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# Do investors and countries commit to more sustainable finance since Covid-19 crisis?

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# **Do Investors and Countries Commit to More Sustainable Finance Since Covid-19 Crisis?**

**Presented by: DUPUY Lucy**

University supervisor: GIRERD POTIN Isabelle

**Master 2  
Master Finance  
Advanced in Research and Accounting  
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Mémoire de recherche

# **Do Investors and Countries Commit to More Sustainable Finance Since Covid-19 Crisis?**



**Presented by: DUPUY Lucy**

**University supervisor: GIRERD POTIN Isabelle**



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## ABSTRACT

This research was developed to study whether the COVID-19 crisis had enabled all actors in the world to become aware of the ecological emergency that we are facing now and in the future. And if this awareness is reflected through the commitment to sustainable finance by investors and countries. For this, the study analyses the demand and the supply of Green Bonds since the beginning of the COVID-19 crisis.

In addition, this research gives various literature reviews on sustainable finance, Green Bonds, reactions of stock markets since the start of the COVID-19 crisis and reactions of countries to the pandemic through their recovery plans.

This coupled with an overview of the environmental issues, development and reasons surrounding the pandemic, as well as various facts leading us to believe that people feel fear about the future. Makes me expect that we can observe a growing interest in Green Bonds since the start of the COVID-19 crisis which is reflected by an increase in demand and supply of Green Bonds.

### **Keywords :**

- Green Bonds,
- Global warning,
- COVID-19 crisis.

## INTRODUCTION

As we are currently facing one of the worst crises the planet has known to date, the COVID-19, we can therefore foresee the next one: the climate crisis.

It has been proved that our lifestyles, consumption and production have changed our climatic environment in a very quick and worrying way. [The Intergovernmental Panel on Climate Change](#) has expressed how necessary it is to take radical measures to slow down and eventually stop global warming.

Indeed, according to the latest figures from the [Institute for Climates Economics](#), the direct consequences of climate change are visible on several levels. First, we see that global temperatures increased by +1.1 degrees between 1900 and 2019. And this continues to increase. Thus the objective of the 2015 Paris Agreement, which is a legally binding international treaty on climate change ratified by nearly 196 parties, focuses on a goal by 2100 of keeping the global temperature rise below 2 degrees.

Because global warming induces many risks for populations, whether through the rise in sea level (+ 9cm between 1993 and 2019), the intensification of precipitation, the melting of ice, the thawing of permafrost as well as the modification of the seasons with delayed blooms.

We thus note that the day of the world overrun the resources that the earth is able to generate in one year was reached in 2020 on August 22 against October 4 in 1995. Without mentioning the indirect consequences induced by global warming and highlights by [My Climate](#) such as the increase in food and water crises, the proliferation of diseases, the loss of biodiversity and finally health risks.

And despite of the various debates that it generates among the public, we can wonder if there really is an awareness among all of the tragic consequences of global warming that we are likely to experience in the coming years.

It is in this respect that the COVID-19 crisis seems to have brought something positive. Indeed, the global pandemic that we are currently experiencing has required various lockdowns of populations around the world to avoid virus transmission. The first lockdown in early 2020 was particularly strict and allowed the shutdown of industries in countries such as China and France.

People could directly see that this stop of our current industrial model had allowed to reduce by early April 2020, the daily global CO<sub>2</sub> emissions by -17% ([Source: Nature Climate Change](#)). In comparison, we can see that CO<sub>2</sub> emissions due to fossil energy have increased by 67% between 1990 and 2018. This decrease in pollution during confinement was so significant in some countries that it was possible to see it visually.



As was the case in China where air pollution has decreased significantly, making this reduction visible on satellite images published by NASA and subsequently relayed on many news channels and social networks.

In addition, the lockdowns of the population allowed for the first time people to experience a halt in their everyday life. Indeed, people could no longer go to their workplaces, it was no longer possible to go out with friends, to do sports or various cultural activities. Because, as the philosopher [Pascal](#) said, life's entertainments allow to avoid the unpleasantness of reality and not to think about it. It is in this sense that lockdowns have given people the opportunity to reflect on their current and future way of life.

That is why I expect that these two facts, coupled with the fact that many researchers have determined a link between global warming and the appearance of COVID-19, suggest that people, whether they are employees, business leaders, politicians or investors, have become aware of the current ecological emergency.

So if this measurement of the environmental stakes has been achieved since the beginning of the COVID-19 crisis, it should be reflected on all areas of society, such as people's consumption patterns, state policies and finally it should also be reflected on the financial markets with a more sustained interest in sustainable finance, which goes through the use of green financial instruments.

This assumption allows us to define the general research problem which is that we can observe a commitment of investors and countries to sustainable finance since the beginning of the COVID-19 crisis.

To analyse this issue, we will focus on Green Bonds. Indeed, although there has been a development of sustainable finance in recent years, largely driven by Green Bonds, as this financial instrument is one of the most developed in the green market today, it is still only marginally used in the global financial markets.

Thus, I think it is relevant to study the commitment of investors in sustainable finance through Green Bonds, since they represent an important part of the recovery plans put in place by states to fight against the COVID-19 crisis and revive the economy.

It is therefore interesting to study their development since the COVID-19 crisis to see if this one had an awareness of people on the environmental problems reflected by a commitment in sustainable finance.

That is why, in my paper I focus on two different things. The supply and demand for Green Bonds since the start of COVID-19 crisis, more precisely I expect to analyse an increase in these two components, as well as a demand for Green Bonds greater than that of the available supply as we can see in the study of [Elhers and Packers \(2017\)](#), who analyse that in normal times the demand for Green Bonds is greater than that of the supply.

This paper is divided in 2 parts. The first one, entirely dedicated to the literature review, is divided into 3 sub-parts.

The first sub-section is particularly interested in the sustainable finance market, to understand what are the factors of development of this market and the reasons surrounding it. Then, we will analyse more precisely the Green Bonds, from its first introduction on the financial markets until its current development.

We will then see that, although this market is developing strongly, it is still largely underdeveloped compared to the entire global financial market. The analysis of the characteristics of Green Bonds will allow us to deduce that the past development factors have not been sufficient to create a real change and development of the sustainable finance market.

We will then analyse the global consequences of the COVID-19 crisis on the financial markets. We will see that the financial markets have experienced a sharp drop in their stock prices relating to the uncertain climate surrounding the COVID-19 crisis. We will see that this pandemic had the particularity of affecting many sectors of activity, in many areas of the world. Then we will see more specifically the impact on sustainable finance, and on Green Bonds. We will also see that COVID-19 has enabled the development of other sustainable financial instruments such as Social Bonds.

Finally, the last part will focus on studying the means put in place by countries to answer to this pandemic through their recovery plans and enable economic recovery. We will then focus on a specific example, the one of France, which represents a major player in sustainable finance around the world.

The last part will focus on the research methodology. First, with an analysis of the COVID-19 crisis, to understand its global development as well as its consequences on the world and on the behaviour and state of mind of people. Allowing me to subsequently develop my hypotheses relating to my research question. Finally, I would suggest some axes of analysis and research model to test the hypotheses.

