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Authors
Jonas David and Ulf Erlandsson (Anthropocene Fixed Income Institute)

Coordinators
Jean-Baptiste Jacouton and Djedjiga Kachenoura (AFD)

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Sustainability-Linked Bonds and Credit Enhancement: New Approaches for PDB Financing

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Sustainability-Linked Bonds and Credit Enhancement: New Approaches for PDB Financing

Anthropocene Fixed Income Institute (AFII)

Auteurs

Jonas David
Research Director, Anthropocene Fixed Income Institute (AFII).

Ulf Erlandsson
CEO and Founder, Anthropocene Fixed Income Institute (AFII).

Coordinateurs

Jean-Baptiste Jacouton
Research officer.

Djedjiga Kachenoura
Research officer.

Résumé

Les investissements nécessaires pour atteindre les Objectifs de développement, notamment dans les marchés émergents et les économies en développement, nécessitent de mobiliser davantage de capitaux disponibles. Les banques publiques de développement (BPD) peuvent jouer un rôle clé dans l'expansion de la finance durable et la mise en œuvre d'investissements transformateurs. Pour cela, elles doivent bénéficier d'un accès à des financements de long terme et abordables.

Dans ce contexte, nous examinons la pertinence des structures de dette liées à la performance, en particulier les obligations liées à des objectifs de durabilité (« *sustainability-linked bonds* »), comme sources de financement. Combinées à des mécanismes de rehaussement de crédit, tels que des garanties, ces obligations ont le potentiel de réduire le coût du capital et d'attirer les investisseurs, ce qui favoriserait l'atteinte des objectifs de durabilité.

Nous proposons une solution innovante, nommée « obligations CORL ». Dotées d'un rehaussement de crédit partiel activé en cas d'atteinte des objectifs de performance, ce concept novateur permet d'aborder des questions fondamentales relatives au marché des obligations durables, et de réconcilier les incitations prêteurs/emprunteurs. Enfin, les obligations CORL pourraient permettre de mobiliser des capitaux privés supplémentaires grâce aux banques de développement.

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Abstract

The investments needed to achieve the Sustainable Development Goals, particularly in emerging markets and developing economies, require the mobilization of more available capital. Public development banks (PDBs) can play a key role in scaling up sustainable finance and driving transformative investments but need access to affordable, long-term funding.

In this context, we assess the suitability of performance-linked debt structures, specifically sustainability-linked bonds, as a source of funding. Combining such bonds with credit enhancements, like guarantees, has the potential to reduce the cost of capital and crowd in investors – both would help to achieve sustainability goals.

As an innovative solution, we propose Contingent Resilience-Linked (CORL) bonds with a partial credit enhancement that is activated if performance targets are reached. This novel concept makes it possible to address fundamental issues relating to sustainable bond markets, in particular reconciling lender/borrower incentives. Finally, CORL bonds could help mobilizing additional private capital through development banks.

JEL Classification
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1. Introduction

1.1. Investment needs and approaches revisited

In order to achieve the Sustainable Development Goals (SDGs), not only public but significant private capital will be needed, particularly in emerging markets and developing economies (EMDEs). The IMF highlights that climate mitigation alone requires investments of USD 2tn per year by 2030 and estimates that the private sector will have to cover most of it (IMF, 2023). Meanwhile, estimates on financing needs for sustainable development suggest an annual gap of up to USD 4tn in developing countries (Inter-agency Task Force on Financing for Development, 2024). Fundamentally, however, the notion of financing gaps is not equal to unmet demand for finance as this would require availability of investable projects that are close to commercial viability (Carter, 2023).

While there is uncertainty about the specific amount of investment required and bankable projects available, there appears to be consensus that more must be done to enable sustainable development. Already in 2015, the Addis Ababa Action Agenda (AAAA) recognized the challenges and outlined a new framework for financing development, combined with a comprehensive list of policy actions (UN, 2015; UN DESA, 2015). Back then, international financial institutions introduced the "billions to trillions" narrative, highlighting the need to mobilize resources of all kinds and the importance of private capital in addition to public sources (IMF, 2015). A decade later, stocktaking on the vision to catalyse trillions of private finance is sobering with progress far behind initial ambitions and further headwinds ahead amid scarce development aid resources, but also highlights specific points that need to be addressed and priorities going forward (Lee, 2025). For instance, solutions with high catalytic potential will require more risk taking. Notwithstanding challenges, mobilizing capital is expected to remain a priority, with multilateral development banks (MDBs) and development finance institutions (DFIs) as pivotal enablers of innovative solutions.

At the same time, it is important to have realistic expectations about what blended finance can achieve, both in terms of absolute investment amounts and relative to other key policies. While the AAAA emphasized the role of public policies as well as the mobilization and effective use of domestic resources, the focus has been on financing gaps. However, filling these gaps would imply extraordinary increases in annual expenditures in the order of 10-20% of GDP for lower-middle income countries, and considerably more for low-income countries (Carter, 2024). This would require fundamental changes beyond the supply of finance, including domestic policies and resources. A recent proposal argues for an international financing architecture focused on the SDGs and stresses the effective utilization of public funds that are already available, including those of development banks, to shape markets aligned with the SDGs (Mazzucato, 2025).

1.2. The role of Public Development Banks

Considering their relevance in scaling up sustainable finance and driving transformative SDG investments (Finance in Common and UNDP, 2022), this paper focuses on public development banks, particularly national and regional development banks (NDBs and RDBs, respectively) due to their unique characteristics and potential to mobilize resources.

In recent years, there has been increasing interest in PDBs and DFIs, underpinned by fundamental research and comprehensive data (Marodon, Jacouton, & Ploen, upcoming). NDBs can play a key role in financing projects to achieve the SDGs, leveraging their market expertise and ability to provide local-currency financing (Volz, Lo, & Mishra, 2024; Griffith-Jones, Attridge, & Gouett, 2020). As shown during the COVID-19 pandemic, they are also critical to respond to crises, relying on their own and additional resources for countercyclical economic support like lending and credit

guarantees (World Bank, 2021). This countercyclical role is observable in the syndicated loan market too, where NDBs address market failures (Gong, Xu, & Yan, 2023). Importantly, they provide loan financing with longer maturities than commercial banks, which argues for well capitalized NDBs to scale up long-term financing but also on-lending from MDBs for governments in a relatively weak financial position (Hu, Schclarek, Xu, & Yan, 2022). A study on PDBs in Africa highlights insufficient capitalization and high capital costs as key constraints, reiterating the need to improve access to affordable funding sources (Attridge, Chen, & Getzel, 2022).

Fundamentally, development banks play a special role in financial markets, not only as providers of capital to finance SDGs but also in terms of raising their own capital under the umbrella of labelled bonds. PDBs have been a cornerstone of the so-called Green, Social, Sustainable, Sustainability-Linked (GSSS) bond market accounting for over a fifth of total issuance (Léon & Opoku-Bossman, 2024). This has been, and is expected to become of even greater importance, as bond markets are able to provide large amounts of capital in a short period of time, and at relatively low cost, to borrowers that are viewed as low-risk issuers. Capital raising during the COVID-19 pandemic is a case in point.

For PDBs to achieve their development goals, they need access to long-term funding. While the appropriate funding sources depend on specific circumstances, virtually all MDBs and almost half of the NDBs issue bonds, particularly those in high- and middle-income countries (Marodon, Jacouton, & Ploen, upcoming). Given the wide range of institutions, however, their experience in capital markets varies and smaller institutions are often not able to issue bonds and therefore rely on other funding sources like loans. Public bank co-financing in countries north and south was often critical to the realization of national developmental projects (Marois et al., 2025). Meanwhile, development finance institutions (DFIs) and multilateral development banks (MDBs) can help to unlock more capital for SDG-aligned investments through blended finance (OECD, 2018). Embedding credit enhancements, like guarantees, in financing structures has the potential to reduce the cost of capital and crowd in investors – both would help to achieve sustainability goals. Historically, however, such structures have often been specific and bespoke, with insufficient scalability.

1.3. A market-based perspective

Considering high investments needs, it is crucial that more capital is mobilized to be deployed in alignment with sustainability objectives, and bond markets are an important channel to facilitate this. The aim of this study is to assess the potential and suitability of performance-linked debt structures, more specifically sustainability-linked bonds (SLBs), as a source of funding for development banks in EMDEs.

To do so, advantages and limitations of SLBs are compared to other labelled bonds as well as plain vanilla bonds. Part 2 introduces the labelled bond market in general and discusses relevant consideration for SLBs, including target setting, pricing and criticisms of early structures. Part 3 develops a combination of coupon step-downs with credit enhancement, in a novel structure called Contingent Resilience-Linked (CORL) bond designed for deployment with development banks in EMDEs. Part 4 applies this concept to specific examples, illustrating how such a structure could look like in practice. Part 5 discusses opportunities and potential obstacles, followed by recommendations. Part 6 summarizes conclusions.

Box 1: Introducing Sustainable-Linked Bonds

An SLB is a bond where the coupons increase or decrease by a predetermined rate at a given point in their term if specific, measurable sustainability objectives are met/not met by the issuer. Achievement of these sustainability objectives is measured using key performance indicators (KPIs) and assessed against predefined sustainability performance targets (SPTs).

2. Labelled bonds: SLBs and public sector issuance

2.1. Background and market overview

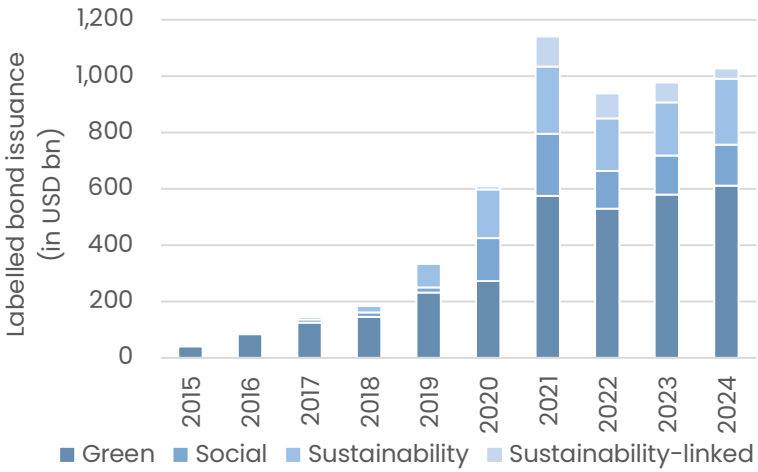
PDBs have been instrumental in the development of the labelled bond market. In 2007, the European Investment Bank (EIB) issued the first green bond, and the Banque Ouest Africaine de Développement (BOAD) issued the first sustainability bond in Africa in 2021.

The evolution of the GSSS bond market is further outlined in Figure 1, where it can be noted that the segment has been issuing around USD 1 trillion of bonds per annum over the past four years, and with at least this amount expected to continue (Environmental Finance, 2025). These numbers should be compared to, for example, issuance of high-yield corporate bonds of less than USD 500bn a year in recent history.

There is ample firepower in the GSSS space to provide capital, but for purposes of PDBs, and especially RBDs/NDBs in lower-income regions, how can this be accessed?

Historically, the traditional Use-of-Proceeds (UoP) bond, most commonly known as a 'green bond', has been issued by relatively high-rated issuers, as shown in Figure 2. In contrast, the alternative format, General Corporate Purpose (GCP), that is used in sustainability-linked bonds, has become relatively more popular among lower-rated issuers[1].

Figure 1. Labelled bond issuance since 2015 (excluding municipality bonds and asset-backed securities).



Source: Bloomberg

There are number of explanations for this[2], foremost is the perceived requirement that a green bond issuer must have sufficient assets to justify the use of proceeds. Smaller issuers without an appropriate 'green' asset pool are locked out of at least benchmark (USD250mn+) green bond issuance. An SLB with its GCP terms, in contrast, does not need a sizable 'green' asset pool. This means that SLB format can be much more flexible for smaller borrowing needs and smaller issuers, which is usually the case for lower-rated entities. Furthermore, the SLB capital can be used better for transition purposes, like financing the retirement of a polluting power plant which is not eligible for green bond financing currently.

Important to note is that all GSSS bonds share the feature that they are 'pari passu', which simply means that they sit equal in rank with other non-GSSS bonds in case of a default by the borrower.

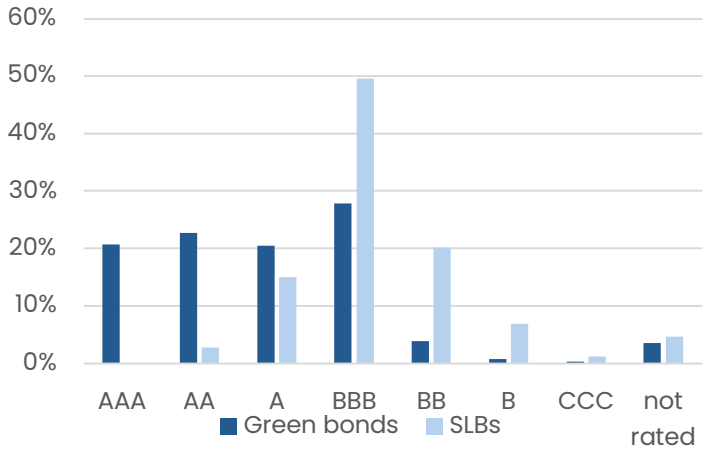
[1] In a UoP bond, the borrower states to which types of expenditures the loan/bond proceeds will go to, whereas in the GCP format, there are no such commitments.

