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# **Markit iBoxx EUR Liquid Index Guide**

**March 2016**

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### Changes to the iBoxx EUR Liquid Index Family

<b>01 May 2015</b>	<ul style="list-style-type: none"> <li>▪ Change to Markit iBoxx tier classification of subordinated debt issued by insurance entities</li> </ul>
<b>01 Dec 2014</b>	<ul style="list-style-type: none"> <li>▪ Markit iBoxx EUR index family will follow the pricing methodology described in the document 'Markit iBoxx Pricing Rules'</li> <li>▪ Index restatement, complaints sections added,</li> <li>▪ Additional clarifications on bond eligibility, classification and corporate actions.</li> </ul>
<b>28 Feb 2014</b>	<ul style="list-style-type: none"> <li>▪ Rule change for the minimum lot size of the bonds eligible for the Markit iBoxx EUR Liquid Non-Sovereigns indices, linked with an additional ranking criterion</li> </ul>
<b>31 Aug 2012</b>	<ul style="list-style-type: none"> <li>▪ The maximum age rule change for the Markit iBoxx EUR Liquid Corporates Indices</li> </ul>
<b>20 Dec 2011</b>	Introduction of Markit iBoxx EUR Germany Sovereigns & Sub-Sovereigns Liquid index
<b>18 May 2009</b>	Change to the treatment of bonds under tender in the Markit iBoxx Euro Liquid indices
<b>01 Dec 2008</b>	Introduction of additional rules for Markit iBoxx Euro Liquid Corporates indices
<b>01 Feb 2006</b>	<ul style="list-style-type: none"> <li>▪ Introduction of Markit iBoxx Euro Liquid Sovereigns Extra Short Index</li> <li>▪ Introduction Markit iBoxx Euro Liquid Sovereigns Index</li> </ul>
<b>01 Dec 2005</b>	<p>Change in the upper limit for minimum lot size</p> <p>Change in the amount outstanding cut-off for Corporate bonds</p>
<b>01 Jul 2005</b>	<ul style="list-style-type: none"> <li>▪ Implementation of Annual Index Review 2005</li> <li>▪ Introduction of gross price and income index analytics</li> <li>▪ Exclusion of retail bonds</li> </ul>
<b>01 Mar 2005</b>	Clarification of exclusion of callable hybrid bank/insurance debt in chapter 2.1.
<b>01 Jan 2004</b>	Calculation of iBoxx Benchmark spreads
<b>01 Dec 2003</b>	Modification of iBoxx re-balancing procedure
<b>01 Oct 2003</b>	<ul style="list-style-type: none"> <li>▪ Expansion of iBoxx EUR Liquid key data for cash payment</li> <li>▪ Revision of the calculation method of portfolio analytics</li> </ul>
<b>01 Sep 2003</b>	Separate Publication of iBoxx index ISINs
<b>06 May 2003</b>	<ul style="list-style-type: none"> <li>▪ Clarification about inclusion of new bonds in the index in chapter 2.1.</li> <li>▪ Correction of coupon income index calculation formula</li> </ul>
<b>23 Oct 2002</b>	Introduction of Markit iBoxx EUR Liquid indices for Sovereigns, Sub-Sovereigns and Corporates

## 1 Markit iBoxx EUR Liquid Indices

The Markit iBoxx EUR Liquid indices consist of a subset of the bonds from the Markit iBoxx EUR index family of benchmark indices. The index rules have been designed to offer targeted coverage of the overall market with emphasis on liquidity to be suitable for OTC and exchanged-traded derivatives, and Exchange Traded Funds (ETFs). The indices are 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 EUR 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 EUR Liquid indices are intended to address these deficiencies by limiting the number of bonds per 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 EUR Index family uses multi-source prices as described in the document “Markit iBoxx Pricing Rules” publically available on [www.markit.com/indices](http://www.markit.com/indices). Additionally, the index rules and their application will be governed by two Index Advisory Committees:

- **Technical Committee:** consists of representatives from market makers / banks and meets on a monthly basis in order to provide feedback and information into the monthly rebalancing process and to monitor any market developments.
- **Oversight Committee:** consists of representatives from mostly the buy side and meets in order to discuss the decisions of the Technical Committee, the wider index rules and any market developments which may warrant rule changes.

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

### 1.1 Index family structure

The Markit iBoxx EUR Liquid index family is comprised of three different index sub-groups: sovereigns, sub-sovereigns, and corporates.