Ultimately this research allows us to accumulate knowledge about a link between the Green Bond market and the COVID-19 crisis.

CHAPTER 1 :  
-  
LITERATURE REVIEW

## CHAPTER 1 – LITERATURE REVIEW

In recent years, it seems that the awareness of environmental issues has been growing. Indeed, this risk, which weighs on all areas of society and not only on the economy or on financial markets, has the specificity of affecting all actors of society. Therefore, it requires a common awareness: whether by investors, regulators, politicians, consumers, and researchers.

Researchers have studied whether Green Bonds represent valuable environmental investments. It's also been investigated to see if Green Bonds were more economically efficient investments than their counterparts. Researchers have explored the reasons for Green Bonds development.

In this study it will be indicated that an increase in measures have been put in place to develop green finances in our society. Through this study, we will focus on the COVID-19 crisis. We will look to understand how this crisis turned out to be a real awareness of the risks that surrounds our future. Will the covid-19 crisis increase the trend for Green Finance and Green Bonds and will it last throughout time?

Several questions deserve our attention:

- What is sustainable finance?
- What is a Green Bond, what are its characteristics and how has the Green Bond market developed?
- Has there been a craze for green finance in recent years driven by Green Bonds?
- How did the COVID-19 crisis affected the financial markets and in particular green investments?
- Can we consider the European states as prime players for the development of this market?
- Can recovery plans developed by European states be considered as vectors of this craze for sustainable finance?

## I. DEVELOPMENT OF SUSTAINABLE FINANCE?

### A. *Green Finance*

According to [Dziawgo \(2019\)](#): “Responsible investment can be defined as a way by which investors try to account for environmental, social, governance and ethical issues in the investment process without sacrificing profit”.

The advantage of sustainable finance is to be able to align the objectives of investors and the financial system as a whole with environmental issues. However, only by the large-scale consideration of climate risk by the world's largest bodies has made this possible. Indeed, for [Pisano et al \(2012\)](#) and [Fullwiler \(2015\)](#), conventional finance does not allow the inclusion of sustainable dimensions in investments.

For many, including [Park \(2018\)](#), the development of sustainable finance accelerated in 2015 as the United Nations recognized this risk and implemented a solution to seek greater transparency from financial players. It is partly due to this that the ESG (Environmental Social Governance) criteria have greatly grown. Today, many legal constraints weight on large companies with regard to the extra-financial reporting of these indicators. In addition, these indicators represent a true role in the decision-making of investors.

According to [Cambourg and Gardes \(2020\)](#), extra-financial information plays a key role in the development of sustainable finance. It is: “A central priority of the program in terms of sustainability is therefore to reduce the unjustified race for short-term performance in the price of economic and financial decisions, in particular through increased transparency, allowing investors, whether companies or individuals, to make more informed and responsible investment decisions”.

Subsequently, if extra-financial information plays a key role in sustainable finance, it gives investors the opportunity to analyse financial investment in a different way ([Dziawgo](#)).

The main challenge of sustainable finance is to educate financial players to take a long-term view in investing and to make responsible investment a priority. Secondly, it is important to look at the returns in financial terms as well as considering the positive impact of the financed projects. Third, it is essential to appreciate another mode of governance and to obtain an uncorrelated growth in the use of resources. Quite simply, it is investing in something you understand and support. This requires the investor to obtain quality, reliable, and harmonized information.

However, according to [Dziawgo](#), ESG criteria have been developed and made mandatory by legal institutions and have enabled the acceleration of sustainable investment. In the end, it is still up to investors and managers to take the final decision to capitalize on this type of support and thus have the possibility of changing the way we all invest.

In addition, as [Gill \(2008\)](#) and [Park \(2018\)](#) pointed out, whether it is the socially responsible investing (SRI) or ESG criterias or everything related to Green Finance, it all remains the will of the people rather than strict laws. Therefore, it is important to understand and analyse the participants of this "green" market.

### *B. Actors of the evolution*

As explained by [Park \(2018\)](#), states or international institutions through their policy levers take various measures to improve climate conditions. However, they are themselves stopped or at least limited by their budget and funding, or by lack of priority in their fight against global warming.

According to [Park](#), it is the private actors of governance who are able to influence a new breath in finance by making it greener. This includes companies, institutional investors, banks and all other private actors. Moreover, according to him, it is these same actors who have created a legal framework around green finance: "Investors as regulators".

In summary the main idea is that states make it possible to influence a dynamic, but these actors allowing it are from the private sector.

Similarly, according to [Berensmann and Linderberg \(2016\)](#), the two main objectives of finance are to "internalise environmental externalities and to reduce risk perceptions in order to encourage investments that provide environmental benefits". Thus allowing to attract private flows of capital. This requires a framed environment that surrounds green finance, as well as transparency and defined rules and standards.

### *C. Green bonds*

#### *i. What is a Green Bond?*

Depending on [NASDAQ \(2019\)](#), Green Bond can be defined as "loans used to finance projects that bring clear environmental and social-economic benefit". They are issued on the financial markets by a private company or a public entity and are part of a socially responsible investment (SRI) strategy.

Contrary to a traditional bond, the issuer commits to produce a detailed report on the financed project and to certify the allocation of funds to environmental projects. Reporting is established annually throughout the life of the bond or the project.

Many studies have looked closely at Green Bonds and their various characteristics, but also at the advantages of this particular type of bond.

Through his study of Corporate Green Bonds [Flammer \(2020\)](#) used the Bloomberg database and has drawn some particularly interesting findings. He has proven the essence to why Green Bonds were created to work. Indeed, he first noticed that investors who issue Green Bonds really improve their environmental performance thereafter. In addition, the problem of green investments discussed above would finally be resolved, since according to him, companies: "experience an increase in ownership by long-term and green investors". Finally, the other advantage of these bonds is that they send a positive signal from the company to the market, which can only be beneficial for the company.

The study of [Tang and Zhang \(2018\)](#) comes to the same conclusion. Indeed, they are interested in another point of view: the one of investors. However, as it was concluded by [Flammer](#), Green Bonds are advantageous for existing investors because they send a positive signal to the media and thus allow a greater diversity of shareholders.

Their findings suggest that this type of bond is beneficial for existing shareholders since after the issuance of Green Bonds, [Tang and Zhang](#) found that the issuers' stock prices increased directly. However, the studies carried out by the researchers also highlight the disadvantages of Green Bond financing.

The main disadvantages linked to Green Bonds but also common to sustainable investments in general are: the lack of transparency as well as the difficulty for institutions to define common classification criteria.

According to [Jones and Comfort \(2020\)](#), the main difficulty associated with this type of financing is the risk of "Greenwashing". In other terms, the problem related to the complexity of verifying the veracity of the information is given on the projects financed in the reporting of companies.

Furthermore, another problem is that the extra-financial reporting of companies is too focused on how the funds raised are allocated and less on examining the real impact of these projects on environment. Namely: is the real goal of the Green Bonds achieved?

