

**S&P Dow Jones
Indices**

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Markit iBoxx GBP Liquid Index Guide

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1) Markit iBoxx GBP Liquid Corporates Long Dated Index

The Markit iBoxx GBP Liquid Corporates Long Dated Index reflects the performance of GBP denominated investment grade, liquid corporate debt. The index rules have been designed to offer a broad coverage of the market with emphasis on liquidity to be suitable for OTC and exchange-traded derivatives, and Exchange Traded Funds (ETFs). The index is an integral part of the global suite of Markit iBoxx Liquid Indices which provide the marketplace with liquid and investable versions of the broader Markit iBoxx benchmark index families.

Broad benchmark indices generally consist of a large number of bonds, especially within the corporate sector. Portfolio managers tracking an index from the broad benchmark Markit iBoxx GBP index family will therefore incur substantial costs in attempting to replicate or hedge the individual bonds in the portfolio. Furthermore, bonds with special features or smaller amounts outstanding usually suffer from illiquid trading, resulting in relatively large bid-ask spreads.

The Markit iBoxx GBP Liquid Corporates Long-Dated Index is intended to address these deficiencies by limiting the number of bonds in the index and excluding special bond types, thus reducing tracking and hedging costs.

All iBoxx indices are priced based on multiple data inputs. The Markit iBoxx GBP Index family uses multi-source prices as described in the document *Markit iBoxx Pricing Rules* publicly available on www.ihsmarkit.com. Additionally, the index rules and their application will be governed by two Index Advisory Committees.

This document covers the index rules and calculation methodology.

2) Bond selection rules

All bonds in the Markit iBoxx GBP Liquid Corporates Long Dated Index are contained in the universe of the Markit iBoxx GBP Benchmark indices, though the number of bonds in the liquid index is limited. To remain consistent with the benchmark indices, all bonds in the liquid index retain the same classification they have in the benchmark indices. To ensure that only suitable bonds enter the liquid index, further selection criteria are applied. In addition to the selection criteria used to define the eligible bond universe, ranking criteria determine which bonds enter the Markit iBoxx GBP Liquid Corporates Long Dated Index.

The following selection criteria are designed to reduce the number of eligible bonds:

- Bond type
- Credit rating
- Time to maturity
- Amount outstanding
- Age
- Maximum permissible minimum lot size/increment
- Minimum run

2.1) Bond type

Markit iBoxx indices are comprised solely of bonds. T-Bills and other money market instruments are not eligible for inclusion in the index.

The list of eligible bond types is as follows:

- Bullet fixed coupon bonds (plain vanilla bonds)
- Callable dated and undated hybrid bank/insurance capital
- Rating-driven bonds
- Step-up bonds
- Subordinated financial debt with a contingent conversion feature at the point of non-viability, in line with the capital adequacy requirements of Basel III
- Senior bank bonds with call options where the first call date is 25 months or less prior to maturity.

The following bond types are specifically excluded from the index:

- Structured bonds and bonds with optional characteristics, particularly those whose cash flows cannot be determined in advance
- Zero-coupon bonds
- Sinking funds
- Amortizing bonds
- Domestic non-gilts issues
- Optionally and mandatory convertible bonds from non-financial issuer
- Subordinated financial debt with mandatory contingent conversion features that are based on an observable trigger
- Retail bonds and private placements.

For retail bonds and private placements, publicly available information is not always conclusive and the classification of a bond as a retail bond or a private placement will be made at IHS Markit's discretion based on the information available at the time of determination. IHS Markit may consult with the specific Index Advisory Committees to review potential retail bonds or private placements. Any bond classified as

retail or private placement is added to the list of excluded private placements and retail bonds. The list is published on www.ihsmarkit.com under News & Information for future reference and to ensure decision's consistency.

In instances where a new bond type is not specifically excluded or included according to the published index rules, IHS Markit will analyze the features of such securities in line with the principles set out in 2.1 of this guide. IHS Markit may consult the specific Index Advisory Committees. Any decision as to the eligibility or ineligibility of a new bond type will be published and the index rules will be updated accordingly.

In addition, insurance-wrapped bonds are excluded from the index as they do not directly subject the bondholder to the credit risk of the issuer.

2.2) Credit rating

All bonds in the Markit iBoxx GBP Liquid Corporates Long Dated Index must have an iBoxx Rating of investment grade. Ratings from the following three credit rating agencies are considered for the calculation of the iBoxx Rating:

- Fitch Ratings
- Moody's Investor Service
- S&P Global Ratings

Investment grade is defined as BBB- or higher from Fitch Ratings and S&P Global Ratings and Baa3 or higher from Moody's Investor Service.

If a bond is rated by more than one of the above agencies, then the iBoxx rating is the average of the provided ratings. The rating is consolidated to the nearest rating grade. Rating notches are not used. For more information on how the average rating is determined, please refer to the *iBoxx Rating Methodology* document. The methodology can be found on www.ihsmarkit.com under *Methodology*.

