# TENDENCIES IN GREEN FINANCE

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***Abstract***

*Green finance, a developing sector, started to attract more and more attention from the academic and practise perspectives. Awareness of environmental and climate change issues has highlighted finance's role. The development of this side of finance brings changes in the dynamics of financial markets, investors' behaviour, and the activity of regulation and supervision. The subject's topicality and importance reflect institutional funding orientation towards the green sector and climate change. These motivate our research on green finance topics, including a presentation on the dimension of green finance in the last years, the identification of the main characteristics of green finance in the specialized academic literature and the practice-oriented studies, and an overview of some aspects of the effects of the COVID-19 crisis on green finances.*

***Keywords:*** *green finance, climate change*

***Clasificare JEL:*** *G32, O16, Q5*

## 1. Introduction and context of the study

Investor behavior has changed over time, from phasing out of high-carbon assets to identifying and acquiring low-carbon products and services. These products and services can be divided into banking, investment, and insurance products. They can be used for environmental and risk management projects, pursuing organizational approaches, or targeting specific sectors.

Such tools are subject to 'green principles' involving transparency, reporting, and recognition of the green product by a third party. In addition, the 'green' quality is given by the products associated with the assets (such as investment projects in clean energy production) or by investments in efficient resource management projects. Products and services considered green financing can also reward investors or consumers who choose environmentally friendly activities. Studies show that green investment generates similar returns to comparable traditional investment (Giese and Lee, 2019).

Green bonds are an essential part of this sector, being a liquid instrument with a simple structure. A subcategory of these is climate bonds used to finance projects related to mitigation or adaptation to climate effects, instead of green bonds that can finance larger environmental projects. Most bonds have been financed the realization of climate change targets. In addition, other subcategories have emerged, such as blue bonds to support sustainable fishing projects or protect marine areas. According to the Climate Bonds Initiative, the green bond market grew by 36% in 2019 compared to the previous year, reaching $ 230 billion. In the euro area, they have increased sevenfold from 2015 to 2020, reaching 75 billion euros. However, green bonds denominated in the euro represent only 4% of total corporate bonds (Lagarde, 2021).

Green bonds are not the only green financing instruments. These tools include various options, from crowdfunding for small-scale projects to green bonds issued for significant infrastructure projects or corporate energy efficiency projects. References can be made to stock

indices specializing in pollution or climate issues, municipal financing instruments or green projects, crowdfunding platforms, bonds issued to cover events such as natural disasters, banks specializing in green investments, or insurance products. The development of the green finance market has led to the emergence of associated services or products, such as indices for green bonds or stocks or special funds. At the same time, sound financial sector development supports environmental performance (Neagu and Porumbăcean, 2021).

The first country to issue government green bonds was Poland in 2016, followed by France, Fiji, Nigeria, Indonesia, and Belgium. However, the largest global issuer of such financial instruments is the United States, followed by China.

One trend noted by the Climate Bonds Initiative is that most of the green bonds issued so far are the green use-of-proceeds bonds. This means that capital is used for projects to adapt to or mitigate climate effects, which is guaranteed with all assets on the balance sheet. Such an issue provides investors and rating agencies confidence, as the associated risk is low. In contrast, green project bonds are guaranteed only by the green project and its assets, which increases the risk profile of the bond. Because investors find them less attractive, these types of bonds are backed or underwritten by other institutions. Green revenue bonds are guaranteed only by the income from the project, which makes them riskier than the first category.

The paper proposes to examine a few characteristics of green finance by resorting to a research methodology based on an analysis of statistical data, descriptive passages, and logical interpretations of reality. The bibliographic exploration identifies the main results published in the specialized literature related to the studied subject.