[Ehlers and Packer \(2017\)](#), whose study focuses on Green Bonds in general and the issue of certifications, also illustrate the risk associated with the lack of a common vision on this type of financing. It also needs to focus on harmonized definitions and labels for all. Their research stresses that certifications and standards do not put enough emphasis on the financial risk associated with Green Bonds. [Ehlers and Packer](#) believe these bonds are particularly exposed to this kind of risk.

Although Green Bonds and Conventional Bonds are driven by the same factors, many studies have looked at the characteristic differences between both.

They notably analysed the Green Bond Premium which is the difference in yield with a conventional bond as [Zerbib did in 2018](#). His study focused on 1,065 Green Bonds in accordance with the Green Bond Principle which aims to discover if there is a different yield for the Green Bonds in the secondary market. The study also highlights whether the characteristics specific to these bonds allow to define the level of the premium. According to [Zerbib](#): "The results suggest a small negative premium: the yield of a green bond is lower than that of a conventional bond". Based on [Zerbib's](#) conclusions the characteristics that particularly influence this premium are: the sector and the rating. A lower yield implies a higher price for Green Bonds, meaning investors agree to receive lower yield in return for the opportunity to invest in a Green Bond.

The study by [Bauer and Hann \(2014\)](#), in the same line as the one of [Zerbib](#) and many other authors, explains that investments associated with "environmental advantages" express a lower return than other bonds. Thus, representing an advantage for investors which are expressed in a non-financial way (ecological impact, reduction of information asymmetry, impact on stakeholders etc.). While for the issuers a lower cost of debt. For [Ehlers and Packers \(2017\)](#), this difference in yield corresponds to a high demand which is greater than the supply offered by Green Bonds.

The article by [Bachelet et al \(2018\)](#), concludes that in general Green Bonds have a higher yield than their closest brown bonds on the secondary market, but they also conclude that Green Bonds have the characteristics of having a lower variance and of being more liquid. These findings are explained by the fact that private Green Bonds express a positive green premium and the reverse for institutional Green Bonds.

For [Bachelet et al](#), the negative Green premium is explained by the fact that Green Bonds reduce the risk of information asymmetry between the issuers and the investors because of the verifications and certifications associated with their reputation.

Finally, the research done by [MacAskill et al \(2020\)](#) investigates the studies done about Green Premium between 2007 and 2019. Their investigation suggests that based on the articles analysed, 50% concluded on the existence of a Green Premium on the primary market and 70% on the secondary market. They analysed what could be the drivers for a green premium and found that there were three drivers: The social, the economic, and the environmental drivers. These three drivers allow to influence the Green Bond pricing characteristics in the primary bond market and the secondary bond market.



What is interesting to highlight in this article, is that according to [Inderst et al \(2016\)](#): «GBs exhibit a low correlation with other fixed income securities and therefore provide diversification benefits to investor » this could be explained by the particularly increased presence of long-term investors on the Green Bond market.

In conclusion, Green Bonds which are a relatively young financial instruments, are causing some debate. Researchers do not agree among themselves on whether or not Green premium should exist. It is difficult to make a generalization about the general yield, price and risk of Green Bonds. In addition, one of the characteristics of the ESG criteria associated with Green Bonds is that they consider notions of non-traditional risk not priced by the market making Green Bonds particularly difficult financial instruments to characterize.

However, they seem doomed to a strong evolution over time. Indeed, as quoted by [Park](#): “The green bond market is still small but it is also a critical leading indicator of a revolution”.

In addition, the decision by the [European Commission](#) to develop in 2022 a taxonomy around green investments: a common regulation between the member states of the European Union for this type of instruments, and thus prevent the risks of GreenWashing, should only participate in the metamorphosis of the environment around Green Bonds and modify its characteristics.

#### *ii. Development of Green Bonds*

Originally, the first issuance of Green Bonds was made in July 2007 by the EIB (European Investment Bank) under the name: "Climate Awareness Bond", it raised several billion dollars in renewable energy development projects. This program represented an important step in the fight against climate change and highlighted the essential role of the European Union in this fight.

This issuance was followed by the [World Bank](#) in 2008, which decided to prioritize the fight against climate change.

It was the [World Bank](#) that introduced the term "Green Bond" for the first time, serving as an ecolabel for financing sustainable development programs. This was followed by issuance of this kind of bond by supranational organizations and international agencies. It is only after 2010 that governments and companies have integrated the Green Bond market.

After 2013 the Green Bond market took a real turn as 13 large banks decided to join their forces to implement a harmonization around Green Bonds and set up the "Green Bonds Principles".

These principles have been listed by [ICMA](#) (International Capital Markets Association). Prior to that, there were no specific criteria as how to characterize and standardize the environmental dimensions

of projects supported by green bonds. These principles have been a strong growth lever for this type of bond.

### *iii. The Green Bonds Market*

The Green Bonds market has greatly exploded since the first issuance of Green Bond in 2007, and according to [The Climate Green bonds](#) the cumulative Green Bonds issuance is 1.197 trillion dollars, with a volume of 269 billion for the year 2020 and nearly 115.2 billion at the end of April 2021. The Green Bonds used by [The Climate Green Bonds](#) include all Green Bonds in line with The Climate Bonds Standard. This means that bonds and loans who are consistent with the 2-degree global warming target identify by the COP 21 Paris Agreement.

Undeniably, it was this event that gave to the Green Bond market a big boost, as it identified the Green Bonds as "An innovation for the financing of the energy and ecological transition". Although the market was launched by the World Bank and development banks, it was companies, private banks, and states that have largely contributed to making this market a diversified and internationalized market.

Such as EDF and its 2013 issuance of \$1.4 billion in Green Bonds to finance its renewable energy projects. As well as states such as France and its first issuance in January 2017, by [Agence France Trésor](#), of a 22-year sovereign green bond for a total amount of €7 billion.

Various financial institutions and rating agencies have decided to create indices that allow Green Bonds to be supervised on the financial markets due to the strong development of this market, these indices make it possible to measure the overall performance of Green Bonds.

Each Green Bond indices have their own methodology for identifying a bond as being green. All the indices are in line with Green Bond Principles.

There are currently four stock market indices:

- Solactive: First Green Bond Index launched in 2014,
- Followed by S&P Green Bond Index and S&P Green Project Bond Index,
- Then The BAML Green Bond Index by Bank of America Merrill Lynch,
- And finally, Barclays MSCI Green Bond.

This makes Green Bonds a particularly well-established instrument in its environment today.

In addition, as described by [Bele \(2020\)](#) in his study on Green Bonds, for which he analyses data from the Luxembourg Green Exchange on the S&P Green Bond Index.

At a time where the various stakeholders in the economy and finance are increasingly interested in the development of environmental projects. Green bonds have been a particularly attractive tool for investors, he concludes in his article by saying that: “Green Bonds are the newest and most innovative green financing instruments”.

## II. EFFECT OF THE COVID-19 CRISIS ON THE MARKET

### A. *Effect on the Global Market*

One of the particularities of financial markets is its reaction to the events of everyday life. Indeed, financial markets are very reactive and depends on various current news, whether it is good news or bad news about companies, countries, or economic crisis. We can imagine that an event such as the COVID-19 crisis can only have consequences on financial markets.

