Reforming Sustainability-Linked Bonds by Strengthening Investor Trust

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Abstract: This paper explores the emergence of sustainability-linked bonds (SLBs) as an innovative instrument to finance sustainability objectives. SLBs are any type of bond instrument for which the financial characteristics vary depending on whether the issuer achieves predefined sustainability objectives. SLBs were launched in 2019, represent 7% of labeled bonds, and now exceed USD 250 billion. In the context of the growth of sustainable finance and concerns of greenwashing, this paper asks whether SLBs are an effective mechanism to attract sustainable finance. Drawing on a complete revision of the literature and interviews with practitioners, the findings highlight the potential of SLBs to contribute to sustainability financing, especially in hard-to-abate sectors. Recommendations include defining standardized KPIs based on a materiality assessment, requesting SPTs to be supported by science, and tailored step-up mechanisms. The academic literature and experts converge in their description of greenwashing risks posed by SLBs, their signaling effect, and the lack of sophistication in SLB pricing, in particular the optionality represented by step-ups. The literature differs from the practitioners’ perception on the existence of an issuance premium. Enhancing the design of SLBs represents an opportunity to add rigor to sustainable finance and better price externalities, where material topics have an explicit impact on the cost of funding.

Keywords: sustainable finance; sustainability-linked bonds; SDGs; materiality; greenwashing

1. Introduction

Sustainable finance has achieved remarkable growth over the past decade. Assets under management with a sustainability label are expected to represent more than one-third of total assets under management globally by 2025 (Bloomberg 2022; Shahrour 2022). This growth has been led by rising social demands related to sustainability, regulations, and an evolution of the concept of fiduciary duty for asset managers (Redondo Alamillos and de Mariz 2022). However, the growth of sustainable finance has come with concerns around greenwashing, defined as an intentional or negligent “misrepresentation of the sustainability characteristics of a financial product and/or of the sustainable commitments and/or achievements of an issuer” (ICMA 2023b). Sustainable finance faces the challenge of reaching scale while maintaining integrity. Scale is needed, since reaching the UN SDGs will require USD 3 trillion to USD 5 trillion annually by 2030 (United Nations Global Compact n.d.). Integrity hinges on public and private sector collaboration to provide evidence of material impact and will require pricing mechanisms for sustainability to tackle imperfect markets (Glisovic et al. 2012; O’Donohoe et al. 2009).

Finance can serve sustainability in several ways: through the funding of businesses that have a positive environmental and social contribution, such as renewable energy or inclusive financial platforms enabled by FinTech (de Mariz 2020); or via innovative financial instruments, such as labeled bonds (Deschryver and de Mariz 2020; Bosmans and de Mariz 2023). Several of these instruments define an explicit price to reward the sustainable aspect of an economic activity or punish the lack thereof. Green bonds are the most well-known
sustainable debt instrument. They carry a green premium, although it is not guaranteed (Flammer 2021). Furthermore, this “greenium” is rarely the main factor for an issuer to abide by the Green Bond Principles (Mao 2023).

In contrast, four types of instruments carry a predefined, explicit, and enforceable price for sustainable characteristics: carbon credits, renewable energy certificates (RECs), contracts with sustainability clauses, and sustainability-linked bonds (SLBs) or loans (SLLs). Carbon credits relate to financial rewards or penalties tied to the externality of greenhouse gas emissions, in the voluntary or compliance market. RECs represent certificates granting legal ownership of a unit of electricity derived from renewable sources to corporations. Contractual agreements, such as social impact bonds, debt-for-nature swaps, and pay-for-results or pay-for-outcome contracts explicitly link a payment, reward, or penalty to the achievement of a predefined outcome with a clear positive impact on sustainability (de Mariz and Savoia 2018).

SLBs are an innovative financial product that translates a sustainability benefit into an explicit and quantifiable financial cost or benefit for the issuer. 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” (ICMA 2021).

SLBs are fixed-income securities whose structural characteristics depend on the issuer’s ability to meet predetermined key performance indicators (KPIs) and sustainability performance targets (SPTs). KPIs serve as metrics used to measure and evaluate the issuer’s performance. SPTs represent specific, quantifiable targets that the issuer commits to achieving over the life of the bond. SLBs possess a forward-looking nature and bring credibility to an issuer’s sustainability commitment. By combining KPIs and SPTs, the “materiality and ambitiousness of the company’s sustainability objectives can be externally verified and quantified” (Berrada et al. 2022). Commonly used targets include a reduction in greenhouse gas emissions and improvement in diversity metrics in the workforce.

SLBs distinguish themselves from the green, social, and sustainability bonds by adopting a “target-based” approach as compared to the “use-of-proceeds” model. Use-of-proceeds refers to a bond issuance structure where the funds raised are specifically earmarked for a particular purpose or set of projects or specific expenditures. On the other hand, SLB issuers have the flexibility to use the bond proceeds for general purposes. This feature makes SLBs accessible to a wider range of issuers, especially in hard-to-abate sectors. Failure to meet an SPT leads to alterations in the financial and/or structural attributes of the bond (ICMA 2023a). The most common mechanism is a step-up on the coupon paid. The prevailing market practice involves a step-up of 25 basis points to the bond coupon, with the average step-up amounting to 10% of the original coupon, with a “wide spectrum of variation” (Meng 2023). Once an issuer fails to meet the specified target by a specified date, the interest rate on the bond increases, leading to higher funding costs for the issuer. Step-down mechanisms also exist, albeit less frequently, and work in the opposite manner (IFC 2023). Under this approach, if an issuer successfully meets its targets, the coupon rate of the SLB decreases, rewarding the issuer with reduced interest costs upon reaching their sustainability goals. The alteration of the bond mechanism linked to a KPI can happen at the target observation date, which is the particular date on which the performance of each KPI is assessed against predefined SPT. The trigger event is the result of the observation outcome of whether a KPI has achieved or not a predefined SPT. The level of ambition of targets together with the materiality of the step-up represent strong signals of the issuer’s commitment to sustainability and materiality of KPIs.

