

Parameter Sheet for

- **MSCI U.S. 3Y-5Y Choice Government Bond**
- **MSCI Eurozone 3Y-5Y Choice Government Bond Index**
- **MSCI Global Developed Market Corporate and Government Bond Select Index**
- **MSCI Global Developed Market Corporate and Government Bond Select Index hedged to EUR**

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1 General Methodology Overview

The MSCI Global Developed Market Corporate and Government Bond Select Index, MSCI U.S. 3Y-5Y Choice Government Bond and the MSCI Eurozone 3Y-5Y Choice Government Bond Index (‘the Indexes’¹) are constructed to measure the performance of fixed coupon paying bonds from the respective fixed income market segments.

The Indexes are rule based and conform to a general construction guideline as described in this document.

¹ The Indexes are governed by a set of methodology and policy documents (“Methodology Set”), including the present index methodology document. The Methodology Set for the Indexes can be accessed from MSCI’s webpage <https://www.msci.com/index-methodology> in the section ‘Search Methodology by Index Name or Index Code’.

2 Index Construction: General guidelines

2.1 Determining the Underlying Universe

The index constituents will be weighted and rebalanced according to the MSCI Corporate Bond Indexes Methodology² and the MSCI Government Bond Indexes Methodology³.

2.2 Defining the Indexes

2.2.1 MSCI U.S. 3Y-5Y Choice Government Bond Index

The MSCI U.S. 3Y-5Y Choice Government Bond Index is constructed using the methodology for the MSCI U.S. Government Bond Index, as defined in the MSCI Government Bond Indexes Methodology except for the below customization:

Maturity: The Index is constructed by applying the following maturity filter-

Index Name	Maturity Filter
MSCI Eurozone 3Y-5Y Choice Government Bond Index	All eligible constituents in this Index must have a maturity greater than or equal to 3 year and less than 5 years , as measured from the Rebalancing Date.

2.2.2 MSCI Eurozone 3Y-5Y Choice Government Bond Index

The MSCI Eurozone 3Y-5Y Custom Government Bond Index is constructed using the methodology for the MSCI Eurozone Government Bond Index, as defined in the MSCI Government Bond Indexes Methodology except for the below customizations:

Maturity: The Index is constructed by applying the following maturity filter-

Index Name	Maturity Filter
MSCI Eurozone 3Y-5Y Choice Government Bond Index	All eligible constituents in this Index must have a maturity greater than or equal to 3 year and less than 5 years , as measured from the Rebalancing Date.

2.2.3 MSCI Global Developed Market Corporate and Government Bond Select Index

The index is constructed by combining the MSCI Global IG Corporate Bond Index and the MSCI Global HY Corporate Bond Index as defined in the according to the MSCI Corporate Bond Indexes Methodology and the MSCI Developed Market Government Bond Index as defined in the MSCI Government Bond Indexes Methodology.

² The MSCI Corporate Bond Indexes Methodology is available at: <https://www.msci.com/index-methodology>

³ The MSCI Government Bond Indexes Methodology is available at: <https://www.msci.com/index-methodology>

2.2.4 MSCI Global Developed Market Corporate and Government Bond Select hedged to EUR Index

MSCI Global Developed Market Corporate and Government Bond Select hedged to EUR Index (“the Hedged Index”) construction involves the following steps:

- **Identifying the Home Currency:** EUR
- **Identifying the hedging percentage:** 100% hedged
- **Construction Methodology:** Refer to Appendix II

Maintaining the Hedged Index

The Hedged Index is maintained with an objective of reflecting the evolution of the underlying currency exposures in the unhedged underlying index on a timely basis. In particular, the hedged index maintenance involves:

- Resetting the weights of the currencies to be sold in the index
- Rolling the Forward contracts over to the next month

The Hedged Index is rebalanced monthly on the last trading day of the month, when the Hedged Index will take into account the effect of rolling into new 1-month Forward contracts based on the newly determined weights of currency to be sold for the next month’s Hedged Index calculation. The currency weights corresponding foreign currency notional amounts are determined as of the close of two weekdays before the first calendar day of following month and remain constant intra month. This means that no changes in the weights are made during the month to account for changes in the unhedged underlying index due to price movement of securities, corporate events, additions, deletions or any other changes.

