

BOND INDEX METHODOLOGY

Version 1.3

02 September 2022

TABLE OF CONTENTS

INTRODUCTION	4
1 INDEX CALCULATION	7
1.1 Index Types	7
1.2 Calculation Formulas.....	7
1.2.1 Direct Reinvestment Index Formula	7
1.2.2 Periodic Reinvestment Formula	8
1.2.3 Definitions of variables.....	10
1.3 Rounding Convention	11
1.4 Settlement Convention	12
1.5 Day Count Convention.....	12
1.6 Index Rebalance	13
1.7 Special Treatments.....	13
1.7.1 Treatment for Sinkable Bonds	13
1.7.2 Treatment for bonds with Ex-Dividend Period	13
1.7.3 Treatment for Capitalizing Bonds.....	13
1.7.4 Treatment for Floating Rate Notes	14
1.8 Calculation.....	14
1.9 Weighting	14
1.10 Notice Period	14
1.11 Distribution	14
2 CORPORATE ACTIONS.....	15
2.1 Early Redemption: Full Call / Full Tender / Full Buyback.....	15
2.1.1 Definition	15
2.1.2 Adjustment.....	15
2.2 Exchange Offer.....	17
2.2.1 Definition.....	17
2.2.2 Adjustment	17
2.3 Distressed Debt Exchange Offer	17
2.3.1 Definition.....	17
2.3.2 Adjustment.....	18
2.4 Default Corporate Action.....	18



2.4.1 Definition.....	18
2.4.2 Adjustment.....	18
2.5 Default Outcome.....	18
2.5.1 Definition.....	18
2.5.2 Adjustment.....	18
2.6 Funge.....	19
2.6.1 Definition.....	19
2.6.2 Adjustment.....	19
2.7 Payment-in-Kind.....	19
2.7.1 Definition.....	19
2.7.2 Adjustment.....	20
2.8 Conversion of bonds.....	20
2.8.1 Definition.....	20
2.8.2 Adjustment.....	20
2.9 Debt issuances.....	20
2.10 Bond Maturity between two Rebalance Days.....	20
2.11 Debt Re-Opening.....	20
3 DEFINITIONS	21
CONTACT	22

INTRODUCTION

Solactive is committed to the highest standards of integrity and professionalism, which is reflected by a transparent and replicable index design and calculation methodology. Solactive adheres to the following standards in developing methodologies, which, inter alia, are:

- > robust and reliable;
- > rigorous and continuous;
- > traceable and verifiable;
- > resilient; and
- > inclusive of information on the treatment of Corporate Actions.

In line with the above objectives, Solactive develops, calculates and maintains its Indices based on the specifications in this Bond Index Methodology.

Solactive fully complies with the IOSCO principles on the quality and integrity of Index Guidelines by giving its stakeholders a detailed insight into the calculation and maintenance of its Indices. With further



reference to the EU Benchmarks Regulation (Regulation (EU) 2016/1011), it is the objective of this Bond Index Methodology to carve out a general framework of applicability which can be referenced by individual Index Guidelines. Disclosure of the index maintenance rules as well as general calculation methods contained in the Bond Index Methodology should further enable issuers and investors to evaluate and utilize Solactive Indices.

The Index Guidelines contain specifications of the relevant Index, Index Component Requirements and calculation frequencies whereas this Solactive Bond Index Methodology elaborates on the Index formulae used by Solactive and their respective adjustments. This Bond Index Methodology further defines the various Corporate Actions which are considered by Solactive in the index maintenance process and specifies their corresponding treatment. It explains the application by means of a detailed description of the individual steps.

Solactive considers the following Corporate Actions as relevant for index maintenance:

- > Early Redemption;
- > Exchange Offer;
- > Tender Offer / Buy back;
- > Distressed Debt Exchange;
- > Default Corporate Action;
- > Default Outcome;
- > Funge;
- > Payment-in-Kind;
- > Conversion of bonds;
- > Debt issuance; and
- > Bond Maturity.

Generally speaking, Corporate Actions that have a material impact on the price, weighting or overall integrity of Index Components need to be accounted for in the calculation of the Index.

Solactive also develops and calculates customized indices. Due to the variety of their different constructions, each customized may Index follow its own unique Index Guideline. Therefore, the respective Index Guideline provides more detailed information on the index setup and maintenance. In case rules described in an Index Guideline differ from the framework of the Bond Index Methodology, the Index Guidelines prevail. While Solactive aims at maintaining its Bond Index Methodology as generic and transparent as possible and in line with the above-mentioned regulatory requirements, it retains the right to deviate from the standard procedures described in this Bond Index Methodology in case of any unusual or complex Corporate Action or if such a deviation is made to preserve the comparability and representativeness of an Index over time.

In accordance with the principle of transparency, the Bond Index Methodology is directed to all stakeholders, such as financial issuers, potential investors as well as interested third parties, among



others. Therefore, this Bond Index Methodology intends to be concise as well as comprehensible on all levels. The core concepts and terms are defined in Section 4 and the adjustment formulae are presented and explained.



1 INDEX CALCULATION

This section details the general calculation methodology for Solactive Indices, elaborating on the index types and the calculation formulas applied for the different cash reinvestment approaches. An overview of the rounding, settlement and day count conventions, index adjustment rules, treatments for special bond types, notice period and index data distribution process used by Solactive for index calculation is also provided.