The paper’s methodology draws on a mixed-methods approach, including the most complete revision of the literature on SLBs to date, the views from practitioners in sustainable finance, and market data. The paper presents considerations on SLBs stemming from semi-structured interviews with 14 sustainable finance experts gathered via an online multiple-choice survey conducted in November 2023. The interviews included a series of 19 closed-end questions with multiple choice and 2 open-ended questions (Appendix A). The multiple choices were derived from the literature. The responses were then computed
and aggregated to provide the descriptive statistics used in the article. The geographical breakdown included eight experts based in North America, six in Latin America, and one in Europe. By function, four experts come from financial institutions, four are third-party verifiers, three are investors, two work in academia, and one is an issuer. Two detailed interviews of experts were also conducted and recorded.

The contribution of this paper is two-fold. Our paper contributes to the emerging literature on sustainability-related debt securities by providing a complete review of the small but growing literature on SLBs. The paper also confronts the analysis of the literature with the view of practitioners. The paper analyzes whether SLBs are an effective mechanism to attract sustainable funds. By delving into SLB characteristics, the paper proposes potential design improvements to enhance SLBs’ effectiveness and improve investor confidence. Through those enhancements, SLBs can illustrate how material sustainability topics impact the financial profile of companies and potentially their credit ratings.

Our findings are as follows. First, we describe the advantages and limitations of issuing sustainability-linked bonds, building on the literature on sustainable finance. To enhance the design of SLBs and foster market trust, recommendations consist of standardizing KPI selection, comparability, and materiality assessments. Second, a better design includes calibrating SPTs by integrating targets into core strategies, linking them to science, demonstrating material improvement, and incorporating intermediate assessments. Third, bond characteristics should be enhanced through tailored step-up mechanisms. Finally, reporting practices should be improved through standardization.

The academic literature and experts converge when it comes to the greenwashing risks posed by SLBs, their signaling effect, and the lack of sophistication in SLB pricing, in particular the optionality represented by step-ups. We find that the literature differs from the practitioners’ perception on the existence of a premium: practitioners do not perceive a premium in SLB issuance.

The remainder of this paper is structured as follows. In Section 2, we describe the evolution of the SLB market and provide a review of the literature. Section 3 analyzes the advantages and limitations of SLBs and explores why linking a sustainability outcome with a financial cost for the issuer is a very significant mechanism, albeit not new. In Section 4, based on insights gathered from interviews, the paper proposes measures for enhancing SLB design and investor trust and discusses those measures in light of the literature. Section 5 is the conclusion.

2. Evolution of the Market and Review of the Literature on SLBs

2.1. Evolution of the Market of SLBs

The world’s first SLB was launched in September 2019 by Enel, a multinational utility based in Italy. The second issuer, the Brazilian paper company Suzano, did not appear until September 2020 (Liberadzki et al. 2021), illustrating the interest from emerging markets for sustainable finance (de Mariz 2022; Possebon et al. 2024). At present, cumulative issuance has surpassed USD 250 billion and represents 7 percent of the overall labeled bond universe (Meng 2023). SLBs took only four years to hit USD 250 billion, a milestone that took green bonds a decade to achieve. While SLBs benefitted from the ecosystem established by green bonds, SLBs also possess distinct characteristics that explain their appeal to issuers and investors alike. SLBs are more prevalent in the private sector than with sovereign borrowers.

That said, Chile and Uruguay were the first countries to launch SLBs linked to their Nationally Determined Contributions (NDCs) in 2022. Both bonds were oversubscribed and attracted new investors (The World Bank Group 2023), indicating investors’ strong interest and confidence in this asset class and setting a precedent for other countries. SLBs can address some of the challenges related to the issuance of green bonds, such as the “fungibility requirements for many sovereigns”. The authors note that “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” (Cheng et al. 2022).

The year 2022 posed challenges for the global capital markets, in particular with tighter monetary policies and heightened geopolitical tensions. In the green, social, sustainable, and sustainability-linked bonds (GSSS) segment, there was a 13% (IFC 2023) annual decline in issuance, marking the first decrease since the launch of green bonds (Figure 1). Despite this contraction, the GSSS segment fared better than the broader fixed-income market, which experienced a more substantial reduction of 26%. Notably, SLB issuances saw a 22% (IFC 2023) decline in 2022, followed by a recovery in 2023. The SLB market presents a higher proportion of high-yield issuers (28% for SLBs compared to 4% for green bonds), making them especially susceptible to the challenging conditions posed by higher rate levels (Meng 2023). SLBs have a higher acceptance than green bonds in hard-to-abate sectors such as aluminum and airlines (Figure 2). Indeed, the flexible allocation of proceeds in SLBs significantly broadens the pool of issuers compared to use-of-proceeds bonds.

![Figure 1. Semi-annual issuance of the labeled bond market (in USD billion). Source: Authors, adapted from Meng 2023.](image1)

![Figure 2. SLBs popular in hard-to-abate sectors. Source: Authors, adapted from Meng 2023.](image2)
Market data analysis shows that SLBs have issued thus far relied on one KPI in 53% of the issuances, two KPIs for another 35% of issuances, and three KPIs in 12%. As demand grows for a more measurable and less complex SPT mechanism, SLBs with just one KPI may prove more popular. A preference for a smaller number of SPTs goes hand in hand with a preference for SPTs that are science-based. For example, the European Central Bank (ECB) includes in its asset purchase program only those SLBs connected to SPTs with environmental goals like addressing climate change or environmental harm, excluding enhancements in ESG ratings or scores as valid SPTs. As the SLB market evolves, KPIs may become narrower in range and predominantly focused on environmental elements (S&P Global 2021a).

A diverse array of KPIs has been employed in SLB issuance, from greenhouse gas (GHG) emissions, waste, water, renewable energy, and energy efficiency (Climate Bonds Initiative 2022). GHG emissions have become the dominant KPI, with approximately 54% of total SLB issuance (Figure 3). However, GHG inventory coverage is not sufficiently thorough for the purpose of KPIs (Sustainalytics 2023). Indeed, in 2022, 33% of KPIs related to GHG emissions included only Scope 1 emissions, while 44% included two scopes, and 22% three scopes (Climate Bonds Initiative 2022).

