MSCI Corridor Hedged Indexes Methodology

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1 MSCI Corridor Hedged Indexes

1.1 OVERVIEW

MSCI Corridor Hedged Indexes ("the Indexes") are designed to represent the performance of a strategy that can be achieved by combining the return of a parent MSCI Equity Index and the hedge impact resulting from hedging the currency exposures of the index using FX Forward contracts ("Forwards") at the end of month, as well as intra-month if the unhedged exposure reaches certain threshold during the month.

The hedge impact of the MSCI Corridor Hedged Indexes aim to represent the hedging of each foreign currency corresponding to the constituents of the underlying index back to the home currency of the investor that would be achieved by selling each foreign currency Forward at the one-month Forward rate during monthly rebalance. In addition, the Index methodology also involves intra-month adjustment of hedge positions based on certain conditions ("corridor breach", as described in Section 1.4). The amount of Forwards sold on the last weekday of the month represents the value (or the market capitalization) of the index as of the close of two weekdays before the first calendar day of the following month. 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. Adjustments to the hedge is done only in the case of a corridor breach, where the amount of Forwards to be sold is determined on the day of the breach ("detection day") and become effective on the next trading day ("adjustment day").

1.2 CONSTRUCTING THE MSCI CORRIDOR HEDGED INDEXES

Constructing the MSCI Corridor Hedged Indexes involves the following steps:

- Defining the home currency
- Identifying the currencies to be hedged
- Identifying the weight for each currency to be hedged in the index
- Calculation of hedged Index levels

1.2.1 DEFINING THE HOME CURRENCY

The home currency is the home currency of an investor investing in the international equity markets. For construction of MSCI Corridor Hedged Indexes the default home currency is the US Dollar. The MSCI Corridor Hedged Indexes can also be constructed with reference to any home currency.

1.2.2 IDENTIFYING THE CURRENCIES TO BE INCLUDED IN THE INDEX

Constituent prices of MSCI Equity Indexes can be quoted in different foreign currencies. Each foreign currency used to denote the security prices in the underlying MSCI Equity Index is included in the calculation of the MSCI Corridor Hedged Indexes. For example, for a US-based investor who is investing in the MSCI Emerging Markets Index, the calculation would combine the unhedged MSCI Emerging Markets index return in US dollars (USD) with the performance impact of hedging the currency exposure of all the currencies represented in the MSCI Emerging Markets Index relative to the US Dollar.

1.2.3 IDENTIFYING THE WEIGHT OF EACH CURRENCY IN THE INDEX

In the MSCI Corridor Hedged Indexes, the weight of each currency corresponds to the relative market cap weight of the securities quoted in that currency in the underlying MSCI Equity Index.

The weights are derived from the aggregate free-float adjusted market capitalization of the securities quoted in the respective currencies in the underlying MSCI Equity Index as of the close of two weekdays before the first calendar day of the following month. The weight calculation takes into account any changes in the index constituents due to a rebalancing and/or corporate actions becoming effective on the first weekday of the next month. For the intra-month adjustment of hedges, the weights are derived from the aggregate free-float adjusted market capitalization of the securities quoted in the respective currencies in the underlying MSCI Equity Index as of the close of the detection day of corridor breach, but taking into account any changes in the index constituents due to the corporate actions becoming effective on the next weekday (adjustment day).

1.2.4 CALCULATION OF HEDGED INDEX LEVELS

The MSCI Corridor Hedged Index level is calculated as a sum of the Equity Component expressed in the home currency and the Hedge Impact. The calculations are described in detail in section 1.4.

1.3 MAINTAINING THE MSCI CORRIDOR HEDGED INDEXES

The MSCI Corridor Hedged Indexes are maintained with an objective of reflecting the evolution of the underlying currency exposures in the MSCI Equity Indexes on a timely basis. In particular, index maintenance involves:

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

The MSCI Corridor Hedged Indexes are rebalanced monthly on the last trading day of the month[1], when the 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 hedged for the next month's index calculation. The currency weights and corresponding foreign currency notional amounts are determined as of the close of two weekdays before the first calendar day of the following month. Adjustment to the hedge is done only in the event of a corridor breach, where the amount of Forwards "sold" is determined on the day of corridor breach based on odd-days Forward rate and the newly determined weights of currency for adjustment on next weekday.

