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Sustainability-linked bonds and their role in the energy transition

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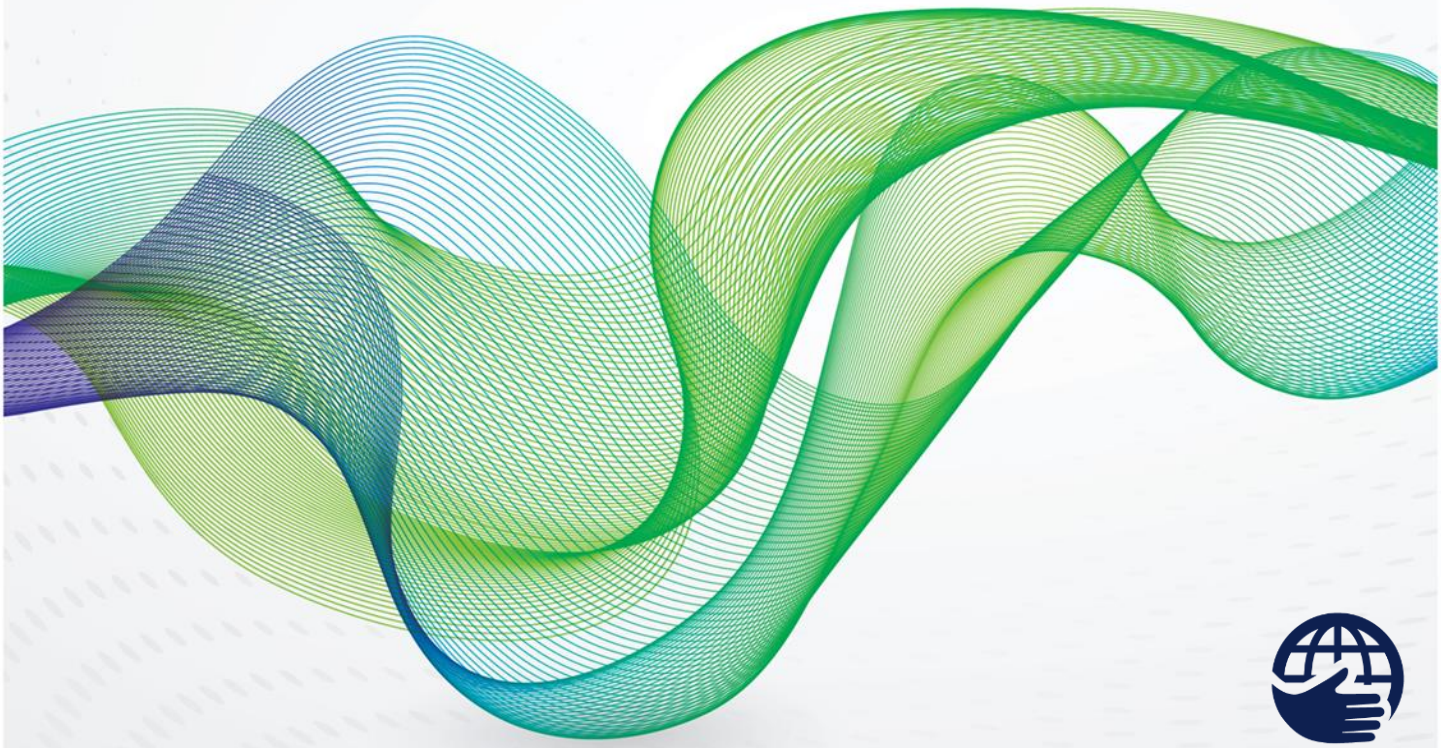

Energy Transition

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Abstract

Sustainability-linked bonds (SLBs) are emerging as a major sustainable financing instrument, particularly for companies in hard-to-abate sectors, which use SLBs as an alternative to more constraining financing instruments such as green bonds. For firms in economic sectors with large issuances of green bonds, such as financials and utilities, SLBs represent a complementary instrument to their sustainability financing portfolios. The main characteristic of SLBs is to embed financial incentives for firms to achieve specific sustainability targets. The 'margin rachet' structure typical of SLBs solves the inner tension in green bonds between project-level environmental benefit and company-wide alignment towards sustainability. Companies issue SLBs to signal their commitments to sustainability, raise cheaper financing, or both at the same time. However, the specific design of SLBs' financial incentives requires additional scrutiny from investors to distinguish the SLBs with reliable environmental characteristics from those with greenwashing motives.

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I. Introduction

The scale of the energy transition requires a sizeable increase in public and private investment to reduce the carbon intensity of the energy system[1]. The International Energy Agency (IEA, 2021) recently estimated that investments in the energy system need to increase annually from the current average between 2015 and 2020 of USD 1.5 trillion, to USD 5 trillion by 2030 and dropping to USD 4.5 trillion between 2040 and 2050. Total investments to reduce the energy intensity of economies and improve energy efficiency could range from USD 100 trillion to USD 150 trillion between 2020 and 2050 (IEA, 2021). At COP 26, signatories and private-led initiatives expressed their intention to ramp up the capital invested in climate mitigation, yet a large investment gap still remains. Progress in the Sustainable Development Goals will also necessitate a large deployment of funds for climate adaptation, requiring capital investments that cannot be met solely by public funds.

'Green' financing instruments play an important role in channelling capital towards the energy transition. Investors can use these instruments to express climate and, more generally, environmental, social and governance ('ESG') preferences. Depending on their degree of 'concern' for ESG, investors can implement investment strategies and invest in specific financial instruments tailor-made to offer ESG exposure. Firms can use these instruments to signal their commitment to the energy transition, raise cheaper funding, and occasionally both at the same time[2]. Given the current gap between the investment needed and the capital committed to the energy transition, green financing instruments are expected to continue their growth and become a major asset class that sustains the investment needed for the transition.

Among 'green' financing instruments, green bonds and sustainability-linked bonds (SLBs) are emerging as favoured solutions by firms making commitments to decarbonize their operations within their corporate strategies and mandates. The green bond market achieved substantial growth in the last decade, with more than USD 1 trillion total issuances in 2021, (Maino, 2021). Accounting also for social and sustainability bonds[3] (which together with green bonds are generally jointly labelled as 'GSS bonds') and SLBs, total issuance reached USD 1 trillion in 2021 alone[4], as seen in Figure 1. The SLBs market has seen strong growth since the first recorded issuance in December 2018. In 2021, the SLB market reached USD 120 billion and the latest available data for Q1 2022 suggests that it has grown to a total cumulative issuance of USD 155 billion[5]. Despite this rapid growth across green bonds and SLBs, the size of the green financing market is only a marginal proportion of the overall debt financing needed to realize the energy transition.

[1] Here and in the rest of the paper, carbon intensity of the energy system is intended in the sense of the Kaya Identity, i.e. emissions per unit of energy consumed or the ratio between carbon dioxide emissions and the unit of energy consumed. Kaya, Yoichi; Yokoburi, Keiichi (1997). Environment, energy, and economy: strategies for sustainability. Yamaji, Matsuhashi; Nagata, Kaya (1993). "A study on economic measures for CO2 reduction in Japan". Energy Policy. 21 (2): 123–132

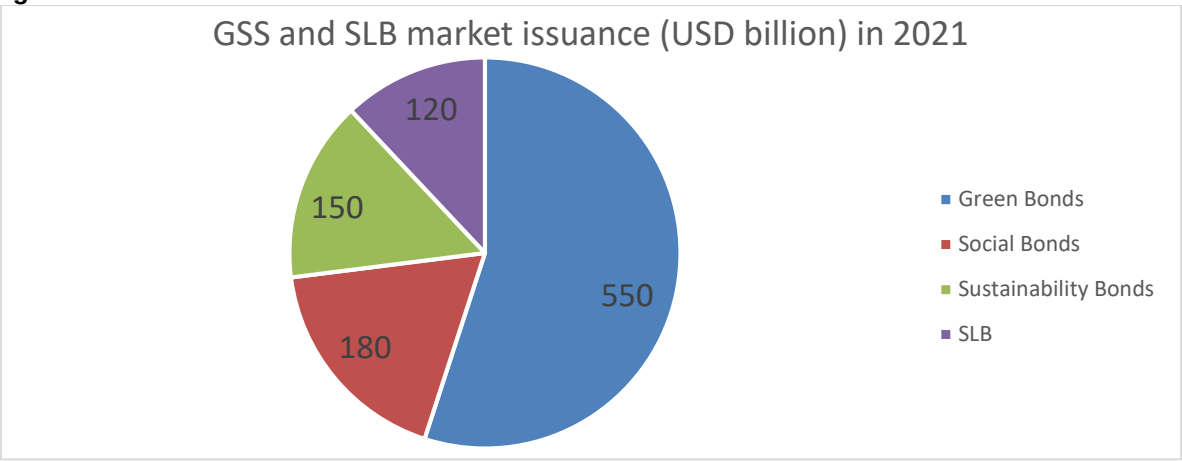
[2] Maino (2021) discusses the role of green bonds as a sustainable capital financing instrument for firms globally.

[3] Social and Sustainability bonds are 'use of proceeds' bonds similar to green bonds but for which capital raised needs to be channeled towards projects with social benefit, in the case of social bonds, and a mix of social and environmental benefits for sustainability bonds. Both social and sustainability bonds have their own ICMA principles in a similar way to green bonds. See: https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/social-bond-principles-sbp/ and https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-bond-guidelines-sbg/

[4] Total cumulative SLBs issuance reached USD 155.5 billion in Q1 2022 and Green Bonds reached USD 1.7 trillion. For comparison, the total size of the global bond market stands at USD 128 trillion as of August 2020. See: https://www.climatebonds.net/files/reports/cbi_susdebtsum_q12022_01f.pdf and https://www.icmagroup.org/market-practice-and-regulatory-policy/secondary-markets/bond-market-size/#:~:text=As%20of%20August%202020%2C%20ICMA,outstanding%2C%20is%20approximately%20%24128.3tn.