2.3) Time to maturity

To qualify for inclusion all eligible bonds must have a remaining time to maturity of at least 1.5 years measured from the rebalancing date to the maturity date. The time to maturity for substitutes is measured from the substitution date to the maturity date of the bond.

Bonds in the index with a remaining time to maturity of less than 1.5 years are excluded at the next rebalancing.

The expected remaining life is expressed in years and calculated as follows:

- For plain vanilla bonds, the expected workout date is the final maturity date
- For dated and undated callable hybrid capital bonds, the first call date is always assumed to be the expected workout date
- For soft bullets, the expected workout date is determined using the first call date
- For senior callable bank bonds, the first call date will be considered as the workout date if the call date is more than 11 months prior to the final maturity. In case the first call date is 11 months or less prior to the maturity date, the final maturity date will be assumed as the workout date to calculate the time to maturity

2.4) Amount outstanding

All bonds must have a minimum amount outstanding of GBP 250 million in order to be eligible for the Markit iBoxx GBP Liquid Corporates Long-Dated index. Bonds subject to a tender offer (i.e. where the issuer has announced its intention to buy back, tender or call parts or the whole amount of a bond) will not be eligible for the Markit iBoxx GBP Liquid Corporates Long Dated index, in case the results of the tender are not publicly known three business days before the end of the quarterly rebalancing month. If a bond under a tender offer is already in a liquid index, it will be removed at the next regular quarterly rebalancing.

2.5) Age

Bonds older than four years are excluded from the index at the next rebalancing or once they have completed their minimum run period. For the bonds that are currently not part of the index membership maximum age criterion is set to three years. The minimum age difference required for exchanges of bonds from the same issuer is two years. The age of a bond is measured from the first settlement date to the current quarterly rebalancing date.

For bonds with multiple taps or tranches, the age of the most recent tap is used. New tranches of existing bonds are considered once they have funged with the original issue. The age of substitutes is measured from the first settlement date to the substitution date of the bond.

2.6) Maximum of minimum lot size and maximum of minimum increment

The maximum permissible minimum lot size is GBP 100,000. The upper limit for the minimum increment is GBP 1,000.

2.7) Minimum run

Each bond has a minimum run of two years. The minimum run supersedes the age and ranking criteria.

2.8) Index size, bond ordering and bond selection

To facilitate replication, the index has a maximum number of issuers. This chapter describes the selection procedure that is applied to determine the most liquid bonds for the Markit iBoxx GBP Liquid Corporates Long Dated index.

Index size

The maximum number of issuers in the Markit iBoxx GBP Liquid Corporates Long Dated Index is 40.

The minimum number of issuers in the Markit iBoxx GBP Liquid Corporates Long Dated Index is 25.

Issuer ranking criteria

If more than the maximum number of issuers are available for an index, the following ordering criteria are applied in order to rank the eligible issuers in an issuer hierarchy:

1. Higher amount outstanding (total eligible amount outstanding)
2. Longer weighted average time to maturity (calculated from all eligible bonds)
3. More recent weighted average age (calculated from all eligible bonds)

These criteria are applied in the order stated above until a difference can be established (i.e. if two issuers have the same total issue size but different weighted average times to maturity, then criteria 1 and 2 are

applied, but 3 is not). With the help of these ordering criteria, an issuer hierarchy is defined and the issuer with the biggest issuance is at the top of the hierarchy.

Limit on number of bonds from a single issuer

The index will comprise no more than one bond from the same issuer.

In the event that the number of eligible bonds is less than or equal to the maximum number of bonds, all available bonds will be included in the index.

Limit on weight of bonds from a single issuer

At each re-balancing, the market value of a bond in an index is capped at 4% of the overall index weight.

If less than 25 bonds are available, the remaining balance is kept in cash.

Selecting the bond from an issuer

If more than one bond per issuer is eligible for the index, an intra-issuer ranking factor is calculated. The ranking factor is based on a standard z-score calculation (i.e. standard deviation from the mean). Z-score is calculated for each of the following three bond characteristics:

- Amount outstanding (AO)
- Time to maturity (TTM)
- Age

For example, the z-score for the amount outstanding of a bond i is define as:

$$(1) z_i(AO) = \frac{AO_i - \mu(AO)}{\sigma(AO)} ; \mu(AO) = \frac{\sum_{j=1}^n AO_j}{n} ; \sigma(AO) = \sqrt{\frac{\sum_{j=1}^n (AO_j)^2}{n} - [\mu(AO)]^2}$$

where:	
z_i	z-score of bond i 's issue size
$\sigma(AO)$	average issue size of all eligible bonds from the same issuer as bond i
$\mu(AO)$	standard deviation of issue size of all eligible bonds from the same issuer as bond i
AO_i	issue size of bond i
n	number of bonds from the same issuer as bond i

The same calculation is performed for the time to maturity and the age of the bond.