1.3.1 EXCHANGE HOLIDAYS

The MSCI Corridor Hedged Indexes are not adjusted for the corridor breach when more than a pre-defined threshold ('Corridor breach Holiday Weight threshold'[2] parameter) of the constituents of the underlying MSCI Equity Index (calculated by the constituent weights) are not traded due to exchange holidays on the adjustment day. In this case, the corridor breach on the detection day, if any, are overridden such that no adjustments are carried out on the next weekday.

1.4 MSCI CORRIDOR HEDGED INDEX CALCULATION FORMULA

There are two components to the MSCI Corridor Hedged Index:

1. The unhedged equity component in the home currency ("Equity Component")
2. The hedge impact (aimed to represent the gain or loss on the Forward contracts) in the home currency

The intra month adjustment of hedges is triggered based on the value of Hedge Ratio (as described in Appendix I).

A corridor breach occurs if, the Hedge Ratio moves beyond a pre-defined threshold (corridor). For example, when the Hedge Ratio corridor threshold is set at 5%, corridor breach occurs if the ratio is below 0.95 or it is above 1.05.

If the corridor breach is observed on the penultimate date of the month, no adjustment is made due to the corridor breach, because the positions will be reset at the end-of-month based on the monthly reset.

[1] Please refer to Appendix IV for details on the monthly rebalancing holiday treatment.

[2] Please refer to Appendix III for details.

If currencies are added to the underlying MSCI Equity Indexes in between monthly resets, then no additional forwards are created for new currencies until the next adjustment triggered by corridor breach or monthly reset. If any of the currencies are deleted from the underlying MSCI Equity Indexes in between the monthly resets, then forwards of the deleted currencies are closed on the last applicable day of those currencies in the MSCI Equity Indexes and hedge impact generated from them is added to the equity component. Additionally, the adjustments are carried out on the next weekday (not applicable if next weekday is the first calendar day of the month) in line with the adjustments made after the Hedge Ratio corridor breach.

1.4.1 EQUITY COMPONENT

The Equity Component, is calculated as follows:

a) At the first calendar day of the month,

$$EQ\_Comp(M) = HedgedIndex_{M-1} * \frac{EquityIndex_M}{EquityIndex_{M-1}}$$

b) Otherwise, the Equity Component follows the underlying unhedged MSCI Equity Index in the home currency,

$$EQ\_Comp(t) = EQ\_Comp(t-1) * \frac{EquityIndex_t}{EquityIndex_{t-1}}$$

where

t	= Index calculation date
M	= First calendar day of the month
$EquityIndex_t$	= Value of the unhedged MSCI Equity Index in home currency on the calculation date
$EquityIndex_{t-1}$	= Value of the unhedged MSCI Equity Index in home currency on a weekday before the calculation date
$EquityIndex_{M-1}$	= Value of the unhedged MSCI Equity Index in home currency on the last weekday of the previous calendar month
$HedgedIndex_{M-1}$	= Value of the MSCI Corridor Hedged Index on the last weekday of the previous calendar month.
$EQ\_Comp(t-1)$	= Value of the unhedged equity component on a weekday before the calculation date

1.4.2 HEDGE IMPACT

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

$$HI(t) = PreviousPositionsHI(t) + HedgePercentage(t) \times \sum_{i=1}^{n} \left\{ HedgeNotional_{i,adj_t} \times \left(\frac{1}{FFRate_{i,adj_t}} - \frac{1}{FFRate_{i,odd-days_t}} \right) \right\}$$

where

t	= Index calculation date
M	= First calendar day of the month
$HI(t)$	= Index Hedge Impact at time t
$PreviousPositionsHI(t)$	= Previous Positions Hedge Impact at time t

This term equals,

a) 0 …at the first calendar day of the month (t),

b) $PreviousPositionsHI(t-1) + HedgePercentage(t-1) \times \sum_{i=1}^{n} \left\{ HedgeNotional_{i,adj_{t-1}} \times \left(\frac{1}{FFRate_{i,adj_{t-1}}} - \frac{1}{FFRate_{i,odd-days_t}} \right) \right\}$ ……on the adjustment day (t) when (t-1) is the detection day of Hedge Ratio corridor breach

c) $PreviousPositionsHI(t-1)$ …on all other days

$HedgePercentage(t)$ = Hedged Percentage at time t

$HedgeNotional_{i,adj_t}$ = This term determines the notional amount of the foreign currency to be sold at the time of reset (monthly reset or reset because of corridor breach) which is applicable at time t.

