GREEN BONDS: INCORPORE ENVIRONMENTAL RISKS INTO THE FINANCIAL MARKET

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Abstract

This work aims to give an overview of the recent developments of the climate related risks and its potential impact on the financial market. It highlights the lasts documents and agreements that have been released by the main international institutions, such as United Nations, World Economy Forum, International Capital Market Association, Sustainable Banking Network, Bank for International Settlements along with others regarding both climate change and the financial market.

Those institutions have also released some guidelines for the governments and central banks around the world to encourage the development of the Green Bonds market. Along with it there are a series of reports showing the development, in financial terms, throughout the world and its consistent growth. The balance between environmental and financial results is a key aspect for this method of greening the economy.

Key Words: Green Bonds, Financial Market, Risk, Paris Agreement, United Nations

GREEN BONDS: INTEGRAR RISCOS AMBIENTAIS NO MERCADO FINANCEIRO

Resumo
Este trabalho tem como objetivo fornecer uma visão geral dos desenvolvimentos recentes dos riscos relacionados com o clima e o seu potencial impacto no mercado financeiro. Destaca os últimos documentos e acordos que foram divulgados pelas principais instituições internacionais, como Nações Unidas, Fórum Mundial de Economia, Associação Internacional do Mercado de Capitais, Rede Bancária Sustentável, Banco de Compensações Internacionais e outros relacionados a mudanças climáticas e o mercado financeiro.

Essas instituições também divulgaram algumas diretrizes para os governos e bancos centrais de todo o mundo, a fim de incentivar o desenvolvimento do mercado de títulos verdes. Junto com ele, há uma série de relatórios mostrando o desenvolvimento, em termos financeiros, em todo o mundo e o seu crescimento consistente. O equilíbrio entre resultados ambientais e financeiros é um aspeto fundamental para esse método de tornar a economia mais ecológica.

Palavras-chave: Títulos Verdes, Mercado Financeiro, Risco, Acordo de Paris, Nações Unidas

Introduction

The climate change has been taking the center of the attention in the recent years due to the emergency of the issue and the catastrophic impacts across the world. Several important institutions have been releasing documents to alert the countries and the society to face the problem. The United Nations has released the Paris Agreement in 2015, The Bank for International Settlements has released in January 2020 a document called The Green Swan to address the main challenges for the central banks about the issue and its possible consequences. The World Economic Forum has also released its traditional Global Risks Report of 2020, which corroborates the later warnings about the urgency to the climate change effects in the global economy.

Financial sector as the rest of the world is being and will be affected by the effects of the climate change. This work discuss some instruments and tools that can be used to deal with this emergency regarding the financial assets and how to incorporate new methods aiming the reduction of the emission of greenhouse gases, also known as Green Banking.

One of the instruments is the Green Bonds that helps to certify that the bonds comply with the new requirements to greening the sector. As it is a new tool, adjustments will have to be made in the future. The Sustainable Banking Network has released a document to guide the financial institutions to issue and incorporate the green bonds in the market.

To illustrate this new trend, some cases from several countries are explored in terms of volume and evolution of the Green Bonds and its developments.

1. Climate Change Emergency in the Financial Market

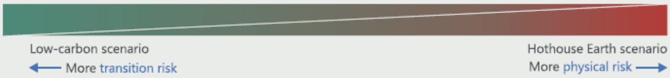
United Nations Paris Agreement is the most important document to guide the others institutions towards a greener economy. The main goal of the agreement is “Holding the increase in the global average temperature to well below 2ºC above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5ºC above pre-industrial levels…” United Nations (2015). Another goal of the agreement that regarding the financial market is “Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.”. United Nations (2015).

Following these drivers, the BIS released The Green Swan describes the emergency of the climate change and how it affects the financial market stability. Besides, most relevant is that the document enables Central Banks around the world with a clear overview of the situation and how to drive each country to overcome this challenge. The main worry is the possibility of a systemic financial crisis lead by climate-related event. The document uses a concept known as black swan. “Black swan events have three characteristics: (i) they are unexpected and rare, thereby lying outside the realm of regular expectations; (ii) their impacts are wide-ranging or extreme; (iii) they can only be explained after the fact.”(Silva, Bolton & Despres, 2020: p 3).The green swan would be, then, a black swan climate-related. A characteristic of those events is the risk management approach, which is based on historical data and for such an event it is not enough.

