

Markit iBoxx EUR Benchmark Index Guide

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1) Markit iBoxx EUR Indices

The Markit iBoxx EUR Index family is designed to reflect the performance of EUR denominated investment grade debt. The index rules aim to offer a broad coverage of the EUR bond universe, whilst upholding minimum standards of investability and liquidity. The indices are an integral part of the global Markit iBoxx index families, which provide the marketplace with accurate and objective benchmarks by which to assess the performance of bond markets and investments.

The Markit iBoxx EUR Index family is split into five major indices: Overall, Eurozone, Collateralized, Corporates and Sub-sovereigns. These are further broken down into sub-indices based on ratings, maturities and sectors. All Markit iBoxx indices are priced based on multiple data inputs. The Markit iBoxx EUR Benchmark Index family uses multi-source pricing as described in the document *Markit iBoxx Pricing Rules* publicly available at <https://www.spglobal.com/spdji/en/>.

This document covers the index family structure, rules and calculation methodology.

1.1) Index family structure

Overview of Markit iBoxx EUR family indices. For more detailed information on the classification levels please refer to Section 3 - Bond Classification.

Markit iBoxx EUR Overall			
Sovereigns	Non-Sovereigns		
Sovereigns	Sub-Sovereigns	Collateralized	Corporates
<ul style="list-style-type: none"> Eurozone Sovereigns <ul style="list-style-type: none"> > Eurozone country indices 	<ul style="list-style-type: none"> Other Sovereigns Agencies Public Banks Regions Supranationals Other Sub-Sovereigns 	<ul style="list-style-type: none"> Covered <ul style="list-style-type: none"> > Country indices Securitized Other Collateralized 	<ul style="list-style-type: none"> Financials <ul style="list-style-type: none"> > Market sector indices <ul style="list-style-type: none"> – Market sub-sector indices Non-Financials <ul style="list-style-type: none"> > Market sector indices <ul style="list-style-type: none"> – Market sub-sector indices
Rating and maturity indices			

2) Bond selection rules

The following selection criteria are used to determine the index constituents:

- Bond type
- Credit rating
- Time to maturity
- Amount outstanding

2.1) Bond type

Only fixed-rate bonds whose cash flow can be determined in advance are eligible for the indices. The indices are comprised solely of bonds. T-Bills and other money market instruments are not eligible. The Markit iBoxx EUR indices include only Euro and legacy currency denominated bonds. The issuer's domicile is not relevant.

In particular, bonds with the following characteristics are included:

- Fixed coupon bonds ("plain vanilla bonds")
- Zero coupon bonds
- Step-up bonds
- Event-driven bonds with step-up and step-down coupons, such as rating- or tax-driven bonds
- Dated and undated callable subordinated corporate bonds, including fixed-to-floating rate bonds
- Soft bullet bonds. These are bonds with an initial fixed-coupon period, and a variable or step-up coupon period thereafter, that are structured so that they are expected to be redeemed at the end of the initial period
- Bonds with call options where the first and subsequent call dates are on a date when the bond is otherwise no longer eligible for the index, i.e. bonds with American call options within the last year prior to maturity
- Subordinated financial debt with a contingent conversion feature at the point of non-viability, in line with the capital adequacy requirements of Basel III
- Subordinated financial fixed-to-floating rate bonds with a reset date on or after the first call date
- Senior bank bonds with call options where the first call date is 25 months or less prior to final maturity

The following bond types are specifically excluded from the indices:

- Sinking funds and amortizing bonds
- Other callable and undated bonds
- Floating rate notes and other fixed-to-floater bonds
- Optionally and mandatory convertible bonds from non-financial issuers
- Subordinated financial debt with mandatory contingent conversion features that are based on an observable trigger, or with any conversion options before the first call date, is ineligible for the index
- Collateralized Debt Obligations (CDOs) and bonds collateralized by CDOs
- Retail bonds
- Private placements
- Bonds with differences between accrual and coupon payment periods and monthly-paying bonds
- Extended bonds as defined under section 'Maturity extension' in this document

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 S&P DJI's discretion based on the information available at the time of determination. Partial private placements where information

on the specific amounts publicly placed and privately placed can be ascertained are included in the indices with the amount publicly placed. If the amount publicly placed is below the cut-off, the bond is not included in the indices. Any bond classified as retail or private placement is added to the list of excluded private placements and retail bonds. The list is published at <https://www.spglobal.com/spdji/en/> for future reference and to ensure consistency.

