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The design flaw in Sustainability-Linked Bonds

by

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Abstract: We examine in this paper sustainability-linked bonds (SLBs) whose issuance now totals more than USD 200 bn. A typical SLB has a coupon step-up linked to the issuer achieving a predetermined sustainability performance target. First, we recall why a SLB and a counterfactual vanilla bond issued by the same borrower should be and actually are priced with the same issuer yield. Our analysis then shows that the SLBs parameters (mainly step-up period as a fraction of the bond's tenor, coupon step-up size and step-up activation probability) cannot be manipulated to lower the issuer's cost of capital significantly, which is presumed to be the very goal of the SLB product. There is a structural design flaw in the SLB mechanism: setting a significant coupon step-up does not suit the issuer's nor the investors' interests, considering conditionality. This creates a no win situation for the issuer and investors alike and explains the "benign" use of SLBs by current market participants.

Keywords: Sustainability-linked bonds, ESG, Green bonds, Sustainable finance innovation, Greenwashing, Greenium

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Contents

1. Introduction

Green finance has marketed green bonds as a tool to finance projects with environmental benefits. As eliminating any existing negative environmental (or social) impact amounts in the end to paying additional costs (such as the costs of depollution for example), the added value of these green bonds was based on the assumption that these additional costs would be, at least partially, transferred to bondholders - the buyers of green bonds - thus making them contribute to the environmental or social goals. This assumption concerning green bonds was unrealistic. Ekeland and myself showed this in a simple way by explaining in a previous paper (Ekeland, Lefournier, 2019, 2021) how the mechanics of the primary bond market (through its specific bookbuilding process) forbid any specific premium for green bonds. In a nutshell, green bond and its counterfactual non-green bond having identical risks and pay-offs, we showed that professional investors can only be indifferent between the two types of securities. With no additionality and at equal price, the green bond failed to provide its issuer with any comparative advantage over the traditional bond. It is a communication tool for all parties involved.

Social bonds are a copy of green bonds with social benefits replacing environmental benefits, and sustainable bonds are bonds whose issuance proceeds are used to finance or refinance a combination of both green and social projects (aligned with all components of both the Green Bond and Social Bond Principles). So they suffer from the same defect as green bonds, given constant credit risk and financial profile versus a counterfactual traditional bond issuance.

Given this consideration, Sustainability-Linked Bonds (SLBs), the newest product of the "sustainable finance" sector, completing the existing family of Green, Social and Sustainable bonds (all together acronymed as GSSSB), provides a structure which allows for a variation in pay-off profile. However, the trade-off is that the bond loses its green (or social) promise regarding the use of proceeds. The proceeds of SLBs are no longer earmarked towards green (or social) projects but are intended to be used for general purposes. This is a serious caveat considering traceability is considered essential to specific redirection in favor of sustainable investments. The link with sustainability (hence the name) is theoretically achieved through establishing *Sustainability Performance Targets* (SPTs) which if not met at some point in time during the bond's life will trigger an increase (and/or if met will potentially trigger an decrease) in fixed-coupons paid by the issuer. SLBs are usually structured as fixed-coupon bonds where coupons increase by a fixed amount called a coupon step-up.

The assumption here is that SLBs will incentivize the issuer's achievement of these SPTs through this mechanism. Leaving aside whether the SPTs in and of themselves are relevant or not for an issuer to achieve its transition towards sustainability (cf. 6), the key question becomes whether or not the SLB parameters can be tweaked to provide such a real incentive for the issuer, what potential coupon discount versus counterfactual traditional bond could be expected by the issuer given the conditional features. This is what explores this paper.

Considering SLBs cumulated issuance volume above USD 200 bn and the indisputable participation of many professional investors, there is no rational reason to believe that SLBs would benefit from any irrational premium (that an investor would be willing to pay in order to achieve some « good »). All the arguments used in Ekeland, & Lefournier (2019, 2021) to show the absence of a green premium in green bonds remain valid. Therefore we are not chasing an elusive premium for the SLBs, but develop an analysis focusing in the SLB pricing on the variation of the pure financial profile (credit risk being constant) on an absence-of-arbitrage basis and try to assess if SLB structure can be used to lower cost-of-capital for issuers through adjusting its various parameters.

2. What are Sustainability-Linked Bonds?

2.1. Definition

With c. USD 200bn worth of issuance in 2021-2022, SLBs are still unregulated (as any other GSSS product). Market participants are left to interpret the relevance and ambition of the SLBs' sustainability targets and the merits of the product itself.

Yet, the International Capital Markets Association (ICMA) published a set of "*voluntary guidelines*", the Sustainability-Linked Bonds Principles (SLBP) in June 2020 (ICMA, 2020).
According to these SLBP:
"*SLBs are any type of bond instrument for which the financial and/or structural characteristics can vary depending on whether the issuer achieves predefined sustainability/ESG objectives. In that sense, issuers are thereby committing explicitly (including in the bond documentation) to future improvements in sustainability outcome(s) within a predefined timeline. SLBs are a forward-looking performance based instrument.*
Those objectives are (i) measured through predefined Key Performance Indicators (KPIs) and (ii) assessed against predefined Sustainability Performance Targets (SPTs).
The proceeds of SLBs are intended to be used for general purposes, hence the use of proceeds is not a determinant in its categorisation."

The financial profile variation referred to in the above definition is typically a coupon step-up penalty meaning that, if the issuer does not meet its predetermined SPTs by a target observation date, subsequent interest payments will be increased by a predetermined penalty amount.

2.2. Current state of the SLB market

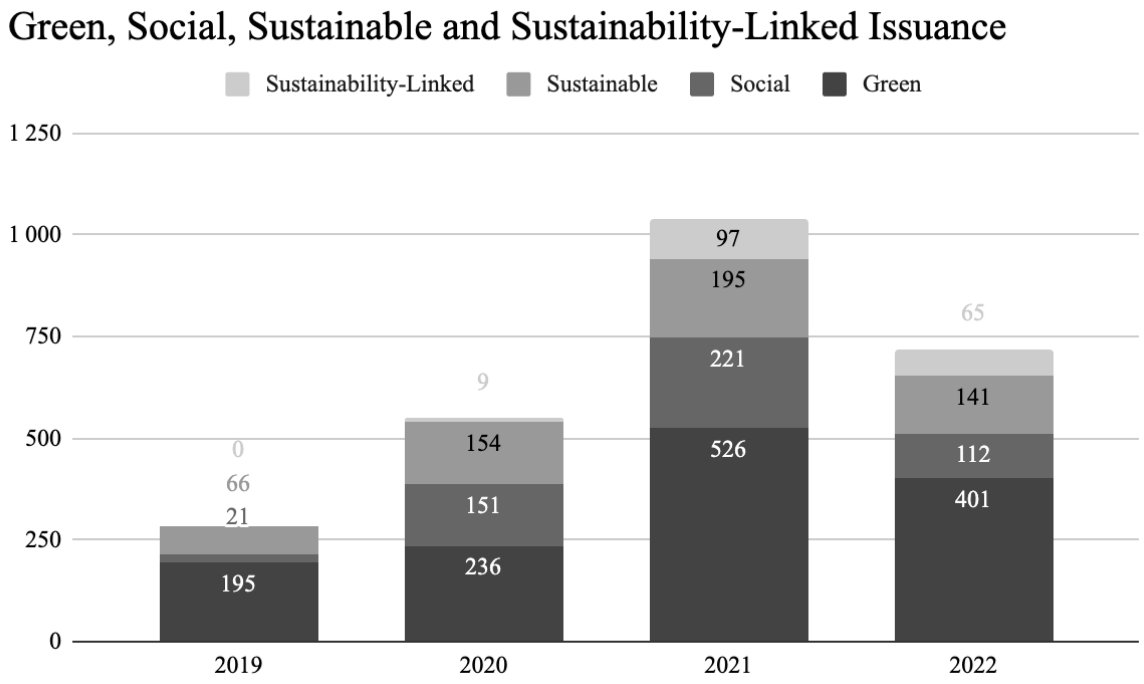
Total cumulative size of the SLBs market at end of 2022: USD 204,2 bn, by a total of 336 issuers from 50 countries in 21 currencies (versus green bonds market total size of USD 2,2 tn, by a total of 2457 issuers from 57 countries in 49 currencies).

