MSCI Risk Control Indexes Methodology

August 2024

Contents

1. Introduction

The MSCI Risk Control Indexes[1] ("the Indexes") aim to replicate the performance of an investment strategy that targets a specific level of risk by varying the weights of an underlying MSCI equity index (herein, the "Parent Index") and the cash component. The weights of the MSCI parent index and the cash component are determined daily based on the ratio of the specific risk level and the realized volatility of the Parent Index and are subject to a maximum leverage.

The Indexes may serve as benchmarks for managed volatility strategies and as the basis for exchange traded funds and structured products.

The Indexes are part of the MSCI Blended Index Family. For further details on the MSCI Blended Index Family, please refer to the MSCI Blended Index Family – Benchmark statement available on www.msci.com.

[1]The Indexes are governed by a set of methodology and policy documents ("Methodology Set"), including the present index methodology document. Please refer to Appendix IV for more details.

2. Applicable Universe, Cash Component and Specific Risk Levels

The MSCI Risk Control Indexes methodology is applicable to any existing Parent Index.

The MSCI Risk Control Indexes methodology uses the short-term rates for determining the returns of the cash component. Refer to Appendix II for more information on short-term rates.

The Indexes are available for six specific risk levels: 5%, 7.5%, 10%, 12.5%, 15% and 17.5%[2].

[2]MSCI may create custom indexes choosing different risk levels other than the values mentioned here.

3. Volatility Estimation

The returns of the Parent Index in a specific base currency are used for volatility estimation. The volatility estimation approach takes into account both the short-term and the long-term volatility trends of the Parent Index.

The volatility of the Parent Index of an MSCI Risk Control Index is calculated as the maximum of two volatility estimates: the short-term realized volatility estimate, calculated over a short horizon of 20 days, and the long-term realized volatility estimate, calculated over a long horizon of 60 days. The volatility estimation approach uses equally weighted daily gross total returns of the Parent Index for both horizons. The volatility calculation formulas are described below:

$$Realized\ Volatility_t = \sqrt{\frac{252}{n} * Variance\ (t)}$$

$$Variance(t) = 1/N * \sum_{t-N+1}^{t}\left[ln\left(MSCI\ Parent\ Index(i)/MSCI\ Parent\ Index(i-n)\right)\right]\text{^}2$$

n = Number of interval days used for return calculation; n=1 for daily returns.

N = Total number of historical trading days used for variance calculation and varies for short-term volatility estimate (N = 20) and long-term volatility estimate (N = 60)

$$MSCI\ Parent\ Index\ Volatility_t = Max\ (Short - term\ Realized\ Volatility_t, Long - term\ Realized\ Volatility_t)$$

4. Index Leverage of MSCI Risk Control Indexes

The objective of the Indexes is to replicate the performance of a strategy that targets a specific level of risk by varying the weights of the Parent Index and a cash component.

The Index Leverage of the Indexes is the weight of the Parent Index and is calculated daily as the ratio of the specific risk level and the volatility of the Parent Index subject to a maximum leverage of 150% and turnover buffers.

If the volatility of the Parent Index is higher than the specific risk level, then the weight of the Parent Index will be less than 100% while the weight of the cash component will be 100% minus the weight of the Parent Index. The daily return on the cash component is determined using the short-term rate[3] in the applicable currency. Similarly, if the volatility of the Parent Index is lower than the specific risk level, the weight of the Parent Index will be more than 100% subject to a maximum leverage of 150%. The borrowing cost associated with daily Index Leverage is calculated using the short-term rate in the applicable currency.

The Index Leverage applicable on an effective date is determined using the volatility of the Parent Index estimated two trading days before the effective date.

[3]Refer to Appendix II for more information on short-term rates.

5. Turnover Buffer and Exchanges Holidays

The Indexes apply turnover buffers to reduce turnover associated with changes in Index Leverage arising from changes in the realized volatility of the Parent Index. These Indexes are rebalanced daily subject to a turnover buffer of 5% and are rebalanced only when the percentage change in daily Index Leverage exceeds 5%. On days when the Indexes are not rebalanced, the Index Leverage from the previous trading day is maintained.

The Indexes are not rebalanced when 10% or more of the constituents of the Parent Index (calculated by the constituent weights) are not traded due to exchange holidays[4] on the day prior to the effective date.

[4]An unplanned exchange holiday may be considered as an "exchange holiday" if it is announced with sufficient advance notice for processing before the rebalancing day (the rebalancing day is two business days before the effective date).

