**S&P Dow Jones Indices**

A Division of S&P Global

# iTraxx-CDX IG Global Credit Steepener & Flattener *Indices Guide*

June 2024

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# iTraxx-CDX IG Global Credit Steepener & Flattener Indices

This document describes the methodology for the iTraxx-CDX Investment Grade (IG) Global Credit Steepener & Flattener Indices (the "Indices"). The Steepener Index is rebalanced monthly to hold 3x leveraged 10Y protection buyer positions, with leverage equally allocated to iTraxx Europe (1.5x) and CDX.NA.IG (1.5x) credit default swap (CDS) indices. The Steepener index has 5Y protection seller positions on iTraxx Europe and CDX.NA.IG that are rebalanced to maintain credit spread DV01 neutrality to their respective 10Y positions. The Flattener Index is rebalanced to hold CDS positions with opposite directions to those of the Steepener Index. The base currency of the Steepener and Flattener indices is EUR.  No FX hedging is included. A cash return of minus a spread is included.

The CDS index positions held are rolled to the latest issued series over three days starting on the second business day the new series becomes available semi-annually in March and September. The methodology includes transaction costs. The indices are calculated on all business days "$t$".

**Index Summary Table**

| Index | Ticker | Underlying Contracts | | Base Currency | Target Leverage | Calendars |
|---|---|---|---|---|---|---|
| iTraxx-CDX IG Global Credit Steepener | ITXCDXST | **Protection Seller:** iTraxx Europe 5Y, CDX.NA.IG 5Y | | EUR | 3x leverage on 10Y; 5Y leverage determined to balance credit spread DV01 | London, TARGET, New York |
| | | **Protection Buyer**: iTraxx Europe 10Y, CDXIG 10Y | | | | |
| iTraxx-CDX IG Global Credit Flattener | ITXCDXFL | **Protection Buyer:** iTraxx Europe 5Y, CDX.NA.IG 5Y | | EUR | 3x leverage on 10Y; 5Y leverage determined to balance credit spread DV01 | London, TARGET, New York |
| | | **Protection Seller:** iTraxx Europe 10Y, CDXIG 10Y | | | | |

# Index Calculation

The following sections describe the calculation of the index.

**Inputs**

The index levels are calculated each business day using the IHS Markit CDS Index prices which in turn are used to derive the Present Value (PV). IHS Markit CDS Index prices as published by the IHS Markit Pricing Service are used. The following Pricing Snaps are used to calculate the respective index levels:

| Index | Pricing Snap |
|---|---|
| CDX North America | New York 17:00 hours |
| iTraxx Europe | London 17:00 hours |

The exchange rates used for currency conversions will be done using the 16:00 London rate from WM/Refinitiv for the relevant currency.

**CDS Target Weights**

The CDS indices index target weights are given below:

(1) $\quad w_{j,m,t}^{CDS} = 1.5 \cdot DV01_{j,n,t}/DV01_{j,m,t}$

(2) $\quad w_{j,n,t}^{CDS} = 1.5$

(3) $\quad w_{k,m,t}^{CDS} = 1.5 \cdot DV01_{k,n,t}/DV01_{k,m,t}$

(4) $\quad w_{k,n,t}^{CDS} = 1.5$

where:

$m = 5Y\ CDS\ index$

$n = 10Y\ CDS\ index$

$j = iTraxx\ Europe\ CDS\ index$

$k = CDX.NA.IG\ CDS\ index$

$DV01_{n,t}$ is the value change in basis points (bps) per unit notional for a parallel upward shift in the underlying credit spread curve of one basis point (1bp).

**Index Value**

The index has an initial value of 100.

(6) $\quad I_{t0} = 100$

The index is rebalanced monthly, but its value is calculated daily on each business day. Its value each day is calculated using the overall return $(R_t)$.

