

# **iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged Index Methodology**

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# iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged Index

The iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged Index is a strategy targeting to provide a duration hedge to the iBoxx GBP Liquid Corporates Large Cap Index (“Underlying Index”) which reflects the performance of GBP denominated investment grade corporate debt. The index aims to achieve a neutral duration (i.e., duration equal to zero) by taking a long position in the Underlying Index and a short position in Gilt futures contracts.

The Underlying Index consists of investment grade GBP denominated bonds issued by corporate issuers from developed countries and rated by at least one of three rating services: Fitch Ratings, Moody’s Investors Service, or S&P Global Ratings. The eligible contract for the short position is the Long Gilt Futures contract.

The iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged Index is rebalanced once a month at the month-end (the “rebalancing date”).

This document covers the index selection rules and calculation methodology.

# Selection Criteria

The index has long positions in the iBoxx GBP Liquid Corporates Large Cap Index and a short position in the Long Gilt front month quarterly futures contracts.

## **Long Position**

The Underlying Index in the long position consists of investment grade GBP denominated bonds issued by corporate issuers and rated by at least one of three rating services: Fitch Ratings, Moody's Investors Service, or S&P Global Ratings. Detailed methodology for the iBoxx GBP Liquid Corporates Large Cap Index is available on [www.spglobal.com/spdji](http://www.spglobal.com/spdji).

## **Short Position**

The eligible front month contract for the short position is the Long Gilt futures contract. The contract follows a March quarterly cycle and expires in March, June, September and December.

The "Cheapest-To-Deliver" bonds ("CTD") for each futures contract are determined at every rebalancing.

# Index calculation

## Bond and Futures Prices

Futures prices are taken from Euronext-Liffe from 4:14 to 4:15 p.m. London.

For more details on the bond prices, please refer to the “iBoxx Pricing Methodology” document, publicly available under Methodology on [www.spglobal.com/spdji](http://www.spglobal.com/spdji).

## Index Rebalancing

The iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged indices are rebalanced monthly on the last business day of the month after the close of business.

The iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged index strategy uses futures contracts to fully hedge the duration of the Underlying Index. The hedge positions are reset to achieve target duration of zero at each monthly rebalancing day.

A preliminary membership list is published on the 6th calendar day of the month (moved to the next business day in case of holiday/weekend).

Three business days before the end of each month an updated membership list is published.

On the last business day of each month, S&P DJI publishes the final membership.

## Rebalancing procedure

On each rebalancing day the following steps are taken to ensure that the index has a target duration of zero.

The rebalancing process follows 3 steps as follows:

- Calculating the duration of the long position
- Determining the Cheapest-To-Deliver bond (CTD) for the Gilt futures contract
- Determining the number of futures contracts to hedge the sub-indices

## Long Position

The market value of the long position on day t is calculated as below:

$$MV_t^l = \sum_i MV_{i,t}$$

The annual modified duration of the Underlying Index is calculated as below:

$$MD_{t-s}^l = \frac{\sum_i MV_{i,t-s} \cdot MD_{i,t-s}}{\sum_i MV_{i,t-s}}$$

where	

where	
$MD'_{t-s}$	denotes the annual modified duration of the Underlying Index on the rebalancing day $t - s$
$i$	denotes the $i$ -th bond constituent of Underlying Index on the rebalancing day $t - s$
$MV_{i,t-s}$	denotes the market value of the $i$ -th bond constituent in the Underlying Index on the rebalancing day $t - s$
$MD_{i,t-s}$	denotes the annual modified duration of the $i$ -th bond constituent in the Underlying Index on the rebalancing day $t - s$

### Determining Cheapest-To-Deliver Bond

The CTD bond is the least expensive bond that can be delivered upon expiry to satisfy the requirements of a futures contract.

The CTD bond is used as the proxy of a futures contract in determining the number of contracts required to fully hedge the index.

### Determining the Number of Futures Contracts

There are two steps to determine the number of future contracts required for each sub-index.