[2] For a more extensive market overview and comparison between UoP and GCP formats, see Chapter 1 in Erlandsson & Richardson (2024).

2.2. Issuance by governments and development banks

Among governments and development banks, while many have embraced UoP bonds, few have issued SLBs. However, some issuers use them to support their sustainability ambitions. Chile and Uruguay were the firsts to venture into the SLB market in 2022 (AFII, 2022a & 2023b). In late 2024, the government of Thailand issued its inaugural SLB (AFII, 2024b), and South Africa and Slovenia are reportedly considering issuance of such bonds (IFR, 2024). Among national development banks, the Development Bank of Rwanda was the first to launch an SLB in September 2023 (World Bank, 2023), followed by the issuance of a second tranche in September 2024.

Figure 2. Rating distribution of broad indices for green bonds and SLBs (FTSE Global Green Impact Bond Index and FTSE Global Sustainability-Linked Bond Index).



Source: *FTSE Russell.*

In terms of funding, public development banks tend to rely on long-term liabilities and equity, while size affects the ability to attract long-term funding (Léon & Opoku-Bossman, 2024). Given the wide range of institutions, their experience in capital markets varies, with more established institutions being able to issue bonds. Bond issuance helps to diversify funding sources and foster capital market development, particularly through local-currency issuance in EMDEs but also labelled bonds in general.

Conceptually, SLB structures may be preferable for governments that are looking to finance their climate transition plans (Bruegel, 2023; SSDH, 2023) and development banks with a focus on SDG-aligned investments, particularly for lower-rated and smaller issuers. Several factors recommend them for this purpose.

- SLBs take a holistic perspective on the issuer instead of focusing on specific assets, acknowledging that money is fungible in the public sector. Also, the impact linked to the bonds is forward-looking.
- SLBs offer greater flexibility. Unlike UoP bonds, which are tied to specific projects and technologies determined prior to issuance, an SLB allows an issuer to invest in a range of areas focused on sustainability. This is a useful feature given that cost effectiveness and attractiveness of specific projects might change over time.
- SLBs emphasize the end goal rather than the initial investment amount. For instance, by linking financing to carbon reduction targets through an SLB, an issuer demonstrates to investors its long-term commitment to sustainability. This approach would have the added benefit of ensuring government commitments extend beyond electoral cycles, because any policy changes that deviate from these commitments could lead to increased financing costs, ensuring a level of accountability.

Another area of recent innovation in the development bank sector is the issuance of hybrid capital, which is subordinated to regular bonds in terms of repayment rank and typically issued in the form of perpetuals or long-dated bonds. Conceptually, these instruments combine bond and equity-like features, bolstering the issuer's lending capacity. In January 2024, the African Development Bank (*AfDB* 5.75%, USD 750mn, Perpetual Non-call 10.5y) was the first MDB to issue sustainable hybrid capital. In

early 2025, the African Finance Corporation (*AFRFIN* 7.5%, USD 500mn, Perpetual Non-call 5.25y) and Banque Ouest Africaine de Developpement (*BOAD* 8.2%, USD 500mn, 30y maturity with 5y non-call period) came to the market. These structures offer investors a higher risk-profile than for the issuer's senior bonds, leveraging on the relatively high rating of the issuing entity (AfDB is rated AAA/Aaa, AFRFIN is A3, and BOAD is BBB/Baa1). The hybrids themselves have lower ratings (AfDB: AA-/Aa3, AFRFIN: Baa3, BOAD: Baa3), which is why hybrid capital might be a less attractive solution for development banks with sub-investment grade ratings.

2.3. SLB considerations

2.3.1. Target setting

More formally, an SLB is a bond where the coupons, i.e. the cost of capital, increase or decrease by a predetermined rate at a given point in time if specific, measurable sustainability objectives are met/not met by the issuer. Achievement of these sustainability objectives is measured using key performance indicators (KPIs) and assessed against predefined sustainability performance targets (SPTs). SPTs set out the sustainability ambition to which an issuer – for instance, a government or development bank - is ready to commit and should therefore reflect on the level of progress it considers achievable and realistic. Ideally, an investor should be able to gauge the probability of a target being achieved and the commensurate change in issuer creditworthiness that would ensure, as these variables are critical to accurately pricing an SLB relative to a plain vanilla bond issuance.

Because of their importance to the SLB structure, market participants have developed uniform standards on establishing and monitoring SPTs. In this context, the International Capital Market Association (ICMA), a trade association, is an important provider of industry-driven standards and recommendations in fixed income markets.

ICMA has been a driving force in defining principles and guidelines for the issuance of labelled bonds, promoting transparency and disclosure to foster market integrity. In 2023, 97% of sustainable bonds were aligned with these market standards (ICMA, 2023). As outlined in Table 1, the principles distinguish between GSS bonds and SLBs. The core components reflect the different structures of these bond types (e.g., use of proceeds, general purposes) and related considerations, including target setting for SLBs.

Table 1. ICMA Principles – Financial instrument guidance.

Green, Social, Sustainability Bonds	Sustainability-Linked Bonds
Core components: 1 Use of proceeds 2 Process for project evaluation and selection 3 Transparent management of proceeds[3] 4 Reporting **Key recommendations**: 1. Bond frameworks 2. External reviews	**Core components**: 1. Selection of key performance indicators (KPIs) 2. Calibration of sustainability performance targets (SPTs) 3. Bond characteristics 4. Reporting 5. Verification

Source: ICMA.

[3] The proceeds of Green Bonds, i.e. how the issuer intends to spend the borrowed funds, can be managed per bond (bond-by-bond approach) or on an aggregated basis for multiple green bonds (portfolio approach).

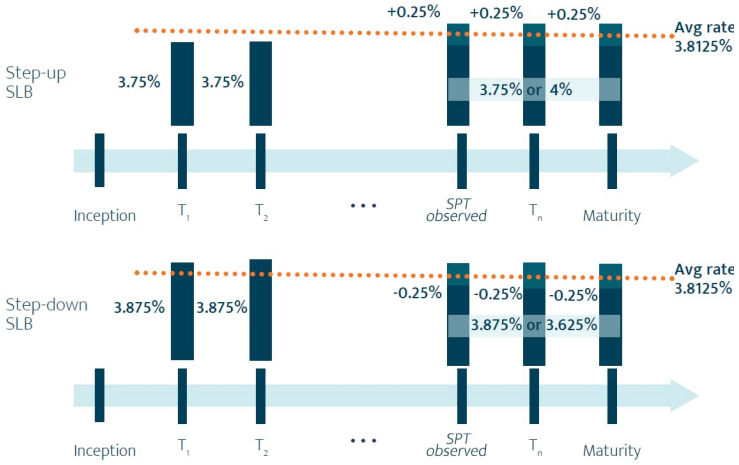
These principles are intended for broad use by market participants, including issuers, investors and underwriters. For bonds to be aligned with the Sustainability-Linked Bond Principles (SLBPs), they should have transparent sustainability credentials. As summarized in the recommendations on target-setting and disclosures in the appendix, the goal is to have clear processes and transparent commitments from issuers to understand the relevant characteristics of any given bond.

2.3.2. Intuition

A basic overview of SLB structures is provided in Figure 3, with the payout structure of an SLB with maturity T. In the step-up version of the bond, the coupon increases by 0.25% from an initial rate of 3.75% if the SPT is not met at the observation date. In the step-down case, the coupon decreases 0.25%, from 3.875% to 3.625%, if the SPT is achieved. If we assume there is a 50/50 chance of the SPT being met, and that the length of the pre- and post-step periods are similar, then the expected interest rate of each structure will be 3.8125%[4].

Figure 3 conveys a key point with the SLB format that is often missed: an issuer that succeeds in meeting performance targets achieves a lower cost-of-capital than what would otherwise have been the case. In the figure, a 'normal' bond for the issuer would have been issued at a 3.8125% interest rate. In the case of the step-up bond, if the issuer succeeds in meeting targets, they will get an average coupon of 3.75%. And in the case of the step-down bond, the issuer will get a (3.875%+3.625%)/2= 3.75% average interest rate. Both cases are lower than for the vanilla bond.

Figure 3. Step-up and step-down SLB structure.



Source: AFII.

Thus, the issuer can achieve a lower cost-of-capital, but only by providing the pre-set outcome that the investor wants to see. Also, and importantly for investors, the fact that the outcome is not certain means that it can be priced in a completely fiduciary duty aligned way[5].

2.3.3. Pricing

Schematically, the structure of an SLB implies how it should be priced based on its key feature: the optionality of a coupon step-up or step-down[6]. A typical SLB has two components: a fixed-coupon bond and a coupon step option that confers on the investor a claim on a different fixed-rate cash flow if the issuer exceeds, or falls short, of its SPTs. This latter component can be referred to as an SLB embedded option[7].

[4] Calculations for the step-up [3.75% + (0.5*3.75% + 0.5*4%)]/2 and for the step-down [3.875% + (0.5*3.875% + 0.5*3.625%)]/2.

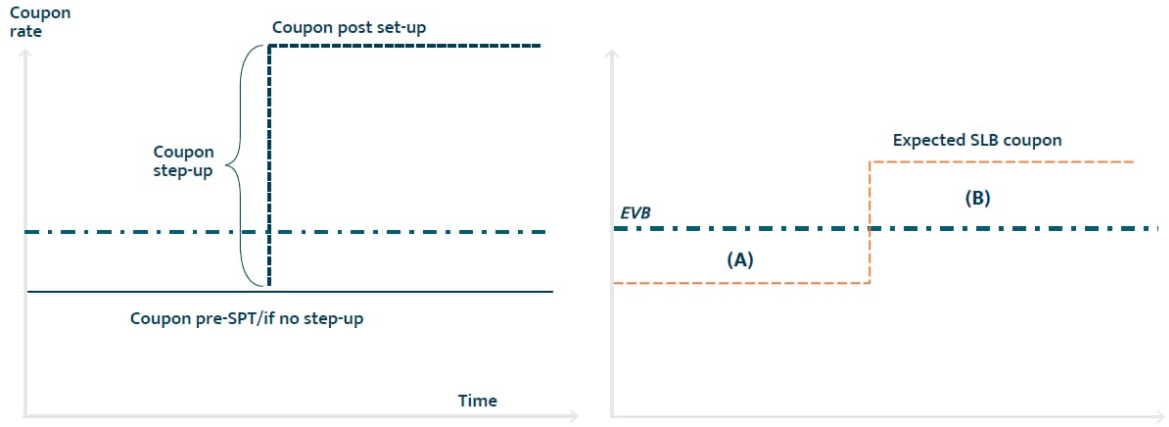
[5] Most investors are obliged to follow fiduciary duty, which in a narrow sense means that they are not allowed to buy something expensively just because it has non-pecuniary (non-financial) values attached to it.

[6] For further details, please see (Erlandsson, Mielnik, Richardson, & Rimaud, 2022; AFII, 2022a).

[7] The extension to an SLB having several SPTs, and thus several embedded options, is conceptually straightforward, but actually fairly complex in terms of pricing as one needs to make an assumption on the correlation between the KPIs and SPT achievement. For purposes of this paper, however, we assume that they are uncorrelated/independent.

We illustrate the basic pricing approach in Figure 4. The left-hand graph shows the various pathways the SLB coupon can take compared to the coupon level of an equivalent vanilla bond (EVB) with the coupon level illustrated by the dotted blue line. For simplicity, we will assume there is a 50% probability that the issuer does not meet the SPTs and thereby triggers a coupon step-up. Using this as an input, we can calculate the expected coupon of the SLB over time, as shown in the right-hand panel by the dashed orange line.

Figure 4. Embedded options structure of a step-up SLB.



(left) the coupon level in the step or no-step up case, (right) the expected SLB coupon/the probability weighted average of the step and no-step up coupon levels.

Source: *AFII.*

Put simply, the investor is paying a premium to "buy" the embedded option in the SLB. This means the investor buys the bond at a higher price/lower yield/lower initial coupon compared to the EVB. The situation is reversed for the issuer. This premium is reflected as the size of the rectangle (A).

In return for paying this premium, the investor receives the economic value of the option, measured as the expected coupon step-up after the step-up date. This is illustrated by rectangle (B).

Again, translating this into bond language:

- The SLB investor gets a lower initial coupon than an EVB but a higher expected coupon in the future.
- The SLB issuer gets an initial lower cost of capital but only retains this lower cost of capital if they achieve their sustainability targets.

Based on a risk-neutral, no-arbitrage condition, we can state that the areas of rectangles (A) and (B) should be similar. In other words, the investor's long option position is an asset that is commensurate in value to the issuer's short option liability[8]. We will use this argument again in the next section.

2.3.4. Step-up or step-down?

From a purely theoretical financial analysis perspective, whether an SLB features a step-up or step-down should be a non-issue, as the expected value of the transaction should be the same and it is assumed that both investors and issuers are risk-neutral and indifferent to the format.