The consolidated ranking factor for bond i is determined by adding and weighing the three z-scores:

$$(2) z_i^* = 0.45z_i(AO) + 0.35z_i(TTM) - 0.2z_i(Age)$$

where	
z_i^*	ranking factor of bond i
$z_i(AO)$	z-score of bond i 's issue size
$z_i(TTM)$	z-score of bond i 's time to maturity
$z_i(Age)$	z-score of bond i 's age

For size and time to maturity, positive z-scores (larger than average issue size and longer than average maturity) contribute to liquidity; while for the age-criterion negative z-scores (more recently issued bonds) are desirable.

The bond with the highest ranking factor from an issuer is selected for the liquid index.

3) Bond classification

All bonds are classified based on the principal activities of the issuer and the main sources of the cash flows used to pay coupons and redemptions. In addition, a bond's specific collateral type or legal provisions are evaluated. Hence, it is possible that bonds issued from different subsidiaries of the same issuer carry different classifications.

The issuer classification is reviewed regularly based on updated information received by S&P DJI, and status changes are included in the index at the next rebalancing if necessary.

Where the sector classification of a specific entity is not very clear due to the diversified business of the entity, decision will be made at S&P DJI's discretion. S&P DJI will assign the classification according to its evaluation of the business risk presented in the security prospectus and annual reports, if available. S&P DJI will also compare the classification to peers in the potential sectors and may consult with the Index Advisory Committees. Membership lists including classification are published on the FTP server and in the *Indices* section of products.markit.com for registered users.

3.1) Corporates

Bonds issued by public or private corporations. Corporate bonds are further classified into their multiple-level economic sectors, according to the issuer's business scope. The main sector classifications within the Markit iBoxx GBP Liquid Corporates Long-Dated Index are described below.

Table 1: Overview of Markit iBoxx Corporates Sectors

	Economic Sector	Market Sector	Market Sub-Sector
Financials	Core Financials	Banks	Banks
		Insurance	Life Insurance
			Nonlife Insurance
	Financial Services	Financial Services	General Financial
			Equity Investment Instruments
			Nonequity Investment Instruments
		Insurance-wrapped	*
	Real Estate	Real Estate	Real Estate Investment & Services
			Real Estate Investment Trusts
	Non-Financials	Basic Materials	Basic Resources
Industrial Metals			
Mining			
Chemicals			Chemicals
Consumer Goods		Automobiles & Parts	Automobiles & Parts
		Food & Beverage	Beverages
			Food Producers

	Economic Sector	Market Sector	Market Sub-Sector
		Personal & Household Goods	Household Goods
			Leisure Goods
			Personal Goods
			Tobacco
	Consumer Services	Education	Academic & Educational Services
		Media	Media
		Retail	Food & Drug Retailers
			General Retailers
	Travel & Leisure	Travel & Leisure	
	Health Care	Health Care	Health Care Equipment & Services
			Pharmaceuticals & Biotechnology
	Industrials	Construction & Materials	Construction & Materials
		Industrial Goods & Services	Aerospace & Defense
			Electronic & Electrical Equipment
			General Industrials
			Industrial Engineering
			Industrial Transportation
			Support Services
	Oil & Gas	Oil & Gas	Alternative Energy
			Oil Equipment / Services & Distribution
			Oil & Gas Producers
	Technology	Technology	Software & IT Services
			Technology Hardware & Equipment
	Telecommunications	Telecommunications	Integrated Telecommunications
			Wireless Telecommunications
	Utilities	Utilities	Electricity
			Gas / Water & Multiutilities

4) Index calculation

4.1) Static data

Information used in the index calculation is sourced from offering circulars and checked against standard data providers.

4.2) Bond prices

For more details please refer to the *Markit iBoxx Pricing Rules* document, available in the *Methodology* section of the iBoxx Documentation page on www.ihsmarkit.com.

4.3) Rebalancing process

The Markit iBoxx GBP Liquid Corporates Long Dated Index is rebalanced quarterly on the last business day of February, May, August and November after the close of business. Changes to outstanding amounts are only taken into account if they are publicly known three business days before the end of the month. Changes in ratings are only taken into account if they are publicly known two business days before the end of the month. New bonds issued are taken into account if they are publicly known to settle until the last calendar day of the month, inclusive, and if their rating has become known at least three trading days before the end of the month.

The rebalancing procedure for the Markit iBoxx GBP Liquid Corporates Long Dated Index is analogous to the rebalancing of the Markit iBoxx GBP Benchmark indices. 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, a membership list with final amount outstanding for each bond is published. This list contains the maximum number of constituents for the next month.