Appendix I: Methodology Sets

The Indexes are governed by a set of methodology and policy documents (“Methodology Set”), including the present index methodology document as mentioned below:

- Description of methodology set –
<https://www.msci.com/index/methodology/latest/FIInfo>
- MSCI Fixed Income Data Methodology –
<https://www.msci.com/index/methodology/latest/FIDATA>
- MSCI Fixed Income Calculation Methodology –
<https://www.msci.com/index/methodology/latest/FIINDEXCALC>
- MSCI Fixed Income Glossary of Terms –
<https://www.msci.com/index/methodology/latest/FIGLOSS>
- MSCI Fixed Income Index Policies –
<https://www.msci.com/index/methodology/latest/FIINDEXPOLICY>
- MSCI Government Bond Indexes Methodology-
<https://www.msci.com/index/methodology/latest/FIGOV>
- MSCI Corporate Bond Indexes Methodology-
<https://www.msci.com/index/methodology/latest/FIICORP>

The Methodology Sets for the Indexes can also be accessed from MSCI’s webpage <https://www.msci.com/index-methodology> in the section ‘Search Methodology by Index Name or Index Code’.

Appendix II: Hedged Indexes Construction Methodology

The Hedged Indexes are designed to represent a close estimation of the return that can be achieved by hedging the currency exposures of the Unhedged Underlying Indexes in the one-month Forward market at each end of month. The Hedged Indexes hedge each foreign currency in the index back to the home currency of the index by selling each foreign currency forward at the one-month Forward rate. The amount of Forwards sold on the last weekday⁴ of the month represents the market value of the index as of the close of two weekdays before the first calendar day of the following month with the aim of achieving better index replicability. The foreign currency weights, however, take into account any changes in the composition of the index implemented as of the close of last weekday of the month. No adjustment to the hedge is done during the month to account for changes in the indexes due to price movement of securities, corporate events, additions, deletions or any other changes. In other words the amount hedged is kept constant over the whole month.

1. Common Principles in the Calculation of the Hedged Indexes

1.1. Closing Spot Rates

For constructing the Hedged Indexes, MSCI uses the WM/Reuters closing Spot rates (the mid-point of closing bid and ask rates to five decimal places), taken at 4 p.m. UK time in the daily index calculation and also in the determination of the notional amount of currencies to be sold forward on the roll date.

The WM/Reuters closing Spot rates are provided by Refinitiv. MSCI may elect to use alternative sources of exchange rates if the WM/Reuters rates are not available, or if MSCI determines that the WM/Reuters rates may not reflect market conditions.

1.2. Closing Forward Rates

For constructing the Hedged Indexes, MSCI uses the bid and ask values of the 1-month WM/Reuters Forward rates published by Refinitiv at 4 p.m. UK time.

1.3. Missing Spot or Forward Rates

In the case Refinitiv does not provide Spot rates for specific markets on given days (for example, Christmas Day and New Year Day), the Spot rates on the last weekday for which they are available will be used. If a Forward rate is missing, the Forward premium/discount on the last weekday for which it is available is applied to the current day's Spot rate.

1.4. Currency Crisis

Disruptions in the currency Spot and/or Forward market may potentially result in a currency being excluded from the Hedged Indexes even though the currency may be still included in the Unhedged Underlying Indexes. In this case, the resulting currency weights may be different from the currency weights in the Unhedged Underlying Indexes.

In such circumstances, MSCI would send an announcement to clients with the related information and with sufficient advance notice. All such determinations are made by the MSCI Fixed Income Index Committee (FIIC).

⁴ The treatment of missing spot and forward rates on any weekday is defined in section 2.3.

1.5. Calculation Time and Frequency

The Hedged Indexes are calculated after the calculation of the Unhedged Underlying Indexes.

Similar to the Unhedged Underlying Index calculation schedule, the official month-end index levels for the Hedged Indexes are calculated on the last weekday of the month.

2. Constructing the Hedged Indexes

Constructing the Hedged Indexes involves the following steps:

- Defining the home currency
- Identifying the currencies to be sold in the index
- Identifying the weight for each currency to be sold in the index
- Combining the Unhedged Underlying Index return with the Hedge Impact

2.1. Defining the Home Currency

The home currency is the home currency of an investor investing in international fixed income markets. Often, a cross-border investor would like to measure the performance impact of hedging the currency exposure of his holdings relative to his home currency. For construction of the Hedged Index the home currency is EUR.

2.2. Identifying the Currencies to be Sold in the Index

The Unhedged Underlying Indexes have security constituents that can be quoted in different foreign currencies. Each foreign currency used to denote securities in the Unhedged Underlying Index is included in the calculation of the Hedged Indexes.