In instances where a new bond type is not specifically excluded or included according to the published index rules, S&P DJI will analyze the features of such securities in line with the principles set out in 2.1 of this guide. S&P DJI may consult specific Index 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.

2.2) Credit rating

All bonds in the Markit iBoxx EUR indices 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. Bonds with an RD/SD rating are excluded from the Markit iBoxx EUR indices.

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 available at <https://www.spglobal.com/spdji/en/>.

If a new tranche of a bond is not rated, the rating of its parent applies. Bonds in the Markit iBoxx EUR Eurozone index do not use individual bond rating. The individual countries are subject to a rating requirement. All countries in the Markit iBoxx EUR Eurozone index require a long-term local currency sovereign debt rating of investment grade. The average rating from the aforementioned rating agencies determines the index rating, which is used for all government bonds from the country. Prior to Jan. 1, 2008, the lowest rating was used as the Markit iBoxx Rating.

2.3) Time to maturity

All bonds must have a remaining time to maturity of at least one year at rebalancing. The time to maturity is calculated from the rebalancing date to the assumed workout date of the bond, by using the day count convention of the bond.

The workout date for a bond is determined based on the bond features as follows:

- For plain vanilla bonds, the expected workout date is the final maturity date
- For dated and undated callable financial hybrid capital bonds, the workout date is assumed to be the first call date
- For non-financial hybrid capital bonds with an interest rate reset, the workout date is assumed to be the first reset 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 require a specific minimum amount outstanding in order to be eligible for the indices, as shown below. The figures indicate minimum issue sizes.

- Sovereigns: EUR 1 billion
- Sub-sovereigns: EUR 1 billion
- Collateralized: EUR 500 million – EUR 1 billion for legacy bonds (covered bonds with an issue size between EUR 500 million and EUR 1 billion only qualify for inclusion in the indices if they have at least three lead managers (not including the issuer itself). Covered tranche bonds with issue size between EUR 500 million and EUR 1 billion qualify for the inclusion in the indices irrespective of the number of lead managers provided the parent bond is eligible for the index.
- Corporates: EUR 500 million for EUR-issued bonds and EUR 1 billion for legacy bonds (converted from pre-EUR currencies)

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 indices 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. Membership lists including classification are published on the FTP server and in the *Indices* section of the webpage for registered users.

3.1) Sovereigns

Bonds issued by a central government of a member country of the Eurozone and denominated in Euro or in a pre-Euro currency. The bonds are further broken down into Issuer Country.

3.2) Other sovereigns

Bonds issued by a central government that is not a member country of the Eurozone and denominated in Euro or in a pre-Euro currency are considered as "Other Sovereigns". In the classification schema, these bonds are shown as a sub-group in the category "Sub-Sovereigns".

3.3) Sub-sovereigns

Bonds issued by entities with explicit or implicit government backing due to legal provision, letters of comfort or the public service nature of their business. The issuer requires a strong central government ownership/relationship if its bonds are not explicitly guaranteed by the central government.

The five main sub-sovereign sectors are:

- **Agencies:** Bonds issued by entities whose major business is to fulfill a government-sponsored role to provide public, non-competitive services (e.g. Kreditanstalt fuer Wiederaufbau). Often, such business scope is defined by a specific law, or the issuer is explicitly backed by the government
- **Supranationals:** Bonds issued by supranational entities, i.e. entities that are owned by more than one central government (e.g. World Bank, EIB)
- **Public Banks:** Bonds issued by publicly owned and backed banks that provide regular commercial banking services (e.g. NV Bank Nederlandse Gemeenten)
- **Regions:** Bonds issued by local governments (e.g. Isle of Man)
- **Other Sub-Sovereigns:** All remaining bonds considered sub-sovereign. There are three main types of bonds and issuers falling into this category:
 - > **Non-Financials:** An issuer from a non-financial sector with **explicit** or **strong implicit** debt guarantee from the state, whose credit rating is closely correlated with the sovereign rating and expresses a strong credit uplift based on a high level of support from the government. iBoxx by S&P DJI would expect the issuer credit rating reflected as **no worse than on par or 2 notches below** the sovereign rating. A '**strong implicit guarantee**' is defined as an issuer being **100%**

owned by the state or public-sector, and their debt being consolidated into state public debt, or the issuer has preexisting access to government financing, or funding derived from tax revenues. The local regulatory and political framework will be considered when assessing the classification of state-owned companies.

