

**S&P Dow Jones  
Indices**

A Division of **S&P Global**

**Markit iBoxx Target  
Duration TIPS Indices  
*September 2022***

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# 1) Markit iBoxx Target Duration TIPS Index

The index measures the performance of the Treasury Inflation Protected Securities (TIPS) market with a specific target duration. Two different indices are available. The Markit iBoxx 3-Year Target Duration TIPS Index and Markit iBoxx 5-Year Target Duration TIPS Index.

This document covers the index selection rules and calculation methodology.

## 2) Bond selection rules

### 2.1) Selection criteria for the Markit iBoxx Target Duration TIPS Index

The following selection criteria are applied to select the bonds for the Markit iBoxx Target Duration TIPS index:

- Bond type
- Time to maturity
- Issue amount outstanding
- Selection algorithm and index weights

### 2.2) Bond type

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

### 2.3) Time to maturity

For the Markit iBoxx 3-Year Target Duration TIPS Index all bonds must have a minimum remaining time to maturity of at least or equal to one year and less than 10 years as of the rebalancing day. For the Markit iBoxx 5-Year Target Duration TIPS Index all bonds must have a minimum remaining time to maturity of at least or equal to three years and less than 20 years as of the rebalancing day.

### 2.4) Issue amount outstanding

The real amount outstanding of a bond must be greater than or equal to USD 2bn as of the Bond Selection Date.

### 2.5) First Settlement Date

Only bonds with a first settlement date on or before the rebalancing day are eligible for the index. For bonds settling after the Bond Selection Date (three business days prior to month-end) but before the rebalancing date a price of 100 will be used as index prices while the determining the membership.

# 3) Index alcculation

## 3.1) Bond prices

The prices for the index are as of approximately 4 p.m. Eastern Time. For more details please refer to the “Markit iBoxx Pricing Rules” document, available on the Markit iBoxx Rules page of [www.markit.com](http://www.markit.com) (<http://www.markit.com/en/products/data/indices/bond-indices/iboxx/rules.page>) in the Methodology Documentation section on the right-hand side of the page.

## 3.2) Target Duration Blended Price

At each Bond Selection Date the following algorithm is applied to determine the target duration for the index. Each maturity index needs to have a target duration of the specified maturity index +/- 5%, i.e. 3-years +/-5% for the Markit iBoxx 3-Year Target Duration TIPS Index and 5-years +/-5% for the Markit iBoxx 5-Year Target Duration TIPS Index.

## 3.3) Bond Selection Mechanism and Weight Distribution Lockout

The following mechanism is applied to all eligible bonds to determine the composition of each target duration index.

1. For all eligible bonds determine the distance between the nominal modified adjusted duration of the bond and the target duration of the index.
2. Determine the five bonds with the shortest absolute distance to the target duration of the index.
3. Those five bonds are eligible for the index and will be the “core bonds” of the index.
4. In the first step all eligible bonds are treated to be part of the index, i.e. “index bonds”.
5. Verify for each bond if they are in the lockout period
  - a. If three or more “core bonds” are in the lockout period the lockout rule is not applied at that specific month to the core bonds.
  - b. If a bond # is in the lockout period and the new weight is higher than the maximum eligible weight for that bond as defined in chapter 2.6; the excessive weight is distributed to the “core bonds” that are not in the lockout period.
6. Determine the nominal market-value weighted average modified adjusted duration (“average duration”) of the index.
7. If the “average duration” of all “index bonds” is in between the target duration of the index - i.e. +/-5% +target duration - the index will consist of all “index bonds”. Otherwise an adjustment to the list of “index bonds” is necessary.
8. If the “average duration” is above the target duration; the full weight of the “index bond” with the highest duration is redistributed pro rata to the “core bonds”; otherwise the full weight of the “index bond” with the lowest duration is redistributed pro rata to the “core bonds”.
9. Repeat steps 5 to 8 until either the “average duration” is in the predefined range or only the “core bonds” are left in the list of “index bonds”.
10. Exclude all bonds with a zero weight from the list of “index bonds”

### 3.4) Lockout

A full and partial lockout period of one month is applied to the bonds. For bonds in lockout, the weight of the bond is not increased. The lockout rule is applied whenever at least one of the following two conditions are valid:

1. Condition 1 is satisfied when both of the following stand:
  - a. The weight after the rebalancing on the previous month using the new composition is lower than the weight of the same bond at last month end using the composition as of that day, i.e.  $w_{i,t-2s^*}^+ < w_{i,t-2s^*}^-$ , where t-2s\* is the last month's Bond Selection Date.
  - b. And the weight of the bond based on the new composition is higher as the weight of the bond based on the previous month's composition as of the Bond Selection Date, i.e.  $w_{i,t-s^*}^+ > w_{i,t-s^*}^-$ , where t-s\* is defined as the current Bond Selection Date.
2. Condition 2: weight cap of 25% is reached. If the bond weight based on the new composition exceeds 25%, a weight cap of 25% is applied and the bond is considered to be in lockout.
3. If both conditions are satisfied at the same time, the maximum eligible weight for the bond is the minimum of  $w_{i,t-s^*}^-$  and 25%.

### 3.5) Blended price

For all new bonds, nominal ask price is used as blended prices. For bonds which have been in the prior month index, the nominal bid price is used.

To derive the blended prices for the bonds the following procedure is used:

First the daily weight of each bond in the current index is determined based on their nominal market value, i.e. the weight of each bond in the current index is:

$$w_{i,t-s^*}^- = w_{i,t-2s} mtdr_{i,t-2s,t-s^*} = \frac{BMV_{i,t-2s}^N mtdr_{i,t-2s,t-s^*}}{\sum_{j \in J} BMV_{j,t-2s}^N mtdr_{j,t-2s,t-s^*}}$$

where J is the set of all bonds that are in next months composition and have been in the last months composition.

The following iterative procedure is used to derive the blended prices. The procedure is run twice.

1. Calculate the weight of these bonds after the bond selection based on their nominal base market value as of the Bond Selection Date.
2. Adjust the weight using the bond selection process in the way that the target duration of the index is 3 years +/-5% (5-years +/-5%) as of the Bond Selection Date. This weight is defined as  $w_{i,t-s^*}^+$  for each bond as of the Bond Selection Date.
3. Determine the weight difference  $w_i^+ - w_i^-$ . The difference shows the weight increase for each bond.
4. The relative weight increase for these bonds is determined as  $w_{i,t-s^*}^{ask} = \max[0, \frac{w_{i,t-s^*}^+ - w_{i,t-s^*}^-}{w_{i,t-s^*}^+}]$ . This is the percentage of the bond that needs to be calculated based on nominal ask prices.
5. The blended price on the Bond Selection Date is calculated as  $P_{i,t-s^*}^{N,index} = w_{i,t-s^*}^{ask} P_{i,t-s^*}^{N,ask} + (1 - w_{i,t-s^*}^{ask}) P_{i,t-s^*}^{N,bid}$  where t-s\* is defined as the current Bond Selection Date.

Repeat the procedure with the newly calculated price  $p_{i,t-s^*}^{N,index}$ .

On the rebalancing date the blended price is calculated as  $p_{i,t-s^*}^{N,index} = w_{i,t-s^*}^{ask} p_{i,t-s^*}^{N,ask} + (1 - w_{i,t-s^*}^{ask}) p_{i,t-s^*}^{N,bid}$

where t-s\* is defined as the current Bond Selection Date.

### 3.6) Number of bonds

The index contains at least 5 bonds, i.e. the “core bonds” as defined above. If less than 5 bonds are available in the eligible maturity bucket, the maturity bucket will be extended in 2.5 year steps on both ends until 5 bonds are eligible for the index. The minimum time-to-maturity in such a case will be 1 year.

### 3.7) Index rebalancing

The index is rebalanced monthly on the last calendar day of the month. The membership for the index is determined using information available at the close on the third business day before month end (Bond Selection Date). The final weights are determined on the rebalancing day based on the composition, beta, notional and  $w_{i,t-s^*}^{ask}$  determined three business days before month-end. Ten business day before month-end IHS Markit will publish a forward looking composition based on the information available at that time.

### 3.8) Index data

The indices will be calculated based on the SIFMA US calendar and for the last calendar day of each month. Index calculation is based on nominal bid prices. 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, IHS 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 IHS Markit has the ability to refer back to previous cases.