SLBs 2021 issuance: USD 112,1 bn via 190 issues (versus 582,4 bn for green bonds via 976 issues).
SLBs 2022 issuance: USD 76,4 bn via 142 issues (versus 487,1 bn for green bonds via 741 issues).

Average SLB issue size in 2022: USD$ 372,6 m (versus 140 m for green bonds).

Non-financial corporate share in 2022 new SLBs issuance: 78% (versus 25% in 2022 new green bond issuance).

In 2022, 30% deals had a tenor of 10+, 20% had a tenor of less than five years, while tenors of 5-10 years remained the majority with 50% of SLBs.



2.3. Key Performance Indicators (KPIs)

Sustainability Performance Targets (SPTs) are set as measurable improvements in KPIs, which are quantifiable metrics that are pre-defined. A bond may have multiple KPIs. Each individual KPI may have its own associated incentive/penalty or they can mutually trigger the penalty.

KPIs may be related to different "themes" if they are all directly related to topics associated with:

- environmental issues: climate change (GHG emissions and energy), air quality, waste management and reduction, raw material recycling, etc.
- social issues: gender equality, diversity, human rights, working conditions (employee engagement, labor practices and labor rights), etc.
- governance issues: business ethics, data protection & security (incl. cybersecurity), product governance (safety & quality)

According to the Climate Bonds Initiative (CBI) data, KPIs related to GHG emissions are by far the most used with 55% of issuers in 2022 including some kind of decarbonisation target; renewable energy and energy efficiency targets were the next most popular, with 8% and 6% of deals, and 5% linked to ESG score performance.

2.4. Types of financial profile adjustments

There are various different types of financial incentives associated with SLBs including coupon step-ups, coupon step-downs or redemption premium. Those SLBs with multiple SPTs may have multiple financial incentives or not.

Qualitatively, Ul Haq and Doumbia (2022) found that:

- The most common financial incentive associated with SLBs is a coupon step-up penalty representing 75% of their 203 bonds sample. Adding redemption premium at maturity, this share reaches 95% of the sample.
- Step-down coupons are very rare (3/203 bonds).
- Of the 77 bonds with multiple incentives, 55 bonds have multiple step-up penalties.

Quantitatively, they found that about 75% of SLBs with only step-up penalties (whether single or multiple) have penalties lower or equal to 25 bps[2] (aggregated at bond level), while 60% have a step-up coupon penalty of exactly 25 bps. The average penalty being only 31.2 bps, representing 12% of the average coupon rate for SLBs with step-up penalties.

3. Lesson learned from green bonds: not a new issue premium discussion

3.1. New Issue Premium

The bond pricing formula, which is of practical use in the bond market (it does serve to calculate actual prices), is:

(E_0) $P(i,s) = \mathbf{\Sigma}_{p=1 \text{ à } N}\, C/(1+i+s)^p + 100/(1+i+s)^N$

It uses only two inputs:

- a "risk-free" interest rate (the *i* in the formula). This rate is an exogenous data, a commonly shared and perfectly observable reference, depending on the market and the maturity considered. For example, on the Euro bond market, it will be a swap rate whose maturity corresponds to that of the bond (a swap rate is a reference used in an interest rate swap, i.e. a contract where a stream of fixed interest payments is exchanged for a floating Euribor-based one on a specified principal amount).
- a credit spread measuring default risk which is specific to the issuer (the *s* in the formula). The bond is indeed risky in the sense that the borrower can default: he can stop paying the interest due and/or not repay the nominal when due. This credit spread is generally an increasing function of the maturity at a given issuer risk (the further in time we lend, the greater the uncertainty, the greater the risk of borrower default) and decreasing function of the quality of the credit at a given maturity (the higher the default risk, the higher the credit spread).

The sum of the credit spread and the risk-free rate, of course, constitutes the bond's yield (r = i + s). The potential debate on the bond pricing would therefore solely be focused on the credit spread, *i* being again an observable and objective market data.

When secondary credit references exist for the considered issuer, pricing of a new bond issuance is derived from the issuer secondary bond levels. The new issue credit spread is extrapolated from the issuer existing credit spread curve, i.e. current prices of previously issued bonds, but with the addition of an (algebraic) premium, called the New Issue Premium (NIP). This NIP reflects the investors' aggregated appetite during the bookbuilding process. Usually, the NIP is positive as it is a premium

[2] A basis point (bp) is 0,01%

conceded by the issuer to place the whole size of a primary bond issuance (usually greater than or equal to € 250 m) when compared to quotes for the same credit on the secondary market (typically bids for € 5 m). But it can very well be nil or even negative, when the appetite of investors is overwhelming (massive investment programs vs. limited offers, investment program behind schedule, favorable fixed-rate movements, etc.). In this latter case, when the NIP is negative, market participants tend to call it "new issue discount" or "new issue price concession" rather than NIP (the premium being negative, it is actually paid by investors for the benefit of the issuer).

NIPs are not stable over time and they do not depend solely on the credit of the borrower but on the specific timing of the new issuance itself. To be concrete, if an issuer were to launch a new € 500 m 7-year issue on a Wednesday rather than on a Tuesday of the same week, this issuer could pay a higher NIP, simply because of new issuance launched on Tuesday (an issue poorly received by the market; relative saturation of investors' appetite for the issuer sector, ratings, maturity bracket etc.; fall in rates with investors maintaining minimum fixed-rate targets; etc.), while its credit curve could remain completely unchanged. Such a variation could even occur within a single day (1st to launch versus last in the day's "pipeline of deals"). Naturally other sets of conditions could make for a lower NIP.

3.2. Greenium confusion

Climate Bonds Initiative (CBI), a charity promoting green finance, has created serious confusion when coining the term *greenium* for green bonds: "*Climate Bonds developed and uses the term greenium which describes a green bond that has priced inside its own yield curve in the primary market (new issue discount), and has been monitoring its presence since 2017. The existence of a greenium implies that the issuer has obtained cheaper funding for its new bond compared to prevailing rates*." (CBI, 2022, H2, p.15).

This is misleading as the name, a contraction of "green bond" and "new issue premium", suggests it is the NIP of a green bond (a green NIP) while the use of the word is restricted to cases when this green NIP is negative. In other words, this is a variable whose name is changing according to the value it can have. The CBI greenium exists if and only if it exists… forgetting all other green bonds.

Even more misleading is *"cheaper funding for its new bond compared to prevailing rates"*. It should read "*cheaper funding for its new bond compared to prevailing SECONDARY rates"*. Indeed the counterfactual scenario for the issuer is to fund its needs through new issuance of a traditional bond. So what CBI suggests is comparing apples with oranges i.e. primary and secondary market references. When comparing the usefulness of two financing tools (green bond versus traditional bond or SLB versus traditional bond), only a homogeneous green/non green differential should be considered, either in the primary market or in the secondary market. A bond issuer is essentially concerned by the former where its new issuance is priced.

