MSCI Fixed Income Index Calculation Methodology

September 2020
# Contents

**Introduction** 3

**MSCI Fixed Income Indexes** 4

1 **MSCI Fixed Income Index Return Calculation Methodology** 5
   1.1 Market value of a Fixed Income Security 5
   1.2 Market value with cash 6
   1.3 Security Level Total Return Calculation 7
      1.3.1 Security Level Price Return 8
      1.3.2 Security Level Income Return 9
      1.3.3 Currency Return 10
   1.4 Index Level Total Return Calculation 10
      1.4.1 Index Total Return Attribution 11
      1.4.2 Calculation of Index Levels 11

2 **Corporate Events Treatment** 13
   2.1 Outstanding Amount Decreases 13
   2.2 Outstanding Amount Increases 14
   2.3 Outstanding Amount Decreases, and a New security is Issued in Exchange 14

3 **MSCI Index Level Datapoints** 16

4 **Appendix** 19
   4.1 Transaction cost adjustment on Index Returns 19
   4.2 Credit Rating Scale 20
   4.3 Treatment for Negative Accrued Interest 21
   4.4 Treatment of Missing Data and Usage of Alternate Sources 22
**Introduction**

This methodology book describes MSCI’s general Index calculation methodology for the MSCI Fixed Income Indexes.

These policies and guidelines affect all securities across the MSCI Fixed Income Indexes and products. Unless otherwise stated the policies and guidelines apply therefore to all securities in the MSCI Fixed Income universe.

Please note that the index construction methodology, input data specification and other guiding principles for MSCI Fixed Income Indexes can be found at [www.msci.com](http://www.msci.com).
MSCI Fixed Income Indexes

MSCI Fixed Income Indexes measure the performance of a set of fixed income securities over time. They are calculated using the Laspeyres’ concept of a weighted arithmetic average together with the concept of chain-linking.

MSCI calculates its fixed income indexes in “local” currency as well as in USD. Index levels are also available in several other currencies such as EUR, GBP etc. While the local currency series of indexes cannot be replicated in the real world, it represents the theoretical performance of an index without any impact from foreign exchange fluctuations i.e., a continuously hedged portfolio.

MSCI Fixed Income Indexes are calculated 5 days a week, from Monday to Friday. However, the index levels may not change on days that are noted as holidays as per the MSCI Fixed Income Data methodology1.

MSCI also reviews its fixed income indexes on an ongoing basis to account for the following:

- If an index constituent is no longer priced (intra-rebalancing) by the pricing source or the price is unavailable, the last available price is used.
- MSCI, at times, may use a price different from the last available price provided, including 0.00 in the case of default or missed interest payment. MSCI will employ procedures as noted in the MSCI Fixed Income Data Methodology document relevant to pricing.

Please see Appendix 4.4 for detailed policy around handling of missing data and use of alternate data sources.

Announcements with relevant information pertaining to MSCI Fixed Income Indexes will be made at 6 p.m. EST and calculated Index levels will be distributed at end of each business day at 7 p.m. EST.

---

1 MSCI Fixed Income Data Methodology on https://www.msci.com/index-methodology
MSCI Fixed Income Index Return Calculation Methodology

The total return index measures the change in market value of a Fixed Income portfolio over a given period relative to a starting base date value. This includes, return from fixed income security price movements, exchange rate fluctuations, coupon income earned as well as P&L generated from redemption of principal.

1.1 Market value of a Fixed Income Security

Market Value of a security is defined as the product of its notional amount outstanding and dirty price. Dirty price of the security is calculated by adding its clean bid price and accrued interest. Therefore, market value of the security accounts for daily changes in price and interest accrued from the fixed income security.

\[ DP_{t,j} = P_{t,j} + A_{t,j} \]

\[ MV_{t,j} = \frac{DP_{t,j} \times N_{t,j} \times K_{t,j}}{100} \]

Where:
- \( P_{t,j} \) – Clean Bid Price of the security \( j \) at the close of day \( t \)
- \( A_{t,j} \) - Accrued Interest of the security \( j \) at the close of day \( t \)
- \( DP_{t,j} \) - Dirty Price of the security \( j \) at the close of day \( t \)
- \( N_{t,j} \) - Amount Outstanding of the security \( j \) at the close of day \( t \)
- \( MV_{t,j} \) – Market Value of the security \( j \) at the close of day \( t \)
- \( K_{t,j} \) – Security Inclusion Factor of the security \( j \) at the close of day \( t \)

2 In the document term price refers to price of the fixed income security, unless explicitly stated otherwise. Please refer to MSCI Fixed Income Data Methodology for detailed specification on input data points.