![Figure 3. Most commonly used KPIs in SLBs. Source: Authors, adapted from Climate Bonds Climate Bonds Initiative (2023b).](image)

Metrics for carbon emissions can be categorized as either absolute or intensity-based. The metric of absolute emissions tracks total emissions over a time period, targeting a definitive reduction. Intensity emissions, on the other hand, divide emissions by economic or production output. An intensity-based KPI might offer comparability against other companies or a benchmark.

Many SLB issuers employ third-party verification to independently assess and confirm their achievement of sustainability targets, enhancing credibility and fostering trust among investors and stakeholders.

2.2. Review of the Literature on SLBs

The literature on SLBs is limited in essence, due to the recent nature of this financial innovation. Most of the literature has described the main market trends for this instrument,
including growth and profile of issuers. We provide below the most complete review of the existing academic literature on SLBs to our knowledge.

Academic research on SLBs has focused on four main aspects: (1) their role within the larger umbrella of sustainable finance instruments, (2) the pricing of SLBs, especially the existence of a premium for issuers and the pricing of the optionality of a step-up coupon, (3) the shortcomings in their design and potential for greenwashing, and (4) whether SLBs are effective to improve the sustainability profile of issuers, in what can be described as an elusive quest for additionality.

A stream of the literature analyzes SLBs in the overall context of sustainable finance. While most papers look at SLBs as just another and more recent category within labeled instruments, Barbalau and Zeni (2022) adopt an innovative approach and analyze the conditions to explain why issuers may resort to green bonds or to SLBs, defined as outcome-based contingent contracts. The authors find that “contingent debt is issued by low-type firms which seek to profit from manipulation, whereas non-contingent debt can be used as a costly signaling device”, suggesting SLBs can be prone to favor greenwashing.

A second stream of research analyzes the pricing of SLBs, at issuance and in the secondary market. Studies have explored the presence of a premium for SLB issuers (Liberadzki et al. 2021; Kölbel and Lambillon 2023; Ul Haq and Doumbia 2022; Berrada et al. 2022) and sustainability-linked loans (SLLs) (Aleszczyk et al. 2022; Carrizosa and Ghosh 2023; Kim et al. 2022; Du et al. 2022). The available data are not extensive enough to draw definitive conclusions. A comparison with conventional bonds reveals that the average coupon rate of SLBs is 14 basis points lower, and the yield at the time of issue is 9 basis points lower (Kölbel and Lambillon 2023). This indicates that SLB issuers can potentially benefit from a premium. Mięlnik and Erlandsson (2022) demonstrate that issuers may experience a notably reduced yield when the penalty for non-performance is substantial and front-loaded and sustainability targets are ambitious (Bruegel 2023).

Kölbel and Lambillon (2023) define a “bond matching technique initially developed to study the fair pricing of green bonds and documents for a large sample of 102 SLBs that issuers benefited from a sustainability price premium which is larger for callable bonds and for bonds that bear a higher coupon step-up”. The authors find that the average yield discount for their sample of −29.2 bps compares favorably with the average coupon step-up of 26.6 bps, with companies therefore deriving a “net benefit” of issuing SLBs or “free lunch” for issuers. The authors highlight the lack of relationship between the yield at issue and the coupon step-up agreement of SLBs, suggesting that the “value of the option that is embedded in SLBs is not a first-order influence on the pricing of SLBs”. This is consistent with the findings of Liberadzki et al. (2021) in their event study of the Tesco 2021 SLB issuance who “dismiss concerns that investors look for issuers to fail in pursuit of material changes in their carbon footprints”. The authors defend that investors are not misaligned with the issuer and do not bet on the issuer’s failure to meet its sustainability target.

Pohl et al. (2023) find that SLLs “come with lower initial spreads for borrowers”, with a more favorable pricing for “borrowers with strong environmental profiles, and for loan originations conducted using a lender syndicate with high environmental standards.”

Vejarano and Swinkels (2023) are more cautious and show that “yield differences between returns on sustainable and conventional bonds are small”, suggesting that “the risk and return profile of the portfolio is unlikely to change much when certain conventional bonds are replaced with sustainable bonds with similar characteristics.”

A third stream of literature highlights the limitations of SLBs and the loopholes in their design. SLBs’ design flexibility is described as a major advantage but also perceived to have shortcomings, as it can lead to greenwashing concerns for both issuers and investors. Our literature review highlights SLBs’ limitations across five categories: KPI selection, SPT calibration, bond characteristics, reporting and verification, and costs of issuance (ISS Insights 2022) (Burke 2023) (S&P Global 2023) (Segal 2023) (Ritchi and Tugwell 2022) (World Economic Forum 2022). The authors have mentioned shortcomings in “data transparency,
disclosure, adoption of global standards, and the lack of international rating” (Pianese 2023).

Ul Haq and Doumbia (2022) describe two loopholes in the design of SLBs: late target dates
and options to call the bond early. Vejarano and Swinkels (2023) flag the “lack of clear rules
and standardization for these new types of bonds risks leading to greenwashing by bond
issuers”. Kim et al. (2022) highlight “the importance of transparency in ESG-contingent
financing”.

A fourth stream of research looks at how SLBs incentivize issuers to improve their
sustainability profile. Berrada et al. (2022) build a highly stylized model to assess whether
SLBs are “incentive compatible for firms”, i.e., if pricing provides enough of an incentive
to the issuer to reach its sustainable target. They explain that it is optimal for the issuer
to achieve the sustainability target if the present value of the penalty is higher than the
cost of achieving a given sustainability target. The authors show that most SLBs are
overpriced by markets, leading to a wealth transfer from bondholders into equity holders
and limiting the incentive for the issuer to improve its sustainability profile. Carrizosa and
Ghosh (2023) analyze SLLs and find that “some sustainability-linked loans are designed
to provide incentives to borrowers to improve their sustainability performance, although
[they] also find some evidence consistent with greenwashing concerns”. Aleszczyk et al.
(2022) provide evidence that “sustainability-linked loans are unlikely to drive significant
impact on performance improvements in sustainability issues”, calling for more “contract
sophistication”. Similarly, Du et al. (2022) find “SLLs do not have lower initial loan spreads”
and “mixed evidence that borrower ESG performance improves post-SLL”, calling “into
question the purported objectives of SLLs in promoting sustainable practices”.

