SOLACTIVE
German Index Engineering

INDEX GUIDELINE

Solactive L&G ESG Corporate Bond Index Series

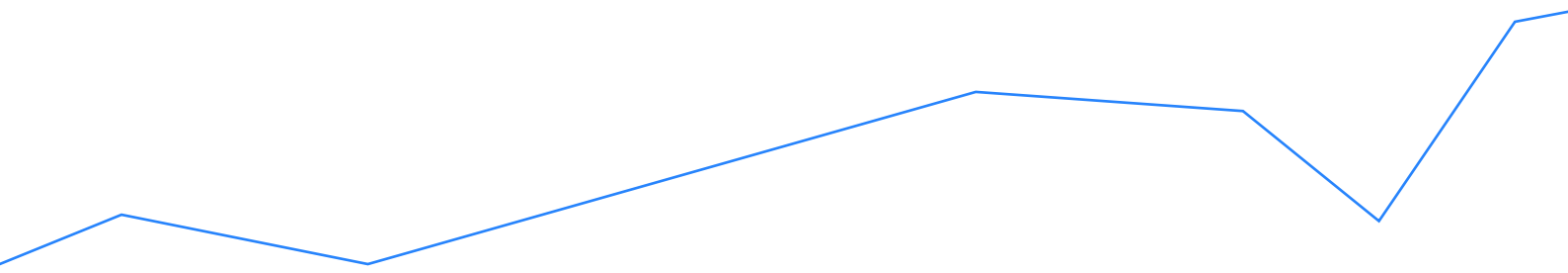
Version 1.2

01 October 2018

TABLE OF CONTENTS

INDEX GUIDELINE

Introduction



Version 1.2 – 01 October 2018

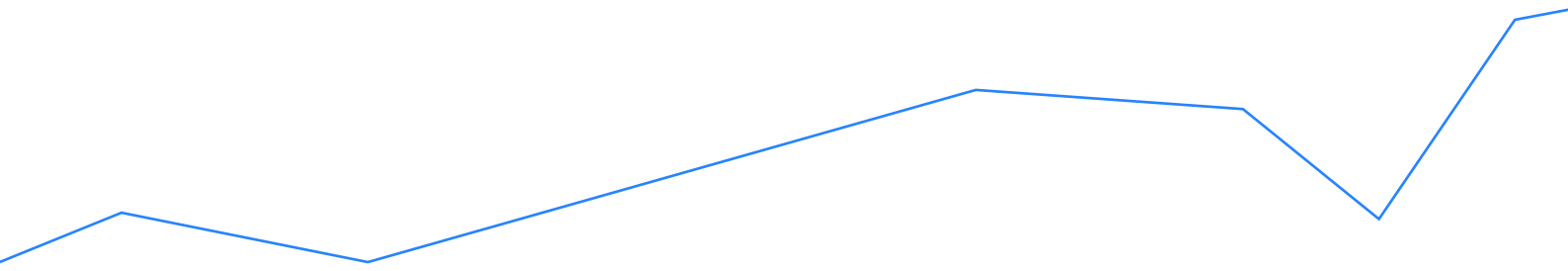
INTRODUCTION

This document (the "Guideline") is to be used as a guideline with regard to the composition, calculation and maintenance of the Solactive L&G ESG Corporate Bond Index Series. Any changes made to the Guideline are initiated by the Committee specified in Section 1.6. The Index is calculated and published by Solactive AG. The name "Solactive" is trademarked.

It contains the underlying principles and rules regarding the structure and operation of the Solactive L&G ESG Corporate Bond Index Series (the "Index"). Solactive AG shall make every effort to implement the applicable regulations. Solactive AG does not offer any explicit or tacit guarantee or assurance, neither pertaining to the results from the use of the Index nor the Index value at any certain point in time nor in any other respect. The Index is merely calculated and published by Solactive AG and it strives to the best of its ability to ensure the correctness of the calculation. There is no obligation for Solactive AG – irrespective of possible obligations to issuers – to advise third parties, including investors and/or financial intermediaries, of any errors in the Index. The publication of the Index by Solactive AG does not constitute a recommendation for capital investment and does not contain any assurance or opinion of Solactive AG regarding a possible investment in a financial instrument based on this Index.

INDEX GUIDELINE

Index Specifications



Version 1.2 – 01 October 2018

1 INDEX SPECIFICATIONS

- The Solactive L&G ESG Corporate Bond Index Series (the "Index") is an Index by Solactive AG and is calculated and distributed by Solactive AG.
- The Solactive L&G ESG Corporate Bond Index Series ("the Index") is intended to reflect the total return performance of EUR, USD and GBP denominated corporate bonds, adjusting for Environment, Social and Government (ESG) factors.
- The base universe for each currency is drawn from the respective benchmark for that currency, with additional criteria as specified in section 2.1. These criteria screen out government-owned entities, relax the minimum remaining maturity rule for bonds that are approaching maturity and exclude issuers that are on the L&G Future World Protection List.
- The bonds in each currency universe are initially weighted according to their market value and are then tilted by their issuer Environmental, Social and Government (ESG) scores from Legal and General Investment Management (LGIM). Capping is applied to ensure that the resulting index remains representative of each respective benchmark.
- The Index is published in GBP, EUR and USD. The EUR and USD are also available in GBP Hedged versions. For the hedging methodology, please consult the "Currency-hedged Indices Methodology" document, which is available on the http://www.solactive.com web site.