3 Please refer to MSCI Fixed Income Glossary for definition of the technical terms used in the document.

4 Please refer to Appendix – Section 4.3 of the document for details in adjustment to accrued interest in the ex-coupon period
1.2 Market value with cash

In the MSCI Fixed Income Indexes, constituent securities accrue cash balance from regular interest payments and principal redemptions in between two index reviews. The accrued cash is reinvested across the index on the Rebalancing date. Therefore, we define market value with cash as follows.

\[
MVC_{t,j} = MV_{t,j} + CCB_{t,j}
\]

Where:

- \(MVC_{t,j}\) - Market Value with Cash of the security \(j\) at the close of day \(t\)
- \(CCB_{t,j}\) - Total cumulative cash balance of the security \(j\) at the close of day \(t\)

Total cumulative cash balance of the security is a summation of cash flow accrued from interest payments and principal redemptions between last Rebalancing date and the return calculation date (\(t\)).

\[
CCB_{t,j} = CCB_{t-1,j} + \text{Cash from Coupon}_{t,j} + \text{Cash from Redemption}_{t,j}
\]

\[
CCP_{t,j} = CCP_{t-1,j} + \text{Cash from Coupon}_{t,j}
\]

\[
CCR_{t,j} = CCR_{t-1,j} + \text{Cash from Redemption}_{t,j}
\]

Where:

- \(CCP_{t,j}\) - Cumulative cash from coupon payments of the security \(j\), accrued since last rebalancing at the close of \(t\)
- \(CCR_{t,j}\) - Cumulative cash from principal redemption of the security \(j\), accrued since last rebalancing at the close of \(t\)
- \(CCB_{t,j}\) - Total cumulative cash balance of the security \(j\) accrued since last rebalancing at the close of \(t\)

In case of corporate bonds, cash from coupon and cash from redemption are calculated using the formulae defined below.
MSCI FIXED INCOME INDEX CALCULATION METHODOLOGY | SEPTEMBER 2020

\[
Cash from Coupon_{t,j} = \frac{Coupon_j/100}{Coupon\ Frequency_j} * N_{t-1,j} * K_{t,j}^5
\]

Where:

- \( Coupon_j \) – Annual coupon rate of the bond \( j \)
- \( Coupon\ Frequency_j \) – Coupon payment frequency of bond \( j \). For instance, it is common for corporate bonds to pay coupon semi-annually which implies a coupon frequency of 2.

\[
Cash from Redemption_{t,j} = \left( \frac{RP_{t,j} + A_{t,j}}{100} \right) * (N_{t-1,j} - N_{t,j}) * K_{t,j}
\]

Where:

- \( RP_{t,j} \) – Redemption Price of security \( j \) at the event effective day \( t \). It is the price at which the security is redeemed by the issuer. This price may vary from the current market price of the security. If the data for redemption price is unavailable, then it is assumed to be the clean bid price of the security \( j \) at the close of \( t \).

1.3 Security Level Total Return Calculation

MSCI calculates daily security level total return to account for changes in:

- Market price
- Accrued interest
- Cash generated from interest payments
- Cash generated from redemption or prepayment of the outstanding principal
- Exchange Rate
- Corporate Events

\[5\] Please refer to Appendix – Section 4.3 for details on calculation of cash from coupon for bonds with a provision for ex-coupon period.
Daily security level total return between t-1 and t is calculated using the following formula. Note that Adjusted MVC is treated appropriately to account for corporate events. Please refer to Section 2 for details.

\[
SLTR_{t-1,t,j} = \left( \frac{Adjusted\ MVC_{t,j}}{Initial\ MVC_{t,j}} - 1 \right)
\]

\[Initial\ MVC_{t,j} = MVC_{t-1,j} \times FX_{t-1,j}\]

\[Adjusted\ MVC_{t,j} = MVC_{t,j} \times FX_{t,j}\]

Where:

\(FX_{t,j}\) – Foreign Exchange Rate applicable for security j in Foreign Currency/USD convention at the close of day t

\(Initial\ MVC_{t,j}\) – Market value inclusive of cash with which security j is included in the opening index portfolio for return calculation on day t