### 3.9) Index Formulae and Bond Analytics

#### 3.9.1) Inflation-Adjusted amount outstanding & Index-ratio

The current market capitalization of a bond is affected by the real amount outstanding, the real price of the bond, and any adjustments due to past inflation. The inflation-adjusted amount outstanding (nominal amount outstanding) is equal to the product of the inflation index ratio multiplied by the unadjusted amount outstanding: #

$$N_{i,t}^N = N_{i,t} IR_{i,t}$$

where the index ratio is defined as:

$$IR_{i,t} = \frac{CPI_t}{CPI_{t_0}}$$

### 3.9.2) Clean Price Index

The nominal price index is calculated as follows:

$$PI_t^N = PI_{t-s}^N \frac{\sum_{i \in I} (p_{i,t}^R IR_{i,t} N_{i,t-s})}{\sum_{i \in I} (p_{i,t-s}^R IR_{i,t-s} N_{i,t-s})};$$

and the real price index is calculated as follows:

$$PI_t^R = PI_{t-s}^R \frac{\sum_{i \in I} (p_{i,t}^R N_{i,t-s})}{\sum_{i \in I} (p_{i,t-s}^R N_{i,t-s})}$$

### 3.9.3) Total Return Index

Two different total return indices are provided; an adjusted version taking into account the inflation adjustment (nominal total return), and an unadjusted version (real total return) based on unadjusted real market values.

The nominal total return index is calculated as follows:

$$TR_t^N = TR_{t-s}^N \frac{\sum_{i \in I} ((p_{i,t}^R IR_{i,t} + A_{i,t}^R + XD_{i,t}(CP_{i,t}^R IR_{i,t} + G_{i,t}^R IR_{i,t})) N_{i,t-s})}{\sum_{i \in I} ((p_{i,t-s}^R + A_{i,t-s}^R + XD_{i,t-s} CP_{i,t-s}^R) N_{i,t-s})}$$

and the real total return is calculated as follows:

$$TR_t^R = TR_{t-s}^R \frac{\sum_{i \in I} ((p_{i,t}^R + A_{i,t}^R + XD_{i,t}(CP_{i,t}^R + G^R)) N_{i,t-s})}{\sum_{i \in I} ((p_{i,t-s}^R + A_{i,t-s}^R + XD_{i,t-s} CP_{i,t-s}^R) N_{i,t-s})}$$

### 3.9.4) Inflation-Adjusted Duration

The annual modified adjusted duration of each bond is calculated using the following formula:

$$MD_{i,t}^{a,NM} = MD_{i,t}^{a,R} \beta_{t-s^*}$$

The following methodology is applied to determine the beta for each index at every month end.

To determine the index, the values of each node at each month-end over the last 5 years are determined. The values for nodes 1, 3, 5, 7, 10, 15 and 20 are determined.

1. The zero curves for treasuries using all treasury bonds from Markit iBoxx USD Treasury index
2. The zero curve for all the TIPS using the securities in the Markit iBoxx TIPS Inflation-Linked Index.

For each month a regression model between the two zero curves is applied to each node. The data ranges between the values available as of the Bond Selection Date and the month-end data for the last 5 years prior to the Bond Selection Date.

The beta for each target duration index is calculated using a different set of nodes:

1. For the Markit iBoxx 3-Year Target Duration TIPS Index, nodes 1, 3, 5, 7 and 10 are used.
2. For the Markit iBoxx 5-Year Target Duration TIPS Index, nodes 3, 5, 7, 10, 15 and 20 are used.



### 3.10) Index history

The Index history starts on 31 December 2005. The indices have a base value of 100 on that date.

