

Gong Cheng  
gong.cheng@bis.org

Torsten Ehlers  
TEhlers@imf.org

Frank Packer  
frank.packer@bis.org

## Sovereigns and sustainable bonds: challenges and new options<sup>1</sup>

*The sustainable bond market, comprising green, social and sustainability (GSS) bonds, continues to develop rapidly. Until recently, sovereign issuers played only a minor role, due in part to tensions between the use-of-proceeds earmarking of GSS bonds and the fungibility requirements for many sovereigns. That said, sovereign GSS bond frameworks rely on stringent reporting and verification standards, thus setting goalposts for private issuers to aim for. Sustainability-linked bonds allow an unrestricted use of proceeds and – if based on contractual terms that sufficiently align issuers' incentives with sustainability objectives – can provide sovereigns with new options to make progress towards carbon emission reduction targets.*

*JEL classification: H63, O16, Q01, Q50.*

The market for green, social and sustainability (GSS) bonds<sup>2</sup> has grown rapidly since its inception, to around \$2.9 trillion outstanding by end-June 2022.<sup>3</sup> The funds raised for GSS bonds are earmarked for eligible projects: climate and environmental projects in the case of green bonds; projects related to health and education, affordable housing or food security for social bonds; and a mixture of green and social projects in the case of sustainability bonds. In contrast to conventional bond markets, sovereign issuers were latecomers to the GSS market, but have contributed notably to its growth more recently.

Exploiting the BIS sustainable bonds database, this feature analyses factors underlying sovereign GSS bond issuance. Sovereign issuers emerged late because of hurdles stemming from the fungibility requirements of public debt frameworks in many countries, which conflict with the use-of-proceeds earmarking of GSS bonds. That said, frameworks for sovereign GSS bond issuance have alleviated some of these difficulties and have set ambitious best practices for private issuers in terms of use-of-proceeds verification and sustainability impact reporting. We illustrate this by

<sup>1</sup> The authors thank Claudio Borio, Stijn Claessens, Ingo Fender, Kumar Jegarasasingam, Benoît Mojon, Hyun Song Shin, Nikola Tarashev and Dora Xia for helpful comments and discussion. We also thank Jimmy Shek and Jakub Demski for assistance with data. The views expressed in this article are those of the authors and do not necessarily reflect those of the Bank for International Settlements or the International Monetary Fund.

<sup>2</sup> GSS bonds are part of the wider universe of ESG assets, or assets with environmental, social or governance benefits (see Scatigna et al (2021)). GSS refers to the bond asset class and the objectives that bond proceeds aim to finance, which do not include governance benefits. ESG applies to all types of financial securities, including bonds but also equities, derivatives and mutual fund shares.

<sup>3</sup> The data source is the BIS sustainable bonds database. Cutoff date is 30 June 2022.

### *Key takeaways*

- The sustainable bond market has developed rapidly, reaching \$2.9 trillion at end-June 2022, with sovereigns joining late but increasing their share from 4% to 7.5% over the past two and a half years.
- Tensions between sovereign green bonds' prescribed use of proceeds and the fungibility requirements of public debt can be partially overcome through refined reporting standards and external review.
- Sovereign sustainability-linked bonds with meaningful climate targets and penalties for non-compliance that are material in the public's eye could help sovereign issuers make progress towards carbon emission reduction targets.

focusing on sovereign green bond frameworks. In future, outcome-based instruments, such as sustainability-linked bonds (SLBs), could further lower the hurdles for sovereign issuers by offering more flexibility in the use of proceeds. Such instruments have attracted investors. Yet it is a challenge to set the key contractual terms so that they align the incentives for issuers with sustainability objectives.<sup>4</sup>

The roadmap for the rest of the feature is as follows. In the next section, we document the evolution and recent state of GSS bond finance, focusing in particular on differences between sovereign and other issuers. The following section highlights the challenges and the new options for financing sovereigns' climate ambitions: first, the tensions between green bond principles and the fungibility of government debt; second, the development of higher standards by sovereigns for green external review and impact assessment; and finally, SLBs as an option for overcoming the shortcomings of conventional green bonds.