There are two sources of risk that can affect the financial market: Physical risks and Transitions risks. Physical risks are described by Patrick Bolton, Morgan Despres, Luiz Awazu Pereira da Silva, Frédéric Samama, Romain Svartzman as “those risks that arise from the interaction of climate-related hazards […] with the vulnerability of exposure to human and natural systems” (Batten et al (2016)). Transition risks are “associated with the uncertain financial impacts that could result from a rapid low-carbon transition, including policy changes, reputational impacts, technological breakthroughs or limitations, and shifts in market preferences and social norms.” (Silva, Bolton & Despres, 2020: p 18).

There is a necessary balance when it comes to green the financial system due to the transitional risks shock with the physical risks. The

Graph 1 shows that contradiction. The faster you green the economy the higher the transitional risks and the slower you implement it the higher the physical risks.



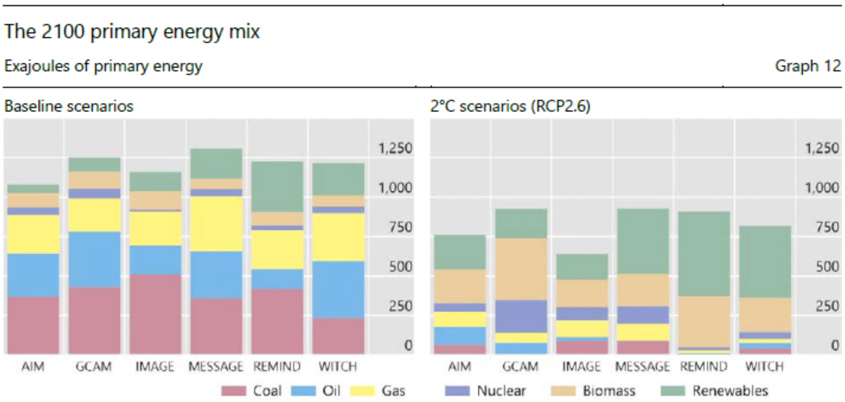
Scenario	Rapid Transition	Two-degree	Business-as-intended	Business-as-usual
Corrective transition response	Very strong	Strong	Substantial	Limited
Change in temperature, 2100 vs pre-industrial era	1.5°C	2°C	3°C	4°C

Graph 1: Transitional x Physical Risks
Source: Silva, Bolton & Despres (2020)

An aspect of the transitional risks worth to be highlighted, it is the stranded assets concept. The idea is that a fast transition to a greener economy would make the fossil fuels assets to devaluate to rapid and it could cause a systemic financial crisis. Patrick Bolton, Morgan Despres, Luiz Awazu Pereira da Silva, Frédéric Samama, Romain Svartzman mentions this idea as “Limiting global warming to less than 1.5°C or 2°C requires keeping a large proportion of existing fossil fuel reserves in the ground.

As mentioned earlier, the measurement risk approach based on historical data does not support the requirements for green swans. Another approach to measure risk is necessary: “it is critical for central banks, regulators and supervisors to assess the extent to which these forward-looking, scenario-based methodologies can ensure that the financial system is resilient to climate-related risks and green swan events.” (Silva, Bolton & Despres, 2020: p 22).

There different models and approaches to design those forward-looking scenarios and they will not be detailed in this text. However, it is relevant to mention that to reach the rise of 2ºC in the global temperature requires improvements both in the technology and the mix of the sources of energy. The primary energy necessary to feed the world is expected to be lower due the efficiency improvement. The graph below show a scenario for 2100 and the baseline scenario from different models. It can be seen that a significant reduction in the primary energy and a rise in the share by renewable energy.



Graph 2: Forward-looking scenario from mix energy 2100
Source: Silva, Bolton & Despres (2020)

The World Economic Forum 2020 research on risk corroborates the worries about climate change and its impacts. There are two groups of respondents, the Global Shapers and the Multistakeholders. The former is a network of young people driving dialogue, action and change. The latter is a community of stakeholders linked with the World Economic Forum. The general perception can be seen in the two tables below. Is illustrates the development of the risk perception along the last years.