### 3.11) Settlement conventions

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

### 3.12) Calendar

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

### 3.13) Data publication and access

The table below summarizes the publication of the Markit iBoxx Target Duration TIPS Index in the *Indices* section of the IHS Markit website [www.ihsmarkit.com](http://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 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)	Forward 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 IDs for each publication channel:

Index Name	ISIN	SEDOL	Bloomberg	RIC
Markit iBoxx 3#Year Target Duration TIPS Total Return Index	GB00B3VJB812	B3VJB81	IBXXTD3T	.IBOXTD3T
Markit iBoxx 3#Year Target Duration TIPS Price Index	GB00B4JQ7166	B4JQ716	IBXXTD3C	.IBOXTD3C
Markit iBoxx 5#Year Target Duration TIPS Total Return Index	GB00B5T40Y12	B5T40Y1	IBXXTD5C	.IBOXTD5T
Markit iBoxx 5#Year Target Duration TIPS Price Index	GB00B4VXJP34	B4VXJP3	IBXXTD5T	.IBOXTD5C

### 3.14) Annual index review

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

## 4) 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](#).

# 5) Appendix

## 5.1) Annotations

$A_{i,t}^R$	Real accrued interest for bond #i at date t
$\beta_{t-s^*}$	Reference index inflation beta as of the Bond Selection Date t-s*
$BMV_{i,t}^N$	Nominal base market value for bond #i at date t
$A_{i,t-s}^R$	Real accrued interest for bond #i at rebalancing date t
$C_{i,t}^R$	Real coupon for bond #i at date t
$C_{i,t-s}^R$	Real coupon for bond #i at rebalancing date t-s
$CPI_t$	Reference Consumer Price Inflation on settlement date t
$CPI_{t_0}$	Base index level applying to the interest accrual date of the bond
$G_{i,t^*,t}^R$	Real coupon payment received for bond #i at date t* still retained in the index as cash at date t (i.e. date t* is in the same settlement month as t, but t* is earlier than/or at date t)
I	List of bonds that are in the index
$IR_{i,t}$	Index ratio for bond i at date t
$MD_{i,t-s}^{a,R}$	Annual modified real duration for bond #i at rebalancing date t-s
$MD_{i,t-s}^{a,NM}$	Annual modified adjusted duration for bond #i at rebalancing date t-s
$mtdr_{i,t-2s,t-s^*}$	Month-to-date return for bond #i at from prior re-balancing t-2s to the Bond Selection Date t-s*
$N_{i,t}$	Notional of bond #i at date t
$N_{i,t}^N$	Nominal notional of bond #i at date t
$p_{i,t}^{N,ask}$	Nominal clean ask price for bond #i at date t
$p_{i,t}^{N,bid}$	Nominal clean bid price for bond #i at date t
$p_{i,t}^{N,index}$	Nominal clean index price for bond #i at date t
$p_{i,t}^R$	Real clean price for bond #i at date t
$PI_t^N$	Nominal price index date t
$PI_t^R$	Real price index date t

t	Calculation date for the index
t-s	Rebalancing date for the index
t-s*	Bond Selection Date for the index
t-2s	Prior months rebalancing date for the index
$TR_t^N$	Nominal total return index level at date t
$TR_t^R$	Real total return index level at date t
$w_{i,t}$	Weight of bond i at date t in the index
$XD_{i,t}$	Indication for bond i at whether it entered the index at the last rebalancing date t-s during its ex-dividend period

## 6) Changes to the iBoxx Target Duration TIPS Indices

<b>01-Jul-2022</b>	Monthly forward start date updated from 10th calendar day to 6th calendar day
<b>01 Sep 2021</b>	Update of monthly forward start date from 12th calendar day to 10th calendar day
<b>31 Mar 2021</b>	Governance and Regulatory Compliance section added
<b>30 Sep 2016</b>	<ul style="list-style-type: none"> <li>• Changes to the lockout rules. Added weight capping of 25% as another type of lockout. Lockout rules are removed if 3 or more core bonds are in lockout</li> </ul>
<b>01 Dec 2014</b>	<ul style="list-style-type: none"> <li>• Markit iBoxx Target Duration TIPS 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</li> </ul>
<b>24 Sept 2013</b>	Change to the reference point for the lockout period
<b>23 Mar 2012</b>	Adjustment to the rebalancing schedule
<b>15 Sep 2011</b>	Launch of Markit iBoxx Target Duration TIPS Indices

# 7) Further information

## Glossary of key terms

The Markit iBoxx Glossary document of key terms is available in the *Methodology* section of the iBoxx *Documentation* page on [www.ihsmarkit.com](http://www.ihsmarkit.com).

## Contractual and content issues

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# Disclaimer

## Performance Disclosure/Back-Tested Data

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

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

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

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



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

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