, mainly due to the different degrees of development of the national bond market and the political support of government authorities. For example, the market is particularly developed in countries such as France, the Netherlands, Germany, Switzerland and the United Kingdom and less advanced in countries such as Bulgaria.

The experience in green emissions has experienced a considerable delay in Italy, where the first green bond was issued by Hera only in 2014. In 2017 the MOT green segment and the Social Bond of Borsa Italiana were inaugurated.

Currently, 73 % of European green bonds are issued in euros, 12 % in dollars, used to attract US investors, 8 % in SEK and the remaining 6 % is fragmented among eleven different currencies (CBI, 2018). The euro is the dominant currency even at the global level. Green-bond issues offer a wide range of ratings, but most of the securities subject

to ratings report values greater than A. In Europe, the market for sustainable bonds, built on the basis of existing financial infrastructures, has developed rapidly thanks to the important political support provided by the European institutions (Cotter & Najah, 2012). Europe is considered the center of gravity of the green bond market, reaching 51% of total green global emissions in 2018 (Figure 1). This phenomenon is attributable to the growing political attention to the sustainable finance of the European institutions, which have adopted a series of actions aimed at harmonizing the capital market and attaining sustainable long-term objectives (European Commission, 2018). The issue of mandatory rules that homogeneously regulate the issue of green bonds and greater transparency in the allocation of proceeds, based on recorded trends, would ensure constant growth in the diffusion of green instruments.

**Figure 1.** Regional distribution of green bonds



Source: authors' elaboration based on Bloomberg and SEM data (2018)

### 4. THE EVOLUTION OF THE LEGISLATION ON GREEN BONDS

The green bond market, as detailed in the previous paragraph, has experienced significant growth, which made it necessary to clarify the scope of application and the assessment of the environmental impacts generated by them. The green bonds do not represent an autonomous and independent category of instruments, but are considered as bond instruments and as such follow the discipline of the obligations provided for each state. What differentiates a green bond from a conventional bond lies in the destination of the proceeds, which must be used exclusively to finance or refinance projects with positive environmental impact. In Europe, there are no cogent rules on the subject but the issue of green bonds is regulated by procedural guidelines that do not provide for any sanctions in the event of non-performance. In particular, the regulatory framework of reference, which allows the definition of a "green" obligation, consists of the Green Bond Principles, issued starting from 2014 by the International Capital Market Association (ICMA) and by sectoral criteria still being finalized issued by the Climate Bonds Initiative (CBI) organization.

**Table 2.** The normative references of the green bonds

<i>Name</i>	<i>Year of issue</i>	<i>Issuer</i>
Green Bond Principles	2014 continuously updated	International Capital Market Association (ICMA)
Climate Bonds Standard	2010 continuously updated	Climate Bond Initiative (CBI)

*Source: authors' elaboration*

Furthermore, in June 2019, the EU Commission published a report containing the proposal to introduce common criteria for the issuance of green bonds in Europe (EU Green Bond Standard) with the aim of increasing market transparency and increasing the volume of investments.

#### 4.1. The Green Bond Principles

Issued for the first time in 2014 by the International Capital Market Association, the Green Bond Principles represent the focal point of reference for green bonds, since they provide issuers with key indications on the green bond issuance procedure and guarantee communication between issuers and investors. They promote transparency and allow investors to monitor the environmental impact of their investments. These are guidelines and, as such, have a non-binding consultative nature. They are updated once a year based on the development of the global green bond market (Table 1) and have the objective of increasing the capital allocated to the financing of sustainable projects (CBI, 2015). Since the 2014 edition, the GBP is divided into four components: use of proceeds, evaluation process and project selection, income management, reporting activities. The following are analyzed in detail.