(7) $\quad I_t = I_{t-1} \cdot (1 + R_t)$

The overall return is the sum of the return components for the CDS indices weighted by the CDS notional to index values and the cash return:

$$(8) \qquad R_t = x_t^{cash} R_t^{cash} + \sum_{i \in G} x_{i,t}^{CDS} \cdot R_{i,t}^{CDS}$$

where:

$$G = \{iTraxx\ Europe\ 5Y,\ iTraxx\ Europe\ 10Y,\ CDX.NA.IG\ 5Y,\ CDX.NA.IG\ 10Y\}$$

In the rest of the document, the subscript $i$ is used to denote the different CDS indices held: ($iTraxx\ Europe\ 5Y,\ iTraxx\ Europe\ 10Y,\ CDX.NA.IG\ 5Y, CDX.NA.IG\ 10Y$). During the three days that the CDS are rolled, there will be different variables (returns, notionals, etc.) for both the old and new series.

**Returns**

**CDS Returns.** The return on each of the CDS indices considers the change in PV of the index held as well as coupons, credit events, and transaction costs. The PV, coupon terms, and credit event terms in the formula below are for protection seller positions regardless of whether the underlying CDS is a protection seller or protection buyer since the $\varphi_i^{CDS}$ variable is used to make the sign of the $x_{i,t}^{CDS}$ notional ratio to negative for protection buyer positions. Excluding the credit event and transaction cost terms, the units of these are in terms of percentage of the product of the notional and the index factor ($f_{i,t}$) so these can be multiplied by $f_{i,t}$, the notional to index value fraction ($x_{i,t}^{CDS}$) and the index value to give the change in index value. Over rolls, two sets of variables are used to account for the old and new series. The transaction cost term is defined in *Appendix I – Transaction Costs*.

$$(9) \qquad R_{i,t}^{CDS} = FX_{i,t}^{LCY|BCY} \cdot f_{i,t} \cdot PV_{i,t}^{\%,dirty} - FX_{i,t-1}^{LCY|BCY} \cdot f_{i,t-1} \cdot PV_{i,t-1}^{\%,dirty} + FX_{i,t}^{LCY|BCY} \cdot$$
$$\left( \Delta_{tc_{prev},tc} \cdot f_{i,t-1} \cdot Coupon_{i,t-1}^{\%,ifCouponDate} - CEC_{i,t}^{\%} - \varphi_i^{CDS}.TransactionCosts_{i,t}^{\%} \right)$$

The coupon term has a value of zero if it is not a coupon payment date. The credit event costs ($CEC_{i,t}^{\%}$) are zero on all days except the switching date ($t_{swt}$) that the index calculation methodology switches from the previous index version data for the underlying CDS index $i$ to the "reduced" index version data where the impacted entity is zero weighted as described in the *Credit Events* section; its value is defined in *Appendix II – Credit Event Costs*.

$FX_{i,t}^{LCY|BCY}$ is the foreign exchange rate that specifies how many units of BCY can be bought with one unit of LCY. BCY is the base currency of the Steepener or Flattener Index and LCY is the currency of the underlying CDS. If BCY and LCY are the same currency, then $FX_{i,t}^{LCY|BCY}$ is equal to one.

**Cash Return.** The cash return $R_t^{cash}$ is the product of the interest rate for the cash component and the year fraction between $t$-1 and $t$ using the Actual/360 convention. The cash component earns interest at the Overnight Rate minus a spread ($s_1$ or $s_2$).

$$R_t^{cash} = (r_{t-1}^{ON} - s) \cdot \Delta_{t-1,t}$$

Where, $s$ is the applicable spread, either $s_1$ or $s_2$ for the Steepener or Flattener index, respectively.

**Table A – Overnight Rate & Spread Removed from Overnight Rate**

| Start Date | Overnight Rate | $s_1$ | $s_2$ |
|---|---|---|---|
| 20 March 2007 | EONIA[1] | 0.00% | 0.00% |
| 1 April 2021 | EONIA | 0.15% | 0.15% |
| 15 June 2021 | ESTR[2] | 0.07% | 0.07% |
| 10 February 2023 | ESTR | 0.18% | 0.18% |

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[1] Euro Overnight Index Average (EONIA)
[2] Euro Short Term Rate (ESTR)

**Ratios**

**CDS Notional to Index Value Ratio.** The notional must be determined as described in the next section in order to calculate the CDS notional to index value ratio, $x_{i,t}^{CDS}$.

$$(14) \qquad x_{i,t}^{CDS} = \frac{\varphi_i^{CDS} \cdot \text{Notional}_{i,t-1}}{I_{t-1}}$$