\(Adjusted\ MVC_{t,j}\) – Market value inclusive of cash for security j adjusted for changes in price, interest, principal on day t

Note that \(Adjusted\ MVC_{t,j}\) calculation shown above pertains to return calculation in USD. In case of return calculation in “local” currency, MSCI uses \(FX_{t-1,j}\) in the formula. Similar adjustments are made in calculation of Price Income\(_{t,j}\), Coupon Income\(_{t,j}\) and Redemption Income\(_{t,j}\) to capture the return attribution accurately in local currency. Currency Return is always zero for the local currency variant.

\[Adjusted\ MVC_{t,j}^{local} = MVC_{t,j} \times FX_{t-1,j}\]

MSCI decomposes security level total return calculation into the following components for attribution purposes.

1.3.1 Security Level Price Return

Price return of the security is calculated using the following formula –
\[ SLPR_{t-1,t,j} = \frac{Price Income_{t,j}}{Initial MVC_{t,j}} \]

\[ Price Income_{t,j} = \left( \frac{P_{t,j} - P_{t-1,j}}{100} \right) * N_{t-1,j} * FX_{t,j} * K_{t,j} \]

Where:

\( SLPR_{t-1,t,j} \) – Security Level Price Return of the security \( j \) between \( t-1 \) and \( t \)

\( Price Income_{t,j} \) – P&L generated between \( t-1 \) and \( t \) for security \( j \) from market movements of clean bid price

### 1.3.2 Security Level Income Return

Income Return of the security represents part of total return that is earned via regular interest payments as well as interest accrued over time in between interest payment dates. Income return also accounts for P&L generated when principal is paid out at a premium or a discount as compared to closing clean bid price of the security on the effective date of the corporate event.

\[ SLIR_{t-1,t,j} = \frac{Coupon Income_{t,j} + Redemption Income_{t,j}}{Initial MVC_{t,j}} \]

\[ Coupon Income_{t,j} = \left( \frac{A_{t,j} - A_{t-1,j}}{100} \right) * N_{t-1,j} + Cash from Coupon_{t,j} \right) * FX_{t,j} * K_{t,j} \]

\[ Redemption Income_{t,j} = \left( \frac{RP_{t,j} - P_{t,j}}{100} \right) * (N_{t-1,j} - N_{t,j}) * FX_{t,j} * K_{t,j} \]

Where:

\( SLIR_{t-1,t,j} \) – Security Level Income Return of the security \( j \) between \( t-1 \) and \( t \)

\( Redemption Income_{t,j} \) – P&L generated due to difference in market price and redemption price of the security \( j \) at the close of day \( t \)
1.3.3 Currency Return

Fixed Income securities denominated in foreign currency will be impacted by the movement of exchange rate between foreign and local currency. MSCI captures return from exchange rate movements using the following formula.

\[ FXR_{t-1,t,j} = \frac{FX_{t,j}}{FX_{t-1,j}} - 1 \]

Where:
- \( FXR_{t-1,t,j} \) - Currency Return of the security \( j \) between \( t-1 \) and \( t \)

Therefore, for a given security \( j \), total return between \( t-1 \) and \( t \) can also be calculated using the attribution return components.

\[ SLTR_{t-1,t,j} = SLPR_{t-1,t,j} + SLIR_{t-1,t,j} + FXR_{t-1,t,j} \]

1.4 Index Level Total Return Calculation

Index level total return can be calculated using the below formula.

\[ Index\ TR_{t-1,t} = \sum_{j=1}^{n} SLTR_{t,j} * opening\ wt_{t,j}^{MC} \]

Note that on the effective date of index rebalancing, certain variants of the index total return are adjusted to account for transaction costs. Details on transaction cost adjustment to the total return variant is outlined in the Appendix – Section 4.1.
opening wt_{t,j}^{MVC} = \frac{\text{Initial MVC}_{t,j}}{\sum_{j=1}^{n} \text{Initial MVC}_{t,j}}

Where:

opening wt_{t,j}^{MVC} – Opening weight of security j in the index including market value and cash on day t

Index TR_{t-1,t} – Index level total return between t-1 and t

1.4.1 Index Total Return Attribution

Daily Index level total return is attributed into the following three parts, like security level total return

- Daily Index level Price Return (Index PR)
- Daily Index level Income Return (Index IR)
- Daily Index level Currency Return (Index XR)