[8] This observation has important implications from a technical angle, as it means standard option methodologies, such as the Black-Scholes pricing model, can be applied. See Mielnik & Erlandsson (2022) and Resendiz & Shrimali (2024).

In practice, the step-up format is dominant, with the vast majority of SLB adjustments being step-ups rather than step-downs. For investors, the step-up format is easier to explain: if the issuer fails to reach a stretch target, the investor should be compensated with a higher return. Furthermore, bond investors, like insurance companies, which use the instruments to match future liabilities may need to have investments that generate a minimum yield, and thus would refrain from investing in step-down structures.

Even so, some investors do seem to be nervous about actually getting paid a stepped-up coupon in the event an issuer misses its targets. It is argued that receiving a financial benefit when targets are missed creates a fundamental lack of alignment for sustainability-minded investors: "Why should I as an investor benefit financially when a sustainability target is missed?"

This overlooks two fundamental points: first, the step-up should have been already "paid for" by providing a cheaper cost-of-capital to the issuer prior to the step-up. In other words, the step-up is a normalization of the interest rate provided to the investor over the life of the bond. Second, a step-up should be considered by the investor as compensation to offset the increased risk to the issuer caused by its failure to meet sustainability targets.

In contrast, step-down structures are struggling for popularity among investors due to the nature of hardcoding a potentially lower return (coupon) in the future. This feature may be an obstacle to certain investors because of their fiduciary duties, among other things. No investor likes a lower return unless it is associated with lower risk. However, hard data showing that achieving SPTs leads issuers to become less risky, are in short supply.

Theoretically, the lower future return (coupon) in the step-down SLB should be compensated by a higher-than-baseline return (coupon) today, but this is rarely observed in practice. Issuers are not keen to place SLBs if initial coupons are over and above what they could get by issuing plain vanilla bonds – it is simply hard for an issuer to argue in favour of bonds that are more expensive (in fiscal year terms).

Sovereign issuers provide a special case. Some jurisdictions have legal constraints on taking on debt where the cost of the debt may increase over time. This is naturally explained by electoral cycles: if the current government can shift the costs of debt assumed today onto the next government, as could be argued is the case when issuing step-up SLBs, it may lead to skewed incentives to take on excessive debt today.

On the flipside, a step-down SLB could be complicated for some sovereign issuers that may have technical requirements barring them from selling debt more expensively (in yield cost terms) than current debt. We will discuss potential solutions to this problem later, as the step-down structure may be especially relevant for developing economies, where a high impact in terms of financing climate transition and resilience could be achieved.

2.3.5. Transparency and anti-greenwashing

The SLB structure means that investors who seek a particular sustainability outcome will pursue claims for a relatively higher coupon on the bond if the outcome does not materialize. This is often framed as investors seeking to penalize issuers that do not perform, or even suggesting that investors might make it more difficult for the issuer to hit their sustainability performance target.

If the investor's investment is worth USD100mn and there is a 25bps step-up on the table, it would be rational and indeed its fiduciary duty to pursue the claim for the USD250k per year, and, depending on

its belief in success, the associated legal costs. Of course, if there is a consortium of investors able to bring a class-action lawsuit, then the economics as well as human resource allocation to make such a claim would become even more efficient.

From a different perspective, the issuer of an SLB with ambitious targets can gain in credibility on those targets as the outcome is likely to be scrutinized by investors (see section 4.1.1.). For example, the case of Enel, the market's biggest issuer of SLBs, missing targets in 2023 did lead to – if anything – more support for its issuances (AFII, 2024a).

2.3.6. Main criticisms

The growth of SLBs has been met with increasing criticism of the structures employed. Complaints conform to one of two types: the ambition of SPTs and KPIs used and the value of coupon step-up rates. We define the former as sustainability materiality and the latter as financial materiality.

- Sustainability materiality critique: Insufficiently ambitious SPTs and/or inadequate KPIs are less likely to drive significant sustainability improvements by the issuer and will make the SLB less compelling for investors seeking to achieve impact and/or particular outcomes.
- Financial materiality critique: SLBs with insubstantial penalty rates or unclear step-up mechanisms are harder to differentiate on price vis-a-vis plain vanilla bonds, and the issuer may lack sufficient financial incentives to attempt to achieve the associated SPTs.

The following list highlights different versions of these two critiques:

1. **Lack of pricing benefit to issuers:** There is little pricing benefit for issuers to recoup the costs of setting up a sustainability-linked bond structure. Historically, this has been true, as there have been few reasons to price the optionality in SLB structures. With more robust structures, a clear pricing advantage and lower cost-of-capital should be achieved if SPTs are met.
2. **Unambitious sustainability targets:** Sustainability performance targets set by issuers are not challenging enough. SLB issuers that have set ambitious targets have historically not been rewarded with lower costs of funding and have been stigmatized when they have failed to achieve these. This means issuers have little incentive to set ambitious targets in the first place. However, ambition level is – or should be – mathematically linked to pricing benefits and incentives.
3. **Small coupon steps and weak incentives/ hedging capacity**: The use of small coupon steps means that a step-up event is financially immaterial to an issuer. This provides a weak incentive to achieve targets. It also means that the SLB does not provide enough of a hedge on sustainability performance for investors. Without potential pricing benefits, it is hard to see why coupon steps should be any larger than what is needed to place a bond in the market. Applying a pricing framework should remedy this failing and SLBs, if priced robustly, can add substantial value to investor portfolios.
4. **Complexity:** Multiple, hard-to-calculate KPIs; lack of observation reporting dates and other operational complexities make it too resource-demanding for investors to track SLBs. The SLB market is still relatively new, and one should not be overly surprised that there are tuning difficulties when it comes to legal documentation and the structuring of certain features, which can load unwanted costs on investors.
5. **Callability:** Many SLBs are callable before their first trigger date. So far, callability has been extremely rare in the SLB market, and some of the critique appears misplaced as it confuses the more general callability of the high-yield space (where SLBs are more prevalent) as well as with newer vintages of bonds (such as SLBs).

6. **Ineligibility for 'labelled' funds/strategies:** SLBs are not accounted for as traditional green bonds, making them ineligible for dedicated green funds and/ or strategies. Fundamentally, many of these critiques stem from the lack of pricing differentials between SLBs and traditional bonds. If an SLB does not provide a differentiated enough structure — or if the difference is not being priced — then the issuer and investor rationale for pursuing such instruments is negligible.

Some of these critiques are related to the relative newness of the SLB market. Many of the problematic features noted above are likely to be ironed out over time through various stakeholder activities, as well as market evolution.

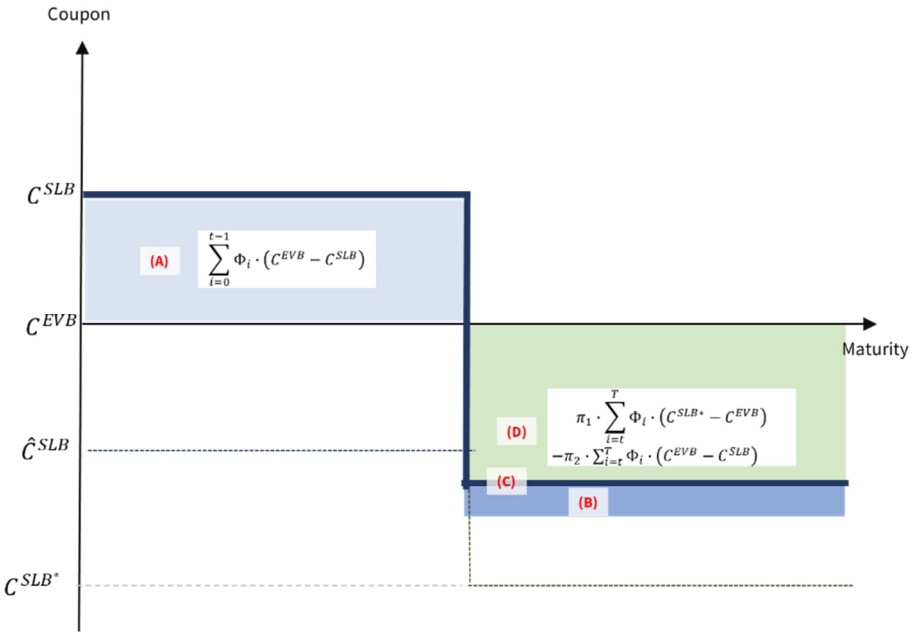
3. Combining SLB step-downs with credit enhancements

The notion of step-ups containing a stigmatizing "penalty" on non-performance has moved more attention to step-down structures, where the achievement of targets is prized instead. Such reward-oriented structures would also align better with the objectives of development finance. However, SLBs with step-downs have one significant drawback in their basic format: the fixed coupon must, everything else equal, fix above the equivalent vanilla bond (EVB) in order to be attractive to investors –fundamentally, this is very unattractive to the issuer side, but will be addressed in the CORL structure.

3.1. Analysing the 'cost' of step-downs

If we consider an EVB with 5% coupon and compare it with an SLB that steps down by 0.5%, then that SLBD should have a fixed coupon of more than 5% in order to compensate investors for the potentially lower coupon in the future. This dynamic is illustrated in Figure 5:

Figure 5. Coupon structure and pricing equations in an SLBD.



Source: AFII.

A mathematical expression for the relationship between the fixed coupon in the SLBD and the EVB can be derived using a simple no-arbitrate relationship[9]:

$$\sum_{i=0}^{t-1} \Phi_i \cdot (C^{EVB} - C^{SLB}) = \gamma_1 \cdot \sum_{i=t}^{T} \Phi_i \cdot (C^{SLB*} - C^{EVB}) - \gamma_2 \cdot \sum_{i=t}^{T} \Phi_i \cdot (C^{EVB} - C^{SLB})$$

where Φ_i is the risky discount factor for time i (which runs from 0…t…T where t is the step date and T is the maturity date), C is the coupon for the EVB, the start date SLB and the stepped up SLB*. The probability to step is denoted γ_1 with the non-step probability $\gamma_2=1-\gamma_1$.

However, it may be difficult for an issuer to argue that one should pay a higher coupon in the short term, in order to get a lower one in the future. But now consider merging this with our discussion on switching risk curves. We know that an investor sees more value in a bond traded at a "better" risk curve, where we have alternated between a risk discounting perspective, as well as a perspective based on derived (from ratings) default risks. Can we use that higher valuation to frontload a lower SLBD coupon? It turns out the answer to this is yes.

Consider Table 2 where we set the SLBD with a fixed 7.25% coupon and allow it to drop by 0.1% if some sustainability target is met. This would be correlated with an improvement in creditworthiness, thus allowing us to assume a BBB discount curve after year 5. This SLBD would price at 100.27, meaning that it would be more attractive than the BB bond without the credit improvement (but also without a step-down). The more lenient discount curve more than compensates for the lower coupons for the investor.

Table 2. Pricing an SLBD with 7.25% fixed coupon, a step-down after year 5, and split (BB/BBB) discount curves.

	BB bond				BB 1-5y, BBB 5-10y, 0.1% SD				0.58% SD
Year	Spot rate	Disc. factor	Disc. coupon	Disc. nominal	Spot rate	Disc. Factor	Disc. Coupon	Disc. Nominal	Disc. Coupon
1	6.87	1.07	6.78		6.87	1.07	6.78		6.78
2	6.85	1.14	6.35		6.85	1.14	6.35		6.35
3	6.85	1.22	5.94		6.85	1.22	5.94		5.94
4	6.89	1.31	5.55		6.89	1.31	5.55		5.55
5	6.97	1.40	5.18		6.97	1.40	5.18		5.18
6	7.09	1.51	4.81		7.00	1.50	4.76		4.44
7	7.20	1.63	4.46		7.04	1.61	4.44		4.14
8	7.31	1.76	4.12		7.10	1.73	4.13		3.85
9	7.42	1.90	3.81		7.16	1.86	3.84		3.58
10	7.53	2.07	3.51	48.38	7.23	2.01	3.56	49.74	3.32
Contribution			50.51	48.38			50.54	49.74	49.74
Bond price				*98.89*				*100.27*	*98.88*

Source: AFII.

Indeed, if we price the SLBD such that is equal in value to the original EVB, we can set the step-down to 0.58%, as indicated in the rightmost column of Table 2. This means that – under the condition that the bond risk switched to BBB after the step-down date – the investor would be agnostic about that structure or the EVB.

[9] Further explanation of this pricing relationship and related graphs are available in AFII (2023a).

Here it is important to note that, as our baseline pricing measure is the price of non-structured bonds, the probability of the SLB step to happen does not matter to the pricing of the bond. The key here is the improvement of creditworthiness and thus a switch in discount curves. As indicated in the pricing equations, in a real-world setting, this must be set according to the probability of the improvement actually happening, thus dampening the above results somewhat. Credit enhancement is a way to hardcode that this change would actually happen.

3.2. Credit enhancement contingent on SPT performance

In order to see how credit enhancement[10] can play a role in this setting of ratings-based risky discounting, we can start by looking at historical loss given default (LGD) rates and probability of default (PD) within rating categories. We use the following simple relationship:

$$r^{BB} = r^{AAA} + E(L^{BB})$$

i.e. the yield on the BB-rated bond, r^{BB}, is equal to the yield on the risk-free bond, r^{AAA}, plus the expected loss on the BB-rated bond, $E(L^{BB})$. We assume a zero risk-premium here. We furthermore define the expected loss as:

$$E(L^{BB}) = PD^{BB} \cdot LGD^{BB} = \pi^{BB} \cdot (1 - R)$$

where $PD^{BB}$is the probability of default for the BB bond and LGD^{BB} is the loss-given-default. Loss-given-default is alternatively defined as $(1 - R)$, where R is the recovery rate for the bond. We will assume, unless otherwise stated that R is 40%.