## Sustainable bond finance: sovereign vs other issuers

The BIS sustainable bonds database<sup>5</sup> indicates that the market for GSS bonds has been expanding rapidly. The amount of GSS bonds outstanding rose more than fourfold from January 2019, to stand at \$2.9 trillion at the end of June 2022 (Graph 1, left-hand panel).

An unusual feature of the development of the GSS bond market is the late entry of sovereign issuers (Graph 1, centre panel). The first sovereign green bonds were issued by Poland and France as recently as early 2017 – more than nine years after the first green bonds were issued by two supranationals, in 2007–08.<sup>6</sup> Local

<sup>4</sup> There is a growing literature on how investors can provide incentives for issuers to support environmental sustainability and the greening of the financial system. Cheng et al (2022) in particular propose a strategy to build portfolios of sovereign securities with progressively declining carbon footprints.

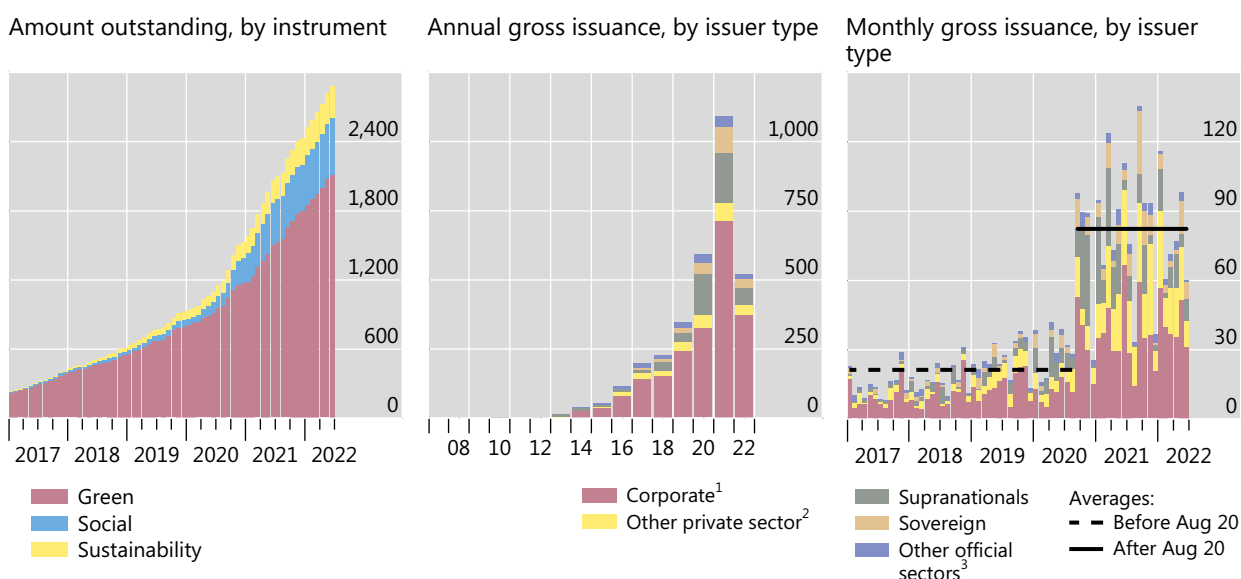
<sup>5</sup> The BIS sustainable bonds database, developed to support the work of the central banking community, uses three distinct data sources for GSS bonds: Climate Bonds Initiative (CBI), Dealogic and Environmental Finance.

<sup>6</sup> In 2007, the European Investment Bank issued a Climate Awareness Bond, the world's first green bond. The World Bank's first green bond in November 2008 was the first to define project eligibility and to provide assurance, through a second-party opinion provider, that eligible projects would address climate change.