1.1 INDEX TYPES

Based on the client's objective and in line with the industry standards, Solactive offers bond index calculation in price return and total return versions. A Price Return (PR) Index reflects Clean Price movements of the Index Components disregarding accrued interest and coupon payments and only accounting for redemption proceeds with respect to Index Components resulting from Corporate Actions taking place between two Rebalance Days. In this way, price return indices aim to reflect the price performance of the overall market, or of its particular segment. A Total Return (TR) Index seeks to replicate the overall return from holding an index portfolio, thus considering both coupon payments and Corporate Action proceeds in addition to the Dirty Price changes.

1.2 CALCULATION FORMULAS

The index calculation depends on the cash reinvestment approach. Based on whether the cash reinvestment is daily or periodic, Solactive Indices can be calculated with either of the formulas outlined below, as specified in the Index Guideline for the individual Index.

1.2.1 Direct Reinvestment Index Formula

The Direct Reinvestment Index Formula implies daily reinvestment of proceeds resulting from Corporate Actions and, with respect to total return indices, coupons into the Index on the effective date proportionally to the weights of Index Components. The Direct Reinvestment Index Formula implies that the Index Level changes along with the weighted change of prices of its Index Components (the Clean Price, which means the accrued interest is excluded, is used for a Price Return Index and the Dirty Price, which accounts for the accrued interest, is used for a Total Return Index). A Total Return Index additionally incorporates the Cash Component. Depending on the index version (TR or PR), a different formula is used:

> Price Return Index

$$Index_t = Index_{t-1} \cdot \left(1 + \sum_{i=1}^a (PriceReturn_{i,t} \cdot Weight_{i,t-1})\right) \quad (1)$$

where:

$$PriceReturn_{i,t} = \frac{Price_{i,t} \cdot FX_{i,t} \cdot IR_{i,t}}{Price_{i,t-1} \cdot FX_{i,t-1} \cdot IR_{i,t-1}} - 1 \quad (2)$$



$$Weight_{i,t-1} = \frac{Price_{i,t-1} \cdot SinkingFactor_{i,t-1} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t-1} \cdot IR_{i,t-1}}{\sum_{i=1}^a Price_{i,t-1} \cdot SinkingFactor_{i,t-1} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t-1} \cdot IR_{i,t-1}} \quad (3)$$

> Total Return Index

$$Index_t = Index_{t-1} \cdot \left(1 + \sum_{i=1}^a (TotalReturn_{i,t} \cdot Weight_{i,t-1})\right) \quad (4)$$

where:

$$TotalReturn_{i,t} = \frac{(Price_{i,t} + AI_{i,t} + Cash_{i,t} + CPAdj_{i,t}) \cdot SinkingFactor_{i,t} \cdot IR_{i,t} \cdot FX_{i,t}}{(Price_{i,t-1} + AI_{i,t-1} + CPAdj_{i,t-1}) \cdot SinkingFactor_{i,t-1} \cdot IR_{i,t-1} \cdot FX_{i,t-1}} - 1 \quad (5)$$

$$Weight_{i,t-1} = \frac{(Price_{i,t-1} + AI_{i,t-1}) \cdot SinkingFactor_{i,t-1} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t-1} \cdot IR_{i,t-1}}{\sum_{i=1}^a (Price_{i,t-1} + AI_{i,t-1}) \cdot SinkingFactor_{i,t-1} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t-1} \cdot IR_{i,t-1}} \quad (6)$$

1.2.2 Periodic Reinvestment Formula

According to the periodic cash reinvestment methodology, proceeds resulting from Corporate Actions and, with respect to total return indices, cash payments are held in a Cash Component from the effective date of the Corporate Action or Coupon Payment up to the next regular Rebalance Day when the proceeds are reinvested into the Index proportionally to the weights of the Index Components. Unlike the Direct Reinvestment Index Formula that uses daily bond returns as a basis for index calculation, the Periodic Reinvestment Index Formula tracks performance relative to the so-called Base Value (Market Value on the Rebalance Day with the Amount Outstanding as of Selection Day). The formula for a Price Return Index adjusts the Index Level for changes in the Market Value and Cash Component as compared to the Base Value. Total Return version includes cash derived from coupon payments and replaces Dirty Price with Clean Price.

> Price Return Index

$$Index_t = Index_n \cdot \frac{MarketValue_t + Cash_t}{BaseValue_n} \quad (7)$$

where:

$$BaseValue_n = \sum_{i=1}^a Price_{i,n} \cdot SinkingFactor_{i,n} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,n} \cdot IR_{i,n} \quad (8)$$



$$MarketValue_t = \sum_{i=1}^a Price_{i,t} \cdot SinkingFactor_{i,t} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \cdot IR_{i,t} \quad (9)$$

$$Cash_t = CashSink_t + CashCA_t \quad (10)$$

$$CashSink_t = \sum_{i=1}^a CashSink_{i,t-1} + \sum_{i=1}^a SinkPayment_{i,t} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \cdot IR_{i,t} \quad (11)$$

$$CashCA_t = \sum_{i=1}^a CashCA_{i,t-1} + \sum_{i=1}^a RedemptionPrice_{i,t} \cdot SinkingFactor_{i,t-1} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \cdot IR_{i,t} \quad (12)$$