2.3. Identifying the Weight for Each Currency to be Sold in the Index

In the Hedged Indexes, the weight of each currency corresponds to the relative market cap weight of the securities quoted in that currency in the Unhedged Underlying Index. More precisely, the weights are derived from the weight of the securities quoted in the respective currencies in the Unhedged Underlying Index as of the close of two weekdays before the first calendar day of following month, but taking into account any month end changes in the index constituents due to rebalancing and corporate actions.

2.4. Combining the Unhedged Underlying Index Return with the Hedge Impact

The Hedged Index return is calculated as a sum of the Unhedged Underlying Index return expressed in the home currency, and the Hedge Impact. As currency weights and corresponding Forward notional amounts are determined two weekdays before the first day of the following month, an adjustment factor needs to be introduced in the calculation of the Hedge Impact to account for the performance of the Hedged Index on the last weekday of the month. This adjustment is described in details in section 4.

3. Hedged Index Calculation Formula

3.1. Calculation Formula

There are two components to the Hedged Index return:

1. The performance of the unhedged index in the home currency
2. The Hedge Impact (aimed to represent the gain or loss on the Forward contracts) in the home currency

The Hedge Impact, expressed in percent, is calculated as follows (all exchange rates are expressed as amount of foreign currency for 1 unit of hedged currency):

$$HI(t) = NAF \times \sum_{i=1}^n \left\{ Weight_{i,M-2} \times FXRate_{i,M-2} \times \left(\frac{1}{FFRate_{i,M-1}} - \frac{1}{FFRate_{i,odd-days_t}} \right) \right\}$$

where

t = Index calculation date

NAF = Notional Adjustment Factor that accounts for the fact that the total value of the currency notional amount is not the same as the value of the Unhedged Underlying Index due to the fact that the first is determined on M-2 whereas the second on M-1. It is defined as the ratio of the Hedged Index level on M-2 and the Hedged Index level on M-1

$$= \frac{HedgedIndex_{M-2}}{HedgedIndex_{M-1}}$$

M = First calendar day of the month

$HI(t)$ = Index Hedge Impact at time t

$Weight_{i,M-2}$ = Weight of the currency i in the Unhedged Underlying Index two weekdays before the start of the current calendar month, but reflecting changes in the composition of the index to be implemented as of the close of the last weekday of the previous month

$FXRate_{i,M-2}$ = Spot rate of the currency i two weekdays before the start of the current calendar month. This term determines the notional amount of the foreign currency to be sold corresponding to its weight in the index

$FFRate_{i,M-1}$ = 1-month Forward (ask quote) for the currency i one weekday before the start of the current calendar month (or last weekday of the previous calendar month)

$FFRate_{i,odd-days_t}$ = Interpolated odd-days Forward rate of the currency i on day t . This term is used to mark to market the currency position intra month and is equal to the Spot rate of currency i on the last day of the month. Its calculation is defined in Section 6.1.

The Hedged Index performance is the combination of the unhedged performance (in hedged currency terms) and the Hedge Impact:

Performance of the Hedged Index =

$$\frac{\text{UnhedgedUnderlyingIndex}_t}{\text{UnhedgedUnderlyingIndex}_{M-1}} - 1 + HI(t)$$

where

$\text{UnhedgedUnderlyingIndex}_t$ = Value of the Unhedged Underlying Index on the calculation date

$\text{UnhedgedUnderlyingIndex}_{M-1}$ = Value of the Unhedged Underlying Index on the last weekday of the previous calendar month

$HI(t)$ = Hedge Impact on the index calculation date defined above

3.2. Calculation Example

We consider a simple example of calculation of a two-currency index hedged to GBP. We describe the hypothetical calculation of the hedged index level for August 31, 2021. The data relevant for this calculation is displayed below.

	(M-2)	(M-1)	(t)
	29-Jul-21	30-Jul-21	31-Aug-21
Proforma EUR Weight (effective 02-Aug-21)	19.61%		
Proforma USD Weight (effective 02-Aug-21)	80.39%		
GBPEUR spot (Mid Quote)	1.1759		1.1659
GBPUSD spot (Mid Quote)	1.3976		1.3763
GBPEUR 1M forward (Ask Quote)		1.1722	
GBPUSD 1M forward (Ask Quote)		1.3906	
GBPEUR odd-days forward			1.1659
GBPUSD odd-days forward			1.3763
Hedged Index Level (GBP)	1016.64	1017.02	
Parent index Level (GBP)		1920.75	1947.63

where

$$\text{GBPEUR spot (Mid Quote)}_{M-2} = \frac{\text{USDEUR spot (Mid Quote)}}{\text{USDGBP spot (Mid Quote)}} = \frac{0.8414}{0.7155} = 1.1759$$