Several authors note the information asymmetry on the cost of achieving the sustain-
ability target. Kölbel and Lambillon (2023) believe ESG investors focus on the qualitative
signal of the SLB issuance rather than the details of the financial structure. This is consistent
with their finding that SLBs act as a signal especially on the first issuance. Auzepy et al.
(2023) present a cautious paper and show that “the issuance of SLLs is not associated with a
significant change in the ex-post ESG performance of the borrowers”. They also show that
“stock markets are rather indifferent to the issuance of SLLs by EU borrowers, while SLL
issuance announcements by US borrowers are met with significantly negative abnormal
returns by investors”, calling “into question the beneficial sustainability and signaling
effects that borrowers may hope to achieve by issuing ESG-linked debt”.

3. Potential and Limitations of SLBs

This section builds on a series of interviews with practitioners in the field of sustainable
finance. We review the SLB market outlook and potential. In semi-structured interviews
conducted with 14 industry experts, when asked about the general impressions about
the current state and adoption of SLBs, 39% of respondents claimed that “the market is
growing, but the effectiveness of these bonds in driving real change is yet to be seen”. In
total, 38% highlighted that SLBs “are gaining traction, but there is still a lack of awareness
and understanding among many investors”. An additional 23% mentioned that “SLBs
are at a nascent stage but hold great potential for sustainable development”. Therefore,
respondents present a cautiously optimistic view of the instrument.

When asked about “where [they] see the market for sustainability-linked bonds in the
next five to 10 years”, responses were relatively balanced. A total of 43% of respondents
claimed that “SLBs will continue at an inflection point if concerns about ambitions and
incentives to achieve sustainability targets are not addressed”; 43% expected SLBs “growing
significantly as awareness and demand for sustainable investments increase”; and 36%
mentioned SLBs “becoming more integrated with mainstream finance and playing a key
role in national sustainable development goals”.

The semi-structured interviews with experts reinforced and prioritized the list of
limitations and criticisms highlighted in the literature (Figure 4). In total, 33% emphasized
concerns with the calibration of SPTs, in particular the fact that targets are not standardized
and not always science-based, or that it is difficult to assess impact, especially to determine
whether SLBs could be fit for impact-focused investment strategies and Article 9 funds under SFDR regulation. A further 33% noted an unfavorable cost–benefit for the issuer, with a lack of financial benefit for issuers and an additional cost for structuring SLBs, with no clear greenium or reduction in yield at the time of issuance, especially driven by a lack of consensus on the valuation methodology tailored to SLBs. Overall, 25% percent of respondents pointed to concerns with the selection of KPIs, such as their lack of ambition, or materiality. Finally, 17% noted that the penalties (coupon step-up) defined in the bond mechanism are too mild. Finally, other concerns included the fact that this market is still new and will need more proof of concept, and negative headlines with select corporations missing their targets at the observation date.

![Figure 4](image-url)

**Figure 4.** “What do you perceive as the main factors that inhibit SLB market growth?” Source: Authors.

### 3.1. Selection of Key Performance Indicators (KPIs)

The choice of performance indicators (KPIs) is a concern, especially for comparability purposes. There is currently no universally accepted set of metrics for evaluating issuer performance, even though the ICMA registry offers an attempt to guide issuers and investors. Likewise, the World Bank has proposed guidance for KPI selection (The World Bank Group 2021). KPIs differ across entities, limiting the comparability of one set of indicators to another. The relevance of KPIs can differ based on factors such as an entity’s industry, business model, geography, and sustainability trajectory. Additionally, in certain instances, metrics established by an issuer may not apply to a significant portion of its business. According to the Fitch Sustainability-Linked Bond Progress Report, less than half of the 30 issuers examined have their core KPIs integrated with their business operations in accordance with the ICMA’s registry. Furthermore, 15% chose KPIs irrelevant to their business activities (Fitch 2022). KPIs should capture material aspects of company operations within the realms of sustainability factors. For example, a transportation company might prioritize carbon emissions, while a healthcare-focused company may find social topics like affordability more pertinent (Sustainalytics 2023). Standardization and materiality are two common shortcomings for KPIs, highlighted in the literature and by practitioners.

When asked about SLB effectiveness, 64% of respondents claimed that KPIs and SPTs are “somewhat effective” in driving environmental and social impact, suggesting
market perception differs from the available evidence flagged in the literature. A further 29% highlighted that “currently, [KPIs] lack the standardization needed to drive significant change”. An additional 7% mentioned they are somewhat effective, but penalties are too low and SPTs require higher incentives to be achieved (Figure 5). Therefore, respondents present a mildly optimistic view on SLBs with the need for more rigor and materiality on KPIs.

Figure 5. “How effective are the current SPTs and KPIs in driving social and environmental impact?”
Source: Authors.

3.2. Calibration of Sustainability Performance Targets (SPTs)

The choice of performance targets (SPTs) with a real-world contribution to sustainability goals is another concern, especially for impact measurement. To encourage an efficient market for SLBs, it is critical to set targets that are credible, measurable, transparent, and robust. Critics have argued that targets set by borrowers lack ambition and, in some entities, are set closer to the baseline business target as opposed to scientifically determined forward-looking ESG targets (S&P Global 2021b). Cross-industry comparison is a challenge, making tracking and assessment more difficult. ICMA’s Sustainability Linked Bond Principles (ICMA 2023a) explicitly emphasize the importance of SPTs beyond the “Business as Usual” corporate or sovereign trajectory (ICMA 2023a). Target setting requires ambition and a scientific basis.

