



Morningstar® Currency Hedge Index Methodology

Morningstar Methodology Paper
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Overview

The Morningstar Currency Hedge Index methodology measures the performance of Morningstar index (Benchmark Index) after applying a practical hedging program, limiting the effects of currency fluctuations. Hedging each foreign currency in the portfolio, relative to an investor's home currency, is a close estimation of the return a local investor can achieve. The U.S. dollar is the default home currency for Morningstar Currency Hedged Indexes.

The Currency Hedge Index is long the Benchmark Index and short currency forwards whose notional amount is based on market capitalization of foreign currencies in the Benchmark Index. In other words, the hedge ratio, that is, the proportion of the portfolio's currency exposure that is hedged is set to 100%.

Typically, the Morningstar hedged index is rebalanced monthly, using foreign currency weights and corresponding notional amounts determined as of one business day prior. This approach ensures that index calculation closely resembles the actual implementation lag seen in real-world portfolios.

In order to account for the difference in the rebalance date and the date on which the notional amounts are determined, a monthly adjustment factor is applied on the hedge ratio. The notional amounts hedged remain constant throughout the month and are not modified on account of price movement, corporate action, rebalance, and reconstitution of the underlying index. The daily index calculation marks to market the one-month forward contracts using a linear interpolation of spot and forward prices based on the one-month forwards.

Morningstar Hedged Index Calculation Formula

Hedge Ratio Calculation

To calculate the Morningstar Hedge Ratio, let:

ET = the currency hedge rebalance effective date

RT = the reference date when notional currency weights to be hedged is calculated. Typically this is set one day prior to the effective date¹

To calculate the hedge ratio on day t we use the following formula:

$$HR_t = AF_{ET} * \sum_{i=1}^n W_{i,RT} * S_{i,RT} * \left(\frac{1}{F_{i,ET}} - \frac{1}{IF_{i,t}} \right)$$

where

n = number of currencies in the unhedged index

$W_{i,RT}$ = weight of currency i on reference date RT

$S_{i,RT}$ = spot rate of currency i on RT ²

$F_{i,ET}$ = one-month forward rate of currency i on ET ²

AF_{ET} = adjustment factor on the last rebalancing date to account for change in Hedge Index between the reference date and the effective date

To calculate AF_{ET} , let:

HI_{RT} = hedged index level on the reference date

HI_{ET} = hedged index level on the rebalance effective date

Hence,

$$AF_{ET} = \frac{HI_{RT}}{HI_{ET}}$$

1. Morningstar Currency Hedged Index backtests set the Reference and Effective Date to the same date, meaning there is no lag between the calculation of the currency notional and effective date of the hedge

2. Morningstar Currency Hedged End-of-Day calculations use WM Reuters 4PM London Close rates.

Finally $IF_{i,t}$ is the interpolated forward on day t:

Let

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

$IF_{i,t}$ then is calculated as follows:

$$IF_{i,t} = S_t + (F_t - S_t) * \frac{D - d}{D}$$

Hedge Index Calculation

To arrive at the Hedge Index Level, let:

UI_t = unhedged index level at time t

UI_{ET} = unhedged index level at rebalance effective date

Hence,

$$HI_t = HI_{ET} * \left(\frac{UI_t}{UI_{ET}} + HR_t \right)$$