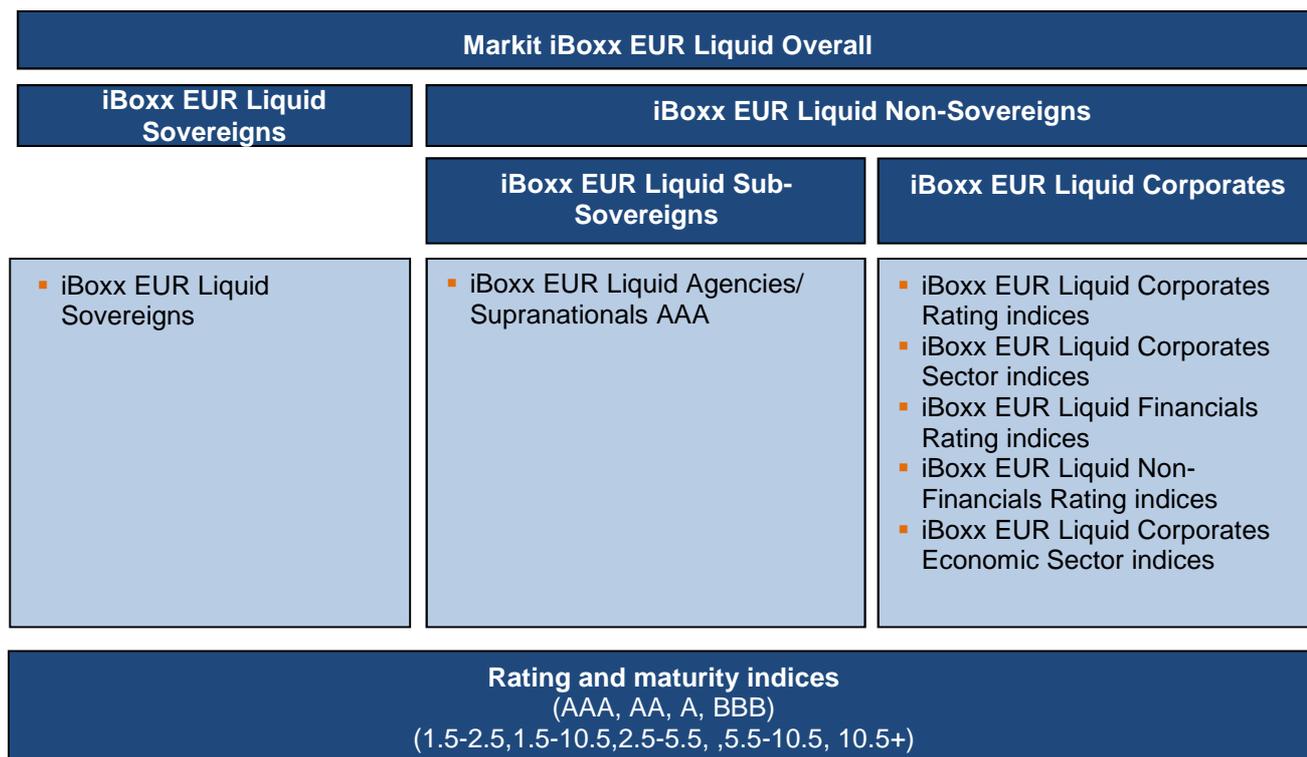
Four maturity buckets (extra short, short, medium and long) are published for the Markit iBoxx EUR Liquid Sovereigns index. The Markit iBoxx EUR Liquid Sovereigns index is a weighted aggregation of the Markit iBoxx EUR Liquid Sovereigns Short, the Markit iBoxx EUR Liquid Sovereigns Medium and the Markit iBoxx EUR Liquid Sovereigns Long index.

In addition, Markit provides five capped Sovereign indices in which the weight of any given country is capped at 20%.

The Markit iBoxx EUR Liquid Agencies/Supranationals AAA index includes the most liquid government-backed bonds with an AAA rating.

The corporates index sub-group is further classified into sectors. In addition to the Markit iBoxx EUR Liquid Corporates index, the corporates index group includes separate indices for financial and non-financial bonds, as well as rating indices for both groups. In addition, a selection of corporate economic sector indices is published.

The figure below provides an overview of the index family structure:



## 1.2 Index governance

In order to ensure the independence and the objectivity of the Markit iBoxx EUR Index family, the index rules and their enforcement will be governed by two distinct Index Advisory committees, in line with the governance structure for the main Markit iBoxx index families.

### 1.2.1 Technical Committee

The Technical Committee is composed of representatives from market makers/banks. The main purpose of this group is to provide assistance in the identification of eligible constituents, especially in the instance where the eligibility or the classification of a bond is unclear or contentious. Additionally, the Technical Committee discusses any market developments which may warrant index rule changes, and provide recommendations on changes to the rules or additional indices. It also reviews the impact of financial sanctions on the eligibility of countries or specific index constituents. The Technical Committee meets once a month.