Beyond concerns around KPIs and SPTs, 36% of respondents claimed that the incorporation of more diverse and sector-specific sustainability metrics could be beneficial to enhance the impact of SLBs (Figure 6). An additional 28% highlighted that “improvement is needed in transparency and accountability mechanisms”; 29% mentioned there needs to be better alignment with national sustainability goals; and 7% noted that simplicity will help drive adoption. Importantly, KPIs and SPTs are top-of-mind concerns, followed by transparency, assurance, and alignment at the country level.
3.3. Bond Characteristics

SLB characteristics—including an observation date too close to maturity, the callable nature of bonds, and a mild penalty—are sometimes a cause of concern for markets. In certain instances, the financial penalty for not meeting predetermined targets may lack the material impact needed to motivate the entity to achieve its goals. IFC (2023) found that SLBs are approximately three times more likely to be callable (65% of instances) than corporate green bonds (23%) and approximately five times more likely than conventional corporate bonds (12% of instances). Mild penalties for unmet goals as well as callable options on bonds may suggest issuers are not committed to their sustainability goals. Prominent early investors in green bonds have criticized SLBs for their lack of transparency regarding how proceeds contribute to improvements in issuers’ sustainability performance, the potential “gaming” of SPTs to make them easily achievable, and the insufficient incentivization provided by performance-based coupon adjustments (Vulturius et al. 2022). In contrast, select penalties might be seen as too high, especially in a context of rising rates for companies with strained cash flows, potentially putting additional pressure on issuers’ credit risk (Hermes Investment 2022). The European Banking Authority, cited by S&P Global (S&P Global 2023), notes that concerns over coupon rates highlight the complications of step-ups for issuers’ debt management offices. While KPIs and SPTs evidence flexibility and allow for innovation, research has pointed to the lack of customization of SLB step-up mechanisms, illustrated by the limited correlation of coupon step-up and credit ratings, as noted in the Fitch Sustainability-Linked Bond Progress Report. Markets have customarily implemented a one-size-fits-all step-up mechanism of 25 basis points for most issuers.

3.4. Reporting and Verification

The need for reporting and performance assurance is a consensus (Climate Bonds Initiative 2023a). The reliability of issuer performance against set targets is frequently dependent on self-reporting and unaudited practices. Consequently, performance may not be consistently or reliably reported. However, third-party verification as a mechanism is now being adopted by several issuers to provide more credibility to their issuances. In some countries such as Brazil, an auditing baseline is a requirement for new SLBs, which goes beyond ICMA rules that only recommend a verification of baseline, highlighting variable rules depending on jurisdiction (de Mariz 2022).

Figure 6. “Concerning SPTs and KPIs, what areas do you think require improvement in the design of SLBs to enhance their impact?” Source: Authors.
In order to obtain assurance, timely data availability is critical. Indeed, data should be accessible at a reasonable cost; attributable (“plausibly associated with […] interventions”); recent (“current and produced with enough frequency”); regular (“provided in sequence with equal intervals between them over a long period of time”); and comparable across countries (The World Bank Group 2021). Those principles are largely aligned with ICMA’s reporting guidelines, in which SLBs should have “up-to-date” performance information, “verification assurance report” relative to SPTs outlining KPI performance, and information available for investor’s assessment of KPI level of ambition (ICMA 2023a).

When asked how SLBs could be better designed to address sustainability-related risks, 64% of respondents mentioned “regular, detailed reporting on sustainability performance and risks”. In total, 43% emphasized the opportunity to “engage with unbiased third-party auditors”, while 21% noted the role of “including comprehensive risk assessments related to sustainability in their documentation”. The responses therefore combined pre-issuance risk assessment and third-party assurance as well as post-issuance reporting and disclosure, providing transparency to investors.

3.5. Cost Related to SLB Pre- and Post-Issuance

Finally, the pre-issuance and post-issuance of SLBs represent an extra cost for issuers, in the form of monetary expense and resource allocation. Before the issuance takes place, issuers need to disclose an SLB framework, hire a second-party opinion to provide an expert’s view on this framework, and define and audit a baseline. After the issuance takes place, the issuer will need to maintain frequent disclosure of its evolution toward the achievement of its targets. Moreover, the flexibility in KPIs and SPTs, while positive for issuers, can represent an additional operational burden or challenge for asset managers and investors who need to familiarize themselves with new targets. This extra cost is not different from what is observed in use-of-proceeds instruments, such as green bonds. We summarize below the advantages and limitations of SLBs (Figure 7).

<table>
<thead>
<tr>
<th>Advantages of SLBs</th>
<th>Limitations of SLBs</th>
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<tr>
<td>• Linking the attainments of sustainability goals with a financial penalty (or reward) is an innovation that gives credibility to sustainable finance instruments.</td>
<td>• Allowing for a wide range of KPIs brings comparability challenges and some KPIs may not be material, exposing issuers and investors to greenwashing risk.</td>
</tr>
<tr>
<td>• Allowing proceeds to be used for general corporate purpose (as opposed to use-of-proceeds bonds) opens SLBs to wider sector representation, especially hard-to-abate sectors.</td>
<td>• Defining SPTs that are not science-based may expose issuers and investors to greenwashing risk.</td>
</tr>
<tr>
<td>• Setting ambitious targets can bring credibility to an issuer’s sustainability commitment, acting as a signal.</td>
<td>• Bond characteristics, such as including an observation date too close to maturity, call options, and mild penalties, can be a source of concern.</td>
</tr>
<tr>
<td>• Defining KPIs flexibly can support innovation and allows to make KPIs context-specific.</td>
<td>• Reporting and assurance are a challenge for SLBs, since they require robust data disclosure.</td>
</tr>
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<td></td>
<td>• Issuing SLBs brings additional costs pre- and post-issuance.</td>
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Figure 7. Key advantages and limitations of SLBs. Source: Authors.

4. Enhancing SLB Design to Strengthen Market Trust

This section details what actions can be taken to address the concerns described in the previous sections, to enhance SLB design and support investor trust in this innovative finan-
cial instrument. An overall way to enhance SLBs is to engage stakeholders in their design. Drawing on semi-structured expert interviews, 62% of respondents emphasized the role of “creating platforms for continuous dialogue between investors and issuers”; 23% percent noted the importance of “conducting regular stakeholder meetings and incorporating their feedback into SLB design”; and finally, 8% highlighted the role of standard reporting and another 8% the role of pre-issuance consulting with investors to define materiality and KPIs. Overall, responses evidenced a preference for industry platforms, such as investors’ groups, followed by one-on-one tailored interactions between prospective issuers and investors.