As shown in the formulae below, they are calculated using the weighted average of security level price and income returns.

\[
\text{Index PR}_{t-1,t} = \sum_{j=1}^{n} \text{SLPR}_{t,j} \times \text{opening wt}_{t,j}^{MVC}
\]

\[
\text{Index IR}_{t-1,t} = \sum_{j=1}^{n} \text{SLIR}_{t,j} \times \text{opening wt}_{t,j}^{MVC}
\]

\[
\text{Index XR}_{t-1,t} = \sum_{j=1}^{n} \text{FXR}_{t,j} \times \text{opening wt}_{t,j}^{MVC}
\]

1.4.2 Calculation of Index Levels

MSCI will create and publish three variants of the index levels. They will start with the base value (example: 1000) and will be calculated by chain-linking of appropriate daily index returns. Formulae shown below are example of chain-linking daily index returns between period t-s and t to calculate index levels.
MSCI FIXED INCOME INDEX CALCULATION METHODOLOGY | SEPTEMBER 2020

\[ TRI_t = TRI_{t-s} \times \left[ \prod_{t-s < u \leq t} \left( 1 + \text{Index TR}_{u-1,u} \right) \right] \]

Where:

\( TRI_t \) – Total Index Level at the close of day \( t \)

MSCI also calculates Index levels for Price return (PRI) and Income return (IRI) using similar formulae.
2 Corporate Events Treatment

This section of the methodology book provides a description of the rules and guidelines followed by MSCI for the treatment of corporate events within the MSCI Fixed Income Indexes.

Any exceptions to these rules are reviewed and approved by the MSCI Fixed Income Index Committee (FIIC) and are publicly announced in advance of the implementation. This methodology book focuses on the implementation of corporate events affecting securities across all the MSCI Fixed Income Indexes and products.

MSCI endeavors to develop and maintain a set of corporate event implementation rules that are as generic as possible and that can apply to any fixed income security included in the MSCI Fixed Income universe.

Unless otherwise stated, the policies and guidelines apply therefore to all securities in the MSCI Fixed Income universe.

For certain corporate events, MSCI applies a market value adjustment at the security level to neutralize (at least partially) the price movement due to the event and keep only the price performance in the index due to real market movement.

The policies and guidelines set forth apply in most corporate events cases. For corporate events not described in this Methodology Book or combinations of different types of corporate events and other exceptional cases, MSCI reserves the right to determine the most appropriate implementation method and announces it prior to the changes becoming effective in the MSCI Fixed Income Indexes.

MSCI has identified three broad categories of corporate events based on their impact on outstanding amount of the security.

1) Outstanding amount decreases
2) Outstanding amount increases
3) Outstanding amount decreases, and new security is issued in exchange

2.1 Outstanding Amount Decreases

MSCI treats decrease in amount outstanding of the security as redemption, thus the security level cash balance is increased when the outstanding amount decreases. Formulaically, security level return and market value calculation as described in section 1.2 and 1.3 handle such corporate events implicitly.
2.2 Outstanding Amount Increases

Certain corporate events may result in an increase in the notional amount outstanding of the fixed income security. MSCI handles these events by increasing the weight of the security in the opening portfolio of the next business day. On the day of the event for the purposes of return calculation, adjusted market value with cash of the security is calculated in the following manner.

\[
Adjusted \ MV_{t,j} = MV_{t,j} \times FX_{t,j} \times \left(1 + \frac{(P_{t,j} + A_{t,j}) \times (N_{t-1,j} - N_{t,j}) \times K_{t,j}}{100 \times MV_{t,j}}\right)
\]

Note that in this event notional amount outstanding increases and no redemption income is generated.

2.3 Outstanding Amount Decreases, and a New security is Issued in Exchange

Securities in an index may be exchanged or restructured by the issuer where a security is issued in exchange for another. In such cases, MSCI applies market neutral treatment and includes the security / securities issued in exchange in the opening index portfolio of the next business day, provided it is eligible for index inclusion.

If the security issued in exchange is not eligible, then the corporate event is treated as a redemption event and the treatment is based on principles outlined in Section 2.1.

Security eligibility criteria is same as that defined in the relevant MSCI Corporate Bond Index methodology.

In this case no cash is received from principal redemption, therefore Cash from Redemption and Redemption Income as defined in Section 1.2 and Section 1.3.2 are set to zero. However, cash is assumed to be paid out in case there is difference in the accrued interest between exchanged security and “issued in exchange” security.

