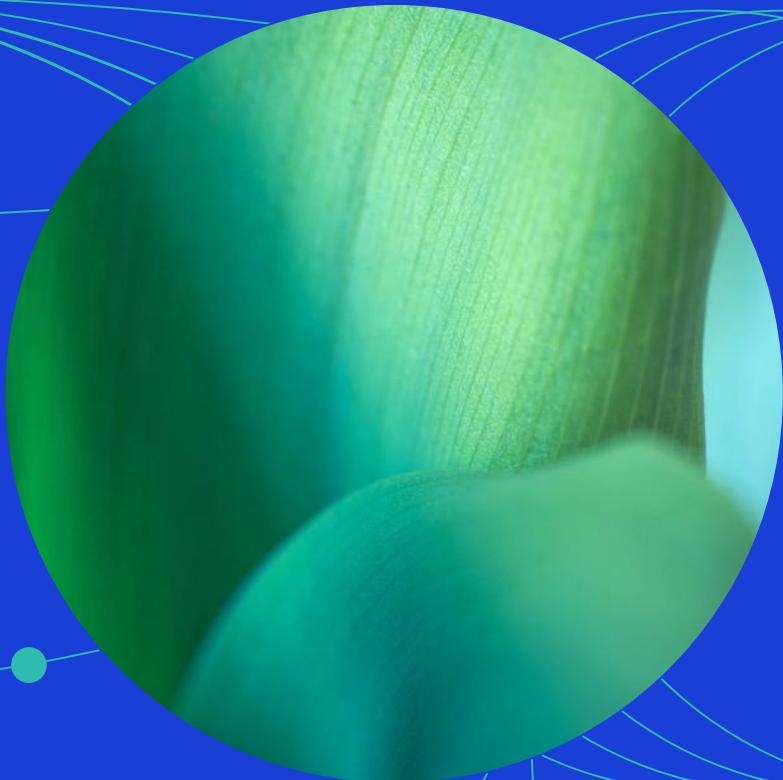


MSCI Minimum Volatility Advanced Indexes Methodology



Contents

1	Introduction	3
2	Constructing the Indexes	4
2.1	Defining the Parent Index and the Base Currency for Optimization	4
2.1.1	Eligible Universe	4
2.2	Defining the Optimization Constraints	4
2.3	Determining the Optimized Index	5
2.4	Treatment of Unrated Companies	5
3	Maintaining the Indexes	6
3.1	Semi-Annual Index Reviews	6
3.2	Quarterly Index Reviews	6
3.3	Ongoing Event-Related Changes	6
4	MSCI Solutions	8
4.1	MSCI ESG Ratings	8
4.2	MSCI Controversies	8
4.3	MSCI Business Involvement Screening Research	8
Appendix I: Handling Infeasible Optimizations		9
Appendix II: New Release of Barra® Equity Model or Barra® Optimizer		11
Appendix III: Methodology Set		12
Appendix IV: Changes to this Document		13

1 Introduction

The MSCI Minimum Volatility Advanced Indexes (the "Indexes")¹ are designed to represent the performance of a strategy that seeks systematic integration of environmental, social and governance (ESG) norms in minimum volatility investing by seeking to minimize risk along with the improvement in the ESG profile of the index. In other words, the index methodology aims to achieve lowest risk while improving the ESG score relative to the underlying parent index.

MSCI categorizes the MSCI Minimum Volatility Advanced Indexes as part of the family of MSCI Factor Indexes, which are designed to reflect the systematic elements of particular investment styles or strategies. While capitalization weighted indexes aim to represent the broad market beta, additional sources of systematic return associated with particular investment styles and strategies, such as value, quality, volatility, etc. or their combination could be represented through alternatively weighted indexes.

This index methodology aims to incorporate ESG-based constraint in a bottom-up factor index construction approach with a focus on low volatility factor indexes (Minimum Volatility)².

The Indexes are calculated by optimizing a parent MSCI Index by using an estimated co-variance matrix to produce an index that has the lowest absolute volatility for a given set of constraints. This includes specific constraints for improving the ESG profile for the index relative to that of the underlying parent index.