If we assume that same notation for a BBB bond, we can write the yield of the BB bond as a function of the yield of the BBB bond, and the incremental expected loss:

$$r^{BB} = r^{BBB} + [E(L^{BBB}) - E(L^{BB})] \leftrightarrow r^{BBB} = r^{BB} - [E(L^{BBB}) - E(L^{BB})]$$

In other words, the yield on the BB-rated bond is simply the yield of the BBB-rated bond plus the expected (increased) loss on the BB-rated bond.

Now, suppose there is an R^* such that

$$E(L^{BBB}) = PD^{BBB} \cdot LGD^{BBB} = \pi^{BBB} \cdot R = \pi^{BB} \cdot R^*$$

i.e., this $R^*$is the recovery rate which would be required to match the expected loss of a BBB-rated bond, but assuming a BB default probability.

This means that if we improve the recovery rate on the BB-rated bond, to R^*, then we can create a BBB rated asset – the investor should be indifferent to a higher probability of default and a lower loss rate, or a lower default rate and a higher recovery. This is one of the main strands of credit enhancements: the guarantor does not lower the probability of default but covers losses in case it happens[11].

Now consider a worked example of this: a third party commits to cover some of the losses of the investor in case of default of a BB rated bond. This means that the investor will get the improved recovery rate R^* vis-à-vis the non-enhanced case in case of default. Default probabilities π^{BB} themselves are not affected, but it is only the "Expected recovery" leg that is affected in terms of our calculations. We tabulate this in two versions in Table 3.

[10] This concept was initially introduced in Erlandsson (2023).

[11] Note that not all credit ratings agencies use loss-given-default in their rating assessments. This means that one rating agency would likely consider an asset with a 100% recovery rate as nearly risk-free and have as high a rating as the credit enhancement provider, whereas another would rate is significantly lower, just looking at the probability to default.

Table 3. Pricing the BB bond with changing recovery assumptions to analyse credit enhancements.

Year	BBB base case	BB base case	BB with 58% recovery	BB with 93% recovery	BB with 100% recovery
1	0.38	2.09	3.03	4.87	5.22
2	0.27	1.40	2.04	3.27	3.51
3	0.26	1.36	1.97	3.16	3.39
4	0.20	0.51	0.74	1.19	1.27
5	0.19	0.49	0.71	1.13	1.22
6	0.11	0.22	0.31	0.50	0.54
7	0.10	0.20	0.30	0.48	0.51
8	0.24	0.28	0.41	0.66	0.71
9	0.22	0.27	0.39	0.62	0.66
10	0.20	0.24	0.35	0.56	0.61
Recovery	**2.19**	**7.05**	**10.23**	**16.44**	**17.63**
Disc. nominal	54.45	46.43	46.43	46.43	46.43
Coupon	54.58	48.35	48.35	48.35	48.35
Bond price	*111.22*	*101.82*	*105.00*	*111.21*	*112.40*

Source: AFII.

First, we look at setting the value of the recovery such that the legs of the BB and BBB are equal. In other words, what is the recovery rate such that the investor is indifferent between the BBB and BB bond in terms of return of nominal amounts, but excluding coupon payments? This happens at R* = 58% recovery rate (i.e., an 18% credit enhancements), with a bond price of 105.00.

Second, we look at what recovery rate the investor would be all-in indifferent between the BBB and BB bon. In other words, what is the recovery rate for the BB bond for which the price of the BB bond is equal to that of the BBB bond? This number is approximately 93.25% recovery rate. This does not seem intuitive, and indeed, if we price the BB bond as loss risk-free, as in the final column of Table 3 it is only marginally more valuable (112.4 price for the BB-100% recover bond, vs. 111.22 for the BBB-40% recovery bond) than the BBB bond. This is an effect of the discounting of the coupon stream (the second to last row of the table) making it more valuable for the BBB bond, where the higher likelihood of cumulating more coupons in the BBB bond is still more valuable for the BBB (54.58) versus the BB (48.35).

A crucial decision here is thus to decide if the credit enhancement should cover nominal repayments only or also cover for (lower) likelihoods of getting the full coupon stream. Here we opine that the first option should apply: an investor should only look for credit enhancement as a way to target a certain expected loss $E(L^{BBB})$, and reinvestments of any recoveries should be upon the investor to decide[12].

We will now assume that a credit enhancement is provided by concessional capital to the tune of $R^* - R$, and that credit enhancement only applies when the SPT is achieved in the SLB structure. This means, as alluded to earlier, that an investor will view the SLB as BBB rated in case of SPT performance, and BB otherwise. This then allows us to price in the possible step-down that could be 'offered' in the SLB structure to the issuer, while still holding the SLB fixed coupon at the same level as the EVB.

[12] A special case arises when credit enhancements provide 100% recovery. Then the investor will, in case of default, be able to reinvest the full notional again, in some other asset yielding what the original coupon of the bond was, which would appear a good outcome for the investor compared to holding a straight BBB bond. As illustrated in Table 4, the 100% recovery BB bond only prices 1.2 points above the BBB bond with 40% recovery, which seems relatively small. This illustrates the assumption in the pricing model that the recovery is not reinvested.

To illustrate this, consider the bond pricing approach in Table 4 below and Table 3 above, where we had that a BB rated bond with 40% recovery pricing at 101.82. Using the same structure but applying a step-down of 1% (and holding the SLB fixed coupon at the EVB level, 7.25%), we see the bond price at 99.04, which just shows that the step-down structure would not be attractive to the investor.

We then seek the R^* that would equalize the expected loss of the BBB and BB bond, contingent on the bond having stepped down. This can be done by simple numerical search, and as the results in the rightmost section of Table 4, we find this number to be 56%. At that assumed "enhanced" recovery rate, the SLB step-down structure is pricing just slightly above (is more attractive) than the straight BB bond, at 101.87 vs 101.82.

In plain words, with a relatively modest amount of contingent credit enhancement, an SLB step-down bond with a fairly high (and incentivizing) step-down would price equal to a straight non-step bond. Indeed, if we look at the proposed structure and assume a 50% probability for the step to happen, then the option value is $1.39 in bond price terms, which is clearly above a so-called greenback SLB threshold [13].

Table 4. Pricing the BB bond (left), with a step-down structure (mid), and a step-down structure but with higher recovery rate (right).

	BB bond			BB bond with -1.0% SD			BB bond with -1.0% SD and 56% recovery		
Year	Disc. coupon	Exp. recovery	Nom. payback	Disc. coupon	Exp. recovery	Nom. payback	Disc. coupon	Exp. recovery	Nom. payback
1	6.50	2.09		6.50	2.09		6.50	2.92	
2	5.99	1.40		5.99	1.40		5.99	1.97	
3	5.54	1.36		5.54	1.36		5.54	1.90	
4	5.24	0.51		5.24	0.51		5.24	0.71	
5	4.93	0.49		4.93	0.49		4.93	0.68	
6	4.64	0.22		4.00	0.22		4.00	0.30	
7	4.35	0.20		3.75	0.20		3.75	0.29	
8	4.06	0.28		3.50	0.28		3.50	0.40	
9	3.75	0.27		3.23	0.27		3.23	0.37	
10	3.37	0.24	46.43	2.90	0.24	46.43	2.90	0.34	46.43
Contribution	48.35	7.05	46.43	45.57	7.05	46.43	45.57	9.87	46.43
Bond price			*101.82*			*99.04*			*101.87*

Source: *AFII.*

Another use of these results is to answer the question: what would be the cost to provide credit enhancement such that the SLB step-down structure would be considered BBB contingent on SPTs having been achieved? Numerically, the cost of providing 56%-40% = 16% credit protection in case of default is 101.87 – 99.04 = 2.83, or in other words, less than 3% of bond notional in net present value terms. From the perspective of a development finance institution, theoretically that would be the required value to book at issuance of the bond. Of course, in case it actually crystallizes, the payout would be 16% of bond notional, but that is being heavily discounted both through time-discounting as well as actual default probabilities.

[13] A greenback SLB is defined as an SLB where the risky discounted value of the coupon step stream is more than $1 in bond price terms, and assuming a 50% probability of step AFII (2023a).

To summarize, the above analysis has shown a few important points that are particularly relevant in the context of blended finance:

- By using a relatively small amount of partial credit protection that only is operational in a step-down scenario where targets are achieved, such a bond can be priced with an initial coupon identical to that of a plain vanilla bond.
- By using contingent partial credit enhancements, investors can be provided with step-down type of bonds that could represent similar value between ratings categories. This would be especially important in terms of lifting sub-investment grade bonds into investment grade.
- By linking the credit enhancement to the achievement of targets, the guarantor's exposure is tied to the issuer's performance. This contingent structure is similar to a binary option, with clearly defined dates and KPIs. Therefore, the risk exposure can be assessed in different ways before/after the guarantee was activated.

The above analysis has not made assumptions that achieving the targets for a coupon step-down is directly correlated to credit improvements. There are good arguments for actually making that assumption, especially in the context of resilience type of investments.

4. From theory to practice[14]

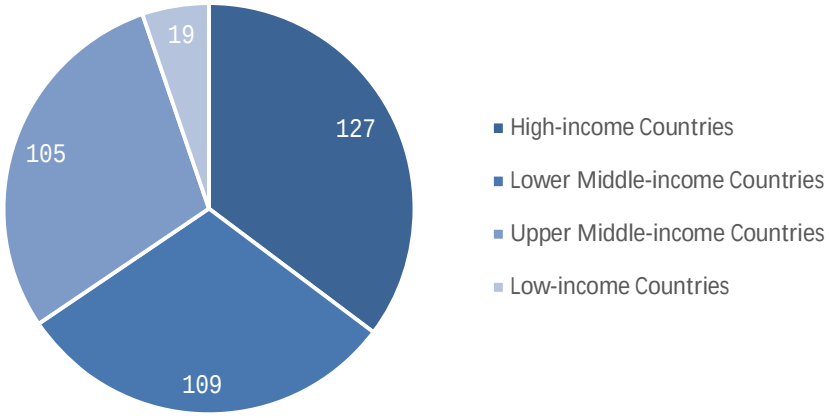
In this section we illustrate how CORL bonds could be structured, both from the perspective of the issuer and the provider of credit enhancements. These case studies should foster further dialogue between issuers, investors, and development finance practitioners.

While a CORL bond structure could be used by a wide range of issuers, we focus on NDBs and RDBs here as they have a vital role in facilitating financing for development. There is a wide range of institutions in this category that differ in size, mandates, investment focus and funding sources, with varying degrees of experience in capital markets. Traditionally, funding is often provided by governments and bilateral/multilateral organizations, often on concessional terms for low- and middle-income countries. Several developments banks also issue bonds, and capital markets can play a key role in diversifying funding sources.

The Agence Française de Développement, together with the Institute of New Structural Economics and the FERDI, have mapped PDBs worldwide, providing valuable insights about the scope and relevance of these institutions (Xu, Marodon, & Ru, 2021). The latest version of the comprehensive database shows 536 entities in total, including 360 national development banks. Figure 6 illustrates the split of NDBs by country income groups. Most of them are based in lower and upper middle-income countries (214 combined) and some in low-income countries (19). In Africa alone, there are 84 national development banks – a list of the largest 30 is included in the appendix, which have assets of around USD 100bn overall.

[14] While based on market data, the examples outlined in this section are hypothetical and actual pricing might differ. This content is for information and educational purposes only. It is not intended to provide, and should not be relied on for, tax, legal, investment or accounting advice. Please see full disclaimer at the end of the report.

Figure 6. National development banks by income group.



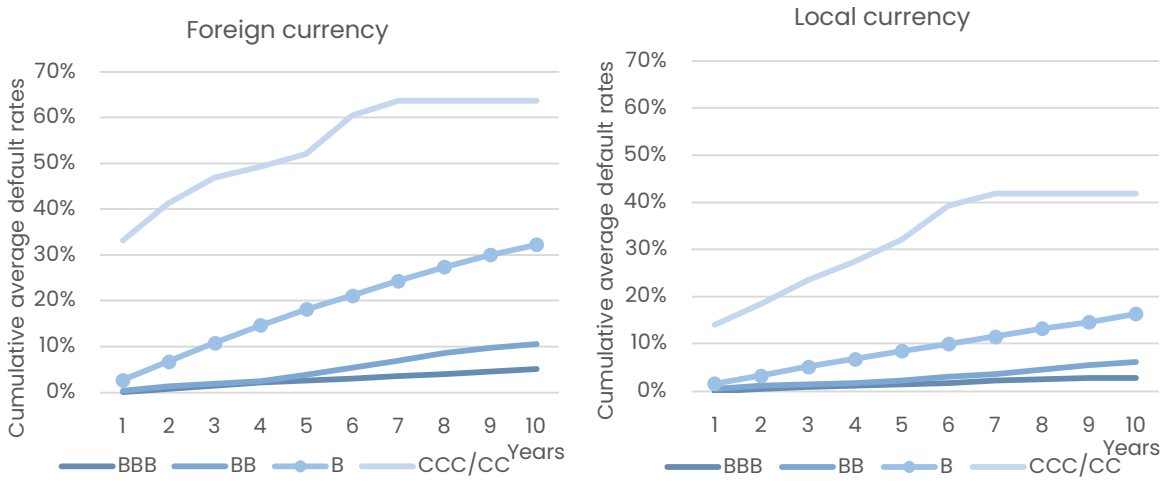
Source: PDB Database(2024)[15].