Two business days before the end of each month, the rating information for the constituents is updated and the list is adjusted for all rating changes which are known to have taken place two trading days before the end of the month. Bonds which are known to have been upgraded to investment grade two trading days before the end of the month are not included in the membership, but bonds which are known to have been downgraded to sub-investment grade two trading days before the end of the month do get excluded from the membership.

On the last business day of each month, IHS Markit publishes the final membership with closing prices for the bonds, and various bonds analytics based on the index prices of the bonds.

4.3.1) Rebalancing procedure

In the first step the selection criteria are applied to reduce the universe of GBP denominated bonds.

- Bond ratings and amounts outstanding are applied as of three business days before the rebalancing date
- Minimum lot sizes are fixed for the life of the bond
- Maturity dates remain fixed for the life of the bond
- Only bonds with a first settlement date on or before the rebalancing date are included in the selection process

Once the eligible bond universe has been defined, a hierarchy of issuers is determined by the ranking criteria. The procedure to select bonds from an issuer is described in chapter 2.8.

4.3.2) Index weights within the Markit GBP Liquid Corporates Long Dated index

The bonds in the index are market-value-weighted. Since the weight of a bond in the index is capped at 4%, the total market value of the index may be less than the sum of the market values of all bonds when calculated with the total amount outstanding of the bonds. The market values of the bonds in the index at the time of the rebalancing $(t - s)$ are:

$$(3) MV_{i,t-s}^* = \begin{cases} MV_{i,t-s}; & MV_{i,t-s} \leq \frac{1}{25} MV_{t-s} \\ \frac{1}{25} MV_{t-s}; & \text{else} \end{cases}$$

For rebalancing the indices, the market value of the bonds and the bond holding is determined in two steps:

First step: The total market values of the 40 bonds are calculated and the bonds are sorted by market value, in ascending order:

$$(4) MV_{i,t-s} = (P_{i,t-s} + A_{i,t-s}) AO_{i,t-s}$$

Second step: The bonds enter the index beginning with the smallest. Starting with the 25th biggest bond (n^*) , a test is applied to determine whether the market value of the next bond breaches the 4% limit. The $(n^* + 1)$ th bond breaches the market value cap if:

$$(5) MV_{n^*+1,t-s} > \frac{1}{n^* - (N - 25)} \sum_{i=1}^{n^*} MV_{i,t-s}; \quad n^* > (N - 25)$$

All bonds with a market value greater than the $(n^* + 1)$ th bond will also be capped at 4%. If we denote the last bond that is fully included as n^* , the bond market values in the index are:

$$(6) MV_{i,t-s}^* = \begin{cases} MV_{i,t-s}; & i \leq n^* \\ \frac{1}{n^* - (N - 25)} \sum_{j=1}^{n^*} MV_{j,t-s}; & \text{else} \end{cases}$$

As a result, the total market value of the index after the rebalancing is:

$$(7) MV_{t-s} = \sum_{i=1}^N MV_{i,t-s}^* = \frac{25}{n^* - (N - 25)} \sum_{i=1}^{n^*} MV_{i,t-s}$$

The notional amount outstanding of bond i in the index is defined as:

$$(8) N_{i,t-s} = \frac{MV_{i,t-s}^*}{P_{i,t-s} + A_{i,t-s}}$$

where:	
$A_{i,t-s}$	Accrued interest of bond i on the last calendar day of the previous month
$AO_{i,t-s}$	Amount outstanding of bond i on the third business day prior to the liquid rebalancing
MV_{t-s}	Final market value of the index at the last rebalancing
$MV_{i,t-s}$	Total market value of bond i at the last rebalancing
$MV_{n^*+1,t-s}$	Total market value of bond $n^* + 1$ at the last rebalancing
$MV_{i,t-s}^*$	Final market value of bond i in the index at the last rebalancing
N	Total number of bonds comprised in the index
$N_{i,t-s}^*$	Notional amount outstanding of bond i at the last rebalancing
$P_{i,t-s}$	Closing price of bond i on the last trading day of the previous month
n^*	Highest rank position of the bond included in the index with its total market value

4.3.3) Weekly preview

In addition to the regular rebalancing, a preview list (including sector classification for new bonds) is published each Friday of the rebalancing month with predicted changes to the index constituents at the next rebalancing. The preview list includes the next month's index constituents and shows bonds joining or leaving the indices at the next rebalancing, based on information available on such Fridays.

The first weekly preview will be published on the Friday of the rebalancing month that is at least three business days after the preceding month-end.

4.4) Index data

The calculation of the index is based on bid prices. New securities are included in the index at their respective ask prices when they enter the index family. In the event that no price can be established for a particular security, the index continues to be calculated based on the last available price. This might be the case in periods of market stress, or disruption as well as in illiquid or fragmented markets. If the required inputs become impossible to obtain, IHS Markit may consult market participants prior to the next rebalancing date. Decisions are made publicly available on a timely basis and IHS Markit may refer back to previous cases.

