Chapter 18
Green Bonds: Opportunities and Challenges for Reconciling Ethics and the International Financial System

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Abstract Climate change is one of the most pressing challenges of the world and mankind, in general, at the present time. The most frequent occurrence and intensity of extreme weather events along with the increase of carbon dioxide particles and other greenhouse gases (GHGs) in the atmosphere have resulted in an escalation of economic and political tensions between and within states, opening up new sources of instability in the contemporary international order. Faced with the need to obtain foreign exchange to honor their international financial liabilities and the failure of developed countries to meet climate finance commitments, a significant number of developing states have been urged to deepen unsustainable production structures, limiting the possibility of an effective transition on a global scale. All this results in a reinforcement of the climate and sovereign debt crises. In recent years, innovative instruments have been developed in search of scaling up the resources allocated to the fight against climate change. Within this incipient trend, green bonds stand out as specific instruments oriented to finance certified climate-sustainable projects. This chapter aims to analyse the opportunities and challenges presented by green bonds in bridging the financial and ethical worlds. Based on this main objective, this chapter attempts to contribute to the design and implementation of international and national regulatory frameworks for green bonds and "labelled bonds", in general.

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18.1 Introduction

Climate change is one of the most pressing challenges of the world and mankind, in general, at the present time. The most frequent occurrence and intensity of extreme weather events along with the increase of carbon dioxide particles and other greenhouse gases (GHGs) in the atmosphere have resulted in an escalation of economic and political tensions between and within states, opening up new sources of instability in the contemporary international order. Although the externalities of the climate crisis are global, this phenomenon has particularly affected developing states, as they have fewer resources to address mitigation and, above all, adaptation policies. Paradoxically, these states have been the ones that reported lower emissions in historical terms.

This asymmetry between responsibilities and vulnerabilities has been recognised from the beginning of the multilateral negotiations that resulted in the United Nations Framework Convention on Climate Change (UNFCCC) during the so-called Summit of the Earth in 1992. This assumption, enshrined in the principle of common but differentiated responsibilities (CBDR), has been reflected in each of the agreements and protocols adopted and implemented under this institutional arena. Naturally, this premise became a cornerstone of the international climate finance architecture configured at the Conference of the Parties (COP) 15 of the UNFCCC held in Copenhagen in 2009. Under this mechanism, developed countries—those listed in Annex I of the UNFCCC—pledged a global collective goal of mobilising USD 100 billion a year by 2020. These commitments were subsequently formalised years later at the COP 16 in Cancun and ratified at the COP 21 in Paris, extending the aforementioned commitments to 2025.

Despite the rhetoric of leaders in several multilateral fora, industrialised countries have been far from meeting these goals, all of which have contributed significantly to a chronic deficit of climate actions aimed at meeting the aims of the Paris Agreement (PA).

Similarly, climate finance provided by developed countries has been heavily biased towards credit rather than grants. It was also skewed towards funding climate change mitigation measures. This credit-anchored pattern of climate finance does not correspond to the mandate of climate justice aimed at redressing the externalities caused by the emissions caused by the industrialisation process deployed by developed countries as a whole. Similarly, the pre-eminence of mitigation finance is not only a marked departure from what was agreed in the Paris Agreement but also a setback for the developing countries, which urgently need to take action to adapt to the new realities brought about by changing climate patterns on a global scale.

On the other hand, the gap in the fulfilment of climate finance pledges has exacerbated the effects of other crises that affect the contemporary international order and developing countries in particular: sovereign debt crisis. In this regard, it is noteworthy that during the last decades, and particularly since the global financial crisis in 2007/2008, sovereign debt has grown significantly. This process, drastically intensified after the outbreak of the COVID-19 pandemic, has particularly affected

developing countries, which have recorded growing debt/GDP ratios with meagre precedents. Faced with the need to obtain foreign exchange to honour their international financial liabilities, a significant number of developing states have been urged to deepen unsustainable production structures, limiting the possibility of an effective transition on a global scale. The failure of developed countries to meet their climate finance commitments further exacerbates the problem. In effect, given the limited access to resources promised by developed states and the chronic lack of endogenous resources to finance mitigation and adaptation policies, many developing countries have found incentives for not adopting and fulfilling climate commitments.