## Green, social and sustainability (GSS) bond market: an overview

In billions of US dollars

Graph 1



<sup>1</sup> Both financial and non-financial corporations. <sup>2</sup> Asset-based securities and special purpose vehicles. <sup>3</sup> Local governments, development banks and public enterprises.

Sources: Climate Bonds Initiative, Dealogic, Environmental Finance Bond database, authors' calculations.

governments and public enterprises in advanced economies<sup>7</sup> issued GSS bonds in the early 2010s to fund specific environmentally friendly projects, for instance to improve water quality and energy efficiency or to support pollution clean-ups. Even non-financial corporations and banks started issuing green bonds before sovereigns, with the first issues by entities in France in 2013.

Sovereign issuance has, however, increased notably since the pandemic. At end-2019, the share of sovereign issuers in total outstanding GSS bonds was only 4.2%, but it increased to 7.5% by end-June 2022. By then, 38 sovereigns from five continents had brought out debut GSS issues, with the United States being noticeably absent. Several countries in Latin America (eg Chile and Mexico) have issued all three types of sustainable bond.

The 2020–21 period saw a particularly strong acceleration in the overall GSS bond market. Monthly gross issuance has averaged \$88 billion since August 2020, compared with around \$30 billion the previous three years (Graph 1, right-hand panel). Among the key drivers was the generous fiscal support in response to the Covid-19 pandemic as well as governments' expanding climate ambitions.

After the beginning of the pandemic, the relatively small social bond market received a boost from governments and government agencies (eg housing finance agencies in the United States) because of increased social needs, notably those related to the provision of healthcare services and equipment. As a result, the public sector accounted for about 80% of all social bonds issued in 2020–21. In the first half

<sup>7</sup> For instance, bonds issued by Kommunalbanken Norway (2010), Government of the Île-de-France region (2012), the City of Gothenburg, Sweden (2013) and the Commonwealth of Massachusetts (2013), to name but a few.

of 2022, gross issuance of social bonds declined by 40% year on year amidst the post-pandemic recovery in many countries.

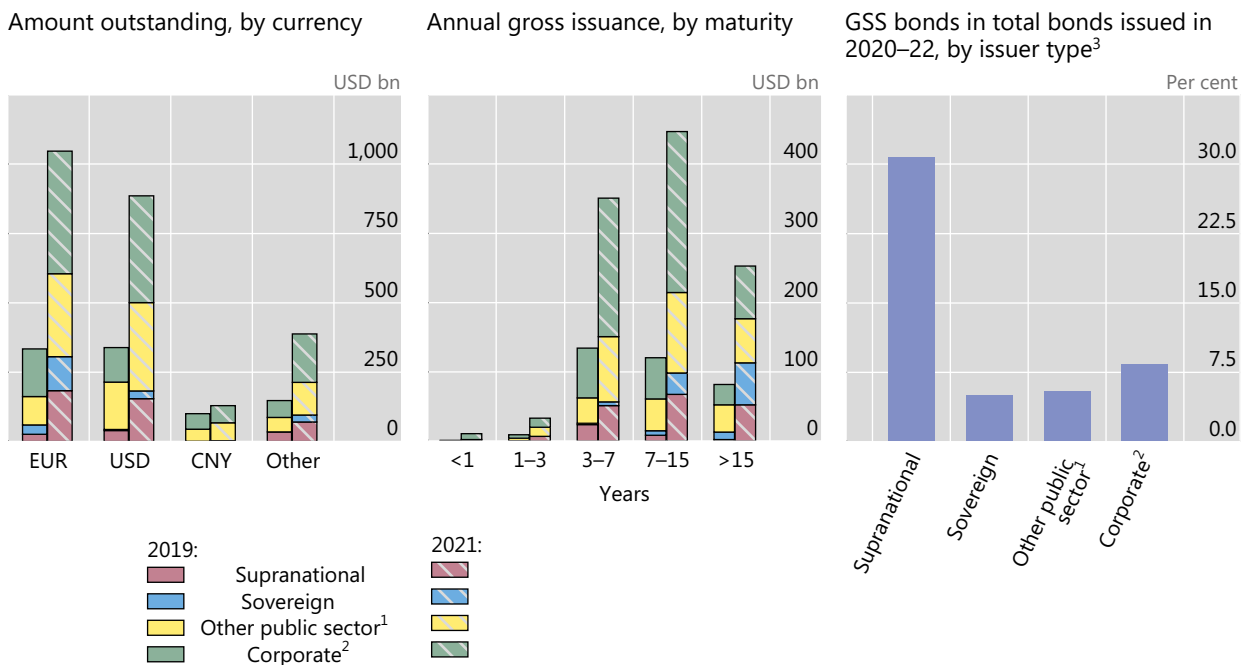
Sovereign green bond issuance has also increased since 2020. In particular, many countries, especially members of the European Union (EU), have committed themselves to using increased fiscal spending to accelerate green transition. Not only did several EU member states issue their inaugural sovereign green bonds during the pandemic (eg Sweden, German, Italy and Spain), but the EU also aimed at financing part of its pandemic response – for instance, 30% of NextGenerationEU funds – via green bonds.

