Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index Guide

February 2020

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1 Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index

The Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index aims to provide an interest rate hedge to Markit iBoxx USD Liquid Investment Grade Index ("Underlying Index") which reflects the performance of USD denominated investment grade corporate debt. The index hedges a long position in the Underlying Index with pay-fixed/receive-float positions in USD interest rate swaps.

The Underlying Index consists of investment grade USD denominated bonds issued by corporate issuers from developed countries and rated by at least one of three rating services: Fitch Ratings, Moody's Investors Service, or S&P Global Ratings. The eligible contracts for the swap position include: 2-Year, 5-Year, 10-Year, 20-Year and 30-Year plain vanilla interest rate swaps.

The Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index is rebalanced once a month at the month-end (the "rebalancing date").

This document covers the index selection rules and calculation methodology.

1.1 Index governance

In order to ensure the independence and the objectivity of the Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index, the index rules and their enforcement will be governed by two distinct Index Advisory Committees, in line with the governance structure for the main iBoxx index families.

1.1.1 Technical Committee

The Technical Committee comprises 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.

1.1.2 Oversight Committee

The Oversight Committee comprises 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.

1.2 Publication of the Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index

The Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index is calculated as end-of-day and distributed once daily. The index is calculated every day on which the Markit iBoxx USD Liquid Investment Grade Index is published. In addition, the index is calculated with the previous trading day's close on the last calendar day of each month if that day is not a trading day. IHS Markit publishes an index calculation calendar which is available in the Indices *Documentation* section on *www.ihsmarkit.com* under *iBoxx Calendar*. Index data and bond price information is also available from the main information vendors.

Bond and index analytical values are calculated each trading day using the daily bond closing prices and interest rate swap valuations. Closing index values and key statistics are published at the end of each business day in the *Indices* section on *www.ihsmarkit.com* for registered users.

2 Selection criteria for the Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index

The index has a long position in the Markit iBoxx USD Liquid Investment Grade Index and pay-fixed/ receive-float positions in USD interest rate swaps.

2.1 Long position

The Underlying Index in the long position consists of investment grade USD denominated bonds issued by corporate issuers from developed countries and rated by at least one of three rating services: Fitch Ratings, Moody's Investors Service, or S&P Global Ratings. Detailed methodology for the Markit iBoxx USD Liquid Investment Grade Index is available in the *Methodology* section on *www.ihsmarkit.com*.

2.2 Interest rate swaps position

The eligible contracts for the swap position include: 2-Year, 5-Year, 10-Year, 20-Year and 30-Year plain vanilla interest rate swaps with a notional value of USD 1,000,000 each.

3 Index calculation

3.1 Bond and interest rate swap prices

Interest rate swap prices are provided by IHS Markit Portfolio Valuation team.

For more details about bond pricing please refer to the *Markit iBoxx Pricing Rules* document, available on the *Methodology* section on *www.ihsmarkit.com*.

3.2 Rebalancing process

The Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index is rebalanced monthly on the last day of the month.

The Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index uses USD interest rate swaps to provide an interest rate hedge to the Underlying Index. The hedge positions are reset at each monthly rebalancing day.

Ten business days before the end of each month, a preliminary membership list is published.

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

On the last business day of each month, IHS Markit publishes the final membership.

3.3 Rebalancing procedure

On each rebalancing day each bond in the underlying index is paired to a certain number of specific interest rate swap contracts. These bond/swap pairs are then aggregated into the hedged index.

The rebalancing process follows the following steps:

- Determine the $DV01$ for each j swap contract, with $j = \{2, 5, 10, 20, 30\}$
- Each bond is assigned to the two neighboring swap contracts where available. If only one neighboring swap is available, the bond is assigned to that swap only.
- The *delta distribution ratio* $\delta_{i,j,t-s}$ is determined for each bond/swap pair. The distribution weight can be between 0 and 1.
- Determine the notional for each swap contract.
- Calculate the index.

3.4 Determining the distribution weight

The *delta distribution ratio* is determined for each bond and swap combination:

1. For all bonds with a $DV01$ less than the $DV01$ of the 2-year swap contract or a $DV01$ greater than the $DV01$ of the 30-year swap contract the *delta distribution ratio* is 1
2. For all bonds where the $DV01$ is in between the $DV01$ of two neighboring swap contracts, the *delta distribution ratio* is calculated as:

$$\delta_{i,j,t-s} = 1 - \frac{abs(DV01_{i,t-s} - DV01^{S}_{j,t-s})}{DV01^{S}_{j+1,t-s} - DV01^{S}_{j,t-s}}$$

and

$$\delta_{i,j+1,t-s} = 1 - \delta_{i,j,t-s}$$

where

$$DV01^{S}_{j,t-s} \leq DV01_{i,t-s} \leq DV01^{S}_{j+1,t-s}$$

3.5 Index calculation

Step 1: Calculate the hedge ratio for each of the two swaps used to hedge each bond

