MSCI Fixed Income Climate Change Indexes Methodology

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1 Introduction

The MSCI Fixed Income Climate Change Indexes (the 'Indexes') aim to represent the performance of an investment strategy that re-weights securities based upon the opportunities and risks associated with the transition to a lower carbon economy, while seeking to minimize exclusions from the parent index. The methodology uses the MSCI Low Carbon Transition[1] (LCT) score and category to reweight constituents of a parent index to increase its exposure to companies participating in opportunities associated with transition and decrease its exposure to companies exposed to risks associated with transition.

[1] Please refer to Appendix II: MSCI Low Carbon Transition Risk Assessment and https://www.msci.com/climate-change-solutions for further details regarding the MSCI Low Carbon Transition score and category

2 MSCI ESG Research

MSCI ESG Research provides in-depth research, ratings and analysis of the environmental, social and governance-related business practices of thousands of companies worldwide. It consists of an integrated suite of tools and products to efficiently manage research, analysis and compliance tasks across the spectrum of ESG factors.

The Index uses company ratings and research provided by MSCI ESG Research. In particular, this index uses the following MSCI ESG Research products: MSCI Climate Change Metrics and MSCI ESG Business Involvement Screening Research.

For details on MSCI ESG Research's full suite of ESG products, please refer to: https://www.msci.com/esg-investing

2.1 MSCI CLIMATE CHANGE METRICS

MSCI Climate Change Metrics are designed to support investors seeking to achieve a range of objectives, including measuring and reporting on climate risk exposure, implementing low carbon and fossil fuel-free strategies, and factoring climate change research into their risk management processes. It provides Carbon Emissions, Fossil Fuel exposure, environmental impact (i.e., clean technology) data and screens, as well as climate-related risk exposure and management assessment on companies.

For more details on MSCI Climate Change Metrics, please refer to https://www.msci.com/climate-change-solutions

2.2 MSCI ESG BUSINESS INVOLVEMENT SCREENING RESEARCH

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

For more details on MSCI ESG Business Involvement Screening Research, please refer to http://www.msci.com/resources/factsheets/MSCI_ESG_BISR.pdf

3 Index Construction Methodology

3.1 APPLICABLE UNIVERSE

The applicable universe includes all the existing constituents of the parent index ("Parent Index"). This approach aims to provide an opportunity set with sufficient liquidity and capacity.

3.2 ELIGIBLE UNIVERSE

The eligible universe is constructed by excluding securities based on the following criteria:

3.2.1 UNRATED COMPANIES

Missing LCT Category/Score – Companies not rated by MSCI ESG Research for Low Carbon Transition Assessment.

3.2.2 COMPANIES INVOLVED IN CONTROVERSIAL WEAPONS BUSINESSES

Companies involved in Controversial Weapons (i.e. cluster munitions, landmines, depleted uranium weapons, biological/chemical weapons, blinding lasers, non-detectable fragments and incendiary weapons), as defined by the methodology of the MSCI Ex-Controversial Weapons Indexes. For more details on the controversial weapons exclusion, please refer to Appendix I.

3.3 DETERMINATION OF COMBINED SCORE

Each company in the eligible universe is assigned a Combined Score, which is calculated using a company's LCT Category and its Low Carbon Transition Score as outlined below.

3.3.1 CATEGORY TILT SCORE

The 'Category Tilt Score' is used to express relative tilt towards or away from a security based on the LCT Category. Based on the LCT Category of a company, a Category Tilt Score is assigned based on the table below:

LCT Category	Category Tilt Score
Solutions	3
Neutral	1
Operational Transition	0.667
Product Transition	0.333
Asset Stranding	0.167

3.3.2 RELATIVE TILT SCORE

The 'Relative Tilt Score' differentiates companies within an LCT Category. Companies with higher LCT Score are determined by MSCI ESG Research to be relatively better at managing their climate related risk compared to their peers with worse LCT Score.

The Relative Tilt Score is calculated by normalizing security level LCT score relative to the maximum[2] LCT Score of the LCT Category within the Parent Index. The 'Relative Tilt Score' is floored at 0.5 to balance its effect on the final weight of index constituents

$$Relative\ Tilt\ Score = \frac{LCT\ Score}{Maximum^2\ LCT\ Score\ in\ LCT\ Category}$$

3.3.3 COMBINED SCORE

The Combined Score is calculated for each company as follows:

Combined Score = Category Tilt Score * Relative Tilt Score.

[2] To account for potential outliers within each LCT Category, the category maximum LCT Score is calculated after winsorizing the security level LCT Score at 90th percentile of the LCT Category.

3.4 WEIGHTING SCHEME

At each rebalancing, all the securities from the eligible universe are weighted by the product of their weight in the Parent Index and the Combined Score.

$$Security\ Weight = Combined\ Score * Weight\ in\ Parent\ Index$$

The above weights are then normalized to 100%.

Additionally, constituent weights are capped at the issuer level to mitigate concentration risk:

1. Issuers in the Indexes based on broad Parent Indexes are capped at 5%
2. Issuers in the Index based on narrow Parent Indexes are capped at the maximum weight in the Parent Index.

Narrow Parent Indexes are defined as those indexes for which the maximum issuer market value weight in the Parent Index is more than 10%.

Note that the capping of the issuer weight is done for the pro forma index as of the effective date, based on the closing prices as of the Cut-Off date. In cases where the issuer weight breaches the cap as a result of market price movements or corporate events between the Cut-Off date and the Rebalancing date, the capping is not applied again. Similarly, even if any issuer weight breaches the cap as a result of market price movements or corporate events between two Monthly Index Reviews, no capping is applied.