> Total Return Index

$$Index_t = Index_n \cdot \frac{MarketValue_t + Cash_t}{BaseValue_n} \quad (13)$$

where:

$$BaseValue_n = \sum_{i=1}^a (Price_{i,n} + AI_{i,n} + CAP_{i,n} + CPAdj_{i,n}) \cdot SinkingFactor_{i,n} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,n} \cdot IR_{i,n} \quad (14)$$

$$MarketValue_t = \sum_{i=1}^a (Price_{i,t} + AI_{i,t} + CAP_{i,t} + CPAdj_{i,t}) \cdot SinkingFactor_{i,t} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \cdot IR_{i,t} \quad (15)$$

$$Cash_t = CashCoupon_t + CashSink_t + CashCA_t \quad (16)$$

$$CashCoupon_t = \sum_{i=1}^a CashCoupon_{i,t-1} + \sum_{i=1}^a Coupon_{i,t} \cdot SinkingFactor_{i,t-1} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \cdot IR_{i,t} \quad (17)$$

$$CashSink_t = \sum_{i=1}^a CashSink_{i,t-1} + \sum_{i=1}^a SinkPayment_{i,t} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \cdot IR_{i,t} \quad (18)$$

$$CashCA_t = \sum_{i=1}^a CashCA_{i,t-1} + \sum_{i=1}^a (RedemptionPrice_{i,t} + AI_{i,t} + CAP_{i,t} + CPAdj_{i,t}) \cdot SinkingFactor_{i,t-1} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \cdot IR_{i,t} \quad (19)$$



1.2.3 Definitions of variables

a	Number of bonds in the Index
$AI_{i,t}$	Interest accrued of bond i on Business Day t
$Amt_{i,t}$	Amount Outstanding of bond i on Business Day t
$BaseValue_n$	Base Market Value of the Index as of Rebalance Day n
$CAP_{i,t}$	Capitalization Rate of bond i on Business Day t (only relevant for Capitalizing Bonds, otherwise the default value is zero)
$CF_{i,SD}$	Capping factor of bond i on Selection Day : Fixed on the immediately preceding Selection Day and defined as a parameter used to scale the weight of the bond
$CPAdj_{i,t}$	Variable Coupon Adjustment Factor of bond i on Business Day t : If the bond is included in the Index during the Ex-Dividend Period, the factor is zero; if the bond is a constituent of the Index during the Ex-Dividend Period, the Variable Coupon Adjustment Factor equals to the coupon value that will be paid on the next coupon date (only relevant for bonds with Ex-Dividend Period, otherwise default value is zero)
$CashCA_t$	Aggregated cash consisting of all repayments resulting from Corporate Actions effective up to and including Business Day t
$CashCoupon_t$	Aggregated cash consisting of all coupon payments made by the Index Components up to and including Business Day t
$CashSink_t$	Aggregated cash consisting of all early repayments of all Sinkable Bonds up to and including Business Day t
$Cash_t$	Aggregated cash consisting of all payments made by the Index Components up to and including Business Day t . In relation to Price Return Indices the term $Cash$ includes cash derived from payments resulting from Corporate Actions and early repayments of Sinkable Bonds, while Total Return Indices reflect coupon payments in addition to that. On the immediately following Rebalance Day, $Cash$ is reinvested into the Index and the value is set to zero



$Cash_{i,t}$	Cash consisting of all payments made by bond i on Business Day t . On the immediately following Business Day, $Cash$ is reinvested into the Index and the value is set to zero
$Coupon_{i,t}$	Coupon value of bond i on Business Day t
$FX_{i,t}$	Exchange rate of bond i currency against the Index Currency on Business Day t
$IR_{i,t}$	Inflation ratio of bond i on Business Day t (only relevant for Inflation-Linked Bonds, otherwise the default value is one)
$Index_t$	Index Level on Business Day t
$MarketValue_t$	Market Value of Index on Business Day t
n	Last Rebalance Day
$PriceReturn_{i,t}$	Price Return of bond i on Business Day t
$Price_{i,t}$	Clean Price of bond i on Business Day t
$RedemptionPrice_{i,t}$	Price at which bond i is redeemed as a result of a Corporate Action effective on Business Day t
SD	Last Selection Day
$SinkPayment_t$	Value of the early repayment of Sinkable Bond i on Business Day t . The Sink Payment is calculated as: $Sink\ Payment_{i,t} = (SinkingFactor_{i,t-1} - SinkingFactor_{i,t}) \cdot Price_{i,t}$
$SinkingFactor_{i,t}$	Sinking Fund Factor of bond i on Business Day t (only relevant for Sinkable Bonds, otherwise default value is one)
t	Business Day which is between two regular Rebalance Days
$TotalReturn_{i,t}$	Total Return of bond i on Business Day t
$Weight_{i,t}$	Weight of bond i on Business Day t

1.3 ROUNDING CONVENTION

Solactive calculates its Indices in accordance with the following rounding convention:



- > Index Level: No rounding
- > Prices of Index Components: No rounding
- > Foreign exchange rates: No rounding
- > Amount Outstanding: No rounding
- > Coupon: No rounding
- > Accrued interest: No rounding
- > Cash Component / Payments: No rounding
- > Market Value (Base Market Value, Market Value): No rounding
- > Weights: No rounding
- > Capping factor: No rounding

The published Index Levels are rounded to 2 decimal places. Any deviation from these specifications will be indicated in the individual Index Guidelines.

1.4 SETTLEMENT CONVENTION

The default Settlement Convention applied in Solactive Indices is $t + 0$, which assumes that bond buy/sell transactions are settled on the same Business day for all Index Components. With respect to the index calculation, this implies the accrued interest of each individual bond i used for the Index Closing computation as of t being exactly the interest that has accrued on the bond up to and including Business Day t .