[5] https://www.climatebonds.net/files/reports/cbi_susdebtsum_q12022_01f.pdf

Figure 1: GSS bonds and SLB issuance in 2021



Source: Elaborated by the author using the Bloomberg Fixed Income Dataset. This figure shows the relative amount of GSS bonds and SLBs issued in 2021 in USD billion. From 2021, the SLB market expanded by 941 per cent year-on-year to a total of USD 135 billion according to data compiled by CBI. At the end of 2021, SLBs comprised 4.8 per cent of the GSS+ (also including Transition Bonds) market, up from a 0.9 per cent share in 2020 according to the CBI.

While green bonds have merit, they have shown to date only a limited scale of adoption in hard-to-abate sectors such as the manufacturing and energy sectors (with the exclusion of utilities which are large issuers of green bonds). All of the hard-to-abate sectors need to scale up capital investments to reduce their carbon footprint. Globally, companies have been lagging behind the required investment pace, arguably due to uncertain regulatory and policy environments. For instance, green bond taxonomies do not include extensive coverage of hard-to-abate sectors[6] thus limiting green bond adaptation in these areas.

More fundamentally, green bonds lack a clear link between financing and emissions reductions at the company level. This is because issuing firms are constrained in the way they deploy green bond capital but are not constrained in how other funds are invested. Also, the projects and assets underpinning green bonds do not need to satisfy a criterion of 'additionality'[7]. Therefore, the rapid growth of green bonds has been fuelled more often than not by 'relabelling'. In other words, refinancing existing corporate projects and assets under the green bond umbrella but not necessarily representing an increased company-wide effort to reduce within value-chain GHG emissions (thus the absence of 'additionality'). Research shows that the lack of an explicit requirement of 'additionality' for green bonds is at the core of the weak link between green bond financing and emissions reduction at firm levels[8]. Therefore, complementing green bond financing with science-based commitments would give investors some assurance of selecting climate-ambitious companies and would strengthen the link between green financing and emissions reductions at the company level.

Sustainability-linked bonds (SLBs) offer a solution to these two criticisms of green bonds by providing a more straightforward 'impact' financing mechanism at the firm level. They do so by linking financing to company-wide sustainability objectives and by de-linking raised capital for specific projects and assets, thereby removing constraints imposed by green bond taxonomies. In a typical SLB structure, the SLB financing costs are linked to the achievement of some sustainability key performance indicators

[6] For instance, in the case of the Climate Bond Initiative, several activities in the 'industry' category are 'under development' or 'due to commence'. See: https://www.climatebonds.net/standard/taxonomy
[7] Here 'additionality' is in the sense that the financed project would have not been realized in the absence of the raised capital.
[8] See for instance Ehlers, Mojon and Packer (2020).

(KPIs) [9]. If the issuers meet or beat the predefined goals at bond event dates, generally referred as sustainability performance targets (SPTs), they make reduced coupon payments to investors; these lower payments are referred to as 'step-down'. On the other hand, investors receive a higher coupon payment if the issuer does not meet the SPTs; these higher payments are referred to as 'step-up' payments. So, the issuing firm is penalized for underperformance and rewarded for meeting the targets.

The important questions from an investor perspective are:

- Which SLB structures are 'incentive-compatible'—in other words, designed in a way to offer real, material and binding incentives for the issuing firms to achieve their KPIs?
- Which KPIs show sufficient ambition for 'effort sharing' between investors and firms to reduce emissions, where effort for investors is the willingness to receive a lower ('step-down') coupon payment (or more generally a lower yield on its investment compared with conventional but otherwise equivalent bond investments) if the issuer successfully meets its targets?

In line with green bonds, and to foster transparency and standardization, several methodologies and third-party reviewers have emerged for SLBs. Most notable are the SLB Principles issued by the International Capital Markets Association (ICMA) [10], which echo the Green Bond Principles that have become a widely accepted green bond standard for issuers and investors.

It is worth highlighting that the SPTs are company-wide and are not restricted to a portion of investments or assets. If the issuers achieve the SPTs, investors forgo the potential coupon 'step-up' that is paid if the issuers don't meet their targets, or can even receive a coupon 'step-down' based on the SLB structure. This creates a direct monetary-incentive mechanism for the issuers to meet their targets. However, in principle, investors may not bear all the costs for sustainability improvements at the firm level. The overall 'sustainability premium'[11] depends both on the coupon conditions (to 'step-up' and 'step-down') and on the issuing prices that investors are willing to pay for the SLBs. This premium represents the overall monetary incentive (for the issuer to reduce their emissions and, more generally, to achieve its ESG/SDG targets) when the SLB is issued compared with an otherwise equivalent conventional bond issued by the firm. Note that while investors pay the 'sustainability premium' whenever purchasing the SLBs at higher prices during the life of the bond (which could be on the primary or secondary market), the coupon 'step-up' or 'step-down' only materializes at predefined coupon payment dates when the SPTs are achieved or breached.

Who pays for the sustainability improvements at the firm will determine to what extent SLBs are investment instruments enabling investors to have a positive impact on the climate (i.e. when they invest in SLBs trading at higher costs than comparable conventional bonds), and for issuing firms to signal their commitment to sustainability improvements (i.e. when issuing SLBs despite them being more expensive than comparable conventional bonds) [12]. If SLBs attract a 'sustainability premium' when issued, then investors pay for sustainability[13], thus suggesting that the recent strong growth of the market is at least in part due to cheaper financing costs obtained by the SLB issuers. As discussed in

[9] ICMA provides a list of illustrative KPIs for firms seeking to issue SLBs: https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/ . Examples are 'Scope 1, 2 and 3 GHG emissions (absolute in CO2e)', '% of revenues that are aligned with the EU Taxonomy' and other sector specific core and secondary KPIs.

[10] https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/June-2020/Sustainability-Linked-Bond-Principles-June-2020-171120.pdf

[11] In terms of nomenclature, in the article we refer to 'Sustainability premium' when referring to the lower costs of financing of SLBs compared to conventional bonds. The 'premium' reflects the higher costs at which SLBs are issued in primary market transaction. In terms of yields, this translates to a lower yield for SLBs compared to conventional bonds. In general, to a higher bond price at issuance, correspond a lower bond yield and vice versa.

[12] In other words, if SLBs are issued at a premium, then investors pay for the sustainability improvements of the firm. If they are issued at a discount, then issuers pay for issuing SLBs compared to conventional financing instruments.

[13] Which is the case when investors are willing to accept overall lower returns from companies willing to reduced their carbon footprint.

detail in the article, SLBs, on average, attract a sizeable 'sustainability premium' when issued suggesting that, to some extent, SLBs represent a cheaper financing solution compared with conventional bonds. However, not all SLBs have a 'sustainability premium' and still a considerable portion of the market—around 35 per cent of issued amounts according to Kolbel et al. (2022)—are priced at a discount[14]. This suggests that certain firms issue SLBs as a costly signalling instrument to communicate to investors and shareholders their commitment to sustainability. Ultimately, as discussed in the article, SLBs are used by both issuers and investors to contribute to sustainability improvements in line with their investments' mandates and corporate sustainability plans.

Finally, it is possible that part of the SLB issuance is motivated by greenwashing motives. This is even more plausible if one considers the SLBs which have a 'step-up' (reflecting post-issue performance) that is lower than the 'sustainability premium' (when coupons are issued). Furthermore, the structural design of a large portion of SLBs, which incorporate a call option at dates earlier than triggering events, raises questions on the transparency of certain structures from an investor perspective. In these cases, the issuer has the option to buy back the outstanding SLB if it appears clear that the firm will not be able to meet its SPTs. This obviously weakens the financial incentive of the firm to embark on costly investments to meet its SPTs in the first place.

The rest of the paper is structured as follows. Section II discusses the design and main characteristics of SLBs and looks at the impacts that SLBs can have in incentivizing issuers to achieve sustainability goals. Section III discusses the features of SLBs issued by private firms in the utility, manufacturing and energy sector. Section IV dives into the state of the SLB markets as of 2021, discusses the main trends and focuses on the role of governments and central banks in adopting SLBs. Section V analyses the main economic aspects of SLBs with a particular focus on pricing and incentive structures. Section VI concludes the report.

II. The design and impact of sustainability-linked bonds

SLBs are debt instruments which raise 'general purpose' funds for the issuing company, meaning that issuing firms are not constrained in the way collected capital is deployed within the company business. In itself, this is in contrast with the 'use of proceeds' structure of green bonds, in which funds are dedicated and often legally ring-fenced to specific projects and assets (Maino, 2021).

The main characterizing feature of SLBs is in the link between the cost of financing (in particular the coupon payment) and the achievement of specific sustainability performance targets (SPTs) by selected metrics, also referred to as KPIs. The SLB structure offers, under certain conditions, a monetary incentive for firms to reduce their carbon footprint in line with the stated KPIs and SPTs.

Similar to other initiatives related to green bonds, ICMA has published a Sustainability-Linked Bond Framework [15] and the ICMA Sustainability-Linked Bond Principles (SLBP), with the objective of providing a market standard and to support harmonization in the SLB market. According to the ICMA SLB Principles, SLBs are defined as follows: 'Sustainability-linked bonds (SLBs) are any type of bond instrument for which the financial and/or structural characteristics can vary depending on whether the issuer achieves predefined sustainability/ESG objectives. In that sense, issuers are thereby committing explicitly (including in the bond documentation) to future improvements in sustainability outcome(s) within a predefined timeline. SLBs are a forward-looking performance-based instrument.'