1.1 SHORT NAME AND ISIN

The Index series is distributed under the following identifiers:

Index	ISIN	RIC
Solactive L&G ESG GBP Investment Grade Corporate Bond TR Index	DE000SLA52D9	.SOESGBGB
Solactive L&G ESG USD Investment Grade Corporate Bond TR Index	DE000SLA52E7	.SOESGBUS
Solactive L&G ESG EUR Investment Grade Corporate Bond TR Index	DE000SLA52F4	.SOESGBEU
Solactive L&G ESG USD Investment Grade Corporate Bond TR Index – GBP Hedged	DE000SLA52G2	.SOESGHUS
Solactive L&G ESG EUR Investment Grade Corporate Bond TR Index – GBP Hedged	DE000SLA52H0	.SOESGHEU

1.2 INITIAL VALUE

The Index is based on 1000 at the close of trading on 23 May 2018.

1.3 DISTRIBUTION

The Index is published via the price dissemination services of Boerse Stuttgart AG and is distributed to all affiliated vendors. Each vendor decides on an individual basis as to whether it will distribute/display the Index via its information systems.

1.4 PRICES AND CALCUATION FREQUENCY

The Index Levels are calculated on each Business Day based on the Evaluated Bid Prices of the Index Components. Newly added bonds are added at the Evaluated Ask Price. Index analytical values are calculated each Business Day using the Last Evaluated Price.

In the event that data cannot be provided to the pricing services of Boerse Stuttgart AG, the Index cannot be distributed.

1.5 WEIGHTING

The purpose of the weighting schema is to tilt the market value weight of bonds according to their issuer's ESG score, whilst ensuring that the resulting index remains representative of the benchmark index in terms of key risk factors.

The process is as follows:

The market value weight of each Index Component is tilted using the following formula, which takes into account ESG score assigned to the issuer:

$$Wi^{tilt} = (1 + ESG\_Score)^{T} x W_i^{MC}$$

Where:

Wi^{tilt}	Is the weight of $\mathbf{bond}_i$ after the ESG tilting has been applied.
Wi^{MC}	Is the market-value weight of $\mathbf{bond}_i$ relative to all the eligible bonds of the same currency.
ESG_Score	Is the latest available LGIM Issuer ESG score which takes a value between -1 or +1. Unrated issuers are given a score of 0.
T	Is the tilting strength or power. The default value is 3.

In the next step, the new weights are checked relative to the benchmark weights across the following dimensions: sector, issuer, bond and maturity ranges. These weights must fall within the following limits:

- No single sector has a weight +/- 3% relative to the benchmark
- No bond issuer has a weight +/- 1%
- No single bond has a weight +/- 0.25%

- No maturity band has a weight +/- 1%.

These checks are to ensure that no single sector, issuer, bond or maturity range is under or over-represented in the final index relative to the benchmark. The checks are applied iteratively and, in the sequence listed above until all dimensions are within the limits. If a sector or maturity band exceeds these limits, its weight is redistributed proportionally to bonds belonging to the sectors or maturity bands which are within the limits. If an issuer or bond exceeds the limits, its weight is redistributed proportionality to all the other eligible bonds that belong to the same sector.

If there are multiple breaches within a single dimension, the largest deviation is found and adjusted, before the process is repeated.

Finally, the minimum weight for any bond is set at 0%, so that it does not fall to a negative weight at any stage during the capping process.

In the rare cases where a solution cannot be found within the constraints given above, the tilting power, T will be reduced in 0.5 increments until the weighting procedure completes successfully and all the dimensions are within the limits.

1.6 OVERSIGHT

A Committee composed of staff from Solactive AG (the "Committee" or the "Index Committee") is responsible for decisions regarding the composition of the Index as well as any amendments to the rules.

Members of the Committee can recommend changes to the Guideline and submit them to the Committee for approval.

1.7 PUBLICATION

All specifications and information relevant for calculating the Index are made available on the http://www.solactive.com web page and sub-pages.

1.8 HISTORICAL DATA

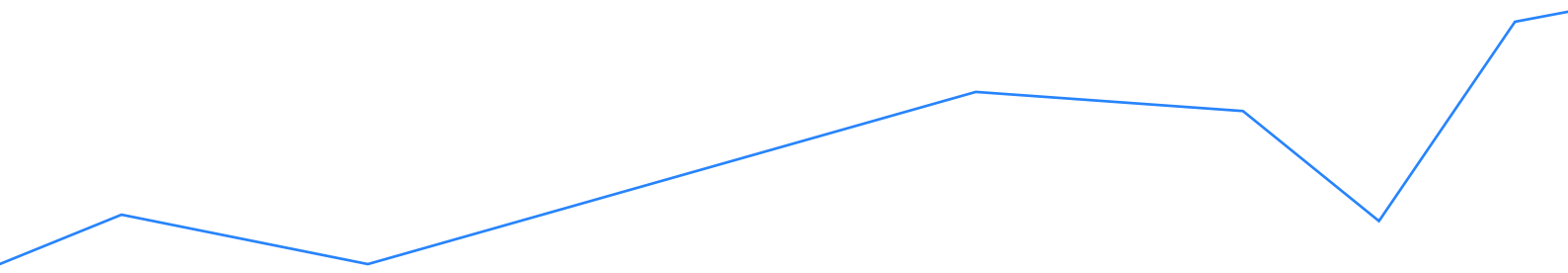
Historical data will be maintained from the launch of the Index on May 24 2018. The simulated index back history is available from 31 December 2013.

1.9 LICENSING

Licenses to use the Index as the underlying value for derivative instruments are issued to stock exchanges, banks, financial services providers and investment houses by Solactive AG.