A $t + x$ convention implies that the payment for a bond is made in x Business Days after the execution date. Under this convention, the accrued interest of bond i used for the calculation of the Index Level on a Business Day t equals the interest that has accrued on the bond up to and including Business Day $t + x$.

These two approaches define the Settlement Convention applicable for calculation of the Index, which disregard individual bond conventions. Another way to account for transaction settlements, is to apply the bond-specific Settlement Conventions. This treatment results in bond i accrued interest contribution to the Index Level as of t depending on its individual convention.

1.5 DAY COUNT CONVENTION

According to the terms of a bond, the following day count conventions are taken into account:

- > Act/Act
- > Act/360
- > Act/365
- > 30/360
- > ISMA 30/360
- > BUS DAY/252



1.6 INDEX REBALANCE

The composition of the Index is ordinarily reviewed on the Selection Day. Any change to the Index will be implemented on the Rebalance Day, if not specified otherwise in the Index Guideline. Changes will be announced on the Announcement Day.

1.7 SPECIAL TREATMENTS

1.7.1 Treatment for Sinkable Bonds

In order to account for payments from Sinkable Bonds, a respective cash component will be considered in the index calculation.

The cash component $CashSink_t$ is calculated according to the formula:

$$CashSink_t = \sum_{i=1}^a CashSink_{i,t-1} + \sum_{i=1}^a SinkPayment_{i,t} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \quad (20)$$

$$SinkPayment_{i,t} = (SinkingFactor_{i,t-1} - SinkingFactor_{i,t}) \cdot Price_{i,t} \quad (21)$$

$SinkingFactor_{i,t}$ of a bond i on Business Day t is only relevant for Sinkable Bonds, otherwise the default value is one.

1.7.2 Treatment for bonds with Ex-Dividend Period

For bonds with coupon payments that go ex-dividend, the bond buyer will not be entitled to receive the coupon payment, if purchased between the ex-dividend date and coupon payment date. To compensate the bond buyer for holding the bond up to the coupon payment date, the accrued interest is negative during the Ex-Dividend Period. Therefore, the Dirty Price reflects that the coupon will not be paid to the new bondholder but rather to the original bondholder. With respect to the index, this means that if a bond is already a constituent of the Index on its ex-dividend date, the next coupon payment is displayed as a Variable Coupon Adjustment Factor $CPAdj_{i,t}$ which adjusts the accrued interest taken into account in the index calculation. If the bond is included in the Index during the Ex-Dividend Period (i.e. the bond was not a constituent of the Index on ex-dividend date) $CPAdj_{i,t}$ is zero as the next coupon payment does not accrue to the bond holder.

1.7.3 Treatment for Capitalizing Bonds

Between two Rebalance Days the increased Amount Outstanding of Capitalizing Bonds is incorporated into the Market Value via the Capitalization Rate ($CAP_{i,t}$).

When calculating the Market Value of a Capitalizing Bond, the variable $CAP_{i,t}$ receives the value of the Capitalization Rate of bond i on Business Day t , which is different from the default value of zero.



$$MarketValue_t = \sum_{i=1}^a (Price_{i,t} + AI_{i,t} + CAP_{i,t} + CPAdj_{i,t}) \cdot SinkingFactor_{i,t} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \quad (22)$$

On the next Rebalance Day, the Amount Outstanding for the Capitalizing Bond will be increased accordingly in case the bond is still an Index Component.

1.7.4 Treatment for Floating Rate Notes

The coupon payments of Floating Rate Notes are dependent on an external interest rate. If the rate is unavailable for the determination of the next coupon payment (e.g. the coupon is paid on the floating rate "fixing" date), the current rate is used as an indicative value. Once the rate is available, the coupon will be adjusted accordingly.

1.8 CALCULATION

The Index is calculated and distributed once every Business Day based on the Last Evaluated price of the Index Components. In each Index, the Index Price Convention will determine the price type used for the calculation of the Index. The price convention states whether bid, mid, ask prices are used for entering, existing and exiting index components. Unless otherwise specified in the Index Guideline, newly added bonds will be included in the Index at the Index Price Convention. Bonds removed from the Index at the Rebalance Day will be removed following the Index Price Convention unless specified otherwise. The bond removal will take place at the last Index Closing calculation before the new Index Composition becomes effective. Prices of Index Components not denominated in the Index Currency are converted using the foreign exchange fixings specified in the Index Guideline.

1.9 WEIGHTING

The Index Components are weighted on the Weighting Day in accordance with the rules stated in the Index Guideline.

1.10 NOTICE PERIOD

Solactive will announce the result of the Rebalance no later than until COB one Business day after the Selection day, if not specified differently in the Index Guideline. In case of an ad-hoc adjustment, Solactive will inform the relevant parties as soon as information is available directly via email and through an announcement on the Solactive official website: <https://www.solactive.com>.

1.11 DISTRIBUTION

The Indices are distributed via the price marketing services of Stuttgart Stock Exchange and are distributed to all affiliated vendors.



2 CORPORATE ACTIONS

This section outlines the treatment of Corporate Actions that may result in changes in the Index between two Rebalance Days. Corporate Actions are implemented on the day they are effective, and sufficient information is available. The Corporate Actions that occur on weekends or on holidays are implemented on the next Business Day.