As shown above, default rates are a key input for the calculation of CORL bonds[16]. As development banks are often owned, sponsored and/or supported by governments, sovereign default rates are a useful proxy. Figure 7 shows cumulative average default rates by rating category.

As a first observation, default rates are higher in foreign currency than local currency, which is intuitive as serving foreign-currency debt is more difficult for a country. Meanwhile, the increase of default rates in not linear when moving from one rating bucket to the next, for example the increase in 10yr cumulative default from BBB to BB is approximately from 5% to 10% whereas the step is 10% to 30% for BB to B.

Figure 7 illustrates average default rates for broad rating buckets. For a more issuer specific perspective, credit default swaps (CDS) can be used to derive implied default probabilities for USD debt, but availability and pricing of these instruments can be a limiting factor.

Figure 7. Sovereign cumulative average default rates (based on data from 1975-2023).



Source: S&P.

[15] PKU and AFD. 2024. Public Development Banks and Development Financing Institutions Database. http://www.dfidatabase.pku.edu.cn/. Database DOI：https://doi.org/10.18170/DVN/VLG6SN

[16] In the previous section, we used risky discount curves as an indirect number for default probabilities. The original CORL paper illustrates the switch between risky discounting and probability pricing but is left out here for brevity purposes.

4.1. Development Bank of Rwanda[17]

The Development Bank of Rwanda, also known as Banque Rwandaise de Développement (BRD), is an established provider of financial services and has become a pioneer in sustainable finance with its inaugural bond in 2023 – it was the first sustainability-linked bond (SLB) issued by a development bank globally (World Bank, 2023). With the experience of launching a SLB framework and a related medium term note program, BRD seems a natural fit to explore innovative finance solutions and below we outline some key considerations in the context of CORL bonds. From a broader policy perspective, Rwanda puts a strong emphasis on climate and nature finance, creating an enabling environment to pursue innovative finance to mobilize capital (Government of Rwanda, 2024).

4.1.1. Performance targets

BRD has already developed a comprehensive SLB framework (BRD, 2024), aligned with its 2024-2028 strategy and covering a range of intervention areas, including housing & infrastructure, energy, agriculture, exports, manufacturing, and education (BRD, 2024). This work could set the foundation for further issuance of performance-linked bonds with a focus on achieving the SDGs. In the context of CORL bonds, it is desirable to have a positive correlation between SPT achievement and underlying credit quality as an improved creditworthiness will count towards rising bond prices. Investors are incentivized to ask for an ambition and target levels of the SPTs that will most likely lead to an improving creditworthiness of the issuer. Rwanda's Vision 2050 and the related Second National Strategy for Transformation (NST2) outline a range of objectives that could inform targets (Republic of Rwanda, 2020; Republic of Rwanda, 2024). For instance, policymakers aim to achieve universal access to electricity and increase the share of renewable energy in power generation from 53.8% (2020 baseline) to at least 60% in 2035. More generally, improving access to reliable and affordable electricity supports growth prospects (Jack, 2022). Besides power generation, electricity distribution is a priority. At the same time, there are limits on how much a development bank can directly influence these variables on a country level due to factors outside of its control.

Therefore, it would be sensible to translate high-level objectives into specific KPIs like new household connections to renewable energy or megawatts of renewable energy created – both are already part of BRD's strategy and can be influenced by the bank's investment and lending decisions.

4.1.2. Rating

BRD is rated B+ with a stable outlook by Fitch (Fitch Ratings, 2024), which is in line with the government's rating as is common for development banks[18]. Given indirect ownership of 98.5% and importance for policy, the government has a high propensity to support BRD. With a rating in the speculative category, credit enhancements can play an important role in supporting investor confidence in an issuer, particularly the perception of default risk as addressed in the CORL structure.

4.1.3. Bond markets

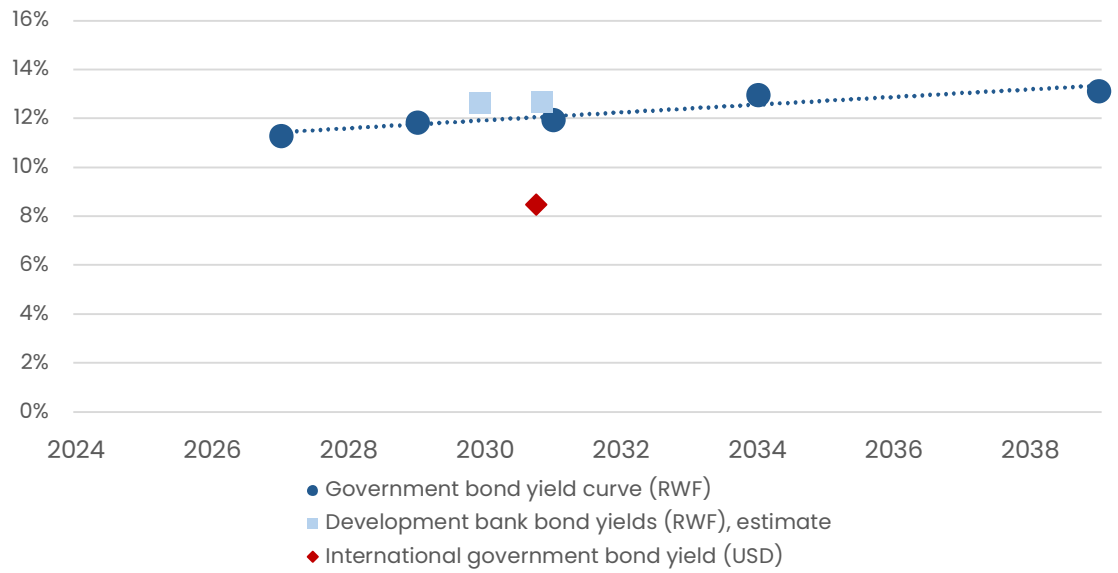
The currency of issuance is a critical decision for an issuer, both in terms of market access and risk management. In general, local-currency issuance helps domestic capital market development, which is important for EMDEs to contain dependency on volatile foreign capital flows. However, it takes time

[17] This section was prepared in November/December 2024 and is based on information back then, unless stated otherwise.

[18] The sovereign is rated B+/B+/B1 by S&P/Fitch/Moody's in terms of long-term foreign currency rating. For the purposes of this case study, we will assume that BRD has the same rating as the sovereign, in line with the analysis by Fitch.

to develop deep capital markets and in certain circumstances issuance in foreign currency (e.g., USD, EUR) could be considered, assuming related risks can be managed through FX hedging or other risk-mitigation mechanisms. In practice, this might not be feasible due to lack of suitable instruments or related costs. As the initial conceptual work on CORL is based on USD, we will start with a related example and then consider variations in local currency, but first we need some reference data for yields.

Figure 8. Bond yields of the Government and the Development Bank of Rwanda (as of end-November 2024).



Source: Authors, based on data from Bloomberg and the National Bank of Rwanda

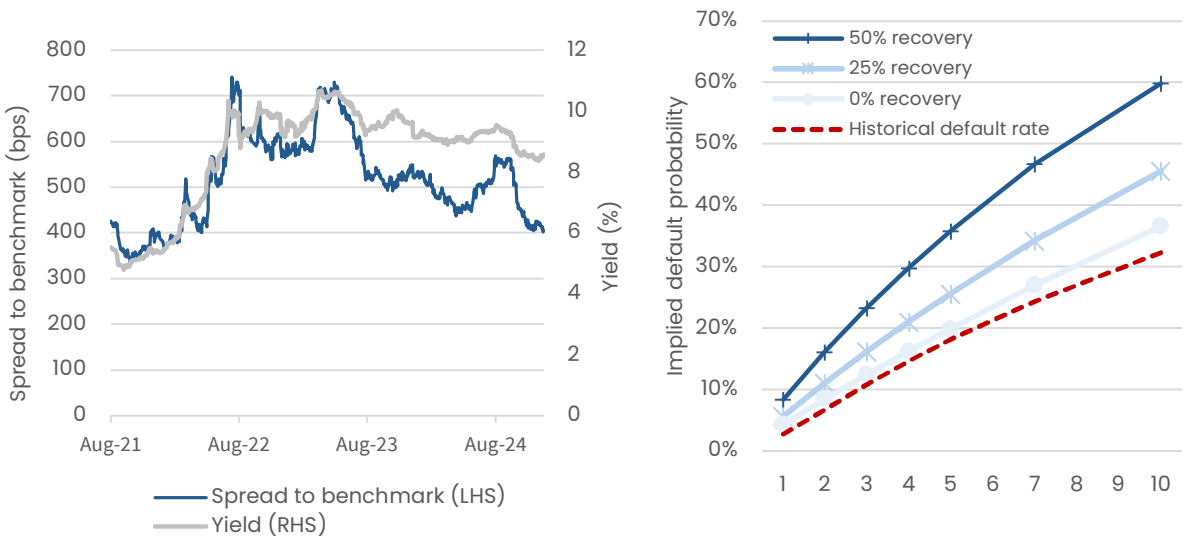
The Development Bank of Rwanda has issued two SLBs maturing in 2030 and 2031, both are denominated in Rwandan Franc (RWF) and benefit from credit enhancement through partial collateralization. The most recent bond was priced in September 2024 and issued with a 12.9% coupon, roughly a 70bps spread over the government curve.

Meanwhile, the local government yield curve can act as a reference for pricing of different maturities. Importantly, there is also one international government bond issued in USD maturing in 2031. Overall, market data is limited, but sufficient as working assumptions for our analysis.

Example 1: USD issuance.

For foreign currency valuation purposes, the main pricing points for a CORL structure on BRD would be the sovereign USD issuance: there is currently a RWANDA 5.5% 08/2031 bond outstanding (ISIN US78347YAL74) with a nominal amount of USD600mn. As of December 2024, the bond trades at cash price of 84, or equivalently a yield of 8.5%, and a spread of 450bps over US Treasury. Given a general rise in rates from the time of the issuance of the 5.5% bond, issued in 2021, the fall in price/rise in yields is natural. In Figure 9, we also show how the spread between the US Treasury has changed since issuance: spreads are approximately flat compared to at the time of issuance.

Figure 9. (Left) RWANDA 5.5% 2031 spread and yield, (Right) Average historical cumulative default rate and market-implied default probabilities, per annum, with different recovery assumptions.

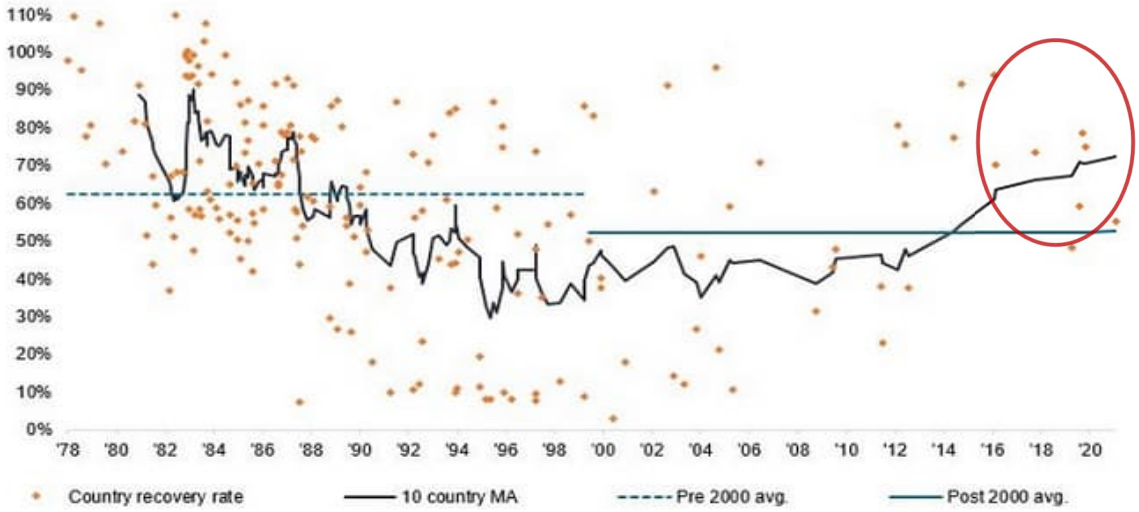


Source: AFII, Bloomberg.

Given the general idea of the CORL bond to provide increased recovery rates for investors, in case of SPTs being achieved, it is relevant to consider what the market considers a reasonable recovery rate today. Historically, as illustrated in Figure 10, foreign currency recovery rates on EM sovereign debt are around 50% on average, but variability is high. Notably, recovery rates in the past decade have been around the 60% level, as marked in the figure.

