LUISS Università Guido Carli

Department of Economics

Thesis in

Financial Markets and Institutions

An Analysis of Green Bonds

How green bonds can create benefits for the issuers, the shareholders, the investors, and the planet

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To my family and Pedro,
who have always supported me with love
and unconditional faith

Introduction

While the economic and financial literature of the last centuries focused on the standard economic notions of rationality and selfishness behavior and on how the financial market can manage risk and allocate capital to the most efficient use, the challenge of the following years is to integrate the financial market with tools that go beyond the accepted notion of capital used only to make other money.

Indeed, in the last few years, interest has grown in developing new investment approaches that seek to have a positive social impact, stemming out from the fact that there are still social, environmental and humanitarian problems in the world that we cannot ignore.

In 2015, the United Nations developed 17 Sustainable Development Goals and 169 targets, which sum up the environmental, social and economic objectives to be reached by 2030.

Achieving these goals within the deadline is possible, but doing so will require «*rapid, far-reaching and unprecedented changes in all aspects of society*» (IPCC, 2018).

So far, it was believed that the only way to contribute actively to these challenges was through charity activities or volunteering. Lately, however, «*the idea of impact investing is disrupting a world organized around the belief that for-profit investments should only produce financial returns, while people who care about social problems should donate money or their time in an attempt to solve the problems or wait for the government to step in*» (Bugg-Levine et al., 2011).

Within the 17 SDGs, the environment has a particularly central role: goal 7 aims to affordable and clean energy, goal 13 calls for climate action, goal 14 and 15 address the safeguard of life below water and on land.

Green bonds are considered a particular type of impact investment and are assumed to represent one of the key financial tools that can aim to mobilize financial resources for sustainable, low carbon projects and to finance the cost of adaptation of the increasing global warming.

This thesis aims to understand and explain the reasons behind impact investment's increasing interest and to provide an overview of the impact investing and green bonds.

The ultimate goal is to inform potential investors, issuers, and shareholders about the potential benefits and advantages of green bonds, since the more investors integrate climate risk and its related advantages in their investment portfolio, the greater will be the incentive for market participants to issue green bonds and even to design other related financial instruments that will contribute to have a positive impact on the environment and to scaling up solutions for the issues of climate change.

Chapter 1 provides an analysis of the bonds, highlighting their elements, characteristics, cons and pros.

Afterward, Chapter 2 introduces the concept of impact investing, focusing on its historical roots, market developments, measurements and analyzing the reasons behind the increasing investor's interests.

Finally, chapter 3 provides a more detailed analysis of green bonds and focuses on the advantages of this kind of impact investing.

Chapter 1 - Bonds as an investment tool

Before analyzing in depth the benefits and potential of green bonds, it is useful to identify the contest of green bonds: that is the bond market and impact investment.

In particular, this chapter spells out the general definition of bond, the different types of bonds that can be found in the market, its various elements and the latest developments of the bond market. Afterward, the cons and pros are analyzed in order to clarify when and why bonds can represent an attractive form of investment.

1.1 An introduction to the bond market

Individuals and firms looking for a financial return through investments have two basic options: stocks and bonds. The main difference is that «*bonds are a form of debt while stocks are a form of ownership*» (The World Bank, 2015). A bond, therefore, is a form of debt security, that is, a legal contract for money owned that are either bought or sold between the parties and has basic terms defined, which obligate the issuer to pay a specified amount at a given date, generally with periodic interest payments (Eakins and Mishkin, 2011).

In other words, bonds are a form of lending and borrowing through which the issuer (the seller of the bond) receives an initial amount from the lender (the buyer of the bond) and has to repay it during a specified period.

From the perspective of the issuer, bonds are an alternative way of raising money for new projects, for research and development or to hire new employees (in the case of corporations), and for public investment, such as new schools, buildings, and roads (in the case of the government).

Usually, the problem that large corporations run into is that they typically need far more money than the average bank can provide (Hayes, 2017). In this way, bonds serve as a solution, representing an alternative to bank loans.

On the other hand, from the perspective of the lender, a bond is a long-term investment, whose characteristics may be appealing for some specific needs of the investor. For example, some investors may choose to invest in bonds to reduce the risk that the interest rate rises, as we will further detail later.

1.1.1 Types of bonds

Usually, bonds are distinguished mainly in relation to the different issuers.

Issuers can be private companies or public entities, such as the US treasury or local state governments and municipalities.

In line with this classification, Eakings and Mishkin (2011) distinguish among three main types of bonds:

- TREASURY BONDS: bonds issued by the US Treasury to finance the national debt.
  Treasury bonds usually have a maturity that varies between 10 and 30 years.
  The essential characteristic of treasury bonds, which distinguishes them from the other types of bonds, is that they are extremely safe because free of default risk. Indeed, the government can always print money to pay off the debt, if necessary.
  It follows that treasury bonds have a very low interest rate, being it positively correlated with the risk, such that a lower risk corresponds to a lower interest rate.
- MUNICIPAL BONDS: bonds issued by local, county, and state governments. As we mentioned earlier, these bonds are primarily used to finance public investments, such as the construction of schools, roads, transports, etc.
  For example, in 2014 the Bay Area Authority in northern California issued bonds for an amount of $811.4 million for the purpose of financing the construction of the bridges and toll roads in the San Francisco Bay Area (The World Bank, 2015).
  Municipal bonds are not free of default because, unlike the federal government, the local governments cannot print money and there are limits on how high policymakers can increase taxes because citizens can always leave the city or the county.
  The major advantage for investors is that the returns on municipal bonds are free from federal tax and, furthermore, state and local governments will often consider their debt non-taxable for residents, thus making some municipal bonds completely tax free, sometimes called "triple-tax-free" (Hayes, 2018).
- CORPORATE BONDS: bonds issued by large corporations. This type of bond corresponds to the larger portion of the bond market.
  A corporate bond is considered short-term corporate when the maturity is less than five years, intermediate when is within five and twelve, and long-term if it is over twelve years (Hayes, 2018).
  Corporate bonds are characterized by a higher interest rate than that of government bonds because the risk of default is much higher.
  Indeed, the degree of risk varies widely among corporations because it depends primarily on the company's health, which can be affected by several variables. For corporate bonds, there are fairly standardized bond rating systems that determine the company's credit or default risk. The major rating agencies in the world are Moody's, Fitch and Standard & Poor's.

Companies can issue bonds with fixed or variable interest rates and varying maturity. The former consists of the same interest rate which is predetermined in the contract. The latter consists of rates that vary according to the market interest rate of comparable bonds.

A corporation's financial managers are hired, fired and compensated according to the decisions of a board of directors, which represents the corporation's stockholders. This arrangement implies that the managers will be more likely to cover the interest of the stockholders than those of the bondholders. Therefore, managers may not use the funds provided by the bonds as the bondholders prefer. A way to avoid this situation is the presence of restrictive covenants, which are rules and restrictions on managers designed to protect the bondholders' interests. These may include a limit on the number of dividends the firm can pay or the limit to issue additional debt. Typically, the more restrictions are placed on management, the lower the interest rate.

1.1.2 Elements of bonds

There are many varieties of bonds but there are common characteristics that should be defined.
First of all, it is important to delineate the essential elements to understand how bonds are traded in the market.
We already pointed out that a bond is a sort of credit to private or public entities. Of course, people would not lend their money without compensation: the issuer of a bond must pay the investor some periodic coupon interest payments, which are predetermined in advance and are usually paid at fixed intervals (semiannual, annual, occasionally monthly). However, as was mentioned above, sometimes coupons are not fixed throughout the time of the contract but vary according to the market rate of comparable bonds.
At the end of the contract, that is the maturity, the issuer must repay the borrower with the amount initially borrowed, that is the face or par value.
The maturity is agreed by the issuer and influences the bond's yield: the longer the maturity, the higher the yield because the probability that the company will go on default, and thus the uncertainty, is higher.
The current yield is the coupon interest payment divided by the current market price of the bond, while the yield to maturity is the yield an investor will earn if the bond is purchased at the current market price and held until maturity (Eakings and Mishkin, 2011). The yield to maturity is another way of considering a bond's price. «*It is the total return anticipated on a bond if the bond is held until the end of its lifetime*» (Hayes, 2017). In other words, it corresponds to the internal rate of return of the bond if the investor holds it until maturity.

Bonds can also be distinguished according to the different reimbursement options. The most common form of reimbursement is the bullet option, in which the money will be repaid at maturity. On the other hand, amortizing consists of a small repayment each year.

Moreover, a bond can be callable, which means that the issuer can decide to pay back the debt even before maturity. This represents an advantage for the issuer because if, for example, the market interest rate goes down, the company can pay back the bond and issue another one, paying lower interest rates. A callable bond typically has a higher interest rate to compensate for the added risk of the investor.

Bonds can be sold before maturity in the so-called secondary market. These types of transactions are called secondary because the trade is on a security that has been already traded in the market in a previous time. Consequently, in a secondary market, the seller is not the issuer of the bond and the trade is not increasing the capital raising power of the issuer. They are bought and traded mostly by institutions like central banks, sovereign wealth funds, pension funds, insurance companies, hedge funds, and banks. Nowadays, in the U.S., nearly 10% of all outstanding bonds are held directly by households (Lumen).

1.1.3 The bond market

According to the analysis carried out by Lund et al. (2018), corporate bond issuance has increased 2.5 times over the past 10 years. More specifically, total debt has increased from $97 trillion to $169 trillion (Lund et al., 2018), including households, non-financial corporate and government debt. Government debt accounts for 43% of the total increase, while less data has been available for corporate debt, which increase has been nearly as big. Considering the sole corporate debt, nearly 20% of corporate debt is in the form of bonds, which is the double percentage as in 2007. Annual non-financial corporate bond issuance has increased from $800 billion in 2007 to $2 trillion in 2017. This increase in bond issuance is mainly due to the financial crises of 2008. Since then, banks have struggled to recover their profitability and, consequently, the bond market became a cheaper source of debt than bank loans. Following this reasoning, bonds represented a good alternative for companies and, simultaneously, investors have been eager to buy these new bonds, being attracted by the higher yield than the corresponding sovereign bonds and by the fact that corporate bonds can be an alternative to equities. Consequently, the increase in issuance easily attracted new demand and this self-fulfilling process enabled even new companies to issue bonds for the first time.

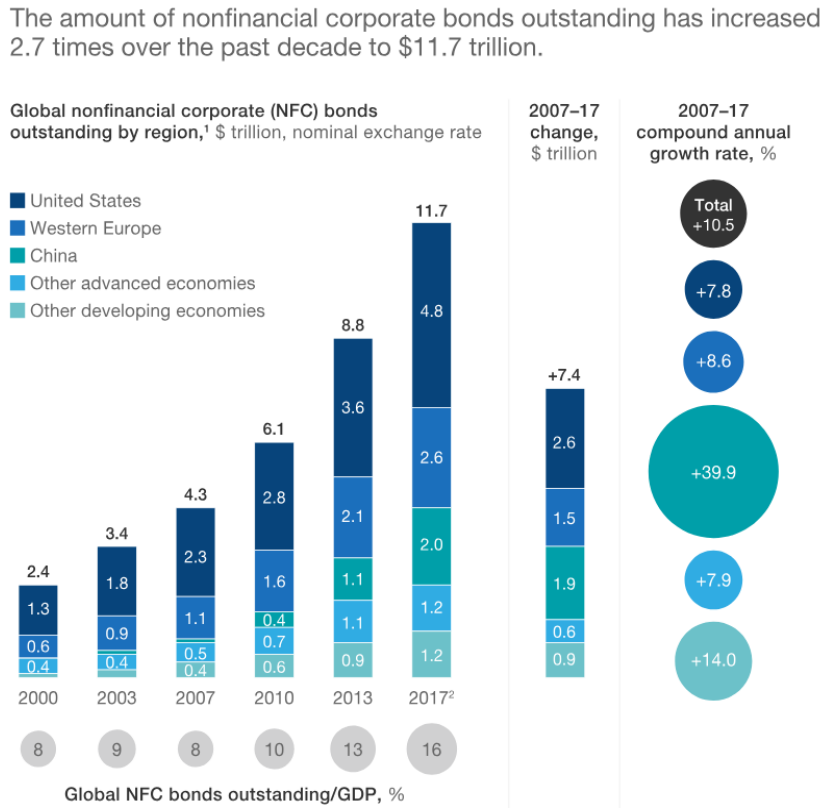
Figure 1.1 below shows the global non-financial corporate bonds outstanding by regions.

A shift toward bond financing has been observed in all countries.

More specifically, the United States had a shift from 19% of all corporate debt financing in 2000 to 34 % in 2016. In Western Europe, the percentage has almost doubled, from 9% to 17%.

The last years have also been characterized by a great number of issues by developing countries, where the issuance reached $164 billion in 2017, from $85 billion in 2007. More specifically, growth has been particularly strong in China and then Brazil, Chile, Mexico, and Russia.