INDEX GUIDELINE

Composition of the Index



Version 1.2 – 01 October 2018

2 COMPOSITION OF THE INDEX

2.1 SELECTION OF THE INDEX COMPONENTS

On each Selection Date, the potential index constituents are drawn from the respective Solactive Investment Grade Corporate Bond index for USD, EUR and GBP. In addition, the following criteria is also applicable:

- Bond issuers must not be on the L&G Future World Protection List. The L&G Future World Protection List includes: i) companies that are involved in, and/or derive revenues from controversial weapons; ii) pure coal mining companies, and iii) certain companies that do not comply with the United Nations Global Compact screening criteria.
- Bond issuers that are majority government owned are not eligible.
- The lowest credit rating from S&P and Moodys must be at least investment grade defined as BBB- or Baa3 respectively.
- Securitised & collateralised bonds are not eligible.
- Bonds must have a minimum amount outstanding of EUR 500 million / USD 500 million / GBP 250 million.

Additionally, the minimum remaining maturity rule will not apply to the current members of the Solactive L&G ESG Corporate Bond Index Series: a bond that is included in the current month's index will remain in the index until its maturity date, providing that it continues to meet all the other criteria listed above.

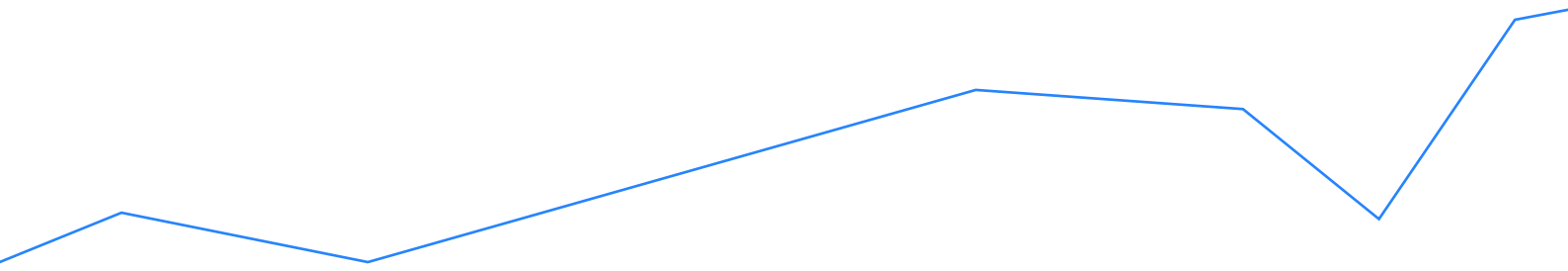
2.2 ORDINARY ADJUSTMENT

The composition of the Index is ordinarily adjusted on the Adjustment Day, which falls on the last calendar day of each month, with the exception of December. Additionally, any income (e.g. resulting from coupon payments or corporate actions) is reinvested proportionately across all constituents at the end of each index calculation date.

The composition of the Index is ordinarily reviewed on the monthly Selection Day. The monthly Selection Day is 3 Business Days prior to the Adjustment Day. The weight adjustment is carried out on the business day following the selection day and becomes effective on the Adjustment Day.

INDEX GUIDELINE

Calculation of the Index



Version 1.2 – 01 October 2018

3 CALCULATION OF THE INDEX

3.1 INDEX FORMULA

The Solactive L&G ESG Corporate Bond Index Series is calculated in Total Return format, which recognizes price movements, accrued interest, coupon income and other cash payments. Coupon and other cash payments are reinvested daily proportionally across all index constituents. The Total Return index calculation is performed according to the standard rules applied by Solactive:

As a formula:

$$Totalretum_{t,i} = \frac{\mathrm{Price}_{t,i} + ACCInt_{t,i} + PaidCash_{t,i}}{\mathrm{Price}_{t-1,i} + ACCInt_{t-1,i}} \cdot \frac{FX_{t,i}}{FX_{t-1,i}} - 1$$

$$Weighting_{t,i} = \frac{MarketValue_{t,i} \cdot Cap_{SD,i}}{\sum_{i=1}^{a} MarketValue_{t,i} \cdot Cap_{SD,i}} = \frac{(\mathrm{Price}_{t,i} + ACCInt_{t,i}) * Amount_{SD,i} * Cap_{SD,i} * FX_{t,i}}{\sum_{i=1}^{a} (\mathrm{Price}_{t,i} + ACCInt_{t,i}) * Amount_{SD,i} * Cap_{SD,i} * FX_{t,i}}$$

$$Index_t = Index_{t-1} * (1 + \sum_{i=1}^{a} (Totalretum_{t,i} * weighting_{t-1,i})$$

Whereas:

$Totalretum_{t,i}$	= Total return of the bond i on trading day t
$Index_t$	= Value of the index on trading day t
$Index_{t-1}$	= Value of the index on trading day t-1
$\mathrm{Price}_{t,i}$	= Last Evaluated Price of the bond i on trading day t
$\mathrm{Price}_{t-1,i}$	= Last Evaluated Price of the bond i on trading day t-1
$ACCInt_{t,i}$	= Accrued Interest of the bond i on trading day t
$ACCInt_{t-1,i}$	= Accrued Interest of the bond i on trading day t-1
$Weighting_{t,i}$	= Weighting of the bond i on trading day t
$Weighting_{t,i}$	= Weighting of the bond i on trading day t-1

$Amount_{SD,i}$ = Amount Outstanding of bond i on the last Selection Day SD

$Cap_{SD,i}$ = Capping Factor which helps to adjust the weights as defined under 1.6.