An issuer should not care for CBI greenium as it is not a valid decision criteria. Consider these two examples:

- If the issuer could save 25 bps by going green paying a green NIP of +5 bps versus counterfactual vanilla NIP of +30 bps, he should certainly do so, despite the lack of actual CBI greenium (considering that in this case the green NIP has a positive value).

- Conversely, if the issuer could launch green and traditional bonds at respectively NIPs of -5 and -10 bps, he should indeed select the traditional one (more negative) despite the actual CBI greenium of -5 bps.

So the best outcome, all things being equal, is not related to the CBI greenium. The fact that an issuer would price inside its own yield curve (or not) is not related to any green/non green differential (the true green premium) and irrelevant to a green premium discussion. For that matter, borrowers issuing above their secondary curve are the general case: the CBI's own data shows that in 2022-H2 only a small fraction of new € and USD sustainable issuance (all formats: green, social, sustainable, SL) did actually price through their traditional bond curve.

CBI greenium = $(\text{New Issue Spread})_{green}$ - $(\text{Secondary Level})_{vanilla}$ = NIS_g - SL_v = NIP_g (when negative).

The true green premium is the green/non green differential cost for the issuer equals to:
$NIS_g - NIS_v = (NIS_g - SL_v) - (NIS_g - SL_v) = NIP_g - NIP_v$.

It is never unobservable as no issuer issues simultaneously identical green and traditional bonds, considering investor demand cannibalization (the two bonds would constitute the exact same offering). NIS_g and NIS_v are market prices never available simultaneously. Nevertheless, financial reasoning allows us to conclude on the green premium.

3.3. Conclusion on green premium

In the primary markets, any new bond issue could present a negative NIP and many traditional bonds actually do. The only relevant question to determine a green premium for the issuer would be: "what would have been the NIP on an identical vanilla bond issued in place of the green one at that exact same time". There cannot be any actual answer to this question as no issuer issues simultaneously identical green and vanilla bonds. Unlike on the secondary market, the green NIP and its counterfactual vanilla one cannot be simultaneously observed. Any inter-temporal comparison is not robust as discussed above considering NIP volatility.

Nevertheless, Ekeland and myself (Ekeland, Lefournier, 2019, 2021) delivered a proof of impossibility by showing how the mechanics of the primary bond market (through its bookbuilding process) forbid any real premium for green bonds. The end result is in and of itself not surprising: the green promise (the use of proceeds for green projects) having no impact on the financial profile of the green bond, the credit risk being that of the given issuer, no professional buyer should give green bonds any pecuniary value if fulfilling its basic fiduciary duty. So green bonds are essentially priced like traditional bonds. Our result was based on financial reasoning, basic absence-of-arbitrage paradigm, not data crunching.

Latest empirical observations are consistent with our findings as several recent papers found no premium on green bonds, including that of:

- Larcker and Watts (2020) who compared green bonds to identical non-green bonds issued by the same municipal issuers on the same day. They documented that the prices of green and non-green issues were identical. They interpret this as indicating that in a real market environment, investors are not willing to trade off their wealth for environmental projects.
- Flammer (2021) finds no greenium either for her sample of 152 corporate bond pairs.

Our conclusion was also consistent with secondary level observations where there is no substantial difference between green and vanilla bonds (for given issuer/maturity) beyond liquidity discrepancies. The notorious German "twin" bunds (vanilla and green 2050 bunds) differential is driven by technical factors: different issuance methods by German treasury (adjudication vs. syndication), huge difference in issue sizes, lack of suitable reopenings, as well as massive Budensbank buy back programmes such as Public Sector Purchase Programme (PSPP) and Pandemic Emergency Purchase Programme (PEPP) affecting liquidity in the bonds. This situation is fictitious as it cannot be arbitraged (sell green Bund and buy traditional Bund, with associated reverse repo/repo).

Absence-of-arbitrage prevents anyone to buy and sell the same cash-flows for a profit.
In (E_0), if s' < s :

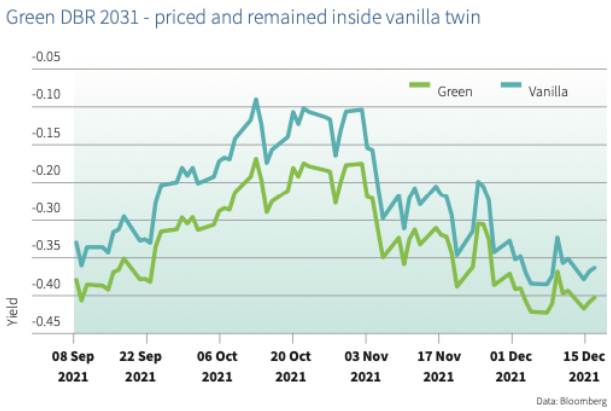
(1) Sell Green @ 102 = $\mathbf{\Sigma}_{p=1 \text{ à } N}\ C/(1+i+s')^p + 100/(1+i+s')^N$

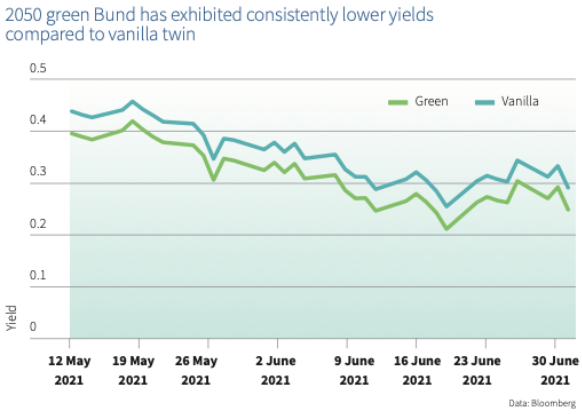
(2) Buy Traditional @ 100 = $\mathbf{\Sigma}_{p=1 \text{ à } N}\ C/(1+i+s)^p + 100/(1+i+s)^N$

if s' < s

	t_0	Y_l	Y_k	Y_N
Sell (1)	+102	-C	-C	-100
Buy (2)	-100	+C	+C	+100
(1) - (2)	2	0	0	0

Nota bene: The graphics put forward do not reflect market prices… one curve is obviously computed from the other (Bloomberg data, CBI charts).





3.4. Implication for SLBs

If the formula (E_0) clearly expresses that a bond confers on its buyer a single right, that of receiving the coupons each year and to be reimbursed on the maturity date, in fine, it does not explicitly reflect a fact extremely important for bondholders, which is that this right is strictly the same for all holders (existing and future!) of bonds issued by a given borrower. They are said to be *pari passu* among themselves. That is to say that the borrower commits to provide these investors with the same guarantees and protections but above all, with the same advantages that he might have to grant in the future to other bond investors (of the same rank - here we steer clear of structural subordination which can be contracted in a transparent manner because it does not particularly concern our SLB subject). This provision therefore establishes solidarity, legal equality between bond investors in the same

debtor. In particular, it avoids the possibility that, in the event of financial difficulties leading to a bankruptcy procedure, the bondholders of the same debtor can each assert collateral giving them different ranks. It is easy to understand the interest for the bond market of such a structural pillar, which is crucial in terms of bond law.

Naturally, for a given issuer, SLBs holders are *pari passu* with any other bondholders, they are exposed to the same and unique credit risk. If maturity is also fixed, then both the *i* and the *s* in the bond formula are identical for the pricing of both a SLB and its counterfactual traditional bond. The only variation is the modification of the financial profile of the SLB.