The starting universe to determine a Minimum Volatility Index is an MSCI Equity Index and the estimated co-variance matrix is based on the relevant Barra multifactor equity model. Details about the Barra multi-factor risk models are available at <https://www.msci.com/portfolio-management>.

This methodology book describes a generic methodology that can be applied to create Minimum Volatility Advanced Indexes from any of the existing MSCI equity indexes (herein, "Parent Indexes"). Some of the optimization constraints applied to determine the MSCI Minimum Volatility Advanced Index may vary based on the Parent Index on which the optimization is performed.

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 III for more details.

² For the methodology for other MSCI Factor Advanced indexes please see MSCI Factor Advanced Indexes Methodology

2 Constructing the Indexes

The Indexes use company ratings and research provided by MSCI Solutions LLC ("MSCI Solutions")³ for the Index construction.

Constructing the Indexes involves the following steps:

- Defining the Parent Index and the base currency for optimization
- Defining the optimization constraints
- Determining the optimized portfolio

The steps mentioned above are defined in detail in the subsequent sections

2.1 Defining the Parent Index and the Base Currency for Optimization

Constructing the Indexes begins with selecting the Parent Index and eligible universe to perform total risk minimizing optimization. The optimization is performed from a base currency perspective and does not allow short selling of securities. The default currency is the US Dollar.

The optimization relies on the factor exposures for all the securities in the Parent Index and the factor co-variance matrix of the relevant Barra Equity Model⁴.

2.1.1 Eligible Universe

The Eligible Universe is constructed by excluding securities from the Parent Index based on the exclusion criteria described below.

- **Controversies:** All companies assessed as having involvement in Controversies that are classified as Red Flags (MSCI Controversy Score of 0). A Red Flag indicates an ongoing, Very Severe controversy implicating a company directly through its actions, products, or operations.
- **Controversial Weapons:** Companies involved in Controversial Weapons as defined by the methodology of the MSCI Ex-Controversial Weapons Indexes⁵.

2.2 Defining the Optimization Constraints

At each Index Review, the following optimization constraints are employed, which aim to ensure replicability and investability while achieving lowest volatility and improving the ESG profile.

³ See Section 4 for further information regarding sustainability and climate data used in the Indexes that MSCI Limited and MSCI Deutschland GmbH source from MSCI Solutions LLC ("MSCI Solutions"), a separate subsidiary of MSCI Inc. MSCI Solutions is solely responsible for the creation, determination and management of such data as a provider to MSCI Limited and MSCI Deutschland GmbH. MSCI Limited and MSCI Deutschland GmbH are the benchmark administrators for the MSCI indexes

⁴ Please refer to Appendix II for the detailed information on model usage

⁵ The MSCI Global Ex Controversial Weapons Indexes is available at <https://www.msci.com/index/methodology/latest/XCW>

- The maximum weight of an index constituent will be restricted to the lower of 1.5% and 20 times the weight of the security in the Parent Index.
- The minimum weight of an index constituent will be 0.05%.
- For countries with weight greater than 2.5% in the Parent Index, the weight in the MSCI Minimum Volatility Advanced Index will not deviate more than +/- 5% from the country weight in the Parent Index.
- For countries with weight less than 2.5% in the Parent Index, the weight in the MSCI Minimum Volatility Advanced Index will be capped at 3 times their weight in the Parent Index.
- The above country weight constraint will also apply on China A Stock Connect listings as a group separately in addition to the usual country weight constraint on China.
- The sector weights of the MSCI Minimum Volatility Advanced Index will not deviate more than +/- 5% from the sector weights of the Parent Index.
- No constraint will be applied on the exposure of the MSCI Minimum Volatility Advanced Index to the Barra Volatility risk factors (BETA and RESVOL). Exposure to all other Barra risk factors will be restricted to +/-0.25 standard deviations relative to the Parent Index.
- The weighted-average industry-adjusted ESG score⁶ of the Index portfolio will be at least 20% more than the weighted-average industry-adjusted ESG score of the Parent Index portfolio at the time of rebalancing
- The one-way turnover of the MSCI Minimum Volatility Advanced Index is constrained to a maximum of 10% at each SAIR

2.3 Determining the Optimized Index

The Indexes are constructed using the Barra Open Optimizer in combination with the relevant Barra Equity Model. The optimization uses the eligible universe as the universe of eligible securities and the specified optimization objective and constraints to determine the MSCI Minimum Volatility Advanced Index. Infeasible optimizations are handled as explained in Appendix I.