Those tables shows a significant change in the risk perception since 2012, when the top 5 risks where related with Societal and Economical risks. From 2014 the environmental risks have started to show up more expressively concerning about Extreme Weather, Water crises and Climate action failure. From 2017 the environmental is already the majority of the worries divided with technological and geopolitical concerns. In 2020, 8 of 10 topics are environmental.

The tables also illustrates a difference between a risk perception in terms of likelihood and impact. It can be observed that in terms of likelihood, the risks are even higher and it requires action from the world community.

	2012	2013	2014	2015	2016	2017	2018	2019	2020
1st	Income disparity	Income disparity	Income disparity	Interstate conflict	Involuntary migration	Extreme weather	Extreme weather	Extreme weather	Extreme weather
2nd	Fiscal imbalances	Fiscal imbalances	Extreme weather	Extreme weather	Extreme weather	Involuntary migration	Natural disasters	Climate action failure	Climate action failure
3rd	Greenhouse gas emissions	Greenhouse gas emissions	Unemployment	Failure of national governance	Climate action failure	Natural disasters	Cyberattacks	Natural disasters	Natural disasters
4th	Cyberattacks	Water crises	Climate action failure	State collapse or crisis	Interstate conflict	Terrorist attacks	Data fraud or theft	Data fraud or theft	Biodiversity loss
5th	Water crises	Population ageing	Cyberattacks	Unemployment	Natural catastrophes	Data fraud or theft	Climate action failure	Cyberattacks	Human-made environmental disasters

Economic Environmental Geopolitical Societal Technological

Table 1: Top 5 Global Risks in Terms of Likelihood
Source: World Economic Forum. 2020

	2012	2013	2014	2015	2016	2017	2018	2019	2020
1st	Financial failure	Financial failure	Fiscal crises	Water crises	Climate action failure	Weapons of mass destruction	Weapons of mass destruction	Weapons of mass destruction	Climate action failure
2nd	Water crises	Water crises	Climate action failure	Infectious diseases	Weapons of mass destruction	Extreme weather	Extreme weather	Climate action failure	Weapons of mass destruction
3rd	Food crises	Fiscal imbalances	Water crises	Weapons of mass destruction	Water crises	Water crises	Natural disasters	Extreme weather	Biodiversity loss
4th	Fiscal imbalances	Weapons of mass destruction	Unemployment	Interstate conflict	Involuntary migration	Natural disasters	Climate action failure	Water crises	Extreme weather
5th	Energy price volatility	Climate action failure	Infrastructure breakdown	Climate action failure	Energy price shock	Climate action failure	Water crises	Natural disasters	Water crises

Economic Environmental Geopolitical Societal Technological

Table 2: Top 5 Global Risks in Terms of Impact
Source: World Economic Forum. 2020

2. Green Bonds

The urgency of climate change has affected several areas in the financial market and the bonds is one of them. Green Bonds is a tool that can contribute to achieve the United Nations goals. SBN define this tool as "Green bonds are fixed-income instruments with one distinguishing feature: proceeds are earmarked exclusively for new and existing projects with environmental benefits." Sustainable Banking Network (2018), p 3. The main idea is to label the bonds of the stock market so it enables investors to direct investment to the green market and the report released by the SBN shows, based on the development in the partners countries, how to map the current status, provide guidance, standards and practices to the countries better develop its green bond markets. As a global market requires, the credibility is a key to the success of this development and well-established standards to label the bonds are essential.

One of these tools is the Self-Assessment and Planning Matrix, which organize a project in phases and 4 areas: Market Infrastructure, Guidance, Issuance and Capacity Building and it can be observed below.