The euro and the US dollar remain the key issuance currencies for GSS bonds, with euro denominations growing the fastest between 2019 and 2021, thanks to a strong contribution from sovereign issuers (Graph 2, left-hand panel). Not only did several EU member states enter the market, but many governments outside the euro area issued in euros to attract European institutional investors. The share of GSS bonds denominated in other currencies has also increased over time, mainly because other public sector and corporate issuers usually issue in the currencies of their jurisdiction.

Sovereign bonds tend to have the longest maturities within the GSS universe. Nearly two thirds of sovereign issues in 2021 are longer than 15 years (Graph 2, centre panel). The Monetary Authority of Singapore offered the latest example, with a 50-year inaugural green bond issued in August 2022 raising \$2.4 billion, the longest-tenor green bond issued by a sovereign. By contrast, 41% of corporate GSS bonds have a maturity of less than seven years. Between 2019 and 2021, corporate issuers have also increased their issuance tenor.

GSS bonds: currency composition, maturity structure and relative sizes

Graph 2



<sup>1</sup> Local governments, development banks and public enterprises. <sup>2</sup> Both financial and non-financial corporations. <sup>3</sup> Issuance amount.

Sources: Climate Bonds Initiative, Dealogic, Environmental Finance Bond Database, Refinitiv, authors' calculations.

GSS instruments represent a rather small share of the overall bond issuance from 2020 to 2022, despite their rapid growth since the pandemic. Standing at around 5%, this share is lowest for the sovereign (central government) sector, with that of other public sector entities similarly low. In the case of corporations (both financial and non-financial), slightly more than 8% of their total bond issuance were green instruments (Graph 2, right-hand panel). International financial institutions (supranationals) are the exception, raising more than 30% of their total bond issues via green instruments.

## Challenges and new options

While the momentum of sovereign GSS bond issuance has strengthened, structural challenges remain. At the same time, sovereign issuance can have a positive impact on general GSS bond market development by establishing best practices in verification and reporting. We now elaborate on these points, focusing on green bonds, given their dominant size within GSS instruments (Graph 1, left-hand panel). In addition, external review and impact reporting are most common for this bond class.