6. Treatment of Corporate Events

The Indexes are derived from the existing underlying Parent Index. As a result, corporate events are reflected in the Indexes as they occur and as they are captured in the underlying Parent Index.

7. Index Calculations

The objective of the Indexes is to replicate the performance of a strategy that targets a specific level of risk by varying the weights of a Parent Index and the cash component. The Indexes take into account:

1. Return of the Parent Index, and

2. Return of the cash component.

For the Indexes, two index level variants are calculated:

1. The Total Return Index that represents the weighted return of the Parent Index and the cash component.

2. The Excess Return Index that represents the return of the Total Return Index minus the return of the cash component.

These index levels variants are determined for both the Gross Daily Total Return Index level and the Net Daily Total Return Index[5] level of the Parent Index[6].

The Index calculation formulas are described below:

$$MSCI\ Risk\ Control\ Total\ Return\ Level_t = MSCI\ Risk\ Control\ Total\ Return\ Index\ Level_{t-1} \times (1 + MSCI\ Risk\ Control\ Total\ Return\ Index\ Return_t)$$

$$MSCI\ Risk\ Control\ Total\ Return\ Index\ Return_t = Index\ Leverage_t \times MSCI\ Parent\ Index\ Return_t + (1 - Index\ Leverage_t) \times Return\ on\ Cash\ Component_t$$

$$MSCI\ Risk\ Control\ Excess\ Return\ Index\ Level_t = MSCI\ Risk\ Control\ Excess\ Return\ Index\ Level_{t-1} \times (1 + MSCI\ Risk\ Control\ Excess\ Retrun\ Index\ Return_t)$$

$$MSCI\ Risk\ Control\ Excess\ Return\ Index\ Return_t = Index\ Leverage_t \times (MSCI\ Parent\ Index\ Return_t - Return\ on\ Cash\ Component_t)$$

$$Index\ Leverage_t = Minimum\ (1.5, \frac{Specific\ Risk\ Level}{MSCI\ Parent\ Index\ Volatility_{t-2}})$$

$$MSCI\ Parent\ Index\ Return_t = \frac{MSCI\ Parent\ Index\ Level_t}{MSCI\ Parent\ Index\ Level_{t-1}} - 1$$

$$Return\ on\ Cash\ Component_t = \frac{Rate_{t-1}}{N} \times (Number\ of\ calendar\ days\ between\ t\ and\ t-1)$$

$Rate_{t-1}$ = Short-term rate published on the previous day
N = Day count convention used by the short-term rate

[5] MSCI Gross total return indexes reinvest all of the constituent companies' dividend distributions. Net total return indexes reinvest dividends after the deduction of withholding taxes.

[6] The price return index level variant of the Parent Index is also available for the custom MSCI Risk Control Indexes.

Appendix I: Risk Control Index Methodology Parameters

Exhibit 1: Main methodology parameters for the Indexes

	MSCI Risk Control index Methodology Parameters	Available Settings
1	Parent Index	Any Parent Index
2	Cash Component	Short-term rates applicable for the MSCI Risk Control Indexes
3	Specific Risk Level	5%, 7.5%, 10%, 15% and 17.5%
4	Number od days used for Volatility Calculation	20 and 60
5	Maximum Leverage	150%
6	Turn over Buffer	5%
7	Exchange Holiday Rule Threshold	10%
8	Lag between Rebalancing Date and Effective Date	2 business days

Calculation of Return on Cash Components Using T-Bills

When US Treasury Bills are used the return on Cash component is calculated as follows:

$$Return\ on\ Cash\ Component_t = (1 + Cash\ Rate_{t-1})^{Number\ of\ calendar\ days\ between\ t\ and\ t-1} - 1$$

$$Cash\ Rate = [1/(1 - (T - Bill\ Tenor/360\ \times T\ Bill\ Rate_{t-1}))]^{1/T-Bill\ Tenor} - 1$$

$T - Bill\ Tenor = Maturity\ of\ the\ US\ Treasury\ Bill$; for example, T-Bill Tenor is 91 for a 91 day T-Bill

Appendix II: Short-Term Rates

Coinciding with the August 2021 Quarterly Index Review, MSCI Risk Control Indexes transition away from LIBOR to the short-term replacement rates.

The short-term rates replacing 3-month LIBOR are highlighted below.

3-month LIBOR	USD	GBP	EURO	CHF	JPY
Short-term Rate	Overnight SOFR	Overnight SONIA	3-month EURIBOR	Overnight SARON	3-month TIBOR

MSCI indexes may use other rates as applicable for determining the returns of the Cash component.