Self-Assessment and Planning Matrix			
	Phase 1	Phase 2	Phase 3
Market infrastructure	Review current debt capital market structure for bonds and its readiness/suitability for green bond growth	Develop supporting market infrastructure (index, dedicated exchange segment)	Organise an international investor roadshow to present the domestic green bond pipeline
Guidance	Initiate dialogue with domestic market players to consider and, if appropriate, develop national guidelines, aligned with international practices	Convene a Market Development Council with relevant capital market institutions to propose and consult on policy recommendations	Consider incentives as appropriate (grants for external reviews, tax exemptions)
Issuance	Assess readiness and opportunities for green bond issuance	Build demand side through engagement with local investors. Potentially deliver a Green Bond Statement from domestic investors and convene forums with selected potential issuers	Engineer demonstration issuances: such as sovereign, municipal, financial institution, and/or corporate bonds
Capacity building	Set up a promotional campaign to engage market professionals	Set up, partner and deliver training programs for issuers, investors, verifiers and regulators	Consider accreditation schemes for training programs, as well as dedicated training incentives for industry professionals

Table 3: Self-Assessment and Planning Matrix
Source: Sustainable Banking Network (2018)

Besides, a suggested road map can be used as a guide to the sequence of steps that a country can follow to implement the Green Bond market. Figure 1 shows this roadmap.

Figure 1: Roadmap for developing green bond markets
Source: Sustainable Banking Network (2018)

Important stakeholders in the process are the issuers and investors that need to be attracted to this market and perceive financial and reputational gains, besides the social and environmental impact. The Table 4 has a summary of potential benefits for them.

Potential benefits for investors	Potential benefits for issuers
• Comparable financial returns with the addition of environmental benefits • Satisfy environmental, social and governance (ESG) requirements for sustainable investment mandates (i.e. when ESG standards such as the IFC Performance Standards are applied to green projects) • Enable direct investment in the "greening" of brown sectors and social impact activities • Increased transparency and accountability on the use and management of proceeds	• Provide an additional source of green financing • Match maturity with project life (in the case of green project bonds) • Improve investor diversification and attract buy-and-hold investors • Enhance issuer reputation • Attract strong investor demand, which can lead to high oversubscription and pricing benefits • Support issuers with environmental risk management

Table 4: Potential benefits to investors and issuers
Source: Sustainable Banking Network (2018)

The market has already been growing and some countries are ahead as it can be seen in the map below. The Graph 3 shows the volume of green bond issuance along the last years by type of issuer until June of 2018.

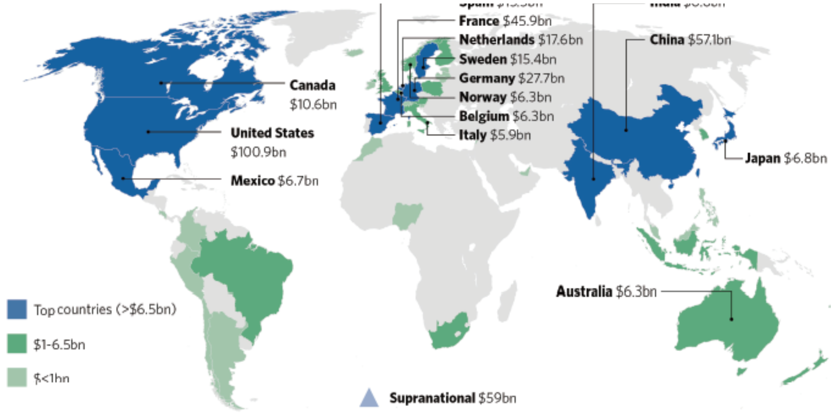
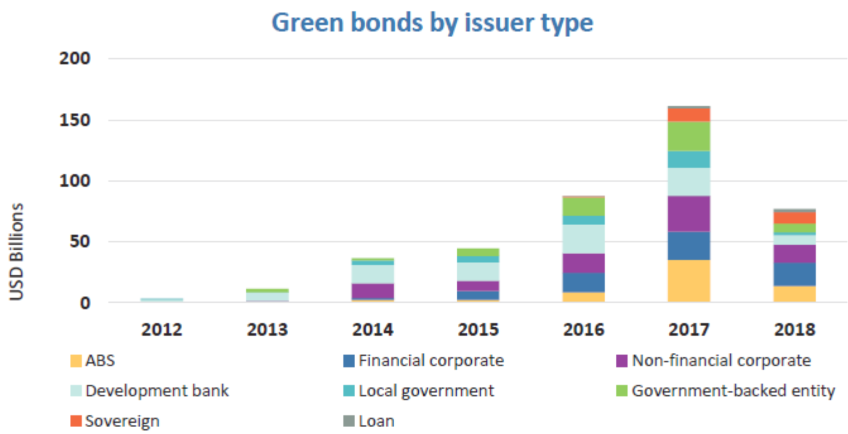
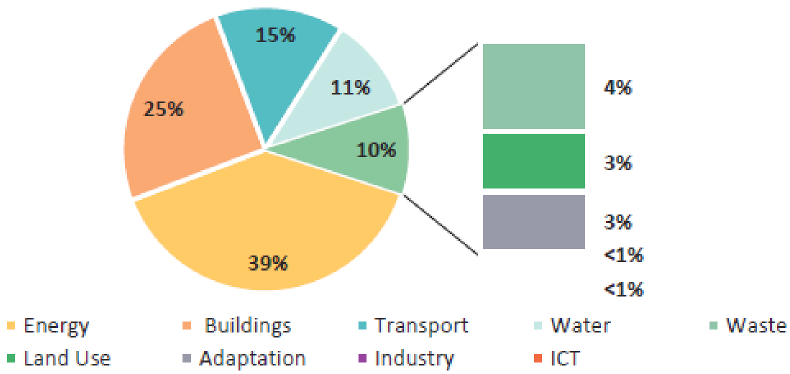