##### 4.1.1. Use of proceeds

The guidelines provide that the project that is intended to finance with the proceeds deriving from the issue of the obligation, must provide quantifiable environmental benefits and appropriately describe in the title documentation. The GBPs provide a non-exhaustive and continuously updated list of green fundable project categories. Each project must generate positive effects on climate change, the protection of resources, the preservation of biodiversity and the reduction of pollution. Among the categories explicitly enucleated from GBP include renewable energy, energy efficiency, activities to reduce atmospheric emissions, agriculture, sustainable forestry and livestock, the protection of coastal environments, clean transport, sustainable water management waste, climate change adaptation, circular economy, and ecological construction. However, this principle proceeds by way of example and does not formalize objective and specific criteria in order to assess the green nature of the project to be financed. Extreme discretion is left to the issuer, which translates into limited investor protection. Furthermore, the need to generate quantifiable environmental benefits is emphasized but no objective indicators are expressed for their appreciation.

##### 4.1.2. Process for project evaluation and selection

The GBPs recommend that the sustainability objectives to be achieved with the proceeds, the processes implemented to achieve them and any risks related to the project are clearly communicated. However, there is no objective indication of the risks associated with the project and a standard document for communication between issuers and investors is not proposed.

##### 4.1.3. Management of proceeds

In line with the desire to achieve an adequate level of transparency, the GBP recommend issuers to periodically report the financing obtained to investors. The objective is the traceability of the capital to verify that it has been allocated to the selected project.

However, a standard document for communication between issuers and investors is not indicated and reporting is only recommended.

##### 4.1.4. Reporting activity

The guidelines provide that the issuers prepare a report annually until the bond expires to inform investors of the progress of the selected projects and the degree of achievement of the set environmental objectives. In the report the projects in which the proceeds were placed must be described, the amount allocated to them and the environmental impact generated must be indicated. However, for the quantification of the latter, no precise quantitative or qualitative performance indicators are outlined. Furthermore, the drafting of the report is only recommended and there are no strict standards to comply with when drafting the document.

##### 4.1.5. External review

The ICMA (2018) has inserted additional content to the four guidelines, expecting to contact an external auditor to confirm the alignment of its obligation with the four principles described above. The third-party can be represented by individuals or institutions with expertise in environmental sustainability. To certify the correspondence between guidelines and obligations, auditors can offer different types of services, grouped into the following categories: second party opinion, verification, certification, green bond scoring/rating. The second party opinion can be issued by an institution with environmental expertise independent of the issuer. It deals with verifying the characteristics of the projects to which the proceeds are destined and their alignment with the general objectives specified in the first principle. CICERO is one of the most famous external reviewers that deals with the second party opinion, but there are also other companies such as EY, KPMG, Deloitte (Park, 2018). The verification consists of the evaluation of the procedure used to trace the capital raised, of the formal correctness of the report, of the alignment of the selected project with the categories indicated in the first principle. The issuer can also request a qualified and accredited third party to

certify their qualifications, certifying their alignment to specific recognized environmental standards. The main international certification organization is the Climate Bonds Initiative. Finally, the issuer can have its green bonds assessed by rating agencies. The score, in addition to taking into account the credit

risk of the issuer, will include assessments of its environmental performance.

The changes made to the principles over the years by the ICMA are summarized in the following Table 3.

**Table 3.** Changes made to the Green Bond Principles from 2015 to 2018

2015	2016	2017	2018
<ul style="list-style-type: none"> <li>• Inclusion of a globally recognized definition of green bonds.</li> <li>• Update of the recognized categories of eligible projects.</li> <li>• Insertion of clarifications on the figure of the external auditor.</li> <li>• Implementation of the linguistic clarity of the document.</li> </ul>	<ul style="list-style-type: none"> <li>• Inclusion of projects with a social purpose between the categories financed with green bonds.</li> <li>• Introduction of guidelines for drafting reports on energy efficiency, renewable energy, and water management with the aim is to obtain a harmonized reporting model.</li> </ul>	<ul style="list-style-type: none"> <li>• Inclusion of ecological building among the eligible projects.</li> <li>• Further clarifications on the requirements of the projects that can be financed: it is required to specify, where possible, the exclusion criteria or any other process applied to identify and manage potential risks of environmental and / or social impact related to these projects.</li> </ul>	<p>Specific objectives are inserted to be pursued with the financing of green projects:</p> <ul style="list-style-type: none"> <li>• mitigation of climate change;</li> <li>• adaptation to climate change;</li> <li>• conservation of natural resources;</li> <li>• the preservation of biodiversity;</li> <li>• the prevention and the control of pollution.</li> </ul>