- Step 1: Calculate the market value required for the “CTD” of the Gilt futures contract

$$MV_{t-s}^{CTD,*} = \frac{MD'_{t-s} MV'_{t-s}}{MD_{t-s}^{CTD}}$$

- Step 2: Calculate the number of futures contracts

In theory, the number of futures contract required on rebalancing day is determined as below:

$$f_{t-s} = \frac{MV_{t-s}^{CTD,*} CF^{CTD}}{P_{t-s}^{CTD} FCS}$$

The number of Gilt futures contract ( $F_{t-s}$ ) on rebalancing day  $t - s$  is rounded to the nearest integer,

$$\text{i.e., } F_{t-s} = \text{Round}(f_{t-s})$$

The market value of the underlying short position on the rebalancing day  $t - s$  is then calculated as below:

$$MV_{t-s}^F = F_{t-s} P_{t-s}^F FCS$$

where:	
$MD_{t-s}^{CTD}$	denotes the annual modified duration of the CTD for the Gilt futures contract on the rebalancing day $t - s$
$MV_{t-s}^{CTD,*}$	denotes the market value required for the CTD for the Gilt futures contract on the rebalancing day $t - s$
$MD'_{t-s}$	denotes the annual modified duration of the Underlying Index on the rebalancing day

where:	
$f_{t-s}$	denotes the theoretical number of futures contract required for the Underlying Index on the rebalancing day $t - s$
$P_{t-s}^{CTD}$	denotes the dirty price of the CTD of the Gilt futures contract on the rebalancing day $t - s$
$FCS$	denotes the contract size of the Gilt futures
$C_{t-s}^{CTD}$	denotes the conversion factor of the CTD for the Gilt futures contract
$P_{t-s}^F$	denotes the quote of the Gilt futures contract at the rebalancing day

### Composing the Overall Index

On the rebalancing day, the Underlying Index in long position and the Long Gilt futures contract in short position enter into the iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged index as below:

The ratio of short position value to long position value on rebalancing day  $t - s$  is calculated as below:

$$ShortRatio_{t-s} = \frac{MV_{t-s}^F}{MV_{t-s}^I}$$

### Index Calculation

The iBoxx GBP Investment Grade Interest Rate Hedged index is calculated on every index business day.

The index level on index day  $t$  is calculated as below:

$$IndexLevel_t = IndexLevel_{t-s} IndexReturn_{t-s,t}$$

where	
$IndexLevel_t$	denotes the index level on day $t$
$IndexLevel_{t-s}$	denotes the index level on latest rebalancing day $t - s$ prior to day $t$

The index return on such day is calculated as below:

$$IndexReturn_{t-s,t} = LongReturn_{t-s,t} - ShortReturn_{t-s,t} ShortRatio_{t-s}$$

where	
$LongReturn_{t-s,t}$	denotes the return of the long position in the period that starts from the rebalancing day $t - s$ and ends on (including) day $t$
$ShortReturn_{t-s,t}$	denotes the return of the short position in the period that starts from the rebalancing day $t - s$ and ends on (including) day $t$
$ShortRatio_{t-s}$	denotes the ratio of short position value to long position value on the rebalancing day $t - s$

Or equivalently the index return is calculated as below:

$$IndexReturn_{t-s,t} = \frac{MV_t^L + Cash_{t-s,t}^L}{BMV_{t-s}^L} - \frac{MV_t^F}{MV_{t-s}^F} \frac{MV_{t-s}^F}{MV_{t-s}^L}$$

where	
$BMV_{t-s}^L$	denotes the base market value of the constituent in long position on the rebalancing day $t - s$
$MV_t^L$	denotes the market value of the long position on day $t$
$MV_{t-s}^L$	denotes the market value of the long position on rebalancing day $t - s$
$Cash_{t-s,t}^L$	denotes the cash accumulated in the period that starts from the rebalancing day $t - s$ and ends on (including) day $t$
$MV_t^F$	denotes the market value of the short position on day $t$
$MV_{t-s}^F$	denotes the market value of the short position on rebalancing day $t - s$

### Roll Process

At the rebalancing day prior to the delivery month the futures contract is rolled into the new front month quarterly futures contract.