Figure 2: Total green bonds issued as of 30 June 2018.
Source: Sustainable Banking Network (2018)



Graph 3: Green bonds by issuer type
Source: Sustainable Banking Network (2018)

An aspect that is accompanied is the sector of these issued bonds. The next graph shows that 39% of the issuances is directed to energy, followed by 25% to buildings and 15% to transportation. This data is relevant in terms of achieving the main goal of reducing the green gashouse emission.



Graph 4: Cumulative issuances distribution
Source: Sustainable Banking Network (2018)

Returning to the tools, another relevant is to incentive the development of the green bond market by subsidies and costs incentives due the initial barriers to enter in the market, such as new types of monitoring, external review and disclosure. Some countries have been applying incentives. Malaysia established US$ 1.5 million to support external costs by issuers. Singapore launched the "Green Bond Grant Scheme" to support the grant of external review and qualify its issuers enhancing the credibility of the green bonds. China and Japan has also implemented similar incentives in their markets.

As mentioned earlier, the credibility of the market is extremely important to the development. International practices and standards play a vital role in the process. The International Capital Market Association, ICMA, released in 2018 a document called Green Bond Principles that dictates, "The Green Bond Principles (GBP) promote integrity in the Green Bond market through guidelines that recommend transparency, disclosure and reporting." (International Capital Market Association, 2018: p 2).

The GBP principles have four core components: Use of Proceeds, Process for Evaluation and Selection, Management of Proceeds and Reporting.

Use of Proceeds: "All designated Green Projects should provide clear environmental benefits, which will be assessed and, where feasible, quantified by the issuer." (International Capital Market Association, 2018: p 3).

Process for Evaluation and Selection: "The GBP encourage a high level of transparency and recommend that an issuer's process for project evaluation and selection be supplemented by an external review." (International Capital Market Association, 2018: p 3).

Management of Proceeds:

"The net proceeds of the Green Bond, or an amount equal to these net proceeds, should be credited to a sub-account, moved to a sub-portfolio or otherwise tracked by the issuer in an appropriate manner, and attested to by the issuer in a formal internal process linked to the issuer's lending and investment operations for Green Projects." (International Capital Market Association, 2018: p 5).

Reporting: "Issuers should make, and keep, readily available up to date information on the use of proceeds to be renewed annually until full allocation, and on a timely basis in case of material developments." (International Capital Market Association, 2018: p 5).