2.4 Treatment of Unrated Companies

Companies not assessed by MSCI Solutions on data for any of the following MSCI sustainability and climate products are not eligible for inclusion in the Indexes.

- MSCI Controversies

⁶ Companies not assessed by MSCI Solutions on data for industry-adjusted ESG score are assigned an industry-adjusted ESG score of zero.

3 Maintaining the Indexes

3.1 Semi-Annual Index Reviews

The Indexes are rebalanced on a semi-annual basis, usually as of the close of the last business day of May and November, coinciding with the May and November Index Reviews of the MSCI Global Investable Market Indexes. Barra Equity Model data as of the end of April and October are used respectively. This approach aims to capture timely updates to the risk characteristics of the companies and coincide with the rebalancing frequency of the relevant Parent Index.

In general, MSCI uses MSCI Solutions data⁷ (including MSCI ESG Ratings, MSCI Controversies Scores and MSCI Business Involvement Screening Research) as of the end of the month preceding the Index Reviews for the rebalancing of the Index. For some securities, such data may not be published by MSCI Solutions by the end of the month preceding the Index Review. For such securities, MSCI will use data published after the end of month, when available, for the rebalancing of the Index.

The pro forma Indexes are in general announced nine business days before the effective date.

3.2 Quarterly Index Reviews

In addition to the semi-annual index review, the ESG-based exclusions are applied on a quarterly basis at the time of February and August Index Reviews of the MSCI Global Investable Market Indexes, usually as of the close of the last business day of February and August. At the quarterly index reviews, the Indexes are not reconstituted, but existing constituents are deleted from the Indexes if they do not satisfy the eligibility criteria as described in Section 2.1 above. The data used for the quarterly index review will be taken as of the end of the month preceding the Index Review i.e., January and July. For some securities, such data may not be published by MSCI Solutions by the end of the month preceding the review. For such securities, MSCI will use data published after the end of month, when available, for the monthly review of the Index.

3.3 Ongoing Event-Related Changes

The general treatment of corporate events in the Indexes aims to minimize turnover outside of Index Reviews. The methodology aims to appropriately represent an investor's participation in an event based on relevant deal terms and pre-event weighting of the index constituents that are involved. Further, changes in index market capitalization that occur as a result of corporate event implementation will be offset by a corresponding change in the Variable Weighting Factor (VWF) of the constituent.

Additionally, if the frequency of Index Reviews in the Parent Index is greater than the frequency of Index Reviews in the MSCI Minimum Volatility Advanced Index, the changes made to the Parent Index during intermediate Index Reviews will be neutralized in the MSCI Minimum Volatility Advanced Index.

⁸ See Section 4 for details of data sourced from MSCI Solutions used in the Indexes

The following section briefly describes the treatment of common corporate events within the Indexes. No new securities will be added (except where noted below) to the Index between Index Reviews. Parent Index deletions will be reflected simultaneously.

Event Type	Event Details
New additions to the Parent Index	A new security added to the Parent Index (such as IPO and other early inclusions) will not be added to the Index.
Spin-Offs	All securities created as a result of the spin-off of an existing Index constituent will be added to the Index at the time of event implementation. Reevaluation for continued inclusion in the Index will occur at the subsequent Index Review.
Merger/Acquisition	For Mergers and Acquisitions, the acquirer's post event weight will account for the proportionate amount of shares involved in deal consideration, while cash proceeds will be invested across the Index. If an existing Index constituent is acquired by a non-Index constituent, the existing constituent will be deleted from the Index and the acquiring non-constituent will not be added to the Index.
Changes in Security Characteristics	A security will continue to be an Index constituent if there are changes in characteristics (country, sector, size segment, etc.) Reevaluation for continued inclusion in the Index will occur at the subsequent Index Review.