In light of the above, it is worth pointing out that the climate and sovereign debt crises tend to feedback and reinforce each other. In sum, the systemic increase in sovereign indebtedness operates against the capability of developing states to finance climate actions. Similarly, the occurrence of more frequent and intense extreme events will require more resources from countries that are already highly indebted and fiscally constrained (Mejía 2023). The existing climate challenges should be perceived as urgent by the stakeholders in the governance of the international financial architecture. In effect, extreme climate events affect the real economy by destroying physical assets, production, value chains and tax revenues. Besides, climate change significantly affects the financial system by affecting the payment (and collection) capacities of economic agents, and along with this, an increase in insurance and default events.

The responses to this climate crisis should not be based exclusively on a rational calculation, but rather on ethical considerations. By deepening inequalities and/or asymmetries between states, but above all, between people, the fighting of climate change—the financing of the fighting against climate change—becomes a problem that requires solutions based on ethics. Likewise, the response to the climate crisis—and the challenges of financing the transition process—should not be left to the states. As noted by Ehlers et al. (2022), the public sector response to the COVID-19 pandemic and the externalities of the Russia-Ukraine war have placed a burden on public finances in a number of economies, all of which have raised borrowing costs in parallel to the implementation of conservative monetary policies worldwide.

Notwithstanding the relevance of the climate finance commitments assumed by developed countries in a number of climate agreements (which understand climate finance as public, new and additional), private climate finance can help states—emerging ones, in particular—meet PA goals. It was precisely on this premise that, in recent years, innovative instruments have been developed in search of scaling up the resources allocated to the fight against climate change. Within this incipient trend, green bonds stand out as specific instruments oriented to finance certified climate-sustainable projects. Far from perceiving these instruments as a trivial response or a channel for exonerating public responsibilities, political-economic decision-makers must realise the relevance of green bonds and build a solid regulatory framework around these specific types of labelled bonds.

This chapter aims to analyse the opportunities and challenges presented by green bonds in bridging the financial and ethical worlds. Based on this main objective,

this chapter attempts to contribute to the design and implementation of international and national regulatory frameworks for green bonds and "labelled bonds", in general. This work is inspired by the premise that "small changes in financial regulation should be expected to have a large impact on financial flows and hence on the real economy, (…) since financial regulations are designed to have a large leverage effect" (Schydlowsky 2020, p. 1). After this introduction, the chapter discusses the challenges and opportunities of green bonds. It then outlines possible courses of action to strengthen the regulatory frameworks and markets for these instruments. Finally, the chapter presents some concluding reflections.

18.2 Green Bonds: Between Opportunities and Challenges

The transition to a resilient and carbon–neutral society is one of the most defiant and ambitious undertakings of the human history given the challenge at stake: the sustainability of life in the planet itself. Since its externalities are not confined to a specific geographic region or socio-economic sector, climate change raises a complex debate which needs to be addressed through an open and democratic logic where no position is precluded. At the risk of being perceived as altruism, it is important to stress that these discussions must be approached ethically, as they deal with issues of sustainability of life and inequality between people and nations. Since discussions on climate change involve at their core deliberations on the allocation of intergenerational costs (Sanson and Burke 2020), contributions from an ethical perspective are vital, too. In this connection, an ethical perspective can shed light on a number of key questions concerning climate justice, such as the following: "Should the current generation choose to slow current growth based on cheap fossil fuel energy, for example, by imposing heavy carbon taxes, so as to move to a low carbon economy, aiming at minimising climate change damages to future generations? And if the answer is positive, can the current shortsighted political system (governments are elected every four years) provide the necessary policies? Can we find a way to distribute costs and benefits from mitigating climate change justly across generations?" (Sartzetakis 2021, p. 761).