Figure 1.1 - Global non-financial corporate bonds outstanding by regions



Source: BIS; McKinsey Country Debt Database (Lund et al. 2018); McKinsey Global Institute analysis

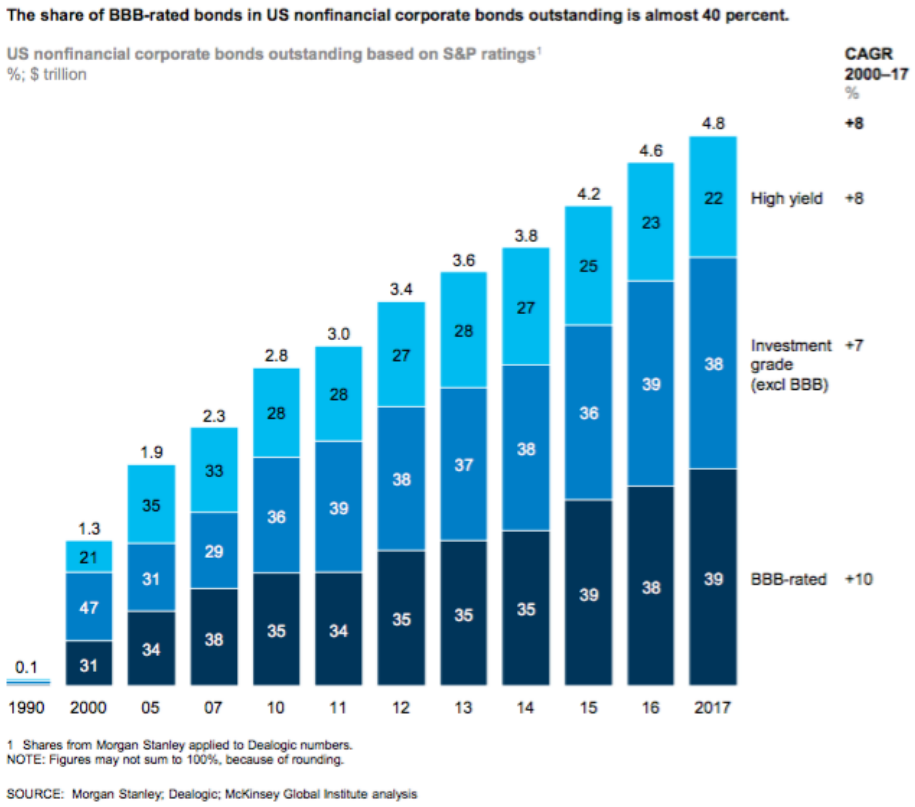
This increase in bond issuance created both advantages and risks.

The risks are associated primarily with the increase in the issuance of bonds from BBB-rated companies, making bonds riskier, particularly in developing countries and in some industries of developed countries.

As can be noticed from Figure 1.2 below, the percentage of bonds issued which have a high yield and the ones with an investment grade has remained almost constant since 2000, with some fluctuations.

On the other hand, the share of BBB-rated bonds has increased gradually, from a percentage of 31% to 39% of total bonds.

Figure 1.2 - The share of BBB-rated bonds in US non-financial corporate bonds outstanding



Source: BIS; McKinsey Country Debt Database (Lund et al. 2018); McKinsey Global Institute analysis

The benefits of this expansion of the bond market concern mainly the fact that companies are now able to borrow at longer maturities. This, in turn, reflects the increase market depth, liquidity and growing market confidence among investors in providing long-term financing.

At the same time is a good development that now bonds have become an attractive alternative form of debt around the world. Bond markets can provide an alternative to bank lending and can enhance the stability of the financial system, mitigating some of the risks of banking crises on the economy.

From the perspective of the investors, bonds can constitute an alternative to stocks and provide higher yields than other similar forms of investment. On the other hand, from the perspective of the issuer, bonds can represent a way to raise new funds while hedging the bank risks.

In conclusion, bond market development in the last decades plays a key role in facilitating economic growth, productivity and development and the drawbacks that this development can bring about can

be subdued by higher attention by investors and stronger regulation to monitor and rating bond issuance.

1.2 Bond investment: cons and pros

Bonds have their cons and pros and the choice to invest in bonds over other types of investments depends primarily on the different needs of the investors. In the following sections, we will briefly explain which are the main advantages and disadvantages of investing in bonds, concluding that bonds can be valuable securities to include in an investor's portfolio.

1.2.1 Cons

If it is true that bonds are much safer than other forms of investments because they are pre-determined (in the case of fixed-rates), it is important to point out that there are still some risks.
The main types of risks the investor can experience are credit, liquidity, interest rate, inflation, callability and exchange rate risks.

The first risk is related to the credit risk, that is, the risk that the company or the government goes on default.
Table 1.1 below shows the bond rating of Moody's, S&P and Fitch, highlighting the correspondence between the grade given by the agency and the risk associated.

Table 1.1 – Bond rating for Moody's, S&P and Ficth

Bond Rating		Grade	Risk
Moody\'s	S&P/ Fitch		
Aaa	AAA	Investment	Highest Quality
Aa	AA	Investment	High Quality
A	A	Investment	Strong
Baa	BBB	Investment	Medium Grade
Ba, B	BB, B	Junk	Speculative
Caa/Ca/C	CCC/CC/C	Junk	Highly Speculative
C	D	Junk	In Default

Source: Investopedia

It can be noticed that if the company falls below a certain credit rating, that is, for example, BBB for Fitch, the bonds are considered speculative, junk bonds. This situation may occur if, for example, companies are in some sort of financial instability. Of course, this higher risk is compensated with a

higher yield. This brings up an important point: sometimes bonds can be as risky, if not riskier, than stocks (Hayes, 2017).

Another important risk of holding bonds is the liquidity risk. It refers to the risk that the investor experiences if he wants to resell the bond before maturity. In other words, liquidity risk refers to the lack of marketability of an investment. This can be the case when the market is thin: when there are few buyers and sellers. It follows that to make the bond more attractive, the investor has to decrease the price, as it will be further detailed below. Therefore, the higher the liquidity risk, the higher the probability that the investor will suffer a loss if he wants to resell it.

A further pitfall and risk of holding bonds is the interest rate risk.
Bonds can be sold at a variable or fixed interest rate. As it can be deduced from the name, a fixed interest rate bond has fixed interest payments until maturity, while a variable interest rate bond is characterized by interest rates which vary at the time of each payment, according to the fluctuations of the market interest rate, which, in turn, depend primarily on the demand and supply of the type of bond in consideration. In the former case, it is straight forward that the risk refers to the fact that if the interest rate in the market gets lower, the investor will receive fewer interest payments.
However, even in the case of a fixed interest rate, there is uncertainty and risk. Indeed, interest rates and prices are negatively correlated, so that if the interest rate rises, the price has to fall to make the bond competitive with other similar bonds in the market. It follows that if the interest rate on the market rises, the opportunity cost of holding the bond increases, as bondholders could invest their money in more profitable investments. If then, the investor wants to sell the bond in secondary markets, he has to sell it at a discount. For example, if the bond has a coupon rate of 5% and a price of $100 and now the market rate is 6% for bonds of similar characteristics, the investor cannot sell it at $100 because, in this case, nobody would prefer to buy a security which costs the same as another which will yield a higher return, ceteris paribus. Usually, the longer a security's maturity, the more its price declines to a given increase in the interest rate.
Therefore, in the case of a floating rate, the capital gain, that is the difference between the buying and the selling price, is certain and the coupons are uncertain; on the other hand, in the case of a fixed rate, the capital gain is uncertain, and the coupons are certain.
As it can be noticed from the graph in Figure 1.3 below, even the interest treasury yield (in this case of the US) varied consistently during the years, reaching peaks during periods of tight monetary policy or when investors simply expect it to go up. Indeed, when the demand for treasuries is low, the treasury yield will increase to compensate for the lower demand.

The treasury rate, in turn, influences the other rates in the market, as it represents the rate associated with the safest security. Therefore, an increase in the treasury rate will push the rates of all other riskier investments up and vice versa.

Figure 1.3 – 10 Year Treasury Rate – 54 Year Historical Chart

Source: Macrotrends LLC

In addition to the risks described above, there can be other risks, such as the inflation risk, that is the risk that inflation increase so much that investors will see their purchasing power erode and may actually achieve a negative rate of return (Hayes, 2017); the risk of callability, that is the risk that the interest rate decreases and the callable bonds are exercised by the issuer; or the exchange rate risk, that is the risk that there is an unanticipated change in the exchange rate between two currencies, so that if an investor invests in a bond denominated in another currency and has to exchange it with his own currency, he can suffer losses for the unexpected change in the exchange rate.

1.2.2 Pros

Investors may choose to invest in bonds over other types of investments for several reasons.

First of all, fixed-rate bonds offer fixed returns over a fixed time in fixed periodical installments. This generally makes the investment more predictable and less risky than other investment options. This higher predictability of cash flows makes bonds a good investment to balance the riskiness of an investment portfolio (The World Bank, 2015).

Moreover, bonds are safer than stocks because they have a higher priority of payments. This means that, when the company is having difficulties meeting its obligations, bondholders get paid before the stockholders. Even in the worst-case scenario, the creditors usually get at least some of their money back, while shareholders may lose their entire investment (Hayes, 2017).
Additionally, even healthy firms with additional capital to pay both stockholders and bondholders frequently have very volatile stock prices. In this perspective, bonds are a much safer alternative because they offer relative safe cash flows of payments (Eakings and Mishkin, 2011).

Another advantage of bonds is that they are often liquid, meaning that there are so many buyers and sellers that an increase or decrease of the number of bonds traded will not cause a drastic change in price. It follows that, usually, it is easy for an institution to sell a large number of bonds without affecting the price much, while it may be difficult for equities (Lumen).

Bondholders also enjoy some legal protection. In addition to the legal safeguard of being repaid of at least a part of the investment in the case of default of the company, bonds come also with indentures, a debt agreement that establishes the terms of the bond issue, and covenants, which is the clause of such agreements. Therefore, for the purpose of investing in social impact initiative, the presence of such covenants can represent a great advantage for a socially responsible investor. Indeed, covenants can be used to assure that the projects, financed through the bond issued, have a real social impact, in line with the intention of the creditor.
In addition, as was mentioned above, in the case of municipal bonds the investor can be exempted from taxes.

Furthermore, investing in bonds can represent a hedge against an economic slowdown or deflation. Indeed, during a period of deflation, holding bonds in the portfolio can be a good source of return because usually bonds pay a fixed income that doesn't change and, if the general purchasing power deteriorates with time, bondholders can buy more goods and services with the same bond income. This process makes bonds attractive and pushes the demand for bonds to increase, further increasing the prices and bondholders returns.

Following these reasons, bonds may be the perfect option for investors who are seeking security and predictability. At the same time, bonds generally yield a higher return than simply depositing money in the bank, because, as we explained above, even the safest bonds have a certain amount of risk.

In conclusion, bonds can be a valuable option for people who don't need their money in the short-term and don't want to pose too much risk or for people who are looking for specific investments that are in line with their needs and expectations as, for example, speculative investors who buy bonds to hedge against inflation or against an increase in the interest rate.

Chapter 2 – Impact Investment

After an overview of the main characteristics of bonds and an analysis of the cons and pros, through which it was delineated why and when bonds can represent an attractive investment, this chapter provides a closer overview of the impact investments in general, before going more into details in the world of green bonds, which is considered a particular kind of impact investing, as it will be further detailed below.

In particular, this chapter will specify which kinds of investments are considered to have an impact, the historical roots of impact investment, the latest development of its market, the aim and expectations of impact investors, and how private firms can exploit impact investment's increasing interest.

2.1 What is the impact investment

2.1.1 Definition

As impact investment is growing substantially lately, defining the term has become increasingly important.

First of all, we should define the term "investment". The latter can have different meanings, depending on the context in which it is defined. In this case, the frame of reference which is more connected with the concept of impact investment is the financial one: in this context, investment refers to a monetary asset purchased in the view that this asset will generate future income which will, eventually, be higher than the initial money invested.

According to Haigh (2012), the ordinary definition of investment includes «*giving one's capital a new form*» and to «*endow with a quality and a characteristic*». In this view, the definition of investment is more linked with the final aim of the money invested: an investor invests time, money and effort to transform his financial capital in a form of non-economic capital (which is the human, intellectual, emotional, cultural and social capital).

Investment in this term means «*to take stock and to spend time in activities which call forward an ethics of responsible research*» (Haigh, 2012), and this is the most appealing interpretation since it is the definition closest to the concept of impact investment because it takes into consideration the non-economic impacts that an investment can have and the need to consider ethics and responsibility when making investment decisions.

According to Bugg-Levine et al. (2011), impact investing comprises all those investments that intend to achieve social and environmental development, while still aiming to earn financial returns.

More specifically, an impact investment consists of «*capital placed in enterprises that generate social or environmental goods, services, or ancillary benefits such as creating jobs*» (Brest and Born., 2013).
From the latter definition, it can be noticed how impact investment encompasses a broad range of activities and diverse investors who have different needs and expectations.