4.1. Selection of KPIs

The lack of standardization in metrics presents issuers and investors with reputational risks. Aligning performance indicators with recognized reporting standards and external benchmarks will facilitate their broader adoption of SLBs (The World Bank Group 2021). For greater clarity and reliability, KPIs should be externally verifiable and disclosed frequently. This alignment is essential to validate the issuer’s ambition. In fact, issuers are expected to transparently articulate the selection process of KPIs, detailing the underlying logic and materiality assessment. A comprehensive explanation encompassing the baseline data, calculation methods, and eligibility criteria is necessary to meet industry standards (ICMA 2023b). Collaboration with key stakeholders including ICMA, credit rating agencies, or external sustainability experts to support the selection of KPIs based on an issuer’s sustainability theme is also advised. KPIs need to be relevant, aligning with UN SDGs and the Paris Climate Agreement (The World Bank Group 2021). The ICMA’s KPI registry (Chesné 2022), offering 300 pre-validated KPIs across 22 sectors complete with sector materiality matrices, serves as a resource for issuers to align their KPIs with their strategic goals. Although participation is voluntary, this registry is poised to become a cornerstone for third-party verification, potentially addressing the issue of insufficient investor trust.

4.2. Calibration of SPTs

The lack of comparability of performance targets between issuers and how trigger events can lead to financial impact for issuers can lead to information asymmetry in the market (Meng 2023). SPTs projected a decade into the future mirror current expectations around sustainability. However, the absence of a midway assessment point can lead to these targets becoming less relevant or challenging as time progresses, especially in cases where the targets are tied to external ESG scores or indices, which may evolve over time. ICMA (2022) recommends issuers to incorporate an intermediate assessment date for their performance targets.

The case of Suzano, a global pulp and paper company headquartered in Brazil, offers a compelling example of a successful implementation of the ICMA principles. Suzano raised SLBs worth USD 2.75 billion, reflecting the company’s commitment to align its funding needs with the sustainability targets integrated in their core strategy (Mielnik and Erlandsson 2022). Suzano’s 2020 SLB, distinguished as the “Sustainability-Linked Bond of the Year” in 2021 by Environmental Finance, set a notable precedent as the first globally to secure a voluntary second-party opinion (Environmental Finance n.d.). This pioneering step underlines two critical aspects for the analysis of SLBs. First, it underscores the paramount importance of having precise and readily available data, which can substantially reduce the uncertainty premium that investors might otherwise require due to the unclear dynamics of KPIs. Second, the valuation of the SLB is significantly influenced by the assumptions made about the company’s potential performance trajectory had it not issued the SLB. This aspect of “counterfactual” analysis is important. By presenting a well-founded scenario for these counterfactuals, issuers like Suzano can mitigate the uncertainty premiums. This approach is akin to option pricing, where certain recovery values are conventionally accepted (Mielnik and Erlandsson 2022). This strategic combination of data transparency and robust counterfactual reasoning plays a key role in the successful issuance and reception of SLBs like that of Suzano.
4.3. Bond Characteristics

The Inter-American Development Bank (IDB) Invest published guidelines on how to advance SLB design. The guidelines recommend trigger events to occur well before the bond’s maturity or call date. Additionally, to counter the misuse of voluntary call options, contractual terms should ensure that any early calls include the coupon step-up if KPIs are not met. According to the IFC (2023), there is already a growing trend towards using contractual terms more rigorously. “KPI restatement mechanisms” need clearer constraints—any such changes should require bondholder approval (Cavosoglu et al. n.d.). In total, 64% emphasize that increased mandatory transparency and consistent reporting standards would bolster investor confidence in SLBs, and 50% advocate for third-party verification (Burke 2023) to strengthen credibility.

When asked about the type of bond mechanisms, 46% showed a preference for step-up mechanisms. Surprisingly, the difference with other mechanisms was not as large as current market practice may have suggested. A total of 27% mentioned step-downs, and 9% mentioned that both step-up and step-down mechanisms should be used in an issuance. Finally, just 18% suggested using other tailored mechanisms, showing a clear preference for simple and relatively standardized mechanisms.

Criticism remains on the uniform nature of the 25 basis points step-up mechanism. Overall, 38% of respondents noted that the “uniform approach fails to account for the varying impact of SPTs on large versus small companies”; 31% highlighted that a “flat rate is insensitive to the varying challenges faced by high-grade and high-yield companies”, especially during periods of rising rates; 23% of respondents explained that a standard step-up does not consider the differing abilities of companies referring to their cash flows to absorb such penalties; finally, just 8% mentioned that the standard step-up of 25 basis points “fails to account for the wide range of KPIs” (Figure 8). A one-size-fits-all approach with a 25 basis points step-up mechanism ignores the size, credit quality, and repayment ability of the issuer as well as the wide variety of KPIs.

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**Figure 8.** “What are the most relevant criticisms of using a uniform 25 bps coupon step-up across different situations, and why?” Source: Authors.
To remedy the one-size-fits-all simplification of the step-up coupon, 46% of respondents suggest that the step-up should be aligned with the coupon “tailoring the reward relative to the company’s cost of debt”, neutralizing the effects of changing federal fund rates. Meanwhile, 46% believe the step-up mechanism should take into consideration the “company’s overall financial scale, ensuring equity between large and small issuers”. Finally, only 8% estimate that the step-up should be determined by the SPT, in an attempt to calculate the “true benefit/cost of the SPT”, irrespective of the issuer. Respondents showed a clear preference to anchor the definition of step-up to the total coupon of the issuance or to the total interest expense of the issuer.

The reality of the market calls into question some authors’ request for companies to disclose the cost of reaching their SPT (Berrada et al. 2022), since the step-up value appears to be independent from the actual company profile and not a driver of SLB pricing.

The vast majority (73%) estimate that the step-up mechanism should lead to a higher interest payment in the benefit of the investor, while 27% defend different options, such as the purchase of carbon offsets or donations to philanthropic projects, in order to avoid a perverse incentive whereby investors benefit from the non-attainment of SPTs.