- > *Guaranteed Financials*: A specific bond issued by a private sector financial institution that is irrevocably guaranteed by a government. Most of these bonds are issued under programs set-up after the 2008 financial crisis
- > Bonds issued by unguaranteed institutions with an irrevocable and explicit guarantee by a central government that covers amount and timeliness of all interest and principal payments until the maturity of the bond

3.4) Collateralized

There are three main categories: covered bonds, securitized bonds and other collateralized bonds.

3.4.1) Covered bonds

Bonds which are secured by a general pool of assets in case the issuer becomes insolvent, in particular bonds conforming to the criteria specified in UCITS 22.4 or similar directives, e.g. CAD III. In addition, bonds with a structure affording an equivalent risk and credit profile that are considered by the market as covered bonds are also included in the iBoxx Covered Bond Indices. The criteria taken into account in evaluating the status of a bond will be the structure, trading patterns, issuance process, liquidity and spread-levels.

Currently, the list of eligible covered bond types includes, but is not limited to:

- Austrian Pfandbriefe and Fundierte Bankschuldverschreibungen
- Australian, Belgian, Canadian, Danish, Dutch, Estonian, Finnish, Hungarian, Italian, Japanese, New Zealand, Norwegian, Polish, Portuguese, Singaporean, Slovakian, South Korean, Swedish, Swiss, Turkish, UK, and US covered bonds
- French Obligations Foncières, Obligations à l'Habitat, CRH and General Law Based Covered Bonds
- German Pfandbriefe, German contractual covered bonds
- Irish Asset Covered Securities
- Luxembourg Lettres de Gage
- Spanish Cédulas Hipotecarias and Cédulas Territoriales

3.4.2) Securitized bonds

Bonds secured against specific assets or receivables (ABS), mortgages (MBS) or cash flows from a whole business segment (Whole Business Securitizations) in each case via a special purpose vehicle.

3.4.3) Other collateralized bonds

Collateralized bonds not falling into the above two categories.

3.5) Corporates

Bonds issued by public or private corporations. Corporate bonds are further classified into Financials and Non-Financials bonds and then into their multiple-level economic sectors, according to the issuer's business scope. The category insurance-wrapped is added under Financials for corporate bonds whose

timely coupon and/or principal payments are guaranteed by a special mono-line insurer such as AMBAC or MBIA. The sector overview is shown in Table 1 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	Equity Investment Instruments
			General Financial
			Nonequity Investment Instruments
	Real Estate	Real Estate	*
			Real Estate Investment & Services
			Real Estate Investment Trusts
Non-Financials	Basic Materials	Basic Resources	Forestry & Paper
			Industrial Metals
			Mining
		Chemicals	Chemicals
	Consumer Goods	Automobiles & Parts	Automobiles & Parts
		Food & Beverage	Beverages
			Food Producers
		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
	Energy	Oil & Gas	Oil Equipment / Services & Distribution
			Oil & Gas Producers
		Renewable Energy	Renewable Energy
	Health Care	Health Care	Health Care Equipment & Services

	Economic Sector	Market Sector	Market Sub-Sector
	Industrials	Construction & Materials	Pharmaceuticals & Biotechnology
			Construction & Materials
		Industrial Goods & Services	Aerospace & Defense
			Electronic & Electrical Equipment
			General Industrials
			Industrial Engineering
			Industrial Transportation
			Support Services
	Technology	Technology	Software & IT Services
			Technology Hardware & Equipment
	Telecommunications	Telecommunications	Integrated Telecommunications
			Wireless Telecommunications
	Utilities	Utilities	Electricity
			Gas / Water & Multiutilities

3.6) Additional classification

Corporate debt is further classified into senior and subordinated debt. Bank senior debt structure additionally differentiates between Bail-in and Preferred bonds. The Bail-in classification captures all senior notes which are subject to write-down or conversion into a subordinated instrument on the occurrence of a resolution event, as well as senior bank debt issued by bank holding companies.

Hybrid capital issued by banking and insurance institutions is further detailed into the respective tiers of subordination.

The market information on the tier of subordination for insurance capital is often less standardized and clear than the equivalent issues by banks. In these cases, the classification is based on the maturity, coupon payment and deferral provisions of the bond from the offering circulars of the bonds. The table below displays the seniority classification of debt issued by both financial and non-financial sectors.