**Cash Notional to Index Value Ratio.** The cash notional to index value ratio, $x_{i,t}^{cash}$ calculates as one minus the fraction of index value from the CDS indices dirty PV. The fraction of index value from CDS calculates using the CDS notional to index value ratios and the dirty PV as a percentage of the product of the notional and the index factor. Note the dirty PV drops when a coupon is paid, increasing the fraction of cash; however, such action doesn't affect the overall index value.

$$(15) \qquad x_{i,t}^{cash} = \frac{Cash_{t-1}}{I_{t-1}} = 1 - \sum_{i \in G} x_{i,t}^{CDS} \cdot f_{i,t-1} \cdot PV_{i,t-1}^{\%,dirty} \cdot FX_{i,t-1}^{LCY|BCY}$$

If (t-1) was a roll date, then **use** the **new series'** PV. If (t-1) was a date on which the methodology switched to use data from a "reduced" index version after a credit event, then **use the "reduced" index's** PV and index factor.

**CDS Notional**

The portfolio is rebalanced monthly to align the notional to index value ratios with the target weights. The notional is always considered positive although $x_{i,t}^{CDS}$ can be positive or negative depending on long/short direction.

The following relation holds for each underlying CDS index when it is rebalanced monthly, excluding over rolls described in the next section:

$$(16) \qquad \frac{FX_{i,t-1}^{LCY|BCY} \cdot \text{Notional}_{i,tr}}{I_{t-1}} = w_{i,t-1}^{CDS}$$

The CDS notional values for each underlying CDS index that satisfy the ratios above when rebalancing can then be determined by the formula below obtained from rearranging the preceding equations. The formula below gives the notional after rebalancing on rebalancing date $tr$. Note: $Notional_{i,tr}$ is in the currency of the CDS which may be different from the Index currency, hence the FX conversion.

$$(17) \qquad Notional_{i,tr} = \frac{w_{i,t-1}^{CDS} \cdot I_{t-1}}{FX_{i,t-1}^{LCY|BCY}}$$

On days that are not rebalancing or roll dates, the Notional remains constant and equal to the previous day's notional.

$$(18) \qquad Notional_{i,t \neq tr} = Notional_{i,t-1}$$

**CDS Rolls**

The CDS index positions held are rolled to the latest issued series over three days starting on the second business day the new series becomes available semi-annually in March and September. One third of the target weight allocation is shifted from the old series to the new series each day over the roll, and the notionals are rebalanced each day over the roll.

**CDS Notional Rebalancing Schedule**

The CDS index notionals are rebalanced monthly on the first business day of the month in the months of January, February, March, May, June, July, August, September, November, and December. CDS index notionals are also rebalanced over the three days in the roll month when the old CDS index series is rebalanced to the new CDS index series. The CDS notionals are not rebalanced on the first business day in April and October (since they will have recently been rebalanced during the roll) unless the roll is delayed and no rebalancing related to the roll has taken place by the first business day of April or October, respectively.

# Credit Events

In the case of credit events, the Credit Derivatives Determinations Committee votes to determine if a credit event has occurred for an entity and if an auction will be held. If the vote is positive for an entity in either of the underlying CDS indices, IHS Markit publishes a new index version (the "reduced" index) giving the impacted entity a weight of zero. Note the new "reduced" index version will still be the same CDS index series as the previous version.

The index methodology handles restructuring and non-restructuring credit events in the underlying CDS indices differently as described below.

In the case of credit events, the index calculation methodology switches from using the previous index version data for the underlying CDS index $i$ to the "reduced" index version data on the switching date $(t_{swt})$ when it becomes available. If the switch to the "reduced" index data occurs on day $t = t_{swt}$, the $f_{i,t} \cdot PV_{i,t}^{\%,dirty}$ variables use the "reduced" CDS index $i$ version data and $f_{i,t-1} \cdot PV_{i,t-1}^{\%,dirty}$ variables use the previous index $i$ version data.