Bond mechanisms also include callable features, which are normal practices for issuers that practice liabilities management. In order to avoid issuers using call options to conceal a missed target, 67% of respondents suggest “restrictive covenants or penalties for early repurchase”. This is in line with the literature showing call options as a loophole (Ul Haq and Doumbia 2022). A total of 33% suggest that enhanced transparency and reporting could deter issuers using the call options to hide a missed target. The Sustainability-linked Bond Principles from 2023 attempt to address this shortcoming by encouraging issuers to set the target observation date/payment of penalty date before the call date.

4.4. Reporting and Verification

Disclosure of advancement towards the issuer’s targets must rely on data sources that are credible and can be independently verified. To enhance transparency and reporting, 64% of respondents demand “mandatory, standardized reporting on sustainability metrics”. Overall, 50% require “having independent third-party verification of sustainability claims”, while 43% mention “regular updates and disclosures about progress towards sustainability targets”.

4.5. Potential for Growth

When addressing potential incentives to enhancing transparency and improving reporting, regulatory public bodies enforcing transparent SPT reporting (IFC 2023) came to light. Overall, 54% of our survey respondents answered that, to stimulate market participation, tax incentives for issuers and investors focusing on improving SPTs are recommended, which would offset additional reporting and third-party verification costs. In total, 20% highlight “recognition and reward for achieving outstanding sustainability performance”, 13% would explore potential subsidies or grants, and another 13% express there is no need for incentives.

Similarly, 50% mention that regulatory bodies “can facilitate market growth through supportive policies and incentives”, while 43% defend the role of regulatory bodies as rule setters, with “clearer guidelines and standards for SLBs”. In addition, 36% flag the role of regulators for “monitoring and enforcing compliance”, and 7% see no role for regulators (Figure 9).

The majority (79%) of respondents note the critical importance of showing “evidence of tangible environmental and social impacts” to increase investor confidence in SLBs, while 64% focus on transparency and disclosure, and 43% focus on the role of regulators (Figure 10).
5. Conclusions

SLBs have emerged as a transformative financial instrument, establishing a link between the cost of funding and predefined sustainability objectives. Their issuance can be a signal and lend credibility to issuers, and the flexibility of its proceeds explain their popularity in hard-to-abate sectors. Initially more prevalent in the private sector, SLBs are gaining ground in sovereign markets. Despite their success, SLBs have encountered skepticism, evidenced by a setback in the market in 2022 relative to other sustainable debt instruments. This juncture marks a crucial turning point, introducing uncertainty about the future trajectory of the SLB market. The maturation of SLBs, coupled with efforts to enhance trust, will shape its trajectory in the financial landscape.

The paper added a contribution to the literature with a critical review of the literature in light of the views of practitioners. The paper pinpointed limitations in five pivotal areas:
related to SLBs. First, KPIs may currently lack comparability and materiality. Second, SPTs may not be calibrated based on science, and as such can be less credible. Third, SLBs’ characteristics raise questions about how issuers can avoid penalties by calling bonds. Fourth, reporting and verification may not be as regular or detailed as required to instill trust. Finally, SLBs require more monetary and talent resources than plain vanilla bond issuances.

To enhance the design of SLBs and foster market trust, recommendations consist of standardizing KPI selection with a focus on clear logic, comparability, and materiality assessments. Second, a better design includes calibrating SPTs by integrating targets into core strategies, demonstrating material improvement, and incorporating intermediate assessments. Third, bond characteristics should be enhanced through tailored step-up mechanisms. Finally, reporting practices should be improved through the utilization of credible and verifiable data sources.

The size of the sample was limited both in terms of interviews and in the time period to analyze past SLBs. We therefore highlight the potential for future research with a larger sample, in particular to analyze to what extent sustainability targets are ambitious enough, how they contribute to a change in issuer’s behaviors, and how to improve the pricing of step-up mechanisms.


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**Appendix A**

The following questionnaire was completed by 14 industry experts, chosen based on their extensive experience and significant expertise within the realm of sustainable finance. The questions cover market trends, challenges, opportunities for growth, and the implications of these instruments for future sustainability initiatives. The questionnaire includes 19 multiple-choice questions and 2 open-ended questions. We indicate in parentheses the theoretical reference for the option.

1. What are your general impressions about the current state and adoption of sustainability-linked bonds?
   a. “SLBs are at a nascent stage but hold great potential for sustainable development”. (IFC)
   b. “They are gaining traction, but there’s still a lack of awareness and understanding among many investors”. (Green Finance Guide)
   c. “The market is growing, but the effectiveness of these bonds in driving real change is yet to be seen”. (Bond Vigilantes)

2. What do you see as the biggest benefits of SLBs?
3. In your view, how effective are the current SPTs and KPIs in driving social and environmental impact?
   a. “They are somewhat effective, but there’s room for more rigorous and impactful KPIs”. (S&P Global)
   b. “Currently, they lack the standardized compliance needed to drive significant change”. (S&P Global)
   c. “They are quite effective as they provide clear targets and measurable outcomes.”

4. What do you perceive as the main factors that inhibit SLB market growth?
5. Beyond SPTs and KPIs, what areas do you think require improvement in the design of SLBs to enhance their impact?
   a. “There needs to be better alignment with the Paris Agreement Goal and/or UN SDGs” (World Bank and ISS Corporate)
   b. “Improvement is needed in transparency and accountability mechanisms”. (IFC)
   c. “The incorporation of more diverse and sector-specific sustainability metrics could be beneficial”. (Climate Bonds Initiative)

6. How can SLBs be designed to better address and communicate sustainability-related risks?
   a. “By including comprehensive risk assessments related to sustainability in their documentation”. (PwC)
   b. “Through regular, detailed reporting on sustainability performance and risks”. (PwC)
   c. “By engaging with unbiased third-party auditors to mediate between issuers and investors.”