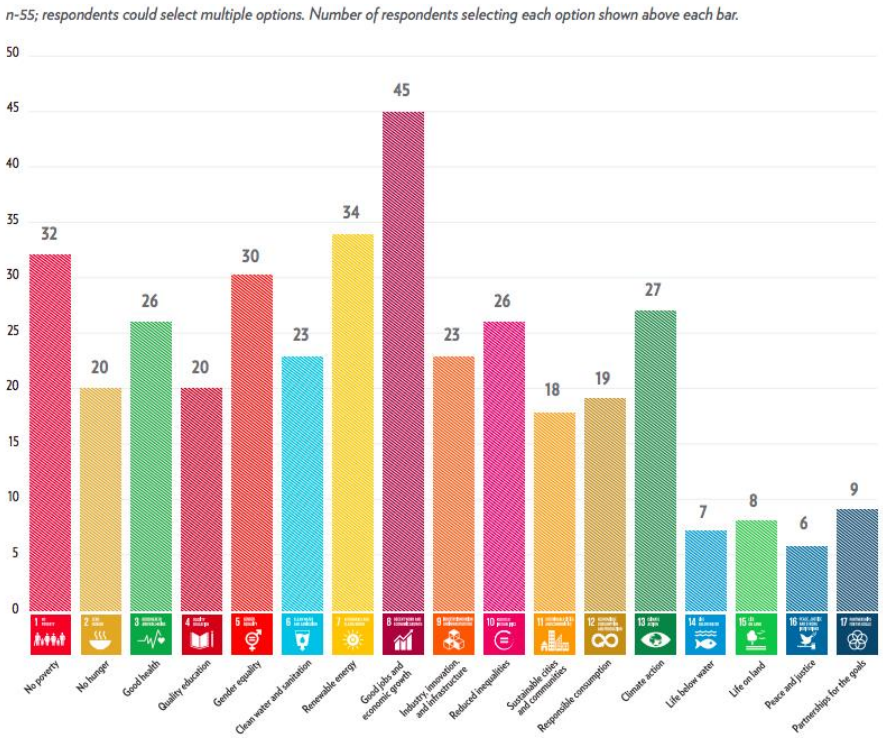
It follows that the concept of impact investing is linked with responsibility and ethics: there has been increasing realization that private companies can contribute to solve social and environmental problems, together with philanthropy activities and government aid. Indeed, additional money is needed to complement the activities of government and charitable organizations to bring solutions to scale. At the same time, a growing number of investors are expressing the desire to «*do good, while doing well*» (Brest and Born, 2013).

Therefore, the main difference between impact investors and "neutral" investors, as pointed out by Brest and Born (2013) is that impact investors act more as philanthropists, in the sense that their actions are socially motivated. They offer a bridge between philanthropy and the use of private capital markets. Their goals can be specific, such as providing anti-malaria medicines to residents of particular regions in Africa, or generic, such as trying to address and to offer solutions to climate change. On the other hand, "neutral" investors are indifferent about the social consequences of their investments and their primary goal is earning the highest profits through their investment decisions.
This juxtaposition between a "neutral" and an impact investor is linked with the concepts of individualism and common goods. As Haigh (2012) indicates, citing Aristotle's works, wealth is a concept separate from money. Wealth includes that of the planet, of relationships, of a well-functioning group (Oikos). Aristotle, then, condemns the use of money merely for the pursuit of financial returns, but celebrate its use for the achievement of Oikos. In this view, impact investing is a business practice that responds to a «*belief that legal, financial, trade, and business practices pursue a common end, not an individualized end*» (Haigh, 2012).

The concept of impact investing is also linked with that of sustainability. In creating a social and environmental outcome, impact investing also aims to be sustainable.
In general, a sustainable system is «*one which survives and persists*» (Haigh, 2012).
In economic terms, sustainability refers to an equitable distribution of resources and opportunities between the present and future generations and a sustainable investment requires investing in building long-term capacities for improvement (Haigh, 2012).

As the United Nations (2018) highlighted, there is a deep association between impact investment and the principles of the 17 Sustainable Development Goals (SDGs). The United Nations developed these objectives «*in the recognition that it would be impossible to achieve the goals without accessing the tremendous untapped potential of the world's investment capital to contribute to positive global change*» (GIIN, 2018).

Figure 2.1 – Sustainable Development Goals (SDGs) to which Impact Investor track their performance



Source: GIIN (2018), Impact investing, a guide to this dynamic market, thegiin.org

In this view, impact investing comprises all those activities which address the world's most pressing challenges in sectors such as environmental themes: sustainable agriculture, renewable energy, conservation, water, and social themes: education, affordable housing, health, inclusive finance. These 17 goals have provided a useful and inspiring starting point for investors aiming to tackle social and environmental issues (GIIN, 2018).

To understand which outputs can result from impact investments, a further term should be defined, that is the bended value. According to Bugg-Levine et al. (2011), «*if impact investing is what impact investors do, blended value is what they produce*». A common mistake is to think that private companies only produce economic value but, on the contrary, all the organizations, including the

private ones, produce all sorts of values: economic, social, and environmental. These three concepts are intertwined and non-divisible. Blended value is the recognition that money, society, and the market can create more together than the sum of the three independently (Bugg-Levine et al., 2011). It follows that every investment decision will have not only a financial output but also a positive or negative impact on the social and environmental reality; and thus, all investors shape these effects through their investment choices.
At the same time, focusing on the blended value on its entirely is a precious opportunity to fully exploit the total value of an investment.

The Global Impact Investing Network (GIIN), which «*focuses on reducing barriers to impact investing so that more investors can allocate capital to fund solutions to the world's most intractable challenges*» (GIIN, 2018), provides a more detailed definition of impact investment, defining its main characteristics. According to this network, the key elements that define an impact investment are:

- INTENTIONALITY: Impact investors intentionally seek to generate positive social and environmental impact. This distinguishes them from "neutral" investors, who may create a positive impact unintentionally: for example, socially "neutral" investors, motivated only by profits, have contributed to the positive social impact of telecommunications companies in both the developed and developing world (Brest and Born, 2013), but according to the GIIN's key elements, their investments cannot be included in the category of the impact investments.
- FINANCIAL RETURNS: impact investors are different form philanthropists because the former seeks a financial return on capital that ranges from below market to risk-adjusted market. A common mistake around the definition of impact investment is the belief that it is inevitably a below-rate investment that scarifies financial return for a social and environmental impact. On the contrary, «*impact investors don't seek either wealth or social justice: they seek both*» (Bugg-Levine et al., 2011).
- RANGE OF ASSET CLASSES: impact investments can be made along a broad range of asset classes, including cash equivalents, fixed income, private equity, etc.
- IMPACT MEASUREMENT: impact investors shall be committed to report the investment's performance to enhance transparency and accountability based on certain defined targets.

2.1.2 Historical roots

The term sustainability was launched with a strict environmental interpretation during the United Nations conferences in the 1970s/1980s. During the following years, the concepts of sustainability

entered the business and management literature as internal responsibility of corporations, called Corporate Social Responsibility (CSR), (Soppe, 2009).
However, this early connotation was based on the concept that sustainable development is primary supply-driven: it comes solely from the internal decisions of the stakeholders.
In the following years, the concept was enlarged to the discipline of finance and became also demand-driven, as it depends on investment and purchasing decisions too.
The term "impact investment" was coined by the Rockefeller Foundation in 2007 and, in particular, it came out from a discussion among a group of investors in green technology. What united all of them was the interest in assessing the potential and real performance of the capital through more than «*the passive financial length*» (Bugg-Levine et al., 2011), and thus the desire to use their capital to have a broader positive impact.

According to Bugg-Levine et al. (2011), the idea behind the concept of impact investment is not new, but, instead, goes beyond at least to the 17th century England and the Quakers, who tried to align their purchasing decisions with their ethics and values. Soppe (2009) agrees with this historical root, stating that the idea behind impact investing can be linked to the many religious investors who, pushed by their ethics of peace and non-violence, actively avoided to invest their capital in certain kind of enterprises, such those that are engaged with the production of weapons, tobacco, alcohol, and gambling.
Then, in the 1960s, some major charitable institutions, like the Ford Foundation, announced that ethical investments had become part of their philanthropic programs (Soppe, 2009).
In the '70s there was a greater contribution to this field thanks to the escalation of environmental movements.
What is new now is the realization that private businesses can greatly contribute to the social and environmental goals and, in particular, the growing awareness that positive impact can be reached through the use of financial tools.
Impact investment has been increasingly growing, especially after the financial crises of 2008, because governments started to recognize the need and potential advantages to go beyond donations and volunteering to achieve their goals of protecting jobs and social stability and started to invest tens of billions in loans and equity, which later became the main financial tools of impact investors (Bugg-Levine et al., 2011).
Since the emergence of the concept of impact investment, greater attention has been devoted to this field, with promotions by international organizations, such as the United Nations. Therefore, from 2007, impact investment has attracted the attention of an increasing number of investors in all types

and from all over the world. Indeed, over 50% of active impact investing organizations made their first investment in the past decade (Mudaliar and Dithrich, 2019).

2.1.3 Current developments of the impact investment market

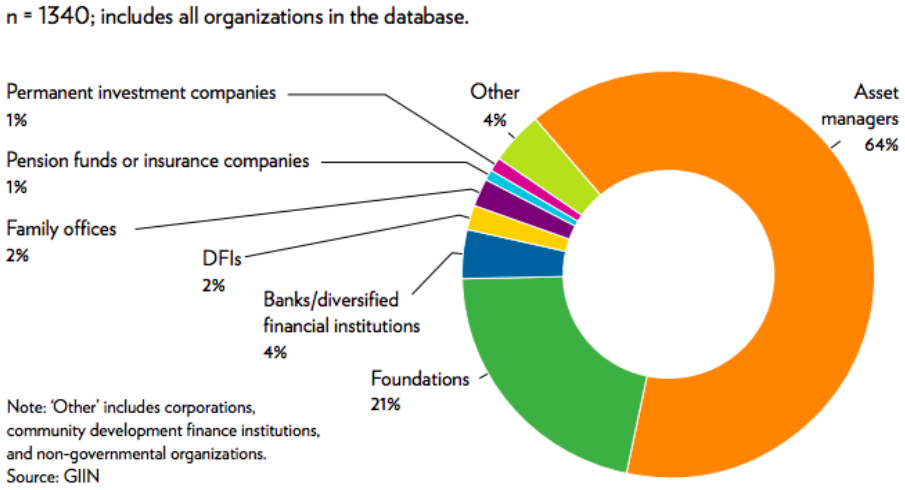
As was cited above, the impact investment market is relatively new. For this reason, little information can be found on the latest development of impact market but the current growth of this kind of investments called for a well-defined estimate of the size of its market.

Mudaliar and Dithrich (2019) provided the first rigorous analysis and estimate of the size of the impact investment market, focusing on its last developments. In this analysis, the term impact investment was generalized to all the investments made with the intention to generate positive, measurable, social and environmental impact alongside a financial return (Mudaliar and Dithrich, 2019). More specifically, the analysis focused on a database of 1340 impact investors drawn from a variety of sources (only organizations, not individual investors).

The first result associated with this analysis concerns the different sources of supply of capital allocated to impact investing.

As Figure 2.2 displays over 60% of capital's suppliers are asset managers, the second highest percentage represents foundations, then there are banks and other financial institutions, development financial institutions, family offices, etc…

Figure 2.2 - Organizations by type

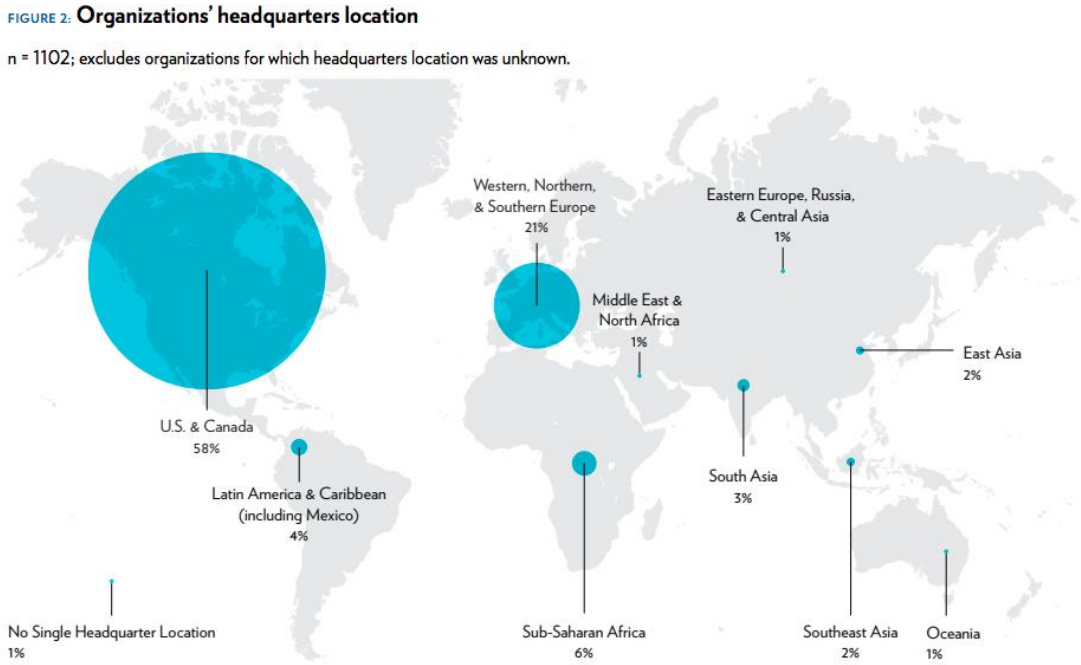


Source: GIIN, Sizing the impact investment market, Mudaliar and Dithrich, 2019

The database also displays the different organization's headquarters location and, from the results displayed in Figure 2.3 below, it can be noticed that the majority of the suppliers of capital allocated to impact investments is located in the US and Canada (58%), followed by the Western, Northern and

Southern Europe (21%). All the other regions of the globe only account for the small percentage left (21%). Therefore, as it could be easily predicted, the majority of organizations are based in developed markets but there are still some of them in other regions such as Sub-Saharan Africa, Latin America, the Asia-Pacific, the Middle East, and North Africa.