### Monthly Reinvestment

P/L from the index is reinvested in the Underlying Index.

### Index History

The Index history starts on 30 September 2009. The index has a base value of 100 on that date.

### Settlement Conventions

All iBoxx indices calculate using the assumption of T+0 settlement days.

### Calendar

S&P DJI publishes an index calculation calendar available on [www.spglobal.com/spdji](http://www.spglobal.com/spdji) under *iBoxx Indices Calendars*. This calendar provides an overview of the index calculation holidays of the iBoxx bond index families each year.

### Publication of the Index

All indices are calculated as end-of-day and distributed once daily after close of UK markets. The indices are calculated every day on which the iBoxx GBP Liquid Corporates Large Cap Index is published.

In addition, the indices are calculated using the previous trading day's closing prices on the last calendar day of each month if that day is not a regular trading day as well as on common bank holidays as published in the iBoxx index calculation calendar. This index calculation calendar is available on [www.spglobal.com/spdji](http://www.spglobal.com/spdji) under *iBoxx Calendars*. Index data is also available from the main information vendors.

Bond and index analytical values are calculated each trading day and on London bank holidays using the daily bond closing prices and the prices from Euronext-LIFFE. Futures prices are taken as from 4:14 to

4:15 p.m. London time. Closing index values and key statistics are published at the end of each business day and on London bank holidays in the indices section on [www.spglobal.com/spdji](http://www.spglobal.com/spdji) for data subscribers.

### Data Publication and Access

The table below summarizes the publication of the index at [www.spglobal.com/spdji](http://www.spglobal.com/spdji) for registered users and on the FTP server.

*In addition to the indices detailed in this methodology, other indices covered by this document may be available. For a list of available indices, please refer [here](#).*

### Frequency, File type and Access

Frequency	File Type	Access
Daily	Underlying file – Bond level	FTP Server
	Indices file – Index level	FTP Server / website / BBG for index levels only
Daily from the sixth calendar day of the month (or the next index publication day if the sixth calendar day falls on a non-business day)	Forwards	FTP Server
Monthly	End of Month Components	FTP Server / website

Below is a summary of the IDs for each publication channel:

Index Name	iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged Index
Return Type	TRI
SEDOL	BC5ZDY8
ISIN	GB00BC5ZDY87
Ticker	IBXXH2GB
RIC	.IBXXH2GB

# Index Governance

## Index Committee

An Index Committee maintains the indices. All committee members are full-time professionals at S&P Dow Jones Indices. Meetings are held regularly. The Index Committee oversees the management of the indices, including determinations of intra-rebalancing changes, maintenance and inclusion policies, and other matters affecting the maintenance and calculation of the indices.

In fulfilling its responsibilities, the Index Committee has full and complete discretion to (i) amend, apply, or exempt the application of index rules and policies as circumstances may require and (ii) add, remove, or by-pass any bond in determining the composition of an index.

The Index Committee may rely on any information or documentation submitted to it or gathered by it that the Index Committee believes to be accurate. The Index Committee reserves the right to reinterpret publicly available information and to make changes to the indices based on a new interpretation of that information at its sole discretion. All Index Committee discussions are confidential.

The Index Committee is separate from and independent of other analytical groups at S&P Global. In particular, the Index Committee has no access to or influence on decisions by S&P Global Ratings analysts.

S&P Dow Jones Indices' Index Committees reserve the right to make exceptions when applying the methodology if the need arises. In any scenario where the treatment differs from the general rules stated in this document or supplemental documents, clients will receive sufficient notice, whenever possible.