On the event effective day (t) for the purposes of return calculation, adjusted market value with cash and cumulative cash balance of the security is calculated using the following formulae.

\[
CCB_{t,j} = CCP_{t,j} + CCR_{t-1,j} + \left(\frac{A_{t,j} - A_{t,j}^{\text{new}}}{100}\right) \times (N_{t-1,j} - N_{t,j}) \times K_{t,j}
\]
Adjusted $MVC_{t,j} = MVC_{t,j} \times FX_{t,j} + \frac{(P_{t,j}^{new} + A_{t,j}^{new}) \times (N_{t-1,j} - N_{t,j}) \times FX_{t,j} \times K_{t,j}}{100}$

Where:

$P_{t,j}^{new}$ – Clean bid price of the security issued in exchange of security $j$ at the close of day $t$

$A_{t,j}^{new}$ – Accrued Interest of the security issued in exchange of security $j$ at the close of day $t$

Note that to be included in the index, the securities issued in exchange must have price coverage at the close of event effective date (t).

Income return component of security level total return accounts for P&L generated if the clean price of security issued in exchange differs from clean price of exchanged security.

$SLIR_{t-1,t,j} = \frac{Coupon\ Income_{t,j} + ((P_{t,j}^{new} - P_{t,j})/100) \times (N_{t-1,j} - N_{t,j}) \times FX_{t,j} \times K_{t,j}}{Initial\ MVC_{t,j}}$
MSCI Index Level Datapoints

MSCI calculates aggregated index level data points for MSCI Fixed Income Indexes using weighted average methodology, as shown in the formulae enlisted below.

**Market Value Weight with Cash**

\[
W^{MVC}_{t,j} = \frac{MV_{t,j} \cdot FX_{t,j}}{\sum_{j=1}^{n} (MV_{t,j} + CCB_{t,j}) \cdot FX_{t,j}}
\]

**Nominal Weight**

\[
W^{N}_{t,j} = \frac{N_{t,j} \cdot K_{t,j}}{\sum_{j=1}^{n} N_{t,j} \cdot K_{t,j}}
\]

**Effective Duration Adjusted Weight**

\[
W^{DMV}_{t,j} = \frac{MV_{t,j} \cdot FX_{t,j} \cdot D^{EFF}_{t,j}}{\sum_{j=1}^{n} D^{EFF}_{t,j} \cdot (MV_{t,j} + CCB_{t,j}) \cdot FX_{t,j}}
\]

**Index Average Clean Price**

\[
AP_t = \sum_{j=1}^{n} P_{t,j} \cdot W^{N}_{t,j}
\]

**Index Average Dirty Price**

\[
ADP_t = \sum_{j=1}^{n} DP_{t,j} \cdot W^{N}_{t,j}
\]
Index Average Coupon

\[ AC_t = \sum_{j=1}^{n} \text{Coupon}_j \cdot w_{t,j} \]

Index Average Notional

\[ AN_t = \frac{\sum_{j=1}^{n} N_{t,j} \cdot K_{t,j}}{n} \]

Index Average Time to Maturity

\[ TM_t = \sum_{j=1}^{n} T_{M_{t,j}} \cdot w_{t,j} \]

\[ T_{M_{t,j}} = \frac{\text{Number of days between Maturity Date and } t}{365} \]

Index Average Modified Duration

\[ AD_{t}^{MOD} = \sum_{j=1}^{n} D_{t,j}^{MOD} \cdot w_{t,j}^{MVC} \]

Index Average Effective duration

\[ AD_{t}^{EFF} = \sum_{j=1}^{n} D_{t,j}^{EFF} \cdot w_{t,j}^{MVC} \]

Index Average Convexity

\[ AX_t = \sum_{j=1}^{n} X_t \cdot w_{t,j}^{MVC} \]
Index Average Effective Convexity

$$\text{AEX}_t = \sum_{j=1}^{n} E^*_t * w^MVC_{t,j}$$

Index Average Yield to Maturity

$$\text{AY}_t = \sum_{j=1}^{n} Y_{t,j} * w^MVC_{t,j}$$

Index Average Yield to Worst

$$\text{AYW}_t = \sum_{j=1}^{n} W_{t,j} * w^MVC_{t,j}$$

Index Average OAS

$$\text{OAS}_t = \sum_{j=1}^{n} OAS_{t,j} * w^{DMV}_{t,j}$$

Index Average Credit Rating

$$\text{ART}_t = \sum_{j=1}^{n} R_{t,j} * w^MVC_{t,j}$$

MSCI converts credit rating in letter from Moody’s and S&P by assigning each security with a credit score using the table presented in Appendix Section 4.2. Using the numerical scores, final credit rating score of the security is calculated as shown below.