It is a well-known fact that the transition to a post-carbonic socio-economic and political order involves the mobilisation of a huge mass of assets as well as united wills. The amounts and eventual allocations of these resources have forged arduous discussions among the scientific community, socio-political referents and movements, economic agents of various dimensions, among others. Beyond the differences in terms of sums and guidelines on strategies, all projections assume that they are sums involving several points of global Gross World Product (GWP). To illustrate, McKinsey (2022) calculated that to achieve a zero emissions scenario in 2050, it would require an investment of around 7.5% of the GWP over the period, which would be equivalent to 275 trillion dollars. Similarly, most projections claim that the amounts will continue to increase as long as mitigation efforts remain inadequate or, even worse, testimonial. In effect, the implementation of climate commitments on

a global scale is far from achieving the objectives set out in the PA. In this regard, and in accordance with the UNFCCC synthesis report published in late 2022, it is warned that if the climate commitments of 193 countries were 100% fulfilled, emissions would have increased by almost 11% in 2030 instead of being reduced by 45%, as established in the PA. Thus, the global average temperature would substantially exceed the commitments to keep this indicator below 1.5 °C (UNFCCC 2022).

Given the magnitude of the concerns and sums involved, it must be acknowledged that the transition to a carbon–neutral society cannot be covered by a limited number of actors—states and/or institutions—but by all actors participating in the global arena, in the international financial system, particularly. While it is true that the emissions of the financial sector are relatively limited in comparison to other sectors, it plays a capital role throughout the economy, mobilising capital from agents with the capacity to save to those with immediate consumption needs. In this sense, finance operates as a catalyst for emissions. In accordance with the former UNFCCC Executive Secretary Christiana Figueres (2020), "where finance goes, so go emissions or emission reductions".

As previously marked, a multiplicity of instruments has been developed in recent years in order to achieve global climate goals. Green bonds are a clear derivative of this "greening" process within the international financial system and, therefore, a vehicle for expanding climate finance. Certainly, green bonds are not the only products of this trend. Alongside these innovative instruments, others have been developed during the last years in order to make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development" (PA, article 2.1. c). In this context, a variety of green instruments has gradually emerged such as "green loans", "green sukuk"[1], "mezzanine/first-loss finance for infrastructure projects", sustainability-linked instruments—bonds, loans, commercial paper, etc.—and "environmental impact bonds" (UNEP 2014; Bhattacharya et al. 2022; Fouad 2021; Berrada et al. 2022). Similarly, the development of these instruments has been accompanied by the institutionalisation of forums or platforms to foster the intersection of finance and the fight against climate change. In this vein, it is to be considered the creation of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), launched at the Paris One Planet Summit in December 2017 and the Glasgow Financial Alliance for Net Zero (GFANZ) established in April 2021 with the involvement of 450 financial institutions (Michie 2022).

This awareness of the vulnerability of the economy, and of the financial system in particular, to climate change, was not spontaneous, but has been linked to the increasingly visible warning of the risks arising from climate change (Carney 2015). According to the specialised literature, the risks that the financial system may face as a consequence of climate change are threefold: physical, transitional and litigation risks. The physical risks of climate change refer to the damage caused to assets within

[1] As explained by Prasad et al. (2022:10): "Green Sukuk, Islamic bonds, that were first launched by Malaysia in 2017 and were used to exclusively finance green projects, have seen issuances in a few countries over the past few years, including Indonesia and the UAE".

an economy following the manifestation of changing global weather patterns. In this sense, physical risks can be classified into "gradual" risks (caused by sea level rise, for example) and "abrupt" risks (generated by extreme weather events, such as storms or floods, for example). Transition risks, on the other hand, refer to those arising from the possibilities of certain agents being affected by the regulatory changes of the states in the fight against climate change in each country. Finally, liability litigation risks derive from the possibility of the different actors in the economic and financial systems being sued for not having correctly managed the challenges brought about by climate change (Campiglio 2016; Campiglio et al. 2018; Fernandez Alonso 2018).

In simplified terms, green bonds can be defined as a specific type of debt instrument issued by public or private institutions to finance environmental or climate change-related projects (Mercer 2015), such as renewables, water and energy efficiency, bioenergy and low carbon transports (Campiglio 2016). It is precisely the commitment to allocate the borrowed funds to a project with a positive impact on the environment and climate that constitutes the main characteristic of green bonds. In view of the need to assure creditors of the destination of the resources collected, green bonds are also distinguished by the fact that they are subject to a process of verification and public reporting.