7. How can transparency and reporting practices be enhanced to boost the credibility of SLBs?
   a. “Through mandatory, standardized reporting on sustainability metrics”. (ESG Reporting Hub)
   b. “By having independent third-party verification of sustainability claims.”(ESG Reporting Hub)
   c. “Regular updates and disclosures about progress towards sustainability targets.”(ESG Reporting Hub)

8. What alternative methods or tools can be used to measure the impact of SLBs more effectively?
   a. “Utilizing advanced data analytics and AI for more accurate impact assessment”. (KPMG)
   b. “Implementing a robust system to correlate issuers’ credit ratings with applicable step-ups and target ambitions”. (Sustainable Fitch)
   c. “Enforcing issuers to purchase carbon offsets of a corresponding amount if SPTs are unmet”. (IDB Invest)

9. What are the key factors that, in your opinion, would increase investor confidence in SLBs?
   a. “Greater transparency and more consistent reporting standards”. (S&P Global)
   b. “Evidence of tangible environmental and social impacts”. (Bruegel)
   c. “Stronger regulatory frameworks and government support”. (Bruegel)
   d. “Expert advisory services to help issuers structure and market large-scale SLBs”. (ISS Corporate)

10. What role do you see for regulatory bodies in shaping the future of SLBs?
    a. “They should establish clearer guidelines and standards for SLBs”. (IFC)
    b. “Regulatory bodies could play a role in monitoring and enforcing compliance.”(IFC)
    c. “They can facilitate market growth through supportive policies and incentives”. (Bruegel)

11. What kind of incentives could be introduced to encourage more issuers and investors to participate in the SLB market?
    a. “Tax incentives for issuers and investors focusing on SLBs”. (QECBs and CREBs, US Department of Energy)
    b. “Financial subsidies or grants for issuers of SLBs, in order to increase issue size”. (Bruegel)
    c. “Recognition and rewards for achieving outstanding sustainability performance”. (IDB Invest)
12. How do you think stakeholder engagement could be improved in the structuring of SLBs (Impact Investor)?
   a. “By conducting regular stakeholder meetings and incorporating their feedback into SLB design.”
   b. “Through increased collaboration with NGOs and community organizations in SLB projects.”
   c. “By creating new platforms for continuous dialogue between investors, issuers, and beneficiaries.”

13. How can SLBs be better aligned with national sustainability goals and policies?
   a. “By directly linking SLB objectives with national sustainability agendas and targets and earmarking the proceeds for specific projects; combining the fundamentals of green bonds and SLBs”. (IEEFA)
   b. “Through collaboration between government bodies and SLB issuers for coherent goal setting”. (Energy Advisor)
   c. “By ensuring that SLBs support sectors critical to the national sustainability agenda”. (World Bank)

14. How can SLBs be effectively integrated with other financial instruments to promote sustainable finance?
   a. “SLBs can diversify green financial portfolios, offering investors a broader range of sustainable investment choices alongside traditional products”. (Sustainalytics)
   b. “Effective integration can be achieved by leveraging blended finance approaches to de-risk SLBs, such as credit enhancement, combining concessional and public financing in the SLB structure for CCE-SLBs based on high-quality collateral”. (World Bank)
   c. “Sustainability-linked funds leverage concessional finance and invest in conventional debt instruments, avoiding fragmentation of the debt portfolio and supporting emerging market issuers’ access to private capital”. (World Bank)

15. How can the long-term viability and attractiveness of SLBs be ensured?
   a. “By continually updating and improving sustainability targets and strong transition plans in order to reflect evolving global standards”. (Climate Bonds Initiative)
   b. “Through consistent market performance and proving the economic benefits of sustainability”. (Bruegel)
   c. “By fostering a supportive regulatory and economic environment for sustainable investments”. (IFC)

16. Where do you see the market for sustainability-linked bonds in the next five to ten years?
   a. “Growing significantly as awareness and demand for sustainable investments increase”. (S&P Global)
   b. “Becoming more integrated with mainstream finance and playing a key role in national sustainable development goals”. (Reuters)
   c. “SLBs will continue at an inflection point if concerns about ambitions and incentives to achieve sustainability targets are not addressed”. (S&P Global)

17. Should the mechanism for adjusting interest rates in response to missed or reached SPTs be a step up, step down, or another mechanism?
   a. “A step-up mechanism ensures clear penalties for missing targets, but may not be suitable for all issuers”. (ICMA)
   b. “Step-down mechanisms could provide incentives for exceeding sustainability targets but might be less effective in ensuring compliance”. (Environmental Finance)
   c. “Alternative mechanisms might offer more nuanced incentives or penalties tailored to specific issuer circumstances or market conditions”. (Green Finance Institute)
18. How can one ensure that issuers do not repurchase bonds early to conceal a miss in SPTs, given the higher likelihood of repurchase in SLBs compared to traditional bonds?
   a. “Introducing transparency and reporting requirements could deter issuers from using early repurchase as a tactic to hide SPT misses”. (Sustainability Accounting Standards Board)
   b. “Restrictive covenants or penalties for early repurchase related to SPT misses could be implemented”. (Climate Bonds Initiative)
   c. “Regular independent reviews and audits of SPT achievements could discourage early repurchase for concealing misses”. (Global Reporting Initiative)

19. What are the most relevant criticisms of using a uniform 25 bps coupon step-up across different situations, and why?
   a. “The uniform approach fails to account for the varying impact of SPTs on large vs. small companies”. (Hermes-Investment)
   b. “It does not consider the differing abilities of companies with large/small cash flows to absorb such penalties”. (Hermes-Investment)
   c. “A flat rate is insensitive to the varying challenges faced by high-grade and high-yield companies, especially during periods of fluctuating federal rates”. (Hermes-Investment)

20. What should be the basis for defining a just financial reward/penalty in SLBs? Please rank the top 3 rationales in order of importance.
   a. “Intervention-aligned: Estimating the true benefit/cost of the SPT, irrespective of the company’s size or sector”. (Global Impact Investing Network)
   b. “Company-aligned based on coupon: Tailoring the reward/penalty relative to the company’s cost of debt, neutralizing effects of changing federal rates”. (Federal Register)
   c. “Percentage of total cost: A penalty that accounts for a company’s overall financial scale, ensuring equity between large and small issuers”. (Reuters)

21. How should the step-up penalties in SLBs be applied?
   a. “Providing additional returns to investors, directly linking their investment returns to the issuer’s sustainability performance”. (Ceres)
   b. “Purchasing carbon credits for an equivalent amount, contributing to environmental sustainability directly”. (Aspiration)
   c. “Donating to charity or philanthropic causes, aligning financial penalties with broader societal benefits”. (Harvard Business Review)

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