In the following sections, a brief definition for each Corporate Action is provided along with a description of the relevant index adjustment to account for such Corporate Action.

2.1 EARLY REDEMPTION: FULL CALL / FULL TENDER / FULL BUYBACK

2.1.1 Definition

A **Call** option embedded in a bond provides the Issuer with the right to redeem the bond before maturity under certain predetermined conditions. A regular call means that the bond may be repurchased on a predefined date at a predefined price. Another type of this Corporate Action is a **Conditional Call**, a notice of redemption in which the redemption is subject to a specific condition being satisfied. With this call type, the bond issuer retains the right to cancel the redemption. **Make Whole Call** is a type of Call that implies a special 'MWC provision' in the debt indenture which allows the issuer to redeem the bond early at a level that does not disadvantage the bond holder. A Make Whole Call can occur anytime regardless of the bond call schedule.

While a Call can be exercised without bondholders' consent (provided that the bond is callable), a **Tender Offer** represents an offer made by the Issuer to its bondholders to repurchase all or some of its bonds at a specified price within a certain time period. The second most common type of Early Redemption along with a Tender Offer is a **Buyback** program initiated by the Issuer. In this case the Issuer repurchases a portion of its debt at the price available on the bond market (including private trading transactions).

In order to ensure the tradability of the Index, Solactive defines an Early Redemption as full if 90% or more of the bond's Amount Outstanding is redeemed in any of the aforementioned Corporate Action types. Any Early Redemption resulting in a repurchase lower than 90% is considered to be partial.

2.1.2 Adjustment

Unscheduled redemptions receive different treatments depending on:

- > Type of the Early Redemption: full/partial

Only full Early Redemptions, as defined by Solactive, lead to intramonth Index adjustments. Partial Early Redemptions have no effect on the Index Composition and weights until the next Ordinary Rebalance. For the avoidance of doubt, partially called or repurchased bonds may be removed from the Index on the next Rebalance Day provided that they no longer meet the Index Component Requirements on the Selection Day as a result of the decrease in the Amount Outstanding.



However, if several partial calls and/or debt repurchases take place between two Rebalance Days or if a partial Call or debt repurchase is followed by a full Call or debt repurchase so that the resulting Amount Outstanding of the bond falls below 10% of its initial value on the last Selection Day, the Index is adjusted assuming that the bond's full amount was called/repurchased at the price of the latest Corporate Action. If part of the bond's Amount Outstanding is called and another part is repurchased on the same date but at different prices with the combination of the two events resulting in a full redemption, the full bond Amount Outstanding is called at the weighted average price of the Call and Tender/Buyback Corporate Actions.

> Type of the index cash reinvestment approach: direct/periodic

The Direct Reinvestment Index Formula implies direct reinvestment of the redemption proceeds with respect to Index Components into the Index. Clean Price and accrued interest of bond i are set to zero for the calculation of a Total Return Index (see Section 1.2.1) whereas cash incorporates the redemption proceeds including any payments for coupons or accrued interest. If a Corporate Action takes place on a non-Business Day, the accrued interest as of the effective date of the Corporate Action is used for the cash calculation. The cash increment of bond i is calculated as follows:

$$Cash_{i,t} = (RedemptionPrice_{i,t} + AI_{i,t}) \quad (23)$$

On the next Business Day $t + 1$, the bond is removed from the Index with its weight being distributed among the remaining Index Components on a pro rata basis thus leading to an increase of their individual weightings, other things equal.

According to the Periodic Reinvestment Index Formula, redemption proceeds with respect to Index Components are held as a Cash Component from the effective date up to the next Rebalance Day when the Cash Component is proportionally reinvested into the Index. Clean Price and accrued interest of bond i are set to zero for Total Return and Price Return calculations (see section 1.2.2) whereas the cash incorporates the redemption proceeds together with the accrued interest. If the Corporate Action did not take place on a Business Day, accrued interest for the cash will be calculated as of the effective date of the Corporate Action. On the Rebalance Day the period's accumulated cash is set back to zero. The cash increment of bond i is calculated as follows:

$$Cash_{i,t} = (RedemptionPrice_{i,t} + AI_{i,t} + CAP_{i,t} + CPAdj_{i,t}) \cdot SinkingFactor_{i,t} \cdot Amt_{i,SD} \cdot CF_{i,SD} \cdot FX_{i,t} \quad (24)$$

> Redemption Type (only relevant for full Calls): conditional/regular

The information on the Conditional Call might be not available on the effective date. In the event of unavailability of reliable information with respect to the Conditional Call, the respective adjustment will be postponed until reliable information is published by the Issuer of the bond but up to 5 Business Days after the Call has occurred, unless stated otherwise in the Index Guideline. This procedure is intended to achieve the correct treatment of such events in low transparency transactions, where it is often observed that the Issuer is unable to meet the necessary conditions to proceed with the Call.



If a Conditional Call occurs on a Selection Day, the bond will not be considered for the new Index Composition in the event of unavailability of reliable information with respect to the Conditional Call. This treatment aims to avoid considering a bond expected to be called in a new Index Composition.

In case the status of the Conditional Call changes after the Index was adjusted to account for the Conditional Call, the bond might be considered on the next Selection Day provided that it still meets the selection criteria. The Cash Component will not be adjusted.