# Index Governance and Regulatory Compliance

IHS Markit Benchmark Administration Limited (IMBA UK) is the Administrator of the iTraxx-CDX Investment Grade Global Credit Steepener & Flattener Indices. Information on IMBA UK's governance and compliance approach can be found here. This document covers the following topics:

- 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: Benchmark Administration by IMBA UK | IHS Markit.*

# Index Data

**Credit Prices**

All market data used is end-of-day data at mid-price. CDS index prices as published by the S&P Global Market Intelligence CDS Pricing Service are used. The following pricing snaps are used to calculate the index levels:

| Index | Pricing Snap |
|---|---|
| iTraxx Europe 5Y | London 17:00 hours |
| iTraxx Europe 10Y | London 17:00 hours |
| CDX.NA.IG 5Y | New York 17:00 hours |
| CDX.NA.IG 10Y | New York 17:00 hours |

**Index History**

| Index | Base Date | Base Level |
|---|---|---|
| iTraxx-CDX IG Global Credit Steepener | 20 March 2007 | 100 |
| iTraxx-CDX IG Global Credit Flattener | 20 March 2007 | 100 |

**Data Publication and Access**

The table below summarizes the publication of the Index data.

| Frequency | File Type | Access | Publication Time |
|---|---|---|---|
| Daily | Index levels | S&P Dow Jones Indices FTP Server / S&P Dow Jones Indices website / Bloomberg / Refinitiv | New York Close |

In the event that S&P Global Market Intelligence Pricing Service does not publish the relevant CDS index price/spread or in periods of market stress or disruption as well as in illiquid or fragmented markets preventing the publication of a daily S&P Global Market Intelligence CDS index price, S&P Dow Jones Indices will publish on the iTraxx News page of its website a statement outlining the course of action due to the disruption.

In the event of a major structural change in the CDS market that affects the calculation of the Indices, S&P Dow Jones Indices will confer with all relevant stakeholders and publish the outcome of any material change. Also published will be any decisions made at S&P Dow Jones Indices' discretion that prompted the resulting methodology change.

**Calendar**

Markit publishes an index calculation calendar which is available here: under Calendar for registered users.

The following business calendars are used for the respective indices:

| Index | Business Calendars |
|---|---|
| iTraxx-CDX IG Global Credit Steepener | London, TARGET, New York |
| iTraxx-CDX IG Global Credit Flattener | London, TARGET, New York |

**Index Restatement**

Index restatement follows the policy described in the [CDS Benchmarks Restatement Policy](#), available on S&P Dow Jones Indices' [website](#).

**Index Review**

Index methodology reviews for the iTraxx-CDX IG Global Credit Steepener Index and iTraxx-CDX IG Global Credit Flattener Index outlined within this guide are performed on a periodic basis. The index rules, their enforcement will be governed by the Index Advisory Committee. The purpose of this committee is to conduct a timely review of the index methodology and any changes thereto. As part of the review process, the committee will address any suggested changes brought to it by index stakeholders, such as a potential change to any of the Index Parameters. In the event that following an index review an amendment is to be made to the Index Parameters, a notice of the proposed change will be published on the iTraxx News page. Following the publication of the impending index rule change, a consultation period is put in place up until the second Wednesday following the notice having been made public or the business day thereafter if the Wednesday is not an index business day. Provided that during the consultation period no concerns raised by index stakeholders are seen to be material by the Index Advisory Committee, the rule change will be implemented for the index close on the index business day following the final day of the consultation period.
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# Annotations