Figure 2.3 - Organizations' headquarters location

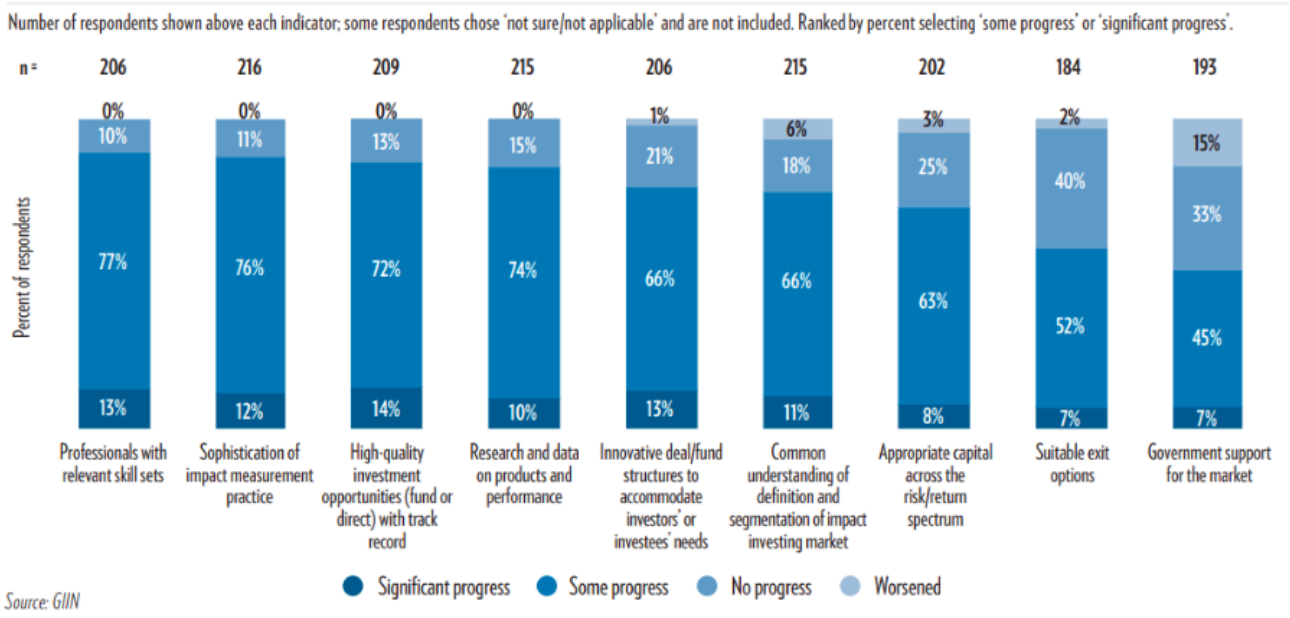


Source: GIIN, Sizing the impact investment market, Mudaliar and Dithrich, 2019

Moreover, another important result from the GIIN analysis is that investors are optimistic about the development, future growth, and efficiency of the impact investment market. This can be noted from Figure 2.4 below, which shows the expectations on the progress of different indicators of market growth for the impact investment market. The overall result is that the majority of investors expects at least some progress over all the indications of the market growth.

One of the basic principles in economics is that expectations influence decisions. In line with this principle, if investors expect a market to grow steadily and are optimistic about the indicators of impact investment growth, there is a high probability that the market will be characterized by future positive growth.

Figure 2.4 - Progress on indicators of market growth



Source: GIIN (2018), Impact investing, a guide to this dynamic market, thegiin.org

Finally, the analysis provides an estimation of the size of the impact investment market, which was estimated at $502 billion at the end of 2018. It is interesting that the individual investor portfolio varies widely in size: while the median investor is $29 million, the average is $452 million, implying that, although most organizations are relatively small, many investors manage very large investing portfolios (Mudaliar and Dithrich, 2019).

Nowadays, «*one in four dollars of professionally managed assets considers sustainability principles*» (Mudaliar and Dithrich, 2019).

This growing consideration of the impact investment market and the increasing aspiration to include impact investments in the financial portfolio is a signal of the expanding awareness about the challenges that the world is undergoing and the recognition that investors' money can represent a key instrument to move capital toward sustainable projects.

2.2 The Measurement of the Impact

Measuring impact is an essential part of impact investing. «*The more professional institutions are entering the market, the bigger is the need for active screening, consistent rating and benchmark tools*» (Knoepfel, 2001). To measure the intensity of the outcome that this type of investment creates, which distinguishes it from a mere financial one, specific performance metrics are needed. In other words, it is necessary to measure the social and environmental performance data together with

financial performance data in order to fully understand the performance of the investee and the investment choices (GIIN, 2018).

The socio-economic impact can be «*positive or negative, intended or unintended, temporary of sustainable overtime*» (WBCSD, 2013). A positive and sustainable impact is what it should be achieved in the context of impact investment. Therefore, as impact investment is growing, the ability to measure and demonstrate its real impact has become increasingly vital.

Indeed, measuring when impact investment really creates impact is crucial to avoid situations in which money is placed into activities that seem to have an impact but whose final result has, on the opposite, detrimental effects on the environment and/or on social variables. For example, simply putting capital to work in a poor country doesn't qualify an investor as an impact investor. To be classified within the definition of impact investments, funds and firms need to «*focus on initiatives and activities aimed at uplifting rather than exploit poor customers*» (Bugg-Levine, 2011).

According to Barby et al. (2014), impact measurement is essential for the success of the impact investment market and without it effective impact investment cannot occur. Indeed, in the perspective of an impact investor, without successfully being able to measure the final impact of their investment, impact investment cannot efficiently develop.

If done right, impact measurement can have various advantages, such as:

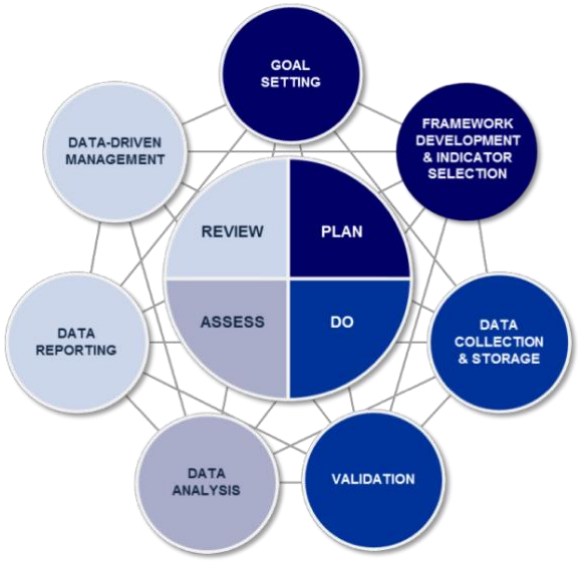
- Generate intrinsic value for all stakeholders in the impact investing ecosystem,
- Mobilize greater capital to increase the amount of aggregate impact,
- Increase the transparency and accountability to deliver the intended output (Barby et al., 2014).

The following section introduces some authors who proposed their own measurement standards and introduced various concepts related to the assessment of investment's' impact.

First of all, it is important to delineate the impact measurement program, which is defined as «*all the activities that are implemented in order to manage investee performance and track progress toward the desired social and environmental objectives*» (GIIN, 2018).

Barby et al. (2014) developed the concept of impact measurement program along with four main steps, together with seven attached guidelines which provide the definition, collection, and analysis of impact data:

Figure 2.5 – Impact measurement process and guidelines



Source: Barby et al. 2014 – Measuring impact

Plan: includes all those activities that the investor and the investee agree upon and all the indicators they will use to measure the progress toward the desired impact.

Do: includes all the activities that the investor and investee collect and share to validate the achievement toward the desired impact.

Assess: includes all the activities to analyze the quality and efficiency of the impact that the investment has generated.

Review: includes the insights from the impact measurement and the strategic decisions to further improve the measurement processes.

In broad terms, an investment can have a wide range of impacts. Usually, only the monetary impact is analyzed but, as it was mentioned above, each economic decision has also social and environmental consequences.

According to Brest and Born (2013), an enterprise can have two fundamental impacts:

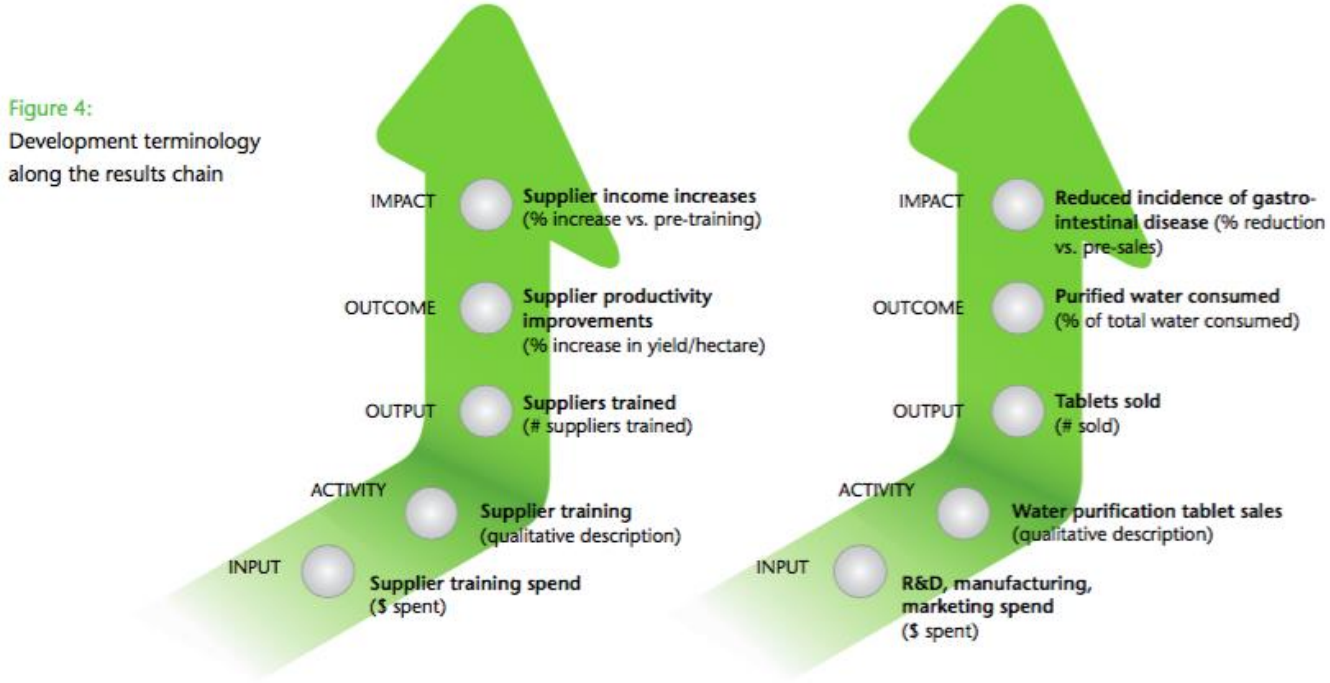
- *Product impact:* the impact of the goods and services produced by the enterprise (such as providing anti-malaria vaccines),
- *Operational impact*: the impact that derives from the enterprise's managerial decisions and practices, which includes the employee's health and economic security, its effect on jobs, the environmental effects of the production of its goods and services, etc…

According to the conception developed by Brest and Born (2013), «*an enterprise has impact only if it produces social outcomes that would not otherwise have occurred*». Therefore, to have impact, an impact investment should produce social and environmental outcomes beyond those that would have been produced in the absence of the outlined investment.

In this view, there is a discrepancy between the concepts of outputs and outcomes. «*The output is the product or service produced by the firm, while the outcome is the final effect of the output in improving people's lives*» (Brest and Born, 2013). In the process of measurement, the impact investor must be able to measure to what extent the intended output occurs and to what extent the output contributed to the intended outcome.

A further interpretation of this distinction between output and outcomes was developed by Barby et al. (2014), who classified the various impacts that investments can have along a so-called "impact value chain". This chain starts with the input data and ends with outputs and outcomes. Just as product value grows with every link of the value chain, socio-economic impact deepens with every link of the impact value chain (WBCSD, 2013). In this context, to know where the investment creates impact along the spectrum of the value chain may be valuable information in the perspective of the impact investor.

Figure 2.6 - Two examples of the impact value chain and possible measurement for each



Source: WBCSD, 2013

Figure 2.6 above shows two examples of a value chain. In the left one, a company invests in training its suppliers, the expected results are increased productivity and consequently higher sales. In the right one, the company invests in research and development, manufacturing and marketing, resulting in a consequent increase in sales.

In this figure, the different phases of the value chain are outlined, together with some possible impact measurement for each stage.

- INPUTS: the resources needed. In the first example, the input is the supplier training spend and a possible way to measure it is the total money spend on it.

- ACTIVITY: Actions that are performed in support of specific impact objectives (Barby et al. 2014). In the first example, the activity is the definition of the supplier training and one possible measurement is the qualitative description of the activity.
- OUTPUT: The result. It includes all the practices, goods and services that result from the activity undertaken. In the first example, the output of the investment are the suppliers trained and the possible measurement is the number of suppliers trained.
- OUTCOME: Changes that result from the use or activity of the output on individuals, society or environment. In our case, the outcome refers to the change in the life of the supplier and more specifically, in their increase in productivity. One possible measurement can be the percentage increase in sales.
- IMPACTS: Global-level changes that result from the use or activity of the output on individuals, society or environment. The most common indicators are changes in education, health, income or environmental effects. In our case, the final impact refers to the change in the life of the targeted population and it can be measured by the increase in suppliers' income.