This term equals,

a) At the first calendar day of the month (t),

$HedgedIndex_{M-2} * FXRate_{i,M-2} * Weight_{i,M-2}$

where,

$HedgedIndex_{M-2}$ Value of the MSCI Corridor Hedged Index level two weekdays before the start of the current calendar month. At inception, $HedgedIndex_{M-2}$ is set to base value which equals $HedgedIndex_{M-1}$

$FXRate_{i,M-2}$ Spot rate of the currency i two weekdays before the start of the current calendar month. At inception, $FXRate_{i,M-2}$ is set to $FXRate_{i,M-1}$

$Weight_{i,M-2}$ Weight of the currency i in the underlying MSCI Equity Index two weekdays before the start of the current calendar month taking into account any changes in the index constituents due to the corporate actions becoming effective on (t). At inception, $Weight_{i,M-2}$ is set to $Weight_{i,M-1}$

b) At the time of corridor breach,

$$HedgeNotional_{i,adj_{t-1}} + ShortfallAmount_{t-1} * FXRate_{i,t-1} * Weight_{i,t-1}$$

Where,

$HedgedNotional_{i,adj_{t-1}}$ Hedged notional amount one weekday before the adjustment day

$ShortfallAmount_{t-1}$ Shortfall amount one weekday before the adjustment day which is defined as,

$$ShortfallAmount_{t-1} = EQ\_Comp(t-1) - HedgeNotional_{adj_{t-1}}$$

$FXRate_{i,t-1}$ Spot rate of the currency i one weekday before the adjustment day

$Weight_{i,t-1}$ Weight of the currency i in the underlying MSCI Equity Index one weekday before the adjustment day, taking into account any changes in the index constituents due to the corporate actions becoming effective at adjustment day (t)

c) Otherwise,

$$HedgeNotional_{i,adj_t} = HedgeNotional_{i,adj_{t-1}}$$

$FFRate_{i,odd-days_t}$ = 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 1.6.1.

$FFRate_{i,adj_t}$	= Selling rate at the time of reset (monthly reset or reset because of corridor breach) for the currency i which is applicable at time t. At the first calendar day of the month (t), this term equals 1-month Forward for the currency i one weekday before the start of the current calendar month (or last weekday of the previous calendar month), At the time of corridor breach, this term equals $FFRate_{i,odd-days_t}$ on the adjustment day (t), Otherwise, it is same as $FFRate_{i,adj_{t-1}}$

1.4.3 HEDGED INDEX

The Hedged Index is the combination of the unhedged Equity Component (in home currency), and the Hedge Impact:

$$HedgedIndex(t) = EQ\_Comp(t) + HI(t)$$

where

$EQ\_Comp(\mathrm{t})$	= Value of the unhedged Equity Component on the calculation date
$HI(t)$	= Hedge Impact on the index calculation date defined above

1.5 CALCULATION OF DAILY RETURNS

1.5.1 MARKING TO MARKET THE FORWARD CONTRACTS ON A DAILY BASIS

The daily calculation of MSCI Corridor 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).

1.5.2 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 need to be calculated. For the sake of simplicity, when calculating MSCI Corridor 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.