2.2 EXCHANGE OFFER

2.2.1 Definition

A bond **Exchange Offer** is a type of a Tender Offer where the Issuer offers its bondholders to exchange their existing bonds for an asset other than cash (the cash exchange is described above as a Tender Offer). Among the assets offered in the exchange there may be other bonds, stocks, warrants, or a combination of these.

2.2.2 Adjustment

Treatment of Exchange Offers will vary from case to case, depending on:

- > Type of the Exchange: mandatory/optional, full/partial

Only mandatory Exchange Offers for 90% or more of the bond's Amount Outstanding will result in an adjustment of the Index. Optional and partial offers are not considered to be events that affect the Index Composition. For the avoidance of doubt, optionally or partially exchanged bonds can be removed from the Index on the next Rebalance Day provided that they no longer meet the Index Component Requirements (usually due to decrease in the Amount Outstanding).

- > Asset type received as a compensation

If a bond i is fully exchanged into shares, warrants, cash, or a combination of these with other bonds, the bond will be removed from the Index at the latest available price. The proceeds will be treated as Cash Component and reinvested into the Index in the same manner as described above for a Call/Tender Offer Corporate Action (in this case, the redemption price will equal the bond's latest available price).

If 90% or more of the Amount Outstanding is exchanged for another bond series, the new bond receives the weight of the exchanged bond. Should the new bond have different parameters (coupon, maturity date, coupon payment frequency etc.) such that it no longer meets the index eligibility criteria, the exchanged bond will be removed from the Index at the latest available price.

2.3 DISTRESSED DEBT EXCHANGE OFFER

2.3.1 Definition

A **Distressed Debt Exchange (DDE)** is a form of debt exchange in which bondholders agree to reduce the principal amount of debt securities in order to obtain higher payment priority in the form of secured debt. When offering the Distressed Debt Exchange, the Issuer of the bond may aim to increase its financial stability and liquidity, extend time to maturity of the bonds and avoid breaching of covenants.



2.3.2 Adjustment

In case more than 90% of the Amount Outstanding is exchanged in a Distressed Debt Exchange with the new bond having different characteristics (maturity, coupon or Amount Outstanding), such that it no longer meets the index eligibility criteria, the exchanged bond will be redeemed at the latest available price with the proceeds held as Cash Component and reinvested in accordance with the relevant index calculation formula.

2.4 DEFAULT CORPORATE ACTION

2.4.1 Definition

Default Corporate Action occurs when the Issuer fails to meet its coupon payment obligation or repay the principal of the bond at maturity within a certain period of time. Generally, after a coupon/principal payment failure occurs, the Issuer is granted a period of time ("Grace Period") to cure the default by making the payment. During this period, the bond is considered to be in Technical Default. If not cured within the Grace Period the failure becomes an **Event of Default**.

2.4.2 Adjustment

If the Issuer fails to meet its coupon payment obligation, the bond's status will be changed to "Flat Trading". In case the coupon was added to the paid cash in an Index and has not been reinvested at the time the information on the missed payment became available, the cash will be removed from the Index going forward. In the state of Flat Trading, a bond buyer is exempted from the responsibility of paying the interest that has accrued since the last interest payment. When a bond is defined to be "Flat Trading" between two Rebalance Days, the respective accrued interests and coupons will be set to zero. If the Issuer pays the missed interest within the Grace Period, the Flat Trading status will be removed and the accrued interest will be calculated again.

If a bond's default is confirmed, the bond's status will be changed to "In Default". In this case, the bond will remain part of the Index until the next Rebalance Day.

2.5 DEFAULT OUTCOME

2.5.1 Definition

Default Outcome is repayment of the defaulted debt through cash and/or financial securities. Cash payments are derived from the restructuring process of a defaulted Issuer. There can be several types of default outcomes:

- > Default Outcome paid with cash
- > Default Outcome paid with financial instruments only or in combination with cash

2.5.2 Adjustment

The treatment of the Default Outcome depends on the compensation received by bondholders.

- > Default Outcome paid with cash



If a Default Corporate Action results in a cash payment whilst the bond is an Index Component, the cash distributions are treated as Cash Component and are reinvested into the Index based on cash reinvestment approach (direct / periodic reinvestment). Specifically, if a defaulted bond i pays cash, the respective payment is reflected in the Index total return as part of the Cash Component on the effective date of the Default Outcome.

- > Default Outcome paid with financial instruments only or in combination with cash

If a Default Outcome results in delivery of financial instruments or in their delivery in combination with cash, the bond will be removed from the Index at the latest available price with the proceeds treated as Cash Component and reinvested into the Index in the same manner as described above for a Call/Tender Offer Corporate Action (where the redemption price will be equal to the latest available price).

2.6 FUNGE

2.6.1 Definition

Funge is a Corporate Action when the Parent bond absorbs the Fungible Bond so that its Amount Outstanding is increased, incorporating the Fungible Bond.

2.6.2 Adjustment

Treatment of the Funge depends on whether both Parent Bond and the Fungible Bond are part of the same Index:

- > The Parent bond and the Fungible Bond are both Index Components:

In the case when both securities are Index Components, between two Rebalance Days the Fungible Bond will become inactive and have an Amount Outstanding set to zero, while the Parent Bond will reflect an increase in the Amount Outstanding equal to the funged amount. On the next Rebalance Day the Fungible Bond will be removed from the Index, while the Parent Bond will remain and reflect the latest Amount Outstanding, as long as it fulfils the Index Component Requirements.