$$\text{GBPUSD spot (Mid Quote)}_{M-2} = \frac{1}{\text{USDGBP spot (Mid Quote)}} = \frac{1}{0.7155} = 1.3976$$

$$\text{GBPEUR 1M forward (Ask Quote)}_{M-1} = \frac{\text{USDEUR 1M forward (Ask Quote)}}{\text{USDGBP 1M forward (Bid Quote)}} = \frac{0.8429}{0.7191} = 1.1722$$

$$\text{GBPUSD 1M forward (Ask Quote)}_{M-1} = \frac{1}{\text{USDGBP 1M forward (Bid Quote)}} = \frac{1}{0.7191} = 1.3906$$

The Notional Adjustment Factor is $1016.64/1017.02 = 0.9996$ and the Hedge Impact is calculated as follows:

$$\begin{aligned} HI(\text{Aug31}) &= 0.9996 \\ &\times \left[19.61\% \times 1.1759 \times \left(\frac{1}{1.1722} - \frac{1}{1.1659} \right) + 80.39\% \times 1.3976 \times \left(\frac{1}{1.3906} - \frac{1}{1.3763} \right) \right] \\ &= -0.9454\% \end{aligned}$$

The Hedged Index performance (month-to-date) for August 31 is

$$\text{Perf}(\text{Aug31}) = \frac{1947.63}{1920.75} - 1 + (-0.9454\%) = 0.4541\%$$

Leading to a Hedged Index level of $1017.02 \times (1 + 0.4541\%) = 1021.63$

4. Calculation of Daily Returns

4.1. Marking to Market the Forward Contracts on a Daily Basis

The daily calculation of Hedged Indexes marks to market the one-month Forward contracts on a daily basis by using an equal and offsetting Forward position. For instance, after 8 days, the Forward would be marked to market using a 22-days offsetting Forward in the case of a month when the last weekday of the month is the 30th (i.e. $30 - 8 = 22$).

4.2. Pricing the Offsetting Forward

Typically, only a limited number of standard duration of Forwards is available in the market. These rates are called “tenors”, and represent one day, one week, one month, etc. This means that other durations for Forwards (called odd-days Forwards) are generally not available, but must be calculated. For the sake of simplicity, when calculating Hedged Indexes, MSCI uses a linear interpolation based solely on the 1-month Forwards to estimate the value of odd-days Forwards every day during the whole month. Odd-days Forwards are computed simply as the Spot rate plus the 1-month Forward premium or discount pro-rated for the number of days until the last weekday of the month.

5. Odd-Days Forwards Calculation Using a Linear Interpolation

5.1. Calculation Formula

MSCI uses a linear interpolation formula to compute odd-days Forwards. The general formula is as follows:

$$FFRate_{odd-days_t} = FXRate_t + \left((FFRate_{1-month_t} - FXRate_t) \times \frac{Odd - days_t}{TotNbOfCalDaysDuringMonth} \right)$$

where

$FXRate_t$ = Spot rate at time t

$FFRate_{1-month_t}$ = 1-Month Forward rate (ask quote) at time t

$Odd - days_t$ = Number of days until the last weekday of the current month (not counting t)

5.2. Calculation Example

To compute a linear interpolation, the following process is used, using as an example data as of September 16, 2021:

- a) Obtain the date of the last weekday of the month, in our example September 30, 2021.
- b) Check if today is the last weekday of the month, in which case, the Spot exchange rate is used and there is no need to compute a linear interpolation.
- c) Obtain the 1-month Forward rate as of today, i.e. September 16, 2021, for example 1.3773 GBP / USD. This Forward settles in one month.
- d) Compute the price difference between the Spot and the 1-month Forward, as of today, September 16, 2021, called the premium (or discount). In this example, the Spot is at 1.3770, so the premium is 0.0003.
- e) Using a linear interpolation, compute the value, as of today, September 16, 2021, of a Forward with a duration equal to the number of days until the last weekday of the month. In our example, the last weekday of the month is the 30th, so the duration of the Forward is $30 - 16 = 14$ days.

The value of a 14 day Forward is estimated as the Spot rate plus the discount pro rated for the period. The total number of days taken into account is the number of days in the month, in our example 30, as there are 30 days in September 2021.

Interpolated value of a Forward for 14 days

$$= 1.3770 + 0.0003 * (14/30)$$

$$= 1.3770 + 0.00014$$

$$= 1.37714$$

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