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

*For more information on index governance policies, please refer [here](#).*

# Methodology Changes

<b>30 Jun 2022</b>	<ul style="list-style-type: none"><li>• Monthly forward start date updated from 10th calendar day to 6th calendar day</li></ul>
<b>01 Sep 2021</b>	<ul style="list-style-type: none"><li>• Monthly forward start date updated from 12th calendar day to 10th calendar day</li></ul>
<b>31 Mar 2021</b>	<ul style="list-style-type: none"><li>• Governance and Regulatory Compliance section added</li></ul>
<b>01 Oct 2014</b>	<ul style="list-style-type: none"><li>• Index restatement, complaints sections added</li></ul>
<b>31 Jul 2013</b>	<ul style="list-style-type: none"><li>• Launch of Markit iBoxx GBP Liquid Corporates Large Cap Interest Rate Hedged Index</li></ul>

# Appendix: Cheapest-to-Deliver Methodology

At expiry of a contract, the seller of a futures contract has the option to choose a bond from a list of bonds to be delivered in return for the final futures price. The seller of the contract will generally choose to deliver a bond that is to his/her advantage, or that maximises his/her profit, i.e. the one that requires the least amount of money relative to the payout from the futures contract. This bond is called the Cheapest-to-Deliver (**CTD**).

The **CTD** Analysis is based on the hypothetical situation of being short one futures contract and long the bond (cash) to be delivered. The goal is to find the bond with the maximum positive difference between the two positions. The calculations consider three elements, the current price and accrued interest of the future and the bonds on the settlement date, the accrued interest on the delivery date, and any cash flows between the two dates. A simplified calculation is available if no cash flows occur between the settlement date and the delivery date.

If the settlement date and the delivery date are on and the same day, the analysis is simple, as everything is known and immediate, however, there are several different ways to look at this situation. Commonly used criteria are:

- Gross basis – the difference between the futures position and the cash position without any discounting
- Net basis – the difference between the futures position and the cash position, where the cash flows are discounted/accrued using the current repo rate
- Implied repo rate – the repo rate (similar to the net calculation) which would result in the current value of the discounted gross futures position being equal to the value of the gross cash position

Note that these calculations only fully apply to futures whose expiry is in the near future (< 1 year).

## Gross basis

The Gross Basis is the simple difference between the futures position and the cash position at delivery:

$$BA_{i,t}^{Gross} = DFP_{i,t} CF_{i,t} + AI_{i,T} - (P_{i,t} + AI_{i,t})$$

## Net basis

The Net basis is the difference between the futures and the cash position, but the bond values are compounded to the delivery date using the current repo rate:

$$BA_{i,t}^{Net} = DFP_{i,t} CF_{i,t} + AI_{i,T} - (P_{i,t} + AI_{i,t}) \left( 1 + r_{t,T}^{Repo} \frac{days(t,T)}{n} \right) + C_{i,t} \left( 1 + r_{t,T}^{Repo} \frac{days(t^*,T)}{n} \right)$$

## Implied repo rate

The implied repo rate is the rate at which both positions are equal in value:

$$r_{i,t}^{implied} = \frac{DFP_{i,t} CF_{i,t} + AI_{i,T} - (P_{i,t} + AI_{i,t} - C_{i,t})}{(P_{i,t} + AI_{i,t}) \frac{days(t,T)}{100n} - C_{i,t} \frac{days(t^*,T)}{100n}}$$

## Ranking

All deliverable bonds can be ranked according to the implied repo rate. The higher the implied repo rate, the cheaper the current bond is in relation to the futures contract. Therefore the bond with the highest implied repo rate should be chosen as the cheapest to deliver.

Annotations	
$AI_{i,t}$	Accrued interest of the bond $i$ on date $t$
$AI_{i,T}$	Accrued interest of the bond $i$ on date $T$
$C_{i,t^*}$	Accrued interest of the bond $i$ on date $t$ with $t^*$ being between $t$ and $T$ otherwise 0
$days(t,T)$	Number of calendar days between $t$ and $T$
$n$	Day count basis (actual)
$P_{i,t}$	Clean price of the bond $i$ on date $t$
$r_{t,T}^{Repo}$	Market repo rate from $t$ to $T$
$DFP_{i,t}$	Futures contract price on date $t$
$CF_{i,t}$	Conversion factor of the bond $i$ on date $t$

# Further Information

## **Client Support**

For client support please contact [index\\_services@spglobal.com](mailto:index_services@spglobal.com).

