

# Bloomberg Yield Curve Indices Methodology

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## Introduction

This methodology (the “Methodology”) has been made available by Bloomberg Index Services Limited (“BISL”) and sets out the rules, criteria, risk factors and other information application to the Yield Curve Indices (the “Indices” and each, an “Index”). Capitalized terms used in this Methodology but not otherwise defined have the meanings set forth in Appendix I (Glossary).

## Objectives and Key Features

The Bloomberg Yield Curve Indices aim to reflect the performance of holding long and short positions across different tenors of the yield curve. The indices aim to maintain a duration neutral profile through monthly rebalance.

## Section 1: Calculation

### Index Value

With respect to each Index, the Closing Index Value on the Index Base Date shall be the Index Base Value. Thereafter, the Index Value with respect to each subsequent Index Business Day,  $t$ , and Fixing,  $f$ , shall be calculated in accordance with the following formula, subject to Section 1 (“Rounding”):

$$I_{(t,f)} = I_{(t-1,close)} + UnitsReturn_{(t,f)} \quad (1)$$

Where:

$t - 1$  means the Index Business Day immediately preceding  $t$ ;

*close* means the Closing Fixing;

$I_{(t,f)}$  and  $I_{(t-1,close)}$  mean the Index Values for Fixing  $f$  on Index Business Day  $t$  and the Closing Fixing on Index Business Day  $t - 1$  respectively;

$UnitsReturn_{(t,f)}$  means the return attributed to the Units at Fixing  $f$  on Index Business Day  $t$ , calculated in accordance with the following formula:

$$UnitsReturn_{(t,f)} = UnitsReturn_{(t,f)}^{Funded} + UnitsReturn_{(t,f)}^{Unfunded} \quad (2)$$

$$UnitsReturn_{(t,f)}^{Funded} = \sum_{i \in FundedConstituents} U_t^i \times (P_{(t,f)}^i \times FX_{(t,f)}^i - P_{(t-1,close)}^i \times FX_{(t-1,close)}^i) \quad (3)$$

$$UnitsReturn_{(t,f)}^{Unfunded} = \sum_{i \in UnfundedConstituents} U_t^i \times (P_{(t,f)}^i - P_{(t-1,close)}^i) \times FX_{(t,f)}^i \quad (4)$$

Where:

$UnitsReturn_{(t,f)}^{Funded}$  and  $UnitsReturn_{(t,f)}^{Unfunded}$  mean the return attributed to the Units at Fixing  $f$  on Index Business Day  $t$  for the Funded Constituents and Unfunded Constituents respectively;

*FundedConstituents* and *UnfundedConstituents* mean the sets of Funded Constituents and Unfunded Constituents respectively;

$i$  means a Constituent;

$U_t^i$  means the Units for Constituent  $i$  on Index Business Day  $t$ ;

$P_{(t,f)}^i$  means the Price of Constituent  $i$  at Fixing  $f$  on Index Business Day  $t$ ;

$P_{(t-1,close)}^i$  means the Price of Constituent  $i$  at the Closing Fixing on Index Business Day  $t - 1$ ;

$FX_{(t,f)}^i$  means the Spot Exchange Rate to convert one unit of the Constituent Currency of Constituent  $i$  to the Index Currency at Fixing  $f$  on Index Business Day  $t$ ; and

$FX_{(t-1,close)}^i$  means the Spot Exchange Rate to convert one unit of the Constituent Currency of Constituent  $i$  to the Index Currency at the Closing Fixing on Index Business Day  $t - 1$ .

## Units

With respect to each Constituent,  $i$ , the Units on the Index Base Date shall be 0 (zero). Thereafter, the Units with respect to each Constituent,  $i$ , and subsequent Index Business Day,  $t$ , shall be calculated in accordance with the following formula:

$$U_t^i = U_{t-1}^i + IU_{t-1}^i \quad (5)$$

Where:

$t - 1$  means the Index Business Day immediately preceding  $t$ ;

$U_t^i$  and  $U_{t-1}^i$  mean the Units for Constituent  $i$  on Index Business Days  $t$  and  $t - 1$  respectively; and

$IU_{t-1}^i$  means the Incremental Units for Constituent  $i$  on Index Business Day  $t - 1$ .