So far, the importance of impact measurement has been outlined and, afterward, we have defined the steps of the impact measurement process, specifying that the impact can occur in different stages of the impact value chain and providing some examples of measurements attached to each phase of the value chain.

The following two sections are more focused on specific measurement systems which are commonly used by firms and investors to ensure that the investor's objectives are followed by the enterprise and to help the investor to compare different investment opportunities. Standardized metrics are essential to guarantee the credibility, comparability and other efficiencies.

In particular, two specific types of measurements are analyzed. The first one concerns a catalog of performance metrics that can be agreed upon by investors and investee before the investment takes place, while the second one is an index which measures the sustainability of a firm with respect to that of others and it can represent a valuable tool used by investors to compare the characteristics of different enterprises and to decide in which firms to allocate their capital.

2.2.1 The IRIS

IRIS is a free catalog that can be found on the GIIN website. It aims to provide a single performance measurement framework through both qualitative and quantitative metrics to measure (GIIN, 2011):

- *The financial performance*,

- *The operational performance*, including the social and environmental impact on the daily activities of the enterprise,
- *The product performance*, including the social and environmental impact of the products and services produced from the money invested,
- *The sector performance*, which includes measures that assess and quantify impacts in social and environmental sectors,
- *The social and environmental objective performance*, which includes metrics that measure the progress towards specific objectives.

IRIS can be helpful for both investors and investee: for example, if the investor is uncertain about investing in two different funds which report similar rates of financial return, he can use IRIS to compare the environmental and social performance of the two enterprises with respect to the type of impact investment he is interested in. On the other side, in the perspective of the entrepreneurs, IRIS can be a valuable tool to make their social and environmental activities more attractive to investors and show how their investments compare to IRIS benchmarks.

An important characteristic of the IRIS is that no single combination of metrics is the right one since the choice of the metrics depends on the characteristics of the investment and on the needs of the investor and investee.

The IRIS framework defines nine different impact sectors: agriculture, education, health, energy, environment, financial services, housing, water and waste, and the cross-sector (GIIN, 2011).

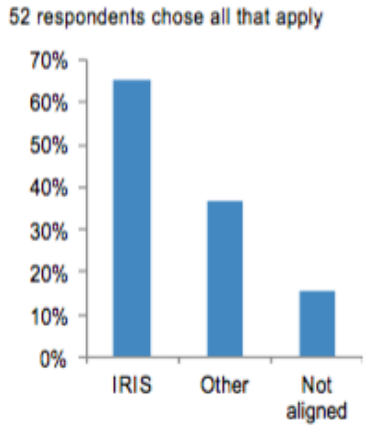
As it is shown in Table 2.1 below, for each sector (in this case the environmental one) there are different metrics and measurements associated. In this way, each investor can choose the most useful measurement for the objectives he wants to reach.

Table 2.1 – Example of IRIS metrics framework

SECTOR	METRIC ID	IMPACT TYPE	METRIC NAME	MEASURE	DEFINITION
ENVIRONMENT *(forestry, waste management)*	IRIS ID: PI4127	Environmental	Trees Planted	Number of hectares	Hectares of trees planted by the organization during the reporting period.
	IRIS ID: PI9556	Environmental	Ecological Restoration Management Area	Number of hectares	Hectares under ecological restoration management during the reporting period. Include both hectares directly controlled and hectares indirectly controlled by the organization. Organizations should footnote relevant ecological restoration activities undertaken during the reporting period.
	IRIS ID: PI4716	Environmental	Protected Land Area: Total	Number of hectares	Number of hectares with a status of protected land during the reporting period. Organizations should footnote the mechanisms used to ensure protection.

Source: GIIN (2011) - Getting started with IRIS, how to select IRIS metrics for social and environmental performance measurement - iris.thegiin.org

Figure 2.7 – Number of investors aligned with third-party impact measurement standards



Source: GIIN, J.P.Morgan

As shown by Figure 2.7, IRIS is a widely used metric. Indeed, through the 52 perception surveys carried by Saltuk (2011), it has emerged that 65% of respondents are using metrics aligned with IRIS.

2.2.2 The Dow Jones Sustainability Index

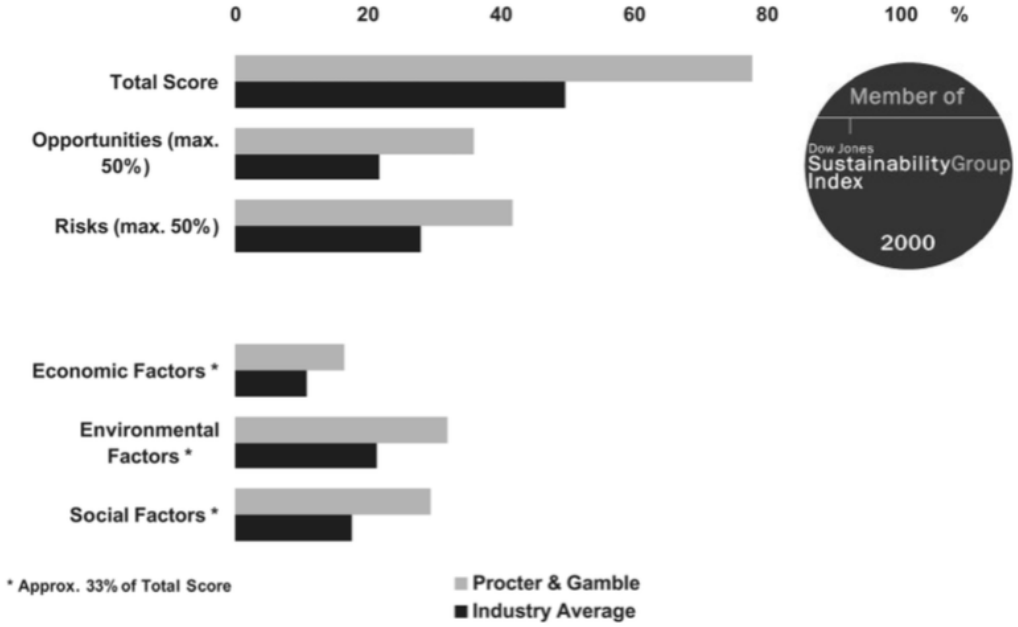
The Dow Jones Sustainability Index (DJSI) is the first global sustainability index, which was launched in 1999 by the Dow Jones Indexes and SAM Sustainability Group.

The DJSI constitutes an opportunity for both the investor, who can have access to strategic sustainability information of the most sustainable firms in each industrial sector, and the investee who will directly benefit from being included in the index because its access enhances the company's reputation in the eyes of the shareholders and of the overall public (Knoepfel, 2001).

The DJSI identifies and ranks companies according to corporate sustainability performance. In a yearly review, 10% of the leading sustainability companies in each of the 64 industry groups are selected to be part of the DJSI (Knoepfel, 2001). To select these companies a variety of sources is used: questionnaires, documents, public information, stakeholders' relations, media screening, and company interviews. Throughout the year the companies are continuously monitored through cross-checking of information and, eventually, excluded from the index.

More specifically, the criteria of selection consist in a first phase of assessment of environmental and social criteria according to the driving forces and trends, and in a second phase in which industry-specific criteria are identified. Then, for each company, a score between 0% and 100% is given and then a comparison is made between the score of the specific industry and the industrial average score (Knoepfel, 2001).

Figure 2.8 – Sustainability scores of Procter and Gable



Source: Knoepfel, 2011 – Dow Jones Sustainability Group Index: a benchmark for Corporate Social Sustainability

Figure 2.8 shows an example of the sustainability scores of Procter and Gamble. Through this representation, the environmental, social, and economic factors of P&G can be compared with the industrial average and, in this way, an investor can choose the most suitable firm to meet his specific investment's objectives.

The measurement analysis carried out in this section highlighted the importance of impact measurements and focused on some specific impact measurement standards that are currently used in the market.

More specifically, two widely used measurements have been analyzed to show how impact measurements can be used with respect to the goals of the investor and, most importantly, to highlight the importance and usefulness of such measurements.

While it is essential to have a sound measurement system to have a solid understanding of what works and what does not, it is true that there is a wide range of measurement and it can be difficult to compare and choose among them. Nonetheless, «*the tools available are incredibly diverse because they are based on different assumptions, they offer different functionality, they focus on different types of impact and they suit different purposes*» (WBCSD, 2013). Therefore, it is important that an investor identifies the tool that best meets his needs.

2.3 How CSR impacts profitability

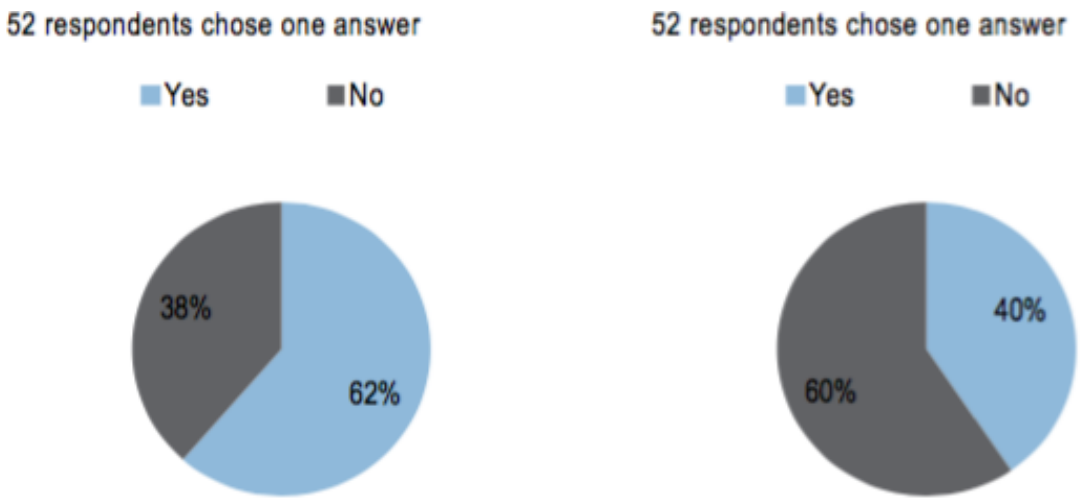
This section focuses on the reasons why investors choose, increasingly more often, impact investments and how this choice positively impacts the profitability of socially responsible enterprises, concluding that impact investment can benefit both the investor and the investee.
Firstly, the expectations of consumers towards impact investment are exposed and then the analysis presents some reasons why corporate social responsibility positively affects purchasing decisions and why being more socially responsible may be profitable for the firm.

It has always been debated whether companies should care about social responsibility. Undoubtedly, we live in a world characterized by a capitalist system and the basic principles of the standard economic theory suggest that the unique goal of firms is to maximize profits. This conception follows the stronghold idea of the economist Adam Smith, who exposed the idea that businesses practices, in the pursuit of profits, will lead to the best allocation of resources, maximizing the social good, thanks to "the invisible hand" in the market.
However, it was later clarified that there are always conditions that impede "the invisible hand" to work properly. They are called market imperfections and some examples are imperfect information, imperfect competitions, barriers to entry and exit, positive and negative externalities, etc.
The fact that firms, while trying to maximize behavior, produce not only financial but also social, human, and environmental effects is an example of externalities, defined as a situation that occurs when the activity of one entity affects the welfare of another in a way that is outside the market mechanism. Investors are increasingly becoming conscious of the fact that firms should be socially responsible and, as was mentioned in the sections above, an increasing number of investors are devoting their money to impact investments committed to the concept of corporate responsibility.
Before citing some data about the attitude of investors toward impact initiatives, the term "corporate social responsibility" (CSR) should be defined.

Corporate social responsibility is a broad concept and, consequently, there is a broad range of definitions. Mohr et al. (2001) suggest that CSR has been defined as including four kinds of responsibilities: economic, legal, ethical and philanthropic. In this sense, CSR is more specifically defined as a company's commitment to minimize or eliminate any harmful behavior and to maximize the long run beneficial impact on society (Mohr et al. 2001). In this sense, a socially responsible consumer would try to avoid buying from companies that harm society and seek to buy from companies that benefit society. Similarly, the impact investor tries to invest more in socially responsible companies.

Saltuk (2011) better defines how many investors can be classified within the definition of impact investors and delineates their expectations about impact investment. Through 52 perception surveys, data about the perception of the impact investment market could be gathered.
In general, the sample of investors was optimistic about the potential growth of the market, thinking that in 10 years the market will constitute on average 5%-10% of investors' portfolios.
The relation between financial return and impact investment was also analyzed. It has been founded that 62% of respondents were eager to sacrifice financial returns for greater impact. At the same time, 60% of respondents don't believe that this trade-off between financial return and impact is necessary. This indicates that the majority of investors are willing to swap return for impact, but don't think it is indispensable.