### The fungibility of fiscal revenues

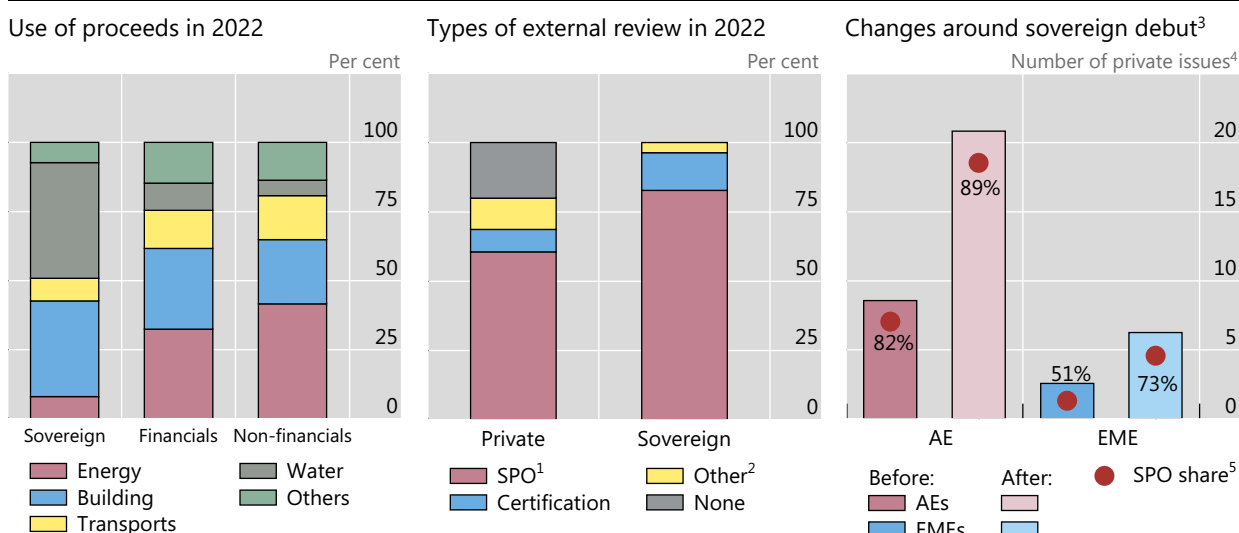
The fungibility of fiscal revenues is widely seen as one of the principles of public financial management. In some countries, it is written into the constitution or basic law (see OECD (2014)). This poses a challenge for many sovereign issuers of green bonds, who cannot legally commit themselves to using the proceeds of the bond for a specifically green purpose. While this is not the case for all sovereigns (Domínguez-Jiménez and Lehmann (2021)), public budgets are subject to frequent changes, and thus potentially to uses other than those envisaged for the proceeds of an existing green bond.

Relatedly, the framework for most sovereign green bonds does not guarantee that new green investments will be made using the bond proceeds. In many cases the funds can be used to refinance past expenditures (Kramer (2020)). Some sovereigns have tried to address this issue by committing some proportion – for example, at least 50% – of the proceeds for same-year expenditure, or for a combination of current and future expenditures.

### Sovereign bonds, green external review and impact assessment

Well formulated best practices in green bond markets have become increasingly important on the back of general concerns about greenwashing, or the tendency for issuers or brokers to misrepresent the environmental benefits of various types of security (Bolton et al (2022), Borio et al (2022)). There is thus great value in taxonomies and other forms of classification that aim to improve and standardise green definitions. That said, efforts are also needed to enhance the credibility of external reviews and reporting on both allocation and impact (Ehlers and Packer (2017), NGFS (2022)).

Despite their own challenges – and to address them in part – sovereigns have played a key role in promoting standards for green bond classifications and their



<sup>1</sup> Second-Party Opinion. <sup>2</sup> Assurance and ESG rating. In cases, where an issue has multiple forms of external review, only one is counted, in this order: SPO, certification, other. <sup>3</sup> This result is also corroborated by a panel regression which formally controls for a time trend and the behaviour of countries that have never issued sovereign green bonds. When the number of corporate green bond issues (and in separate regressions, the number of corporate green bond issues with SPOs) is regressed on a dummy that equals one in all periods during and after the sovereign debut, a quarterly time trend, and country fixed effects, the coefficient on the sovereign debut dummy is strongly significant. <sup>4</sup> Average number of green bonds per annum per jurisdiction issued by non-financial and financial corporations. <sup>5</sup> In the number of private issues.