The main aspects of the SLB Principles are summarized as follows:

- Definition of KPIs: they embed the criteria upon which the issuer will be required to track its progress and will be assessed at pre-specified event dates. In order to follow a sound structure,

[14] Which is the case when investors are investing in SLBs which are less expensive than otherwise comparable bonds issued by the firm.
[15] https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/

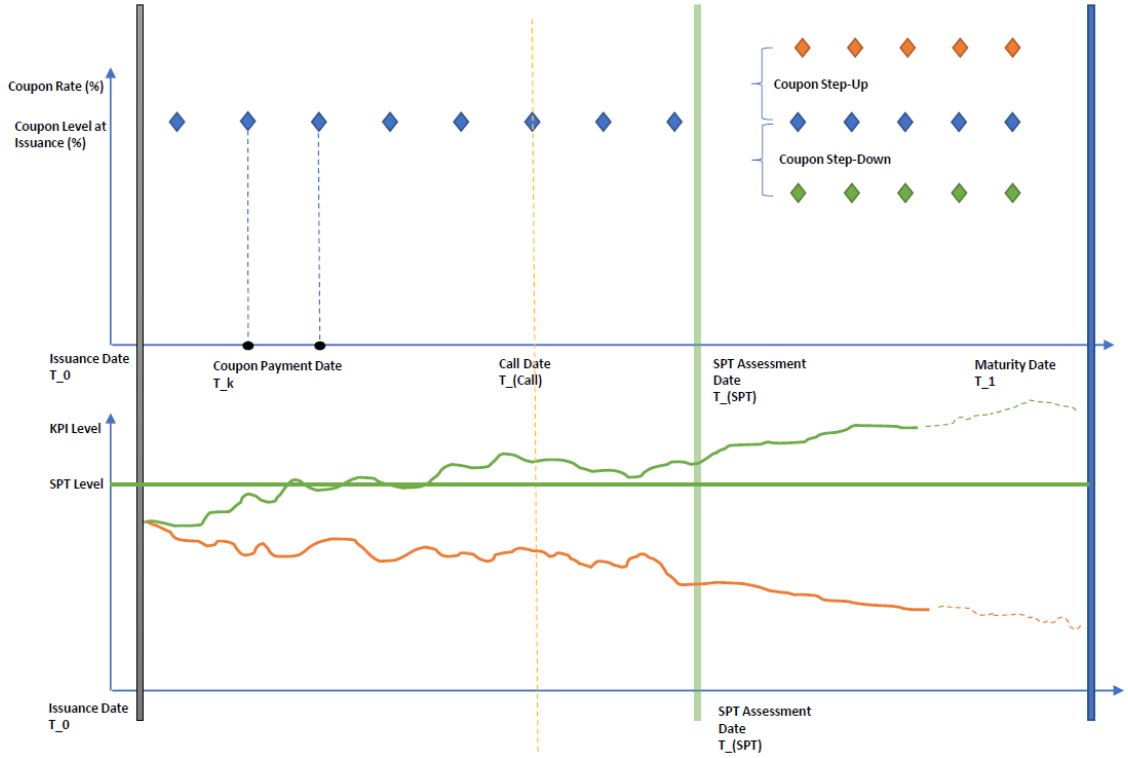
KPIs need to be: i) Credible—they should be climate aligned and represent real and material decarbonization and more general ESG targets for the issuer; ii) Measurable—KPIs should be based on quantities which can reliably be assessed; iii) Verifiable—they should offer the possibility for external parties to assess the targets that have been set; and iv) Benchmarkable—it should be possible to compare SPT ambitions across companies in time and in specific economic sectors. Issuers need to provide a track record of historically verified performance of KPIs and their rationale and fit within the issuer sustainability strategy. It is important to note that SLBP establishes high-level principles KPIs need to abide by, without specifying for example detailed criteria on KPIs and sector or company activities[16]. More specific criteria are, however, established for second-party verification in which external verifiers validate the alignment and credibility of a company's KPIs based on its economic sectors and activities.

- Calibration of sustainability performance targets (SPTs): issuers need to set appropriate targets for their KPIs. The targets need to be credible and sufficiently higher than 'business as usual' levels to provide meaningful incentives to improve sustainability. Issuers are also recommended to align their SPTs with a company-wide sustainability plan which is ambitious and externally verified. In order to inform investors, issuers need to qualify the calibration of SPTs by providing: i) historical performance of selected KPIs, ii) benchmarking compared with SPTs of industry peers when possible, and iii) science-based alignment of their SPTs in order to inform investors of the degree of ambition and positioning compared with an internationally recognized climate objective such as the Paris Agreement or a Nationally Determined Contribution (NDC).
- Definition of Bond Characteristics: consists of the structural details of the SLB and in particular defines the terms and conditions, such as event date, triggering events and step-up/step-down conditions related to the KPIs and SPTs. Typically, SLB structures include periodical evaluation of KPIs against SPTs and the triggering of coupon step-down when predefined conditions are realized. Also, in line with standard practices, bond documentation should include language related to exceptional events, such as drastic changes in regulatory environments, which could materially impact the KPI computations or restatement of SPTs; among others, a significant change in governance or M&A related events.
- Reporting: to promote transparency, SLBs need to include in the bond documentation detailed information about its structural elements such as i) information about selected KPIs; ii) calibration and historical performance of SPTs and their relationship with structural elements of the SLB; iii) updates on information related to the issuer sustainability strategy or corporate actions related to the KPIs and SPTs. The reporting should occur at least annually.
- Verification: in order to enhance transparency, issuers are expected to obtain external verification by a qualified external reviewer[17]. The scope of the verification includes the performance tracking of KPIs against corresponding SPTs. To comply with the SLBP, the verification must occur at least once a year and, in any case, in periods that are relevant for assessing SPT performance against potential adjustments of the SLB's structural characteristics. Most importantly, and in contrast with the Green Bond Principles, SLBs are required to include a verification assurance from an external verifier in their post-issuance report as part of their bond documentation.

[16] High level recommendations have been however developed by the SLBP's KPI sub-working group. See: https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/Registry-SLB-KPIs_Final_2022-06-24-280622.xlsx

[17] External verifiers need to abide to the 'Guidelines for External Reviewers' (https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/External-Review-Guidelines_June-2022-280622.pdf) and a full list of confirmed reviewers can be found at the link: https://www.icmagroup.org/sustainable-finance/external-reviews/

Figure 2: KPI contingent cost of financing in a typical SLB structure



Source: Elaborated by the author. This figure shows a typical SLB structure. Depending on the achievement of predefined levels of the SPT, SLBs trigger a step-up or step-down in the coupon rate. SPT levels, as illustrated in the bottom panel, are defined in the SLB documentation together with their corresponding KPIs. At SPT assessment dates, KPIs are assessed against calibrated SPT levels and trigger conditions for coupon step-up or step-down are evaluated. While coupon adjustments could, in principle, involve several coupon payment dates, most current SLB structures include only one coupon payment date after the potential trigger event. In the above figure, the green curve represents a scenario in which the company's KPIs improve until achieving its SPT (and triggering a step-down in the coupon payment) whereas the orange curve represents a scenario in which the SPT is not achieved at the SPT assessment date (triggering a step-up in the coupon payment).

Figure 2 shows the functioning of a typical SLB structure. At issuance, KPIs and SPTs are established in line with the SLB Principles. The SLB functions in a similar way to conventional corporate bonds in that it pays interest on coupon dates and can generally be called back by the issuers at pre-specified 'call-dates'[18]. At 'SPT assessment' dates, KPIs are compared against SPTs and trigger events are evaluated. If one or more KPIs underperform compared with their SPTs, the trigger event is realized and either the coupon 'step-up' materializes or the 'step-down' (or any other type of margin rachet mechanism) does not materialize for the current and/or future coupon payments depending on the bond structure.

It is worth noting the callable feature of many SLBs. Some callable dates precede the first SPT assessment date, thus allowing issuers to call back the bond in case KPIs are expected to undershoot compared with the SPTs. This feature has often been called into question by market observers in the context of SLBs as it weakens the financial incentive from issuers to achieve their stated SPTs. However, callable features in corporate bonds have become a market standard following the great financial crisis as they give issuers greater liquidity management capabilities.

[18] Generally, bonds with embedded call option are more expensive from the issuer point of view as they provide issuers with higher flexibility in their liquidity management.

The SLBP offer high-level guidance for issuers in structuring compliant SLBs. Beyond these high-level principles, the SLBP provide further indications, in particular related to the selection of KPIs and the calibration of SPT targets according to economic sectors and the issuer's activities as well as the level of ambition and the benchmark reference[19]. In relation to KPIs, the SLBP refer to support material in the form of an 'Illustrative KPIs Registry' for issuers to establish 'material' KPIs[20]. To determine relevant benchmarks and frameworks, SLBP refer to globally recognized standards such as the Paris Agreement or the 2030 Agenda on Sustainable Development Goals[21]. Other examples are provided by international organizations and accounting standards such as the Global Reporting Initiative (GRI) [22], Sustainability Accounting Standards Board (SASB) [23], Task Force on Climate-Related Financial Disclosures (TCFD) [24], International Integrated Reporting Council's Framework [25], the Accountability's Materiality Framework[26], and the various reports produced by the EU Sustainable Finance Platform[27]. The World Bank has issued further indications on the relevant KPIs[28] specifically for sovereign issuers. Finally, as discussed below, additional information regarding the assessment of KPIs and SPTs is generally found in the documentation provided by external verifiers as part of their verification assessment.