$FX_{t,i}$ = Foreign Exchange Rate of bond i on trading day t

$FX_{t,i}$ = Foreign Exchange Rate of bond i on trading day t-1

$PaidCash_{i,t}$ = a) Value of the coupon payment for bond i on trading day t

b) If a bond i will be removed from the index, the resulting payment of the bond will be included in the paid cash component

3.2 ACCURACY

The displayed value of the Indices will be rounded to 2 decimal places.

3.3 ADJUSTMENTS

Indices may need to be adjusted to reflect any market structure changes. The Committee will regularly review the indices to determine if they need to be adjusted to take into account any market changes.

The following Extraordinary Events will result in changes or adjustments to an index as indicated below between Adjustment Days:

1) Early Redemption or Full Call: Any cash proceeds are re-invested into the index on the day that they are received. For the avoidance of doubt a Tender must be mandatory, an offer to tender a bond will not be considered for adjustment until the results have been announced.

2) Flat Trading: A bond is flat trading if the bond issuer is not expected to meet its coupon payment obligation which means that the buyer of a bond is not responsible for paying the interest that has accrued since the last payment. If a bond is defined to be "flat trading" between two Adjustment Days the respective accrued interests and coupons will be set to 0. The bond will be removed on the next Adjustment Day, if it is identified as Flat Trading on selection date.

3) Defaulted Bonds: If the status of a bond changes to "In Default", the bond will remain as part of the index or portfolio at the last available evaluated price provided by the pricing source until the next regular index Adjustment Day.

4) Exchange Offers:
   a) Optional Exchange Offers: Optional Exchange Offers will not result in an adjustment of the index*
   b) Mandatory Exchanges Offers:

i. In the case when less than 90% of the Amount Outstanding is exchanged the exchange will not be considered to be an event that affects the relevant bond's position in the index.
ii. In case more than 90% of the Amount Outstanding is exchanged the exchange will be considered in the index calculation by exchanging the relevant bonds, so that the new bond will receive the weight of the old exchanged bond.

The capping factor of the new bond is calculated based on the following formula:

$$CapFactor_{t,new} = \frac{(\mathrm{Pr}ice_{t,old} + ACCInt_{t,old}) * Amount_{SD,old} * Cap_{SD,old}}{(\mathrm{Pr}ice_{t,new} + ACCInt_{t,new}) * Amount_{t,new}}$$

5) The treatment of events for Fungible Bonds depends on whether:
   a) The parent bond and the sub-tranche are both index constituents: Both bonds are kept in the index until the next Adjustment Day. On the next Adjustment Day, the new bond will be removed and the Amount Outstanding of the parent bond will be increased by the amount of the new bond issue.
   b) The parent bond is an index constituent and the sub-tranche is not: on the next Adjustment Day the Amount Outstanding of the parent bond will be increased by the amount of the sub-tranche.
   c) The parent bond is not an index constituent but the sub-tranche is. The fund will be treated as an exchange into the parent bond, if it meets the index eligibility criteria with an amount equal to that of the sub-tranche. One the next adjustment day, the amount of the parent bond will be updated to include its full amount as of the index selection day. If the parent bond does not fulfil the selection criteria, the funge will be treated as a deletion and the sub-tranche will be removed from the index at the latest available price.

6) Payment-in-Kind Bonds: These bonds pay interest in additional bonds rather than in cash. Assuming the additional bonds will be sold immediately and the proceeds will be reinvested in the index, payments-in-kind are therefore considered as cash in all Total Return calculations.

7) Ex-dividend Bonds: "Ex-dividend" means that the next coupon is detached from the bond several days in advance of the coupon payment date. Between ex-date and pay-date a buyer of the bond does not get the right to receive the next coupon. Therefore, accrued interest is negative during that period. However, the coupon will be paid to the original bondholder, i.e. if a bond is already in the index the next coupon payment is held separate in the Variable Coupon Adjustment Factor CPAdji,t. If the bond enters the index during the ex-dividend period CPAdji,t is zero as the next coupon payment will not accrue to the index.

*For the avoidance of doubt, an optional tender or exchange offer may lead to an index adjustment in between Adjustment Dates. In case the tender or exchange has been successful for at least 90% of the amount outstanding, the bond will be removed from the index/exchanged into the relevant bond.

In case of an Extraordinary Event that is not covered by the standard treatments mentioned above the Committee will meet and decide on how to treat the Extraordinary Event in the index based on the information available. An extraordinary adjustment will only be implemented if the majority of the Committee supports the suggested treatment. As soon as a decision has been taken all parties related to the index are informed about the Extraordinary Event as well as the decided treatment and date of implementation.

3.6 MISCELLANEOUS

3.6.1 Recalculation

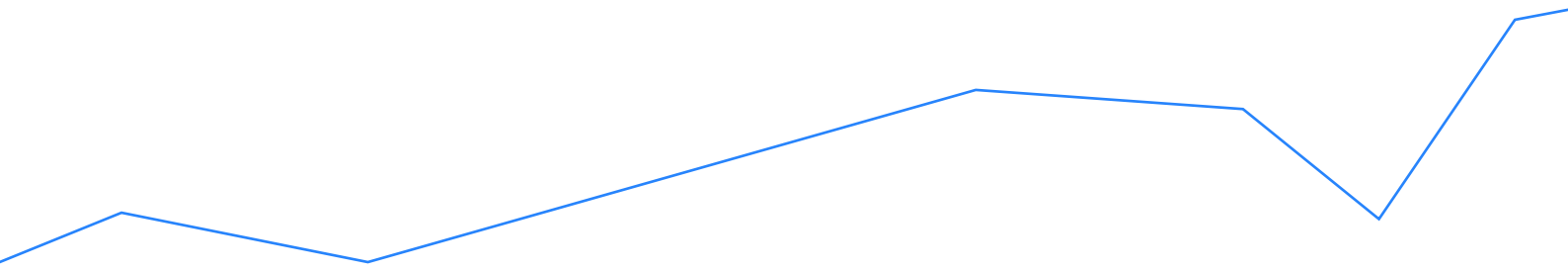
Solactive AG makes the greatest possible efforts to accurately calculate and maintain its indices. However, the occurrence of errors in the index determination process cannot be ruled out. In such cases Solactive AG adheres to its publicly available Correction Policy.