So there is not a single reason to expect to find on SLBs what could not be found on green bonds, that is an irrational premium. After all, issued in billions, SLBs are mass market products with broad investors participation not a niche for investors deviating from traditional fiduciary responsibility associated with its maximization of risk adjusted reward. Remember that to deviate from these principles would require an explicit mandate from beneficiaries to their agents, the fund managers[3]. So it is sensible to assume that SLBs buyers will no more than green bond buyers have a desire to subsidize the issuer's other capital providers. Indeed, any (irrational) premium would improve the issuer's cash flows by reducing the interest charge on the considered SLB, and this for the final benefit of all the other capital providers of the borrower - all the other bondholders then all the shareholders, since it is indeed all the cash-flows, here improved, which first allows the debt service, then the potential dividend payment to shareholders.

So this paper does not to discuss new issue premiums which neither can be modeled (for any bond be it traditional bond, green bond or SLB) nor could be expected to be different for a SLB vs. its counterfactual traditional bond, but focuses on the SLB structural parameters (coupon step-up size, step-up period, maturity, conditionality) in the usual absence-of-arbitrage paradigm, to see if they can be tuned or not to achieve cheaper cost of capital for the issuer. Or, to put it in the symmetrical investor terms, how much SLBs support investors willingness to pay for the optionality of higher coupons.

4. Mechanics of a SLB

In this section, once a maturity is fixed, we consider the issuer credit spread as a given (which is the general case considering existing bond references) as well as the issuer yield. We develop a framework to analyze the coupon pricing and incentive aspects of SLBs. This model is in fact very realistic and widely used. It allows for easier calculations and more immediate understanding of the SLB parameters' role.

4.1. A simple but realistic model

For that purpose, we consider a simple model i.e. a SLB that promises to pay:

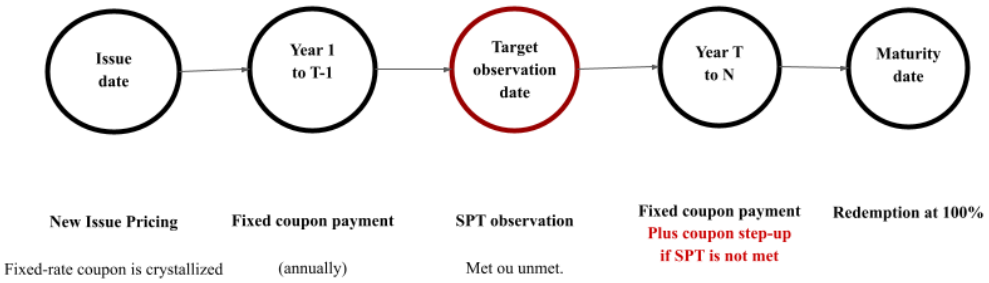
- fixed-rate annual coupons C% until maturity and principal redemption at par (100%) at maturity N. This is actually the "traditional" bond component of the SLB;

[3] The interested reader could look at BlackRock for example, and read Energy investing: Setting the record straight or watch BlackRock's Dalia Blass being auditioned by the Texas Senate Committee of States Affairs on 15/12/2022, say « the purpose of finance was and is […/…] to produce the best risk adjusted returns » (1h52mn37s).

- a predefined fixed additional coupon step-up (CSU) from and including observation year (T) till maturity (N) if a Sustainability Performance Target (SPT) is not met at observation date (year T).

The SPT can be set up as a condition on one or several KPIs set against a defined baseline. SPT is modeled by a random variable $\tilde{X} \in \{S, F\}$ where S is the success state, F the fail state, respectively associated with probabilities (1-p) and p. Thus, the SLB promises a conditional coupon payment penalty S if $\tilde{X} = F$ at T, i.e. when SPT is not met. This is in line with market practice (cf. 2.4).

SLB payment mechanism



4.2. Issuance pricing of a traditional bond

We assume the traditional bond is priced at a yield R associated with the issuer and the chosen maturity N, this yield being the sum of the issuer credit spread and a risk-free rate, both considered as given data for the pricing exercise (R = i + s). So from now on R is fixed.

For a bond, the equation used to determine the coupon rate C is particularly simple:

(E) $100 = EV\{\text{cash flows}\} = \mathbf{\Sigma}_{p=1 \text{ à } N}\ 100C/(1+R)^p + 100/(1+R)^N$

Naturally, the solution is C = R. Indeed the new bond is priced at the issuer yield.

In real life, considering fixed-rate coupons are not any decimal but round numbers like multiple of ⅛ of a percentage point, the nearest round coupon below R is associated with a slightly sub-par (<100) issuance price to guarantee the pricing at R.

4.3. Issuance pricing of a SLB

Considering the mechanism where the issuer now offers a potential S at maturity N, we would expect the final coupon C (or R) to be discounted accordingly.

The random extra coupon is S if $\tilde{X} = F$ and zero otherwise, or $CSU*1_{\{\tilde{X} = F\}}$ wich expected value is $EV\{CSU*1_{\{\tilde{X} = F\}}\} = CSU*Prob\{\tilde{X} = F\} = CSU*p$.

So the SLB coupon C' is the solution of:

$$100 = EV\{ \mathbf{\Sigma}_{p = 1 \text{ à } N} 100C'/(1+R)^p + 100/(1+R)^N + \mathbf{\Sigma}_{p = T \text{ à } N} 100CSU*1_{\{X = F\}}/(1+R)^p\}$$

$$(E') \quad 100 = \mathbf{\Sigma}_{p = 1 \text{ à } N} 100C'/(1+R)^p + 100/(1+R)^N + \mathbf{\Sigma}_{p = T \text{ à } N} 100CSU*p/(1+R)^p$$

The solution is $C' = R - CSU*p*[(1+R)^{N-(T-1)}-1]/[(1+R)^N-1]$
Writing $C' = R - \Delta$ and using linear approximation[4], we find discount $\Delta \sim p*CSU*(N-T+1)/N$.

We can combine the two date parameters T and N into one parameter, SUP, a coefficient equal to the step-up period as a fraction of the bond's tenor. SUP = (N-T+1)//N. When target and maturity dates coincide, period is 1 and SUP = 1/N. Period accrues by 1 for each additional year of potential step-up.

So $\Delta \sim p*CSU*SUP$.

Unsurprisingly, $\Delta = \Delta (p, CSU, SUP) > 0$ and increases with p, CSU and SUP.

4.4. Ex-post issuer yield

C' now being known, it is interesting to determine the ex-post yields.

If $\tilde{X} = S$, the yield R_{min} is the solution of:

$$(E_{min}) \quad 100 = \mathbf{\Sigma}_{p = 1 \text{ à } N} 100C'/(1+R_{min})^p + 100/(1+R_{min})^N$$

Naturally, the solution is $R_{min} = C' = R - \Delta$.

If $\tilde{X} = F$, the yield R_{max} is the solution of:

$$(E_{max}) \quad 100 = \mathbf{\Sigma}_{p = 1 \text{ à } N} 100C'/(1+R_{max})^p + 100/(1+R_{max})^N + CSU/(1+R_{max})^N$$

equivalent to $C' = R_{max} - SU/*[(1+R_{max})^{N-(T-1)}-1]/[(1+R_{max})^N-1]$
After linearization, the solution is: $R_{max} \sim C' + CSU*(N-T+1)/N = C' + CSU*SUP$.
$R_{max} = R - \Delta + CSU*SUP = R + (1-p)*CSU*SUP$.

Of course, $R_{min} \leq R \leq R_{max}$, so there is indeed no free lunch here, not a win-win but a normal win-lose situation (the issuer's cost being the investor's return).