4 Maintaining the MSCI Fixed Income Climate Change Indexes

4.1 MONTHLY INDEX REVIEWS

The Indexes are rebalanced on a monthly basis, coinciding with the monthly index review of the MSCI Corporate Bond Indexes. The pro forma indexes are in general announced three business days before the effective date.

In general, MSCI uses the latest available MSCI ESG Research data (including MSCI Climate Change Metrics and MSCI Business Involvement Screening Research) for the rebalancing of MSCI Climate Change indexes.[3]

[3] Please refer to MSCI Fixed Income Index Calculation methodology for further details on the treatment of missing data and usage of alternate data sources.

Appendix I: Companies Involved in Controversial Weapons Business

Companies which meet the following Controversial Weapons criteria are excluded from the Index

- Cluster Bombs

  MSCI ESG Research's cluster bomb research identifies public companies that are involved in the production of cluster bombs and munitions, or the essential components of these products.

- Landmines

  MSCI ESG Research's landmines research identifies public companies that are involved in the production of anti - personnel landmines, anti - vehicle landmines, or the essential components of these products.

- Depleted Uranium Weapons

  MSCI ESG Research's depleted uranium weapons research identifies public companies involved in the production of depleted uranium weapons and armor.

- Chemical and Biological Weapons

  MSCI ESG Research's chemical and biological weapons research identifies public companies that are involved in the production of chemical and biological weapons, or the essential components of these products.

- Blinding Laser Weapons

  MSCI ESG Research's blinding laser weapons research identifies public companies that are involved in the production of weapons utilizing laser technology to cause permanent blindness.

- Non-Detectable Fragments

  MSCI ESG Research's non-detectable fragments research identifies public companies that are involved in the production of weapons that use non-detectable fragments to inflict injury.

- Incendiary Weapons (White Phosphorus)

  MSCI ESG Research's incendiary weapons research identifies companies that are involved in the production of weapons using white phosphorus.

Involvement criteria:

- Producers of the weapons
- Producers of key components of the weapons (only applies to cluster bombs, landmines, depleted uranium weapons as well as chemical and biological weapons)
- Ownership of 20% or more of a weapons or components producer
- The minimum limit is raised to 50% for financial companies having an ownership in a company that manufactures controversial weapons or key components of controversial weapons
- Owned 50% or more by a company involved in weapons or components production

Revenue limits:

Any identifiable revenues, i.e., zero tolerance

Appendix II: MSCI Low Carbon Transition Risk Assessment

MSCI ESG Research's Low Carbon Transition Risk assessment[4] is designed to identify potential leaders and laggards by holistically measuring companies' exposure to and management of risks and opportunities related to the low carbon transition.

The final output of this assessment is two company-level factors as described below:

(1) **Low Carbon Transition Category**: This factor groups companies in five categories that highlight the predominant risks and opportunities they are most likely to face in the transition (Exhibit 1).

(2) **Low Carbon Transition Score:** This score is based on a multi-dimensional risks and opportunities assessment and considers both predominant and secondary risks a company faces. It is industry agnostic and represents an absolute assessment of a company's position vis-à-vis the transition.

LOW CARBON TRANSITION SCORE	LOW CARBON TRANSITION CATEGORY		LOW CARBON TRANSITION RISK / OPPORTUNITY	
Score = 0	ASSET STRANDING		Potential to experience "stranding" of physical / natural assets due to regulatory, market, or technological forces arising from low carbon transition.	Coal mining & coal based power generation; Oil sands exploration/production
	TRANSITION	PRODUCT	Reduced demand for carbon-intensive products and services. Leaders and laggards are defined by the ability to shift product portfolio to low-carbon products.	Oil & gas exploration & production; Petrol/diesel based automobile manufacturers, thermal power plant turbine manufacturers etc.
		OPERATIONAL	Increased operational and/or capital cost due to carbon taxes and/or investment in carbon emission mitigation measures leading to lower profitability of the companies.	Fossil fuel based power generation, cement, steel etc.
	NEUTRAL		Limited exposure to low carbon transition carbon risk. Though companies in this category could have exposure to physical risk and/or indirect exposure to low carbon transition risk via lending, investment etc.	Consumer staples, healthcare, etc.
Score = 10	SOLUTIONS		Potential to benefit through the growth of low-carbon products and services.	Renewable electricity, electric vehicles, solar cell manufacturers etc.

Exhibit 1: Low Carbon Transition Categories and Scores

[4] For more details on MSCI Climate Change Metrics, please refer to https://www.msci.com/climate-change-solutions

Calculation methodology

The Low Carbon Transition Categories and Scores are determined by a combination of each company's current risk exposure and its efforts to manage the risks and opportunities presented by the low carbon transition. The 3-step process followed by MSCI ESG Research is explained below.

Step 1: Measure Low Carbon Transition Risk Exposure

The first step towards measuring the Low Carbon Transition Risk Exposure for a company is the computation of its Carbon Intensity profile – which is informed by its Product Carbon Intensity, Operational Carbon Intensity and Total Carbon Intensity. In the next step, we compute Low Carbon Transition Risk Exposure Category and Score based on Total Carbon Intensity.

Step 2: Assess Low Carbon Transition Risk Management

In the second step, we assess a company's management of risks and opportunities presented by the low carbon transition. This assessment is based on policies and commitments to mitigate transition risk, governance structures, risk management programs and initiatives, targets and performance, and involvement in any controversies.

Step 3: Calculate Low Carbon Transition Category and Score

In the final step, the Low Carbon Transition Risk Exposure Category and Score that was calculated in Step 1 are adjusted for the strength of management efforts. Following this adjustment, Low Carbon Transition Risk Exposure Score of companies with top or second quartile risk management improves and some top and second quartile companies may move up one category.

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