3.6.2 Market Disruption

In periods of market stress Solactive AG calculates its indices following predefined and exhaustive arrangements set out in its publicly available Disruption Policy.

INDEX GUIDELINE

Definitions



Version 1.2 – 01 October 2018

4 DEFINITIONS

"Adjustment Day" is the last Business Day every month, except December, during which no rebalance occurs.

"Amount Outstanding" is the face value of the respective bond.

The "Base Universe" of the index encompasses all the bonds belonging to the Benchmark.

"Bond Price Provider" is Interactive Data Corporation part of the ICE group.

A "Business Day" in relation to the index is each day Monday to Friday except common banking holidays for the respective index currency. Common European banking holidays are defined as Target 2 holidays and include Good Friday, Easter Monday, Christmas Day, Boxing Day and New Year's Day. For USD, any valid trading day is defined as such by SIFMA and for GBP the calendar follows the London Stock Exchange trading days.

A "Credit Event" is the suspension of debt service, insolvency or failure to pay.

"Early Redemption" includes every event that leads to a redemption of a bond before the actual maturity date.

"Effective Time to Maturity" is the minimum of the next call or put date and the final maturity date.

"Exchange Offer" means that the holder of a bond is invited to exchange the existing bond to another debt security.

In particular, an "Extraordinary Event" is:

- an early redemption of the bond
- a credit event

A bond is "Flat Trading" if the bond issuer does not meet its coupon payment obligation which means that the buyer of a bond is not responsible for paying the interest that has accrued since the last payment.

A bond is "In Default" once the issuer is not able to fulfil its bond payment obligations anymore after the 30 days grace period.

The "Index Currency" is the same as the currency of the underlying constituents of each index.

"Issuer" is the issuing entity of the respective bond.

"Last Evaluated Ask Price" the last available evaluated Ask price by the designated Pricing Provider.

"Last Evaluated Bid Price" the last available evaluated Bid price by the designated Pricing Provider.

The "Market Value" of a bond is defined as the sum of the Last Evaluated Price and Accrued Interest multiplied by the Amount Outstanding.

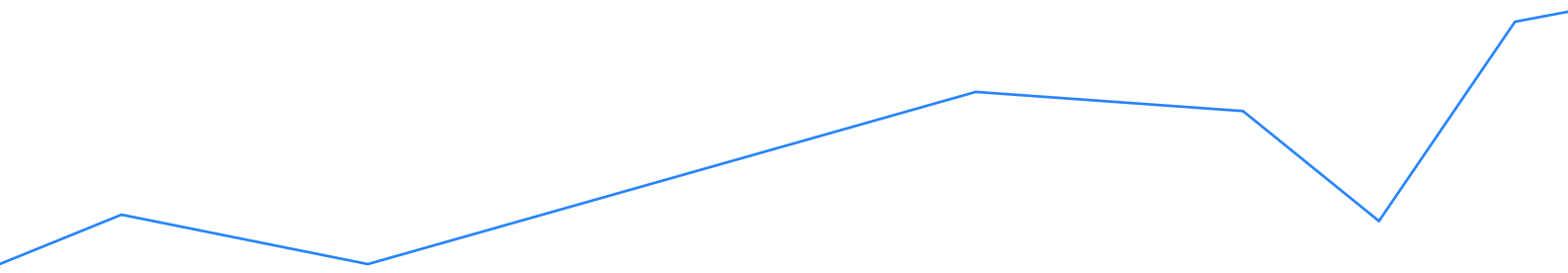
"Monthly Selection Day" is a Business Day 3 Business Days prior to the Adjustment Day.

"Tender Offer" means that a holder of a bond is invited to tender the bond for a specific price at a specific time before the actual maturity date.

"Weighting Cap Factor" in the case of capping, the weighting cap factor is the factor that transforms the market value into the capped market value.

INDEX GUIDELINE

Appendix



Version 1.2 – 01 October 2018

5 APPENDIX

5.1 WORKED EXAMPLE

In order to illustrate the ESG tilting mechanism as described in Section 1.5, this appendix contains a worked example.

The worked example uses the same methodology as the index, however, the limits on the dimensions (sector, bond, issuer, maturity) are relaxed to take into account a reduced number of bonds in the example, otherwise, the process is exactly the same.

Below are the limits on each dimension. They are checked sequentially (in the given order 1-4 below) and repeatedly until all the limits are satisfied.