Sources: Climate Bonds Initiative; authors' calculations.

verification. To date, all 38 central governments issuing sovereign green bonds have announced a green bond framework, all in line with International Capital Market Association (ICMA) principles.<sup>8</sup> Their issuance frameworks have set clear, publicly visible and ambitious examples. We discuss a few aspects of these frameworks in turn.

Sovereign green bond issues stand out in terms of their reliance on external reviews. Importantly, all sovereign issuers solicit a seal of approval from at least one, and often a variety of, specialised service provider(s). By contrast, as many as a fifth of corporate green bonds are self-labelled as green by the issuer without any external review (Graph 3, left-hand panel).

Beyond the verification of the use of proceeds, impact assessment provides another level of assurance that green bonds do achieve environmental benefits. All existing sovereign green bond frameworks require an environmental impact report.<sup>9</sup> With such reports, sovereigns seek to convey that sustainability objectives are a de facto priority, even in the presence of fungibility constraints. In comparison, impact reporting is still scant for corporate green bonds. So far, it has been only voluntary for corporate green bond issuers and, when it is conducted, reporting scopes and methodologies may differ considerably across issuers (NGFS (2022)).

<sup>8</sup> In 2014, the ICMA issued Green Bond Principles recommending a clear process and disclosure for issuers that ensure transparency, tracking and reporting of the use of green bond proceeds. The updated ICMA Green Bond Principles (2021 edition) recommend the use of both qualitative and quantitative indicators to show impact.

<sup>9</sup> In the case of France, for instance, an independent committee defines the specifications for the required impact report of green treasuries.

Sovereign issuers seem to have assumed a leadership role in promoting best practices in green bonds.<sup>10</sup> Indeed, the evidence suggests that the inaugural issue of sovereign green bonds tends to tighten standards for overall green issuance in that country. After such an issue, not only does the annual number of corporate issues tend to increase across jurisdictions, but so does the percentage of corporate issuance with second-party opinions. This tendency is apparent in both advanced and emerging market economies (Graph 3, right-hand panel).

## Sustainability-linked bonds: a new “green” option for sovereigns

SLBs offer an option that sovereigns can explore to address challenges related to the issuance of existing green bonds (and other use-of-proceeds instruments).<sup>11</sup> SLBs are instruments with pre-defined sustainability performance targets that the issuer commits to meet by a given date (“penalty event date”). If the targets are not met, the issuer is subject to a penalty, a mechanism that is absent in the case of conventional green bonds.<sup>12</sup> Thus, in contrast to use-of-proceeds bonds, SLBs give issuers freedom as to how to use the proceeds of any specific issue, which enhances the compatibility of SLBs with the fungibility requirements of public debt.

The SLB market across all issuer types is still nascent but has been growing rapidly. Growth picked up markedly in 2021, involving both AE and EME issuance (Graph 4, left-hand panel).<sup>13</sup> The first (and thus far only) sovereign to issue an SLB was Chile, in March 2022.

Another advantage of SLBs, in particular for sovereigns, is the strong signalling<sup>14</sup> towards achieving high-level climate policy objectives such as the Paris Agreement. Conventional green bonds may not result in a material reduction of carbon emissions, even if the promised use of proceeds is met to the letter (Ehlers et al (2020)). SLBs, on the other hand, can be linked directly to reduced greenhouse gas emissions through the contractual choice of the key performance indicator (KPI) (Graph 4, centre panel). What is more, the target for greenhouse gas emission reduction can be aligned with the Paris Agreement by setting the contractual sustainability performance target (SPT) accordingly (eg a 50% reduction by 2030).