The Markit iBoxx GBP Liquid Corporates Long Dated Index is computed and disseminated Monday to Friday (except during common U.K. trading holidays) once per minute between 9:00 a.m. and 5:15 p.m. CET. It is based on real-time prices. For all other indices, end-of-day closing values are calculated and distributed once daily after 5:15 p.m. CET. The indices are also calculated on the last calendar day of each month irrespective of holidays and weekends. If the indices are calculated on a day that is a non-business day, then the prices from the previous trading day will be carried forward and the index will be calculated using those prices and the current accrued interest and coupon payment data.

The rebalancing takes place after close of market on the last trading day of a rebalancing month.

The indices are transaction cost adjusted. For specific cost factor calculation formulae please refer to the Markit iBoxx Bond Index Calculus document, available in the Methodology section of the Markit iBoxx Documentation page on www.ihsmarkit.com.

4.5) Index calculus

For specific index formulas please refer to the *Markit iBoxx Bond Index Calculus* document, available in the *Methodology* section of the iBoxx Documentation page on www.ihsmarkit.com.

4.6) Treatment of the special intra-month events

Data for the application of corporate actions in the index may not be fully or timely available at all times, e.g. the final call prices for make-whole calls or the actual pay-in-kind percentage for PIK-payment options. In such cases, S&P DJI will estimate the approximate value based on the available data at the time of calculation.

4.6.1) Index adjustments between scheduled rebalancings

Coupon changes

While most index adjustments are made during the quarterly rebalancing procedure, coupon changes will be effective immediately and the indices are adjusted in the same way.

Bonds no longer in benchmark index

Bonds may drop out of the Liquid index at the end of a month, because they have left the benchmark indices. In this case they are replaced by suitable substitutes, or the proceeds are invested in existing bonds.

Cash investment

Cash from coupon payments and proceeds from bonds that could not be used to buy other suitable bonds is invested in the money market at the end of each month.

4.6.2) Monthly bond substitution between scheduled rebalancings

Bonds can leave the Markit iBoxx GBP index universe due to:

- Default of the issue or issuer
- Rating downgrade to sub-investment grade of the issue or issuer
- Reduction in the amount outstanding due to repurchases below threshold level
- Other reasons

Bonds dropping out of the benchmark index will also leave the liquid index at month-end. Chapters 4.6.3 to 4.6.5 are only applied if a bond has left a liquid index between rebalancing dates. In principle, the bond substitution is performed on a 1:1 basis, so that the proceeds from a single exiting bond are completely invested into one new bond – subject to the market value cap of 4%.

Whenever possible, bonds dropped from the liquid index are replaced by bonds from the same issuer if they fulfill the selection criteria. Otherwise new issuers that fulfill the selection criteria (see chapter 2), but have not been included in the current liquid index, become eligible for inclusion. This process is described in 4.6.3. The largest bond leaving the index will be substituted with the largest new bond, until (a) all bonds leaving the index have been substituted, or (b) no more new bonds are available.

However, in the event that no substitutes are eligible for one or more dropped bonds, then the proceeds from the sale of these bonds are pooled and invested in existing bond(s) to prevent large cash holdings. Since the market value of each bond is capped at 4%, the proceeds may have to be invested into more than one existing bond. This procedure is described in chapter 4.6.5.

Finally, if the proceeds cannot be (fully) re-invested they remain in the index as cash and are treated as described in chapter 4.6.6.

4.6.3) Substitution issuer ranking

At the end of the month, the eligible bond universe for the following quarter is determined according to the selection criteria. First, issuers whose bonds leave the index, but that still have other eligible bonds are ranked at the top of the hierarchy. Subsequently the ranking criteria are applied to derive the issuer ranking of those issuers that are not part of the current index. After that the substitution is performed according to chapter 4.6.3.

If there are fewer than required or no issuers on the substitution list, then a note is published on the Markit website that (part of) the proceeds are to be invested in existing bonds. This issuer ranking of the issuers that constitute the new membership list is used to determine the bonds whose weighting should be increased.

4.6.4) Substitution with new bonds

For each dropped bond one new substitute is chosen. In the event that a bond leaves the index because it has funged with its parent issue and the parent issue enters the index as the substitute, then only the ISINs of the two bonds will be exchanged, i.e. the notional amount outstanding of the tranche is carried forward into the parent and no cost calculation is performed. Otherwise, the cash from the leaving bond is invested completely in the new bond, unless the weight of the dropped bond in the index is greater than 4%. In this case, only proceeds equivalent to 4% of the index are invested in the substitute and the rest is invested in cash.