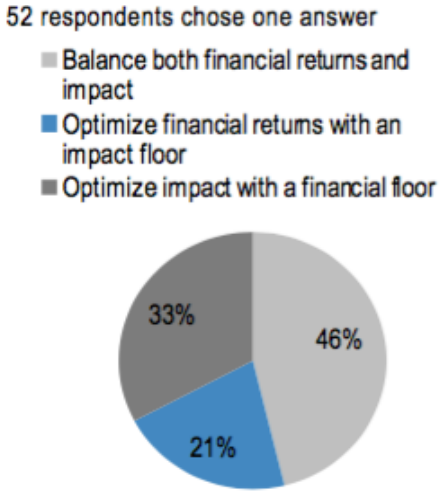
Figure 2.9 – On the left, "as an impact investor would you sacrifice financial returns for greater impact?" On the right, "generally speaking, do you think a trade-off between financial returns and impact is necessary when making impact investments?"



Source: GIIN, J.P. Morgan

Another important finding regards the balance of financial and impact goals in investment decisions. 46% of respondents indicated that they balance both: they try to obtain financial returns while, at the same time, trying to have a positive social and environmental impact.; 33 % optimize the impact with a financial floor and only a 21% optimize financial return with an impact floor.

Figure 2.10 – Investment thesis



Source: GIIN, J.P. Morgan

From the statistical results above, it is clear that the majority of investors will give more value to corporate socially responsible companies. The reasons behind this choice go beyond the traditional economic principles of full selfishness and rational behavior as it will be better explained in the last sections.

Nonetheless, the reasons behind the investors' willingness to invest in socially responsible enterprises can also be explained in a more traditional economic fashion. Indeed, investors are attracted to this kind of investment also because it creates long-term shareholder value, by focusing on future challenges that capture qualitative non-financial information for criteria such as quality of management, corporate governance structures, reputational risks, human capital management, and corporate social responsibility (Knoepfel, 2001).

According to Knoepfel (2001), a sustainable company can make a long-term impact, and thus create value, in:

- Innovation: investing in products and technology that will lead to more efficient use of natural and social resources over the long-run,
- Governance: setting the higher standards of corporate governance, including managing responsibility and corporate cloture,
- Shareholders: meeting shareholder's demand for long-run economic growth and productivity increases,
- Leadership: leading the company and even the industry toward sustainable practices by setting new standards that will lead to long-term superior performance,

- Society: encouraging positive development in communities, enhancing ethical values and protecting the environment.

In this view, impact investing can be attractive for investors because sustainable companies will deliver more predictable results in the long-term. Consequently, investing in CSR companies can positively impact the investor's profitability in the long-run.

According to Mohr et al. (2001) corporations lack a clear understanding of what the public wants from them and how far they are expected to go toward helping the society and the environment.
Table 2.2 below shows a summary of the result from the surveys conducted by Mohr et al. (2001). It can be noticed that 63% of respondents expressed the desire for a high or moderately high level of CSR from companies.
Less than one-tenth of those interviewed showed a negative attitude toward socially responsible firms. Those classified within "qualified positive" expressed a positive attitude together with distrust of the company that derives from worry about a lack of information on the real impact of a purchasing (or investing decision). Accordingly, Mohr et al. also points out that a wide group of people has little knowledge about corporate social responsibility and its ways to measure the real impact, but it is also true that since the time the article was written (2001) the transparency about the definition and the measurements of CSR drastically improved.
Close to one-third of the respondents think that the motives behind CSR are simply self-interested. However, a strong majority thinks that at least some of the motivation is to help others.

Table 2.2 – Views of CSR

	n	%		n	%
Attitude toward business			Attitude toward SR firms		
Extremely positive	12	28	Extremely positive	20	46
Positive	9	21	Positive	12	27
Qualified positive	10	23	Qualified positive	8	18
Qualified negative	6	14	Qualified negative	4	9
Negative	6	14			
			Firm's motives		
Level of CSR desired			Help self	12	29
Very low	3	7	Help self and others	21	51
Low	4	9	Help others and self	5	12
Moderately low	9	21	Help others	3	7
Moderately high	12	27			
High	16	36	Impact of CSR on CB		
			Precontemplation	16	36
			Contemplation	11	25
			Action	8	18
			Maintenance	9	21

Source: Mohr, L.A. et al., 2001 - Do Consumers Expect Companies to be Socially Responsible? The Impact of Corporate Social Responsibility on Buying behavior

Lastly, the researcher asked the respondents if it mattered to them whether the firm acted to help society and the environment or not. The results that stem from these questions are summarized in the right-bottom part of Table 2.2. The study's respondents are divided into four categories:

- PRECONTEMPLATORS: Ethical consideration doesn't affect their purchasing decisions. Basically, they think that their business choices should be based only on economic and rational criteria. Some of them don't think that firms should actively contribute to corporate social responsibility; others think that CSR is important, but they still base their purchasing decisions on the traditional economic criteria: price and quality. Precontemplators constitute 36% of the respondents.
- CONTEMPLATORS: sometimes think about CSR when making economic decisions, but it is still not a major criterion taken into consideration in their decision process.

  Some respondents in this category think that CSR is important but, at the same time, they believe that firms can have relatively little impact on the society and the environment; others are more optimistic and think that CSR is important to have a positive impact, but they have rarely thought about it. The contemplators constitute 25% of the respondents.
- THE ACTION GROUP: are fully aware of CSR and have decided to base their purchases on this criterion. While they actively boycott and recycle, CSR is still not a very important determinant in all their purchasing decisions. Many of them think that they lack sufficient knowledge about the CSR of companies and for this reason, they don't base all their purchasing decisions on it, others are cynical about the real motives behind CSR. The action group constitutes 18% of the respondents.
- MAINTAINERS: commits to use the CSR criteria in much of their decisions. Most people in this group actively seek for CSR companies primarily upon concerns for environmental issues. Others have a more profound reason behind their concern, as they see CSR as a major way to gain some control over businesses, pushing them toward a more sustainable ethic. This group constitutes 21% of the respondents.

From the results above emerges that the majority of the respondents have some concerns about CSR. Indeed, 64% are, at different degrees, affected by CSR when making purchasing decisions, while only 36% of the respondents don't take it into consideration at all. These results challenge the common assumptions, made by standard economic theory, that consumers' purchasing decisions are based solely on a fully rational and selfishness behavior.

Companies can exploit the market advantage that CSR can provide, trying to make their social commitment visible. This can be done through the adoption of the measurement metrics described in the section above. At the same time, the motives behind CSR decisions should be more transparently

expressed by firms to assure consumers that their objectives are not only to increase profitability but also to have a social and environmental impact. Based on this, managers could develop marketing communications that provide details about how their companies have helped to address specific social issuer (Mohr et al. 2001).

From the analysis above the attitude of consumers and investors toward corporate social responsibility and impact investment is clear: even if some skeptical are still present, the majority of consumers have some concern over the impact caused by their purchasing decisions and are willing to devote a share of their investment portfolio to impact investments, having a positive vision of the growth of this market. In this scenario, companies should exploit these investor's concerns and encourage the emergence of investment tools that support CSR.

Chapter 3 – Green bonds

After an analysis of the functioning of bonds in the financial market and an overview of the impact investment in general, we can get deeper into the concept of green bonds.
First of all, a definition of green bonds is given, highlighting their investing context and the link with the broader concept of impact investment; afterward, their benefits and potentials are outlined, evaluating the companies' benefits from issuing this type of bonds, the shareholder's wealth implications, the investor's preferences and advantages, and the environmental effectiveness.

3.1 An introduction to Green Bonds

3.1.1 Definition

The Paris Agreement on climate change adopted by 196 parties in December 2015 committed to limit the global temperature to 1.5/2.0 C° and to implement a set of targets for the full decarbonization of the global economy, by the end of the 21st century (Shishlov et al., 2016).
In this scenario, a large share of the global financial system needs to be mobilized to prevent the ultimate climatic breakdown (Gianfrate, 2018). Indeed, the financial market will be essential to support and accelerate investments in low carbon activities and technologies to help to reach the SDGs which concern the environment. IPCC (2018) estimates that these financial flows should be about $2.4 trillion between 2016 and 2035 to be able to meet expansionary global needs and to finance the cost of adjustments to the increasing global warming.
With banks having restricting lending capacities and with public budget under strain in many countries, private sector sources of capital need to be engaged. As was mentioned in Chapter 1, bonds allow the market to raise a large amount of money to finance projects with long-term expected revenues.

Following this reasoning, green bonds are considered among the key instruments to activate private financial resources toward the progressive decarbonization of the global economy (Gianfrate, 2018).
A green bond is defined as «*a debt security that is issued to raise capital specifically to support climate-related or environmental projects*» (The World Bank, 2015 pp. 23), such as renewable energy, green building or resource conservation.
Green bonds are a special type of impact investing because, if the latter is defined as «*a financial instrument that aims to generate social and environmental impact alongside a financial return*», the former is a type of bond that contributes to both environmental and financial performance (Flammer, 2018).

For example, impact funds can hold green bonds to enhance their impact metrics, which measure their investment influence on the environment and society (Tang and Zhang, 2018)

The main difference between a green bond and a "plain vanilla" bond is the specific use of the funds raised to support specific projects (The World Bank, 2015). This characteristic implies greater attention on how the proceedings of the bond are used, like any other type of impact investing. Therefore, a green bond is slightly more complex than a traditional bond because it includes «*a disclosure of the asset it will finance before issuance, tracking and reporting on the use of the proceeds post-issuance*» (Shishlov et al., 2016).

According to The World Bank (2015), it is generally accepted that green bonds are priced very closely to traditional bonds, as the investor is not willing to give up some returns for greater environmental impact. However, because of increasing demand and preference for green bonds, investors in green bonds should be able to sell them at higher prices than traditional bonds because of their rarity. In general, the pricing compared to traditional bonds depends on the current demand and supply, which vary across time.

We can mainly distinguish between two main types of green bonds, depending on the issuer:

- Corporate green bonds: used to finance the issuer's project. In this case, the project eligibility criteria are clearly specified (Tang and Zhang, 2018).
- Financial institutions' green bonds: issued by commercial banks, investment, insurance companies, etc. They are used to make green loans and to invest in other firms that finance green projects. In this case, only general criteria are specified (Tang and Zhang, 2018).

3.1.2 The Green Bonds Principles

Following the exponential market growth of green bonds, a group of banks developed the Green Bond Principles (GBP) in early 2014, intended to bring greater accuracy to the definitions and procedures associated with green bonds (The World Bank, 2015).

Afterward, subsequent editions were published to enhance the principles of transparency, disclosure, and integrity, taking into consideration the latest development of the green bond market.

The GBPs have four main components:

1. Use of proceeds: the issuer should describe the proceeds of the green bond, which should provide clear environmental benefits. The GBP «*recognizes several broad categories of eligibility for Green Projects, which contribute to environmental objectives, such as climate change mitigation, climate change, adaptation, natural resource conservation, biodiversity conservation, pollution prevention and control*» (ICMA, 2018)

2. Process for project evaluation and selection: issuers should communicate to the investor (ICMA, 2018):
    - The environmental sustainability objectives;
    - The process by which the issuer determines how the project is eligible within the categories described above;
    - The related eligibility criteria.
3. Management of proceeds: proceeds should conduct a formal internal process to track and manage green bond proceeds.
4. Reporting: the issuer should communicate the environmental benefits attained through the green bond to the investor on a timely basis (usually annually).
   Transparency is a key value in this phase, and the GBPs recommend the use of qualitative performance indicators and quantitative performance measures (ICMA, 2018).

External review: it is recommended by the GBPs that the issuer appoints an external review provider to confirm the alignment of their bond with the four main components described above.
There can be several types of external reviewers, who can be grouped in the following categories:

a) Second opinion: an independent institution with environmental expertise may issue a second opinion which can include an assessment and review of the issuer's objectives, strategy, policy and an evaluation of the environmental features of the project financed from the issue of the green bond (ICMA, 2018).
b) Verification: an issuer can obtain verification regarding a set of criteria by an independent authority. It may complement their criteria adjustments with internal or external standards or claims made by the issuer (ICMA, 2018).
c) Certification: this includes the certification of the issued green bonds with some external green standards.
d) Green bond scoring/rating.

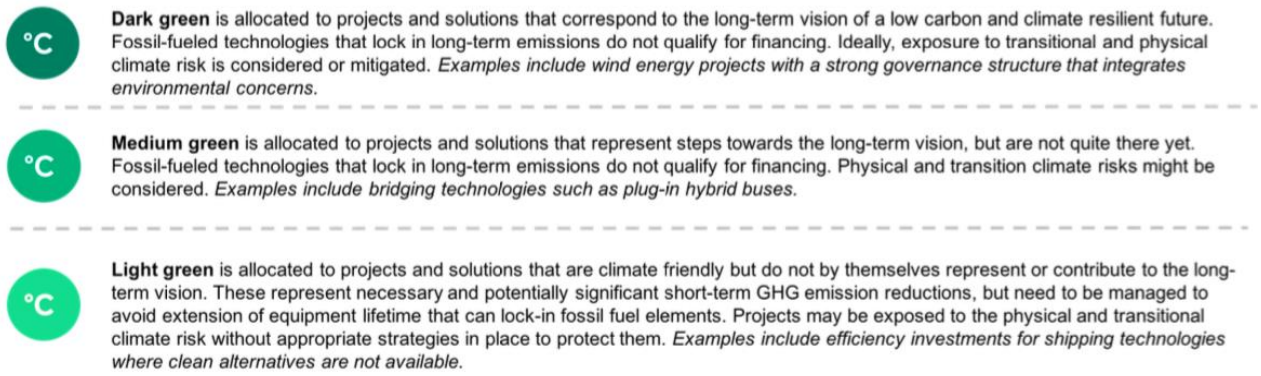
Usually, issuers delineate what is green with credibility by defining categories for environmental projects they plan to support with green bonds and report back to investors depending on their business model and the context (The World Bank, 2015). Moreover, they often rely on external reviews supporting transparency in the definitions and procedures. Indeed, investors can use the information contained in the external reviews to have the security that the use of proceeds is in line with their investment objectives.