### 1.2.2 Oversight Committee

The Oversight Committee is comprised of representatives from a broad range of asset managers, consultants and industry bodies. The purpose of this committee is to review the recommendations made by the Technical Committee and also to provide consultation on any market developments which may warrant rule changes.

## 1.3 Publication of the Markit iBoxx EUR Benchmark Indices

The Markit iBoxx EUR Liquid Indices are computed and disseminated once per minute between 8:00 a.m. and 5:15 p.m. CET. The indices are calculated every day except on common European bank holidays. In addition, the indices are calculated using the previous trading day's closing prices on the last calendar day of each month even if that day is not a trading day. Markit publishes an index calculation calendar which is available in the indices section on [www.markit.com/indices](http://www.markit.com/indices) under *Calendar* for registered users. Index data and bond price information is also available from main information vendors.

Bond and index analytical values are calculated each trading day using the daily closing prices. Closing index values and key statistics are published at the end of each business day in the indices section on [www.markit.com/indices](http://www.markit.com/indices) for registered users. In addition, midday fixing levels for bond prices and indices are also published.

## 2 Bond Selection Rules

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

- Bond type
- Credit Rating
- Time to maturity
- Amount outstanding
- Age (time since first settlement date)
- Maximum of Minimum Lot Size / Maximum of Minimum Increment

### 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 indices.

The list of proposed eligible bond types is as follows:

- Bullet fixed coupon bonds (plain vanilla bonds)
- Rating-driven bonds
- Step-up bonds
- 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. This would apply, for example, to 'American call options' that can be called by the issuer only in the last year prior to maturity when a bond is no longer eligible for the indices due to its remaining time to maturity.

The issuer's domicile is not relevant for bond selection.

The following bond types are specifically excluded from the index:

- All callable and perpetual debt – including callable dated and undated hybrid bank/insurance capital
- Zero-coupon bonds
- Bonds with odd last coupons
- Sinking funds
- Amortizing bonds

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 Markit's discretion based on the information available at the time of determination. . 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.markit.com/indices](http://www.markit.com/indices) under *Indices News* 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, Markit will analyse the features of such securities in line with the principles set out in 2.1 of this guide. 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.

### 2.2 Credit Rating

All bonds in the Markit iBoxx EUR index family must have a Markit iBoxx Rating of investment grade. Ratings from the following three credit rating agencies are considered for the calculation of the Markit iBoxx Rating:

- Fitch Ratings
- Moody's Investor Service
- Standard & Poor's Rating Services

Investment grade is defined as BBB- or higher from Fitch and Standard & Poor's and Baa3 or higher from Moody's. If a bond is rated by more than one of the above agencies, then the Markit 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 Markit iBoxx Rating Rules. The Rules can be found on [www.markit.com/indices](http://www.markit.com/indices) under *Markit Bond Indices – Markit iBoxx → Markit iBoxx Rules*.

Prior to 01 January 2008, the lowest rating was used as the Markit iBoxx Rating.

## 2.3 Time to Maturity

To qualify for the Markit iBoxx EUR Liquid indices all eligible bonds must have a remaining time to maturity of at least 1.5 years (1.25 years for Sovereigns) measured from the respective re-balancing 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 a liquid index with a remaining time to maturity of less than 1.5 years (1.25 years) will be excluded from the indices at the next re-balancing.

### 2.3.1 Maturity Sub-indices

The sovereign bonds are assigned to buckets according to their remaining time to maturity. To take into account the current issuance pattern by Euro zone governments, the maturity bands for the Sovereigns indices are defined as: Extra short (1.25 – 3.0 years), Short (1.5 – 5.5 years), Medium (5.5 – 10.5 years) and Long (more than 10.5 years)<sup>1</sup>. The Markit iBoxx EUR Liquid Sovereigns Capped indices have the following maturities: 1.5 – 10.5 years, 1.5 – 2.5 years, 2.5 – 5.5 years, 5.5 – 10.5 years and 10.5+ years.

## 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 amount outstanding.

- Sovereigns: EUR 2 bn (EUR 4 billion for the Markit iBoxx EUR Liquid Sovereigns Capped indices)
- Corporates: EUR 750 m
- Other bonds: EUR 1 bn

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 any non-sovereign liquid EUR index, in case the results of the tender are not publically 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. This rule is not applicable to the Markit iBoxx EUR Liquid Sovereigns indices.