Everything happens as if $\tilde{X}$ associates with $\tilde{R} \in \{R_{min}, R_{max}\}$ with probabilities (1-p) and p. Naturally:

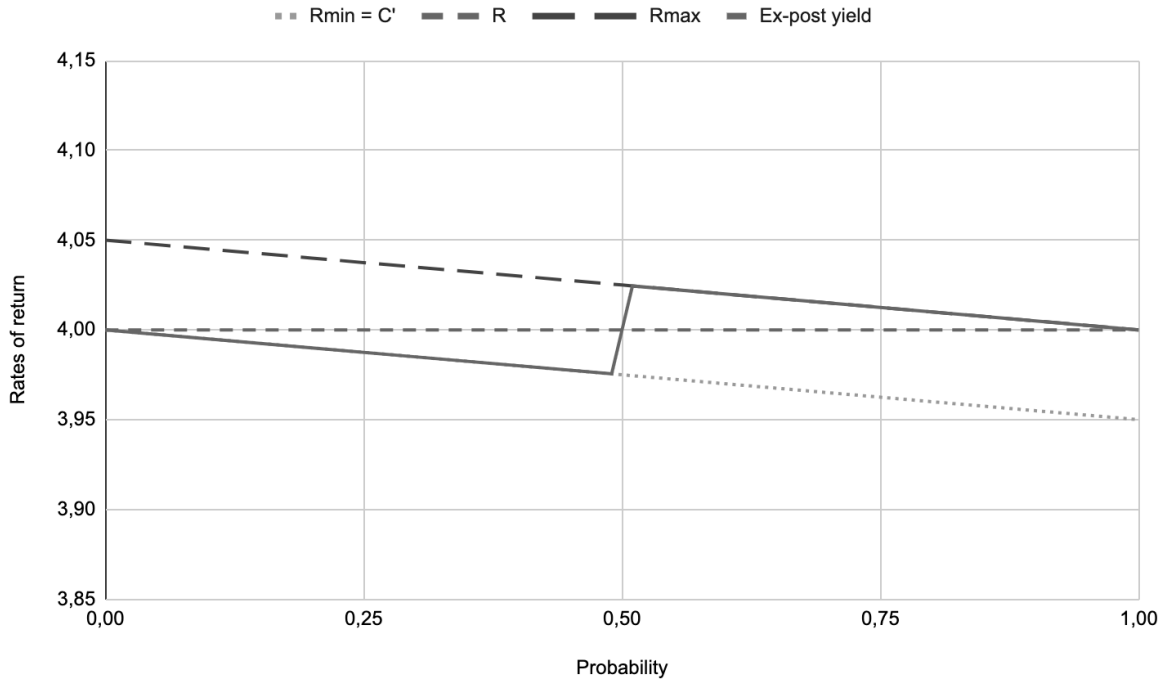
- $EV\{\tilde{R}\} = (1-p)*R_{min} + p*R_{max} = R$
- $SD\{\tilde{R}\} = (p*(1-p))^{\wedge 1/2}*CSU*SUP$
- $Range\{\tilde{R}\} = R_{max} - R_{min} = CSU*SUP$.

5. Structural limits in SLBs

In this section, we develop an understanding of the role of SLB's parameters. These parameters are of different nature. Coupon step-up (CSU), maturity and observation years (N,T) are explicit and objective parameters while failure probability (p) is implicit and subjective.

[4] $(1 + x)^n \sim 1 + nx$

5.1. Visualization



5.2. Explicit parameters T, N (SUP) and CSU: Range and relevance

Dates (T and N) - bond constrained variables

If T = N, then Δ ~ p*CSU/N and a longer maturity penalizes the coupon discount and range. This is a usual consequence resulting from actualisation. Otherwise the longer N the greater Δ (T being fixed). Conversely, if N is fixed, the greater T, the smaller Δ.

Altogether, there is not much flexibility in the combined SUP parameter considering that (i) if the issuer commitment is to be genuine, SLBs should allow for time to transition towards a sustainable model. ICMA indicates in its SLBP concerning SPTs calibration: "*The SPTs should be ambitious, i.e., represent a material improvement in the respective KPIs and be beyond a "Business as Usual" trajectory*" (ICMA, 2020). Such an ambitious trajectory takes time if it is truly of strategic nature ($T \geq 3$) and (ii) a SLB is also bond… and issuers favor tapping the bond market typically at and below 10 years. Unsurprisingly, in 2022, 90% of SLB issuance had a tenor of 10 years or less. Considering these constraints, there is not much flexibility with typically $3 \leq T \leq N \leq 10$ and $0,1 \leq SUP \leq 0,8$.

Additionally, Ul Haq and Doumbia (2022) found that, for SLBs with step-up penalties, issuers tend to actually set a late target cut-off date, relative to the lifetime of the bonds, therefore minimizing the total step-up penalty payout they face if they fail to meet the SPTs. They found a majority (57.2%) have target dates in the latter half of the bond's tenor. With later target dates, fewer coupon payments need to be made at the potentially step-upped coupon rate, reducing the total amount paid out in penalties over the life of the bond. Their paper also finds that issuers set later target dates for SLBs when the step-up coupon penalty is higher. Everything happens as if issuers try to neutralize the step-up potential value. If the step-up is doubled but the coupon period is halved, neither the range nor Δ is changed. Δ = p*CSU*SUP = p*(2CSU)*(SUP/2). In practice, $0,1 \leq SUP \leq 0,4$.

Coupon step-up (CSU) - the stake, an unconstrained variable

A smaller coupon step-up penalizes the coupon discount and range. So SU is really the skin in the game. Unlike maturity which is constrained by both the issuer needs and its long term transition trajectory, SU could theoretically be any fraction of the issuer's yield R. Very surprisingly, SLBP are completely silent on the matter. Unlike for the SPTs themselves (*SPTs/ambitious; material improvement in the respective KPIs*), there is no requirement nor recommendation for any materiality threshold.

Range (CSU*SUP)

Together CSU and SUP form the Range = R_{max} - R_{min} = CSU*SUP.

Once fixed, the probability level cannot be a game changer as $\Delta = p*CSU*SUP = p*Range$ with $p \in [0, 1]$, so we can think of the range as a good indicator of the relevance of the product.

In real life, coupon step-ups are at or below 0,25% (75% of SLBs, cf. 2.4) and $N \geq 5$ (80% of SLBs, cf. 2.4). With CSU = 0,25% and SUP = 0,36, Range equals 0,09%.

According to SLBP, "*Sustainability-Linked Bonds* ***incentivise*** *the issuer's achievement of material, quantitative, pre-determined, ambitious, regularly monitored and externally verified sustainability (ESG) objectives through Key Performance Indicators and Sustainability Performance Targets".* (ICMA, 2020). However, the observed ranges are hardly compatible with the claim to incentivize issuers.

For example, for (p, CSU, T, N) = (½, 0,25%, 7, 10), $\Delta = p*CSU*SUP \sim 0,05\%$.

In other words, assuming p = ½, the investors in such a € 100 m SLB would contribute 50 k€ annually in the best case, i.e. the case where Δ would have been fully discounted and the SPT is met ex-post.

Where is the incentive? *Qui parle*? 0,05% is a lot for a USD 1 tn asset manager ranked on the performance it delivers to its clients. Underperforming by 0,05% relative to peers/benchmark, an asset manager could lose a client. A solid reason not to give it away on a SLB. Issuer's win is investors' loss, as in the best case they will have overpaid for the issuer's credit, ex-post yield being $R_{min} < R$. But, asymmetrically, it is irrelevant for a corporate borrower looking to fund its sustainable transition. Such an order of magnitude is obviously not compatible with taking into account the real costs of a transition. Who could reasonably think that a company executive would make a capex or transformational decision based on a few basis points? We cannot imagine a company deciding to invest (or not) in a transition according to such a criteria. To illustrate this further, consider a company financed 80% by debt (at 4%) and 20% by shares (with a required profitability of 12%). A measure of its cost of capital (Weighted Average Cost of Capital) would be equal to 80%*4% + 20%*12% = 5,60%. Reducing the cost of 100% of its debt (not just SLBs) by 5 basis points decreases the total to 5,56%. It is clear that this does not create any particular incentive for the company to move forward on a transition path. In addition, such an order of magnitude is not significant with regard to credit spreads and interest rates volatility. Also readers should bear in mind that the risk-free component alone rose dramatically in recent months; for example the French 10-year bond yield rose by 3% in the last 2.5 years.