1. The maximum allowed sector deviation is increased from +/- 3% to +/- 30%
2. The issuer limit is increased from +/- 1% to +/- 25%
3. The bond limit is increased from +/- 0.25% to 20%
4. The maturity band limit is increased from +/- 1% to 15%

In the example, the underlying benchmark has the following constituents:

Table 5.1.1 Benchmark Constituents

Bond	Issuer	Sector	Maturity	ESG Score	Benchmark Weight[1]
Bond1	Issuer 1	Financial	0-5Y	-0.25	28.00%
Bond2	Issuer 2	Industrial	0-5Y	0.7	17.00%
Bond3	Issuer 2	Industrial	5-10Y	0.7	7.00%
Bond4	Issuer 3	Industrial	20 - 30Y	-0.015	22.00%
Bond5	Issuer 4	Utility	30Y +	0	11.00%
Bond6	Issuer 5	Financial	10 -20Y	0.05	15.00%

The table contains the issuer, sector, maturity of all the bonds in the benchmark, along with the issuer ESG score and the benchmark weight. The weighted average ESG score of the benchmark, according to the market value weights is 0.1.

Before the weights of the bonds are tilted according to their ESG score, the weight of the sector, issuer and maturity dimensions are calculated, using the information in the table above and are as follows:

[1] The bond weights displayed here are with full precision. All weights displayed in subsequent tables and examples are rounded to the nearest full number, however, the full precision is used for calculation purposes.

Table 5.1.2 Dimension Weights

Sector	Bench. Weight
Financial	43%
Industrial	46%
Utility	11%

Issuer	Bench. Weight
Issuer 1	28%
Issuer 2	24%
Issuer 3	22%
Issuer 4	11%
Issuer 5	15%

Maturity Range	Bench. Weight
0-5Y	45%
5-10Y	7%
10 -20Y	15%
20 - 30Y	22%
30Y +	11%

In order to apply the tilts, the weight of each bond is adjusted according to its issuer ESG score using the formula given in Section 1.5.

Below is the calculation for Bond 1, which has a benchmark weight of 28% and an ESG Score of -0.25:

$$Wi^{tilt} = (1 + ESG\_Score)^{T} x W_i^{MC}$$

$$= (1\text{-}0.25)^3 \text{ x } 0.28$$

$$= 0.1185$$

The benchmark weights of all the bonds are adjusted in in the same way and the resulting weights are rebased so that they all sum to 1. The tilting mechanism gives higher weights to issuers with higher ESG scores, at the expense of those with lower ESG scores. For example, as the issuer of Bond 1 has a negative ESG score, its weight is initially reduced from 28% to 7%. The tilted weights for all bonds are as follows:

Table 5.1.3 Tilted Weights

Bond	ESG Score	Bench. Weight	Tilted Weight	Rebased	Deviation
Bond1	-0.25	28%	12%	7%	-21%
Bond2	0.7	17%	84%	47%	30%
Bond3	0.7	7%	34%	19%	12%
Bond4	-0.015	22%	21%	12%	-10%
Bond5	0	11%	11%	6%	-5%
Bond6	0.05	15%	17%	10%	-5%

After the initial reweighting, the weighted average ESG score across all constituents increases from 0.1 to 0.45.

Before the index weights are finalised, further checks are made to ensure that the tilting has not caused undue concentration amongst any issuers, sectors, bonds or maturity ranges. In order to do this, the resulting weight of the dimensions are recalculated to check if the tilting caused their weights to exceed the constraints set. The deviations of

the tilted bond weights versus the benchmark weights are shown in the final column on Table 5.1.3 above and for the dimensions in Tables 5.1.4 below. In the cases were the deviation has exceeded the constraints, the value is underlined.

For example, Issuer 2, has a relatively high ESG score of 0.7 and its weight increased from 24% in the benchmark to 66%. This means that its tilted weight now exceeds its benchmark weight by 42% against a limit of +/- 25%. Issuer 2 belongs to the Industrial sector, which has also seen its weight increased from 46% to 77% in the benchmark. This difference of 32% is above the sector limit of 30%.

Tables 5.1.4 Dimension Weights After Initial Tilt

Sectors Weight Distribution

Sector	Benchmark Weight	Tilted Weight	Deviation
Financial	43%	16%	-27%
Industrial	46%	78%	32%
Utility	11%	6%	-5%

Issuer Weight Distribution

Issuer	Benchmark Weight	Tilted Weight	Deviation
Issuer 1	28%	7%	-21%
Issuer 2	24%	66%	42%
Issuer 3	22%	12%	-10%
Issuer 4	11%	6%	-5%
Issuer 5	15%	10%	-5%

Maturity Weight Distribution

Issuer	Benchmark Weight	Tilted Weight	Deviation
0-5Y	45%	53%	8%
5-10Y	7%	19%	12%
10 -20 Y	15%	10%	-5%
20 - 30 Y	22%	12%	-10%
30 Y +	11%	6%	-5%

As there has been at least one breach the against the limits, the capping procedure is invoked and is shown below. Otherwise, the tilted weights become the final weights.

Capping Procedure

In order to bring the weights back within the limits, the capping procedure is applied as described in Section 1.5. The aim of the capping process is to find a rescaling factor for each bond that adjusts its tilted weight so that all the dimensions are within the limits. The capping procedure looks at deviations within the Sector dimension first, followed by Issuers, Bonds and then finally Maturity ranges, bringing each dimension within the limit sequentially, and is repeated until all the dimensions are within the limits.

Step 1 – Sector capping

At the first step, the sector weight distribution is checked against the benchmark. Table 5.1.4 above shows that the Industrials sector is above the limit[2]. Its tilted weight is +32% relative to its weight in the benchmark, exceeding the limit of +/-30%. As a result, the weight of the Industrials sector needs to be reduced so that it is within the limit, redistributing the excess weight to the remaining sectors that are within the limit. This is done by calculating a downscaling adjustment factor for Industrials and an upscaling adjustment factor for the eligible sectors.