$$HR_{i,j,t-s} = \frac{(DV01_{i,t-s} * \delta_{i,j,t-s})}{DV01^{S}_{j,t-s}}$$

Step 2: Calculate the number of contracts for each swap needed to hedge the bond

$$S_{i,j,t-s} = \frac{(HR_{i,j,t-s} * N_{i,t-s} * F_{i,t-s})}{N^{S}_{j,t-s}}$$

Step 3: Aggregate the number of swap contracts needed each month

$$\#contracts^{S}_{j,t-s} = round\left(\sum_{i=1}^{n} S_{i,j,t-s}, 0\right)$$

Step 4: Calculate the ratio of each swap contract

$$W^{S}_{j,t-s} = \frac{\#contracts^{S}_{j,t-s} * N^{S}_{j,t-s}}{\sum_{i=1}^{n} BMV_{i,t-s}}$$

With $N^{S}_{j,t-s}$ =USD 1,000,000

Step 5: Calculate the index level

$$IL_t = IL_{t-s} * \left(\frac{IL^{long}_t}{IL^{long}_{t-s}} + \sum_{j \in Swap} W^{S}_{j,t-s}[P^{S}_{j,t} - P^{S}_{j,t-s}] \right)$$

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

3.6 Monthly reinvestment

Cash from the index is reinvested in the Underlying Index.

3.7 Index history

The Index history starts on 30 April 2014. The index has a base value of 100 on that date.

3.8 Settlement conventions

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

3.9 Calendar

IHS Markit publishes an index calculation calendar in the *iBoxx Calendars* section of the iBoxx Documentation page on www.ihsmarkit.com. This calendar provides an overview of the index calculation holidays of the iBoxx bond index families in a given year.

3.10 Data publication and access

The table below summarizes the publication of the Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index in the *Indices* section of the IHS Markit website www.ihsmarkit.com for registered users and on the FTP server.

Table 1: Publication types and access

Frequency	File Type	Access
Daily	Underlying files – Bond level	IHS Markit FTP Server
	Indices files – Index level	IHS Markit FTP Server / IHS Markit website/ Bloomberg for index levels only
Daily T-10 Onwards	Forwards files	IHS Markit FTP Server
Monthly	End of Month Components	IHS Markit FTP Server / IHS Markit website
	XREF files	IHS Markit FTP Server

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

Table 2: Summary of the available index identifiers

Index Name	**Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index**
Return type	TRI
ISIN	GB00BDC5PS69
Sedol	BDC5PS6
Ticker	IBXXIIRS
RIC	.IBXXIIRS

3.11 Index restatement

Index restatement follows the policy described in the *Markit iBoxx Index Restatement Policy* document, available in the *Methodology* section of the Markit iBoxx Documentation page on *www.ihsmarkit.com*.

3.12 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 USD denominated debt market. Decisions made following the annual index review will be published on *www.ihsmarkit.com* shortly after both committees have been held. The publication will contain a detailed overview and timelines for implementation of the rules changes.

4 Appendix

Table 3: Annotations

$BMV_{i,t-s}$	Base market value of the *i-th* bond constituent at the rebalancing day t-s
$F_{i,t-s}$	The product of the redemption adjustment and the pay-in-kind adjustment factors for bond *i* at the rebalancing day t-s
$\delta_{i,j,t-s}$	*delta distribution ratio* for bond *i* and *j-th* swap contract at the rebalancing day t-s
IL_t	Index level on day *t*
IL_t^{long}	Index level of the long index on day *t*
$DV01_{i,t-s}$	$DV01$ of the *i-th* bond constituent at the rebalancing day t-s
$DV01_{j,t-s}^S$	$DV01$ of the *j-th* swap contract at the rebalancing day t-s
$N_{j,t-s}^S$	Notional of the *j-th* swap contract at the rebalancing day t-s [1]
$N_{i,t-s}$	Notional of the *i-th* bond constituent at the rebalancing day t-s
$P_{j,t-s}^S$	Price of the *j-th* swap contract at the rebalancing day t-s
$\#contracts_{j,t-s}^S$	Number of the *j-th* swap contract at the rebalancing day t-s
Swap	Set of eligible swap contracts (2-Year, 5-Year, 10-Year, 20-Year, and 30-Year)
$W_{j,t-s}^S$	Ratio of the *j-th* swap contract on the rebalancing day t-s

[1] The notional is USD 1,000,000 for the 2Y, 5Y, 10Y, 20Y, 30Y USD interest rate swaps.

5 Changes to the Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index

29 Feb 2020	Change in the calculation of the interest rate swap hedge position. Starting with Feb 29, 2020 the hedge position (section 3.5, formula 2) is calculated based on the notional amount of the constituent bonds at rebalancing. Prior to this date the hedge position was calculated based on the market value of the constituent bonds at rebalancing.
17 Jun 2016	Launch of Markit iBoxx USD Liquid Investment Grade Interest Rate Hedged Swaps Index

6 Further information

Glossary of key terms

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

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