5.3. Interpretation linked to implicit p ∈ [0, 1]

Once CSU and SUP are fixed, the probability level is not a game changer to discuss the coupon discount as Δ = p*CSU*SUP with p ∈ [0, 1]. Nevertheless, if CSU grows in magnitude, it remains valid to complete the analysis on p.

For example, for (p, S, T, N) = (½, 2%, 7, 10), Δ = 0,40%.

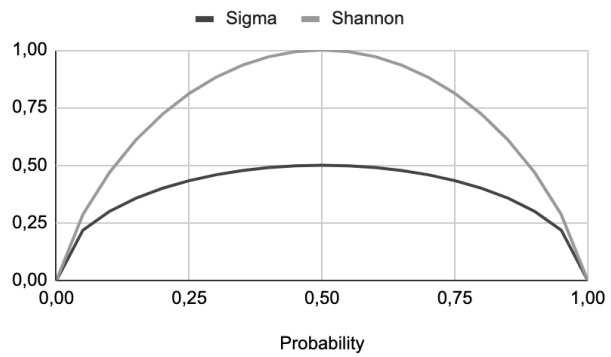
Like CSU size but not directly, p is induced by choice as it results from choosing the KPIs and the associated SPTs. Naturally, a high belief that the company could reach its SPTs implies, ceteris paribus, a lower value for the investor of the potential coupon step-up.

<u>If p = 0</u> then Δ = p*CSU*SUP = 0 and the SLB ex-post cost is R_{min} = R.
SPT will certainly be met. The investor simply does not expect step-ups to be paid out. So there is no value in the step-up. C' = R = C. This is in fact the traditional bond pricing with an inacceptable tail risk for the issuer if the SPT is ultimately not met.
Likely to misprice (coupon rate at R) when p ~ 0 (SPT is easily achievable).
Outcome is greenwashing and zero interest for the issuer.

<u>If p = 1</u> then Δ = CSU*SUP is maxed and the SLB ex-post cost is R_{max} = R.
SPT will certainly NOT be met. This maximizes the coupon discount however it does not change the ex-post rate as the step-up should be paid.
Unacceptable tail risk for the investor if in the end the SPT is met.
Unacceptable reputational risk for the issuer as it should fail to reach its self-designed objectives.
Likely to misprice when p ~ 1.
Outcome is greenwashing and zero interest for both the investor and the issuer.

<u>If p = ½</u> then Δ = ½*CSU*SUP and the SLB ex-post cost is either R_{min} or R_{max}.
So the p ~ ½ calibration is where the concept would have the most value, incentive-wise. Would that be consistent with an ambitious SPT? Whatever, both parties would in fact be concerned by the potential outcome:

- the issuer: it could ultimately fail on such a bet and would face a higher cost of funding on its SLB with an ex-post yield greater than R_{max} > R. The penalty then doubles with the negative signal sent to market observers: the issuer failed to reach its self-designed objectives (that will be reported in financial news). Unacceptable reputational risk.
- the investor: the investor bets on a fair coin toss maximizing the volatility SD{$\tilde{R}$} = ½*CSU*SUP. This has zero interest for a rational investor with any risk aversion level as the SLB is dominated by the traditional bond in terms of risk/reward. In modern portfolio theory, any rational investor would require an additional expected reward to accept the additional risk. Also investors may also face potential reputational risk as they will profit from the coupon step-up when the issuer misses their SPTs.



Shannon entropy of the unknown result of the coin toss is maximized if the coin is fair. p = ½ is the situation of maximum uncertainty as it is most difficult to predict the outcome of the next toss; the result of each toss of the coin delivers one full bit of information.

5.4. No win situation for the issuer

Parameters recap:

Parameter	Nature	Constraint	Comment
SUP	explicit, objective	$0{,}1 \leq SUP \leq 0{,}8$	bond market characterics driven
CSU	explicit, objective	free	stake, “skin in the game”
p	implicit, subjective KPI => SPT => p	$p \in [0, 1]$	probability (no known distribution law)

We should bear in mind that if p is the “volatility” in the model, it is of subjective nature. It is obviously a situation where the buyers and the seller have asymmetric information : no one knows the issuer better than the issuer itself (i.e. not all relevant information is public). We should assume investors would have a more conservative belief (p) regarding the fail state probability than the issuer’s own (p’) (i.e. $p < p'$, an adverse selection bias), implying that the issuer cannot harvest the value being sold to the investors.

Note that SLBP recommendation that “*The KPIs should be:* [...] *measurable or quantifiable on a consistent methodological basis* [...]” (ICMA, 2020) does not imply that their associated SPTs could be modeled and in turn that p can have a proper probability distribution. Forecasting how likely it is that the KPIs will achieve the SLB condition or not is not possible. Not only the probability distribution for the likelihood of the SLB step-up activation cannot be inferred from historical data, but the situation is structurally worse than that of an asymmetrical information situation. Indeed, *after* the issue is priced and launched, we should a priori expect the issuer to do whatever is necessary to meet its SPT. After all the very purpose of the product is precisely to incentivise the issuer. So investors (remember these are any rational investors) would surely resist participating in a coin toss bet, where, finally, the other player could drop the coin on the side that makes him win.

In the end, the SLB structure, not the least the fact that step-ups are not actually priceable, would deter any bond buyer from participating if the stakes (CSU) were actually high (unless mispriced).

Similarly, the issuer finds itself in a "catch-22" situation. Either:

- The issuer wants to benefit from the product and needs to set and use high CSU and an ambitious target ($p'=½$) to generate a material incentive. This ambition will not be recognized as such by investors ($p < p'$), the SLB should be mispriced with a discounted coupon above its theoretical value. Additionally, the issuer carries a very significant reputational risk and a higher cost of funding if the coupons actually do step up.
- The issuer uses the product as a marketing tool, with low step-up values and $p \sim 0$. This greenwashes the SLB (and its participants).

Neither low CSU / significant p nor high CSU / low p are combinations that would make any sense for the issuer.

The SLB market has definitely anchored itself on the low coupon step-up values side (cf. 2.4), the safe side of the dichotomy. There is indeed no other rationale for the observed clustering of step-up values

at 25 bps than reducing the potential penalty payout and neutralizing the product. Less directly observable ex-ante, in such a context, with low CSU and little to no financial incentive, we should expect in turn low p values (p ~ 0) or bogus targets.

Thinking through how one variable affects the other (ex-SUP which is clearly bounded and offers little flexibility), summary recap:

p \ CSU	Low	High
~0	The market settles here. No value (greenwashing mode)	Unacceptable
½	Unacceptable	High potential value but unacceptable risk to both parties
~1	Unacceptable	Unacceptable

5.5. Add-ons

Step-down coupon

Unpopular step-down coupon where the SLB would promise to pay a fixed-rate annual coupon until maturity and principal redemption at par (100%) at maturity N, with a predefined unique coupon step-up down (CSD) at maturity N if SPT is met at maturity N, does not change the analysis. The solutions are unchanged with -CSD and p respectively replacing CSU and 1-p in the calculations, the only difference being that the SLB coupon is priced at C' equal to R_{max}.