Leaving bonds are replaced with bonds from the same issuer where possible. Otherwise, the substitute is chosen from the highest ranked issuer not represented in the index. If more than one bond needs to be substituted, then the largest new bond is substituted for the largest dropped bond (by market value) etc.

The market value of the index at the rebalancing is:

$$(9) MV_t^{Index} = \sum_i (P_{i,t} + A_{i,t} + C_{i,t}) N_{i,t-s} + CASH_{inv} \left(1 + Y_{LIBID} \frac{t - (t-s)}{365} \right)$$

The proceeds from the sale of a leaving bond are:

$$(10) PC_i = (P_{i,t} + A_{i,t}) N_{i,t-s}$$

The notional amount outstanding of the new bond is:

$$(11) N_{substitute} = \begin{cases} \frac{PC_{dropped}}{P_{substitute}^a + A_{substitute}} ; & PC_{dropped} < \frac{MV_t^{Index}}{25} \\ \frac{\frac{MV_t^{Index}}{25}}{P_{substitute}^a + A_{substitute}} ; & \text{else} \end{cases}$$

and the amount retained as cash:

$$(12) CASH_{inv,i}^{new} = \begin{cases} PC_i - \frac{MV_t^{Index}}{25}; & PC_i > \frac{MV_t^{Index}}{25} \\ 0; & \text{else} \end{cases}$$

The substitute bond enters the index at the ask price. For specific cost factor calculation please refer to the Markit iBoxx Bond Index Calculus document, available in the Methodology section of the Markit iBoxx Documentation page on www.ihsmarkit.com.

The substitute will have a notional amount outstanding based on formula (11).

If fewer substitutes than bonds leaving the index are available, then as many dropped bonds are substituted as there are new bonds beginning with the largest dropped bond. The remainder is invested according to the procedure described below.

where:	
$A_{i,t}$	Accrued interest of substituting bond
$A_{substitute}$	Accrued interest of bond i at time t
$C_{i,t}$	Coupon payment of bond i between last month-end and time t
$CASH_{inv}$	Cash invested in the money market at last month-end
$CASH_{inv,i}^{new}$	Cash left over from the substitution of bond i that is invested in the money market until next month end
MV_t^{Index}	Market value of the index before the adjustments at time t
$N_{i,t-s}$	Notional of bond i at the last rebalancing
$N_{substitute}$	Notional of the substitute
$P_{i,t}$	Index price of bond i at time t
$P_{substitute}^a$	Ask price of the substitute
PC_i	Proceeds from the sale of the dropped bond
Y_{LIBID}	One-month interest rate for cash investment

4.6.5) Increasing of weights for existing bonds

In the case that no or not enough new issuers are available, the proceeds from the sale of the dropped bond(s) are invested in existing index constituents. The remaining proceeds are pooled:

$$(13) PC_{remain} = \sum_i (P_{i,t} + A_{i,t}) N_{i,t-s}$$

In order to limit trading costs, the proceeds are invested in five or less bonds per dropped bond. Therefore only the weights of bonds whose market value in the index at the rebalancing is less than

$$(14) MV_{i,t} \leq \frac{MV_t^{Index}}{25} - \frac{PC_{remain}}{5n}$$

This guarantees that at least 20% of a dropped bond can be invested in each eligible existing constituent. The bonds that pass condition (14) form the eligible list. Bonds from the eligible list are chosen according to the issuer hierarchy, beginning with the highest ranking bond.

The proceeds from the bond are invested in the constituent until the 4% market cap for the bond is reached or all proceeds have been invested:

$$(15) MV_{i,t}^{\Delta} = \begin{cases} \frac{MV_t^{Index}}{25} - MV_{i,t}; & PC_{\Delta,i-1} > \frac{MV_t^{Index}}{25} - MV_{i,t} \\ PC_{\Delta,i-1}; & \text{else} \end{cases}$$

The remaining cash for the i -th bond increase is:

$$(16) PC_{\Delta,i} = \begin{cases} PC_{\Delta,i-1} - MV_{i,t}^{\Delta}; & i > 0 \\ PC_{remain}; & \text{else} \end{cases}$$

The additional notional for each bond is given as:

$$(17) N_{i,t}^{\Delta} = \frac{MV_{i,t}^{\Delta}}{P_{i,t}^a + A_{i,t}}$$

If proceeds remain after the market value of all eligible bonds has been increased to 4%, they are invested in the money market.