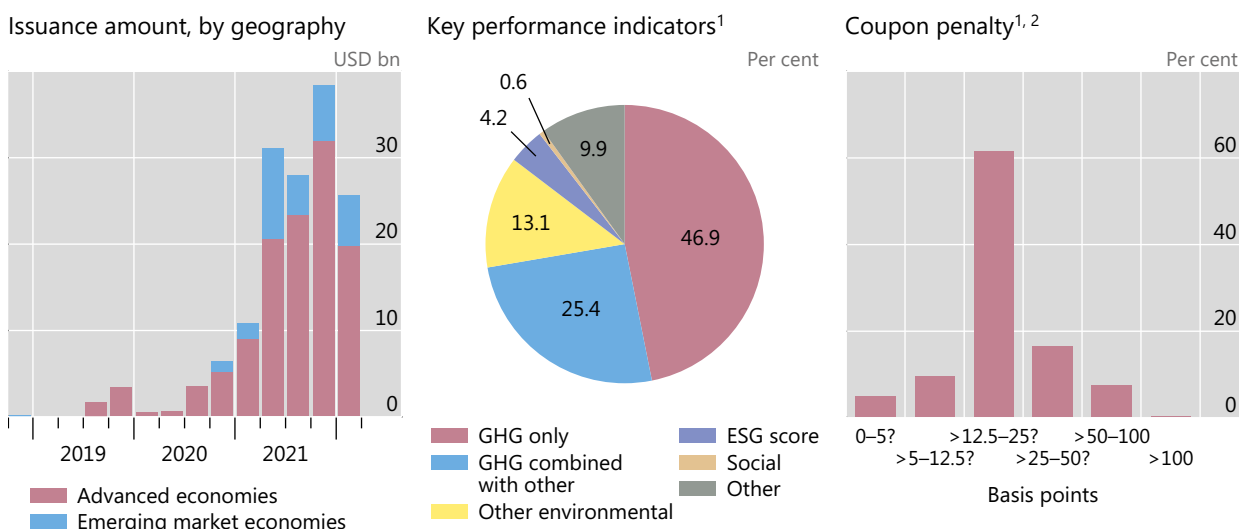
<sup>10</sup> In addition to sovereign issuers, public investors can also promote standards through their investment guidelines, which has been part of the rationale of the green bond funds that the BIS has launched for central bank reserve managers.

<sup>11</sup> The ECB has decided to accept SLBs as collateral for its refinancing operations to support “innovation in the area of sustainable finance”.

<sup>12</sup> There is no direct consequence for the issuer if the proceeds of a green bond are not used for green projects or if there are no resulting environmental benefits from using the proceeds as promised. Secondary effects, however, could include an exclusion from a green bond index or reputational costs that also influence the bond value, for instance through an elimination or reduction of any yield discount achieved by green bonds relative to conventional bonds of the same issuer (“greenium”).

<sup>13</sup> See De la Orden and de Calonge (2022) for an in-depth discussion of how SLBs can be used to mobilise capital for sustainable investments in emerging markets.

<sup>14</sup> Unlike GDP-linked bonds, the contingent mechanism of SLBs is thus intended to penalise non-compliance with environmental goals, in sharp contrast to GDP-linked bonds, which instead reduce the burden on the issuer in the event of unforeseen shocks, which effectively offers insurance, raising moral hazard considerations (Borensztein and Mauro (2004)).



ESG = Environmental, social and governance; GHG = Greenhouse gas.

<sup>1</sup> Share calculated on the basis of aggregate gross issuances amounts over all countries and time periods. <sup>2</sup> Share calculated only for SLBs with a coupon step-up penalty (more than 70% of aggregate issuance amounts).

Sources: Bloomberg; authors' calculations.

For SLBs to gain market relevance and incentivise issuers to achieve the declared objectives, it is essential to set contractual parameters appropriately. This includes KPIs, the associated SPTs and the penalties when the SPTs are missed.

A key problem in the case of sovereigns is that, in practice, penalties cannot be set high enough to create material *financial* incentives for meeting sustainability targets.<sup>15</sup> The annual outlays necessary to achieve a national emission pathway consistent with the Paris Agreement for the energy sector alone amount to several percentage points of GDP. This dwarfs any penalty-related increases in bond service costs (IEA (2021)). Concretely, coupon step-ups in most cases have been 25 basis points or less (Graph 4, right-hand panel), including in the case of the Chile's SLB.<sup>16</sup>

To the extent that a financial penalty has an important signalling effect to investors, it can still serve as sovereigns' commitment device. Setting the penalty very low, as is arguably current market practice, may reduce the credibility of the commitment to achieving the set targets (Kölbel and Lambillon (2022)). Conversely, penalties high enough to be viewed as material by the public – coupled with the public's perception of the long-term benefits of meeting a sustainability target – could be seen as creating the appropriate incentives for the sovereign.