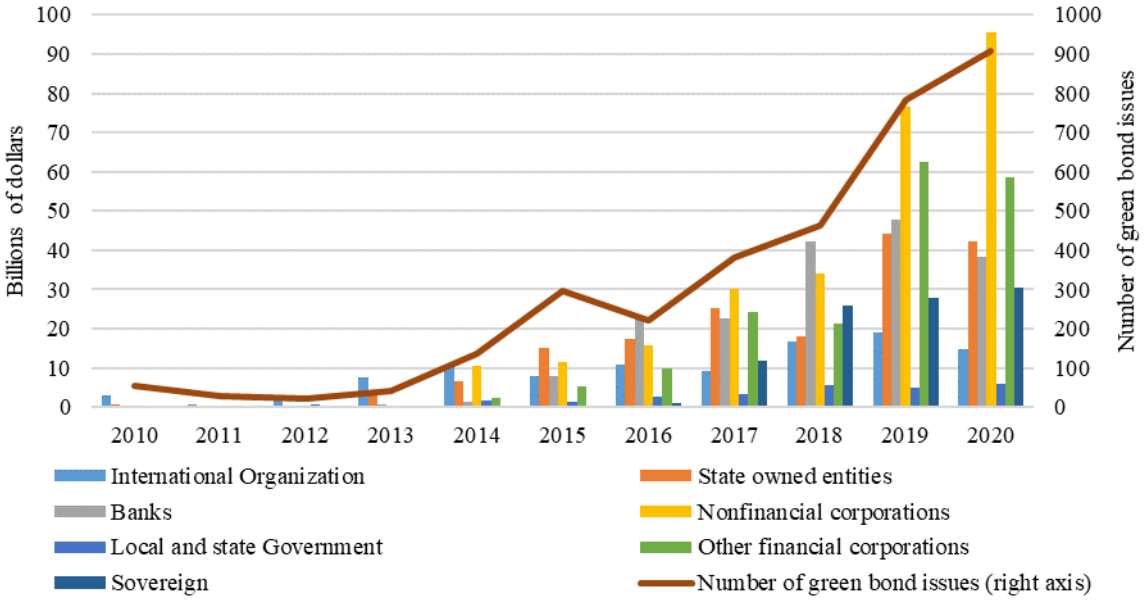
After a brief introduction to the studied subject, we present the evolution of the dimension of green finance in the last years. Subsequently, we identify in the specialized academic literature and practice-oriented studies the main characteristics of green finance. In the fourth section, we present some aspects of the effects of the COVID-19 crisis on green finances. Finally, we propose a few final remarks.

## 2. Brief presentation of the size of green finance

As a first step, green bonds were issued by international financial institutions such as the World Bank or the International Finance Corporation or development banks such as the European Investment Bank or the European Bank for Reconstruction and Development. Meanwhile, the range of issuing green bonds has diversified, and the volume of issues and maturities has increased.

Green investment is still a niche market, but the growth rate is high. The evolution of the total emissions of green bonds worldwide in the period 2010-2020, in billions of dollars, can be seen in Figure no. 1.

Figure no. 1. Global green bond issues by issuer category ($ billion)




Source: Adaptation of authors based on the International Monetary Fund (2021)

The total volume almost doubled from 2018 ($ 164 billion) to 2019 ($ 283 billion), and in 2020 it increased very little compared to the previous year ($ 285.8 billion). Non-financial corporations issued the highest value in 2017, 2019, and 2020 and banks in 2016 and 2018. Other financial companies have been in second place in the last two years.

Recent research has shown a premium for green bonds issued by supranational institutions (international organizations) and those issued by corporations, but with no differences in yield for those issued by financial institutions (Fatica, Panzica, and Rancan, 2021). The authors explain this because investors cannot identify an apparent link between green bonds issued by a financial institution and a particular green project.

According to the data provided by the International Monetary Fund (2021), of the cumulative value, the largest share is held by eligible green projects (47.37%), followed by projects that take into account energy efficiency (20%) and those for clean transport (16.41%). France is the country with the highest volume of green bonds issued in total ($ 132.94 billion), followed by China ($ 110.13 billion), Germany (95.43%), the Netherlands (91.73%), and the US 90.43%), on the first five positions. Sweden holds the next position, but the total value of green bond issues is much lower ($ 50.43 billion), just over half compared to issues in the Netherlands and the US. Spain is the leader of the next group of countries with much lower values, in this country being issued green bonds worth $ 26.63 billion. In 2020, most bonds were issued in Germany ($ 42.81 billion), in 2019 in France ($ 39.58 billion), and in 2018 in China ($ 24.39 billion).

The value of bond issues in Europe amounted to $ 156 billion in 2020, almost half (48%) of global emissions; however, green bonds in the European Union represent only 2% of total bonds (European Court of Auditors, 2021).

The market for green instruments has grown. Although progress has been made in taxonomy, there are still many issues to be clarified to avoid the baseless entry of instruments in this category (greenwashing). In addition, these instruments must be used to finance technological innovation that will enable green growth and not just investment projects that reduce the carbon footprint. At the same time, the new green finance products and services can stimulate innovation in the financial markets themselves, being able to be considered among the motivations and determinants described in the previous studies (Lupu and Criste, 2021).