From the design of the SLBs described above, it emerges that the 'sustainability impact' of SLBs may originate from two main channels: i) SLBs link corporate monetary incentives to sustainability goals; ii) by issuing SLBs, firms publicly commit to SPTs whose breach may constitute a reputational loss[29]. However, market observers have noticed that two concerns remain for SLBs with respect to their effectiveness in delivering sustainability. First, penalties still remain relatively small, which might limit the amount of SLBs which are really incentive-compatible for issuers and that have a material and binding incentive mechanism for investors to 'behave' from a sustainability perspective. Nevertheless, it is possible that on top of built-in penalties from coupon step-ups, other implicit forms of penalties may arise from missing targets—such as a loss of reputation or of future access to market. The very early nature of the market does not allow a conclusion to be drawn either way. Second, another source of concern often cited is the difficulty in benchmarking KPIs of SLBs against industry peers and/or Paris Agreement goals given the market's early maturity. The following section on case studies includes an example of the importance of benchmarking between peers in the oil and gas industry.

III. Case studies: corporate SLB issuance

The early development of SLBs has mainly seen private firms entering the market. Interestingly, issuances have been coming both from firms that already have a presence in the green bond market, as in the case of the Italian utility Enel SpA, but also from new entrants in the sustainability financing market, particularly from firms in hard-to-abate sectors such as industrial, manufacturing and energy companies. This section discusses two case studies: the issuance of Holcim AG, a major cement manufacturing multinational, and the SLB issuances of Enel SpA. The following section discusses in more detail the first SLB issued by government treasuries: the Chile 2020 SLB issuance.

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[19] The 'Guidance Handbook' further elaborates on common questions by issuers regarding GSS bonds and SLBs. See: https://www.icmagroup.org/assets/GreenSocialSustainabilityDb/The-GBP-Guidance-Handbook-January-2022.pdf

[20] https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/ ; https://www.sasb.org/standards/materiality-map/

[21] https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/climate-transition-finance-handbook/

[22] https://www.globalreporting.org/how-to-use-the-gri-standards/

[23] https://www.sasb.org/standards/download/

[24] https://www.fsb-tcfd.org/

[25] https://integratedreporting.org/

[26] https://www.accountability.org/advisory/materiality-review/

[27] https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/220329-sustainable-finance-platform-finance-report-environmental-transition-taxonomy_en.pdf

[28] https://documents1.worldbank.org/curated/en/935681641463424672/pdf/Striking-the-Right-Note-Key-Performance-Indicators-for-Sovereign-Sustainability-Linked-Bonds.pdf

[29] It has to be noted that given the early development of the SLB market, empirical evidences on the role of reputations losses from failing to achieve established targets are not available yet.

Holcim AG, SLB 2020 and SLB 2021

In November 2020, Holcim issued its first SLB, the first in the cement manufacturing sector. The SLB is a EUR 850 million bond with a coupon[30] of 50 bps and maturity in 2031. As part of the bond structure, the coupon step-up is of 25 bps if the company fails to achieve its SPT of 475 kg net CO2 per tonne of cementitious material by 2030. In particular:

KPI: 'CO2 intensity calculated as kg net CO2 emitted/t cementitious material (kg net CO2/t.cem), scope 1. The selection of KPI is consistent with the comprehensive review of Holcim's material issues conducted in 2019, which involved external and internal stakeholders' views on which topics were most relevant for future value creation'[31].

Sustainability performance target (SPT): 'Equal to or lower than 475 kg net CO2/t cem, by 31 December 2030. Science Based Target Initiative (SBTi) validated in September 2020. LafargeHolcim's reduction targets for Scope 1 as consistent with a well below 2°C scenario'[32].

Bond characteristics: 'If the Sustainability Performance Target has not been reached at the Target Observation Date, as per the annual reporting published following the Target Observation Date, a coupon step-up will be payable'[33].

Reporting: 'will communicate annually on the relevant KPI and SPT, making up-to-date information and reporting available on its website'[34].

Verification: 'will apply the following layers of external verification: (1) ISS ESG (a second party opinion provider) provided a Second Party Opinion; (2) the performance against the SPT will be externally verified by an independent third party'[35].

The order book for the SLB was oversubscribed and reached EUR 2.6 billion. The company will report on its KPI performance against its target in its sustainability report which also includes an assurance report and an external verifier. The SLB has received a second-party opinion which confirmed its alignment with the SLB Principles by ICMA.

The SLB issuance is the result of a Partnership with SBTi to support development of a '1.5°C cement roadmap' with approved 2030 targets and an additional multiple sustainability initiative launched by Holcim[36]. Holcim has announced its net-zero pathway endorsed by SBTi on October 2021[37] and joined the First Mover Coalition as a founding member during COP 26.

It is worth noting that from the bond documentation on the coupon step-up, in the event of missing the SPT, the margin rachet will only apply to the last interest payment: '75bp payable on the last interest payment date before maturity, if LafargeHolcim fails to achieve the sustainability performance target'. This means that the monetary incentive on the bond for Holcim is small (0.25 per cent * 850 mio = 2.125 mio) when compared with the company's overall interest payment. Also, the SLB has a callable option (at a predefined callable date): 'Standalone, Make-whole call, 3-months par call, Clean up call (80 per cent)' [38].

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[30] Coupon rates are generally to be intended above Libor or other benchmark rates.
[31] https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_sustainability_linked_bond_-_investor_presentation.pdf
[32] https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_sustainability_linked_bond_-_investor_presentation.pdf
[33] https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_sustainability_linked_bond_-_investor_presentation.pdf
[34] https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_sustainability_linked_bond_-_investor_presentation.pdf
[35] https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_sustainability_linked_bond_-_investor_presentation.pdf
[36] See for instance: https://www.holcim.com/media/media-releases/founding-member-mit-university-usa-climate-sustainability-consortium ; https://www.holcim.com/media/media-releases/holcim-launches-nature-positive-strategy ; https://www.holcim.com/media/media-releases/holcim-accelerates-social-impact ; https://www.holcim.com/media/media-releases/holcim-net-zero-sbti ;
[37] https://www.holcim.com/media/media-releases/holcim-net-zero-sbti
[38] https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_sustainability_linked_bond_-_investor_presentation.pdf

A similar transaction was recently marketed by Holcim in the Swiss market[39]. In this particular case, the SLB refers to the Holcim's Sustainability-Linked Financing Framework which is subject to external verification by ISS ESG (an SLB verifier) [40]. As an illustrative example, the first KPI considered by Holcim is the 'CO2 intensity measured as kg net CO2 emitted/t cementitious material (scope 1)'. It relates to two SPTs: i) 'SPT 1: Reduction of net CO2 emissions per ton of cementitious material equal to or higher than 9.7% from a 2018 baseline by 31 December 2025', 'SPT 2: Reduction of net CO2 emissions per ton of cementitious material equal to or higher than 17.5% from a 2018 baseline by 31 December 2030'. The report elaborates on the materiality and alignment of the selected KPIs and SPTs with respect to Holcim's decarbonization pathway and sectoral activities.

ENEL SpA, SLB 2020

The utility sector has been one of the largest adopters of green bonds among corporate issuers and is also one of the early adopters of SLBs, mostly as a complementary sustainability instrument to green bonds. Examples are Iberdrola with cumulative issuance of green bonds as of 2021 at USD 16.4 billion across 21 deals, Engie SA with USD 16.9 billion across 14 deals and EDP at USD 2.4 billion across three deals[41].

Enel SpA has been at the forefront of sustainable financing, being one of the largest issuers of green bonds in the utility sectors. As of Q3 2021, Enel SpA (via its subsidiary Enel Finance International NV) has issued a total of USD 4.0 billion for a combined total of 3 green bond deals which are aligned with the ICMA Green Bond Principles. With respect to SLBs, in 2019 Enel issued the first ever SDG-linked bond[42], which is the first example of an SLB being issued. According to CBI, Enel SpA is the largest non-financial corporate and individual SLB issuer, with USD 12.1 billion as of December 2021[43].

In October 2019, Enel SpA issued a triple tranche SLB via its subsidiary Enel Finance International NV. The SLB issuance has a tenor of 4,7 and 15 years respectively for the three tranches, with maturities respectively in 2024, 2027 and 2034. The bond structure includes a 25 bps[44] one-time 'step-up' adjustment upon failure to achieve the SPTs. The SLB is structured with two KPIs and corresponding SPTs. KPI 1 is related to the 'Direct Greenhouse Gas Emissions Amount (Scope 1)' and the corresponding target (SPT 1) and the triggering event is evidence of a 'Decrease in Enel's direct greenhouse gas emissions by 70 per cent by 2030 compared with 2017 levels, equivalent to around 125 grams by kWh'. KPI 2 is related to the 'Renewable Installed Capacity Percentage' and the corresponding targets (SPT 2) and triggering events is: 'reach 55 per cent of renewable installed capacity[45] by 2021 compared with 2019[46]. In line with market standards, the bonds have a 3-months par provision, giving the issuer the option to call back (at a pre-specified call back date) the entire SLB against a lump sum payment of the outstanding amount of the SLB.