<sup>15</sup> In general, the penalty serves as an incentive mechanism for issuers. It is optimal for the issuer to achieve the sustainability target if the present value of the penalty is higher than the costs of achieving, say, a given degree of carbon emission reductions (Berrada et al (2022)).

<sup>16</sup> In the case of the Chilean sovereign SLB, the step-up is a maximum of 25 basis points if both SPTs (a greenhouse gas emission target and a renewable energy production target) are missed, or 12 basis points if one of the two targets is missed.



## References

- Berrada, T, L Engelhard, R Gibson and P Krueger (2022): "The economics of sustainability linked bonds", *Swiss Finance Institute Research Papers*, no 22–26.
- Bolton, P, L Buchheit, M Gulati, U Panizza, B Weder di Mauro and J Zettelmeyer (2022): "Debt and climate", *Geneva Report on the World Economy*, no 24, forthcoming.
- Borensztein, E and P Mauro (2004): "The case for GDP-indexed bonds", *Economic Policy*, vol 19, no 38, April.
- Borio, C, S Claessens and N Tarashev (2022): "Finance and climate change risk: Managing expectations", *VoxEU*, June, [voxeu.org/article/finance-and-climate-change-risk-managing-expectations](https://voxeu.org/article/finance-and-climate-change-risk-managing-expectations).
- Cheng, G, B Mojon and E Jondeau (2022): "Building portfolios of sovereign securities with decreasing carbon footprints", *BIS Working Papers*, no 1038, September.
- Climate Bonds Initiative (CBI) (2022): "Hong Kong green and sustainable debt market briefing 2021", July.
- De la Orden, R and I de Calonge (2022): "Sustainability-linked finance— mobilizing capital for sustainability in emerging markets", International Finance Corporation, *EM Compass*, no 110.
- Domínguez-Jiménez, M and A Lehmann (2021): "Accounting for climate policies in Europe's sovereign debt market", *Bruegel Policy Briefs*, May.
- Ehlers, T and F Packer (2017): "Green bond finance and certification", *BIS Quarterly Review*, September, pp 89–104.
- Ehlers, T, B Mojon and F Packer (2020): "Green bonds and carbon emissions: exploring the case for a rating system at the firm level", *BIS Quarterly Review*, September, pp 31–57.
- International Energy Agency (IEA) (2021): *Net zero by 2050 – a roadmap for the global energy sector*, revised version (fourth revision), October.
- International Capital Market Association (ICMA) (2021): *ICMA Green Bond Principles*.
- Kramer, M (2020): "Germany's inaugural green bond... not so green after all", *CEPS*, September, [www.ceps.eu/germanys-inaugural-green-bond-not-so-green-after-all/](https://www.ceps.eu/germanys-inaugural-green-bond-not-so-green-after-all/).
- Network for Greening the Financial System (NGFS) (2022): "Enhancing market transparency in green and transition finance", April, [www.ngfs.net/sites/default/files/medias/documents/enhancing\\_market\\_transparency\\_in\\_green\\_and\\_transition\\_finance.pdf](https://www.ngfs.net/sites/default/files/medias/documents/enhancing_market_transparency_in_green_and_transition_finance.pdf).
- Organisation for Economic Co-operation and Development (OECD) (2014): "Budget Review: Germany", *OECD Journal on Budgeting*, no 2014/02.
- Scatigna, M, D Xia, A Zabai and O Zulaica (2021): "Achievements and challenges in ESG markets", *BIS Quarterly Review*, December, pp 83–97.