## Incremental Units

With respect to each Constituent,  $i$ , the Incremental Units for each Index Business Day,  $t$ , shall be calculated in accordance with the following formulae:

If Index Business Day  $t$  is the Index Base Date:

$$IU_t^i = TU_t^i \quad (6)$$

If Index Business Day  $t$  is a Rebalance Day:

$$IU_t^i = TU_t^i - U_t^i \quad (7)$$

Else:

$$IU_t^i = 0 \quad (8)$$

Where:

$IU_t^i$  means the Incremental Units for Constituent  $i$  on Index Business Day  $t$ ;

$TU_t^i$  means the Target Units for Constituent  $i$  on Index Business Day  $t$ ; and

$U_t^i$  means the Units for Constituent  $i$  on Index Business Day  $t$ .

## Target Units

With respect to each Constituent,  $i$ , the Target Units for each Index Business Day,  $t$ , shall be calculated on the Units Determination Date for  $t$  in accordance with the following formulae:

If Index Business Day  $t$  is either the Index Base Date or a Rebalance Day:

$$TU_t^i = \frac{I_{(obs,close)} \times W_t^i}{P_{(obs,close)}^i \times FX_{(obs,close)}^i} \quad (9)$$

Else:

$$TU_t^i = TU_{t-1}^i \quad (10)$$

Where:

$t - 1$  means the Index Business Day immediately preceding  $t$ ;

$TU_t^i$  and  $TU_{t-1}^i$  mean the Target Units for Constituent  $i$  on Index Business Days  $t$  and  $t - 1$  respectively;

$obs$  means, with respect to Index Business Day  $t$ , the Units Observation Date;

$close$  means the Closing Fixing;

$I_{(obs,close)}$  means the Index Value for the Closing Fixing on Units Observation Date  $obs$ ;

$W_t^i$  means the Weight for Constituent  $i$  on Index Business Day  $t$ ;

$P_{(obs,close)}^i$  means the Price of Constituent  $i$  for the Closing Fixing on Units Observation Date  $obs$ ; and

$FX_{(obs,close)}^i$  means the Spot Exchange Rate to convert one unit of the Price Currency of Constituent  $i$  to the Index Currency at Closing Fixing on Units Observation Date  $obs$ .

## Weights

With respect to each Constituent  $i$ , the Weights for each Index Business Day,  $t$ , shall be determined on the Weights Determination Date in accordance with the Weighting Scheme.

If the Weighting Scheme is 'Fixed Weight', the Weight of each Constituent shall be its Fixed Weight.

Else if the Weighting Scheme is 'Duration Weight', the Weight of each Constituent shall be calculated in accordance with the following formulae:

If Index Business Day  $t$  is either the Index Base Date or a Rebalance Day:

$$Weight_t^i = \frac{Signal_{(dur\_obs,close)}^i}{Duration_{(dur\_obs,close)}^i} \times Multiplier_{(dur\_obs,close)}^i \quad (11)$$

Else:

$$Weight_t^i = Weight_{t-1}^i$$

Where:

$t - 1$  is the immediately preceding Index Business Day;

$Weight_t^i$  and  $Weight_{t-1}^i$  mean the Weight of Constituent  $i$  on Index Business Days  $t$  and  $t - 1$  respectively;

$Signal_{(dur\_obs,close)}^i$  means the Signal of each Constituent  $i$  for the Closing Fixing on Duration Observation Date  $dur\_obs$ ;

$dur\_obs$  means, with respect to Index Business Day  $t$ , the Duration Observation Date;

$Duration_{(dur\_obs,close)}^i$  means the Duration of each Constituent  $i$  for the Closing Fixing on Duration Observation Date  $dur\_obs$ ; and

$Multiplier_{(dur\_obs,close)}^i$  means the Multiplier of each Constituent  $i$  for the Closing Fixing on Duration Observation Date  $dur\_obs$ .

## Rounding

The Index Values shall be calculated without rounding and published to 4 decimal places.

## Section 2: Backtest assumptions

The rules outlined above are applied historically, however the following assumptions have been made:

Unless otherwise specified, the calendars and pricing used at the time of calculating the backtest are assumed to reflect those available at the time.

## Section 3: Stakeholder engagement, risk, and limitations

### Limitations of the index

Though the Index is designed to be representative of the markets it measures or otherwise aligns with its stated objective, it may not be representative in every case or achieve its stated objective in all instances. It is designed and calculated strictly to follow the rules of this Methodology, and any Index level or other output is limited in its usefulness to such design and calculation.

Markets can be volatile, including those market interests that the Index measures or upon which the Index is dependent to achieve its stated objective. For example, illiquidity can have an impact on the quality or amount of data available to the administrator for calculation and may cause the Index to produce unpredictable or unanticipated results.