Beyond the objective of funding an environmentally positive project and the associated certification and monitoring procedures, there is no difference between green bonds and traditional bonds, since the financial features of both—in terms of structure, risk and profitability—are similar. In the words of Bos (2023, p. 1), "the credit profile of a green bond is the same as that of a traditional bond from the same issuer, and in terms of pricing there is no significant difference between a green and non-green bond. (…) Green bond holders have the same recourse to the issuer. Essentially, they are standard bonds with an additional green element. Green bonds come in short—or long-dated maturities and have various types of coupons and yields".

The history of green bonds began in 2007 when the European Investment Bank (EIB) issued its first Climate Awareness Bonds (CAB) to fund the establishment of renewable and energy efficiency programmes across Europe (Al Mheiri and Nobanee 2020). According to Saraiva y Casalinho (2022, p. 256), the EIB issuance "offered a pedagogical perspective or an example to be followed by other issuers. The year immediately following, in 2008, it is the World Bank's turn to launch its first green bond, following EIB footsteps". The years following the first green bond experiences were characterised by issuances designed and implemented by multilateral banks such as the European Investment Bank (EIB) and the World Bank (WB) (Kaminker et al. 2016). Government agencies, municipal entities and national development banks also participated in this nascent trend. The markets' appetite for these instruments surprised more than a few financial market commentators in the years immediately following the outbreak of the crisis in 2007.

During the first years of the history of green bonds, the qualification of these instruments was conducted by the issuers themselves. However, over the course of time, a variety of standardisation efforts have been made in the search for a certain standardisation. In this context, it is important to underline the introduction of the Green Bond Principles (GBPs) by the International Capital Markets Association (ICMA)

in January 2014. In the same year, the Climate Bond Initiative (CBI) launched its climate bonds standards. A large number of jurisdictions began to use these two schemes; however, an equally large number of jurisdictions have developed their own taxonomies (Ehlers and Packer 2016). To summarise, all these initiatives coexist without providing a consistent and binding framework for all actors participating in green bond markets. In view of the foregoing, it is important to note that "there is no public regulation of green bonds, and hence the 'greenness' of the bonds is not enforceable. Instead, the governance of green bonds is decentralised and shaped by private governance. Specifically, to circumvent the lack of enforceability, issuers rely on certification by independent third parties" (Flammer 2020, p. 96).

A few brief comments on the process of issuing green bonds are worth making at this point. Just as Banga (2019, pp. 23–24) explains, "The process of issuing a certified green bond involves at least three major market players, including the issuer, an independent reviewer, and the underwriters (…) The process then begins when an issuer or a project developer sets up a green project. In the project document, the issuer should itemize, as much as possible, the expected positive impacts of its project on the environment. In order to avoid overestimations or underestimations of such impacts, an independent reviewer who is a specialist of environmental impact assessment, is required to confirm whether the project is actually environmentally friendly. (…) Once the second opinion attests the green nature of the project to be financed, the issuer is allowed to issue a certified labeled green bond in order to raise funds in the debt capital market".

As might be expected, the certification of instruments by a third party entails an increase in administrative and compliance costs for issuers. This is all the more so as the market for the verification of such instruments is concentrated in a very limited number of firms.

In addition, there are a number of incentives that encourage green bond transactions and explain the relentless growth of this market. According to Maltais and Nykvist (2020), the motivations to operate in green bond markets—either as an issuer or as a creditor—can be divided into three categories: financial case, business case and legitimacy/institutionally oriented drivers. In terms of financial incentives, the aforementioned authors include better financial returns, reduced financial risk, lower cost of capital and better accessibility to capital. Under the category of business incentives, they recognise the following criteria: branding, operational efficiency, the creation of new markets and the reducing of business risks. Regarding reputational motivations for engaging in green bond transactions, these authors identify the legitimacy seeking and the social licence, the accountability to identifiable stakeholders and institutional pressures.