To better understand how the GBP works, an example of how an external reviewer provides second opinions on green bonds is considered.

The Center for International Climate Research of Oslo (CICERO) has been the first issuer of a second opinion and it is now one of the main external reviewers of green bonds. Over the past ten years, CICERO has completed over 120 second opinions for 100 issuers all over the world (Alfsen et al., 2018).

CICERO has introduced the Shades of Green methodology in 2015 and it is still using it to help investors to understand their investment implications and potential impact of green bonds and «*encourage a race to the top*» (Alfsen et al., 2018). Figure 3.1 below shows the characteristics associated with each shade of green.

Figure 3.1 – CICERO Shades of Green



Source: Alfsen et al., 2018 – CICERO Milestones 2018, a practioner's perspective on the green bond market

According to Alfsen et al. (2018), investments in all shades of green are required to successfully implement the ambitions of the Paris Agreement.

The presence of the Green Bond Principles, together with additional external reviews, comply with the needs of specific performance metrics to measure the impact of this kind of investment, as was detailed in the previous chapter. Therefore, a green bond investor has a number of measures to demonstrate the real impact of its bond: he can use the measurements described in Chapter 2, that are general for all kinds of impact investments, together with the specific tools used in the green bond market, contributing to enhancing transparency and the ability to comply with the environmental objectives.

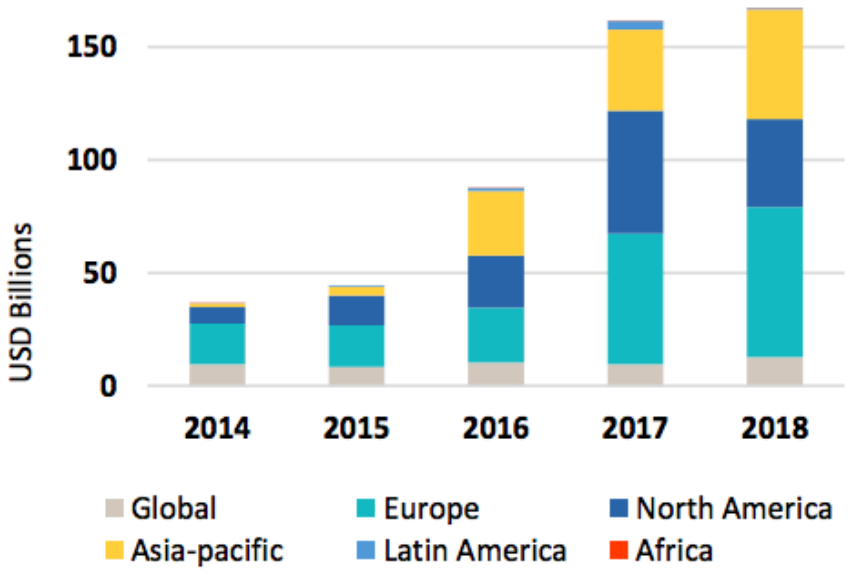
3.1.3 Latest market developments

The first climate awareness bond was issued by the European Investment Bank in 2007, for a total amount of 600 million. Afterward, the World Bank started to issue "eco notes" between 2007 and 2008 (Reichelt, 2010). The rapid success of these investments prooved the investor's interest in climate-related initiatives.

In November 2008, responding to investors' requests, the World Bank issued the first green bonds of the amount of $440 million: «*a fixed income product dedicated to supporting climate change and projects in developing countries*» (Reichelt, 2010). The first green bonds generated interest worldwide, even attracting some new investors who didn't purchase securities form the World Bank before and raising awareness among investors about how to raise private funds to take actions on climate change. This kind of bonds allowed the investors to take advantage of the World Bank's rigorous process in assessing the impact and to scrutinize the use of the proceeds. The development of the bond market in the last years demonstrates the potentials of this kind of financial instrument, as the market has kept growing exponentially, becoming "more sophisticated" and this evolution is sometimes referred to "green bond boom" (Gianfrate, 2018).

Figure 3.2 below shows the evolution by numbers. The market has grown from about $4 billion in 2010 to over $37 billion in 2014 (The World Bank, 2015). From then, the total amount issued continued to increase, reaching $167.3 billion in 2018, from an amount of $162.1 billion in 2017 (Climate Bond Initiative, 2019). According to Flammer (2018), this trend is likely to continue in the future because of the growing interest in sustainability and impact investing.

Figure 3.2 – The evolution of the bond market from 2014 to 2018



Source: Climate Bond Initiative, 2019 – 2018 Green Bond Market summary

Another important thing to notice from the above graph is the relative share of the green bond issuance by world's regions. Europe has always been the leading countries for the issuance of bonds, with an increase of 15% from 2017. The Asia-pacific regions reached the highest level of increase from the previous year: 35% over 2017 to reach $48.5 billion in 2018 and had the second largest 2018 volume after Europe (Filkova et al., 2019).

Figure 3.3 below gives a deeper insight into the issuance for individual countries. As can be noticed, the first issuer is the USA, followed by China, France, Germany, and the Netherlands.

Figure 3.3 – Top 5 in 2018: Green Bond issuance rankings

Source: Filkova et al., 2019 – Green Bonds: the state of the market 2018

3.2 The Green Advantage: Benefits and Potentials

While the green bond market has drastically increased in the last years, little research has been done on the actual benefits and potentials for the actors involved, apart from the "greeness". However, considering climate as part of the investment process has likely short- and long-term financial implications and longer-term consequences for the world (Reichelt, 2010). In the following section, it will be demonstrated through some analysis carried out so far that green bonds have a real impact

and produce benefits for all the actors involved: the issuer, the shareholders, the investor, and the planet.

3.2.1 Benefits for the issuer

From the perspective of the issuer, the money raised from the green bonds can be raised also from traditional bonds and since most of green bonds share similar characteristics with regular bonds, one could argue that they offer limited benefits to the issuer (The World Bank, 2015). In this section, it will be demonstrated how green bonds positively affect the issuer.

Flammer (2018) examined how green bonds issuance affects firm operating performance and long-term value, analyzing its effects on:

- The financial performance: measured through Tobin's Q (to measure the firm value) and the ROA (to measure profitability);
- The environmental performance: measured by the ASSET4 environmental rating and by emissions;
- The green innovation: measured by the ratio of the number of green patents divided by the total number of patents filed by the company within a year;
- The long-term orientation: measured by the LT-Index which analyzes the use of long-term words in the companies' annual reports;
- The company's ownership structure: measured by the percentage of shares owned by institutional owners, by long-term and green investors.

The different variables are analyzed in the years following the bond issuance to examine eventual changes.

The two tables in Figure 3.4 below summarize the results obtained from the analysis.

The columns (1), (2), (3), (4) of the first table show that the firm value increases significantly after the issuance of the green bond; at the same time, also the firm's profitability (measured by ROA) increases in the long-run. These findings show how the granting of green bonds positively contribute to the value creation and overall financial performance of the issuer.

The columns (5), (6), (7), (8) show how green bonds' issuance drastically increase the environmental performance of the firm: the environmental rating goes up by 7.3% and the emission decreases by 27.7%.

The columns (9) and (10) show an increase in green patenting in the long run by 3.4%.

Figure 3.4 – Implications of green bond issuance for the firm outcomes – financial performance, environmental performance, green innovation, long-term orientation, and ownership

	Financial performance				Environmental performance				Green innovation	
	Tobin's Q		ROA		Environment rating		CO_2 emissions / assets		Green patents / total patents	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Green bond	0.028**		0.005**		6.132**		-16.977**		0.021	
	(0.012)		(0.002)		(2.619)		(7.130)		(0.016)	
Green bond (pre-issue year)		0.003		0.001		0.448		1.228		0.002
		(0.013)		(0.003)		(2.722)		(7.986)		(0.016)
Green bond (short-term, 1 year)		0.026**		0.002		4.407		-9.168		0.012
		(0.013)		(0.003)		(2.885)		(7.411)		(0.016)
Green bond (long-term, 2+ years)		0.029**		0.006**		7.283**		-21.585***		0.034*
		(0.014)		(0.003)		(2.988)		(8.071)		(0.019)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	971	971	1,005	1,005	795	795	600	600	416	416
R-squared	0.89	0.89	0.86	0.86	0.88	0.88	0.92	0.92	0.66	0.66

	Long-term orientation		Ownership					
	LT-index		Institutional ownership		Ownership by LT investors		Ownership by green investors	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Green bond	0.039**		0.010		0.015*		0.030**	
	(0.016)		(0.010)		(0.008)		(0.012)	
Green bond (pre-issue year)		0.014		0.003		0.001		0.005
		(0.017)		(0.009)		(0.007)		(0.013)
Green bond (short-term, 1 year)		0.032*		0.010		0.007		0.017
		(0.017)		(0.009)		(0.008)		(0.013)
Green bond (long-term, 2+ years)		0.044**		0.012		0.023**		0.041**
		(0.019)		(0.010)		(0.011)		(0.015)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	382	382	316	316	316	316	316	316
R-squared	0.84	0.84	0.90	0.90	0.57	0.57	0.72	0.72

Source: Flammer C., 2018 – Corporate Green Bonds

Columns (1) and (2) of the second table show the results for the long-term orientation, displaying an increase of 3.9 percentage points. This is confirmed by the analysis carried out by Shishlov et al. (2016): according to their findings, the issue of green bonds can expand and improve the relationship with the investors. In this view, green bonds permit a company to diversify the investor base and enable issuers to gain visibility.

This expanded relationship with the investor has a long-term benefit, and while this benefit may not necessarily materialize in the short-term, it can become particularly useful when market conditions crumble or when firms have restricted ability to borrow (Shishlov et al., 2016).
Finally, columns (3), (4), (5), (6), (7), (8) show that institutional ownership increases slightly but not significantly while long- term and green investors increase significantly. These results indicate that the green bonds issuance attracts investors that incorporate climate risk in their investment decisions and that are more long-term oriented.
According to the results of the study carried out by Flammer (2018), it is confirmed that green bonds are beneficial for the issuer both in terms of value enhancing and long-term profitability.

The benefits and potentials for the issuer are also highlighted by the World Bank (2015). According to the latter, green bonds benefit the issuer because of:

- Investor diversification: in particular by attracting investors focused on sustainable and responsible investment. This is also demonstrated by the analysis carried out above, for which the number of long-term and environmental prone investors increased.
- Raising awareness for the issuer environmental activities, opening an intense dialogue with investors about projects that help address climate change. For example, state and local governments are using green bonds as a tool to reach constituencies physically located close to the green projects they indent to support, improving the community's sense of connection and social responsibility (The World Bank, 2015).

Another important study that confirms the benefits for the issuer of green bonds is the one carried out by Gianfrate (2019). His findings support the view that green bonds can have a central role in "greening" the economy, without financial penalizing the issuer.
Gianfrate (2019) has studied 121 European green bonds issued between 2013 and 2017 and compared them with conventional bonds as similar as possible to the corresponding green bonds.
The results show that green bonds are actually more convenient than conventional bonds because of the lower returns that the issuer has to pay to the investors. The reason for this lower return is the increasing demand for climate sensible investment tools. According to Tang and Zhang (2018), impact funds have a 14.1% higher probability of attracting investment and this growing market demand will translate in a lower cost of capital (lower yield) to be paid by issuers in the primary market. Accordingly, the additional revenue for the issuer exceeds the costs for the additional procedures that characterize green bonds, such as the presence of external reviews and the additional procedures to disclose information about the use of proceeds.