| | |
|---|---|
| $b_{j,m}$ | Fraction of the iTraxx Europe 5Y index spread assumed to be the estimate of the bid-offer spread |
| $b_{j,n}$ | fraction of the iTraxx Europe 10Y index spread assumed to be the estimate of the bid-offer spread |
| $b_{k,m}$ | fraction of the CDX IG 5Y index spread assumed to be the estimate of the bid-offer spread |
| $b_{k,n}$ | fraction of the CDX IG 10Y index spread assumed to be the estimate of the bid-offer spread |
| $b_{e,(t_{swt})}$ | Percentage of the CDS single name spread assumed to be the estimate of the bid/offer spread |
| $BidOffer_{i,t}^{\%,roll}$ | Bid/offer cost when buying/selling CDS indices to roll to the new series on roll dates |
| $BidOffer_{i,tr}^{\%,rebal}$ | Bid/offer rebalancing transaction cost |
| $ClearingCosts_{i,tr}^{\%}$ | Clearing cost representing other transaction costs for trading cleared CDS indices that are not bid-offer related |
| $Coupon_{i,t-1}^{\%,ifCouponDate}$ | Coupon as a percent of the product of the notional and the index factor (has a value of 0 if not a coupon payment date) |
| $CEC_{i,t}^{\%}$ | Credit event cost as a percent of the notional |
| $d_{j,m}$ | Roll trade discount parameter for the iTraxx Europe 5y reflecting reduced transaction costs for trades rolling CDS indices around roll dates |
| $d_{j,n}$ | Roll trade discount parameter for iTraxx Europe 10y reflecting reduced transaction costs for trades rolling CDS indices around roll dates |
| $d_{k,m}$ | Roll trade discount parameter for iTraxx Europe 5y reflecting reduced transaction costs for trades rolling CDS indices around roll dates |
| $d_{k,n}$ | Roll trade discount parameter for the iTraxx Europe 10y reflecting reduced transaction costs for trades rolling CDS indices around roll dates |
| $DV01_{i,t}$ | Value change in the underlying CDS index in basis points per unit of notional for a 1bp parallel upward shift in the underlying credit spread curve |

| | |
|---|---|
| $E_i$ | Original total number of entities present in the CDS index series $i$ on the day it was created |
| $f_{i,t}$ | Index factor representing the fraction of entities remaining in the CDS index out of the total number of entities at the CDS index series inception |
| $g$ | Clearing cost parameter |
| $I_t$ | Index value at day $t$ |
| $i$ | Denotes the underlying CDS Index |
| $L$ | Target CDS notional market exposure ratio |
| $\eta_{i,tr}$ | Approximation of absolute value of the amount of notional to be bought or sold at rebalancing |
| $Notional_{i,tr}$ | CDS notional |
| $PV_{i,t}^{\%,clean}$ | CDS index clean PV as a percent of the product of the notional and the index factor |
| $PV_{i,t}^{\%,dirty}$ | CDS index dirty PV as a percent of the product of the notional and the index factor |
| $PV_{e,t_{swt}}^{\%,dirty,single}$ | Single name CDS dirty PV for the entity $e$ impacted by the credit event as a percent of the notional |
| $r_{t-1}^{ON}$ | Overnight Rate (as per Table A) on |
| $R_t$ | Overall index return at time $t$ |
| $R_t^{cash}$ | Cash return |
| $RebalTransactionCosts_{i,t}^{\%,}$ | Transaction cost of rebalancing |
| $Recovery\ Rate_{e,(t_{swt}-1)}$ | Recovery rate for the entity $e$ |
| $s$ | Spread subtracted from the benchmark interest rate for overall interest on cash component |
| $S_{i,t_{roll},series}$ | CDS index spread of the old or new series on the roll date. It should be entered as a decimal number (e.g., a 250bp spread should be entered as 0.0250). |
| $S_{e,(t_{swt})}$ | Single name CDS spread for the entity $e$ impacted by the credit event. It should be entered as a decimal number (e.g., a 250bp spread should be entered as 0.0250). |
| $t_0$ | Inception date (also considered a rebalancing date) |
| $t$ | Business day $t$ |

| | |
|---|---|
| $t-1$ | Previous business day |
| $tr$ | Refers to rebalancing date |
| $TransactionCosts_{i,t}^{\%}$ | Transaction cost as a percent of the notional |
| $w_{j,m}^{CDS}$ | iTraxx Europe 5Y target weight |
| $w_{k,m}^{CDS}$ | iTraxx Europe 10Y target weight |
| $w_{j,n}^{CDS}$ | CDX.NA.IG 5Y target weight |
| $w_{k,n}^{CDS}$ | CDX.NA.IG 10Y target weight |
| $x_t^{cash}$ | Ratio of cash to index value at time $t$ |
| $x_{i,t}^{CDS}$ | Ratio of CDS notional to index value |
| $\Delta_{tc_{prev},tc}$ | Year fraction between the previous and the current coupon payment date using the Actual/360 convention |
| $\Delta_{tc_{prev},t_{EDD}}$ | Year fraction from the previous coupon date to the Event Determination Date using the Actual/360 convention |
| $\varphi_i^{CDS}$ | A long/short variable that is equal to 1 if CDS index $i$ are protection seller positions or -1 if they are protection buyer positions |