Table 2: Overview of seniority levels

Market Sector	Seniority Level 1	Seniority Level 2	Seniority Level 3
Bank	SEN	Preferred	*
		Bail-in	*
	SUB	T2 (post-Jan '13 issuances)	T2 callable
			T2 non-callable
		T2 (pre-Jan '13 issuances)	LT2 callable
			LT2 non-callable
			UT2

Market Sector	Seniority Level 1	Seniority Level 2	Seniority Level 3
		T1	T1 step
			T1 non-step
Insurance	SEN	*	*
	SUB	T3	*
		T2 dated	T2 dated callable
			T2 dated non-callable
		T2 perpetual	*
		T1	*
Other sectors	SEN	*	*
	SUB	Other	Hybrid"
			Non-hybrid

** Bonds will be required to fulfil the following criteria to be considered hybrids:

- Subordinated
- Deferrable coupons
- First non-call period ≥ 5 years
- Either perpetual or 'long-dated', where 'long-dated' is defined as > 25 years of the time to maturity at issuance

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 *iBoxx Pricing Rules* document, available in the *Methodology* section of the webpage at <https://www.spglobal.com/spdji/en/>.

4.3) Rebalancing process

The Markit iBoxx EUR indices are rebalanced monthly on the last business day of the month 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.

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). Four business days before the end of each month, another preliminary membership list is published on the FTP server and on the webpage at <https://www.spglobal.com/spdji/en/> for registered users.

Three business days before the end of each month, a membership list with final amount outstanding for each bond is published.

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. However, if any bonds which are part of the broader EUR universe become eligible two business days prior to rebalancing because of rating or amount changes, they will be included in the Index.

On the last business day of each month, S&P DJI 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) Weekly preview

In addition to the regular monthly rebalancing, a preview list (including sector classification for new bonds) is published each Friday 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 that is at least three business days after the preceding month-end rebalance.

4.4) Index data

The calculation of the indices is based on bid prices. New securities are included in the indices 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, S&P DJI may consult market participants prior to the next rebalancing date. Decisions are made publicly available on a timely basis and S&P DJI may refer back to previous cases.

A sub-index is calculated if at least one bond matches all inclusion criteria. If no bonds qualify for an index, then its level remains constant. If at least one bond becomes available again, the index calculation resumes and is chained to the last calculated level. All bonds are assigned to sub-indices according to their classification. The assignment of a bond to a certain maturity bucket is based on its expected remaining life. All bonds remain in their maturity bucket for the entire month. All top-level indices (Markit iBoxx EUR Overall, Markit iBoxx EUR Eurozone, Markit iBoxx EUR Non-Sovereigns, Markit iBoxx EUR Collateralized, Markit iBoxx EUR Corporates), and the Markit iBoxx EUR Financials and Markit iBoxx EUR Non-Financials sector indices are computed and disseminated Monday to Friday (except during common European trading holidays) once per minute between 9:00 a.m. and 5:15 p.m. CET, as are their respective maturity indices. They are 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.

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 at <https://www.spglobal.com/spdji/en/>.

4.6) Index and analytics weights

The Markit iBoxx EUR indices are market-value-weighted. The amount outstanding of a bond is only adjusted within the rebalancing process.

All calculations are based on the adjusted amount outstanding that reflects the outstanding bond notional at the last rebalancing. The bond prices relate to the nominal value of 100.

4.7) Treatment of the special intra-month events

Data for the application of corporate actions in the indices 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.

4.7.1) Funged bonds

Bonds may be issued in several tranches. The different tranches are initially legally separate and therefore trade independently for a certain period. On and after the fungo date, the tranches will be combined into

one bond, i.e. the parent tranche will contain the original security, as well as the additional notional(s) from the new tranche(s). After the funge date, the prices for both the securities are the same, because they constitute one uniform bond. This is reflected in the indices as follows:

4.7.1.1) Parent and new tranche are both index constituents

- After the funge date, the price from the parent tranche is used for the funged tranche; no price for the funged bond
- Funged tranche leaves the index at the next rebalancing and parent amount outstanding increases accordingly

4.7.1.2) Parent is an index constituent, but the new tranche is not

- No special intra-month treatment necessary
- Parent amount outstanding increases at the next rebalancing

4.7.1.3) Parent is not an index constituent but the new tranche is

- No special intra-month treatment necessary
- Funged tranche leaves the index; parent tranche enters the index at the next rebalancing

4.7.2) Full redemptions: exercised calls, puts and buybacks

If a bond is fully redeemed intra-month, the bond effectively ceases to exist. In all calculations, the redeemed bond is treated as cash based on the last price, the call price or repurchase price, as applicable. The redemption factor, redemption and the redemption price are used to treat these events in the index and analytics calculation. In addition, the clean price of the bond is set to the redemption price, and the interest accrued until the redemption date is treated as an irregular coupon payment.