As first proposal on a structure, we look at an issuance in USD with a 7-year maturity and a step-down in the coupon rate after 3 years. This would provide BRD with a relatively short runway until being able to access a lower cost-of-capital. This structure allows us to calibrate to the current outstanding RWANDA 5.5% 2031 bond as mentioned above.

Figure 10. Historical recovery rates on emerging market sovereigns (bonds and loans).



Source: Janus Henderson, Cruces, Juan and Christoph Trebesch (2013): Sovereign Defaults: The Price of Haircuts, American Economic Journal. Updated by Morgan Stanley Research for recent restructurings, as of 8 July 2024. Highlighting by the authors.

The results are shown in Table 5. The first section illustrates how the valuation model would price a plain vanilla bond being issued today at the prevailing market yield of the RWANDA 5.5% bond would indeed price slightly above, assuming a 25% recovery rate[19].

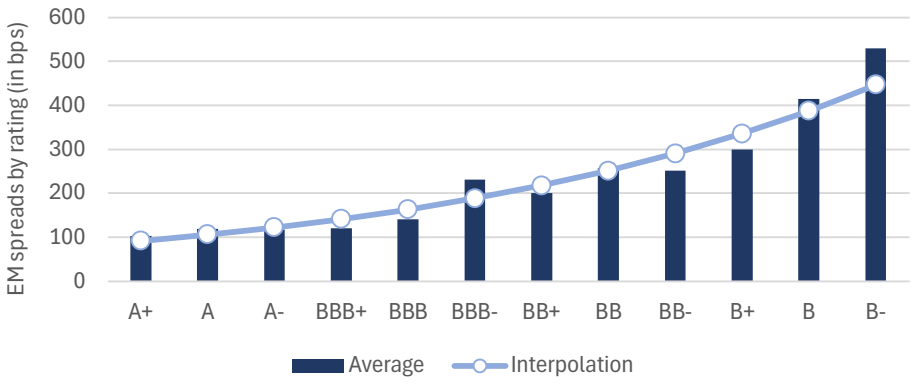
Table 5. Valuation of bond structures for BRD CORL bond in USD. The US Treasury curve has been used as risk-free discount curve.

	B bond with 8.5% coupon, assumed 25% recovery			B bond with -1.5% SD			SD -1.5%, CORL enhanced recovery rate 57.5% (25%+32.5%)		
Year	Disc. coupon	Exp. recovery	Nom. payback	Disc. coupon	Exp. recovery	Nom. payback	Disc. coupon	Exp. recovery	Nom. payback
1	7.91	0.74		7.91	0.74		7.91	0.74	
2	7.25	0.95		7.25	0.95		7.25	0.95	
3	6.61	1.00		6.61	1.00		6.61	1.00	
4	6.00	0.94		4.94	0.94		4.94	2.16	
5	5.49	0.71		4.52	0.71		4.52	1.64	
6	5.03	0.64		4.14	0.64		4.14	1.47	
7	4.59	0.60	54.04	3.78	0.60	54.04	3.78	1.38	54.04
Contribution	42.88	5.58	54.04	39.16	5.58	54.04	39.16	9.37	54.04
Bond price			*102.50*			98.77			102.53

Source: AFII.

Now consider the case of a step-down: we can choose the size of the coupon change in a number of ways. One option is to define the step-down such that the cost-of-capital reduction in case of performance would be equivalent to a one-letter-grade rating uplift (e.g., from B to BB). Figure 11 shows the average USD spreads by rating for a broad universe of EM sovereign issuers. The interpolated spread is around 390bps for B issuers, and 250bps for BB issuers, implying a difference of 140bps. Given market volatility, a step-down size of 1.5% appears reasonable as a working assumption.

Figure 11. Average EM sovereign spreads (7-year proxy, USD), as of 13 Feb 2025.



Source: Blackrock, Bloomberg, AFII.

[19] The pricing calibration assumed that default rates are as historical and then adjust the assumed recovery rate to make the bond price near par. In this case, using a recovery rate of 15% makes the straight B bond price at 100.27 versus the 102.5 for the 25% recovery assumption. Given the relative proximity of 15 to 25%, we use the alter as 25% is often an assumed recovery rate for EM countries in the derivatives space. For the purpose of the CORL structure, using a 15 or 25% recovery rate assumption is immaterial.

The second section in Table 5 shows how that structure loses in value if we apply the 1.5% step-down, as the coupon leg becomes less valuable for the investor. The plain step-down bond then prices at 98.77 (middle column).

Then, in the final columns of Table 5, we show how this would price as a CORL structure with 32.5% contingent credit enhancement. It prices back to the 102.5 level, showing that the investor should be indifferent between the original bond valuation and the CORL bond structure: the credit enhancement compensates the investor for the coupon reduction. At the same time, the issuer achieves a reduction of capital costs equivalent to a full letter-grade rating upgrade[20].

This illustrates how a credit enhancement contingent on the SPT being achieved can balance the cost to the investor from a coupon step-down. Note that one can view this enhancement as either coming endogenously – the underlying credit quality improves as the SPT is met – or exogenously through the form of a third party providing the credit enhancement as the SPT is met.

To summarize:

- BRD gets an improved funding level in year 4-7, akin to if they had been upgraded a full letter grade to near-IG if performance targets have been met. This provides substantially lower cost-of-capital for good performance on sustainability metrics.
- The investor gets a 'as good as' exposure as if they invested in a plain vanilla bond, and at the same time obtains significant sustainability impact potential, with monitoring of the impact by a third party with a vested interest to scrutinize performance and credibility of impact.
- The enhanced credit provider achieves a private to public ratio of 3:1 if the provider accounts for the whole notional credit enhancement exposure, but this can become significantly higher depending on the accounting of nominal exposures versus expected losses.
- Proposed size would be minimum USD100mn in order to allow for some liquidity in the bond (compare with the RWANDA 2031s of USD600mn). Note that the general corporate purpose format of the CORL does not tie the issued amount to projects, but to outcomes. As such, the bond would provide support across the whole of BRDs balance sheet, not only particular projects.

Variations of this theme, especially where 'concessions' are made, are fairly straightforward to introduce.

Example 2: Local-currency issuance

From a credit analysis perspective, considering local currency issuance is slightly different, as the lowest rate one would possibly target would be the government's own funding rate. As of today, BRD's funding rate is roughly 70bps above the government in local currency rates. The target in the CORL structure thus becomes to have a step-down to government funding levels. Furthermore, the local currency case involves substantially higher expected recovery rates (in case of default), as well as much higher discount rates, which affects the calculations.

To get comparability with the hard-currency case, we again consider a structure with a 3-year pre-performance period, and then 4 years where the bond coupon is potentially lower/adjusts to the government bond yield.

[20] If one were to seek a cost-of-capital reduction for Rwanda to be equivalent to being upgraded to investment grade BBB-, we estimate that the spread would need to compress with roughly 225bps/2.25%. This would require a contingent credit enhancement of around 48-49%.

The first thing we note in Table 6 is that in order to match a plain vanilla bond with a coupon 70bps over the government (from 11.95% to 12.65%) with a par bond price, we have raise the assumed recovery rate substantially, from 25% in the USD case to 55% in Rwanda franc (RWF) case. But this is not so illogical after all: local currency debt has historically had significantly higher recoveries than international debt.

Implementing a step-down, as in the middle columns of Table 6, reduces the price by 1.4 cents on the dollar, to 98.63 (from 100.02). Re-doing the same exercise as in the USD case, we see how much of credit enhancement is required to get the bond value back to 100.02 or more again: in this case, 40% additional credit enhancement, which is substantially more than what was required in the USD case. The reason for this is that the value of credit enhancement further out on the curve is substantially lower when the discount rate is high.

Table 6. Valuation of bond structures for BRD CORL bond in local currency. Rwanda's government curve has been used as discount curve.

	B bond with 12.65% coupon, assumed 55% recovery			B bond with -0.7% SD			SD -0.7%, CORL enhanced recovery rate 95% (55%+40%)		
Year	Disc. coupon	Exp. recovery	Nom. payback	Disc. coupon	Exp. recovery	Nom. payback	Disc. coupon	Exp. recovery	Nom. payback
1	11.59	0.77		11.59	0.77		11.59	0.77	
2	10.22	0.80		10.22	0.80		10.22	0.80	
3	8.70	0.75		8.70	0.75		8.70	0.75	
4	7.61	0.57		7.19	0.57		7.19	0.99	
5	6.61	0.54		6.25	0.54		6.25	0.94	
6	5.80	0.41		5.48	0.41		5.48	0.70	
7	5.08	0.39	40.16	4.80	0.39	40.16	4.80	0.68	40.16
Contribution	55.62	4.24	40.16	54.23	4.24	40.16	54.23	5.63	40.16
Bond price			*100.02*			*98.63*			*100.03*

Source: AFII.

A credit enhancement of 40% seems rather big if one considers the perspective of an MDB/DFI providing it[21]. On the flip side, the price differential between the plain vanilla and the step-down bond is not massive. If we consider a fourth party, a concessional capital provider or a philanthropy, sharing some of that cost upfront value differential, what could happen?

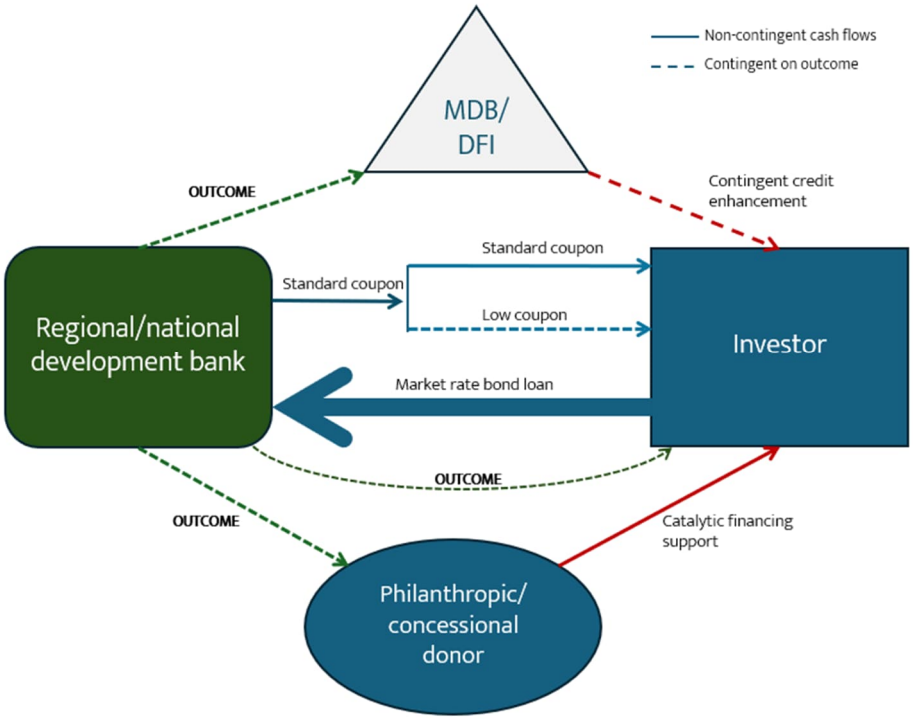
To illustrate this, consider that the price differential between the vanilla B bond above and the 0.7% step-down bond is 1.4 cents in terms of bond price. Suppose that there would be an injection of concessional capital of 0.7 cents, or 700k for a 100mn transaction. This would relieve the MDB/DFI of half of the credit enhancement expected costs, and in that case the DFI would "only" have to provide a 20% credit enhancement but with the same step-down structure: this.

[21] It should also be noted that in credit enhancement structures where the provider of the credit enhancement takes over the claims of the (bond) investor in case of default, the provider will pursue a recovery rate on those claims. As shown above, the historical recovery rate on local currency is substantially higher, making the nominally high 40% credit enhancement in the local currency case look substantially less expensive on an expectations basis.

The schedule of cash flows and impacts in such a structure is outlined in Figure 12 shows the flow of capital as well as the delivery of outcomes. Dotted lines indicate flows that only happen if the SPTs are met. A few key points to elaborate upon:

- Investors do the heavy lifting in terms of supplying the actual capital: they are not being concessional in the financial sense, but of course the structure is more complicated than a plain vanilla bond. However, the extra compensation for the extra work on the structure manifests itself in impact in the form of a predetermined outcome.
- The issuer obtains a strong incentive to reach the outcome, and if successful obtains a lower cost-of-capital. The concession in terms of other parties is delivered back in terms of outcome/impact.
- The MDB/DFI does provide a contingent credit enhancement which has not been priced into this structure yet – more below on this. However, the main distinction between this credit enhancement and a standard one is that this one is backloaded and contingent, making it much cheaper on an expectations basis. Furthermore, the MDB/DFI is guaranteed outcome before the guarantee is activated, which ensures scarce financial resources are deployed to make an impact. Also, this could potentially reduce impact uncertainty in pricing a guarantee.
- For the concessional contributor/philanthropy, a quite small amount of capital relative to the nominal amount in the bond operate catalytically to make a transaction happen. For this party, the outcome is not guaranteed, however, so there is a downside scenario where the contribution does not get the outcome. It should be considered that the concession is still creating the incentives for the outcome to happen.
- This structure results in a strong alignment of incentives between the investors, issuer, MDB/DFI and any additional donors. Ultimately, it's a more complex structure compared to a plain vanilla bond but can achieve stronger accountability and sustainability outcomes.