If no substitute bonds are available for an index, then the proceeds from the sale are invested in cash (see chapter 4.6.6.).

where:	
$A_{i,t}$	Accrued interest of bond i at time t
$MV_{i,t}$	Market value of bond i before the notional increase
MV_t^{Δ}	Market value increase of bond i during the monthly adjustments
MV_t^{Index}	Market value of the index before the adjustments at time t
$N_{i,t-s}$	Notional of bond i at the last rebalancing
$N_{i,t}^{\Delta}$	Notional increase of bond i during the monthly adjustments
$P_{i,t}$	Index price of bond i at time t
$P_{i,t}^a$	Ask price of bond i at time t
$PC_{\Delta,i}$	Remaining proceeds after the weight of the i -th bond has been increased
$PC_{\Delta,i-1}$	Remaining proceeds after the weight of the $(i-1)$ -th bond has been increased

where:	
PC_{remain}	Proceeds that could not be invested into substitutes

4.6.6) Monthly cash re-investment between scheduled rebalancing dates

Cash from received coupons and non-substituted bonds is re-invested at the end of each month in the money market until the end of the following month. Cash from earlier months is also re-invested at the end of each month. The interest rate used is the Sterling Overnight Index Average (SONIA). Cash is invested in the index at the next rebalancing.

4.7) Determination of benchmarks

Benchmark spreads are calculated for every constituent bond as the difference between the annual or semi-annual yield of the bond and the annual or semi-annual yield of its benchmark. The benchmark assignment for the bonds is reviewed monthly.

Prior to 28 February 2015 benchmark gilts in the Markit iBoxx GBP Benchmark index were determined by consolidating the proposals submitted by Markit Technical Committee members, and IHS Markit proposals based on observations of market trading. Each bond was matched to a benchmark gilt of a similar expected remaining life.

Effective from 28 February 2015, IHS Markit adopted a new rules-based methodology for determining benchmark gilts following the International Capital Market Association (ICMA's) recommendation for assigning benchmark gilts for pricing in the primary and secondary market. At present, benchmark gilts in the Markit iBoxx GBP Benchmark index are determined as follows:

- All existing gilts are being considered as benchmarks unless inappropriate, due to high coupons, lack of liquidity or the fact they have suitable alternatives close to their maturities. Gilts in the Markit iBoxx GBP Gilts Index which do not qualify for benchmarks are assigned to other qualifying gilts from the Markit iBoxx GBP Gilts Index, and consequently their spread levels do not equal to zero.
- A gilt is eligible as a benchmark only if it is a member of the Markit iBoxx GBP Gilts index. This means that gilt with an expected time to maturity of less than a year would not be considered as a benchmark bond in the Markit iBoxx indices even though it may be designated as such under the ICMA methodology. In such cases, the shortest maturity gilt available in the Markit iBoxx GBP Gilts index is being used as the benchmark.
- New gilts are considered as benchmarks when they approach GBP 10 billion of free float.
- The assignment process takes place as follows:
 - > where there is only one gilt maturing in the same calendar year, that gilt is selected as benchmark;
 - > where there is no gilt maturing in the same calendar year, the nearest shorter maturity gilt is selected as benchmark;
 - > where there is more than one gilt maturing in the same calendar year,
 - gilt maturing in the same month as that bond, or failing that;
 - the nearest shorter maturity gilt in that calendar year, or failing that;
 - the nearest longer maturity gilt in that calendar year is selected as benchmark.

4.8) Index history

The Index history starts on 31 December 1999. The index has a base value of 100 on that date.

4.9) Settlement conventions

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

4.10) Publication of the index

The Markit iBoxx GBP Liquid Corporates Long Dated Index is calculated as midday and end-of-day index and distributed twice daily.

Bond and index analytical values are calculated midday and end of day Monday to Friday using that day's midday/closing prices. In addition, bond and index analytical values 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.ihsmarket.com under *iBoxx Calendars*. Index data is also available from the main information vendors.

Midday and end of day fixing levels for bond prices and indices are published in the *Indices* section on www.ihsmarket.com for registered users

4.11) Data publication and access

The table below summarizes the publication of the Markit iBoxx GBP Liquid Corporates Long Dated Index in the *Indices* section of the IHS Markit website www.ihsmarket.com for registered users and on the FTP server.

Frequency	File Type	Access
Daily	Underlying file – Bond level	IHS Markit FTP Server
	Indices files – Index level	IHS Markit FTP Server / IHS Markit website / Bloomberg for index levels only
Weekly	Preview components (Rebalancing months only)	IHS Markit FTP Server / IHS Markit website
Daily from the 6th calendar day of the month (or the next index publication day if the 6th calendar day falls on a non-business day)	Forwards	IHS Markit FTP Server
Monthly	End of month components	IHS Markit FTP Server / IHS Markit website
	XREF files	IHS Markit FTP Server

The index identifiers for the publication channels are:

Index Name	Markit iBoxx GBP Liquid Corporates Long Dated Index	
Return Type	TRi	CPi
ISIN	DE0001717668	DE000A1EW1U8
Ticker	IB8X	--

4.12) Annual index review

The rules for the index are reviewed at least once per year during the public annual index review consultation process to ensure that the index provides a balanced representation of the GBP denominated debt market. Decisions made following feedback from market participants, the annual index review and External Advisory Committees (EAC) will be published on www.ihsmarkit.com shortly after the EAC meetings have been held. The publication will contain a detailed overview and timelines for implementation of any rules changes.