Further detail and illustration regarding specific treatment of corporate events relevant to this Index can be found in the MSCI Corporate Events Methodology book under the sections detailing the treatment of events in Capped Weighted and Non-Market Capitalization Weighted indexes.

The MSCI Corporate Events methodology book is available at:

<https://www.msci.com/index/methodology/latest/CE>.

4 MSCI Solutions

The Indexes are products of MSCI Inc. that utilize information such as company ratings and research produced and provided by MSCI Solutions LLC ("MSCI Solutions"), a subsidiary of MSCI Inc. In particular, the Indexes use the following MSCI sustainability and climate products: MSCI ESG Ratings, MSCI Controversies and MSCI Business Involvement Screening Research. MSCI Indexes are administered by MSCI Limited and MSCI Deutschland GmbH.

4.1 MSCI ESG Ratings

MSCI ESG Ratings aim to measure entities' management of environmental, social and governance risks and opportunities. MSCI ESG Ratings use a weighted average key issue calculation that is normalized by industry to arrive at an industry-adjusted ESG score (0-10), which is then translated to a seven-point scale from 'AAA' to 'CCC', indicating how an entity manages relevant key issues relative to industry peers.

The MSCI ESG Ratings methodology can be found at:

<https://www.msci.com/legal/sustainability-and-climate-resources-and-disclosures>.

4.2 MSCI Controversies

MSCI Controversies provide assessments of controversies concerning the potential negative environmental, social, and/or governance impact of company operations, products and services. The evaluation framework used in MSCI Controversies is designed to be consistent with international norms represented by the UN Declaration of Human Rights, the ILO Declaration on Fundamental Principles and Rights at Work, and the UN Global Compact. MSCI Controversies Score falls on a 0-10 scale, with "0" being the most severe controversy.

The MSCI Controversies methodology can be found at:

<https://www.msci.com/legal/sustainability-and-climate-resources-and-disclosures>.

4.3 MSCI Business Involvement Screening Research

MSCI Business Involvement Screening Research (BISR) aims to enable institutional investors to manage environmental, social and governance (ESG) standards and restrictions reliably and efficiently.

The MSCI Business Involvement Screening Research methodology can be found at:

<https://www.msci.com/legal/sustainability-and-climate-resources-and-disclosures>.

Appendix I: Handling Infeasible Optimizations

During the Semi-Annual Index Review, in the event that there is no optimal solution that satisfies all the optimization constraints defined in Section 2.2, the following constraints are relaxed, until an optimal solution is found:

- Maximum turnover
- Minimum weight constraint
- Weighted-average industry-adjusted ESG score improvement

Relaxation Steps:

- Step I: Relax the maximum turnover constraint in steps of 5%, up to a maximum of 30%
- Step II: Relax the minimum weight constraint in steps of 0.01% up to a minimum of 0.01%.
- Step III: The maximum turnover constraint and minimum weight constraint are alternately relaxed until a feasible solution is achieved. For example, constraints relaxation is executed in the sequence as illustrated below:

Order of Relaxation	Turnover limit	Minimum Weight Constraint
1	15%	0.05%
2	15%	0.04%
3	20%	0.04%
4	20%	0.03%

ESG Score Improvement Target Relaxation

If no optimal solution is found after maximum turnover and minimum weight constraint are fully relaxed, the minimum required weighted-average industry-adjusted ESG Score Improvement of the Index relative to the Parent Index will be relaxed from 20% to 1% in steps of 1% (until the ESG Score Target of the Index reaches the ESG Score of the Parent Index), defined as below:

- The ESG Score Improvement Target of the Index is relaxed by 1% and the maximum turnover constraint and the minimum weight constraint are reset to their initial thresholds.
- Steps I, II and III are repeated and the maximum turnover constraints and minimum weight are relaxed again from their initial thresholds.
- This process of relaxing the ESG Score Improvement Target and subsequently relaxing maximum turnover and the minimum weight constraints from their initial threshold to maximum threshold is repeated in the same manner until a feasible solution is achieved.