The downscaling adjustment factor for Industrials is calculated as:

Target Weight / Tilted Weight of bonds to be capped

= (Benchmark Weight + Maximum Deviation) / Tilted Weight of bonds to be capped

= 46% + 30% / 77%

= 0.9798

Similarly, the tilted weights of the bonds belonging to the remaining eligible sectors are multiplied by the following adjustment factor:

Target Weight / Tilted weight

= (1-tilted weight of all bonds not eligible for adjustment) / Tilted weight of bonds to be adjusted

= (1 -46%-19%-12%) / 22%

= 1.07

The weight of each bond is multiplied by the applicable adjustment factor, and they are rebased so that the sum up to 1. Resulting weights are shown in Table 5.1.5.

Table 5.1.5 – Sector Rescaling

Bond	Issuer	Sector	Bench. Weight	Tilted Weight	Adjustment Factor	Rescaled Weight
Bond1	Issuer 1	Financial	28%	7%	X 1.07	7%
Bond2	Issuer 2	Industrial	17%	47%	X 0.9798	46%
Bond3	Issuer 2	Industrial	7%	19%	X 0.9798	19%
Bond4	Issuer 3	Industrial	22%	12%	X 0.9798	12%
Bond5	Issuer 4	Utility	11%	6%	X 1.07	7%
Bond6	Issuer 5	Financial	15%	10%	X 1.07	10%

[2] If multiple sectors (or issuers, bonds or maturity ranges) are above the limits, the largest single deviation is found. In this example, Industrials was the only sector in breach of the limit.

Following the adjustment of all the bonds, the sector distribution is as follows:

Table 5.1.6 – Sector Results

Sector	Benchmark Weight	Tilted Weight	Deviation	Rescaled Weight	Deviation vs Benchmark
Financial	43%	16%	-27%	17%	-26%
Industrial	46%	78%	32%	76%	30%
Utility	11%	6%	-5%	7%	-4%

Step 2 – Issuer capping

As no other sectors are in breach of the limit, the issuer weights relative to the benchmark are checked.

Table 5.1.7 – Issuer Weight Distribution

	Sector	Benchmark Weight	Tilted Weight	Rescaled Weight	Deviation
Issuer 1	Financial	28%	7%	7%	-21%
Issuer 2	Industrial	24%	66%	64%	40%
Issuer 3	Industrial	22%	12%	12%	-10%
Issuer 4	Utility	11%	6%	7%	-4%
Issuer 5	Financial	15%	10%	10%	-5%

The table shows that although the weight of Issuer 2 (Industrial), was reduced from 66% to 64% in the sector capping that took place in step 1, it is still above the maximum issuer limit of 25%.

As a part of the capping procedure its weight will be reduced so that it is within the limit, and the excess weight is redistributed to all the eligible issuers within the Industrial sector, which is Issuer 3.

The bond weights of Issuer 2 are adjusted using a similar adjustment factor as for sectors in step 1, taking into account all the adjustments factors to the tilted weight in the previous steps:

Target Weight / Rescaled Weight of bonds to be capped

= (Benchmark Weight + Maximum Deviation) / Rescaled Weight of bonds to be capped

= 24% + 25% / 66%

= 0.7443

The weight of the bonds belonging to Issuer 3 are adjusted using a similar adjustment factor as in step 1.

Target Weight / Rescaled Weight of bonds to be capped

= (1- tilted weights of bonds not eligible for adjustment) / Rescaled Weight of bonds to be adjusted

= (1 – 7% - 7% - 10% - 49%) / 12%

= 2.3001

For the bonds that are not adjusted in this step, they retain the scaling factors as of the previous step. The tilted weight of each bond is multiplied by the updated scaling factors, and the resulting weights are rescaling so that they sum to 1. The results are shown in Table 5.1.8.

Table 5.1.8 – Step 2 Bond rescaling

Bond	Issuer	Sector	Bench. Weight	Tilted Weight	Scaling factor	Rescaled Weight
Bond1	Issuer 1	Financial	28%	7%	1.0700	7%
Bond2	Issuer 2	Industrial	17%	47%	0.7443	35%
Bond3	Issuer 2	Industrial	7%	19%	0.7443	14%
Bond4	Issuer 3	Industrial	22%	11%	2.3002	27%
Bond5	Issuer 4	Utility	11%	6%	1.0700	7%
Bond6	Issuer 5	Financial	15%	10%	1.0700	10%

The rescaling of the bonds within Step 2 was within the Industrial sector, as a result the sector distribution remains unchanged, as shown in Table 5.1.6. The issuer distribution has changed and is now as follows:

Table 5.1.9 – Issuer Weight Distribution

Issuer	Sector	Benchmark Weight	Tilted Weight	Rescaled Weight	Deviation
Issuer 1	Financial	28%	7%	7%	-21%
Issuer 2	Industrial	24%	66%	49%	25%
Issuer 3	Industrial	22%	12%	27%	-10%
Issuer 4	Utility	11%	6%	7%	-4%
Issuer 5	Financial	15%	10%	10%	-5%

The weight of Issuer 2 has been brought down from 64% in step 2 to 49%, bringing it within the limit of a maximum of 25% above its benchmark weight. This excess weight has been redistributed to Issuer 3 and the weights of all the other issuers remains unchanged. As there are no other issuers in breach of the 25% limit, the next check is for the bond weight distribution, to see the weight of any bond is +20% above its benchmark weight, as shown in Table 5.1.10.