In addition, changes to the availability and/or accuracy of trade, liquidity or forward rates data, may render the objective of the Index unachievable or to become impractical to replicate by investors. They are for the indicative purpose.

In particular, the Index measures the performance of holding long and short positions in interest rate derivatives. As with all investing, the Index is exposed to market risk. The value of interest rate derivatives fluctuate with the changes in economic forecasts, interest rate policies established by central banks and perceived geo-political risk. The Index does not take into account the cost of replication and as a result, a tracking portfolio's returns will underperform the Index with all else equal. As the Index is designed to measure those markets, it could be materially impacted by market movements, thus significantly impacting the use or usefulness of the fixings for some or all users.

## **Section 4: Benchmark oversight and governance**

### **Benchmark governance, audit, and review structure**

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

### **Index and Methodology Changes**

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

### **Expert judgement and Discretion**

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

### **Conflicts of interest**

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

### **Restatement policy**

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

### **Cessation Policy**

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

## Appendix I: Glossary

Closing Fixing	The Fixing corresponding to the end of day valuation.
Closing Index Value	The value of the Index on any given Index Business Day at the Closing Fixing.
Constituents	The Funded and Unfunded Constituents.
Determination Business Days	The days on which an index may make determinations with respect to changing weights or units.
Duration	The measure of sensitivity of bond price to shifts in the yield curve.
Duration Observation Date	For an Index Business Day, the Duration Observation Business Day occurring the Duration Observation Lag number of Duration Observation Business Days prior.
Duration Pricing Day	The days on which the Duration value for a Constituent is considered to be available.
Fixed Weight	For each Constituent, its specified weight.
Fixing	A given time specified with respect to a location or time zone.
Funded Constituent	An Underlying Index for which it is considered that the notional value is exchanged.
FX Data Source	The source of FX data for a Fixing.
Incremental Units	The difference in Units attributed to an action or activity on a Fixing.
Index	Has the meaning set forth in the Introduction.
Index Base Date	The first date on which an Index publishes a value.
Index Base Value	The value of an Index on and prior to the Index Base Date.
Index Business Day	The days on which the Index is calculated.
Index Commencement Date	The date on which an index is first published.
Index Currency	The currency in which an index is published.
Index Value	The value of the Index at a given Fixing on an Index Business Day.
Market Disruption Event	A situation wherein markets cease to function in a regular manner. See Appendix II: Market Disruptions.
Multiplier	A number that is used to increase or reduce weights to obtain target exposure.
Observation Business Days	The days from which data used for making determinations may be taken.
Price	If the Constituent is not a Timezone Lagged Constituent and the date for which the Price is with respect to is a Pricing Day, the value of a Constituent as determined from the Price Source with respect to the Fixing. Otherwise, the value of such Constituent as determined from the Price Source with respect to the Closing Fixing on the immediately preceding Pricing Day.
Price Currency	The currency in which the Prices of the Constituents are quoted.
Price Source	The source of pricing to be used for each Constituent and Fixing.
Pricing Day	The days on which Prices for a Constituent are considered to be available.
Rebalance Business Days	They days on which a rebalancing action may be performed.
Rebalance Day	Each day within a Rebalance Period that is a Rebalance Business Day.
Rebalance Disruption Rule	The set of rules by which a rebalance will be adjusted in the event of certain Market Disruption Events. See Appendix II.
Rebalance End Date	The Rebalance Business Day occurring the number of Rebalance Length minus one (1) Rebalance Business Days after the Rebalance Start Date. For the avoidance of doubt, if the Rebalance Length is zero (0), then the Rebalance End Date is the Rebalance Start Date.
Rebalance Length	The number of Rebalance Business Days over which a rebalance is performed.
Rebalance Period	The set of Rebalance Business Days from, and including, each Rebalance Start Date to, and including, the corresponding Rebalance End Date.
Rebalance Start Date	The Rebalance Business Day on which a Rebalance Period is scheduled to begin.
Signal	A number that determines the sign and magnitude of the weight.
Spot Exchange Rate	The rate used to convert one unit of a Price Currency into the Index Currency at a given Fixing on an Index Business Day as determined from the FX Data Source.
Target Units	The Units of a Constituent that an index intends to hold after trading activities are performed.
Trading Day	The days on which an index considers that a Constituent can be traded.
Timezone Lagged Constituent	A Constituent for which a lag is applied to account for the notional location of the Constituent relative to that of the Index.
Underlying Index	An index that is a Constituent of the Index.



