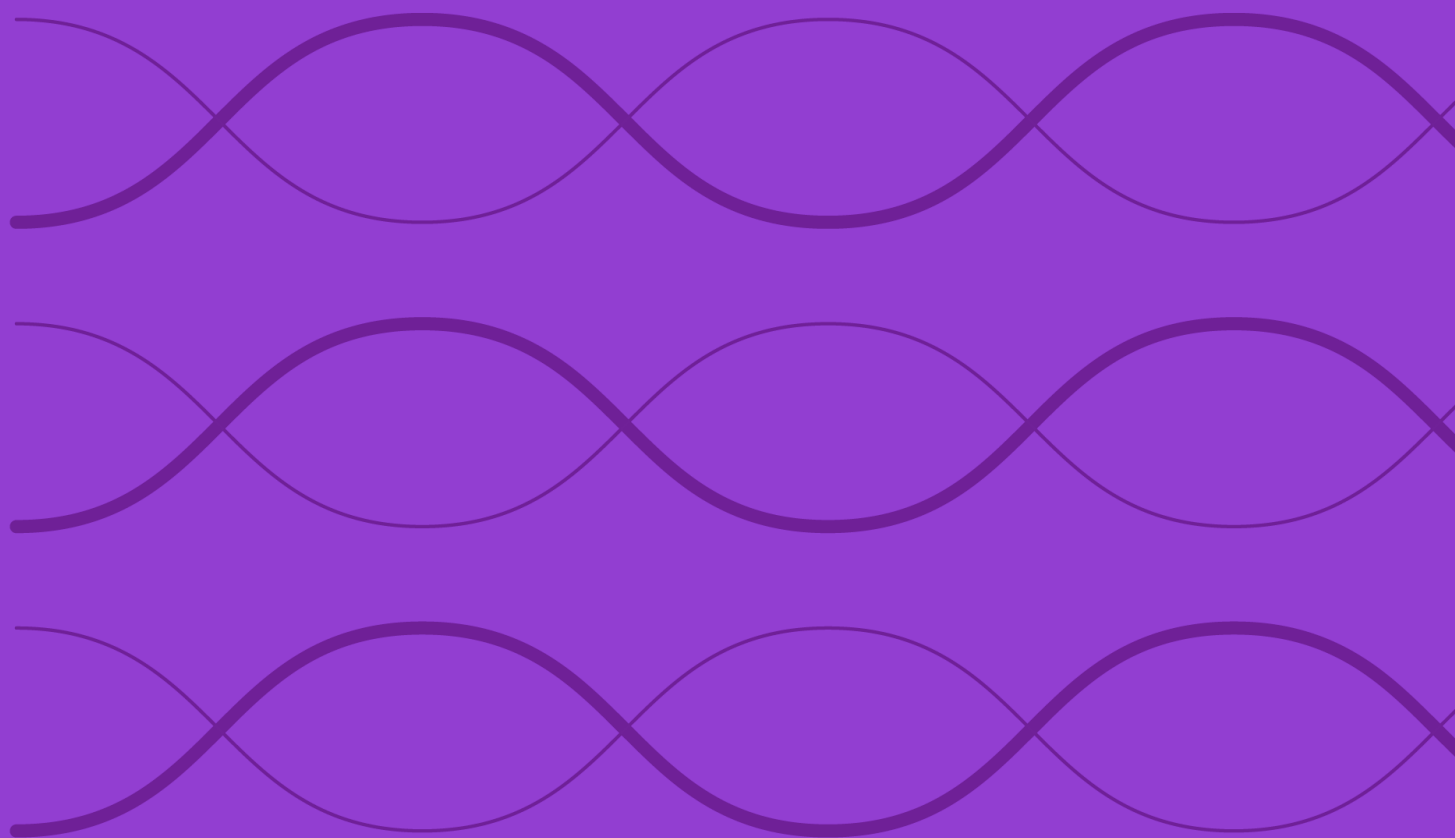


Morningstar Indexes Currency Hedge Index Methodology



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Overview

Morningstar currency hedged indexes are long the benchmark index and short currency forwards whose notional amount is based on the weight of foreign currencies ("currency exposure") in the underlying index. The hedge ratio — the proportion of the portfolio's currency exposure that is hedged — can vary as per the Hedged Index specifications.

Morningstar currency hedged indexes follow a monthly hedging strategy, using foreign currency weights and corresponding notional amounts determined as of one business day before the hedge rebalance date, which is typically the last business day of the month. This approach ensures that index calculation closely resembles the actual implementation lag investors face.¹ New forward positions are effective at the rebalance effective date, which is at the opening on the next business day after the rebalancing day.

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 in the hedge return calculation. The notional amounts hedged remain constant throughout the month and are not modified on account of price movement, corporate action, or 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. All the spot and forward rates are denominated in terms of foreign currency per unit of home currency. The underlying index levels and the hedged index levels are denominated in the home currency.