5) Governance and regulatory compliance

IHS Markit Benchmark Administration Limited (IMBA UK) is the Index Administrator of iBoxx indices. Information on IMBA UK's governance and compliance approach can be found [here](#). This document covers:

- Governance arrangements, including external committees
- Input data integrity
- Conflicts of interest management
- Market disruption and Force Majeure
- Methodology changes and cessations
- Complaints
- Errors and restatements
- Reporting of infringements and misconduct
- Methodology reviews
- Business continuity

More details about IMBA UK can be found on the [Administrator's website](#).

6) Changes to the Markit iBoxx GBP Liquid Corporates Long Dated Index

30 Jun 2022	<ul style="list-style-type: none"> Monthly forward start date updated from 10th calendar day to 6th calendar day
31 Mar 2022	Annual Index Review 2021 <ul style="list-style-type: none"> Introduction of new market sector classification "Education" with market sub-sector classification "Academic & Educational Services"
31 Dec 2021	<ul style="list-style-type: none"> Cash re-investment reference rate changed to SONIA
01 Dec 2021	<ul style="list-style-type: none"> Index calculation frequency updated from real-time to midday/end-of day
01 Sep 2021	<ul style="list-style-type: none"> Monthly forward start date updated from 12th calendar day to 10th calendar day
31 Mar 2021	<ul style="list-style-type: none"> Governance and Regulatory Compliance section added
31 Jul 2020	Annual Index Review 2019 <ul style="list-style-type: none"> Introduction of updated corporate classification schema Implementation of updated Bank Tier Classification Updates as part of the changes in definition and treatment of hybrid bonds
30 Sep 2018	Annual Index Review 2018 <ul style="list-style-type: none"> Treatment of bond rating upgrades on t-2 Clarification on bond eligibility during tender Clarification of treatment of called bonds

30 Nov 2016	Annual Index Review 2015 <ul style="list-style-type: none"> Eligibility of subordinated financial debt with a contingent conversion feature at the point of non-viability
01 Dec 2014	<ul style="list-style-type: none"> Markit iBoxx GBP Liquid Corporates Long Dated Index will follow the pricing methodology described in the document 'Markit iBoxx Pricing Rules' Index restatement, complaints sections added. Additional clarifications on bond eligibility, classification and corporate actions.
28 Feb 2014	<ul style="list-style-type: none"> Rule change for the minimum lot size of the bonds eligible for the Markit iBoxx GBP Liquid Corporates Long-Dated Index and extension of the minimum run period from 12 to 24 months for the bonds in the index
01 May 2014	<ul style="list-style-type: none"> Rule change for the minimum lot size of the bonds eligible for the Markit iBoxx GBP Liquid Corporates 100 indices linked with an additional ranking criterion Inclusion of bonds with call options that can only be exercised in the last year prior to maturity
01 Feb 2010	<ul style="list-style-type: none"> Launch of Markit iBoxx GBP Liquid Corporates 100 Indices
31 Aug 2012	<ul style="list-style-type: none"> The maximum age rule change for bonds in the Markit iBoxx GBP Liquid Corporates Long-Dated Index
18 May 2009	<ul style="list-style-type: none"> Change to the treatment of bonds under tender in the Markit iBoxx GBP Liquid Corporates Long-Dated Index
01 Mar 2009	<ul style="list-style-type: none"> Change in the upper limit for minimum lot size
01 Dec 2008	<ul style="list-style-type: none"> Introduction of additional rules for Markit iBoxx Sterling Liquid Corporates indices
01 Mar 2006	<ul style="list-style-type: none"> Exclusion of insurance-wrapped bonds
01 Dec 2005	<ul style="list-style-type: none"> Change in the upper limit for minimum lot size
01 Jul 2005	<ul style="list-style-type: none"> Implementation of Annual Index Review 2005 Introduction of gross price and income index analytics
12 Jan 2004	<ul style="list-style-type: none"> Introduction of Markit iBoxx GBP Liquid Corporates Long-Dated Index

7) Further information

Glossary of key terms

The Markit iBoxx Glossary document of key terms is available in the *Methodology* section of the iBoxx *Documentation* page on www.ihsmarkit.com.

Contractual and content issues

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A) ESG Disclosures

EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY [1]		
1	Name of the benchmark administrator.	IHS Markit Benchmark Administration Limited (IMBA)
2	Underlying asset class of the ESG benchmark. [2]	N/A
3	Name of the S&P Dow Jones Indices benchmark or family of benchmarks.	iBoxx Benchmark Statement
4	Do any of the indices maintained by this methodology take into account ESG factors?	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.

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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. 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.

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