From the specific perspective of developing country actors, ownership of the climate actions to be financed is crucial. The issuance of green bonds is a suitable mechanism to overcome the traditional conditionalities of official credit providers, both bilateral and multilateral. In this connection, green bonds could be seen as a solution to the pro-mitigation bias that has been reported in the climate finance stack

so far. Similarly, the possibility of issuing these assets allows sub-national actors—and thus less likely to issue on a large scale—to access finance to capitalise on climate-friendly projects. This is the case for provinces, municipalities and/or townships in all countries, though the ability to issue these instruments is crucial for sub-national actors in developing countries, given their inherent budgetary constraints and the resulting difficulties in accessing voluntary debt markets.

Without limiting the foregoing, it is important to underline that green bonds are far from providing a definitive or unquestionable remedy. First of all, it should be said that the process of issuing these instruments is often much more complex—and necessarily lengthy—than that regularly reported. In this context, it is worth noting that green bonds require the fulfilment of numerous steps prior to issuance, which involve monitoring and verification processes by third-party agents.

Regardless of how individual operators are motivated, it is clear that green bonds have become one of the most dynamic financial markets. In effect, since the issuance of the first green bond in 2007, the market for such instruments has been increasing steadily. According to data collected by CBI, green bond issuance reached USD 487.1 billions in 2022, all of which implied just over half of labelled issuance. Besides, a growing share of these green bond markets has been taken up by issuance by states. According to CBI (2023), by the end of 2022, 43 sovereigns had issued labelled bonds. Most of these issues were made under the green bonds category.

Furthermore, and closely related to the above, it is argued that the certification of these instruments is costly since they are concentrated in the hands of a few international firms. The relatively small number of firms engaged to certify green bonds entails a market failure, which in fact makes these instruments more expensive.

It should also be observed that there are no unified criteria for labelling. As Purdie (2019) explains, "despite efforts to standardise the market by the Climate Bonds Initiative, the International Capital Market Association—which authored the 'Green Bond Principles'—and the European Commission, there is still no definitional framework everyone can agree on (…) Existing standards, such as the Green Bond Principles, tend to focus on the use of proceeds, not the issuer's wider operations. This means oil and gas companies can legitimately issue green bonds even if they are net contributors to carbon emissions, leading to charges of 'greenwashing'. Similarly, Poland has led the way in issuing green sovereign bonds despite its continued reliance on coal to run its economy".

Finally, but not least, it should be stressed that green bonds are not an option for all, at least under the current conditions of the structure and dynamics of the international financial system. In this regard, issuers with difficulties in accessing markets—a significant number of developing states—cannot make use of these instruments. This is particularly true for sovereigns with debt crises, as well as for those with difficulties issuing in their own currency.

18.3 Possible Courses of Action to Enable and Strengthen Green Bonds from a Multilateral and Comprehensive Perspective

Adversity, states Schydlowsky (2020, p. 6), "always has a flip side: it offers opportunity. Financial regulators also have a role in boosting society's ability to turn adversity into an advantage". In this respect, there are some responses that could be studied and implemented by policy-makers in order to build a solid framework regarding green bonds. Some of these observations are suggested below.

- To promote **unified criteria** in a multilateral space—G20, for example—for the labelling of green bonds. Although discussions on climate finance are conducted in other specific areas—primarily in the various UNFCCC bodies—this certainly does not prevent other multilateral spaces to make efforts towards the elaboration of cooperative approaches, in the definition of unified criteria for the labelling of green bonds and labelled bonds, in general. In the words of the OECD (2017:14), "Convergence towards commonly accepted definitions will be essential to maximise the effectiveness, efficiency and integrity of the market".
- To foster **national capacity building** for the development and improvement of green bond regulations. The formation and strengthening of green bond markets require the design and implementation of ambitious capacity building processes for market prudential regulators, particularly in developing states. According to Banga (2019, p. 24), "Green bonds foremost require technical skills for monitoring and assessing of their use of proceeds throughout the project's lifecycle. Many developing countries, however, lack such technical skills which are essential to ensure that projects are implemented in accordance with the Green Bond Principles". As a venue that encompasses decision-makers from a number of financial and monetary institutions, the G20 can operate as an enabling framework to generate cooperative proposals for such capacity building. The deepening of technical knowledge on green bonds by officials dedicated to the design and implementation of national regulations can constitute an additional chapter in the effort to reconcile ethics with the international financial system.
    - To promote **fiscal and/or economic benefits** to boost the incentive framework for issuers. This is intended to address one of the most significant de facto barriers in green bond markets, as the cost of the process can be significant, if not prohibitive, for issuers. Kaminker et al. (2016) illustrate that the process of obtaining a second opinion or third-party assurance could cost from 10 to 100 thousand dollars, all of which may limit the possibilities for minor players to pursue green bond issuance, and thus the possibility to finance climate or environmentally ambitious policies and/or projects. In this context, the experience of the Republic of Argentina, for example, could be considered. In this country, the Buenos Aires Stock Exchange decided to grant a bonus on the fee for primary placement as well as on listing and publication costs. Although this is a comparatively small market (USD 1.1 Billion), New firms have been added in recent years as well as Sub-National States.