Daily Currency Hedge Index Calculations

The daily hedge impact is calculated as follows:

$$1) \quad HR_t = MAF * \sum_i^n p_i * \{W_{i1-1d} * FXRate_{i1-1d} * \left(\frac{1}{FFRate_{i1}} - \frac{1}{FFRateInterpolated_{i,t}} \right)\}$$

$$2) \quad FFRateInterpolated_{i,t} = FXRate_{i,t} + \left(\frac{D-d_t}{D} * (FFRate_{i,t} - FXRate_{i,t}) \right)$$

$$3) \quad MAF = \frac{HedgedIndex_{1-1d}}{HedgedIndex_1}$$

$$4) \quad HedgedIndex_t = HedgedIndex_1 * \left(\frac{UnhedgedIndex_t}{UnhedgedIndex_1} + HR_t \right)$$

Where:

¹ For the purposes of showing back-tested performance, no lag is assumed.

HR_t	=	Hedge Return on day t
t	=	Calculation date
p_i	=	Hedge Ratio of currency i in the index (proportion of the foreign currency exposure hedged)
n	=	Number of foreign currencies underlying the index
$W_{i,t-1d}$	=	Weight of currency i in the index as of one business day before the previous rebalance date, after incorporating corporate actions and rebalancing in the underlying index, effective at the open of the rebalance effective date (if calculated by Cirrus), or at the open of the rebalance date (rebalance effective date t-1: if calculated by Amber).
MAF	=	Monthly adjustment factor to account for the one-day lag between the rebalance date and the date on which notional amounts are determined
D	=	Number of calendar days between next rebalance date and previous rebalance date
d_t	=	Number of calendar days between calculation date and previous rebalance date
$FXRate_{i,t-1d}$	=	Spot rate of currency i as of one business day before the previous rebalance date
$FXRate_{i,t}$	=	Spot rate of currency i on day t
$FFRate_{i,t}$	=	One-month forward rate of currency i on day t
$FFRate_{i,t}$	=	Forward rate of currency i as of the previous rebalance date
$FFRate_{i,t}$	=	Forward rate of currency i interpolated for intramonth performance of the hedge
$HedgedIndex_{t-1d}$	=	Hedged index level as of one business day before the previous rebalance date
$HedgedIndex_t$	=	Hedged index level as of the previous rebalance date
$HedgedIndex_t$	=	Hedged index level as on day t
$UnhedgedIndex_t$	=	Underlying index level as on day t
$UnhedgedIndex_t$	=	Underlying index level as of the previous rebalance date

Data Source for FX Rate

The source data for forward and spot rates used in this methodology is WMR London 4 p.m. fixing rates. WMR foreign exchange rates are taken daily at 4 p.m. London time and used in the calculation of the indexes. Unless otherwise noted, this is applicable for all sections where FX Rate is used.

For all non-USD currency pairs, the spot and forward rates are calculated from respective USD rates.

Missing Data

If forward rate data for a currency is missing on the reference date, that currency will not contribute to the hedge impact for the next period. Morningstar Indexes will use the spot rate on the reference date to convert the returns of securities denominated in that currency, leaving that currency portion of each index unhedged for the month. If the daily forward rate data is not available on a given day (between reference dates) at the time of production, The latest available forward rate will be applied when updated values are not available between reference dates. Should the daily forward rate become available subsequently, the levels will be restated according to our index recalculation policy.

Appendix

Appendix 1: Modifications to the Rulebook

Section	Description of Change	Update Date
Entire Document	Moved the September 2015 methodology document to updated Morningstar brand template. No changes were made to the methodology, however, language was added to provide additional clarity on the methodology.	March 2024
Missing Data	Added section clarifying the treatment when forward rate data is not available.	July 2024

About Morningstar Indexes

Morningstar Indexes was built to keep up with the evolving needs of investors—and to be a leading-edge advocate for them. Our rich heritage as a transparent, investor-focused leader in data and research uniquely equips us to support individuals, institutions, wealth managers, and advisors in navigating investment opportunities across major asset classes, styles, and strategies. From traditional benchmarks and unique IP-driven indexes to index design, calculation, and distribution services, our solutions span an investment landscape as diverse as investors themselves.

Morningstar Index Methodology Committee

The Morningstar Index Methodology Committee oversees all new index development, index methodology changes, and cessation of indexes for any indexes where Morningstar owns the intellectual property. This committee is also charged with ensuring that indexes align with Morningstar Research principles and values. The group comprises members of the index team with index research, product development, product management, client service, index implementation, and operation expertise who provide the first layer of governance over index design and methodology.

Morningstar Index Operations Committee

The Morningstar Index Operations Committee governs the processes, systems, and exception handling of the day-to-day management of all live indexes, including index rebalancing and reconstitution, restatements, market classification, and contingency management. The committee oversees the annual review of index methodology (as required by U.K. and EU benchmark regulations, or BMR), ensuring that methodologies remain fit for purpose and continue to achieve their stated investment objectives. The group comprises members of the index team with data, operations, corporate actions, product development, index launch, client service, and index management experience who provide the first layer of governance over index operations.

Morningstar Index Oversight Committee

The Morningstar Index Oversight Committee is responsible for the index oversight function as per the requirements of the U.K. and European BMR, providing independent oversight of all aspects of the governance of benchmark administration as required by the relevant BMR. Its remit extends to all calculation and administration-related business activities of Morningstar Indexes, including administration of Morningstar-owned benchmarks as well as client-owned benchmarks and index calculation. The oversight function is part of the organizational structure of Morningstar but is separate and independent from the index business, index management, and the other index committees.

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