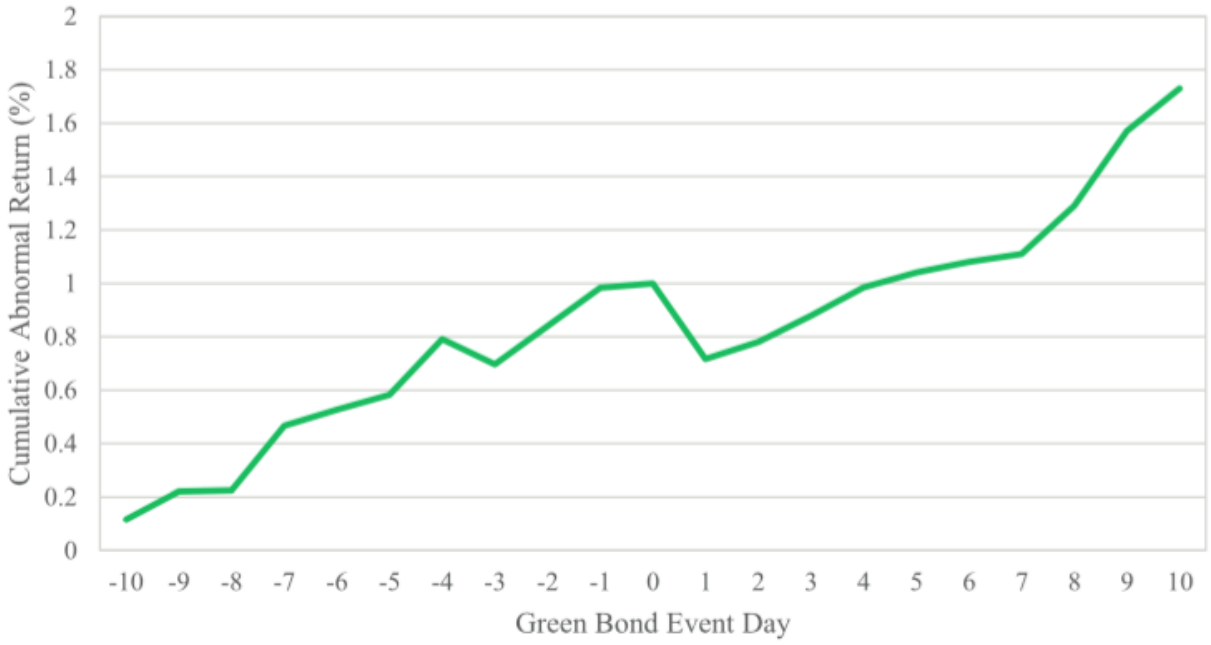
Moreover, it is likely that in the following years there will be regulations to incentivize the issue of impact investment securities, and consequently green bonds not only can help the issuer to achieve better financial results and the global economy to become more sustainable, but they can also help investors to comply with the current and future regulation (Gianfrate, 2019).

Shishlov et al. (2016) include in the benefits of green bonds from the issuer's perspective also the capacity to be able to better communicate its sustainability strategy. Firms and companies are increasingly showing commitments to sustainable business practices and the use of green bonds can be a valuable tool to communicate their strategy and enhance their reputation.
For example, in 2016 Apple issued its first $1.5 billion green bonds, even if it was able to easily raise the same amount on capital markets. Apple's choice lay on the intention to communicate its commitments to a sustainable strategy and to reinforce its name (Shishlov et al., 2016).
An additional benefit outlined by Shishlov et al. (2016) is the building of stronger sustainability awareness within the organization that reinforces the relationship between the financial and sustainability department, enhancing the internal stability of the company. This is particularly important, given that today financial departments seem to be completely dissociated from the principles of social and environmental sustainability.

3.2.2 Benefits for the shareholders

After an examination of the beneficial effects of green bonds on the issuer, we will now analyze how the stock market responds to the issuance of green bonds and how the shareholders, in general, will be affected, through shares prices.
Tang D.Y. and Zhang Y. (2018) carried out a study about how stock prices from different companies respond after the announcement of the new green bond issuance. From the dataset emerges that stock prices positively respond to the green bond issuance announcement. In particular, there is a 1.8% cumulative abnormal return for the 21- day event window around the green bond issuance announcement as Figure 3.5 illustrates.

Figure 3.5 – Stock market reaction of green bond issuance announcement



Source: Tang D.Y, Zhang Y. (2018) – Do shareholders benefit from green bond issuance?

Moreover, the positive abnormal returns are higher for the first-time issuer, but still present in secondary markets.

There are three sources for this increase in stock price return (Tang and Zhang, 2018):

- The financing cost channel: internalizing environmental externalities will attract investors with a green mandate and socially responsible funds, who will push up the bond prices and lower the cost of capital for the firm.
- The investor attention channel: when firms announce green bond issuance, increasing media exposure can attract attention and visibility, leading to an increase in the demand for shares and a larger investor base. Indeed, labeling green is a signal of the sustainability of the firm's projects.
- The firm fundamental channel: green bonds demonstrate the firm's commitment to sustainability and investing in such projects can be value enhancing in the long-run. Green bond issuance contains more information about investment opportunities and thus reduces information asymmetries. As a result, investors will benefit from this additional information and the stock market will react positively to the announcement.

  Moreover, the investors will tend to hold the stock rather than to realize the gain in the short-run because they believe that the green bond issuance will increase the long-term value of the firm.

This analysis suggests that green bonds are value-enhancing: the stock market expects this increase in value and responds accordingly by increasing the issuer's stock prices significantly around the announcement of green bond issuance, implying that existing shareholders benefit after the issuance of green bonds.

3.2.3 Benefits for the investor

As has been discussed in Chapter 2, the majority of consumers and investors takes into consideration the impact of their purchasing decisions and has a positive attitude toward impact investment.
Afterward, it has been stated that green bonds' demand grew significantly after the first issuance of climate awareness bonds and, in response to investors' interests, climate-related investment opportunities have prospered. The reasons why investors incorporate environmental, social, and governance (ESGs) criteria into their investment decisions can be explained in two main ways, that are interrelated and compensate each other.

Behavioral economics and impact investing decisions: First of all, green bonds' interest challenges the traditional economic theory, for which purchasing and investment's decisions are based solely on rational and selfishness behavior.
Increasing green bond's demand can be partly explained by behavioral economics, which identifies anomalies and shortfalls in neo-classical economics and thus explains why investors and consumers sometimes disregard rational choice and choose products and investments that are not utility maximizer.
Standard economic theory assumes a standard wealth maximization problem, which fails to explain some of the reasons behind the interest in impact investing. Indeed, if all economic agents were fully rational and selfishness, the fact that 62% of respondents in the analysis carried out in section 2.3 stated that they would be willing to sacrifice some financial return for greater impact remains unsolved. However, the human being is neither a pure economic agent nor a pure social creature. This concept is linked with the broader subject of behavioral economics, which proposes a solution by expanding the individual's utility function to include additional factors. Indeed, behavioral economics links standard economic theory with psychology and sociology, explaining how human characteristics such as altruism, irrationality, and ethics can explain some market behaviors.
Levitt and List (2007) developed a new utility function that takes in consideration both wealth and moral arguments:

$$U_i\,(a,v,n,s)=M_i(a,v,n,s) + W_i(a,v)$$

"*W"* represents the wealth, which is influenced by "*a"*: the choice regarding a single action, and "*v*": the monetary value of the game.
In addition, the utility also depends on "*M"* which represents the nonpecuniary moral cost of benefit, which depends on "*a*", "*v"* that in this case measures the financial externality that an action imposes on others, "*n*", which is the set of social norms and rules in a society and "*s"*, which is the nature and extent of how an individual is scrutinized (Levitt and List, 2007).
According to this model, the environmental concern of individuals can be considered as a part of the nonpecuniary moral benefit and this explains why investors may have a preference for impact investments over equivalent types of investments.
Therefore, one of the benefits of investing in green bonds is the additional utility that the investor experiences, through the channel of ethics and morality.

Financial and social benefits for the investor: In addition to the increase in the nonpecuniary moral benefit to personal utility, investments in green bonds can also generate more concrete financial and social benefits.
According to Shishlov et al. (2016), given that green bonds have the same characteristics of traditional bonds plus enhanced information, investors could capture these additional data without transaction costs. The increased knowledge regarding the use of the proceeds constitutes an «*additional value of the investment, that can be used to better inform investment strategies and risk assessment, better understand the issuer's strategies and to enhance the communication between the issuer and the investor*» (Shishlov et al. 2016).
Moreover, institutional investors that have a long-term outlook may be willing to invest in green bonds to offset the long-term climate-related risk of their investment portfolio.
At the same time, some investors may engage in this type of investment to respond to political pressure from shareholders and to enhance their reputation (Shishlov et al. 2016).
Finally, an additional benefit can be the possibility to diversify the investment portfolio. Indeed, socially responsible investors usually apply screening methods to invest only in sufficiently sustainable companies. However, one of the drawbacks of this strategy is that it can result in a restricted investor base since only a limited number of companies meet the screening standards.
A way to solve this limitation can be to invest in green bonds to finance a project that is aligned with the screening criteria, even if it is issued by a company that would normally not pass their screening procedure (Shishlov et al., 2016).

3.2.4 Benefits for the planet

It has been argued that sometimes green bonds fail to deliver their promise, often referring to the concept of "greenwashing"- «*the practice of making unsubstantiated or misleading claims about the company's environmental commitment*» (Flammer, 2018). Following this assertion, green bonds can fail to deliver the expected outcome and cannot make a real impact.

However, it has been demonstrated in the analysis carried out by Flammer (2018) that, following the green bonds issuance, there is a great improvement in environmental performance. Specifically, there is an increase in the company's environmental score, measured by the ASSET4, a decrease in CO2 emissions and an increase in green patents. These results are inconsistent with the greenwashing motive.

Moreover, according to Shishlov et al. (2016) green bonds can «*bridge knowledge and capacity gaps on environmental, social and governance issues (ESG*) » and thus overcome some of the barriers related to green investments, while, at the same time, green bonds can better link environmental project with private funds, thus enhancing the number of sustainable initiatives.

Others, as cited by Shishlov et al. (2016), expect that mobilization of the financial sector on environmental issues can trigger a "pulling" effect, so that an increase in supply corresponds to an increase in demand.

All these findings suggest that green bonds have a real impact on the environment, facilitating a shift to low-carbon emissions and projects to reduce pollution and to adapt to future climate changes.

Conclusions

This thesis analyzed the reasons behind the increasing interest in investment tools that balance simultaneously the pursuit of financial return and social and environmental impacts, described how impact investment and, more specifically, green bonds work and highlighted the potentials and advantages for all the agents involved.

Specifically, Chapter 1 provided a broad overview of the bond market, defining its elements, its latest developments, the different types of existing bonds and in which circumstances investing in bonds can enhance investors' financial portfolio.

Chapter 2 introduces the concept of impact investment, pointing out its importance, historical roots and current developments of the market. The results of this section indicate that the majority of investors are optimistic about the long-term prospects of this investing industry, signaling an increasing awareness and confidence that private funds can be oriented toward sustainable innovation.

As the market developed, the importance of transparency and comparability of impact investments has become essential: section 2.2 exposes different ways to measure impact, showing how specific standardized metrics can be used by investors to achieve the desired goals.

Afterward, section 2.3 reveals the consumers and investors' expectations about increasing corporate social responsibility, concluding that the majority of consumers and investors has a positive attitude toward socially responsible companies and value CSR as important in their investment and purchasing decisions, both because of ethical consideration and higher expected firm's long-term value. Indeed, impact investors will lend to sustainable firms not for exceptional performance, which is always momentary, but for above-average growth (Knoepfel, 2001).

These results show one of the advantages of impact investment, as issuers could exploit this interest to increase profitability. According to Mohr et al. (2001), the role of companies should be that of «*profitably exploiting this commitment and interest, trying to support the positive attitude toward responsible firms while providing arguments against some of the consumers' fears and pull them in the direction of CSR*» (Mohr et al. 2001).

Finally, Chapter 3 present a more detailed overview of green bonds, which are one type of impact investing.

The first section of the chapter defines green bonds, introducing the green bond principles, which are used as a benchmark tool to define the procedures associated with green bonds with more accuracy.

Moreover, it has been shown that green bond market has grown steadily in the last years, consistently with the growth in the impact investments market.
Finally, section 3.2 illustrates the green advantages for the issuer, the shareholders, the investors, and the planet.
Four leading articles summarize the benefits of the issuer as: increasing financial performance, increasing relationship between the issuer and investor, gains in visibility, increase in the investor base, investor diversification, growing internal stability, enhanced reputation…
At the same time, shareholders benefit from the issuance of green bonds through three main channels: financing costs, investors' attention and firm fundamentals, which create abnormal positive returns around the bond issuance announcement.
Thereafter, it is explained why investors are eventually attracted from this type of investment, through the principles of behavioral economics. These findings complement the results of section 2.3.
Investors benefit from green bonds not only because of an increase in their utility through the moral component but also because of more concrete advantages: increased amount of information, portfolio diversification, reduction of the climate-risk in their investment portfolio, enhanced reputation…
Last but not least, the final part of this thesis concludes that green bonds have a real positive impact on the environment and thus, can be a valuable financial tool to contribute to the sustainable productivity transformation.

While the goal of this thesis is that all investors understand the importance of including climate investments in their portfolio, it's worth pointing out that investing in green bonds can represent a necessary but not sufficient solution to the challenges of climate change, since other financial instruments may be more suitable, especially in countries with less-developed capital markets (The World Bank, 2015).
Moreover, green bonds should not become a substitute for a more incisive political climate risk planning that has to start and be implemented by political institutions.
The role of institutions is essential to give the right incentives and regulations to enhance the growth of the impact investing market and to educate people about CSR issues. According to Alfsen et al. (2018), «*policy should motivate a race to the top, not burden issuers with unnecessary regulations and requirements that could discourage market and must integrate incentives for the financial sector with broader climate policies*». For example, the governments of Hong Kong and Singapore provide subsidies to issuers, to encourage firms to issue green bonds (Tang and Zhang, 2018).

In conclusion, even if we are on the right path, the full mobilization of capital to finance the provision of the radical solutions that the world needs is still far away; nevertheless, all the results summarized above demonstrate that, although funds generated from green bonds are still a niche market compared to the expected capital needed to finance climate change, it constitutes a valuable investment tool, whose potentials and benefits could represent a considerable contribution to solve the environmental threat that our world is already facing and that will increasingly continue to face in the near future.
All the economic actors involved need to recognize that we are all part of something potentially more powerful than what we can represent alone. Everyone must support impact investments and provide the right incentives to push it in the right direction, to avoid the risk that it will become just a marketing tool and to transform its potentials in a powerful force.

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