Callability

Callable bonds (equivalent to early redemption) are not new and marginally used in fixed-rate bond markets. They are abnormally (in terms of frequency) used on SLBs as another way to empty the SLB product of its substance. For SLBs with step-up coupons, when the issuer is allowed to call its bond before maturity, it can reduce or completely avoid the potential penalties. A step-upped coupon rate (if SPTs are unmet) would only occur in the later part of the bond's tenor. So exercising the call option before the target date ensures that the step-upped coupon rate is never paid, eliminating any penalty. If exercised afterwards, the step-upped coupon payments apply only until the call date, reducing the total potential penalty.

Unsurprisingly, Ul Haq and Doumbia (2022) found that a majority (65%) of the SLBs in their sample are callable. According to them, SLBs in general are about three times more likely to be callable than other types of corporate green bonds and more than five times more likely than conventional corporate bonds. Even cleaning their sample from "clean-up" and "make-whole" call options, they found that for the remaining call options, the SLBs are typically structured to allow minimizing of total penalty payout by setting the call date soon after the target date.

Sustainability-Linked Loans (SLLs)

Just as green loans are to the loan market what green bonds are to the bond market, SLBs have their declinations as well in the loan market: Sustainability-Linked Loans. As we received questions from practitioners concerning these, we just want to include a comment to explain why we discard them from the study. First, mechanism and defect are the same. Second, we do not look at these because the

loan market essentially is not a true market (like the bond market for example). The loan is both a *produit d'appel* and a funder-fundee relationship product, whether it is a bilateral loan or a syndicated one (to a group of banks). Either way, the business context is overwhelming in such a contract. Banks participate in a rather undesired exposure (balance sheet-wise) with the expectation to generate cross-selling of more lucrative products (m&a, derivatives products, etc.). What would a margin of 100 + 5 bps step-up mean, if the banks could have asked for +100 bps in the first place? There is no more penalty there. Anyway, banks' pricing models are not that specific or transparent and their analysis of the profitability of a client relationship is global. Note that step-ups remain small compared to the total credit margin and often designed to never be paid (goals are complacent, already achieved or certain to be achieved). Naturally, volumes are enormous, confirming if needed that " tout ce qui est excessif est insignifiant".

6. Adding context

Not being able to give a pecuniary value, a green premium, to the green promise of green bonds - the allocation of the bond proceeds to green projects - was absolutely not dependent on the quality of the green projects themselves and/or on the borrower's associated commitment. Thus, the taxonomy debate, focusing the attention of many parties on potential greenwashing at the project level, the shade of green, etc., served in a way as a diversion from the basic reality of the green bonds: their complete lack of merits in terms of incentivizing issuers.

Similarly, our structural analysis of the financial product SLB showed their lack of financial materiality regardless of the nature of the associated KPIs and SPTs. In this regard, discussing whether or not these KPIs are "*material to the issuer's overall business, and of high strategic significance to the issuer's current and/or future operations*" (ICMA, 2020), and/or whether or not SPTs "*represent a material improvement in the respective KPIs*" is irrelevant. Materiality at KPI selection and SPT calibration levels has very little interest unless materiality at the financial level is assured. Indeed when the wise man points to the moon, the fool looks at his finger.
That being said, if KPIs would require a case by case analysis, a couple of general comments can be made.

6.1. Self-serving KPIs

In 2021, the French oil and gas major TotalEnergies announced at its 2020 results presentation that from now on all its new bond issuance would be SLBs, climate KPI-linked to be more specific, which would so become the "new normal" at TotalEnergies, "embedding climate ambition into financing policy" according to the company. Alas, NGO Reclaim Finance (2021) showed in an investors briefing that behind this seemingly groundbreaking announcement, the measurable KPIs to be set by the issuer for itself could be bogus KPIs, not aligned with the Paris Agreement.

Reclaim Finance found in particular a problematic KPI relating to scope 1+2 emissions which would cover less than 30% of the issuer's scope 1+2 emissions. For another KPI, scope 3 emissions were not identified and quantified precisely (TotalEnergies had announced a 30% scope 3 emissions reduction target in Europe in absolute terms from 2015 levels but at the same time the company planned to increase them by almost the same proportions in the rest of the world). A last one referred to carbon intensity, a flawed and misaligned target allowing companies to actually scale up fossil fuel growth. As a matter of fact, Reclaim Finance pointed out that in its 2021 universal registration document,

TotalEnergies showed decreasing carbon intensity between 2015 and 2019 while simultaneously increasing GHG emissions.

Note that if such bonds are not linked to credible Paris-aligned KPIs and targets but are issued by companies that are still developing activities that do not fit the remaining carbon budget in a 1.5°C trajectory, SLBs will not only NOT be a link towards sustainability but will on the contrary help fund companies that delay proper climate action. An ultimate paradox, SLBs can favor further lock-in of carbon intensive economic activities. This is actually happening. If, in the end, TotalEnergies never issued SLBs, ENI did. This company, which continues to develop new fields of hydrocarbons against IPCC and IEA recommendations and will have only 7% of its energy mix in renewable energies in 2030, launched a USD 2 bn SLB in 2023.

More generally, CBI data shows (CBI, 2022) that among SLB issuers with emission targets, only 22% covered all 3 scopes while 33% covered only scope 1 (generally by issuers which footprint mostly comes from scope 3, i.e. from sectors which should drive upstream and/or downstream decarbonisation through supply chain engagement etc.).

This shows that self-serving KPIs and targets are indeed not the way. On the other hand, there is indeed no consensus on credible pathways to climate neutrality, and in general no common standards for defining material indicators and agreeing on sustainability targets that could be used for SLBs. A rather complex matter of course. *La nature a horreur du vide*, so SLBP and others have made the usual move towards ESG-linked KPIs, benchmarking them against the issuer's own historical performance and/or the selected SPTs against peers standards.

References to science are also being made but in an incantatory mode: there are no common science-based goals to be converted in terms of SPTs expectations. There is a great deal of confusion between externally reviewed information and a company's climate transition strategy, governance and the materiality of its planned business transition towards sustainability. As example, the Science Based Targets initiative (SBTi) wrote in May 2023[5]: "*The SBTi does not work with companies to develop or set science-based targets. We also do not review or validate organizations' climate plans, nor are we in a position to validate the accuracy of the data submitted to us. Like other certification or verification organizations, the SBTi charges a fee for services rendered to assess a company's targets for conformity to our standards. None of the companies whose targets are validated have a way to influence the results.*"

Additionally, note that science-based thinking is considered a necessary but insufficient condition for setting goals or measuring performance in organizational sustainability. However context-based sustainability is outside the scope of this paper.

6.2. A misnomer: ESG-linked is not linked to sustainability

In real life, KPIs and SPTs are neither science-based nor context-based but ESG-linked.
In the SBLP (ICMA, 2020), the acronym ESG appear 13 times, including:

[5] The SBTi's response to 'Inside the little known group setting the corporate climate agenda', MIT Technology Review, May 16 2023

- "*Sustainability-Linked Bonds aim to further develop the key role that debt markets can play in funding and encouraging companies that contribute to sustainability (from an Environmental and/or Social and/or Governance perspective, "ESG*").
- "*Sustainability-Linked Bonds incentivise the issuer's achievement of material, quantitative, pre-determined, ambitious, regularly monitored and externally verified sustainability (ESG) objectives*".
- "*where possible and taking competition and confidentiality considerations into account, how the issuers intend to reach such SPTs, e.g. by describing its ESG strategy, supporting ESG governance and investments, and its operating strategy*".
- *"The Sustainability-Linked Bond Principles are voluntary process guidelines that outline best practices for financial instruments to incorporate forward-looking ESG outcomes and promote integrity in the development of the Sustainability-Linked Bond market by clarifying the approach for issuance of a SLB*".