Appendix III: Additional Customizations

- Index Fee and Parent Index Fee:
  An Index fee can be deducted from index returns for either Parent Index returns, or the Risk Control Index returns or both. Calculation for fee deduction is similar to that of a fixed percentage daily geometric decrement index based on the MSCI Decrement Indexes Methodology[7].

  It can use a day count of 360 or 365.

  Index Fee is not deducted from Parent Index logarithmic returns used in volatility estimation (as defined in section 3).

- Transaction Costs:

  Transaction cost is used to represent rebalancing costs that may arise at the Index rebalance whenever Index leverage (weight of Parent Index) is changed and is calculated as:

  $\text{Transaction Cost}_t = \text{ABS}(\mathit{Index\ Leverage}_{t+1} - \text{Index Leverage}_t) * C$

  where:
  C represents fixed transaction cost e.g. 0.05%

- Holiday Treatment:

  For the consideration of exchange holidays defined in section 5, the Index can also use holidays for any specific exchange(s) to define the holiday treatment for the Index. The Index level of the Risk Control Index will not change on the days defined as holidays for that specific exchange(s).

  Either specific exchange(s) or all exchanges based on client requirement can be selected to define holidays.

  The Index can only use one of two holiday treatments – either market threshold defined in section 5 or holiday treatment defined here but not both together.

  The days which are considered as holidays as per this treatment are excluded from volatility estimation calculation.

[7] Please refer to the MSCI Decrement Indexes Methodology at www.msci.com/index-methodology

	Additional Customization Parameters	Available Settings
1	Index Fee	as specified
2	Parent Index Fee	as specified
3	Day convention for fee calculation	360 or 365
4	Fixed Transaction Costs (C)	as specified
5	Holiday Parameter – Index Holidays	as specified

Appendix IV: Methodology Set

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/ReadMe
- MSCI Corporate Events Methodology – https://www.msci.com/index/methodology/latest/CE
- MSCI Fundamental Data Methodology – https://www.msci.com/index/methodology/latest/FundData
- MSCI Index Calculation Methodology – https://www.msci.com/index/methodology/latest/IndexCalc
- MSCI Index Glossary of Terms – https://www.msci.com/index/methodology/latest/IndexGlossary
- MSCI Index Policies – https://www.msci.com/index/methodology/latest/IndexPolicy
- MSCI Global Industry Classification Standard (GICS) Methodology – https://www.msci.com/index/methodology/latest/GICS
- MSCI Global Investable Market Indexes Methodology – https://www.msci.com/index/methodology/latest/GIMI

The Methodology Set 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 V: Changes to this Document

The following sections have been modified since April 2012:

• The introduction has been updated to reflect that the index is a part of the MSCI Blended Index Family

The following sections have been modified effective August 2021:

• The methodology book has been updated to reflect the transition to short-term rates from LIBOR.

• Deleted the list of MSCI Risk Control Indexes from Appendix 1.

The following sections have been modified effective August 2022:

• Section 2 of the methodology book has been updated to add 5% and 7.5% Specific risk levels.

• Appendix 1 is updated to reflect additional risk levels and specific parameters applied to the MSCI Risk Control Indexes.

The following sections have been modified effective November 2023:

• Section 2 of the methodology book has been updated to add clarification of custom risk levels.

• Section 5 is updated to add clarification to unplanned exchange holidays.

• Section 7 is updated to reflect use of price return index level variant for Parent Index level.

The following sections have been modified since August 2024:

Appendix III: Additional Customizations

- Added Appendix III: Additional Customizations to reflect some additional custom features that can be added to the Indexes.

Appendix IV: Methodology Set

- Added details on the Methodology Set for the Indexes.

Contact us

msci.com/contact-us

AMERICAS

United States	+ 1 888 588 4567 *
Canada	+ 1 416 687 6270
Brazil	+ 55 11 4040 7830
Mexico	+ 52 81 1253 4020

EUROPE, MIDDLE EAST & AFRICA

South Africa	+ 27 21 673 0103
Germany	+ 49 69 133 859 00
Switzerland	+ 41 22 817 9777
United Kingdom	+ 44 20 7618 2222
Italy	+ 39 02 5849 0415
France	+ 33 17 6769 810

ASIA PACIFIC

China	+ 86 21 61326611
Hong Kong	+ 852 2844 9333
India	+ 91 22 6784 9160
Malaysia	1800818185 *
South Korea	+ 82 70 4769 4231
Singapore	+ 65 67011177
Australia	+ 612 9033 9333
Taiwan	008 0112 7513 *
Thailand	0018 0015 6207 7181 *
Japan	+ 81 3 4579 0333

* toll-free

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