- To promote a **fair and balanced notion** of green bonds in a variety of forums—political, economic and/or academic—as instruments that allow narrowing the gaps in climate finance. These efforts must highlight the crucial intertwining of ethical values and the financial system while recognising the limitations and the resistance of some of the actors in these initiatives. All of this, of course, without relinquishing the primary obligations of industrialised states in this area.
- To promote strong **regulations against green washing**. One of the most serious concerns in green bond markets is greenwashing, the risk that the issuer overstates or neglects to honour its environmental commitments. These developments may well be based on the European Commission's initiatives in this field.[2]

18.4 Conclusion

Changes in climate patterns on a planetary scale represent one of the world's greatest challenges for present and future generations. The progressively visible impacts of climate change are being felt everywhere and in increasingly radical manners. Although the consequences of climate change are global in nature, the most vulnerable states and groups report the most dramatic negative externalities. The international climate negotiations began with the recognition of this disparity between the responsibility for producing climate change and the vulnerability to its consequences. As a result, industrialised countries made a number of climate finance commitments. However, developed country pledges to mobilise international climate finance have not been met over the years and are widely recognised as insufficient to address the current climate crisis. The provided resources have not been adequate to subvert the required levels of finance to meet the commitments under the Paris Agreement to contain the increase in global average temperature to 1.5 °C. The multiple derivations of the war in Ukraine and the financial crisis opened in recent months have increased uncertainty in the international scenario and in the economic-financial dimension, particularly. Climate finance, already limited, has not been immune to the logic of withdrawal/conservative approach adopted by the major agents of the international financial system. This current uncertainty casts a further shadow on how the international climate finance architecture will be (re) configured after 2025. In this context, developed countries that are compelled to provide climate finance encounter greater reluctance to leverage funding. Notwithstanding the above, it is worth highlighting that in order to close the climate finance gap, the PA encourages the private sector the mobilisation of financial flows "with a pathway towards low greenhouse gas emissions and climate-resilient development" (Article 2.1.c).

Climate change as a global problem forces a comprehensive and democratic debate to evaluate and bring about effective solutions. In the context of these discussions, the reconciliation of finance and ethics becomes a categorical mandate.

[2] European Commission proposal of 30 March 2022 amending Directives 2005/29/ EC on unfair commercial practices and 2011/83/EU on consumer rights.

Green bonds could be seen as a manifestation of efforts to develop new frameworks and instruments to finance adaptation and mitigation strategies towards carbon neutrality and climate resilience. Because they can be issued by a wide variety of entities—public or private, large or small—they are optimal instruments for scaling up climate finance, thereby multiplying and accelerating mitigation and adaptation actions.

Like all labelled bonds, green bonds are far from becoming a panacea. In this context, it should be mentioned that although they can increase resources for climate finance and favour a sense of "ownership" of climate actions to be financed, escaping the conditionalities and biased targeting of resources provided by developed countries, green bonds have some drawbacks.

Firstly, green bonds are more costly—both in economic and temporal terms—compared to conventional issuances. Secondly, there are no uniform criteria for cataloguing these types of instruments. Finally, and closely connected to the above, green bonds can be a source of "greenwashing" operations, since the criteria in effect focus on the policy/project to be financed instead of looking at the issuer's entire production structure.