# Appendix I – Transaction Costs

The transaction cost is zero if not a rebalancing $tr$ or roll date $t_{roll}$. It is the sum of the transaction cost components when rebalancing the CDS index notional and the bid-offer cost component when buying/selling CDS indices to roll to the new series on roll dates. In general, the bid offer costs are calculated by assuming the bid-offer spread can be estimated as a percentage of the CDS index spread.

$$(19) \quad TransactionCosts_{i,t}^{\%} = RebaltransactionCosts_{i,t}^{\%,rebal} + BidOffer_{i,t}^{\%,roll}$$

The $BidOffer_{i,t}^{\%,roll}$ is zero if not a roll date. On roll dates, it is calculated as follows:

$$(20) \quad BidOffer_{i,t_{roll}}^{\%,roll} = \frac{1}{3} \cdot \frac{1}{2} \cdot b_i \cdot d_i \cdot \left( f_{i,t,oldseries} \cdot S_{i,t_{roll},oldseries} \cdot DV01_{i,t_{roll},oldseries} + f_{i,t,newseries} \cdot S_{i,t_{roll},newseries} \cdot CS01_{i,t_{roll},newseries} \right)$$

$RebalTransactionCosts_{i,t}^{\%,}$ are zero if it is not a rebalancing date. $RebalTransactionCosts_{i,t}^{\%,}$ are also zero on the rebalancing date coinciding with the series rolls. On other monthly rebalancing dates, it's calculated as:

$$(21) \quad RebalTransactionCosts_{i,tr}^{\%,} = BidOffer_{i,tr}^{\%,rebal}$$

The bid-offer rebalancing transaction cost is calculated using an approximation $\eta_{i,tr}$ for the absolute value of the amount of notional to be bought or sold in the rebalancing to avoid circular dependencies in the formulas:

$$(23) \quad BidOffer_{i,tr}^{\%,rebal} = f_{i,tr} \cdot \frac{\eta_{i,tr}}{Notional_{i,tr-1}} \cdot \frac{1}{2} \cdot b_i \cdot S_{i,tr} \cdot DV01_{i,tr}$$

$$(24) \quad \eta_{i,tr} = \left| \frac{w_{i,t-1}^{CDS} \cdot I_{t-1}}{FX_{i,t-1}^{LCY|BCY}} - Notional_{i,tr-1} \right|$$

**Transaction Costs at Inception**

The index value at $t_0$ ($I_{t_0}$) is 100. No transaction costs are applied for the CDS indices that are included at inception.

# Appendix II – Credit Event Costs

The credit event costs as a percentage of the notional are calculated as described below. It reflects the net protection payment cost in the case of a credit event. The credit event costs are zero on all days except the switching date $(t_{swt})$, on which the index calculation methodology switches from using the previous index version data for the underlying CDS index $i$ to the new "reduced" index version data where the impacted entity is zero weighted, when it becomes available. The calculation of credit event costs is different for restructuring and non-restructuring credit events in the underlying CDS indices.

The formula below gives the credit event costs for the non-restructuring case:

(26) $$CEC_{i,t_{swt}}^{\%,non-res} = \frac{1}{E_i} \cdot \left( \left(1 - Recovery\ Rate_{e,(t_{swt}-1)}\right) - \left(\Delta_{tc_{prev},t_{EDD}} \cdot Coupon_{i,t_{EDD}}^{\%}\right) \right)$$

The formula below gives the credit event costs for the restructuring case (if it is applicable for the underlying CDS). A cost for a restructuring case is only included if applicable for the underlying CDS. It is applicable for iTraxx indices, but not CDX indices.

(27) $$CEC_{i,t_{swt}}^{\%,res} = \frac{-1}{E_i} \cdot \left( PV_{e,t_{swt}}^{\%,dirty,single} - \frac{1}{2} \cdot b_{e,(t_{swt})} \cdot S_{e,(t_{swt})} \cdot DV01_{e,(t_{swt})} \right)$$

In the unlikely event of multiple entities being removed from the underlying CDS index series on the same day, the credit event costs of each of these would be added. However, if an entity had been removed previously at an earlier date and its credit event cost already included previously, it is not included again.