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[39] https://www.holcim.com/sites/holcim/files/documents/sustainability_linked_bond_investor_presentation_2022.pdf

[40] The second party opinion on the SLB has been provided by ISS ESG: https://www.holcim.com/sites/holcim/files/documents/holcim_sustainability-linked_financing_framework_second_party_opinion_2022.pdf

[41] https://www.climatebonds.net/files/reports/cbi_global_sotm_2021_02h_0.pdf

[42] See: https://www.enel.com/content/dam/enel-com/documenti/investitori/investire-in-enel/programmi-principali/sdg-bond/general-purpose-sdg-linked-bond_investor-presentation_september2019.pdf ; https://www.enel.com/content/dam/enel-com/documenti/investitori/investire-in-enel/programmi-principali/sdg-bond/investor-presentation_september2019.pdf

[43] https://www.climatebonds.net/files/reports/cbi_global_sotm_2021_02h_0.pdf

[44] Basis Points

[45] 'The Issuer reports that renewable energy installed capacity encompasses only electricity generation facility exclusively using any (or a combination) of the following technologies: wind, solar, hydro and geothermal and any other non-fossil fuel source of generation deriving from natural resources (excluding, from the avoidance of doubt, nuclear energy)'. See: https://www.enel.com/content/dam/enel-com/documenti/investitori/investire-in-enel/programmi-principali/en/second-party-opinion-on-sustainability-linked-financing-framework.pdf

[46] The SLB has received a second party opinion by Video Eiris: https://www.enel.com/content/dam/enel-com/documenti/investitori/investire-in-enel/programmi-principali/en/second-party-opinion-on-sustainability-linked-financing-framework.pdf

The second-party opinion conducted by Vigeo Eiris considers both the KPIs' and SPTs' ambition as 'Advanced' and contributing to SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action). In line with the SLB Principles, Enel commits to reporting at least on an annual basis on both KPIs within its yearly Sustainability Report and its Annual Report. Both are subject to external verification.

SLBs in the oil and gas sector as of Q4-2021

While the adoption of green bonds within the hard-to-abate sectors is still limited, there is a growing momentum for SLBs[47]. Non-financial corporates represented 89.5 per cent of total issuances. More specifically, the utilities, industrial and oil and gas sectors represent 20 per cent, 16 per cent and 7 per cent of the SLBs' volume respectively. Euros were also the preferred currency of issuance accounting for 50 per cent of overall transactions.

In the oil and gas sector, the largest SLB transactions are those of Enbridge Inc. [48] and Eni SpA[49]. They represent some of the very early examples of SLB issuance in the oil and gas industry. The comparison between the terms of the SLBs also highlights the importance of peer benchmarking when assessing the ambition of KPIs and SPTs. Enbridge Inc. issued SLBs totalling USD 1.5 billion in June 2021 with targets of 35 per cent Scope 1 and Scope 2 GHG reduction as of 2030, compared with a 2018 benchmark. The targets are considered by CBI as being limited in showing adequate ambition, as the targets are not extended to Scope 3 emissions and they represent a target which is already almost 70 per cent achieved. In comparison, Eni SpA is targeting lifecycle GHG emissions to reach net zero by 2050, from a 2018 benchmark, which represents a more ambitious strategy, though certain caveats remain as highlighted in the CBI report[50].

After a controversial initial issuance of green bonds in 2017, Repsol has returned to the market[51] in 2021 with a new green bond, one of the first in its sector. At the same time, the Spanish energy firm has issued two SLBs, marking a debut in this market for the firm and one of the first in its sector[52]. Table (1) shows the Top 5 SLB issuers in 2021.

[47] As of 2021, the SLB market expanded by 941% yoy to a total of USD 135.0 billion according to data compiled by CBI. At the end of 2021, SLBs comprised 4.8% of the GSS+ market, up from 0.9% share in 2020 according to CBI. See: https://www.climatebonds.net/files/reports/cbi_global_sotm_2021_02h_0.pdf

[48] 'Enbridge raises funds from sustainability bonds in climate-goal push', Reuters, 29 June, 2021, https://www.reuters.com/business/sustainable-business/enbridge-raises-funds-sustainability-bonds-climate-goal-push-2021-06-29/

Enbridge 'About Us', https://www.enbridge.com/about-us/our-values/sustainability.

[49] 'ENI launches the first sustainability-linked bond issue in its sector', eni.com, 7 June 2021, https://www.eni.com/en-IT/media/press-release/2021/06/eni-launches-first-sustainability-linked-bond-issue.html.

[50] https://www.climatebonds.net/files/reports/cbi_susdebtsum_h12021_02b.pdf

[51] 'Repsol Returns to Green Bond Market After First Sale Controversy', Bloomberg, 21 June 2021, https://www.bloomberg.com/news/articles/2021-06-21/repsol-returns-to-green-bond-market-after-first-sale-controversy.

[52] 'Repsol Fixed Income, Bonds issued by Repsol International Finance BV', https://www.repsol.com/en/shareholders-and-investors/fixed-income-and-credit-ratings/fixed-income/index.cshtml,

'Repsol set to raise 1.25 bln euros from sustainability-linked bond', Reuters, 29 June 2021, https://www.reuters.com/business/sustainable-business/repsol-starts-marketing-debut-sustainability-linked-bond-sale-2021-06-29/.

Table 1: Top sustainability-linked bond issuance as of December 2021

Issuer Name	Country	Sector	Cumulative amounts issued as of December 2021 (USD) billion	Cumulative number of deals
Enel Finance International NV	Italy	Energy–Power	16.9	**(15 deals)**
Enbridge Inc.	Canada	Energy–Oil & Gas	3.9	**3 deals**
Eni SpA	Italy	Energy–Oil & Gas	1.2	**1 deal**
NRG Energy Inc.	USA	Energy–Power	2.2	**2 deals**
Repsol SA	Spain	Energy–Oil & Gas	1.4	**2 deals**

Source: Climate Bond Initiative Market Analysis and author's computations

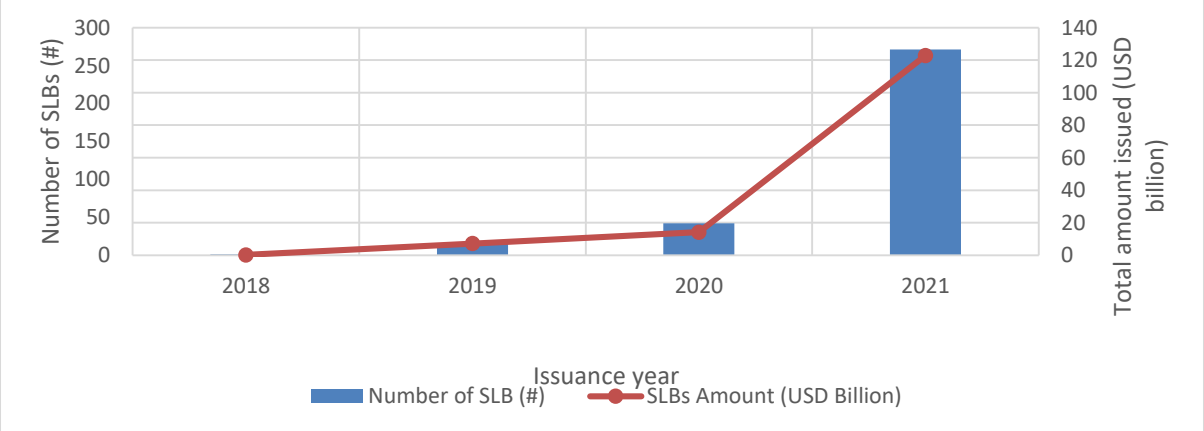
IV. Market developments for sustainability-linked bonds

SLB market status 2021

The year 2021 witnessed an all-time high volume for the issuance of SLBs. This was fuelled by the post-pandemic recovery, the focus of major countries on greening their economies, and growing consumer preferences for climate aligned-companies.

By looking at the universe of issued SLBs from the Bloomberg Fixed Income Database for 2021, Figure 3 shows that a total of 329 SLBs were issued by 189 companies. These SLBs were valued at USD 123 billion, an increase of almost USD 100 billion compared with 2020. The first SLB was recorded in 2019 by Enel SpA.

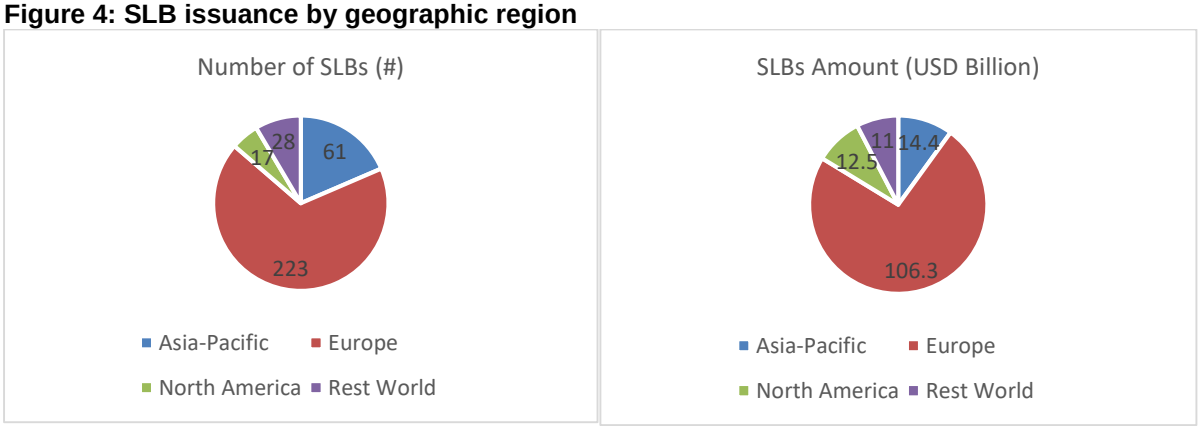
Figure 3: SLB issuance between 2018 and 2021



Source: Bloomberg Fixed Income Dataset. Number of SLBs issued in each year (left-hand side) and amount in USD billion of SLBs issued in each year (right-hand side).

As shown in Figure 4, the majority of SLBs are issued by companies incorporated in Europe and total USD 106 billion, where support by regulators, demand from investors, and awareness of consumers have been greater than in other jurisdictions. Asia-Pacific and North America follow but represent to date only a small percentage compared with the amount issued by European companies.