Figure 12. Capital-, guarantee- and outcome flow in a catalytic CORL transaction.



Source: AFII.

4.2. Regional development bank

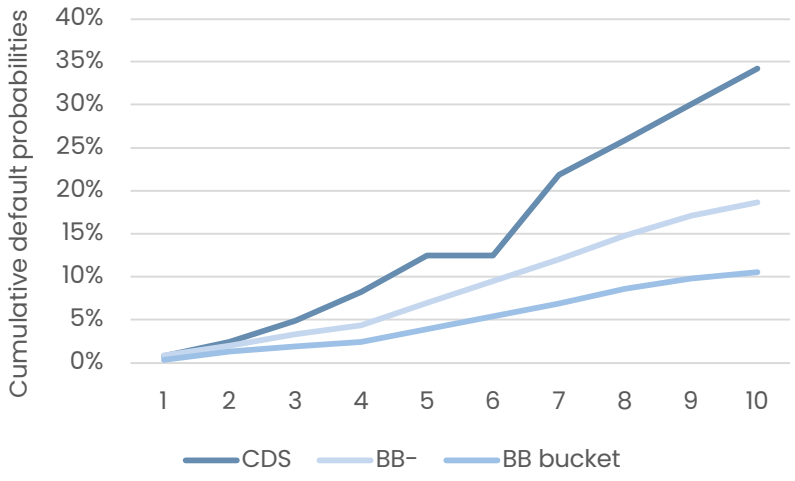
Building on the methodology in the first case, the following illustration focuses on a development bank with a somewhat higher credit rating (i.e. BB- / Ba3) and a mandate to promote economic growth and regional integration for sustainable development. This bank would be the issuer of bonds to diversify funding sources.

The issuer's existing green bond framework already refers to projects related to the generation, distribution and/or transmission of energy from renewable energy sources. A broader sustainable finance framework could enable the issuance of other labelled bonds, including SLBs.

Targets could include renewable energy generation capacity, but there are limits how much a development bank can directly influence these variables on a country level. Therefore, it would be sensible to translate high-level objectives into specific KPIs like new household connections to renewable energy or megawatts of renewable energy created. In this context, the recently launched Mission 300 is an ambitious regional initiative to connect 300 million people to electricity in Sub-Saharan Africa by 2030, led by the World Bank and African Development Bank, reiterating the need for action. Given sizable financing needs, a critical question is how to broaden the pool of investors that provides funding for these projects. Innovative structures like CORL bond enable risk mitigation and could crowd in more private investors.

The focus is on a hypothetical 10-year USD transaction to access international capital markets, complementing existing funding via local-currency issuance. As the development bank is wholly government-owned, there is a high likelihood of support if needed and sovereign data can be used to derive working assumptions on pricing. Funding costs are assumed to be 25bps over the sovereign curve. Figure 13 shows market-implied default probabilities based on CDS pricing as well as average historical default rates for BB- rated issuers and the BB bucket overall. There is a significant difference between the average historical default rates and market-implied default probabilities, indicating that market participants price in a default risk well above long-term averages.

Figure 13. Historical cumulative default rates (foreign currency, by rating) and market-implied default probabilities (CDS in USD) per annum.



Source: AFII, Bloomberg.

We illustrate an issuance in USD with a 10-year maturity and a step-down in the coupon rate after 5 years. This would provide the development make with some time to achieve targets, followed by an equally long time period of access to lower cost of capital.

The results are shown in Table 7. The first section illustrates how the valuation model would price a plain vanilla bond being issued today, assuming a coupon 25bps over the current sovereign yield and a 25% recovery rate.

Now consider the case of a 1% step-down after year 5. Again, the size of the coupon change is roughly equivalent to a one-letter-grade rating uplift (e.g. from BB- to BBB-). The second section in Table 7 shows how that structure loses in value if we apply the step-down, as the coupon leg becomes less valuable for the investor. The plain step-down bond then prices at 97.53 (middle column).

Then, in the final columns, we show how this would price as a CORL structure with 17.5% contingent credit enhancement. It prices back to the 100.21 level, showing that the investor should be indifferent between the original bond valuation and the CORL bond structure as the credit enhancement compensates the investor for the coupon reduction. At the same time, the issuer achieves a reduction of capital costs equivalent to a full letter-grade rating upgrade[22].

Table 7. Valuation of bond structures for CORL bond in USD. The US Treasury curve has been used as risk-free discount curve.

	BB bond with 7.5% coupon, assumed 25% recovery			BB bond with -1.0% SD			SD -1.0%, CORL enhanced recovery rate 42.5% (25%+17.5%)		
Year	Disc. coupon	Exp. recovery	Nom. payback	Disc. coupon	Exp. recovery	Nom. payback	Disc. coupon	Exp. recovery	Nom. payback
1	7.15	0.18		7.15	0.18		7.15	0.18	
2	6.74	0.38		6.74	0.38		6.74	0.38	
3	6.30	0.54		6.30	0.54		6.30	0.54	
4	5.82	0.71		5.82	0.71		5.82	0.71	
5	5.32	0.85		5.32	0.85		5.32	0.85	
6	5.08	0.00		4.40	0.00		4.40	0.01	
7	4.34	1.73		3.76	1.73		3.76	2.94	
8	3.93	0.72		3.40	0.72		3.40	1.22	
9	3.54	0.70		3.07	0.70		3.07	1.19	
10	3.17	0.68	42.33	2.75	0.68	42.33	2.75	1.15	42.23
Contribution	51.38	6.49	42.33	48.71	6.49	42.33	48.71	9.17	42.23
Bond price			*100.21*			*97.53*			*100.21*

Source: AFII.

[22] If one were to seek a cost-of-capital reduction for Rwanda to be equivalent to being upgraded to investment grade BBB-, we estimate that the spread would need to compress with roughly 225bps/2.25%. This would require a contingent credit enhancement of around 48-49%.

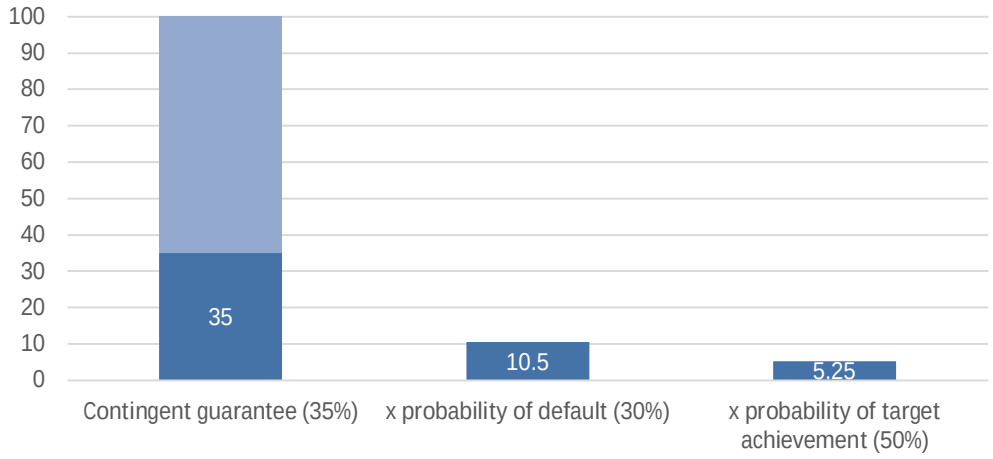
4.3. Credit enhancement providers

International financial institutions (IFIs), development finance institutions (DFIs), and multilateral development banks (MDBs) are important for financing sustainable development in general and would have a pivotal role in the CORL structure. As the provider of credit enhancements, they must be supportive of the overall bond specifications and manage related exposure. Fundamentally, blended finance is a growing area for several of these organizations as high financing needs for SDGs in EMDEs require increased efforts to mobilize capital. However, these innovative solutions require several considerations as outlined below and often involve coordination across different teams, including credit risk and operations.

The CORL bond structure involves a credit enhancement in the form of a guarantee contingent on achieving a performance target. As illustrated earlier, the motivation behind this design is a higher recovery rate in the case of an issuer default, thereby incentivizing commercial investors to participate in such a transaction through risk mitigation. An important feature here is the contingency of the guarantee as it would only become active if the pre-defined targets were achieved, ensuring that the provision of credit enhancement is dependent on impact. While this strengthens accountability and alleviates potential concerns around ineffective use of scarce financial resources, it leads to the question of how an institution should account for such a contingent liability.

In an extreme case, the full guaranteed amount could be maintained throughout the lifetime of the CORL bond. While this might appear prudent, it can be seen as a rather ineffective use of capital. A risk-based approach based on the probability of achieving performance targets, probability of default and loss given default could be considered here.

Figure 14. Illustration of exposure related to a contingent guarantee.



Source: AFII.

Figure 14 illustrates this with a 35% guarantee, meaning the credit enhancement provider would pay the investor this amount in the case of an issuer default, which triggers the guarantee. Assuming a 7-year bond with USD 100mn face value, this could result in a payout of up to USD 35mn. The most conservative approach would be to maintain the full amount throughout the lifetime of the bond. Assigning default probabilities to the underlying exposure would lower the required provisioning but require risk assumptions. Historical and market-implied default rates can act as a reference, as illustrated with a 30% probability of default.

Importantly, in the CORL structure the guarantee is only activated if the performance target is achieved, which can be quantified with a probability, too. Assuming 50% probability of target achievement, the exposure ends up at USD 5.25mn, but obviously there are uncertainties around this number, parameters have to be monitored over time and adjusted if necessary.

Ultimately, institutions that provide credit enhancements need to decide how they account for guarantees on their balance sheets, and if they opt for a (partially) funded or unfunded approach based on callable capital. Related to this are questions around the pricing of such guarantees, ranging from concessional to market-based levels. Given the ongoing focus on credit enhancements in the context of development finance, more discussions are expected on these considerations, while studies and real-life examples show the potential of guarantees as a way to mobilize capital (Blended Finance Taskforce, 2023; Sida, 2024).

4.4. Other considerations

4.4.1. Rating agencies

Credit ratings play a key role in financial markets to assess the riskiness of an issuer. Looking at previous transactions, credit rating agencies' approaches to credit enhancements differ. All else equal, guarantees and blended finance structures in general increase the complexity of an instrument compared to a plain vanilla bond. A fundamental question is how to weigh the probability of default and the loss given default – the former is the main objective of a credit rating, while guarantees mainly address the latter. More blended finance transactions could help to broaden the overall market understanding and perception of credit enhancements.

4.4.2. Capacity building

Looking at the complexity of bond markets, whether it is a plain vanilla bond or blended finance structure, the relevance of capacity building should not be underestimated. This applies to know-how and expertise within larger institutions, several of which are sizable lenders and bond issuers, but also knowledge transfer to development banks that are at an earlier stage of market-based financing. In order to access capital market, it's helpful for RDBs and NDBs to have access to resources from international financial institutions, particularly for first-time issuers of bonds.

4.4.3. Anchor / cornerstone investors

As well-recognized institutions, DFIs and MDBs can also send a market signal by acting as an investor in a specific transaction, thereby encouraging other investors to participate. Such anchor investments are prominent in private market transactions like infrastructure projects. In the context of public bond markets, however, there is the risk of crowding out commercial investors through a sizable investment by a large institution that ultimately lowers market liquidity. More relevant could be the provision of some sort of market liquidity in certain circumstances, but generally this would increase overall complexity, particularly if an institution also acts as a provider of credit enhancements. Meanwhile, leading asset managers or asset owners could act as cornerstone investors, which would be seen as positive for overall market confidence in a transaction.

5. Discussions and recommendations

Based on the concept outlined in part 3 and the practical examples in part 4, Figure 15 summarizes the potential use of CORL bonds with a SWOT analysis. Considering the strengths and weaknesses of the bond structure in the current environment of opportunities and threats, we outline areas for further discussion and recommendations in the context of PDB financing.

We recommend that the development finance community, investors and issuers look at specific, market-based approaches to mobilize more capital for sustainable development at scale. More specifically, sustainability-linked, credit-enhanced bond structures have the potential to lower the cost of capital and crowd in investors and – both would help to achieve the SDGs. CORL bonds are a specific example of how this could look like in practice, and we encourage stakeholders to look at such innovative structures to complement existing funding sources and facilitate more investments into SDG-aligned projects through development banks. In order to move from the concept stage to an actual transaction, feedback from all relevant stakeholders is essential and appreciated.

Figure 15. SWOT analysis of CORL bonds.

Strengths

- Concept with strong emphasis on bond pricing to illustrate relevant risk considerations of market participants.
- Alignment of incentives across relevant stakeholders in a bond transaction
- Potential to significantly lower the cost of capital of development banks through a mechanism that rewards the achievement of sustainability targets.
- Contingent credit enhancement with manageable risk exposure for the providers of guarantees, providing room to leverage their balance sheets.
- Flexibility to apply the underlying approach to loans

Weaknesses

- As a novel concept, market participants are not familiar with it yet.
- Certain degree of complexity in the structure.
- Uncertainty regarding credit rating treatment by rating agencies.
- KPIs/SPTs require additional initial work (i.e., development of framework, calibration), ongoing monitoring and verification at observation date.