## 2.5 Age

The age of the bond is measured from the first settlement date of the bond to the current quarterly re-balancing date. The age of substitutes is measured from the first settlement date to the substitution date of the bond.

Bonds older than four years are excluded from the Markit iBoxx EUR Sovereigns Liquid indices at the next rebalancing.

The age of bonds for the Markit iBoxx EUR Sovereigns Liquid Capped 10.5+ index is not restricted.

For the Markit iBoxx EUR Liquid Agencies / Supranationals AAA index, bonds older than two years are excluded from the index.

For the Markit iBoxx EUR Liquid Corporates indices bonds that are currently part of the index and that are older than four years are excluded from the liquid indices. 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.

## 2.6 Maximum of Minimum Lot Size/Maximum of Minimum Increment

The maximum permissible minimum lot size for Non-Sovereign bonds in the Markit iBoxx Euro Liquid Indices is EUR 100,000. The upper limit for the minimum increment is EUR 1,000.

## 2.7 Minimum Run

For the Markit iBoxx EUR Corporates indices each bond has a minimum run of one year. The minimum run supersedes the age and ranking criteria. The amount outstanding criterion supersedes minimum run.

If a bond in the Markit iBoxx EUR Corporates indices is in its minimum run but it has remaining time to maturity less than 1.25 years on the rebalancing date, the minimum run rule is disregarded and the bond is excluded from the index at the rebalancing.

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<sup>1</sup> The 1.25 to 3.0-year maturity range comprises all bonds with a remaining maturity of 1.25 to 2.99 years. The other ranges have been set accordingly.

## 2.8 Index Size, Issuer 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 EUR Liquid indices.

### 2.8.1 Index size

The maximum number of bonds in each index is:

Index Name	Number of bonds
Markit iBoxx EUR Liquid Sovereigns index	30
Markit iBoxx EUR Liquid Sovereigns Extra Short index	10
Markit iBoxx EUR Liquid Sovereigns Short index	10
Markit iBoxx EUR Liquid Sovereigns Medium index	10
Markit iBoxx EUR Liquid Sovereigns Long index	10
Markit iBoxx EUR Liquid Sovereigns Capped 1.5 – 10.5 index	25
Markit iBoxx EUR Liquid Sovereigns Capped 1.5 – 2.5 index	15
Markit iBoxx EUR Liquid Sovereigns Capped 2.5 – 5.5	15
Markit iBoxx EUR Liquid Sovereigns Capped 5.5 – 10.5	15
Markit iBoxx EUR Liquid Sovereigns Capped 10.5+	15
Markit iBoxx EUR Liquid Agencies / Supranationals AAA	20
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### 2.8.2 Minimum Number of Bonds

An index is calculated if there are at least three bonds available that match all index criteria. If less than three bonds qualify for an index, then the index level will remain constant. Should at least three bonds qualify again, the index calculation is resumed from the last calculated level.

### 2.8.3 Ranking Criteria

Should more than the maximum number of bonds be available for an index, ordering criteria are applied in order to rank the eligible bonds for the Markit iBoxx EUR Liquid indices.

The following five criteria are applied:

1. Minimum lot size of EUR 50,000 or less
2. Higher amount outstanding
3. More recent first settlement date
4. Longer time to maturity
5. Higher rating
6. Lower coupon

These criteria are applied to each pair of bonds in the order stated above until a difference can be established (i.e. if two bonds have the same amount outstanding and the same first settlement date, but one has a longer time to maturity, then criteria 1 to 3 are applied, but 4 and 5 are not). With the help of the ranking criteria, a bond hierarchy can be defined, with the bond that has the highest amount outstanding and minimum size below or equal to EUR 50,000 at the top of the hierarchy.

#### 2.8.4 Limit on Number of Bonds from any Issuer in an Index

The number of bonds from an issuing institution that may enter an index is limited.

No Markit iBoxx EUR Liquid Sub-sovereigns or Corporates index will have more than one bond from the same issuer. The number of bonds from the same country is limited to 5 in the Markit iBoxx EUR Liquid Sovereigns Capped 1.5-10.5 index and to 3 in the other Markit iBoxx EUR Liquid Sovereigns Capped indices.

There is no limit on the number of bonds from the same issuer in the Markit iBoxx EUR Liquid Sovereigns indices.

#### 2.8.5 Weighting

The indices are market capitalization-weighted, with the exception of the Markit iBoxx EUR Liquid Corporates index and the Markit iBoxx EUR Liquid Sovereigns Capped indices. The detailed weighting procedure is described in chapter 4.3.2.