As a consequence, it is clear that these instruments should be considered as an additional instrument for scaling up climate finance and subverting the historical deficit for financing mitigation and adaptation actions on a global level.

The resources leveraged through green bonds cannot replace the financing committed by industrialised countries as the main historical emitters of greenhouse gases.

In line with Park's expressions (2018, pp. 267–268), it should be noted that "The future of the green bond market hinges on the capacity of issuers to sell more green bonds and the confidence of investors and civil society in their economic value and environmental impact. (…). Issuers, investors, and civil society must have confidence in the legitimacy of the marketplace and its rules. At the heart of legitimacy debates in the green bond market is a governance question: what is the optimal process for assessing the environmental impact of a green bond? Unless consensus is found on the answer to this question, green bonds may be relegated to permanent niche status".

Political-monetary authorities around the world—especially Central Banks and national regulatory agencies—have a fundamental role to play in promoting these initiatives aimed at reducing the climate finance gap by promoting this type of instrument. These considerations are based not only on ethical grounds—the sustainability of life itself and issues of climate and intergenerational justice are at stake—but also on the stability of the financial system. In the words of Schydlowsky (2020, p. 5), "the new climate-related concern can be thought of as part of the financial regulator´s responsibility in maintaining a healthy financial system in the long run, capable of an improved handling of climate disasters and climate change in general. (…), it is important to note that coordination of financial regulators´ actions with those of others concerned with climate disasters will leverage all of the applied policies to greater advantage". The experience of the coordinated work in the G20 can serve as a good support to advance in this direction.

References

Al-Mheiri W, Nobanee H (2020) Green bonds: a mini-review. SSRN Electron J. https://doi.org/10.2139/ssrn.3538790

Banga J (2019) The green bond market: a potential source of climate finance for developing countries. J Sustain Finance Invest 9(1):17–32. https://doi.org/10.1080/20430795.2018.1498617

Berrada T, Engelhardt L, Gibson R, Krueger P (2022) The economics of sustainability linked bonds. Swiss Finance Inst Res Pap 15:22–26

Bhattacharya A, Dooley M, Kharas H, Taylor CH and Stern N (2022) Financing a big investment push in emerging markets and developing economies for sustainable, Resilient and inclusive recovery and growth. Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science, and Brookings Institution, London

Bos B (2023) Understanding green bonds. Available at https://www.gsam.com/responsible-investing/en-INT/professional/insights/articles/ understanding-green-bonds

Campiglio E (2016) Beyond carbon pricing: the role of banking and monetary policy in financing the transition to a low-carbon economy. Ecol Econ 121:220–230. https://doi.org/10.1016/j.ecolecon.2015.03.020

Campiglio E, Dafermos Y, Monnin P, Ryan-Collins J, Schotten G, Tanaka M (2018) Finance and climate change: what role for central banks and financial regulators? Nat Climate Change Perspect 8:462–468

Carney M (2015) Breaking the tragedy of the horizon—climate change and financial stability. Speech at Lloyd's of London, 29 September. Available at: https://www.bankofengland.co.uk/speech/2015/ breaking-the-tragedy-of-thehorizon-climate-change-and-financial-stability

Climate Bonds Initiative (CBI) (2023) 2022 Market snapshot: And 5 big directions for sustainable finance in 2023. Available at https://www.climatebonds.net/2023/01/2022-market-snapshot-and-5-big-directions-sustainable-finance-2023

Ehlers T and Packer F (2016) Green bonds–certification, shades of green and environmental risks. Bank for Int Settl

Ehlers T, Gardes-Landolfini CH, Natalucci F and Ananthakrishnan P (2022) Scaling up private climate finance in emerging market and developing economies: challenges and opportunities. In: International Monetary Fund (IMF). October 2022 Global Financial Stability Report, IMF: Washington DC

Fernandez Alonso J (2018) Bancos centrales y cambio climático: basamentos y desafíos de una relación incipiente. *Anuario de Relaciones Internacionales 2018*, Departamento de Medio Ambiente y Desarrollo, Instituto de Relaciones Internacionales (IRI). Univ Nacional De La Plata UNLP 2018:1–10