ESG should not be conflated with impact or sustainability at the system level. Even ESG promoters agree with this structuring differentiation. ESG was coined in 2004 in the UN's Who Cares Wins report[6] which focused " […] *on issues which have or could have a material impact on investment value. It uses a broader definition of materiality than commonly used — one that includes longer time-horizons (10 years and beyond) and intangible aspects impacting company value. Using this broader definition of materiality, aspects relating to generally accepted principles and ethical guidelines (e.g. the universal principles underlying the Global Compact) can have a material impact on investment value*". A broader scope of considerations indeed but still 100% shareholder-centric i.e. used to optimize investment returns.

ESG is an outside-in approach. Only information about impacts of the environment on the considered company is taken into account, when relevant i.e. when financially material to the company's cash flows. This approach structures what is called single (financial) materiality. It is a risk (negative impacts on the company) versus opportunity (positive impacts on the company) perspective which is radically different from the concept of double-materiality which adds to the first approach an inside-out view, i.e. information on the negative and positive impacts of the company on the environment (economic, social, natural) which is also considered material.

ESG is not grounded in science and does not take real-world and authentic sustainability as a goal, which would require evaluating performance of companies relative to absolute ecological and social thresholds. The SLB definition does not even prevent a company with an unsustainable core business to issue SLBs, that is to say its core business could actually "cause harm", therefore not complying with the *Do Not Significantly Harm* (DNSH) principle now considered as a minimum requirement for sustainable activities and investments (Green Taxonomy, SFDR). As no investment can be considered to have a positive impact if it has significant negative impacts on other environmental or social criteria, the SLB name is inconsistent with the key principles of European regulations on sustainable finance.

[6] Who Cares Wins

7. Conclusion

As a funding tool, green bonds fail issuers as they receive nothing for their contribution to sustainable activities, their green projects. Basic financial paradigm forbids investors to price them otherwise, all pricing parameters between green bond and counterfactual traditional bond being identical.

Unlike green bonds, SLBs cannot be deemed as sustainable investments according to EU taxonomy as the proceeds of SLBs are intended to be used for general purposes, hence not directed towards eligible sustainable projects and activities. This is an essential loss. However there supposedly is a gain. If SLBs naturally keep issuer credit and maturity constant (versus counterfactual traditional bond), they allow financial profile to vary according to the achievement of ESG targets, in order to create an incentive for the issuer to achieve them. This is the sole component that differentiates the SLB from its counterfactual traditional bond and which can be priced on a pure absence-of-arbitrage basis. No unrealistic premium, equivalent to subsidized financing, from investors should be considered otherwise rational investors would simply not participate in the issuance process.

Our investigation showed that the promotion towards sustainability was in fact twice compromised. First, at the conditionality level: ESG performance indexation has no logical and scientific relation with systemic sustainability. Second, at the financial profile level: the empirical data shows that market participants have opted for a "benign" version of SLBs. SLBs are emptied of their substance through all possible means: using low step-ups, pushing target dates closer to maturity dates and adding callable features to avoid or minimize the penalties.

We explained these results in turn by the misalignment of interests between investors and issuers. This misalignment is nothing else than the natural opposition of interests between the buyers (investors) and the seller (the issuer) of the SLB, the former maximizing their returns and the latter minimizing the cost of its debt. One's gain is always the other's loss. However, in the context of promoting sustainability, this is fundamentally flawed. It is no surprise that *impact finance* puts the interests' alignment of the various stakeholders, in particular those of funder and fundee, at the heart of its doctrine. In an adequate impact fund, when it exists, a variable performance remuneration mechanism determines the investors remuneration on the basis of impact outcomes aligning their interests with the funded company (just as stock option plans were designed to align shareholders and employees interests). This is exactly the opposite of the carrot and stick SLB mechanism. The conflict within SLB buyer intentionality makes the product a dead end.

More precisely, we have identified three key parameters for pricing SLBs, the step-up period as a fraction of the bond's tenor, the coupon step-up and the probability that the step-up will occur. We saw that the first one is more or less constrained by the bond market characteristics, while the last two are simply ill designed to accommodate the presumed purpose of the SLB: issuer incentivization to achieve associated performance targets. Indeed both seller and buyer have little interest in a significant coupon step-up size as the issuer would fear to not meet its performance targets, pay an increased cost of capital and assume reputational risk, while the investor cannot properly price the conditionality and will resist increasing the stakes for no good reason (expected return is unchanged).

The SLB structure cannot allow for anything different and the current combination of the small step-ups backloaded in the final years' of the bond are not a misuse but a forced outcome. This is a serious design flaw. Indeed no financially material incentives are generated at all. This is rather

consistent with SLBP recommendation regarding calibration of SPTs to consider SMART philosophy (Specific, Measurable, Attainable, Relevant and Time-bound). Isn't "Attainable" setting the step-up probability close to zero?

Ultimately, the amount under scrutiny is dwarfed by the transition needs and there is actually no linkage between the potential financial contribution and the effort exerted by the issuer to achieve its target. On the other end, why would investors pay anything for an issuer to increase its percentage of women at executive management level? Transparency alone does not create the additionality of investors nor justifies any causal link between their investments and the potential impact of the funded company.

Unlike green bonds, theoretically, the concept could be adapted to bring something to virtuous issuers but it would require for example to (i) price coupon at issuer market yield level (R), (ii) have independent authorities select relevant KPIs and SPTs and (iii) only use step-downs if the issuer meets its objective. This would incorporate true incentive and comparative advantage vis-à-vis its counterfactual traditional bond from the issuer's point of view, but there will be very few buyers, if any, as this SLB's risk-reward will be dominated by the regular bond one.

In these times of public questioning notably about how to deal with the climate emergency, some are showing opportunism. SLBs do not offer any paradigm shift, they are an old recipe wrapped in a fashionable theme. In February 2023, a group called Investors for Paris Compliance (referring to the 2015 Paris Accords) filed a complaint with the Alberta Securities Commission. It asked provincial authorities to investigate allegations of misleading statements made by Enbridge Inc. in the context of its recent SLB issuance and to provide more guidance generally on how issuers ought to structure their SLB targets. The European Supervisory Authorities are progressing in their common understanding of greenwashing. In this general context, our managerial recommendation would be to err on the cautious side and avoid SLBs.

References

Climate Bonds Initiative, 2022, Sustainable Debt - Global State of the Market 2022.

Climate Bonds Initiative, 2022, Green Bond Pricing in the primary market, July-December 2022.

Cuvelier, Lara, and Hernández, Andrea, and Pinson, Lucie, 2021, TotalEnergies' climate-linked bonds: a trap, Investors briefing, Reclaim Finance.

Ekeland, Ivar, and Lefournier, Julien, 2019, L'obligation verte: homéopathie ou incantation?, Working paper , chair Energy & Prosperity.

Ekeland, Ivar, and Lefournier, Julien, 2021, Green bond: the emperor wears no clothes, Working paper, chair Energy & Prosperity.

Flammer, Caroline, 2021, Corporate green bonds, Journal of Financial Economics 142, 499–516.

ICMA, 2020. Sustainability-Linked Bond Principles, ICMA International Capital Markets Association.

Larcker, David F, and Edward M Watts, 2020, Where's the greenium?, Journal of Accounting and Economics 69, 101312.

Ul Haq, Imtiaz, and Doumbia, Djeneba, 2022, Structural Loopholes in Sustainability-Linked Bonds, Policy Research Working Paper 10200, International Finance Corporation.