### 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 Markit, 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 Markit's discretion. Markit will assign the Markit classification according to its evaluation of the business risk presented in the security prospectus and annual reports, if available. Markit will also compare the classification to peers in the potential sectors, and Markit may consult with the Index Advisory Committees. Membership list including classification is published on the FTP server and in the indices section on [www.markit.com/indices](http://www.markit.com/indices) for registered users for future reference and to ensure decision's consistency.

The main sector classifications within the Markit iBoxx EUR Liquid indices are described below.

#### 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.

#### 3.2 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 two sub-sovereign sectors are:

- Agencies: Bonds issued by entities whose major business is to fulfil 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).

#### 3.3 Corporates

Bonds issued by public or private corporations. Bonds secured by a 'floating charge' over some or all assets of the issuer are considered corporate bonds. 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 monoline 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	Financials	Banks	Banks	
		Insurance	Life Insurance	
			Nonlife Insurance	
		Financial Services	General Financial	
			Real Estate	
			Insurance-wrapped	Insurance-wrapped
Non-Financials	Oil & Gas	Oil & Gas	Oil & Gas Producers	
			Oil Equipment / Services & Distribution	
	Basic Materials	Chemicals	Chemicals	
			Basic Resources	Industrial Metals
				Mining
		Forestry & Paper		
	Industrials	Construction & Materials	Construction & Materials	
			Industrial Goods & Services	Aerospace & Defense
			Electronic & Electrical Equipment	
			General Industrials	
			Industrial Engineering	
			Industrial Transportation	
			Support Services	
	Consumer Goods	Automobiles & Parts	Automobiles & Parts	
			Food & Beverage	Beverages
			Food Producers	
		Personal & Household Goods	Household Goods	
			Personal Goods	
		Tobacco		
	Health Care	Health Care	Pharmaceuticals & Biotechnology	
	Consumer Services	Retail	Food & Drug Retailers	
General Retailers				
Media				
	Travel & Leisure	Travel & Leisure		
Telecommunications	Telecommunications	Fixed Line Telecommunications		
		Mobile Telecommunications		
Utilities	Utilities	Electricity		
		Gas / Water & Multiutilities		
Technology	Technology	Software & Computer Services		
		Technology Hardware & Equipment		

### 3.4 Additional classifications

Corporate debt is further classified into senior and subordinated debt. Hybrid capital issued by financial institutions is further detailed into the respective tiers of subordination:

- Tier 1
- Upper Tier 2
- Lower Tier 2
- Tier 2 perpetual (for insurance subordinated debt only)
- Tier 2 dated (for insurance subordinated debt only)
- Other

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. Table 2 below displays the tier subordination (seniority level 2) for subordinated debt, as well as seniority level 3.

Table 2: Overview of seniority levels for Markit iBoxx Subordinated indices

Market Sector	Seniority Level 2	Seniority Level 3
Bank	Tier 1	Step
		Non-Step
	Upper Tier 2	*
	Lower Tier 2	Callable
		Non-Callable
Insurance	Tier 1	*
	Tier 2 dated	Callable
	Tier 2 dated	Non-Callable
	T2 perpetual	*
Other	Other Subordinated	*

## 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 on the Markit iBoxx Documentation page of [www.markit.com](http://www.markit.com) (<http://www.markit.com/Documentation/Product/IBoxx>) in the Methodology section on the left-hand side of the page.

### 4.3 Rebalancing Process

The index is rebalanced every quarter at the end of February, May, August and November. The indices are rebalanced on the last calendar day of the month after the last index calculation. Rebalancing also takes place if the last day of the month falls on a non-business day.

Changes to amounts outstanding 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 EUR Liquid indices is analogous to the rebalancing of the Markit iBoxx EUR Benchmark indices.

Four business days before the end of each month, a preliminary membership list is published on the FTP server.

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, 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 a first step the selection criteria are applied to determine an eligible universe for the Markit iBoxx EUR Liquid indices:

- Bond ratings and amounts outstanding are applied as of three business days before the re-balancing date
- A bond remains in its respective maturity bucket until the next re-balancing
- Only bonds with a first settlement date on or before the re-balancing date are included in the selection process

Once the eligible bond universe has been defined, the ranking criteria are employed to determine a distinct hierarchy of bonds in the universe.