Source: our elaboration on ICMA information

#### 4.2. The Climate Bond Standard (CBS)

The Climate Bond Initiative is an organization that through standards (Climate Bond Standard) published for the first time in 2010 and the subject of three successive revisions until the last version published in 2019, promotes a voluntary certification system for green bonds. These are rigorous scientific criteria that ensure the coherence of the project to be financed with the maintenance of the global warming limit below 2° Celsius, as foreseen in the Paris agreement. The official

certification of the title avoids the risks of greenwashing that could generate from improper use of the proceeds and generates reputational benefits on the issuing subjects. Therefore, the certification makes the stock more attractive and becomes crucial for the increase in the volume of investments (Ehlers & Packer, 2017).

The process of drawing up these criteria is still in progress: some sectors may already be subject to certification, others are being developed by CBI expert groups (see Figure 2).

**Figure 2.** The development of sectoral green bonds certification criteria



Source: Climate Bond Initiative (2019)

Although most jurisdictions make use of the two schemes explained above, some jurisdictions have developed their own taxonomies. In China and

India, green bonds are subject to binding public regulation issued by central banks. The option to develop its own jurisdiction, as stated by the



authors Ehlers and Packer (2017), can have advantages for particularly large economic realities, but, in smaller realities, it would limit the value of environmental certification to the public of national investors only.

## 5. EUROPEAN GREEN BOND STANDARD

In 2018, to meet the need for a clear and homogeneous regulation on green bond, the European Commission, in the report drawn up by the TEG (the technical group of experts on sustainable finance), highlights the importance of introducing official guidelines in Europe. For this reason, the content of a voluntary green bond (EU GBS) EU standard was proposed there, on which the group of experts worked for about a year. The proposal is part of the broader European Union Action Plan for supporting sustainable finance (European Commission, 2018).

According to the TEG, it will not be possible to encourage market operators to issue and invest in green bonds without proposing common European standards that improve transparency and therefore the efficiency of the market itself (European Commission, 2019).

Therefore, any obligation, listed or unlisted, aligned with the EU Green Bond Standard will be defined EU green bond.

The full report was published in June 2019, on the basis of which the European Commission will decide which path to take.

The principles of EU GBS are divided into four macro-areas: green projects, Green Bond Framework (GBF), reporting, verification. According to what is specified in the first section of the report, for a bond to be defined as green, it is necessary for it to be part of European sustainable taxonomies, but since it is not yet completed, during the transition phase, the categories defined by ICMA and the CBI taxonomies. The projects that will be financed with the capital raised must be specified in the legal documentation that accompanies the issue and, if they have not been identified exactly on the issue date of the bond, the issuer will be required to describe the type and the project objectives it intends to finance.

As for the use of the proceeds, if a part of them is used for refinancing or, only for the financing of a new project, it will be mandatory to write down the percentage related to these operations. The section dedicated to the Green Bond Framework summarizes, defines and expands the contents of the ICMA guidelines "project selection" and "income management".