# Appendix III – Index Parameters

| Symbol | Value | Description |
|---|---|---|
| $b_{e,(t_{swt})}$ | .10 | fraction of the CDS single name spread assumed to be the estimate of the bid/offer spread |
| $b_{j,m}$ | .007 | fraction of the iTraxx Europe 5Y index spread assumed to be the estimate of the bid-offer spread |
| $b_{j,n}$ | .008 | fraction of the iTraxx Europe 10Y index spread assumed to be the estimate of the bid-offer spread |
| $b_{k,m}$ | .007 | fraction of the CDX IG 5Y index spread assumed to be the estimate of the bid-offer spread |
| $b_{k,n}$ | .008 | fraction of the CDX IG 10Y index spread assumed to be the estimate of the bid-offer spread |
| $d_{j,m}$ | .25 | roll trade discount parameter for the iTraxx Europe 5y reflecting reduced transaction costs for trades rolling CDS indices around roll dates |
| $d_{j,n}$ | .33 | roll trade discount parameter for the iTraxx Europe 10y reflecting reduced transaction costs for trades rolling CDS indices around roll dates |
| $d_{k,m}$ | .25 | roll trade discount parameter for the iTraxx Europe 5y reflecting reduced transaction costs for trades rolling CDS indices around roll dates |
| $d_{k,n}$ | .33 | roll trade discount parameter for the iTraxx Europe 10y reflecting reduced transaction costs for trades rolling CDS indices around roll dates |

# Appendix IV – Methodology Changes

Methodology changes since January 1, 2015, are as follows:

| Change | Effective Date (After Close) | Methodology Previous | Updated |
|---|---|---|---|
| Cash Notional to Index Value Ratio | 05/21/2024 | The cash notional to index value ratio, $x_{i,t}^{cash}$ is calculated as 1.<br><br>$$x_{i,t}^{cash} = 1$$ | The cash notional to index value ratio, $x_{i,t}^{cash}$ calculates as one minus the fraction of index value from the CDS indices dirty PV. The fraction of index value from CDS calculates using the CDS notional to index value ratios and the dirty PV as a percentage of the product of the notional and the index factor. Note that dirty PV drops when a coupon is paid, increasing the fraction of cash; however, such action doesn't affect the overall index value.<br><br>$$x_{i,t}^{cash} = \frac{Cash_{t-1}}{I_{t-1}}$$<br>$$= 1 - \sum_{i \in G} x_{i,t}^{CDS} \cdot f_{i,t-1} \cdot PV_{i,t-1}^{\%,dirty} \cdot FX_{i,t-1}^{LCY|BCY}$$<br><br>If (t-1) was a roll date, then use the new series' PV. If (t-1) was a date on which the methodology switched to use data from a "reduced" index version after a credit event, then use the "reduced" index's PV and index factor. |

# Further Information

**Glossary of Key Terms**

Further information regarding use of IHS Markit Credit Indices and the glossary of key terms is available in the IHS Markit Credit Index Primer located on the IHS Markit website.

**Contractual or Content Issues**

For contract- or content-related queries, please refer to the following:

Markit Indices Limited
Friedrich-Ebert-Anlage 35-37
60327 Frankfurt am Main
Germany

Tel +49 (0) 69 299 868 100 Fax +49 (0) 69 299 868 149
E-mail:            *indices@ihsmarkit.com*
Internet:          https://ihsmarkit.com/index

**Technical Issues and Client Support**

For client and technical support, please e-mail *indices@ihsmarkit.com*, or call the relevant telephone number below:

| Asia Pacific | Europe | USA |
|---|---|---|
| **Japan**: +81 3 6402 0127 | **General**: +800 6275 4800 | **General**: +1 877 762 7548 |
| **Singapore**: +65 6922 4210 | **UK**: +44 20 7260 2111 | |

**Formal Complaints**

Formal complaints should be e-mailed 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*.

# Disclaimer

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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.

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