$$R_{t,j} = \max(R_{t,j}^{Moody's}, R_{t,j}^{S&P})$$

Index level aggregated numerical credit rating score is rounded to the nearest integer and converted back to a MSCI credit rating as presented in the table in Appendix - Section 4.2.
Appendix

4.1 Transaction cost adjustment on Index Returns

On the effective date of index rebalancing (t = s), certain variants of the total index return are adjusted to account for transaction costs.

The return adjustment for transaction costs reflects the fact that in replicating portfolio rebalancing, new index additions and securities where weight has increased are traded at the ask price, whereas index deletions and securities where weight has decreased are traded at the bid price. The formulae mentioned below calculates the impact of the bid-ask spread on the index total return.

\[
\text{Cost}_{t=s} = \sum_{j=\text{all bonds with increase in } \text{wt including new index additions}} \frac{P_{\text{ask},t-1,j} - P_{\text{bid},t-1,j}}{P_{\text{bid},t-1,j} + A_{t-1,j}} \times (\text{opening } \text{wt}_{j,t}^{\text{mv}} - \text{closing } \text{wt}_{j,t-1}^{\text{mv}})
\]

Where:

\( P_{\text{ask},t-1,j} \) – Closing ask price of security j on one business day before the effective day of rebalancing

\( P_{\text{bid},t-1,j} \) – Closing bid price of security j on one business day before the effective day of rebalancing

\( \text{opening } \text{wt}_{j,t}^{\text{mv}} = \frac{\text{Initial MV}_{t,j}}{\sum_{j=1}^{n} \text{Initial MV}_{t,j}} \)

\( \text{closing } \text{wt}_{j,t-1}^{\text{mv}} = \frac{\text{Adjusted MV}_{t-1,j}}{\sum_{j=1}^{n} \text{Adjusted MV}_{t-1,j}} \)

\( \text{Initial MV}_{t,j} = \frac{D_{t-1,j} \times N_{t-1,j} \times F_{t-1,j} \times K_{t,j}}{100} \)

\( \text{Adjusted MV}_{t,j} = \frac{D_{t,j} \times N_{t,j} \times F_{t,j} \times K_{t,j}}{100} \)
Therefore, index total return (Index TR) on the effective date of rebalancing is adjusted as follows

\[
\text{Index } TR_{t=s}^{TC} = \text{Index } TR_{t=s} - \text{Cost }_{t=s}
\]

Where:

\(\text{Index } TR_{t=s}^{TC}\) - Index total return adjusted for transaction cost on the effective date of rebalancing.

Index Total Return calculated for MSCI Fixed Income Indexes can be attributed to price, income, currency and transaction cost components as shown below. On the effective date of rebalancing \((t = s)\), total return calculation will have a finite transaction cost adjustment, whereas on non-rebalancing days transaction cost component will be zero.

\[
\text{Index } TR_{t-1,t} = \text{Index } PR_{t-1,t} + \text{Index } IR_{t-1,t} + \text{Index } XR_{t-1,t} - \text{Cost }_{t-1,t}
\]