The Green Bond Framework represents the document through which the issuer communicates to investors the projects that will be funded with green bonds, providing key indications on the most relevant aspects, such as the actual alignment of the projects to European taxonomies, the use of proceeds from the collection, their reporting and their future allocation. Before the intervention of the TEG, there was no standardized and formal instrument with which issuers and investors could communicate. The GBF thus becomes a document that also manages future communications regarding the management of revenues and the impact generated by the investment. The section dedicated to reporting specifies that, similarly to what is recommended in the GBPs, issuers are required to report, at least once a year and until the entire proceeds of the bond loan are allocated. While in GBP, the drafting of the report is only recommended, in the EU GBS it becomes mandatory and the content must specify:

- compliance of EU Green Bond Standards;
- the nature of the projects and the amount assigned to each, together with the classification according to the EU taxonomy;
- the actual or estimated environmental impact of the projects, based on the parameters outlined in the Green Bond Framework;
- the geographical distribution of the allocation of proceeds;
- the green bond ratio, i.e., the total amount of green bonds in circulation divided by the total amount of debt outstanding at the end of the reference period.

In the last section, verification, the obligatoriness of the figure of the third reviewer is specified, which must be formally accredited on the basis of criteria listed in the draft.

The following table summarizes the main differences between ICMA GBP and the principles of the EU Green Bond Standard.

**Table 4.** Main differences between the GBP and the EU GBS

<i>Criteria</i>	<i>Green Bond Principles</i>	<i>EU Green Bond Standard</i>
Projects for potential financing	A non-exhaustive, non-compulsory list of projects that can be financed	Foresees rigorous criteria that establish the project's financial viability: -must be aligned with specific criteria indicated for each economic sector; -must not interfere with any of the EU's sustainable objectives; -must guarantee respect for the principles and fundamental labor rights issued by the International Labor Organization in 1998.
Indications for use of proceeds	Recommended	Compulsory
Reporting activity	Recommended	Compulsory with mandatory directions regarding the content
External auditing	Recommended	Compulsory
Standard documentation for communication between issuer and investors	Not present	Introduction of Green Bond Framework
Publication of external audit	Recommended	Compulsory

Source: our elaboration based on EU data (2019)

From Table 4 it is immediate to note the greater restrictiveness that the European norms intend to pursue, to implement transparency and guarantee a greater diffusion of sustainable investments.

## 6. DISCUSSION

In international contexts, the relevance of sustainable finance is attested by the initiatives implemented to promote it by organizations and institutions such as the Financial Stability Board and the European Commission. Sustainable finance and in particular green bonds has been given a key role in achieving the goals of the 2030 Agenda.

In particular, sustainable finance tools facilitate the assumption of responsible behavior by companies and use the market as a channel to allocate capital to green projects. The present study, after having ascertained the presence of a gap in the literature on the subject of the rules concerning the issue, assessment and reporting of green bonds and after having ascertained, in line with the theory of market efficiency, the importance which they cover to ensure investor protection and efficiency, has focused on the issue of rules.

The current regulatory framework, being only a first attempt at voluntary regulation, still appears far from ensuring an adequate level of transparency to investors. In fact, these are self-regulatory principles that leave the issuer with extreme discretion, which translates into poor protection for investors.

However, from the analysis of the TEG proposal, it emerges that the new European standards, although still voluntary guidelines, could

exceed many of the limits found in the current context of self-regulation, including rigid rules on the disclosure of information and making the presence of an external auditor for the certification of the title.

## 7. CONCLUSIONS, LIMITS AND IMPLICATIONS

In the context of environmental finance, this contribution focuses on the tool of green bonds, framing the regulators' perspective and the principles of (self) regulation that describe the process of issuing, evaluating and reporting for the transparency and efficiency of the financial market.

The regulatory framework has represented a weakness in the support and development of financial initiatives in the green area and also the banks have shown a limited sensitivity to the issue, despite being privileged partners, considering the Italian banking system. However, in perspective, the current proposals being revised by the European Commission appear to promote greater transparency and market efficiency, leaving wider margins for the development of green investments to be hoped for and thus achieving important sustainable goals.

The one just described represents a first framework analysis, fundamental for further future developments, taking into account that a constantly evolving regulatory framework brings scholars, researchers, and policymakers to pay attention to the impact it will generate on the market.

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