- > The Parent bond is an Index Component and the Fungible Bond is not:

No adjustment will occur. On the next Rebalance Day, the increased Amount Outstanding will be reflected for the Parent Bond, as long as it is part of the new Index Composition.

- > The Parent bond is not an Index Component but the Fungible Bond is:

If the Fungible Bond is part of the Index, but the Parent Bond is not, the Fungible Bond will be removed from the Index at the latest available price.

2.7 PAYMENT-IN-KIND

2.7.1 Definition

Payment-in-Kind Bonds pay interest in additional bonds rather than in cash. This implies no cash interest payments made by the Issuer during the bond lifetime, with the only cash outflow at maturity when the bond's principal is redeemed.



2.7.2 Adjustment

Assuming the additional bonds will be sold immediately and the proceeds will be reinvested in the Index, Payments-in-kind are therefore considered as regular interest payments in the Cash Component in all total return calculations.

2.8 CONVERSION OF BONDS

2.8.1 Definition

Convertible bonds are bonds that can be converted into equity of the bond Issuer or equivalent amount of cash under certain conditions.

Contingent Convertible Capital Securities or **CoCo bonds** are securities that will be converted into equity of the Issuer of such securities or are written down if a pre-defined trigger event occurs.

2.8.2 Adjustment

In the event of a conversion, the bond will be removed from the Index at the latest available price, emulating a Call Corporate Action for which the redemption price is equal to the latest available price.

2.9 DEBT ISSUANCES

Debt issuances of an existing bond and new issuances will not be considered until the next Selection Day unless stated otherwise in the Index Guideline.

Debt issuances with the Issue date between the Selection Day and the Rebalance Day can be included in the selection process given that their prices are available on Selection Day.

2.10 BOND MATURITY BETWEEN TWO REBALANCE DAYS

The standard treatment for bonds maturing between two Rebalance Days is deletion, unless indicated otherwise in the Index Guideline.

If a bond matures between two Rebalance Days, this bond will be removed from the index composition with its weight distributed among the remaining constituents on a pro rata basis. In case of Periodic Reinvestment Index Formula (see 1.2.2), the cash will be kept till the next Rebalance and then reinvested. In case of Direct Reinvestment Index Formula, the cash will be reinvested on the next Business Day. This is the standard treatment, unless indicated otherwise in the Index Guideline.

2.11 DEBT RE-OPENING

Re-opening outstanding issues and increasing the notional amount, which occur between two Rebalance Days, are not considered in the index calculation until the next Rebalance, if not specified differently in the Index Guideline.



3 DEFINITIONS

“Amount Outstanding” is the face value of the respective bond.

“Announcement Day” is always one Business Day after Selection Day.

“Base Value” is a Market Value on the Rebalance Day with Amount Outstanding as of Selection Day.

“Bond Maturity” is an event when the Issuer repays the relevant principal and interest of the bond.

“Business Day” is any day other than a Saturday or Sunday and other than holidays schedule specified in the Index Guideline. Business Day definition might differ in accordance with the Index Guideline.

“Buyback” is an event when the Issuer redeems its debt by repurchasing bonds in the secondary market.

“Call” is an option embedded in a bond that provides the Issuer with the right to redeem the bond before maturity under certain predetermined conditions.

“Capitalization Rate” is rate at which the principal of Capitalizing Bonds increases due to conversion of coupon payments into capital (principal).

“Capitalizing Bonds” are bonds that have a percentage of coupon payments converted into capital (principal).

“Cash Component” is an aggregated cash consisting of all payments made by Index Components.

“Clean Price” is a price of a bond that does not include any accrued interest.

“Contingent Convertible Capital Securities (CoCo)” are bonds that will be converted into equity of the Issuer or written down if a certain trigger event occurs.

“Convertible Bonds” are bonds that can be converted into equity of the Issuer or an equivalent amount of cash under certain conditions.

“Corporate Actions” for bonds are unscheduled payments, other than standard coupon payments that may include calls, puts, repurchases, exchanges or consent solicitations for example.

“Default Corporate Action” occurs when the Issuer fails to meet its coupon payment obligation, repay the principal at maturity within a certain period of time, known as the Grace Period.

“Default Outcome” is the full or partial repayment of the defaulted debt through cash and/or financial instruments .

“Dirty Price” is Clean Price of a bond plus any accrued interest.

“Distressed Debt Exchange Offer” is a form of debt exchange when bondholders agree to reduce the principal amount of debt securities in order to obtain higher payment priority in the form of secured debt.

“Early Redemption” includes any event that leads to a redemption of a bond before the scheduled maturity date.

“Event of Default” occurs if the Issuer fails to make the payment within the Grace Period.



“Exchange Offer” means that the holder of a bond is invited to exchange the existing bond to another security and/or cash.

“Ex-Dividend Period” is a period of time several days in advance of the coupon payment date during which the coupon due on such payment date is detached from the bond.

“Ex-dividend date” is the date when the bond starts to trade without the coupon.