Later we will see in more details, the characteristics, and global impacts of the COVID-19 crisis. For the moment, we will address a brief overview of the studies already carried out on the impact of this crisis on financial markets. Even if we are not out of this crisis yet, there is already a wealth of research on this topic.

Researchers were interested in the characteristics that differentiates this crisis from previous ones, or in understanding its consequences on financial markets. They also try to predict different scenarios for the future.

For example, what we can see right now, are the actions and reactions of various actors. For example, following the announcement of a global pandemic, governments have taken many restrictions like travel restrictions or lockdown. People have changed their consumption patterns and have stopped consuming certain goods and services. However, people also have bought too much food creating many shortages in supermarkets and causing industries to stop their production. All these elements have particularly influenced the financial markets.

One of the particularities of the COVID-19 crisis, that was not seen during the subprime crisis, is the fear linked to the spread of the disease and the many deaths.

According to [Phan and Narayan \(2020\)](#), who analysed the reaction of the stock price return of the countries to infections related to the COVID-19, suggests that there was an overreaction of the stock market to COVID-19. This is explained by the fact that COVID-19 created a strong reaction of fear, and the more information on this infection spread, the more the financial markets corrected themselves to return to correct levels.

In the study of [Fernandes \(2020\)](#), it examines the economic consequences of the COVID-19 crisis on different sectors of the economy as well as on countries. The mortality rates and economic impact in the case of the COVID-19 crisis are not linked but it would be the reactions of governments, companies and others that would have provided shocks on supply and demand.

In addition, [Fernandes](#) states that the two crises we should refer to in order to prevent the scenarios concerning the future of the economy are: The Spanish flu of 1918 and the Ebola virus. However, even if the three crises are health crises, the environment around them is very different, which makes comparisons and forecast difficult.

[Fernandes](#) also shows that global stock market performance has fallen, and all sectors have been affected. Even stable sectors such as tobacco and pharmaceuticals have been impacted. However, it is the industry and raw materials the most affected by the crisis.

He also analysed the implied volatility given by the VIX index, this index represents a good indicator of the environment, the risk and how the future is viewed. However, [Fernandes](#) has shown that this indicator is above the one observed during the subprime crisis, this reflects the particularly uncertain future that surrounds us.

The study by [Kulcsar \(2020\)](#), is about reactions of market indices to COVID-19. The study shows that all the financial markets have reacted negatively to this crisis. Since “On March 18, 2020, the stock market prices (S&P 500 and Stoxx 50) declined more than 30% compared to the peak price value of recent years”. However, by analysing the Hungarian (BUX) and Romanian (BET) stock market indices in more detail, the study proves that indices have not all reacted in the same way to the COVID-19 crisis. Both the reaction time and the intensity of the changes turned out to be different. The minimum price value was achieved on March 18 for the BUX index, but the BET did not happen until the March 23. [Kulcsar \(2020\)](#) also found that the BUX index had experienced a more severe drop in its stock index compared to the BET index (36.27% vs. 31.12%).

The study by [Yan \(2020\)](#), shows that COVID-19 also affected the Chinese stock markets between January 20 and April 7, 2020. This was reflected by big moves on financial markets, in particular, following the lockdown of Wuhan town. The study also shows that the stock returns are reversed every 10 days over this 50-day period due to overreaction by financial market participants, as well as various actions taken by states. The size of companies is one of the main factors enabling them to resist from this reversal stock prices, and therefore market volatility.

[Alber and Saleh \(2020\)](#) were interested in the effects of COVID-19 on stock market of GCC (Gulf Cooperation countries) countries from March 1 to May 31.

Their study is particularly interesting since it allows us to understand more information regarding the COVID-19 crisis and how it influenced investors in their choices. Thus, we learn that it is the information related to the new deaths of COVID-19 that had the most effect on the stock market. While information on the newly infected with COVID-19 or cumulative cases and cumulative deaths related to COVID-19 is not considered as bad news and had no particular impact on financial markets over the period from April to May.

Lastly, a study by [Tashanova et al \(2020\)](#) looks at another aspect of the COVID-19 crisis and shows that even if the global economy and financial markets have suffered from the COVID-19 crisis, it is still possible to take advantage of some investment opportunities and implement winning strategies. To do so, they analysed the factors that influence the stock market as well as several sectors of activity to determine strategies that we can adopt.

According to their conclusion, there are opportunities in financial markets which are the result of the COVID-19 crisis such as online education, entertainment, and healthcare. These sectors deserve our attention, particularly from the point of view of their evolution in the new era into which the COVID-19 crisis has brought us. They also suggest to invest in stocks that have been hit hard by the crisis since their potential development can only be beneficial in the future.

### *B. Effect on Green Finance*

There is currently still little study on the impact of COVID-19 on green investment. However, this is an important subject for investors since there exist a multitude of articles on the internet regarding COVID-19 effects on green investment. Most research articles currently focus on countries' consideration of environmental risks and their recovery plans, which we will see in the next part of the literature review.

Even if the COVID-19 crisis has allowed many financial actors to become aware of the current ecological emergency, it was not enough. According to [Mark Oliphant of The International Stock Exchange Group](#), initially, the impact of the COVID-19 crisis was not necessarily beneficial for Green Bonds. Mark noted a 1/3 value of decline in emissions in March 2020, compared to 2019.

However, the craze was more about sustainable and socially responsible bond issuance. According to [The Institute of International Finance](#) the average issuance volume was around 7 billion dollars against 1.2 billion in 2018 and 2019. Industries such as Philips and Pfizer have concentrated a large volume of these programs.

This growth in social bonds is partly explained by the fact that major global financial players such as HSBC, Bank of America, MSCI etc., have recently reported that ESG leaders have outperformed others.

While green finance has experienced strong growth in recent years, it is now time for sociable finance to draw the attention of the investors in sustainable finance.

However, green bonds have not been forgotten. If the COVID-19 crisis has slowed the growth of this type of bond, according to [The Climate Bond Initiative](#), 2020 still represents the second best year for Green Bonds since their creation in 2007.

This mainly reflects the delay of investors' projects at the beginning of the pandemic. In addition, 2021 is expected to be an exceptional year for sustainable bonds, as they represent a large portion of recovery plan of states.

According to [Broadstock et al \(2021\)](#), "high sustainability firms enjoy lower downside risk and are resilient during turbulent times.", the integration of ESG criteria in investors' portfolios would reduce their risk. Thus, ESG criteria should be a real advantage for investors during the time of the COVID-19 crisis because as previously stated, financial markets have particularly suffered from the COVID-19 crisis, reflecting the difficulty of investors to project themselves into the future.

However, [Broadstock et al](#) in their study on China on CSI300 stocks show that portfolios with high ESG criteria outperformed low ESG portfolios during the time of crisis. This proves that investors considered that the "importance' of ESG criteria is attenuated in normal times, and strengthened during times of crisis" and this is because investors saw ESG investments as an opportunity for future performance.

This is consistent with the conclusion of [Ziolo, Bak and Cheba \(2020\)](#) who explain that "the sustainable finance model is applied in countries after systemic transformations and crises".