Bonds enter the respective index according to their rank in the hierarchy (with the highest rank entering first) until the maximum number of bonds per index has been reached. This does not apply to the Markit iBoxx EUR Liquid Corporates index where a special procedure is applied:

Bond selection for the Markit iBoxx EUR Liquid Corporates distinguishes between Financials and Non-Financials. The basis for bond selection is the market share of the two sectors in the iBoxx EUR Corporates benchmark index. The market share is defined as the percentage share of the total market capitalization of all bonds from a sector in the Markit iBoxx EUR Corporates benchmark index market capitalization:

$$(1) \quad MS_r = \frac{\sum_{i \in r}^n (P_{i,t-s} + A_{i,t-s} + CP_{i,t-s}) \cdot O_{i,t-s}}{\sum_{i \in F+N}^n (P_{i,t-s} + A_{i,t-s} + CP_{i,t-s}) \cdot O_{i,t-s}}$$

where:

$A_{i,t-s}$	Accrued interest of bond i on the last calendar day of the previous month
$CP_{i,t-s}$	Value adjustment of next coupon payment of bond i because of its ex-dividend period If none the value = 0
$MS_r$	Market share of sector r
$O_{i,t-s}$	Adjusted weight of bond i in the index
$P_{i,t-s}$	Closing price of bond i on the last trading day of the previous month
$n$	Number of bonds comprised in the index
$r$	F(inancials); N(on-Financials)

The market share is determined after the benchmark index re-balancing one month prior to the Markit iBoxx EUR Liquid index re-balancing. For example, for the August 31 re-balancing the market share is determined on July 31. The data used are:

- Closing prices from the benchmark indices at the re-balancing date
- New constituents list

The market share is used to determine the number of bonds from each of the two sectors. The calculated market share is rounded to the nearest full 2.5 %. The result is multiplied by 40. The resulting figure is the number of bonds to be selected from the Financials and the Non-Financials sector.

Within each sector, the necessary number of bonds is selected according to their rank in the hierarchy, beginning with the bond with the highest rank. If fewer eligible bonds than required are available for one of the sectors, then all eligible bonds from that sector will enter the index. The number of bonds from the other sector will remain unchanged. As a result, the number of issuers from each sector is split according to the market share in the benchmark index.

### 4.3.2 Index Weighting

All liquid indices bonds are included in the index with their amount outstanding at the last re-balancing, or in the case of substitutes, the fictitious amount outstanding calculated using formula (11). For the Markit iBoxx EUR Liquid Sovereigns index (formulae (2) – (6)) and for the Markit iBoxx EUR Liquid Corporates index additional calculations (formulae (7) – (10)) are applied. In addition, the weight of a country in the Markit iBoxx EUR Liquid Sovereigns Capped indices is capped at 20%.

#### Markit iBoxx EUR Liquid Sovereigns index weighting

The Markit iBoxx EUR Liquid Sovereign index is a weighted aggregation of the Markit iBoxx EUR Sovereigns Short, the Markit iBoxx EUR Sovereigns Medium and the Markit iBoxx EUR Sovereigns Long index. Thus, the index weighting is based on the market value of the bonds in the Markit iBoxx EUR Sovereigns index with corresponding term to maturity for each of the three indices, the market value of all bonds within the term to maturity brackets is aggregated as basis for the weight determination:

$$(2) \quad MV_{XS} = \sum_{i=1}^n (P_{i,t-s} + A_{i,t-s} + XD_{i,t-s} \cdot CP_{i,t-s}) \cdot N_{i,t-s}$$

for bonds with a term to maturity between 1.5 and 5.5 years

$$(3) \quad MV_M = \sum_{i=1}^n (P_{i,t-s} + A_{i,t-s} + XD_{i,t-s} \cdot CP_{i,t-s}) \cdot N_{i,t-s}$$

for bonds with a term to maturity between 5.5 and 10.5 years and for bonds with a term to maturity of more than 10 years:

$$(4) \quad MV_L = \sum_{i=1}^n (P_{i,t-s} + A_{i,t-s} + XD_{i,t-s} \cdot CP_{i,t-s}) \cdot N_{i,t-s}$$

The sum of the market values of all three indices is the basis for weight determination:

$$(5) \quad MV_{Total} = MV_{XS} + MV_M + MV_L$$

The weights for each index are determined as ratio of notional index market value and the sum of all notional index market values.

$$(6) \quad \omega_{XS} = \frac{MV_{XS}}{MV_{Total}} \quad \omega_M = \frac{MV_M}{MV_{Total}} \quad \omega_L = \frac{MV_L}{MV_{Total}}$$

The individual bonds weights of the three indices are multiplied by the index weights to derive the global bond weighting.

For the Capped Sovereign indices, the weight of a country in an index is capped at 20%. If the weight of a country is capped, then the weighting of each bond from the country is reduced according to its relative weight. If less than five countries are available, all countries are equally weighted.