Figure 4: SLB issuance by geographic region



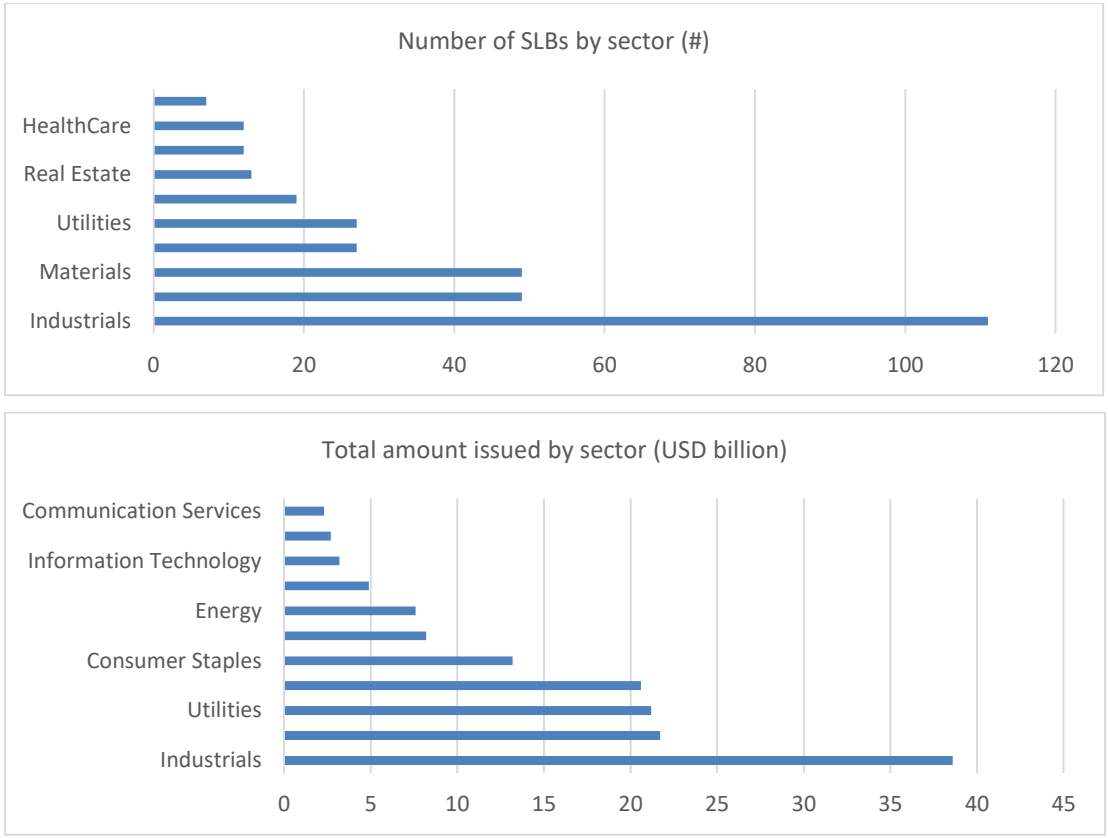
Source: Bloomberg Fixed Income Database. The panel on the left shows the total number of SLBs issued by geographical regions. The panel on the right shows the total amount of SLBs issued in USD by geographical regions.

In terms of economic sectors of issuers, classified by GICS sector classification[53], Figure 5 shows that industrials, consumer discretionary, utilities, and materials represent the largest economic sectors issuing SLBs. Compared with the economic sectoral distribution of green bonds, as discussed in Maino (2021), SLBs are issued more in economic sectors which are generally considered hard-to-abate, as in the case of materials and industrials. By contrast, the financials and real estate sectors, which are among the largest issuers of green bonds, represent only a small portion of the SLBs issued.

One reason for this trend is that, for hard-to-abate sectors, SLBs offer an alternative instrument to green bonds to signal their sustainability commitments. Hard-to-abate sectors are largely excluded by current taxonomies for green bonds[54]. Also, the materials and industrial sectors are very capital-intensive. They might be less prone to allocate some of their capital to specific projects and assets in line with the requirements of green bond standards, as explained by Maino (2021) [55].

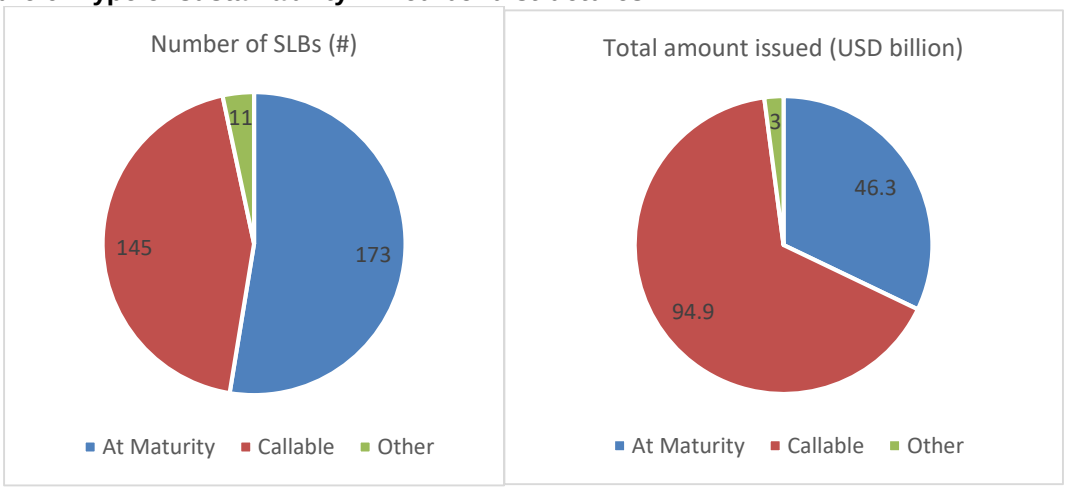
[53] https://www.msci.com/our-solutions/indexes/gics
[54] For instance, Climate Bond Initiative Taxonomy on Cement, Steel and Hydrogen as in development stage: https://www.climatebonds.net/standard/Steel
[55] More details on Q1 2022 recent issuance of SLBs can be found in the state of the market report in Climate Bond Initiative (2022).

Figure 5: Economic sectors of SLB issuers



Source: Bloomberg Fixed Income Database. The top panel shows the distribution of economic sectors of issuers by the total number of SLBs issued. The bottom panel shows the distribution of economic sectors of issuers by the total amount of SLBs issued in USD billion.

Figure 6: Type of sustainability-linked bond structures



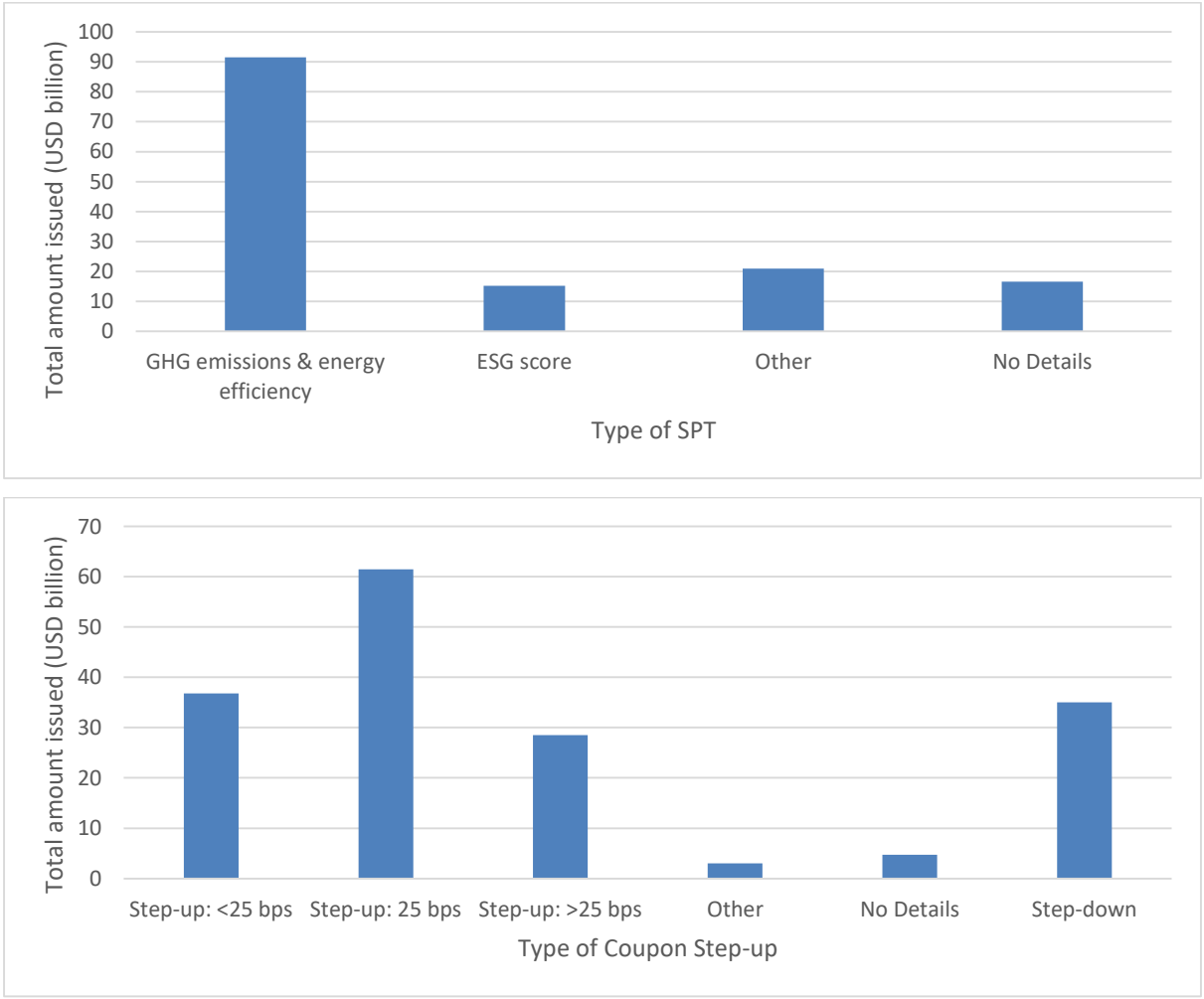
Source: Bloomberg Fixed Income Database. Shows the breakdown of the number of SLBs issued by maturity type (left panel) and the breakdown in USD billion of the amount of SLBs issued by maturity type (left panel). 'Other' refers to SLBs with more complex embedded optionality.