Opportunities

- Address ongoing need to mobilize more capital for sustainable development in an effective way, with PDBs as important players.
- Involvement of impact-driven donors to further enhance pricing of the structure, if needed.

Threats

- Potential shift away from blended finance as a development finance tool amid cuts to aid budgets.

Source: AFII.

6. Conclusions

Significant capital will be needed in EMDEs to achieve the SDGs. Public development banks are uniquely positioned to scale up sustainable finance and are expected to play a key role in financing investments, leveraging their market expertise and ability to provide local-currency financing. This requires access to affordable capital.

Bond markets are an important channel to raise capital, diversify funding sources and crowd in investors. In this context, DFIs and MDBs can help to unlock more capital for SDG-aligned investments through blended finance. Performance-linked debt structures, such as sustainability-linked bonds (SLBs) have the potential to become a more important source of funding for development banks. Embedding credit enhancements, like guarantees, in financing structures has the potential to reduce the cost of capital, as illustrated with the CORL bond – a sustainability-linked, credit-enhanced instrument. The structure involves a partial credit enhancement that is activated if performance targets are reached, thereby compensating investors for the lower coupon – this novel structure has the potential to mobilize capital via development banks.

The case studies show that CORL bonds can be structured to offer sizable and incentivizing step-downs only needing a relatively modest credit enhancement, and with a balanced incentive structure for all stakeholders: The investor gets an investment that is at least as good as a traditional bond, with added non-pecuniary benefits and potential upside from credit improvements. The issuer gets incentivizing financing with potentially lower cost-of-capital for investments in resilience and sustainability. The provider of credit enhancement, either a development finance institution (DFI) or multilateral development bank (MDB), has a relatively low and well-defined contingent exposure.

This study should foster further discussion among investors, issuers and development finance practitioners on specific market-based approaches to mobilize more capital for sustainable development at scale. Sustainability-linked, credit-enhanced bond structures have the potential to crowd in investors and lower the cost of capital – both would help to achieve the SDG. CORL bonds are a specific example of how this could look in practice, complementing existing funding sources and facilitating more investments into SDG-aligned projects through national/regional development banks.

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List of acronyms and abbreviations

AAAA	Addis Ababa Action Agenda
CORL bond	Contingent Resilience-linked bond
DFI	Development finance institution
EM	Emerging market
EMDEs	Emerging markets and developing economies
EVB	Equivalent vanilla bond
GSS bonds	Green, Social, and Sustainable bonds
GSSS bonds	Green, Social, Sustainability, and Sustainability-linked bonds
HC	Hard currency
IG	Investment grade
KPI	Key performance indicator
LC	Local currency
LGD	Loss given default
MDB	Multilateral development bank
NDB	National development bank
PDB	Public development bank
PD	Probability of default
RDB	Regional development bank
SDGs	Sustainable Development Goals
SLB	Sustainability-linked bond
SLBPs	Sustainability-Linked Bond Principles
SPT	Sustainability performance target
UoP	Use of Proceeds

Appendix

Largest national development banks in Africa

	Name	Establishment year	Country	Region	Total Assets (mn USD)
1	Caisse de Dépôts et de Gestion du Maroc	1959	Morocco	Northern Africa	32,550
2	Agricultural Credit of Morocco	2008	Morocco	Northern Africa	13,678
3	Industrial Development Corporation	1940	South Africa	Southern Africa	8,983
4	Development Bank of Southern Africa	1983	South Africa	Southern Africa	6,121
5	Bank of Industry	1959	Nigeria	Western Africa	5,303
6	Export Development Bank of Egypt	1983	Egypt	Northern Africa	3,971
7	Caisse des Dépôts et Consignations Tunisia	2011	Tunisia	Northern Africa	3,410
8	Municipal Equipment Fund	1959	Morocco	Northern Africa	2,867
9	Zambian Investment Holding	1937	Zambia	Southern Africa	2,692
10	National Investment Bank	1959	Côte d'Ivoire	Western Africa	2,613
11	Development Bank of Ethiopia	1909	Ethiopia	Eastern Africa	2,437
12	Land and Agricultural Development Bank of South Africa	1912	South Africa	Southern Africa	1,952
13	Industrial development Corporation Zambia	2014	Zambia	Southern Africa	1,588
14	CDG Capital	2006	Morocco	Northern Africa	1,400
15	Caisse des Dépôts et Consignations Benin	2018	Benin	Western Africa	1,400
16	National Bank for Agricultural Development	1981	Mali	Western Africa	1,271

17	Development Bank of Nigeria	2017	Nigeria	Western Africa	1,161
18	Development Bank of Angola	2006	Angola	Middle Africa	962
19	Caisse des Dépôts et Consignations Gabon	2010	Gabon	Middle Africa	848
20	National Bank for Economic Development	2013	Senegal	Western Africa	520
21	Botswana Development Corporation	1970	Botswana	Southern Africa	479
22	Development Bank of Rwanda	1967	Rwanda	Eastern Africa	448
23	Development Bank of Namibia	2004	Namibia	Southern Africa	439
24	National Housing Finance Corporation	1996	South Africa	Southern Africa	436
25	Small enterprise Finance Agency	2012	South Africa	Southern Africa	436
26	Nigerian Export-Import Bank	1991	Nigeria	Western Africa	423
27	Uganda Development Bank	1972	Uganda	Eastern Africa	409
28	Caisse des Prêts et de Soutien des Collectivités Locales	1902	Tunisia	Northern Africa	380
29	Industry Promotion Fund	1989	DRCongo	Middle Africa	364
30	National Empowerment Fund	1998	South Africa	Southern Africa	354

Source: Public Development Banks and Development Financing Institutions Database, Institute of New Structural Economics (INSE) at Peking University, AFD and FERDI, as of February 2025.

SLB target setting: ICMA recommendations

ICMA's Sustainability-Linked Bond Principles (SLBPs)[23] recommend SLB structuring features, disclosure practices, and reporting processes. The principles represent industry-endorsed best practices and are used to inform SLB structures. On target-setting, the SLBPs lay out the following recommendations:

- SPTs should represent "a material improvement" in their respective KPIs that go beyond business-as-usual improvements.
- They should be compared to a benchmark or external reference where possible.
- They should be consistent with an issuer's overarching business and sustainability strategy (in the case of corporate issuers) or sustainable development policies (in the case of sovereign issuers).
- They should be appropriately baselined against a point-in-time set before or concurrent with the bond's issuance.
- They should be benchmarked using a combination of approaches, including the issuer's own track record on the selected KPIs, its peers' track records, and by reference to climate science or international agreements, such as the 2015 Paris Climate Agreement.

The SLBPs further provide recommendations on SPT disclosures. These should "make clear reference" to the following:

- Timelines for SPT achievement, including target observation date/periods, the trigger events, and frequency of SPTs.
- Where relevant, the verified baseline/ reference point against which KPI improvement is measured, as well as the rationale for that baseline or reference point being used.
- Where possible, how the issuer intends to reach its SPTs, for example by describing its sustainability strategy, supporting governance arrangements, and investments.
- Other key factors beyond the issuer's direct control that may affect the achievement of the SPTs.

By following these SLBPs, an SLB issuer should be able to provide investors with the information they need to efficiently price the instrument's embedded option value and determine whether it makes for an attractive investment. They also facilitate the setting of strong sustainability targets, thereby insulating issuers from claims that they are exaggerating their environmental commitments.

A principles-based approach to target setting is open to subjective interpretations, and the dimensionality of analysis required increases with the number of SPTs featured in the bond.

[23] "Sustainability-Linked Bond Principles", ICMA, 2024.

Market concepts

A) Credit rating scale and description

	Moody's Investors Service	Fitch Ratings	S&P Global Ratings	Rating Grade Description
Investment Grade	Aaa	AAA	AAA	Highest credit quality, lowest level of credit risk
	Aa1 Aa2 Aa3	AA+ AA AA-	AA+ AA AA-	Very high credit quality with very low credit risk
	A1 A2 A3	A+ A A-	A+ A A-	High credit quality with low credit risk
	Baa1 Baa2 Baa3	BBB+ BBB BBB-	BBB+ BBB BBB-	Good credit quality with moderate credit risk
Speculative Grade	Ba1 Ba2 Ba3	BB+ BB BB-	BB+ BB BB-	Speculative with substantial credit risk
	B1 B2 B3	B+ B B-	B+ B B-	Highly speculative with high credit risk
	Caa1 Caa2 Caa3	CCC+ CCC CCC-	CCC+ CCC CCC-	Substantial credit risk with default as a real possibility
	Ca	CC	CC	Very high levels of credit risk with default either occurring or about to occur
	C	C	C	Default or default-like process has begun
		SD	RD	Selective Default (SD): Issuers have defaulted on one or more specific issues but are expected to meet their other payment obligations. Restricted Default (RD): Issuers have missed one or more payments but are not under supervision for reorganization or liquidation.
		D	D	Default: Issuers are unlikely to pay their obligations and have likely entered into bankruptcy filings, administration, receivership, liquidation or other formal winding-up procedures.

Source: Credit Risk: Implementing Structural Models - Scientific Figure on ResearchGate.

B) Credit risk modelling basics

$$EL = PD \cdot LGD \cdot EAD$$

with $LGD = 1 - RR$

The expected loss (EL) of a bond is affected by three components:

1. Probability of default (PD)
2. Loss given default (LGD), which is equal to one minus the recovery rate (RR) in the event of default
3. Exposure at default (EAD)

For further details: Quantitative Risk Management: Concepts, Techniques and Tools - Revised Edition; Alexander J. McNeil, Rüdiger Frey, and Paul Embrechts, Princeton University Press (2015).

C) Overview of debt financing options

This section provides an overview and analysis of various capital provisioning formats that can contain blended finance elements, with a specific regional/national development bank perspective.

As baseline for the comparison between several types of debt, we consider the following:

- **Loans**

  The loan format is a generally negotiated, covenanted and bespoke type of financing, that could be described as several types: public institution bilateral (e.g. an MDB lending directly to a borrower), private institution bilateral (a private bank as lender) or syndicated (a consortium of private lenders as lenders), and variations thereof. With the growth of the private credit market, the lenders can also be 'traditional' investors as well as banks.

  The loan structure is highly bespoke, but generally sitting as more senior in the capital structure than bond financing. Given the bespoke format, it tends to be covenanted, meaning that the lending is attached to more conditionalities than just payment of interest and repayment of notional.

  From an investor perspective, loans are considered at best to have low liquidity or at worst completely illiquid, given a lack of a centralized secondary market.

  For borrowers, loans can actually provide more liquidity especially if the loans are being financed via a credit facility, where additional lending capacity can be part of the set-up (e.g. in a Revolving Credit Facility, RCF).

- **Plain vanilla bonds**

  A traditional bond involves private investors lending money to the borrowers without intermediaries (except for the process of bookbuilding/syndicating the bond at issuance).

  Given the substantial size of traditional bond markets, it is usually the cheapest and fastest way to get access to large amount of capital.

  Access to plain vanilla bond issuance may be constrained for lower rated issuers.

- **GSS bonds**

  A GSS bond is similar to a plain vanilla bond but with the important difference that it has a dedicated use of proceeds. The GSS bond is heavily dominated by green bonds, where the use of proceeds is for capital expenditure into 'assets' that lead to sustainability improvements.

  The use-of-proceed format is different from asset-backed as in the UoP there is no priority for creditors to the underlying assets in case of default, and generally no legal recourse in case the UoP does not fulfil originally stated uses. Although this may appear 'weak' in terms of investors' role in these bonds, the repeat nature of the bond space makes compliance generally strong.

  A GSS bond is costlier to issue than a plain vanilla bond, with costs associated with creating a use-of-proceeds framework, a second party opinion and delivering reports on the use of proceeds.

D) Considerations when comparing SLB/CORL structures to use-of-proceeds and plain vanilla bonds (baseline)

			Specific to CORL
	Issuer	**Investor**	**Credit enhancer**
	(development bank)	(bond holder)	(IFI, DFI, MDB)
Interest rate	Fundamentally, the cost of capital / yield at issuance should be at most the same as for a vanilla bond		
	Lower than the baseline on an expectations basis	Expected yield/return on the bond is lower, but the risk/return ratio does not change, or only increases moderately	
Risks and uncertainties	Risk of failing to achieve SPTs	Uncertainty about coupon adjustment	
	Risk of failing to achieve contingency-linked credit enhancement		Uncertainty about the guarantee being activated
Impact	Outcome focused		Outcome focused
Mobilization multiplier	It depends on the structuring of the guarantee (e.g., funded, unfunded) and related provisioning		
Market signal	Issuer-wide perspective based on SPTs		
	Higher expected recovery rate in case of default Broader investor participation possible		Enhancing the credit profile of the issuer by providing a contingent guarantee
Transaction costs and other factors	Syndication fees	Usual due diligence	
	Data monitoring and delivery on contingency condition	Legal costs verification in terms of credit enhancement, significantly reduced costs in terms of contingency monitoring	Pricing terms of the guarantee (e.g., concessional), Monitoring of achievement of contingency condition

Agence française
de développement
5, rue Roland Barthes
75012 Paris I France
www.afd.fr

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