In the event that no optimal solution is found even after all the above constraints are fully relaxed, including the ESG Score Improvement Target relaxation to 1%, the relevant the MSCI Minimum Volatility Advanced Index will not be rebalanced for that Index Review.

For MSCI Regional/Country Indexes which have relatively lower number of stocks, the standard optimization parameters may lead to an infeasible solution. MSCI may apply relaxed constraints relative to the standard set of constraints based on the following guidelines:

Order of Relaxation	Maximum Asset Weight	Sector Weight
1	Lower of 3% or 20 times the weight of the security in the Parent Index	+/-5% from the sector weights of the Parent Index
2	Lower of 3% or 20 times the weight of the security in the Parent Index	+/-7.5% from the sector weights of the Parent Index
3	Lower of 5% or 20 times the weight of the security in the Parent Index	+/-5% from the sector weights of the Parent Index
4	Lower of 5% or 20 times the weight of the security in the Parent Index	+/-7.5% from the sector weights of the Parent Index

Appendix II: New Release of Barra® Equity Model or Barra® Optimizer

The methodology presently uses MSCI Barra Global Equity Model for Long-Term Investors ("GEMLTL") for the optimization. A new release of the relevant Barra Equity Model or Barra Optimizer may replace the former version within a suitable timeframe.

Appendix III: 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 –
www.msci.com/index/methodology/latest/ReadMe
- MSCI Corporate Events Methodology –
www.msci.com/index/methodology/latest/CE
- MSCI Fundamental Data Methodology –
<https://www.msci.com/index/methodology/latest/FundData>
- MSCI Index Calculation Methodology –
www.msci.com/index/methodology/latest/IndexCalc
- MSCI Index Glossary of Terms –
www.msci.com/index/methodology/latest/IndexGlossary
- MSCI Index Policies –
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 –
www.msci.com/index/methodology/latest/GIMI
- MSCI Global ex Controversial Weapons Indexes Methodology –
www.msci.com/index/methodology/latest/XCW
- ESG Factors In Methodology*

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'.

* 'ESG Factors in Methodology' contains the list of environmental, social, and governance factors considered, and how they are applied in the methodology (e.g., selection, weighting or exclusion). It can be accessed in the Methodology Set as described above.

Appendix IV: Changes to this Document

The following sections have been modified Since September 2017:

- Section 3.2 has been updated to reflect the additional constraint on China A Stock Connect listings.

The following sections have been modified as of July 2023:

- Methodology book was updated to reflect the transition of the MSCI Global Investable Market Indexes (GIMI) to Quarterly Comprehensive Index Reviews.
- All references to "Semi-Annual Index Reviews" and "Quarterly Index Reviews" of the MSCI GIMI were replaced with "Index Reviews."
- Section 2.1.1 & Appendix III: Clarified the exclusion criteria for companies involved in ESG Controversies.
- MSCI ESG Research. Moved that section after the Section 3. Updated the descriptions of MSCI ESG Research products.

The following section has been modified as of February 2025

- The methodology and index name were updated. Effective February 3, 2025, the MSCI Minimum Volatility ESG Target Indexes was renamed to the MSCI Minimum Volatility Advanced Indexes.

Appendix IV: Methodology Set

- Added details on the Methodology Set for the Indexes

The following section has been modified as of February 2026

- Moved Controversy Score and Controversial Weapons Exclusion from Appendix III to Section 2.1.1
- Added footnote in Section 2.2 clarifying the treatment of missing industry-adjusted ESG score data.
- Added Section 2.6: Treatment of Unrated Companies.
- Updated the language in Section 3.1 and 3.2 describing the MSCI Solutions data used at the time of the Index Reviews
- Updated Appendix I: Handling Infeasible Optimizations to incorporate the relaxation related to ESG Score Improvement Target.

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Brazil	+ 55 11 4040 7830
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South Africa	+ 27 21 673 0103
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China	+ 86 21 61326611
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