This is why the COVID-19 crisis represents a real opportunity to adopt a different type of finance due to the need for investments and actions to revitalise the economy, and it is in this respect that countries play a key role in the transition of our economic model.

### III. COUNTRIES BEHAVIOUR IN RESPONSE TO THE COVID-19 CRISIS

According to [Scialom \(2020\)](#), state intervention is necessary to force private financial actors to integrate ecological risks into their calculations and to move towards more sustainable finance.

For [Guersent \(2020\)](#), the member states of the European Union, contrary to past crises and probably because they have learned from their past mistakes, have reacted very quickly and have swiftly put in place budgetary support measures.

States, through their various governmental measures, have the possibility of influencing an entire market and economy. However, according to [Ruiz and Stupariu \(2021\)](#), whatever strategies put in place to get out of the crisis, if the climate emergency is not taken into account as well as considering long-term investments, we run into the risk of heading towards a very tough economic crisis. This would be to shift the consequences of the humanitarian crisis we are currently experiencing to a bigger crisis. Thus, to act on the current crisis and to act on sustainable finance, governments have an arsenal of tools of health, economic, and social levers possible.

We currently are still in this crisis and are already facing the beginnings of a future crisis, the crisis of global warming. However, there is already various researches on the interest of the debt and the behaviour that countries must adopt to fight global warming.

For example, [Barbier \(2010\)](#), states that a green fiscal stimulus by the G20 countries should not necessarily lead to an increase in the debt of the countries but, to the contrary, it should aim at combating energy risks and at the same time: "correct the trade imbalances in the economies most dependent on reducing their current-account deficits".

According to [Sachs \(2014\)](#), public debt is a necessary instrument in the fight against global warming. Moreover, he proposes to use sustainable financing with the issuance of Green Bonds. Finally, he justifies this debt by the fact that it will benefit all generations in the long term.

According to [Ruiz and Stupariu \(2021\)](#), the study suggests various scenarios for countries to adopt in an attempt to recover economies following the crisis while combating climate change. They state: « A debt refinancing process is possible and that a plan based on the green golden rule and one without additional policies are compatible with a deleveraging process, especially in a growth scenario ». Thus, according to them, sustainable financing is not only possible but necessary, but the biggest challenge will be to change mentalities of global powers.

According to the [OECD \(Organization for Economic Co-operation and Development\)](#), rebuilding the world after COVID-19 makes it possible to integrate long-term risk management into policies.

Moreover, taking long-term financing into account does not necessarily mean giving up short-term gains. Indeed, the ecological transition of economies should create 18 million jobs, and support at the same time 1.2 billion jobs that already depend on ecosystem services.

So far, we have focused on the various studies in the behaviours that researchers advise to adopt to fight global warming and the COVID-19 crisis. Next, we are going to look more in depth at the recovery plans developed by Europe and France. Finally, we will see that these plans give considerable importance to Green Finance contrary to what has been done in the past.

#### *A. The European recovery plan to get out of the crisis*

To fight the economic crisis resulting from the global pandemic, Europe adopted on December 17, 2020 a recovery plan called “Next GenerationEU”: The main goal of this plan is to emerge from the COVID-19 crisis stronger and to seize the opportunity to transform Europe and make it greener and more digital. This allows to take advantage of the shutdown of the economy caused by the many lockdown measures, and to analyse what we wish for our future.

The recovery plan consisted of stimulating the economies by using a budget of 750 billion euros, recently revalued at 806 billion euros (which represents 5% of the EU's GDP) distributed among the member countries.

The budget will be established over a wide period: from 2021-2027. The global envelope donated by the [European Union](#) over this period will be 1800 billion (only 750 billion are exclusively reserved for recovery following the COVID-19 crisis). It will consist in helping fight for the realities of today and the uncertainties of tomorrow.

- 50% will be reserved for modernization, research and innovation through the program: Horizon Europe,
- 30% of the funds will be reserved for the fight against climate change: this represents the highest part of the European budget reserved for ecology.

The “Next Generation EU” plan for recovery will be financed by loans and grants to member states. The aim is to mitigate the negative consequences of the crisis and make economies more sustainable. Its purpose will also be to prepare European economies for the future of climate risk and various technological changes.

Following this European recovery plan, it is up to the member states to prepare their own recovery plan and budget to be able to access the funds made available by Europe. They must also include certain criteria in their plan. For example, 37% of spending must be allocated to European environmental objectives and 20% to the digitization of the economy.



The budget will be financed by: Customs duties, member state contributions from VAT (Value Added Tax), and contributions based on GNI (Gross National Income). In addition, since January 1<sup>st</sup> 2021 there is a new national contribution paid by member states based on a calculation of non-recycled plastic packaging waste.

Furthermore, the [European Commission](#) in the name of the [European Union](#) will borrow on the financial markets at favourable rates and proceed with a diversified financing strategy. The financial instruments used are based on the issuance of a common debt: through medium and long term bonds and 30% will be reserved for Green Bonds representing 250 billion euros at current prices.

Currently, the [European Union](#) is already issuing bonds under four programs:

- The balance of payments assistance mechanism,
- The European financial stabilization mechanism,
- Macro Financial assistance,
- Support for mitigating unemployment risks in emergencies.

These unprecedented amounts reserved for sustainable financing are intended to reaffirm Europe's commitment to this type of financing and to consolidate the markets for sustainable finance allowing for the market size to increase.

Moreover, as we have already discussed earlier, the [European Union](#), through these various actions, serves as an "inspiration" for all the other players of finance and shows the right way to go. Thus, encourages investors to issue Green Bonds and more generally to engage financial players in a more sustainable finance. Allowing investors, the opportunity to have various green assets in their portfolio and become as diversified as possible. The Green Bond market in 2021 will be strongly supported by the various stimulus plans of European states.

### *B. Focus on France's recovery plan*

Since September 2020, France's goal has been to quickly but sustainably turn around the economy (there has been a decline in French activity of 9% in 2020). It is adopting a long-term vision that contrasts with the past, where the issues were previously to revive the economy in the short term.

Thus, the plan called "France Relance" for an amount of 100 billion euros will be structured around three components:

- Ecology,
- Competitiveness
- Cohesion.

It is established over a period of two years. And 50% of the investments in the recovery plan will be entirely intended for ecological transition. France's ambition is to become the first major European carbon-free economy. To finance this plan, France will receive 10% of the European plan (40 billion euros) in September.

France also issued on March, 7 billion euros of green bonds for a maturity of 23 years listed on EURONEXT Paris. During this issue, the lead banks were: BNP Paribas, Citi, Crédit Agricole CIB, HSBC et J.P. Morgan. The bond enjoyed a demand of nearly \$ 35 billion.

The strongly high demand compared to the proposed supply allowed France to benefit from a low cost of debt, since its yield is at 0.526% so below the yield curve of traditional bond. France thus pays less than if they had issued a traditional bond on the markets. The bond price was therefore set at 99.432. According to the [French Government](#), more than 300 investors participated in this issue allocated for:

- 36% to asset managers,
- 27% to banks,
- 10% to insurers,
- 8% to pension funds,
- 6% to alternative management,
- And finally 4% to public institutions.