An important element of SLBs are their structural details. One important feature is related to the callability of the bond. Around 33 per cent of current SLBs in Figure 6 are 'At Maturity' bonds while the rest include a 'callable' option prior to maturity. While callable bonds are predominant in bond issuances due to their advantage in liquidity optimization and refinancing, in the case of SLBs, the callability feature interferes directly with their credibility and financial incentives. For instance, Kolbel et al. (2022) shows that only 12 per cent of the SLB issuers have not issued callable bonds prior to the SLB issuance.

As discussed in the previous section, this is an important element for an SLB structure, with callability undermining the incentive compatibility of the issuer's stated objective of delivering real and material sustainability impact.

Finally, Figure 7 shows the distribution of SPTs by type and by coupon step-up, as well as the total amount issued. The top panel in Figure 7 shows that the majority of SPTs are related to decarbonization targets such as 'GHG Emissions' and 'Energy Efficiency'. The bottom panel in Figure 7 shows that a coupon step-up of 25 bps (for underperformance) is the most common structure and, in general, coupon step-ups represent 75 per cent of the total amount issued. The remaining 25 per cent of SLBs have either coupon 'step-downs', other structures, or higher/lower coupon 'step-up' penalties.

Figure 7: Type of sustainability performance targets and coupon step-ups for sustainability-linked bonds



Source: Bloomberg Fixed Income Database. The top panel shows a breakdown by total amount issued in USD billion of sustainability performance targets in SLBs as of 2021. There can be various levels of 'Step-down' and 'Step-up' but these are not illustrated in the graph for brevity.

The role of government and central banks

As with green bonds, SLBs have received direct support by governments and central banks. Maino (2021) and Eliet and Maino (2021) discuss the role of governments and central banks in the green bond market. This section introduces the role of governments and central banks in the SLB market.

Central banks have also included SLBs within their programmatic support to greening the financial system. In the EU, where the ECB has been most active among the world's major central banks in promoting sustainable investment, SLBs have been included within the eligible universe of the collateral framework[56]. The collateral framework defines the set of assets that banks can pledge as collateral against liquidity in refinancing operations with the central bank. This reflects not only explicit support for the instrument, but also has the effect of ultimately supporting supply from issuers, as explained in Giovanardi et al. (2022) and Eliet and Maino (2022).

More specifically, central bank support includes measures that affect the relative supply of segments of the bond market by tilting their collateral framework and their bond purchases. Recently, the ECB announced further details on including environmental criteria within its bond-buying programmes, an approach which has been labelled as 'carbon neutral'[57].. Such measures can be expected to further incentivize the adoption of SLBs and green bonds, similar to the findings of Eliet and Maino (2022) in the context of green bonds. Giovanardi et al. (2022) show that these targeted measures are an alternative, although not equivalent to introducing carbon taxation on economic sectors' emissions.

SLBs are expected to play a complementary role to green bonds for governments when seeking to finance sustainability-related projects. The year 2022 has seen the first issuance of SLBs from the treasury of Chile. The next section focuses on the Chile SLB 2022 issuance.

Chile SLB 2022–First Sovereign SLB

In March 2022, the treasury of Chile issued the first sovereign SLB to date. The SLB raised USD 2 billion in line with the country's SLB framework. Sustainalytics, a third-party verifier, reviewed the Government of Chile's Sustainability-Linked Bond Framework and provided an opinion on the alignment of the linked instruments with the Sustainability-Linked Bond Principles (SLBP).

The issued SLB, in line with the Chile SLB framework, included two KPIs and SPTs: i) KPI 1 is related to 'Absolute Greenhouse Gas Emissions (MtCO2e)' [58] and ii) KPI 2 is related to the 'Share of Non-Conventional Renewable Energy Generation in the National Electric System'[59].

The SLB also includes the following SPTs. With respect to KPI 1: i) 'Achieve annual GHG emissions of 95 MtCO2e by 2030 from a 2018 baseline'[60] and ii) 'Achieve a maximum of 1,100 MtCO2e between 2020 and 2030'. Whereas, for KPI 2: i) 'Achieve 50% electric generation derived from non-conventional renewable sources by 2028, from a 2021 baseline' and ii) 'Achieve 60% electric generation derived

[56] https://greencentralbanking.com/2021/01/16/ecb-first-to-buy-climate-bonds/ .
[57] https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.pr220704~4f48a72462.en.html
[58] The following definition is established in the reviewer documentation (Sustainalytics): 'The KPI measures the absolute GHG emissions emitted in Chile, quantified using IPCC Guidelines for national greenhouse gas inventories. Emission sources include those from Chile's energy, industrial processes and product use, agriculture, and waste sectors. Quantified emissions consist of CO2, methane, NOx, hydrofluorocarbons, perfluorocarbons, Sulphur hexafluoride and nitrogen trifluoride. The KPI excludes emissions from land use, land use change and forestry'.
[59] The following definition is established in the reviewer documentation: 'The KPI measures electricity generated from non-conventional renewable energy as a percentage of the total electricity generated in Chile's National Electric System. Non-conventional renewable energy is defined by the Government of Chile under Law 20.257 (2008) as coming from sources that include geothermal, wind, solar, tidal and small hydroelectric plants (<20 MW).'
[60] https://www.hacienda.cl/english/work-areas/international-finance/public-debt-office/esg-bonds/sustainability-linked-bonds/chile-s-sustainability-linked-bond-framework ; The second party opinion on the SLB has been provided by Sustainalytics: https://www.sustainalytics.com/corporate-solutions/sustainable-finance-and-lending/published-projects/project/government-of-chile/government-of-chile-sustainability-linked-bond-framework-second-party-opinion-(2022)/government-of-chile-sustainability-linked-bond-framework-second-party-opinion-(2022)

from non-conventional renewable sources by 2032, from a 2021 baseline'. The two SPTs and KPIs are considered 'material' for Chile as they are in line with the country's NDC under the Paris Agreement[61]. For instance, with respect to SPT 1, Chile's NDC includes the following objectives: i) 'achieve an absolute GHG emissions level of 95 MtCO2e by 2030' and ii) 'do so without exceeding a maximum total of 1,100 MtCO2e between 2020 and 2030 as international commitments'[62].

In terms of demand, the bond was largely oversubscribed with more than USD 8 billion, 4.1 times the original placed amount.

As a leader in the Americas in the issuing of sustainable financing, Chile was also the first country to issue a green bond in 2019 in the region. The issuance of a SLB contributes the total of more than USD 33 billion of sustainable financing issued since 2019 from the government of Chile and highlights the potential for sustainable financing instruments for government financing aligned with NDCs[63].

V. The economics of sustainability-linked bonds

The above sections have focused on describing the main structural elements and potential impact arising from SLBs. Two important elements which help clarify the functioning and potential growth for SLBs are i) understanding the incentives of companies in issuing SLBs; and ii) understanding whether SLBs are an effective instrument to drive sustainability improvements at the corporate and country level.

From an issuer perspective, different motives might drive the issuance of SLBs. First, SLBs might represent a cheaper source of finance than conventional corporate financing instruments. In this case, investors are effectively paying for the sustainability improvement of the issuer[64] and SLBs are an instrument for investors to have impact or more simply to implement impact-related investment mandates. Second, SLBs might represent a costly instrument for companies to signal their commitment to sustainability objectives by linking their costs of financing to the achievement of sustainability-linked goals. This channel might be all the more realistic for those companies which issue SLBs at a cost in the primary market[65]. Finally, SLBs might represent a 'greenwashing' instrument for certain companies, especially if the SLBs issued lack materiality or ambition and fail to establish binding incentives for corporates by weakening the link between financing costs and sustainability targets.

Several studies on green bonds have analysed the presence of the 'greenium', which is the green premium reflected in the relative pricing between green and conventional bonds[66]. Evidence of the 'greenium' for green bonds remain mixed as detailed in Maino (2021) and references therein. These papers have mostly focused on examining firms' motivations and incentives and understanding the rapid growth of green bonds[67]. Some empirical research finds that green bonds sell at a premium, thus providing lower costs of financing for firms issuing green bonds. More recent papers have instead suggested that green bonds are more expensive for the issuing firms and that these firms may issue green bonds to signal their commitment to environmental sustainability, see Flammer (2020).

By the same token, SLBs might either prove to be a cheaper source of financing or a costly signalling instrument. Kolbel et al. (2022) shows that there is a statistically and economically significant 'sustainability premium'. By comparing the yield differential between SLBs and comparable conventional corporate bonds, they find an average of -29.2 bps sustainability yield discount at issuance

[61] https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/world-s-1st-sovereign-sustainability-linked-bond-issued-by-chile-69226229
[62] https://unfccc.int/NDCREG
[63] https://www.hacienda.cl/english/work-areas/international-finance/public-debt-office/sustainable-bonds/green-bonds
[64] In the sense that investors are willing to accept to invest on SLBs which are more expensive compared to otherwise equivalent conventional corporate bonds.
[65] In the sense that companies issue SLBs at a lower price compared to otherwise identical conventional corporate bonds.
[66] Ehlers and Packer, 2017; Baker, Bergstresser, Serafeim, and Wurgler, 2018; Hachenberg and Schiereck, 2018; Karpf and Mandel, 2018; Zerbib, 2019; Larcker and Watts, 2020; Flammer, 2021.
[67] See for example: Ehlers and Packer, 2017; Baker, Bergstresser, Serafeim, and Wurgler, 2018.