“Fixing Time” is the time point when the prices are fixed for index calculation. Fixing Time is approximately as follows, unless specified differently in the Index Guideline:

Market Close Times

Close

Market	Pricing time
Argentina	16:00 (US Eastern Time)
Australia	17:00 (Aus time)
Bangladesh	13:00 (UK time)
Brazil	16:00 (US Eastern Time)
Canada	16:00 (US Eastern Time)
Chile	16:00 (US Eastern Time)
China	16:50 (HK time)
China	16:50 (HK time)
China	16:50 (HK time)
Colombia	16:00 (US Eastern Time)
Czech Republic	16:15 (UK time)
Denmark	16:15 (UK time)
Eurozone	16:15 (UK time)
Hong Kong	16:30 (HK time)
Hungary	16:15 (UK time)
India	13:00 (UK time)



Indonesia	13:00 (UK time)
Israel	16:15 (UK time)
Japan	16:00 (Aus time)
Malaysia	16:30 (HK time)
Mexico	16:00 (US Eastern Time)
New Zealand	15:00 (Aus time)
Nigeria	16:15 (UK time)
Norway	16:15 (UK time)
Pakistan	13:00 (UK time)
Peru	16:00 (US Eastern Time)
Philippines	17:00 (HK time)
Poland	16:15 (UK time)
Romania	16:15 (UK time)
Russia	16:15 (UK time)
Singapore	16:45 (HK time)
South Africa	16:15 (UK time)
South Korea	15:30 (HK time)
Sri Lanka	13:00 (UK time)
Sweden	16:15 (UK time)
Switzerland	16:15 (UK time)
Taiwan	15:30 (HK time)
Thailand	16:30 (HK time)
Turkey	16:15 (UK time)



United Kingdom	16:15 (UK time)
United States	15:00 (US Eastern Time)
Uruguay	16:00 (US Eastern Time)
Vietnam	16:15 (Aus time)

“Flat Trading” is the bonds' status if the Issuer fails to meet its coupon payment obligation. In this case accrued interest is set to zero.

“Floating Rate Notes” are bonds with a floating coupon rate, i.e. the coupon payments fluctuate in accordance with the underlying level of a pre-specified interest rate.

“Funge” is an event when the Parent bond absorbs the Fungible Bond.

“Fungible Bond” is a new bond into which the Parent Bond is interchanged. It has all the same specifications as an existing issue (bonds with the same parameters can be issued in different tranches).

“Grace Period” is a time frame after missing coupon or principal payment, within which the issuer has the possibility to fulfill its obligation to avoid entering into default.

“Index” is any fixed income index owned, administrated or calculated by Solactive AG.

“Index Closing” is the time at which Index Level is determined on a Business Day.

“Index Component Requirement” are selection rules stated in the Index Guideline.

“Index Components” are financial instruments that satisfy Index Component Requirements in accordance with the rules stated in the Index Guideline.

“Index Composition” comprises all Index Components.

“Index Currency” is the currency in which the Index is denominated. All individual bond currencies are converted into the Index Currency at the fixings for exchange rates specified in the Index Guideline.

“Index Guideline” is a document containing all relevant information regarding the particular Index.

“Index Level” is the result of the determination of the Index at the Index Closing.

“Index Price Quotation” is the quotation (bid/mid/ask) used for the index calculation between the Rebalance Days as specified in the Index Guideline.

“Issuer” is the issuing entity of the respective bond.

“Issue date” is the date when a new bond is publicly known to settle.

“Last Evaluated Price” is the evaluated Bid/Ask/Mid price by the designated Pricing Provider at Fixing Time as specified in the Index Guideline.



"Market Value" is the weighted sum of market capitalization of Index Components and determined as the product of the Amount Outstanding and the Last Evaluated Price adjusted for pre-defined factors (individual bonds currencies, Sinking Factors and other).

"Ordinary Rebalance" is a regular process of reviewing the Index Composition in accordance with the Index Component Requirements on the Selection Day.

"Parent Bond" is a bond that is funged into a new issue in accordance with predefined conditions.

"Payment-In-Kind Bonds" are bonds that pay interest in additional bonds rather than in cash.

"Payment-In-Kind" is an event when Payment-In-Kind Bonds pay interest in form of additional bonds.

"Price Return (PR) Index" reflects Clean Price movements of the index constituents disregarding coupon payments, accrued interest and only accounting for bond redemption proceeds resulting from Corporate Actions taking place between two Rebalance Days.

"Pricing Provider" is, in respect of an Index Component, specified in the List of Bond Pricing Provider which is incorporated by reference and available on the SOLACTIVE website (<https://www.solactive.com/documents/bond-pricing-provider/>), if not specified otherwise in the Index Guidelines.

"Rebalance Day" is the date when new Index Composition becomes effective after the respective Index Closing as specified in the Index Guideline.

"Re-opening" is the issuance of additional amounts for a previously issued bond.

"Selection Day" is the date when the new Index Composition is determined as specified in the Index Guideline.

"Settlement Convention" is number of days between the date when a trade is settled and the date when the transaction occurs used for the Index calculation as specified in the Index Guideline.

"Sinkable Bonds" are bonds that are backed by a fund that sets aside money on a regular basis. A sinkable bond issuer is required to buy a certain amount of the bond back from the purchaser at various points throughout the life of the bond.

"Sinking Factor" is a rate at which principal of Sinking Bond is reduced.

"Technical Default" is a state during the Grace Period resulted from the Issuer failing to make the payment on the due date.

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

"Total Return (TR) Index" measures all the returns generated by the Index Components, including any price movements, coupon income and redemption payments.

"Weighting Day" is the Selection Day if not specified otherwise in the Index Guideline.



CONTACT

Solactive AG

German Index Engineering

Platz der Einheit 1

60327 Frankfurt am Main

Germany

Tel.: +49 (0) 69 719 160 00

Fax: +49 (0) 69 719 160 25

Email: info@solactive.com

Website: www.solactive.com

© Solactive AG