In addition, it should be noted that like the first French Green Bonds, the bond will continue to be replenished depending on the demand made by investors.

By comparing, the first French Green Bond issued in 2017 by the “Agence France Trésor” for 7 billion euros on 22 years, had benefited from a rate on the issue of 1,741. Its outstanding amount has now reached 28.9 billion euros. All this brings total French Green Bond outstanding to 35.9 billion euros.

### *C. The limits of recovery plans*

According to the UN (United Nations), only 20% of the recovery plans are oriented towards environmental protection. These efforts appear very weak in relation to the current and future environmental challenges: the fight against pollution, global warming, and the decline in biodiversity. Moreover, there is also a concern about the rest of the investments included in the recovery plans.

Indeed, these are very negative for the environment and would therefore limit the efforts made on sustainable investments. In this context, the green commitment so much acclaimed by Europe and the member states seems relative.

We can then ask ourselves if there is really an awareness of the ecological issues and if the solutions implemented are sufficient especially since this commitment seems to be very different depending on the country:

- France: 40 billion received by Europe, 50% will be dedicated to the ecological transition,
- Germany: 25.6 billion granted, 90% for the climate,
- Italy: Will receive 191.5 billion euros of aid from Europe out of a total of 222.1 billion euros of recovery plan, 31% (68.6 billion euros) will be dedicated to the green revolution and ecological transition,
- Spain: 149 billion received, 39% will be for the ecological transition.

The project of green taxonomy developed by the [European Commission](#) is timely. It will allow for standardize sustainable activities and avoid Green Washing. We will then be able to check if the 37% of the European recovery plan is really allocated to investments for climate protection and avoid what happened during the 2008 crisis.

According to [Perrier \(2020\)](#), in 2008, 700 million euros were invested by the French government in low-carbon transport infrastructures and in the energy renovation of government buildings. 3.5 billion in investments for climate protection, but the final contribution of companies to this type of investment turned out to be four times lower than initially expected.

Finally, the main issue related to the recovery plan is to wonder whether at the present time the efforts planned by the states including France are sufficient to fight against global warming. And if there is a commitment to sustainable finance, is it enough?

PART 2  
-  
RESEARCH METHODOLOGY

## CHAPTER 4 – RESEARCH PROBLEM

### *A. Overview of the Covid-19 crisis*

In December 2019, the first case of COVID-19 was detected in China in the city of Wuhan. At the end of December there was talk about a viral pneumonia that had taken root in the Huanan seafood market in Wuhan. Then, the [WHO](#) (World Health Organization) and Beijing revealed to the media the existence of an epidemic of viral pneumonia of unknown origin. Very quickly, events accelerated, first the market was closed and finally the entire city of Wuhan was placed under lockdown on January 20, 2020.

At the end of January, the WHO declared the epidemic as a public health emergency. Rapidly, several patients were admitted for the same symptoms in Europe and in the United States, as cases accumulated, the virus circulated more rapidly. Some infected patients had no symptoms making the tracking down of the disease more difficult. Doctors and scientists struggled to discover the causes of the virus, and to explain the circulatory pattern.

On February 25, 2020, the scientific journal reports that the possibility of containing the virus is no longer possible, a global pandemic seems inevitable. At the beginning of March 2020, the number of contaminations increased, and the stock market collapsed in Europe. Italy proceeded with a lockdown on March 10, followed by France on March 17, 2020, a lockdown supposed to last at least 15 days inevitably lasted nearly two months. It was followed by two additional lockdowns in France, on October 29, 2020 and on March 18, 2021.

This global pandemic represents one of the worst event of this decade. This crisis is relatively difficult to compare with other health crisis such as the EBOLA virus or the first SARS-COV-1 coronavirus which took place in China. These viruses represented major epidemics but did not widespread in the world like the one we are experiencing presently.

The COVID-19 crisis has had many negative impacts, whether on health, on economy or on the confidence in the future of people, businesses and countries.

Currently, the virus is still not contained and on the 18th week of 2021, there were 159 million confirmed cases worldwide since the end of 2019, including 52 million in Europe. While there are 3.3 million deaths worldwide, with 704,000 deaths in Europe ([Source : Santé Publique France](#)).

In addition, the epidemic has had a terrible impact on world economy. According to [EUROSTAT](#), the GDP in the European zone fell by 6.8% in 2020, while during the crisis of 2009, the GDP fell by 3.7%.

In 2020, the European economy went through a roller coaster ride, punctuated by national lockdowns. We have seen a drop in GDP in the second quarter of 11.7% followed by a 12.4% rebound in the third quarter and then a relapse in the fourth quarter of 0.7%.

We can see that the economic consequences have been different depending on the country and the lockdowns made. For example, China, which was able to stem the crisis, finally experienced a growth of 3%, while the United States saw their GDP fall by 3.1%. Some European countries have been particularly affected by the recession. France, Italy, and Spain saw their GDP fall by 8.3%, 8.8% and 11% respectively.

As a consequence seen previously, many stimulus packages have been put in place by states to recover from the crisis, which has degraded the deficits of the states. Thus, the United States has seen its deficit reach nearly 17.5% of its GDP compared to 8.4% for the European zone. (Source: [International Monetary Fund](#)).

Finally, socially speaking, the crisis has created a feeling of fear among people. Indeed, the disease affects everyone regardless of origin or income. However, there are some people with higher risk to get the virus and co-morbidity factors such as obese people, diabetics, and all people suffering from lung disease. It is also noted that people without particular risks, young and in good health could also present severe symptoms following their infection.

All this has had a major impact on people's mental health. According to a [Commonwealth Fund](#) study conducted in March and May 2020, a large proportion of people have developed anxiety disorders and depression. For example, in France, 24% of French people have experienced a mental distress, while the United States reaches 33%.

Moreover, the global pandemic has created a fear of the future and has deteriorated people's confidence. This can be seen, for example, in the 7% drop in the birth rate in France in December 2020, 9 months after the start of the pandemic, and the 13% drop in January 2021 (Source: [INSEE](#)).

The current debate about fears for the future and the perception of future risks is often directly related to the environment. According to the UN, there is a link between current and future environmental risks and COVID-19.

About 60% of infectious diseases are "ZONOSIS", which are diseases transmitted through animals to human. Moreover, 75% of emerging infectious diseases are also ZONOSIS.

What is known at this time, is that according to the UN:

- "Deforestation and other land-use changes,
- Intensive agriculture and animal husbandry,
- Poorly regulated and illegal wildlife trade,
- Antimicrobial resistance,
- As well as climate change. "

There are various factors explaining the emergence of ZOOONOSIS. Although the origins of the pandemic are not yet perfectly clear, for many researchers there is a clear link between the decline of biodiversity and the emergence the epidemic COVID-19. It seems obvious that, if nothing is done to solve the current environmental problems, we must expect that other viruses such as the one we are currently experiencing will appear in the future. This is why the UN is advocating for "A healthy and Green Recovery".

### *B. Hypothesis development*

The main focus of this research paper is to examine whether the COVID-19 crisis has created a commitment from investors and countries to green finance.