The European Investment Bank provided 19.6 billion euros in 2017 for green-funded projects at the institutional level. In the same context, the Asian Development Bank announced that it will invest $ 80 billion to combat climate change in 2019-2030. The National Bank of Australia has issued the first green mortgage-based products for residential buildings.

## 3. Features and directions of green finance. Some practice and literature evidence

A notable trend in this area is the predominant focus on funding to support climate change mitigation projects (such as financing renewable energy production, a cleaner transportation system, and more projects aimed at reducing carbon emissions or reducing the pace of climate change) and less to adapt to climate change, current and expected (Padraig, Clark, Meattle, 2018). However, the position of the World Bank is noticeable, which in the latest strategic plans advocates a balance of financing the two aspects, mitigation and adaptation.

Combining green finance with fintech provides access to a range of tools and techniques that can help better manage environmental risks, facilitate better access to capital markets, support monitoring compliance with existing regulations and recommendations (verification, reporting), and the achievement of the assumed environmental objectives. With fintech, green financial products and services can be better promoted and distributed.

Most debates on reducing the impact of climate change are considering setting a reasonable price for carbon. The Emissions Trading System operates in Europe, has undergone several development stages, and is considered an effective tool for reducing greenhouse gas emissions. However, half of the emissions associated with the European Union are traded through this platform. According to European Commission estimates, emissions from stationary sources decreased by 33% between 2005 and 2018 following the use of this system (European Commission, 2020). The Market Stability Reserve has recently been introduced, which will help to set carbon prices properly.

One of the private initiatives in the field has led to the construction and measurement of a Global Green Finance Index to measure green financing and understand the factors that encourage the growth and improvement of this field (Z/Yen, Finance Watch, and MAVA, 2019). The analysis is based on a questionnaire addressed to 110 international financial ccenters'financial professionals and on measurable or instrumental factors. In addition to assigning ratings to various financial ccenters the study highlights some critical issues related to the most exciting areas for green financing, the activities assigned to green financing that have the most significant impact on sustainability, and the dominant factors for green financing. We note that for the first two categories, the financing of sustainable infrastructure, green bonds, and investments in energy obtained from renewable sources represent the first positions, with over 11% of the total each. The last place is green insurance, with over 4% of the total. The dominant factors that contribute to the development of green financing have other structural elements, the first positions being the regulatory and policy frameworks (12.8%), investor demand (10.2%), climate change (9.3%), and public awareness (7.5%).

According to Laborda and Sánchez-Guerra (2021), on the European market, when a green bond issue is announced, the stock market reacts positively by increasing the yield of the shares of green bond companies.

Recent research suggests that their exposure to climate change information influences investors' preference for green or brown stocks. Given that most information or news in this field has a negative connotation (and will continue to maintain this trend), shares considered green (of companies with relatively low carbon emissions) tend to record temporary increases around significant events related to the environment and climate change. In contrast, brown stocks (of companies that emit large amounts of greenhouse gases) show opposite trends. This reaction results from increased attention to environmental issues and awareness of the effects, including regulatory

changes that will find companies with green shares more prepared. A rapid rise in green stock prices means lower expected returns in the future, with higher growth now reducing their potential in the future. Thus, yields in recent years are not a good predictor of future yields (Pastor, Stambaugh, and Taylor, 2021).

Pástor, Stambaugh and Taylor (2021) showed that the preference of economic agents for green shares affects asset prices. In a balanced situation, investors prefer to hold green shares, these being insurance for climate risks, and the expected returns are low. When environmental, social, and governance factors perform well (there is a positive impact on these factors), green stocks produce better results than brown ones. This result is also supported by Ardia et al. (2020), which built an index based on climate change concerns in the media. Using data for companies in the S&P 500 for January 2010-June 2018, the authors showed that when concerns about climate change suddenly intensify, the price of green shares increases and brown shares decreases. The results were confirmed by Pastor, Stambaugh, and Taylor (2021) for the period November 2012 – to December 2020. This trend that may not be maintained in the future is supported by economic theories that show that past performance cannot predict future results. Climate change news will no longer be news, so people are getting used to this information.