Figueres C (2020). Financing a resilient future. UNEP FI's global roundtable. October 13th

Flammer C (2020) Green bonds: effectiveness and implications for public policy. Environ Energy Policy Econ 1(1):95–128

Fouad M, Novta N, Preston G, Schneider T, Weerathunga S (2021) Unlocking access to climate finance for Pacific Islands Countries. IMF, Washington DC

Kaminker C, Kidney S and Pfaff N (2016) Green bonds country experiences barriers and options. Input paper in support of the G20 green finance study group. http://unepinquiry.org/wpcontent/uploads/2016/09/6_Green_Bonds_Country_Experiences_Barriers_and_Options.pdf

Maltais A, Nykvist B (2020) Understanding the role of green bonds in advancing sustainability. J Sustain Finance Invest. https://doi.org/10.1080/20430795.2020.1724864

McKinsey (2022) COP27: financing the transition to net zero. Available at https://www.mckinsey.com/capabilities/sustainability/our-insights/sustainability-blog/ cop27-financing-the-transition-to-net-zero

Mejía C (2023) Crisis climática, deuda y recuperación en un contexto de crisis múltiple. Una mirada desde la Justicia Climática en América Latina y El Caribe. Latindadd.

Available at https://www.latindadd.org/wp-content/uploads/2023/01/ Crisis-climatica-deuda-y-recuperacion-en-un-contexto-de-crisis-multiple_c.pdf
Mercer (2015) Investing in a time of climate change. Mercer Climate Change Study 2015. International Finance Corporation. World Bank Group.
Michie A (2022) The role of the global financial system in financing the transition to net zero. Global Pol 13(4):557–562
National Oceanic and Atmospheric Administration (NOAA) (2022). Trends in atmospheric carbon dioxide. Available at https://gml.noaa.gov/ccgg/trends/weekly.html
OECD (Organization for Economic Cooperation and Development) (2017) Mobilising Bond Markets for a Low-Carbon Transition. In: Green Finance and Investment. Paris: OECD Publishing
Park S (2018) Investors as regulators: green bonds and the governance challenges of the sustainable finance revolution. Stanford J Int Law 54(1):2018
Prasad A, Loukoianova E, Xiaochen Feng A and Oman W (2022) Mobilizing private climate financing in emerging market and developing economies. IMF Staff climate note 2022/007. International Monetary Fund: Washington, DC. Available at https://www.imf.org/en/Publications/staff-climate-notes/ Issues/2022/07/26/Mobilizing-Private-Climate-Financing-in-Emerging-Market- and-Developing-Economies-520585
Purdie C (2019) The three steps that would take green bonds mainstream. Financial News. Available at https://www.fnlondon.com/articles/ the-three-steps-that-would-take-green-bonds-mainstream-20190903
Sanson AV and Burke SEL (2020) Climate change and children: an issue of intergenerational justice. In: Balvin, N., Christie, D.J. (eds) Children and peace. Peace Psychology Book Series. Springer, Cham. Available at https://doi.org/10.1007/978-3-030-22176-8_21
Saraiva HI and Casalinho C (2022) Environmental, social, and governance assets: recent history of green bonds–genesis and current perspectives. Handbook of Research on New Challenges and Global Outlooks in Financial Risk Management, 231–249
Sartzetakis ES (2021) Green bonds as an instrument to finance low carbon transition. Econ Chang Restruct 54(3):755–779
Schydlowsky DM (2020) Prudential regulations for greening the financial system: coping with climate disasters. Latin Am J Central Bank 1(1–4):100010. https://doi.org/10.1016/j.latcb.2020.100010
United Nations Environment Program (UNEP) (2014) Demystifying private climate finance. Available at https://www.unep.org/es/node/10635
United Nations Framework Convention on Climate Change (UNFCCC) (2022) Nationally determined contributions under the Paris Agreement Synthesis report by the secretariat. Available at https://unfccc.int/sites/default/files/resource/ cma2022_04.pdf