Table 5.1.10 – Bond Weight Distribution

Bond	Issuer	Sector	ESG Score	Bench. Weight	Tilted Weight	Rescaled Weight	Deviation
Bond1	Issuer 1	Financial	-0.25	28%	7%	7%	-21%
Bond2	Issuer 2	Industrial	0.7	17%	47%	35%	18%
Bond3	Issuer 2	Industrial	0.7	7%	19%	14%	7%
Bond4	Issuer 3	Industrial	-0.015	22%	12%	27%	5%
Bond5	Issuer 4	Utility	0	11%	6%	7%	-4%
Bond6	Issuer 5	Financial	0.05	15%	10%	10%	-5%

Compared to the initial tilted weights, the weight of Bond 2 is no longer in breach of the bond limit, as it was rescaled when the weight of Issuer 2 was brought down in step 2. This leaves Bond 1, whose weight of 7% is -21 percentage points below its benchmark weight as opposed to the maximum deviation of -20%. Its weight will be increased, decreasing the weights proportionately from the eligible bonds belonging to the same Financial Sector.

Step 3 – Bond capping

The weight of Bond 1 will be adjusted using the adjustment factor as shown in the previous steps:

Target Weight / Rescaled Weight of bonds to be capped

= (Benchmark Weight + Maximum Deviation) / Rescaled Weight of bonds to be capped

= 28% - 20% / 7%

= 1.2130

Similarly, the adjustment factor for bond 6 is found as follows:

Target Weight / Rescaled Weight of bonds to be capped

= (1- tilted weights of bonds not eligible for adjustment) / Rescaled Weight of bonds to be adjusted

= (1 – 35% - 14% - 27% - 7%-8%) / 10%

= 0.9726

As in step 2, the adjustment factors of all the other bonds remains unchanged. The results are shown in Table 5.1.11.

Table 5.1.11 – Issuer Weight Distribution

Bond	Issuer	Sector	Bench. Weight	Tilted Weight	Adjustment factor	Rescaled Weight	Deviation
Bond1	Issuer 1	Financial	28%	7%	1.0700	8%	-20%
Bond2	Issuer 2	Industrial	17%	47%	0.7443	35%	18%
Bond3	Issuer 2	Industrial	7%	19%	0.7443	14%	7%
Bond4	Issuer 3	Industrial	22%	11%	2.3002	27%	5%
Bond5	Issuer 4	Utility	11%	6%	1.0700	7%	-4%
Bond6	Issuer 5	Financial	15%	10%	1.0700	9%	-6%

The weight of Bond 1 has increased, with the excess weight taken from Bond 6. The weights of all the other bonds remain unchanged. At this stage, the deviations of all the dimensions are rechecked. As the weight was redistributed within sectors, there is no change in the sector weights. The issuer weights have been impacted and are as shown in Table 5.1.12.

Table 5.1.12 – Issuer Weight Distribution

Issuer	Sector	Benchmark Weight	Tilted Weight	Rescaled Weight	Deviation
Issuer 1	Financial	28%	7%	8%	-20%
Issuer 2	Industrial	24%	66%	49%	25%
Issuer 3	Industrial	22%	12%	27%	-5%
Issuer 4	Utility	11%	6%	7%	-4%
Issuer 5	Financial	15%	10%	8%	-6%

All issuers are now within the limit of +/- 25%. As the bond limit has already been checked, the final step is to check the Maturity distribution so that no maturity range is in excess of +/-15% above or below its benchmark weight.

Table 5.1.13 – Maturity Weight Distribution

Maturity	Benchmark Weight	Rescaled Weight	Deviation
0-5Y	45%	43%	-2%
5-10Y	7%	14%	7%
10 -20 Y	15%	9%	-6%
20 - 30 Y	22%	27%	5%
30 Y +	11%	7%	-4%

Table 5.1.13 shows that all the maturity bands are within the limit, with the maturity deviations already implicitly reduced as a part of the earlier capping steps.

Final Capping Step

The final step is to calculate the Weighting Cap Factor for each bond, which transforms the market value weight of each bond into its final capped weight. This is calculated by dividing the Rescaled Weights derived at the final stage of the capping, by the Benchmark weights and is shown in Table 5.1.14:

Table 5.1.14 Final Step, Weighting factors

Bond	Benchmark Weight	Final Index Weight	Weighting Cap Factor
Bond 1	28%	8%	0.2857
Bond 2	17%	35%	2.0417
Bond 3	7%	14%	2.0417
Bond 4	22%	27%	1.2273
Bond 5	11%	7%	0.5974
Bond 6	15%	9%	0.6286

In the example, the initial ESG tilting increased the average ESG score from 0.1 in the benchmark to 0.45, however this caused an excessive concentration within certain sectors, issuers, bonds and maturity ranges. After the capping process, the excessive concentration was removed, giving a final average ESG score of 0.32.

5.2 CONTACT DATA

Solactive AG
German Index Engineering
Guiollettstr. 54
60325 Frankfurt am Main
Germany

Tel.: +49 (0) 69 719 160 00
Fax: +49 (0) 69 719 160 25
Email: info@solactive.com

5.3 CHANGES IN CALCULATION METHOD

The application by the Index Calculator of the method described in this document is final and binding. The Index Calculator shall apply the method described above for the composition and calculation of the Index. However, it cannot be excluded that the market environment, supervisory, legal, financial or tax reasons may require changes to be made to this method. The Index Calculator may also make changes to the terms and conditions of the Index and the method applied to calculate the Index that it deems to be necessary and desirable in order to prevent obvious or demonstrable error or to remedy, correct or supplement incorrect terms and conditions. The Index Calculator is not obliged to provide information on any such modifications or changes. Despite the modifications and changes, the Index Calculator will take the appropriate steps to ensure a calculation method is applied that is consistent with the method described above.