## 4. Green finance and COVID-19

COVID-19 is a significant shock to the economy and society. Various national and international support programs have been launched in an effort to mitigate the effects and help the economic recovery. Recovery efforts could be an important opportunity to address the challenges posed by climate change and environmental degradation. The role of sustainable finance in European recovery is highlighted by Frone, Platon, and Constantinescu (2021).

In May 2020, the European Commission launched an € 806.9 billion NextGenerationEU (NGEU) recovery tool (European Commission, 2021) for reforms and investments. The European Commission has announced that green bonds will finance 30% of this amount to confirm the previous commitments. This is intended to encourage other issuers to resort to similar actions and offers the possibility to diversify green investments. NGEU green bonds are based on four main elements: use of the obtained capital; evaluation of expenses and selection; management of the obtained funds; allocation and allocation reporting. The valuation framework for these green bonds is in line with the International Capital Market Association principles. It follows the environmental, social, and governance principles of the European Union. In principle, this framework aligns with the proposed European standard for green bonds, which was adopted in July 2021 and will enter into force after implementation. This green bond program is expected to put the European Union at the forefront of issuers of such instruments.

COVID-19 was also a possibility to test the links between various financial assets. Studies based on questionnaires have found that people have become more attentive to environmental issues after the pandemic (Kachaner et al., 2020). An increase in investments in companies with a higher score for environmental, social, and governance factors in 2020 compared to 2019 is also reported by Sharma et al. (2022). Moreover, the link between the calculated indices for green stocks and the conventional ones became considerably stronger after the COVID-19 pandemic. The increase was from 6.93% before the pandemic to 25.46% after its onset.

Recent studies show significant changes in the structure and connection over time between various assets (Bouri et al., 2021). Before the COVID-19 crisis, stocks and indices based on the US dollar were the main transmitters of shocks in the financial network. After the advent of COVID-19, bond-based indices became the primary transmitters of shocks. Naeem et al. (2021) showed that green bonds have different relationships with different financial assets. While the connection with the US dollar and conventional bonds is strengthening during COVID-19, there is a weak relationship between green bonds and Bitcoin, oil, and gold. Previous studies have shown that

green bonds receive shocks from fixed-income assets and foreign exchange markets but are poorly connected to the stock and energy markets (Reboredo and Ugolini, 2020).

By comparing the yields of green bonds with those of brown bonds before and after the COVID-19 crisis, Hacıömeroğlu, Danışoğlu, and Güner (2021) showed that, although yields on both types of bonds declined after the onset of the pandemic, the advantage obtained by the brown bonds before the pandemic was eliminated. The two categories of assets did not show significant differences during the pandemic. The results of the secondary market analysis highlight the higher demand for green bonds, driven by higher daily yields than brown bonds.

A study analyzing stock returns indicates that the COVID-19 shock did not distract investors from environmental issues, and firms that adopted environmentally responsible strategies had better stock returns, highlighting those held by long-term oriented investors (Garel and Petit-Romec, 2021).

## 5. Conclusions

In recent years, many different measures have been undertaken (economic and financial policies, regulations, sectoral or industrial policies) to accelerate the development of green finance, to which national and international organizations have contributed and private initiatives to support the field.

The emergence of green bonds is considered one of the essential stages in the development of green finance, thereby improving the ability of capital markets to mobilize capital to finance solutions to climate challenges. At the same time, investors benefit from returns associated with the transition to a green economy with low carbon emissions. In addition, for investors, this is an opportunity to diversify the portfolio and align with the requirements of climate targets. They have the benefit of being able to cover funding for multiple purposes.

The development of green finance means changes in regulations, changes in individual attitudes and society as a whole, and the introduction of specific indicators that incorporate environmental criteria in measuring economic activity results. On the other hand, "green" does not mean no risk, and the inclusion of this aspect in various instruments whose primary purpose is to ensure financial stability must be done with caution. At the same time, greening finance and green finance are concepts and approaches that need to work simultaneously.

The concept of green finance is increasingly part of current discourses. The principles of green finance and best practices are increasingly being assimilated, thus demonstrating its growing importance and recognizing the need for such an approach. Although significant steps have been taken and green finance has become a significant part of the financial sector in recent years, there are still many issues to be clarified, given that the involvement is complex.

One limitation of the research is the limited availability of information on green finance. Over time, transparency in reporting and better collection of background information will allow research on subcategories of green finance instruments to be developed.

Future research directions can be oriented toward behavioral economics to understand the reasons, frequency, amplitude of behavioral changes, and degree of acceptance of novelties or changes in perceptions.

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