

Currency-hedged Indices Methodology

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Introduction

We currently have two methods in place to calculate a currency hedge index: monthly and daily hedging using forwards. For both methods the performance of an unhedged index in the same currency is used and on top a hedge impact is calculated.

Index specific information

- Daily or monthly hedging
- Closing calculation with Reuters spot or 4pm London time WM fixing

If monthly hedging, the following additional information is necessary:

- Rebalancing date (*RT*)
Standard is last business day of the month, but it is freely configurable
- Selection date (*ST*)
Selection date is the date on which the weights for the currency hedge are determined and is stated in days from the rebalancing date, i.e. 1 means one business day before rebalancing date. If $ST = 0$, then $ST = RT$.

If daily hedging, the following additional information is necessary:

- Rebalancing date (*RT*)
Standard is last business day of the month, but it is freely configurable

Index calculation using a monthly hedging

1. Calculating FX weight

If the underlying unhedged index contains more than one foreign currency, the weight of each currency is calculated based on COB on the selection date. If only one foreign currency is included in the index or the index is a local currency index, the weight is set to 1.

Simple example:

The underlying unhedged Index is calculated in USD and includes six shares, 2 in CHF, 2 in EUR, 2 in USD:

| Share | Currency | Weight (COB ST) |
|-------|----------|-----------------|
| 1 | CHF | 5% |
| 2 | CHF | 15% |
| 3 | EUR | 20% |
| 4 | EUR | 20% |
| 5 | USD | 30% |
| 6 | USD | 10% |

The weight of CHF is 20% and of EUR is 40%.

2. Calculation of the hedge impact (*HIM*)

The Hedge impact is calculated as follows:

$$HIM_t = AF_{RT} \cdot \sum_{i=1}^n W_{i,ST} \cdot S_{i,ST}^m \cdot \left(\frac{1}{F_{i,RT}^m} - \frac{1}{IF_{i,t}^m} \right)$$

with

AF_RT = Adjustment Factor on the last rebalancing date which is calculated as follows:

$$AF_{RT} = \frac{HI_{ST}}{HI_{RT}},$$

with

HI_ST = value of hedged index on ST

HI_RT = value of hedged index on RT

n = number of different currencies in the unhedged Index (without considering the currency in which the index is calculated)

W_i,ST = weight of currency i on selection date ST

S_m,i,t = Mid Spot of currency i on day t

F_m,i,RT = Mid Forward of currency i on rebalancing date RT

IF_m,i,t = interpolated Forward on day t which is calculated as follows:

$$IF_t^m = S_t^m + (F_t^m - S_t^m) \cdot \frac{D-d}{D}$$

with

D = number of calendar days between the last and the next rebalancing date

d = number of calendar days between t and the last rebalancing date

3. Index calculation

The hedged index is calculated as follows:

$$HI_t = HI_{RT} \cdot \left(1 + \left(\frac{UI_t}{UI_{RT}} - 1 \right) + HIM_t \right)$$

mit

UI_t = unhedged index on day t

UI_RT = unhedged index on the last rebalancing date RT

Index calculation using a daily hedging

Currently it is only possible to calculate a hedged variant of an unhedged index which does not include more than one currency. Further the formula needs not only an unhedged index, but also a local currency index.

Regarding the monthly hedging, only the calculation of the hedge impact (*HIM*) changes and is calculated as follows:

When *t* is the day after the rebalancing:

$$HIM_t = \sum_{i=1}^d AFL_i \cdot \left(\frac{S_{RT}^m}{F_{RT}^m} - \frac{S_{RT}^m}{IF_i^m} \right)$$

else

$$HIM_t = HIM_{t-1} + \sum_{i=1}^d AFL_i \cdot \left(\frac{S_{RT}^m}{IF_{i-1}^m} - \frac{S_{RT}^m}{IF_i^m} \right)$$

with

AFL = Adjustment Factor of the local currency index which is calculated as follows:

$$AFL_t = \frac{ULI_{t-1}}{ULI_{RT}}$$

with

ULI_{t-1} = unhedged Index in local currency on day t-1

ULI_{RT} = unhedged Index in local currency on the rebalancing date RT