### 4.2 Credit Rating Scale

<table>
<thead>
<tr>
<th>Moody’s</th>
<th>S&amp;P</th>
<th>Score</th>
<th>MSCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaa</td>
<td>AAA</td>
<td>0</td>
<td>AAA</td>
</tr>
<tr>
<td>Aa1</td>
<td>AA+</td>
<td>1</td>
<td>AA1</td>
</tr>
<tr>
<td>Aa2</td>
<td>AA</td>
<td>2</td>
<td>AA2</td>
</tr>
<tr>
<td>Aa3</td>
<td>AA-</td>
<td>3</td>
<td>AA3</td>
</tr>
<tr>
<td>A1</td>
<td>A+</td>
<td>4</td>
<td>A1</td>
</tr>
<tr>
<td>A2</td>
<td>A</td>
<td>5</td>
<td>A2</td>
</tr>
<tr>
<td>A3</td>
<td>A-</td>
<td>6</td>
<td>A3</td>
</tr>
<tr>
<td>Baa1</td>
<td>BBB+</td>
<td>7</td>
<td>BBB1</td>
</tr>
<tr>
<td>Baa2</td>
<td>BBB</td>
<td>8</td>
<td>BBB2</td>
</tr>
<tr>
<td>Baa3</td>
<td>BBB-</td>
<td>9</td>
<td>BBB3</td>
</tr>
<tr>
<td>Rating</td>
<td>Rating</td>
<td>Threshold</td>
<td>Rating</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>-----------</td>
<td>--------</td>
</tr>
<tr>
<td>Ba1</td>
<td>BB+</td>
<td>10</td>
<td>BB1</td>
</tr>
<tr>
<td>Ba2</td>
<td>BB</td>
<td>11</td>
<td>BB2</td>
</tr>
<tr>
<td>Ba3</td>
<td>BB-</td>
<td>12</td>
<td>BB3</td>
</tr>
<tr>
<td>B1</td>
<td>B+</td>
<td>13</td>
<td>B1</td>
</tr>
<tr>
<td>B2</td>
<td>B</td>
<td>14</td>
<td>B2</td>
</tr>
<tr>
<td>B3</td>
<td>B-</td>
<td>15</td>
<td>B3</td>
</tr>
<tr>
<td>Caa1</td>
<td>CCC+</td>
<td>16</td>
<td>CCC1</td>
</tr>
<tr>
<td>Caa2</td>
<td>CCC</td>
<td>17</td>
<td>CCC2</td>
</tr>
<tr>
<td>Caa3</td>
<td>CCC-</td>
<td>18</td>
<td>CCC3</td>
</tr>
<tr>
<td>Ca</td>
<td>CC</td>
<td>19</td>
<td>CC</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>20</td>
<td>C</td>
</tr>
</tbody>
</table>

### 4.3 Treatment for Negative Accrued Interest

Accrued Interest is almost always expected to be positive, but bonds with a provision for ex-coupon period can have negative accrued interest.

If a bond is purchased in the ex-coupon period, the buyer is not entitled to the upcoming coupon payment. The buyer of such a bond thus incurs a loss of interest income for remainder of the ex-coupon period. This aspect is reflected accurately by negative accrued interest during that period.

Total return calculation framework for the MSCI Fixed Income Indexes accounts for this by adjusting security calculation in the ex-coupon period based on when it was added to the index.

If a security was added to the index in the ex-coupon period, then it does not receive coupon payment on the next coupon date (i.e. Cash from Coupon = 0). On the other hand, if a security is already a part of the index portfolio when it enters into the ex-coupon period, then accrued interest for the security is adjusted for calculation purposes as shown below.

\[
A_{t,j}^{\text{ex-coupon}} = A_{t,j} + \frac{\text{Coupon}_j}{\text{Coupon Frequency}_j}
\]
4.4 Treatment of Missing Data and Usage of Alternate Sources

For index maintenance purposes, MSCI often uses data received from multiple sources. Such data may need to be taken on specific and defined dates ('Data Date') as is relevant to a specific index methodology. In certain instances, due to an extraordinary event or exceptional technical issue, data needed as of a Data Date may not be available as expected. In such cases, unless otherwise specified in the relevant index methodology, MSCI will use the most recent data available prior to the Data Date. MSCI will release a public announcement to inform clients about the occurrence of any event where this methodological directive is enacted.

Additionally, MSCI independently monitors the quality of data from its data sources on an ongoing basis. MSCI may under exceptional circumstances elect to use data from alternative sources if MSCI determines that the primary source data is not reflective of market conditions. In such circumstances, and if deemed material, MSCI will release a public announcement to inform clients about the change. All such determinations are made by the MSCI Fixed Income Index Committee (FIIC). If appropriate, MSCI may conduct a consultation with the investment community to gather feedback on the most relevant alternate source.
The following sections have been modified since August 2020:

Section MSCI Fixed Income Indexes: Referenced the MSCI Fixed Income Data methodology for details on holiday treatment.
Contact us

voir au dos du document

MSCI is a leader provider of critical decision support tools and services for the global investment community. With over 45 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process.