This issue is supported by the observation of the degradation of people's confidence in the future, coupled with the ecological emergency and a difficult economic period. This suggests that people want to change their consumption patterns, the way they invest, and their way of life in order to bring solutions to the current and future ecological risks.

Moreover, with the numerous periods of lockdowns experienced during 2020 and the beginning of the year 2021, it seems like there has been a stop in time. Many industries were stopped as recently seen during France's first lockdown in March 2021. This lockdown forced people to stay home for several weeks, allowing them to refocus on themselves. It also showed a real awareness of the limits of our current economic model. People no longer want big polluting industries to preserve their economic model based on profitability at all costs with no regard for the planet.

It is in this sense that the pandemic represents an opportunity for green financing and even more an opportunity to use underdeveloped financial tools.

That is why, we can expect people to become aware of the ecological issues, and one of the possible responses would be the development of sustainable finance in the financial markets, specifically with the development of Green Bonds.

Some studies published since the COVID-19 crisis have mostly focused on the reactions of stock market indices, which by their nature are more responsive to changes in their environment, making the impact of an event such as COVID-19 on Green Bonds demand easier to analyse.

This is the case with the study of [Kulcsar \(2020\)](#) on Hungarian and Romanian stock market indices, or with the study of [Batrancea \(2020\)](#), on the impact of COVID-19 on the 34 largest companies listed on the New York Stock Exchange.

However, I believe the interest of studying Green Bonds in this context, is that a large part of the available supply of Green Bonds comes from states through their recovery plans.

Indeed, from the literature review we have seen that the recovery plans take into account a green dimension which implies a greater commitment of countries in favour of sustainable finance and Green Bonds. In addition, we also discussed the major role of states as conditioners of change. Moreover, most of the studies currently published linking COVID-19 and Green Bonds focus on the country responses to the crisis.

There are currently many studies focusing on the growth factors of Green Bonds (lower risk, difference yield with conventional bonds, long term view, etc.). However, while Green Bonds represent less risky financial instruments for investors, it is possible that investors turned to Green Bonds during the time of COVID-19, since this period proved to be relatively unstable economically.

According to [Gurbaxani and Gupte \(2021\)](#) “In present times, investors seem to have become more risk averse, and prefer relatively secure investment options offering moderate return with low risk.”

However, what I would like to understand is whether the demand and the supply for Green Bonds is a function of a particular event, and if the COVID-19 has been a determining development factor for this instrument.

Lastly, I expect that the epidemic represents an opportunity to study this link. There has not been an event as such in the past allowing us to believe that it could challenge our way of doing things. Potentially changing the investor’s behaviour and have an impact on demand and supply of Green Bonds.

Ultimately, I am confident that this study will help understand whether COVID-19 has raised awareness about environmental issues.



These questions allow us to develop our main hypothesis, which is:

***H1: "Demand and supply for Green Bonds has increased following the start of the COVID-19 crisis"***

To study this, we will develop sub-hypotheses:

- ***H1. A: "Supply of Green Bonds has increased since the COVID-19 crisis, largely driven by state recovery plans."***
- ***H1. B: "Demand of Green Bonds has increased since the COVID-19, motivated by investors' consideration of environmental issues and partly influenced by state recovery plans."***

For the last hypothesis, I expect to observe a demand for Green Bonds greater than the available supply. Indeed, according to [Ehlers and Packers](#), we have seen that the negative premiums of Green Bonds observable in normal times can be explained by the fact that the demand is higher than the supply. Therefore, I expect to observe the same thing after the beginning of the COVID crisis but in higher volumes.

- ***H1. C: "The combined effect of increased supply and demand for Green Bond has led to a decline in long-term profitability."***

## CHAPITRE 5 – METHODOLOGY

In order to answer the general hypothesis of this study, which consists in verifying whether there has been a greater interest in Green Bonds since the beginning of the COVID-19 crisis, and analyses the demand and supply of this type of investment. We have developed above 3-sub hypothesis, which represent 3 different ways to analyze our problem.

### *A. Study on the supply of Green Bonds*

In order to study the available supply of Green Bonds since the beginning of the pandemic, it is necessary to look at the new issuance of this type of bond and compare them with the period before COVID-19. This comparison between the two periods allows us to analyze the effect of COVID-19 on demand.

#### *i. Data*

The reference for Green Bonds in the financial markets is the organization [Climate Bonds Initiative](#). Its main goal is "to develop a large and liquid Green and Climate Bonds Market". To do so, the organization collects information available on the market and produces regular reports on the state and size of the market. It also contributes greatly to the standardization of the green market by developing standards, certifications and a common taxonomy, which serve as a reference for the entire market. It also provides policy models and advice. The [Climate Bonds Initiative](#) appears to be the most reliable source for analyzing new Green Bond issues on the financial markets, as the organization lists all labeled Green Bonds on the financial markets. The [Climate Bonds Initiative](#) website allows the extraction on Excel of different information related to the issuance of Green Bonds, such as:

- The amounts issued in USD Billions,
- The number of issuers and the issuers type,
- The region and the market (Developed, Emerging and Supranational) of issuance,
- The allocation of issuance (Energy, Buildings, Transport, etc.),
- The currency used.

#### *ii. Methodology: Qualitative analysis*

To analyze the COVID effect on demand, we create two times of analysis:

- Before the COVID-19: 14/02/2019 - 14/02/2020
- During the COVID-19: 15/02/2020 until now

To define these periods, the easiest way is to look at the price of a benchmark stock market index such as the S&P 500 index. This allows us to determine when there was a stock market crash because of the COVID-19. This date serves as a reference to define the moment when the crisis had an impact on the financial markets and thus establish a date corresponding to a: Before/After COVID-19. .



**Figure 1.** S&P 500 Index. Source: Google Finance

Once the data is collected, we can then:

- Look at the levels of Green Bond issuance since the beginning of COVID-19,
- Compare these levels to pre-crisis levels to determine the supply available since the beginning of the pandemic,
- Analyze the amounts issued,
- Look at the issuers, to analyze the effect of government issuance on other issuance and to determine whether or not there has been an increase in issuance by other financial actors after government issuance.
- Finally, we look at whether or not the results found are consistent with our initial hypothesis and our literature review. If the results do not converge with our expectations, we will try to find a reason for this.

## *B. Study on the Demand of Green Bonds*

It is well known that there is an inverse relationship between the price of bonds and the market rate. Thus, if our hypothesis focuses on an increase in demand, we should observe an increase in bond prices followed by a decrease in interest rates.

### *i. Data*

To observe this, we will use the data of the S&P Green Bond Index developed by [S&P Dow Jones Indices](#). The Green Bonds used in this index must have received the Green label by the [Climate Bonds Initiative](#), and finance environmentally friendly projects. They must also comply with several standards such as : A certain maturity, coupon type, pricing, credit quality rating, minimum per outstanding, etc.<sup>1</sup>

This ensures the relevance of the bonds studied and will allow us to have a global appreciation of the Green Bond market trend. The index is composed of 9,227 Green Bonds on May 21, 2020.

The S&P Index website allows us to extract various information on the performance of Green Bonds on Excel at a global level, the indices are market value-weighted and we can find: The total return of the index, the yield to maturity (YTM), and annual returns for 1, 3, 5 and 10 years.