#### Markit iBoxx EUR Liquid Corporates index weighting

Due to significant differences in the average issue size of financial and non-financial bonds, the amount outstanding of the bonds in the Markit iBoxx EUR Liquid Corporates index is adjusted by a sector specific factor:

$$(7) \quad AF_r = \frac{MS_r}{\sum_{i \in r} N_i} \cdot 10^{12}$$

The adjustment factor is the market share in the benchmark index (rounded to a full percentage point) divided by the total amount outstanding of all bonds from the respective sector in the liquid index. This ensures that the initial market share of a sector in the liquid index equals that for the benchmark index.

Therefore, the weighting of a bond in the Markit iBoxx EUR Liquid Corporates index is as follows:

$$(8) \quad W_i = AF_r \cdot N_i$$

Thus each bond retains its relative weight within each sector. The weights of bonds from the two sectors are different to account for the differences in the average issue size.

However, the weighting  $W_i$  for the Markit iBoxx EUR Liquid Corporates index needs to be adjusted by the dirty price of the bond to derive a suitable adjusted volume for the index calculation:

$$(9) \quad O_i = \frac{W_i}{P_{i,t-s} + A_{i,t-s} + XD_{i,t-s} \cdot CP_{i,t-s}}$$

Hence, a bond will enter a liquid index with:

$$(10) \quad O_i = \begin{cases} N_i & \text{Normal iBoxx €Liquid Indices} \\ \frac{W_i}{P_{i,t-s} + A_{i,t-s} + XD_{i,t-s} \cdot CP_{i,t-s}} & \text{iBoxx €Liquid Corporates Index} \end{cases}$$

Market share and adjustment factor are recalculated at each quarterly re-balancing.

## 4.4 Index Data

The Markit iBoxx EUR Liquid indices are computed and disseminated Monday to Friday once per minute between 8:00 a.m. and 5:15 p.m. CET. The indices are calculated every day except on common European bank holidays. The indices are based on real-time prices. The indices are also calculated on the last calendar day of each month irrespective of holidays and weekends. If the index is 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 calculation of the index is based on bid prices. Bonds that are not in the Markit iBoxx EUR Liquid indices for the current month, but become eligible for them at the next re-balancing, enter the indices at their ask price. For the avoidance of doubt, each index is treated separately, so a bond will enter a certain index at its ask price, even if it is already included in a different Markit iBoxx EUR Liquid index. In the event that no price can be established for a particular bond, 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, Markit may consult the specific Index Advisory Committees at the following rebalancing date. To ensure consistency, decisions taken are made publicly available on a timely basis and Markit has the ability to refer back to previous cases.

On the last trading day of a month, the rebalancing takes place after the daily index calculation for the current month's list, including the calculation of the last calendar day's indices, has been performed.

## 4.5 Index calculus

For specific index formulae please refer to *Markit iBoxx Bond Calculus* document, available on the Markit iBoxx Documentation page of [www.markit.com](http://www.markit.com) (<http://www.markit.com/Documentation/Product/IBoxx>) in the Methodology section on the left-hand side of the page.

## 4.6 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, Markit 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 re-balancing 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 EUR 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. The procedures in chapters 4.6.2.1 and 4.6.2.2 are applied only if a bond has left a liquid index between re-balancing dates.

### 4.6.2.1 Substitution List

At the end of the month, the eligible bond universe for the coming month is compiled and published for all liquid indices in accordance with the selection and ranking criteria. These are applied to establish a hierarchy within the eligible bond universe. For each index, all bonds already in the index are eliminated from the hierarchy, resulting in a substitution list for each index. A separate list that contains bonds dropped and the selected substitutes with their fictitious amounts outstanding is published for each index.

In case of multiple substitutions, a ranking should be done for substitutes and deleted bonds in order to assign a deleted bond to the specific substitute. Ranking criteria from section 2.8.3 are applied. The assignment is essential for the determination of the fictitious amount outstanding (formula (11)).

### 4.6.2.2 Bond Substitution

If the bonds are no longer in the Markit iBoxx EUR Corporates benchmark index, they will also leave the liquid indices. For each bond that has left, another bond will become a substitute and enter the index. The proceeds from the sale of a dropped bond are invested in its substitute. The substitute will have a fictitious amount outstanding:

$$(11) \quad O_{\text{substitute}} = \frac{(P_{\text{dropped}}^b + A_{\text{dropped}}) \cdot O_{\text{dropped}}}{P_{\text{substitute}}^a + A_{\text{substitute}}}$$

where:

$A_{\text{dropped}}$	Accrued interest of dropped bond
$A_{\text{substitute}}$	Accrued interest of substitute bond
$O_{\text{dropped}}$	Amount outstanding of dropped bond
$O_{\text{substitute}}$	Fictitious amount outstanding of substitute bond
$P_{\text{substitute}}^a$	Ask price of substitute bond
$P_{\text{dropped}}^b$	Bid price of dropped bond

If no suitable substitute is available after applying the selection criteria, then the rule concerning the maximum number of bonds from one issuer will be relaxed and the most suitable substitute will be determined using the other selection and ranking criteria.