To learn more, please visit www.msci.com.
Notice and disclaimer

This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the “Information”) is the property of MSCI Inc. or its subsidiaries (collectively, “MSCI”), or MSCI’s licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with MSCI, the “Information Providers”) and is provided for informational purposes only. The Information may not be modified, reverse-engineered, reproduced or redistributed in whole or in part without prior written permission from MSCI.

The Information may not be used to create derivative works or to verify or correct other data or information. For example (but without limitation), the Information may not be used to create indexes, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other MSCI data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. NONE OF THE INFORMATION PROVIDERS MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, EACH INFORMATION PROVIDER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.

Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall any Information Provider have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or willful default of itself, its servants, agents or sub-contractors.

Information containing any historical information, data or analysis should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction. Past performance does not guarantee future results.

The Information should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. All Information is impersonal and not tailored to the needs of any person, entity or group of persons.

None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), any security, financial product or other investment vehicle or any trading strategy. It is not possible to invest directly in an index. Exposure to an asset class or trading strategy or other category represented by an index is only available through third party investable instruments (if any) based on that index. MSCI does not issue, sponsor, endorse, market, offer, review or otherwise express any opinion regarding any fund, ETF, derivative or other security, investment, financial product or trading strategy that is based on, linked to or seeks to provide an investment return related to the performance of any MSCI index (collectively, “Index Linked Investments”). MSCI makes no assurance that any Index Linked Investments will accurately track index performance or provide positive investment returns. MSCI Inc. is not an investment adviser or fiduciary and MSCI makes no representation regarding the advisability of investing in any Index Linked Investments.

Index returns do not represent the results of actual trading of investible assets/securities. MSCI maintains and calculates indexes, but does not manage actual 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 Index Linked Investments. The imposition of these fees and charges would cause the performance of an Index Linked Investment to be different than the MSCI index performance.

The Information may contain back tested data. Back-tested performance is not actual performance, but is hypothetical. There are frequently material differences between back tested performance results and actual results subsequently achieved by any investment strategy.

Constituents of MSCI equity indexes are listed companies, which are included in or excluded from the indexes according to the application of the relevant index methodologies. Accordingly, constituents in MSCI equity indexes may include MSCI Inc., clients of MSCI or suppliers to MSCI. Inclusion of a security within an MSCI index is not a recommendation by MSCI to buy, sell, hold such security, nor is it considered to be investment advice.

Data and information produced by various affiliates of MSCI Inc., including MSCI ESG Research LLC and Barra LLC, may be used in calculating certain MSCI indexes. More information can be found in the relevant index methodologies on www.msci.com.

MSCI receives compensation in connection with licensing its indexes to third parties. MSCI Inc.’s revenue includes fees based on assets in Index Linked Investments. Information can be found in MSCI Inc.’s company filings on the Investor Relations section of www.msci.com.

MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc. Except with respect to any applicable products or services from MSCI ESG Research, neither MSCI nor any of its products or services recommends, endorses, approves or otherwise expresses any opinion regarding any issuer, securities, financial products or instruments or trading strategies and MSCI's products or services are not intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Issuers mentioned or included in any MSCI ESG Research materials may include MSCI Inc., clients of MSCI or suppliers to MSCI, and may also purchase research or other products or services from MSCI ESG Research. MSCI ESG Research materials, including materials utilized in any MSCI ESG Indexes or other products, have not been submitted to, nor received approval from, the United States Securities and Exchange Commission or any other regulatory body.

Any use of or access to products, services or information of MSCI requires a license from MSCI. MSCI, Barra, RiskMetrics, IPD and other MSCI brands and product names are the trademarks, service marks, or registered trademarks of MSCI or its subsidiaries in the United States and other jurisdictions. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and Standard & Poor’s. “Global Industry Classification Standard (GICS)” is a service mark of MSCI and Standard & Poor’s.

MIFID2/MIFIR notice: MSCI ESG Research LLC does not distribute or act as an intermediary for financial instruments or structured deposits, nor does it deal on its own account, provide execution services for others or manage client accounts. No MSCI ESG Research product or service supports, promotes or is intended to support or promote any such activity. MSCI ESG Research is an independent provider of ESG data, reports and ratings based on published methodologies and available to clients on a subscription basis. We do not provide custom or one-off ratings or recommendations of securities or other financial instruments upon request.

Privacy notice: For information about how MSCI ESG Research LLC collects and uses personal data concerning officers and directors, please refer to our Privacy Notice at https://www.msci.com/privacy-pledge.