### *ii. Methodology: Qualitative analysis*

Once the data is collected, we can begin an analysis of it.

As the first sub-hypothesis, to identify a COVID effect on the demand for Green Bonds we will look at two time periods:

- Before the COVID-19: 14/02/2019 - 14/02/2020
- During the COVID-19: 15/02/2020 until now

The next step is to look at the evolution of the YTM whose formula used by the S&P Green Bond Index includes the projected inflation rate to determine the future inflation of the cash flows.

And compare this with the Total Return, which has the particularity of taking into account the sum of the market price and the interest yield, whose formula is the following:

$$TR_t = IR_t + PR_t$$

*Where:  $IR_t$  = Interest return on day  $t$ , and  $PR_t$  = Price return on day  $t$ .*

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<sup>1</sup> S&P Green Bonds Index Methodology : [Table of Contents \(spglobal.com\)](#)

We can then analyse:

- The YTM and Total Return of the S&P Green Bond Index at global level since the beginning of the COVID-19
- Compare these levels with the pre-crisis levels to determine the evolution of the Total Return and the YTM before and after the COVID-19 crisis,
- Finally, we look at whether or not the results match our initial hypotheses and our literature review. If the results do not converge with our expectations, we will try to find a reason for this.

### *C. Study on the combined effect of Supply and Demand of Green Bonds on Primary Market*

The first two sub-hypotheses allowing us to define whether there has been an increase in supply and demand for Green Bonds since the beginning of the pandemic, which leads us to study the last sub-hypothesis, where I expect to find an increase in demand greater than the available supply at issuance. Indeed, the study by [Ehlers and Packers](#), which found a negative premium for Green Bonds on the primary market, explains this by the fact that the demand for this type of instrument is higher than the supply, which can influence the issue price and give the issuer additional sensitivity to issue Green Bonds. We will therefore use the same methodology as the one used by these researchers.

#### *i. Data and experience*

As it was done in their study we will compare the credit spreads at issuance of 21 euro-denominated Green Bonds issued between these two periods of time:

- Before the COVID-19 : 14/02/2019 - 14/02/2020
- During the COVID-19 : 15/02/2020 until now

We will choose these 21 bonds from the list of Green Bonds issuance available on the [Climate Bonds Initiative](#). However, the website gives free access to the Green Bonds issued in the last three months. To have more information, it is necessary to contribute to become a "Climate Bonds Partner". We chose this website because, as we have already discussed, it is a suitable and powerful source of data on Green Bonds.

The credit spread at issuance is calculated by comparing a Green Bond with a non-Green Bond of the same issuer at the closest possible issue date. This is made possible by the fact that most Green Bond issuers tend to issue conventional bonds regularly.

According to the study: “Credit spreads are calculated as the spreads of yields at issuance over the yield curve of German Federal Treasury securities”.

We will then use the same restrictions as [Ehlers and Packers](#), namely, that the bonds must have a maturity of at least two years, an issue amount of at least \$10 million, a fixed interest rate, and a currency in Euros since in our study we will only be interested in euro-denominated Green Bonds.

The results should allow us to determine whether there is a Green Premium on Green Bonds on the primary market. That is, to determine whether investors are willing to receive a lower spread for Green Bonds. Then we can compare the average spread over the two study periods. If the demand for Green Bonds is increasing, we should observe that investors are willing to accept an even lower spread as before the COVID-19.

## CONCLUSION

To conclude, this research paper aims to identify the behaviour of investors since the start of the COVID-19 crisis and to identify whether people have really been aware of the climate issues and if they have changed their behaviour and mode of investment to try to solve the environmental problems which surround us and are not ready to go in arranging insight of the perspectives of analysis of the researchers.

Thus, in the first part, we are particularly interested in a green instrument which is the Green Bonds, to understand its characteristics, development factors and to provide a brief overview of past studies on this subject. We then analyse the consequences of the COVID-19 crisis on the financial markets and on sustainable finance. This has allowed us to reflect on the frightening nature of the COVID-19 crisis, a global pandemic with the particularity of touching and impacting everyone on earth.

Subsequently, we were interested in the recovery plans of the states of the countries to get out of the crisis. Indeed, I expect countries to be seen as initiators of change. Indeed, if they include in their recovery plan a significant part of sustainable financing. I sincerely believe that this, can influence investors to adopt a more sustainable mode of financing. Thus, we have seen that the countries of the European Union are providing an important part of their funding for the issuance of Green Bonds, reinforcing my expectations for a greener future.

Subsequently, in my research methodology part, we did a study of the COVID-19 crisis, to understand its development, its effects on health, on the economy and, more particularly on the confidence in the future of people.

It is this last part that is particularly important in our study since it is on this fact that a large part of my problem is based, which is that: the COVID-19 crisis has created a commitment from investors and countries to green finance.

Finally, it is through the analysis of all these parts, that I finally developed my main hypothesis, which is that it is possible to observe on the financial market an increase in the demand and supply of Green Bonds since the beginning of the global pandemic.

The last part of my dissertation focuses on three different ways to analyse the research problem.

First, we study the supply of Green Bonds since the beginning of the crisis. This is made possible by studying Green Bond issues since the beginning of the pandemic, which is then compared with the same supply before the beginning of the crisis.

Then, we study the demand for Green Bonds by studying the inverse characteristics of a bond, which are: the price and the rate of return.

Finally, according to the study of [Ehlers and Packers](#), who states that they observe that Green Bonds obtain a negative Green Bond premium on the primary market and that this is largely explained by the fact that the demand for this type of investment is higher than the supply. Finally, I am convinced that it is possible to observe an increase in the overall supply and demand for Green Bonds since the beginning of the crisis, but always with higher demand than the available supply.

However, I think my study has some limitations.

First, there is a first limit relative to the long-term effect of the commitment to sustainable finance. Indeed, the third sub-hypothesis in my research is concerned with the observation of the existence of a premium at issuance between a Green Bond and a Conventional Bond. However, studying this can only capture the short-term effect of such a phenomenon. Indeed, if there is a real commitment from investors, it should be observable over the long term. That is why it would be interesting to study this difference in yield between Green Bond and Conventional Bond in the secondary market, but also to analyse the difference between the short term and the long term, to see if there is a decrease in the demand for Green Bonds after some time.

The second limitation of this study is that the COVID-19 crisis is not yet over. It seems difficult to me for the moment to draw definitive conclusions on the behaviour of investors over the long term. At the moment we can only establish intermediate hypotheses.

In addition, at the start of the pandemic, we saw that the markets experienced movements relating to the different phases of the spread of the virus which are particularly reflected during the phases of country lockdown. Perhaps it would be interesting to study the effect of supply and demand for Green Bonds relating to the different periods of containment.

Finally, there are other green financial instruments in financial markets that it might be worth exploring to investigate whether there really is a commitment to green finance from investors. This is the case for example with Green Stocks, moreover, stocks being generally more reactive to changes in the environment in the stock markets might be interesting to study. There are also Sustainability Linked Bonds, which unlike Green Bonds are allocated to finance general business needs, and not just for specific projects.





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