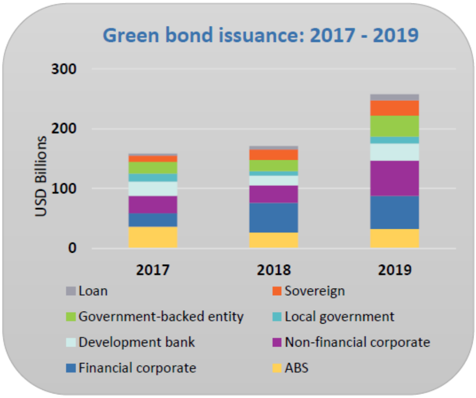
Apart from the four core components, the External Review is highly recommended in the process due the credibility. This certification can be reached by several ways, such as a second party opinion from an independent institution, international verification of the principles and proceeds, a certification and a rating score.

3. Overview of 2019 Green Bond Summary

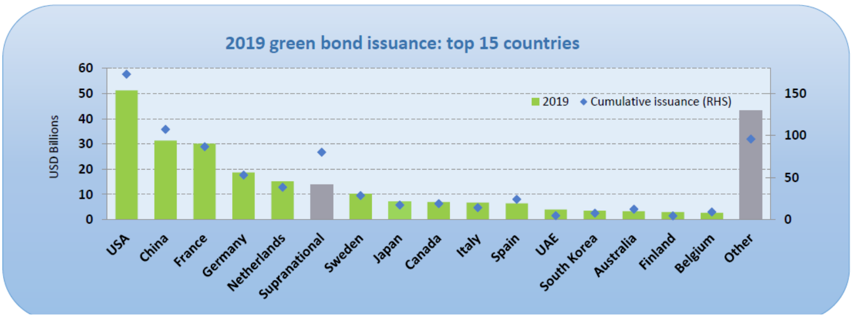
The Initiative Climate Bonds is an international organization that reports the world development of the green bonds. It is reported every quarter to the general public. The highlights of this report is showed next.

- A new global record: USD257.7bn total green bond issuance*
- 51% growth on 2018
- 1788 green bonds from 496 issuers
- 250 new issuers, bringing a total of USD67.8bn
- 51 jurisdictions, of which 8 are new
- Dutch State Treasury Agency (Certified Climate Bond) at EUR5.99bn (USD6.66bn)
- Certified Climate Bonds cumulative total passed the USD100bn market milestone

Figure 3: Highlights of 2019 of Green Bond Market Summary
Source: Iniciative Climate Bonds (2020)



Graph 4: Green Bond Issuance
Source: Iniciative Climate Bonds (2020)



Graph 5: 2019 green bond issuance by country
Source: Iniciative Climate Bonds (2020)

It can be observed in the graphs and figure above that the green bond market has been growing and breaking records. On the figure three 51% rise over 2018 and 51 jurisdictions have issued green bond so far. The Graph 4 shows that, beyond the growth, the total of non-financial and financial corporate has risen compared with development banks, which indicates that the market is absorbing the idea of greening the sector. However, the Graph 5 illustrates the top 15 countries in issuance and there is a clear concentration in developed countries lead by USA and China, respectively the two biggest economies worldwide.

Conclusion

The emergency of the climate change has become clearer in the recent years. Several institutions around the world as well as countries led by the United Nations and the Paris Agreement. Along with different sectors of the economy, the finance market is also part of this process and the related institutions has also taken part in this challenge such as the Bank for International Settlements which guides the Central Banks across the world with international standard. Organizations such as International Capital Market Association and World Economic Forum have also demonstrated effort to achieve the global goals. Even some institutions has been created to this purpose, Sustainable Banking Network and Initiative Climate Bonds for instance.

Those institutions are compromised to develop a greener financial market releasing documents, researches, reports, surveys and tools to support the countries to accomplish the goals and grow. The Green Bonds is one of them and it has demonstrated a development in terms of both structure and results as showed later in this text. The developed countries are leading the way, but some developing countries, especially in Asia have shown positives results.

Green Bonds is a form of greening the economy and have financial results. This is extremely important for the success of the challenge, because there is no chance the in a capitalist world, the core of the system, the financial system can compromise in a project that does not have profit. Once this reality is assumed, the chances for achieving the 2º C rise in the global temperature by 2100 turns out to be feasible.

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