4.7.3) Bonds trading flat of accrued

If a bond is identified as trading flat of accrued, the accrued interest of the bond is set to 0 in the total return index calculation and is excluded from the calculation of all bond and index analytical values.

Bonds will be considered trading flat of accrued in any of the following situations:

- a bond has been assigned a default rating and/or
- issuer has announced a failure to pay a coupon and/or
- issuer has announced an intention not to make a payment on an upcoming coupon (grace period).

4.7.4) Maturity extension

4.7.4.1) Maturity extension for perpetual bonds without a reset date

Maturity	Coupon/call structure	Workout date at issuance	Updated Workout date if not called
Perpetual	Fixed/ Callable	Assume first call date as workout date	Extend workout date until the assumed next call date - 5 years from first call date*.

*Assumes the terms allow for a redemption at the new assumed maturity date.

4.7.4.2) Maturity extension for perpetuals & dated fixed-to-fixed bonds with a reset date

Maturity	Coupon/Call structure	Workout Date at issuance	Updated Workout date if not called
Perpetual	Reset*/Callable	Assume first call date as workout date	Extend workout date until the end of the next reset date*
Dated	Reset/Callable	Assume reset date as workout date	Extend workout date until the end of the next reset date or final maturity date*

*Assumes the bond terms allow for a redemption at the new assumed maturity date

4.7.5) Multi-coupon bonds

Some bonds have pre-defined coupon changes that lead to a change in the annual coupon over the life of the bond. In all instances, the coupon change must be a fixed amount on top of a fixed coupon, i.e. floating coupon bonds are not eligible for the indices. The two main categories of bonds are step-up bonds and event-driven bonds.

- **Step-up bonds:** These are bonds with a pre-defined coupon schedule that cannot change during the life of the bond. The coupon schedule is used in all bond calculations.
- **Event-driven bonds:** These are bonds whose coupon may change upon occurrence (or non-occurrence) of pre-specified events, such as rating changes, e.g. rating-driven bonds, failure to register (register-driven bonds), or failure to complete a merger (merger-driven bonds). In the calculation of the indices and the analytics, the coupon schedule as of the calculation date is used. That is to say, any events occurring after the calculation date are ignored in the determination of the applicable coupon schedule. *Example of an event-driven bond:* A bond's rating changes on 31 December 2003 from A- to BBB+ and the coupon steps up from 6% to 6.25% from 1 March 2004 onward. The coupon dates are 1 October and 1 April each year. The correct coupon schedule for the bond and index calculations is date dependent. The index calculation on 20 December 2003 uses the 6% coupon for the whole life of the bond, while the calculation on 31 January 2004 uses a 6% coupon for the current coupon period to 29 February 2004, and a 6.25% coupon for all later interest payments. The index calculation on 20 March uses a 6% coupon until 29 February, a 6.25% coupon for the remainder of the current coupon period and a 6.25% coupon for all future coupon payments. The index calculation after 1 April uses a 6.25% coupon.

4.7.6) Ex-dividend conventions

Some markets have ex-dividend conventions. Ex-dividend means that the next coupon is detached from the bond several days in advance of the coupon payment date. The date on which the next coupon is detached is the ex-dividend date and the period between the ex-dividend date and the coupon payment date is the ex-dividend period. If a bond is in the ex-dividend period, the next coupon payment will not be paid to a buyer of this bond, but will be paid to the original bond holder.

The indices and analytics calculations take ex-dividend conventions into account. During the ex-dividend period, the accrued interest of the bond is negative, while the next coupon payment is held separate in the variable coupon adjustment. If the bond enters the index during the ex-dividend period, then the next coupon payment and the coupon adjustment will not accrue to the index. However, if the bond was already in the index, the next coupon payment needs to be included in the total return calculations. This is controlled via the ex-dividend indicator which is 0 if the bond enters the index during the current ex-

dividend period and 1 if not. The same treatment is also applied to all analytics calculation, i.e. the first cash flow is excluded from the calculations if the bond enters during the current ex-dividend period.

4.8) Determination of benchmarks

A benchmark bond of the Markit iBoxx EUR Benchmark universe is defined as the most liquid and low risk bond in each of the maturity bands listed below.

The procedure starts at first running a regression algorithm on all bonds in the Markit iBoxx Eurozone index in order to determine the benchmark curve, and bonds with a positive spread to the curve are eliminated. The procedure is then repeated until one of the following is met:

1. R-square above 0.99
2. Standard deviation of yield-spread to curve is less than 3.5 bps
3. Number of bonds left is between 15 and 40.