For specific cost factor calculation formulae please contact [iBoxx@markit.com](mailto:iBoxx@markit.com). The substitute will have a notional amount outstanding based on formula (11).

In the Markit iBoxx EUR Liquid indices a substitute bond enters the index at the ask price.

In the event that no substitute is available, the proceeds from the sale of the dropped bond are invested as cash.

## 4.6.3 Monthly Cash Re-investment between Scheduled Re-balancing 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 one-month LIBID.

LIBID is defined as the relevant one month EURIBOR less 1/8 (12.5 basis points). At the next rebalancing cash is invested in the index.

## 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.

Benchmarks for the bonds in the Markit iBoxx EUR Liquid indices are equivalent to the benchmarks for the respective bonds in the Markit iBoxx EUR Benchmark universe. Benchmark bond 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:

- (i) R-square above 0.99
- (ii) Standard deviation of yield-spread to curve is less than 3.5 b.p.s.
- (iii) 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:

- 1 year: Maturity < 1.5 years
- 2 years: Maturity 1.5 to < 2.5 years
- 3 years: Maturity 2.5 to < 3.5 years
- 4 years: Maturity 3.5 to < 4.5 years
- 5 years: Maturity 4.5 to < 5.5 years
- 6 years: Maturity 5.5 to < 6.5 years
- 7 years: Maturity 6.5 to < 7.5 years
- 8 years: Maturity 7.5 to < 8.5 years
- 9 years: Maturity 8.5 to < 9.5 years
- 10 years: Maturity 9.5 to < 12.5 years
- 15 years: Maturity 12.5 to < 17.5 years
- 20 years: Maturity 17.5 to < 25 years
- Long: Maturity 25 years and greater

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 neighboring bonds is also exactly the same, then the younger of the two benchmark bonds is chosen.

## 4.8 Index History

The index history starts on 31/12/1998 with a base value of 100.

## 4.9 Settlement Conventions

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

## 4.10 Withholding Tax Clause

The European Union sometimes discusses the introduction of a withholding tax on coupons. This may lead to a situation where the index is calculated using the full coupon, yet a trading desk only receives a net coupon. Should this issue arise, it will be addressed in the index calculation.

## 4.11 Calendar

Markit publishes an index calculation calendar which is available in the indices section on [www.markit.com/indices](http://www.markit.com/indices) under Calendar for registered users. This calendar provides an overview of the index calculation times of the Markit iBoxx bond index families in a given year.

## 4.12 Data publication and Access

The table below summarises the publication of Markit iBoxx EUR in the indices section of the Markit website, [www.markit.com/indices](http://www.markit.com/indices) and on the FTP server.

Daily Files	Access
<ul style="list-style-type: none"> <li>Underlying file – Bond level</li> <li>Indices files – Index level</li> </ul>	Markit FTP Server Markit FTP Server/ Markit website/ Bloomberg for index levels only
Weekly Files	
<ul style="list-style-type: none"> <li>Previews_components</li> </ul>	Markit FTP Server/ Markit website
Monthly files	
<ul style="list-style-type: none"> <li>End of Month Components</li> <li>XREF files</li> </ul>	Markit FTP Server/ Markit website Markit FTP Server

## 4.13 Index Restatement

Index restatement follows the policy described in the *Index restatement policy* document, available on the Markit iBoxx Documentation page of [www.markit.com](http://www.markit.com) (<http://www.markit.com/Documentation/Product/IBoxx>) in the Methodology section.

## 4.14 Annual Index Review

The rules for the index are reviewed once per year during the annual index review process to ensure that the index provides a balanced representation of the EUR denominated debt market. Decisions made following the annual index review will be published on Markit's website shortly after both Committees have been held. The publication will contain a detailed overview and timelines for implementation of the rules changes.

## 5 Further Information

- Glossary of key terms is available in the *Glossary* document, available on the Markit iBoxx Documentation page of [www.markit.com](http://www.markit.com) (<http://www.markit.com/Documentation/Product/IBoxx>) in the Methodology section on the left-hand side of the page.

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