## **Formal Complaints**

Formal complaints should be emailed to [spdji\\_compliance@spglobal.com](mailto:spdji_compliance@spglobal.com).

Please note: [spdji\\_compliance@spglobal.com](mailto:spdji_compliance@spglobal.com) should only be used to log formal complaints.

## **General Index Inquiries**

For general index inquiries, please contact [index\\_services@spglobal.com](mailto:index_services@spglobal.com).

# ESG Disclosures

EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY <sup>1</sup>		
1	<b>Name of the benchmark administrator.</b>	S&P Dow Jones Indices Limited
2	<b>Underlying asset class of the ESG benchmark.<sup>2</sup></b>	N/A
3	<b>Name of the S&amp;P Dow Jones Indices benchmark or family of benchmarks.</b>	<a href="#">iBoxx Benchmark Statement</a>
4	<b>Do any of the indices maintained by this methodology take into account ESG factors?</b>	No
Appendix latest update:		May 2023
Appendix first publication:		May 2023

1. The information contained in this Appendix is intended to meet the requirements of the European Union Commission Delegated Regulation (EU) 2020/1817 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the minimum content of the explanation of how environmental, social and governance factors are reflected in the benchmark methodology and the retained EU law in the UK (The Benchmarks (amendment and Transitional Provision) (EU Exit) Regulations 2019).

2. The 'underlying assets' are defined in European Union Commission Delegated Regulation (EU) 2020/1816 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the explanation in the benchmark statement of how environmental, social and governance factors are reflected in each benchmark provided and published.

# Disclaimer

## Performance Disclosure/Back-Tested Data

Where applicable, S&P Dow Jones Indices and its index-related affiliates (“S&P DJI”) defines various dates to assist our clients by providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the index is set to a fixed value for calculation purposes. The Launch Date designates the date when the values of an index are first considered live: index values provided for any date or time period prior to the index’s Launch Date are considered back-tested. S&P DJI defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company’s public website or its data feed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed “Date of introduction”) is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index’s public release date.

Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Information presented prior to an index’s launch date is hypothetical back-tested performance, not actual performance, and is based on the index methodology in effect on the launch date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. In addition, forks have not been factored into the back-test data with respect to the S&P Cryptocurrency Indices. For the S&P Cryptocurrency Top 5 & 10 Equal Weight Indices, the custody element of the methodology was not considered; the back-test history is based on the index constituents that meet the custody element as of the Launch Date. Also, the treatment of corporate actions in back-tested performance may differ from treatment for live indices due to limitations in replicating index management decisions. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate certain ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using “Backward Data Assumption” (or pulling back) of ESG data for the calculation of back-tested historical performance. “Backward Data Assumption” is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as “product involvement”) were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on “Backward Data Assumption” please refer to the FAQ. The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific data points and relevant time period for which backward projected data was used. Index returns shown do not

represent the results of actual trading of investable assets/securities. S&P DJI maintains the index and calculates the index levels and performance shown or discussed but does not manage any assets.

Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the Index or investment funds that are intended to track the performance of the Index. The imposition of these fees and charges would cause actual and back-tested performance of the securities/fund to be lower than the Index performance shown. As a simple example, if an index returned 10% on a US \$100,000 investment for a 12-month period (or US \$10,000) and an actual asset-based fee of 1.5% was imposed at the end of the period on the investment plus accrued interest (or US \$1,650), the net return would be 8.35% (or US \$8,350) for the year. Over a three-year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US \$5,375, and a cumulative net return of 27.2% (or US \$27,200).

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