Unfunded Constituent	An Underlying Index for which it is considered that the notional value is not exchanged.
Units	The number of units of each Constituent held on opening of an Index Business Day.
Units Determination Business Days	The days on which an index may make determinations with respect to changing units.
Units Determination Date	For an Index Business Day, the Units Determination Business Day occurring the Units Determination Lag number of Units Determination Business Days prior.
Units Determination Lag	The number of Units Determination Business Days before any units determinations made by an index should become effective.
Units Observation Business Days	The days from which data used for making units determinations may be taken.
Units Observation Date	For an Index Business Day, the Units Observation Business Day occurring the Units Observation Lag number of Units Observation Business Days prior.
Units Observation Lag	The number of Units Observation Business Days for which inputs used to calculate Units may be lagged.
Weight	The intended weight of a Constituent that an Index uses to determine the Target Units.
Weighting Scheme	The method used to allocate Weights to the Constituents.
Weights Determination Business Days	The days on which an index may make determinations with respect to changing weights.
Weights Determination Date	For an Index Business Day, the Weights Determination Business Day occurring the Weights Determination Lag number of Weights Determination Business Days prior.
Weights Determination Lag	The number of Weights Determination Business Days before any weights determinations made by an index should become effective.
Weights Observation Business Days	The days from which data used for making weights determinations may be taken.
Weights Observation Date	For an Index Business Day, the Weights Observation Business Day occurring the Weights Observation Lag number of Weights Observation Business Days prior.
Weights Observation Lag	The number of Weights Observation Business Days for which inputs used to calculate Weights may be lagged.

## **Appendix II: Market Disruptions**

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

## Appendix IV: ESG Disclosures

<b>EXPLANATION OF HOW ESG FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY</b>	
<b>1.</b> Name of the benchmark administrator.	Bloomberg Index Services Limited ("BISL")
<b>2.</b> Type of benchmark	Other Benchmark
<b>3.</b> Name of the benchmark or family of benchmarks.	Bloomberg Yield Curve Indices
<b>4.</b> Does the benchmark methodology for the benchmark or family of benchmarks take into account ESG factors?	No
<p><b>5.</b> Where the response to Item 4 is positive, please list below, for each family of benchmarks, those ESG factors that are taken into account in the benchmark methodology, taking into account the ESG factors listed in Annex II to Delegated Regulation (EU) 2020/1816.</p> <p>Please explain how those ESG factors are used for the selection, weighting or exclusion of underlying assets.</p> <p>The ESG factors shall be disclosed at an aggregated weighted average value at the level of the family of benchmarks.</p>	
a) List of environmental factors considered:	Selection, weighting or exclusion:  N/A
b) List of social factors considered:	Selection, weighting or exclusion:  N/A
c) List of governance factors considered:	Selection, weighting or exclusion:  N/A
<p><b>6.</b> Where the response to Item 4 is positive, please list below, for each benchmark, those ESG factors that are taken into account in the benchmark methodology, taking into account the ESG factors listed in Annex II to Delegated Regulation (EU) 2020/1816, depending on the relevant underlying asset concerned.</p> <p>Please explain how those ESG factors are used for the selection, weighting or exclusion of underlying assets.</p> <p>The ESG factors shall not be disclosed for each constituent of the benchmark, but shall be disclosed at an aggregated weighted average value of the benchmark.</p> <p>Alternatively, all of this information may be provided in the form of a hyperlink to a website of the benchmark administrator included in this explanation. The information on the website shall be easily available and accessible. Benchmark administrators shall ensure that information published on their website remains available for five years</p>	
a) List of environmental factors considered:	Selection, weighting or exclusion:  N/A
b) List of social factors considered:	Selection, weighting or exclusion:  N/A
c) List of governance factors considered:	Selection, weighting or exclusion:  N/A

<b>7. Data and standards used.</b>	
<p>a) Data input.</p> <p><i>(i) Describe whether the data are reported, modelled or, sourced internally or externally.</i></p> <p><i>(ii) Where the data are reported, modelled or sourced externally, please name the third party data provider.</i></p>	N/A
<p>b) Verification of data and guaranteeing the quality of those data.</p> <p><i>Describe how data are verified and how the quality of those data is ensured.</i></p>	N/A
<p>c) Reference standards</p> <p><i>Describe the international standards used in the benchmark methodology.</i></p>	N/A
<b>Date on which information has been last updated and reason for the update:</b>	January, 2024 (initial publication)

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