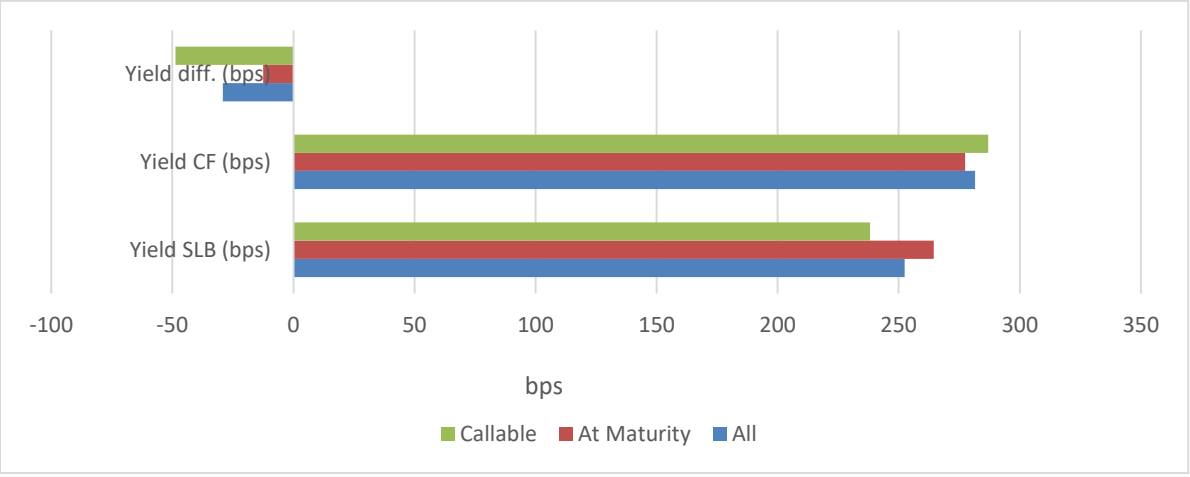
(or receive an equivalent 'sustainability premium' at issuance) compared with an average coupon step-up of 26.6 bps. One possible driver for the observed average cheaper financing received by SLB is the large inflow of capital dedicated to ESG and impact funds. Evidence shows that SLBs raise an order book that is 30 per cent to 40 per cent larger than conventional transactions[68].

This finding suggests that, at least on average, issuers benefit from lower costs of financing and investors pay for the sustainability improvements. However, when looking at the issuance of specific SLBs, Kolbel et al. (2022) find that while in 65 per cent of cases SLBs benefit from the 'sustainability premium', in 35 per cent of cases SLBs lack a 'sustainability premium' suggesting that these issuances are used by issuers as a costly instrument to signal their commitment to sustainability.

Beyond the actual existence of a 'sustainability premium' at issuance, for SLBs to represent an effective instrument to drive sustainability improvements at corporate level and disregard any risk of 'greenwashing', the incentive structure needs to exhibit real and material targets to represent a binding constraint from an issuer perspective. Following this line of reasoning, Kolbel et al. (2022) and Berrada et al. (2022) study whether SLBs set material and binding incentives for issuers. Kolbel et al. (2022) find that for a large portion of SLBs issued as of 2021, the average coupon step-up is lower than the 'sustainability premium' and this becomes effective more often than not in the last year(s) of the SLBs, thus limiting the financial costs linked to failing SPTs via the margin rachet penalty. Furthermore, many SLBs have a callable option (66 per cent by market volume based on data up to Q4 2021) which limit even more the monetary penalty arising from missing the SPTs.

Figure 8 shows the main empirical evidence on the 'sustainability premium' at issuance for SLBs[69]. The top panel shows the yield difference, which is the 'sustainability premium', for callable and 'maturity' (bullet) bonds. In particular, the yield differential is higher for callable bonds compared with non-callable (maturity) bonds. At aggregate level, the 'sustainability premium' is on average -29 bps, as highlighted in the blue bar in the top panel of Figure 8.

Figure 8: Sustainability premium in SLB transactions



Source: Bloomberg Fixed Income Dataset and Datastream. Based on computations by Kolbel et al. (2021), shows the pricing as yield-to-maturities for SLBs (bottom), conventional comparable bonds (middle) and the corresponding yield differential (top).

[68]The oversubscription of SLBs in primary market issuance is mostly driven by ESG driven institutional investors and by the small size of the SLB market. See: https://www.spglobal.com/marketintelligence/en/news-insights/blog/esg-sustainabilitylinked-bonds-offer-pricing-perk-for-right-high-yield-credits

[69] In terms of nomenclature, in the article we refer to 'Sustainability premium' when referring to the lower costs of financing of SLBs compared to conventional bonds. The 'premium' reflects the higher costs at which SLBs are issued in primary market transaction. In terms of yields, this translated to a lower yield for SLBs compared to conventional bonds. In general, to a higher bond price at issuance, correspond a lower bond yield and vice versa.

Berrada et al. (2022) study the conditions under which the margin rachet is 'incentive-compatible', in other words, when the SLBs' structure create binding incentives for the issuing company to embark on costly sustainability improvement. They propose a single period pricing model for SLBs and show that the 'margin rachet' is incentive-compatible when 'the discounted penalty saving is higher than the cost of exercising the sustainability investment'. Under certain conditions, for instance in cases in which the investors have preferences for investing in environmentally positive firms, investors pay more for the SLB than the actual cost of the underlying infrastructure needed by the issuer to achieve its SPTs. In their model, the excess amount paid by SLB investors is transferred directly to shareholders in the form of a lower cost of financing. This supports their findings that the stock prices of companies issuing overpriced SLBs react positively when announced.

In summary, the main characteristic of SLBs is to embed financial incentives for firms to achieve specific sustainability targets. Companies issue SLBs to signal their commitments towards sustainability, may raise cheaper financing, or do both at the same time. On average, SLBs are issued at a significant 'sustainability premium', although 35 per cent of transactions suggest that companies issue SLBs at a higher cost compared with comparable alternative bonds. Ultimately, the specific design of SLBs' financial incentives are important for investors to distinguish between SLBs with weaker incentive structures—which could signal a higher likelihood of 'greenwashing' motives—and reliable SLB structures suggesting a firm's material commitments.

VI. Conclusions

This article focuses on the role, impact, and economics of sustainability-linked bonds (SLBs) in the energy transition. SLBs are bonds which embed a coupon penalty, generally in the form of a coupon 'step-up' (increased payment) when the issuer fails to achieve one of the agreed sustainability targets. It may also embed a coupon 'step-down' if the issuer succeeds in achieving its targets. In contrast to green bonds, SLBs raise 'general purpose' finance, meaning that the raised capital is not constrained to eligible projects and specific assets with environmental benefit. Also, sustainability targets need not be linked to the energy transition and can include targets related to the Sustainable Development Goals. Nevertheless, the majority of SLBs include as a primary target the reduction in GHGs or energy transition related targets.

As a sustainability financing instrument, SLBs solve some of the disadvantages of green bonds as a source of finance. First, not relying on specific assets and projects, SLBs have been used in economic sectors which have been largely excluded by green bond markets because those sectors are effectively excluded by green tax taxonomies. Second, in sharp contrast to green bonds, SLBs provide a forward-looking instrument that rewards or penalizes companies for achieving or failing to meet company-wide sustainability targets defined in their SPTs. In that sense, they provide a direct link between the achievement of sustainability objectives and the costs of financing at company level. That link is missing in green bonds as issuers are not constrained in their investment policies beyond the capital raised via green bonds, thus not guaranteeing a company-wide reduction in carbon footprint.

Empirically, the presence of a 'sustainability premium' shows that investors are, on average, willing to pay for the sustainability improvements of issuing firms. This usually takes the form of oversubscribed issuances, with high demand driving up SLB prices compared with comparable conventional bonds. Kolbel et al. (2022) shows that since the end of 2021 SLBs have received on average -29 bps lower yield at issuance in primary market transactions. However, at least one third of SLBs do not exhibit a 'sustainability premium', highlighting instead that some issuers pay to signal their commitment towards sustainability improvements, most often by committing to reduce the company-wide carbon footprint. Also, some SLBs have bond structures with a relatively small 'margin rachet' (more often as a 'step-up' in the premium when the issuer fails to meet its targets) and with callable features that weaken the incentive profile for issuers, suggesting that a portion of SLBs might have 'greenwashing' motives.

The SLB market has been growing quickly from the first issuance in 2018. The total issuance of SLBs was valued at above USD 120 billion in 2021 and reached USD 155 billion in Q1 2022. The sectoral exposure of issuers shows that SLBs are considered either complementary to green bonds in certain

sectors or an alternative in other sectors. Utilities, real estate and the financial sectors are among the largest issuers of green bonds and of SLBs, although SLBs account for a small share of their financing portfolios compared with green bonds. By contrast, carbon-intensive sectors such as industrials, materials and energy, are among the largest adopters of SLBs and have only marginally entered the green bond market. This pattern shows that SLBs are a particularly suitable instrument for hard-to-abate sectors and can be expected to play a major role in sustainability financing for these sectors in the future.

SLBs provide a promising financing instrument for firms willing to lead and engage in the energy transition. However, high transparency, as well as material targets are necessary to ensure that SLBs provide significant incentives for firms to improve their sustainability profile.

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