The bonds remaining after running the procedure above are assigned to Sets A or B depending on their age. An eligible bond is assigned to Set A within a maturity band if it is not older than two years. Otherwise, it is assigned to Set B. The age of a bond is calculated from the first settlement date to the current rebalancing date. The largest bond (by amount outstanding) of all bonds in Set A is selected as the respective benchmark for each defined maturity band. If Set A is empty, then the most recently issued bond of Set B is chosen as the respective benchmark of the band.

Maturity bands are defined as follows:

Benchmark Maturity Bands	Bond Maturity
1 year	< 1.5 years
2 years	1.5 to < 2.5 years
3 years	2.5 to < 3.5 years
4 years	3.5 to < 4.5 years
5 years	4.5 to < 5.5 years
6 years	5.5 to < 6.5 years
7 years	6.5 to < 7.5 years
8 years	7.5 to < 8.5 years
9 years	8.5 to < 9.5 years
10 years	9.5 to < 12.5 years
15 years	12.5 to < 17.5 years
20 years	17.5 to < 25 years
Long	≥ 25 years

For every bond in the Markit iBoxx EUR indices, the benchmark bond with the closest maturity is selected as a benchmark. Therefore, the chosen benchmark is not necessarily the same as the benchmark for the maturity band of the bond. If the time to maturity distance of a bond to its two neighboring benchmarks is exactly the same, then the benchmark bond with the closer coupon is chosen. If the coupon distance of the two neighbouring bonds is also exactly the same, then the younger of the two benchmark bonds is chosen.

4.9) Index history

The Index history starts on 31 December 1998. The indices have a base value of 100 on that date.

4.10) Settlement conventions

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

4.11) Calendar

S&P DJI publishes an index calculation calendar in the *iBoxx Calendars* section of the iBoxx Documentation page at <https://www.spglobal.com/spdji/en/>. This calendar provides an overview of the index calculation holidays of the iBoxx bond index families in a given year.

4.12) Publication of the Markit iBoxx EUR Benchmark Indices

All headline indices (Markit iBoxx EUR Overall, Markit iBoxx EUR Sovereigns, Markit iBoxx EUR Eurozone, Markit iBoxx EUR Germany, Markit iBoxx EUR Non-Sovereigns, Markit iBoxx EUR Sub-Sovereigns, Markit iBoxx EUR Collateralized, Markit iBoxx EUR Corporates, Markit iBoxx EUR Financials, Markit iBoxx EUR Non-Financials and the Markit iBoxx EUR Corporates Market Sector Indices) are computed and disseminated once per minute between 9:00 am and 5:15 pm CET every day except on common European bank holidays. For all other indices, only end-of-day closing values are calculated and distributed every Monday to Friday.

Bond and index analytical values are calculated each day using that day's 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 at <https://www.spglobal.com/spdji/en/>. Index data is also available from the main information vendors.

Closing index values and key statistics are published at the end of each calculation day at <https://www.spglobal.com/spdji/en/> for registered users. In addition, midday fixing levels for bond prices and indices are also published.

4.13) Data publication and access

The table below summarizes the publication of the Markit iBoxx EUR indices at <https://www.spglobal.com/spdji/en/> for registered users and on the FTP server.

Table 3: Frequency, File type and Access

Frequency	File Type	Access
Daily	Underlying file – Bond level	FTP Server
	Indices files – Index level	FTP Server / website / Bloomberg for index levels only
Weekly	Preview components	FTP Server / 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	FTP Server
Monthly	End of month components	FTP Server / website
	XREF files	FTP Server

4.14) Annual index review

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.

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 iBoxx EUR index family

Aug. 31, 2023	Annual Index Review 2022 <ul style="list-style-type: none"> • Treatment of distressed debt exchanges • Introduction of new economic sector classification "Energy" with new market sector classification "Renewable Energy" • Maturity extension section added
June 30, 2022	<ul style="list-style-type: none"> • Monthly forward start date updated from 10th calendar day to 6th calendar day
March 31, 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"
Sep. 1, 2021	<ul style="list-style-type: none"> • Monthly forward start date updated from 12th calendar day to 10th calendar day
March 31, 2021	<ul style="list-style-type: none"> • Governance and Regulatory Compliance section added
July 31, 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
Jan. 31, 2020	Annual Index Review 2019 <ul style="list-style-type: none"> • Definition update of 'Other Sub-Sovereigns' classification • Addition of German structural covered bonds as eligible bond type under 'Covered bonds'
Sep. 30, 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
July 31, 2017	Annual Index Review 2017 <ul style="list-style-type: none"> • Inclusion of Senior Callable Bank bonds • Classification of Insurance Tier 3 notes
Nov. 30, 2016	Annual Index Review 2016 <ul style="list-style-type: none"> • Update of seniority levels for Markit iBoxx indices • Rule clarification: Bonds trading flat of accrued
Nov. 30, 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
May 1, 2015	Annual Index Review 2014 <ul style="list-style-type: none"> • Change to Markit iBoxx tier classification of subordinated debt issued by insurance entities
Dec. 1, 2014	<ul style="list-style-type: none"> • Markit iBoxx EUR index family starts following the pricing methodology described in 'Markit iBoxx Pricing Rules' • Index restatement and complaints sections added • Additional clarifications on bond eligibility, classification and corporate actions