1.6 ODD-DAYS FORWARDS CALCULATION USING A LINEAR INTERPOLATION

1.6.1 CALCULATION FORMULA

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

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

where

$FXRate_t$	= Spot rate at time *t*
$FFRate_{1-month_t}$	= 1-Month Forward rate at time *t*
$Odd - days_t$	= Number of days until the last weekday of the current month (not counting *t*)

2 Appendix I: Hedge Ratio

The Hedge Ratio is calculated as follows:

$$Hedge\ Ratio\ (t) = 1 - \left(\frac{ShortfallAmount(t)}{HedgedIndex(t)}\right)$$

where

$ShortfallAmount(\mathrm{t})$ = Shortfall amount on the calculation date

$HedgedIndex(t)$ = Value of the MSCI Corridor Hedged Index on the calculation date

The calculations are described in detail in section 1.4

3 Appendix II: Common Principles in the Calculation of MSCI Corridor Hedged Indexes

3.1 CURRENCY DATA

3.1.1 CLOSING SPOT RATES

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

3.1.2 CLOSING FORWARD RATES

MSCI uses the mid values of the 1-month WM/Refinitiv Forward rates published by Refinitiv at 4 p.m. UK time.

3.1.3 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.

3.1.4 CURRENCY CRISIS

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

In such circumstances, MSCI would send an announcement to clients with the related information and with sufficient advance notice. Such decisions are to be made by the MSCI Equity Index Committee (EIC) if warranted.

3.2 CALCULATION TIME AND FREQUENCY

The MSCI Corridor Hedged Indexes are calculated at the same time as the underlying MSCI Equity Index.

More details about calculation time and frequency of MSCI indexes can be found in the MSCI Index Calculation Methodology available on MSCI's web site at www.msci.com/index-methodology.

Similar to the MSCI Equity Index calculation schedule, the official month-end index level for the MSCI Corridor Hedged Indexes is calculated on the last weekday of the month.

4 Appendix III: Index Parameters for the MSCI Corridor Hedged Indexes

This appendix specifies the Index parameters for the MSCI Corridor Hedged Indexes.

Parameter	Default Value
Hedge Ratio threshold	5%
Corridor breach Holiday Weight threshold	30%
Hedge Percentage	100%

5 Appendix IV: Monthly Rebalancing Holiday Treatment

MSCI will prepone the effective date of the monthly rebalance by one weekday for the MSCI Corridor Hedged Indexes, in the following cases:

- WM/Refinitiv is not expected to publish closing spot rates and forward rates on the last weekday of the month.
- Markets which cumulatively constitute more than 20% of MSCI ACWI market capitalization are expected to be closed on the last weekday of the month.[3]

The dates used to determine the inputs for index calculation, as outlined in Section 1.4 and 1.5, will be aligned with the new effective date.

For odd-day Forwards calculations, the total number of calendar days will be adjusted to account for both the rebalance month and the following month. This adjustment will be reflected in the index calculation from the start of the rebalance month. As an example, please find the details if the treatment was used for rebalancing of these indexes in March 2024.

Example:

For the March 2024 monthly rebalance, if the effective date was preponed to March 29, 2024, from April 01, 2024, due to a US holiday and the unavailability of WM/Refinitiv closing Spot and Forwards rates on March 29, 2024.

- The foreign currency notional amounts would be determined on March 27, 2024, using the foreign currency weights and the Spot rates as of March 27, 2024. The foreign currency weights would be available in the product files delivered on March 27, 2024.
- The notional amounts would be sold forward using the 1-month Forward rates as of March 28, 2024.
- For March 2024, the total number of calendar days used in the odd-days Forwards calculation would be adjusted from 31 to 28, reflected in the index calculation from March 1, 2024. The total number of calendar days for April 2024 would be adjusted from 30 to 33.

[3] MSCI will calculate the MSCI ACWI Index market capitalization weight two months before the effective date of the monthly rebalance. For instance, to assess the holiday threshold for the monthly rebalance effective start of April, the MSCI ACWI Index free float market capitalization weight will be calculated as of the first weekday of February using the holiday information available on that day for the last weekday of March.

MSCI will apply this treatment only if holiday information is known with sufficient notice before the end of the month preceding the rebalance month. In cases of unexpected market closures, this treatment will not be implemented i.e., the effective date of the monthly rebalance won't be preponed. Any decision to apply this approach will be publicly announced by the end of the month preceding the rebalance month.

The following sections have been modified effective February 2025:

- The methodology book has been updated to reflect holiday treatment during monthly rebalancing in Appendix IV.

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