Nov. 1, 2014	Annual Index Review 2014 <ul style="list-style-type: none"> Reduction in minimum amount outstanding cut-off value for inclusion of bonds in Markit iBoxx Eurozone Sovereigns index to EUR 1bn from EUR 2bn previously Introduction of a new corporate sector classification layer under level 4 – Real Estate
Dec. 1, 2013	Annual Index Review 2013 – part 2 <ul style="list-style-type: none"> Rule clarification: Inclusion of EUR Covered tranches below EUR 1bn in the Markit iBoxx EUR indices
Aug. 1, 2013	Annual Index Review 2013 – part 1 <ul style="list-style-type: none"> Inclusion of bonds with 'American call options' callable by the issuer only in the last year prior to maturity
March 1, 2012	Annual Index Review 2011 – part 3 <ul style="list-style-type: none"> Introduction of new sub-indices within the Markit iBoxx EUR index family with the relevant rating, maturity and rating-maturity indices: Markit iBoxx EUR Eurozone AAA and Markit iBoxx EUR Sovereigns & Sub-Sovereigns New sub-index for Markit iBoxx EUR France Covered Index based on the additional classification France Covered SFH
Jan. 1, 2012	Annual Index Review 2011 – part 2 <ul style="list-style-type: none"> Rule change: Reduction in minimum amount outstanding cut-off value for inclusion of covered bonds in the Markit iBoxx EUR indices to EUR 500m Change of the benchmark assignment procedure for the Markit iBoxx EUR indices
Dec. 1, 2011	Annual Index Review 2011 – part 1 <ul style="list-style-type: none"> Introduction of a new corporate sector classification layer under level 4 - France Covered SFH
July 1, 2010	Annual Index Review 2010 <ul style="list-style-type: none"> Introduction of additional Markit iBoxx EUR rating and rating-maturity sub-indices Introduction of additional sector indices based on the classification level 5 for Telecommunications and Utilities sectors Introduction of new indices based on mid prices Introduction of two new Markit iBoxx EUR indices: Markit iBoxx EUR Germany Covered 1-5 and Markit iBoxx EUR Non-Financials 1-5
March 1, 2010	<ul style="list-style-type: none"> Introduction of a rating rule regarding the eurozone sovereign debt
Dec. 1, 2009	<ul style="list-style-type: none"> Clarification of the treatment of convertible bonds
July 1, 2009	Annual Index Review 2009 <ul style="list-style-type: none"> New Markit iBoxx EUR Covered Canada Index, ex-Subordinated debt and ex-T1 rating and maturity indices Clarification of treatment of partial private placements
June 1, 2009	<ul style="list-style-type: none"> Introduction of Markit iBoxx EUR Slovakia index
Nov. 1, 2008	<ul style="list-style-type: none"> Rule clarification: Guaranteed financial debt

July 1, 2008	Annual Index Review 2008 <ul style="list-style-type: none"> • Introduction of additional Markit iBoxx EUR Covered indices and additional maturity indices for Markit iBoxx EUR Sovereigns • Maturity indices for Markit iBoxx EUR Spain Covered indices • Introduction of additional sub-indices for financial subordinated debt
Jan. 1, 2008	<ul style="list-style-type: none"> • Change of rating methodology: implementation of average rating method for determination of a bond's eligibility for Markit iBoxx investment grade indices
March 1, 2007	<ul style="list-style-type: none"> • Introduction of new maturity and rating indices for Markit iBoxx EUR Overall, Markit iBoxx EUR Sovereigns and Markit iBoxx EUR Non-Sovereigns
Jan. 8, 2007	<ul style="list-style-type: none"> • Introduction of new maturity indices for Markit iBoxx EUR Sovereigns
July 1, 2006	Annual Index Review 2006 <ul style="list-style-type: none"> • Introduction of new rating and maturity indices for EUR Financials and Non-Financials • Introduction of additional Markit iBoxx EUR indices
Jan. 1, 2006	<ul style="list-style-type: none"> • Subordinated debt reorganization • Unification of rules for subordinated debt • Introduction of additional indices for non-financial senior and subordinated debt
July 1, 2005	Annual Index Review 2005 <ul style="list-style-type: none"> • Introduction of additional Markit iBoxx EUR indices • Introduction of gross price and income index analytics • Exclusion of retail bonds
July 1, 2004	Annual Index Review 2004 <ul style="list-style-type: none"> • Reorganization of Markit iBoxx EUR Sub-Sovereigns indices • Introduction of Markit iBoxx EUR Corporates Insurance-Wrapped indices • Introduction of performance key figures on bond and index level
Jan. 1, 2004	<ul style="list-style-type: none"> • Calculation of Markit iBoxx Benchmark spreads
Dec. 1, 2003	<ul style="list-style-type: none"> • Modification of Markit iBoxx rebalancing procedure • Definition of covered bonds within the Covered sub-indices
Oct. 1, 2003	<ul style="list-style-type: none"> • Expansion of Markit iBoxx EUR key data for cash payment • Revision of the calculation method of portfolio analytics
Sep. 1, 2003	<ul style="list-style-type: none"> • Inclusion of Soft Bullet Bonds
Aug. 1, 2003	<ul style="list-style-type: none"> • Separate publication of Markit iBoxx index ISINs

July 1, 2003	Annual Index Review 2003 <ul style="list-style-type: none"> • Reorganization of Markit iBoxx EUR Collateralized indices • Introduction of Markit iBoxx EUR Financial Senior and Subordinated Debt indices
May 6, 2003	<ul style="list-style-type: none"> • Correction of the formula for average portfolio yield
Apr. 29, 2003	<ul style="list-style-type: none"> • Rule clarification: Inclusion of new bonds into Markit iBoxx EUR index based on ask price
Oct. 23, 2002	<ul style="list-style-type: none"> • Renaming to 'Markit iBoxx EUR Benchmark indices'
Aug. 19, 2002	<ul style="list-style-type: none"> • Expansion of Markit iBoxx EUR bond analytics for periodic and annualized portfolio key data
Aug. 09, 2002	<ul style="list-style-type: none"> • Launch of Markit iBoxx EUR Non-Financials Rating indices
July 10, 2002	<ul style="list-style-type: none"> • Launch of Markit iBoxx EUR Financials Rating indices
July 1, 2002	<ul style="list-style-type: none"> • Exclusion of sinking funds and amortizing bonds • Assignment of Markit iBoxx EUR Other Sovereigns index into the Markit iBoxx EUR Sub-Sovereigns sector • Investment grade rating obligatory for all Markit iBoxx EUR Non-Sovereigns bonds (including Jumbo Pfandbriefe) • Amount outstanding unification for the Markit iBoxx EUR Sub-Sovereigns index to EUR 1bn
June 1, 2002	<ul style="list-style-type: none"> • Expansion of Markit iBoxx EUR bond analytics for periodic and annualized key data analogous to the Markit iBoxx GBP index family
Nov. 22, 2001	<ul style="list-style-type: none"> • Launch of Markit iBoxx EUR Non-Sovereigns, Markit iBoxx EUR Greece and Markit iBoxx EUR Other Sovereigns indices
April 18, 2001	<ul style="list-style-type: none"> • Launch of Markit iBoxx EUR Corporates and Overall indices
March 14, 2001	<ul style="list-style-type: none"> • Launch of Markit iBoxx EUR Sub-Sovereigns indices
Feb. 14, 2001	<ul style="list-style-type: none"> • Launch of Markit iBoxx EUR Collateralized indices
Dec. 13, 2000	<ul style="list-style-type: none"> • Launch of Markit iBoxx EUR Sovereigns indices

7) Further information

Client support

For client support please contact:

E-mail:	indices@ihsmarkit.com		
Phone:	Asia Pacific	Japan: Singapore:	+81 3 6402 0127 +65 6922 4210
	Europe	General: UK:	+800 6275 4800 +44 20 7260 2111
	USA	General:	+1 877 762 7548

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Formal complaints should be emailed to spdji_compliance@spglobal.com.

Please note: spdji_compliance@spglobal.com should only be used to log formal complaints.

General index inquiries

For general index inquiries, please contact indices@ihsmarkit.com.

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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