

# **MSCI WORLD DEMOGRAPHIC AND TECHNOLOGY CHANGE ESG SELECT 30 INDEX METHODOLOGY**

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## 1 Introduction

The MSCI World Demographic and Technology Change ESG Select 30 Index aims to represent the performance of a quarterly rebalanced portfolio of 30 stocks which are rated at BB or above by MSCI ESG Research and are determined to have higher exposure to following themes: Ageing Society Opportunities, Millennials and Disruptive Technology related activities. These stocks also exhibit high dividend yield and low volatility characteristics. The MSCI World Demographic and Technology Change ESG Select 30 Index aims to achieve diversification with country and sector constraints.

## 2 MSCI ESG Research

The MSCI World Demographic and Technology Change ESG Select 30 Index uses company ratings and research provided by MSCI ESG Research. The MSCI World Demographic and Technology Change ESG Select 30 Index uses the following MSCI ESG Research products: MSCI ESG Ratings, MSCI ESG Controversies, MSCI Business Involvement Screening Research, and MSCI Sustainable Impact Metrics.

For details on MSCI ESG Research's full suite of ESG products, please refer to:

<https://www.msci.com/esg-investing>

### 2.1 MSCI ESG RATINGS

MSCI ESG Ratings provides research, analysis and ratings of how well companies manage environmental, social and governance risks and opportunities.

MSCI ESG Ratings provides an overall company ESG rating - a seven-point scale from 'AAA' to 'CCC'. In addition, the product provides scores and percentiles indicating how well a company manages each key issue relative to industry peers.

For more details on MSCI ESG Ratings, please refer to: <https://www.msci.com/esg-ratings>

### 2.2 MSCI ESG CONTROVERSIES

MSCI ESG Controversies provides assessments of controversies concerning the negative environmental, social, and/or governance impact of company operations, products and services. The evaluation framework used in MSCI ESG 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 ESG Controversies Score falls on a 0-10 scale, with "0" being the most severe controversy.

For more details on MSCI ESG Controversies, please refer to :

<https://www.msci.com/documents/10199/acbe7c8a-a4e4-49de-9cf8-5e957245b86b>

### 2.3 MSCI ESG BUSINESS INVOLVEMENT SCREENING RESEARCH

MSCI ESG Business Involvement Screening Research 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](http://www.msci.com/resources/factsheets/MSCI_ESG_BISR.pdf)

## 3 Index Construction

The MSCI World Demographic and Technology Change ESG Select 30 Index is constructed from the MSCI World IMI Index (the “Parent Index”).

### 3.1 INITIAL ELIGIBLE UNIVERSE

An initial selection universe for the index is created by identifying securities that belong to any of the following four MSCI Thematic Indices<sup>1</sup>:

MSCI ACWI IMI Disruptive Technology Index

MSCI ACWI IMI Millennials Index

MSCI ACWI IMI Ageing Society Opportunities Index

From this initial selection Universe, an initial eligible universe is created by selecting all the securities that belong to MSCI World IMI Index.

### 3.2 ESG ELIGIBILITY CRITERIA

#### 3.2.1 ESG CONTROVERSIES SCORE ELIGIBILITY

The MSCI World Demographic and Technology Change ESG Select 30 Index uses MSCI ESG Controversies Scores to identify companies that are involved in very serious controversies involving the environmental, social, or governance impact of their operations and/or products and services. Companies are required to have an MSCI ESG Controversies Score of 1 or above to be eligible for inclusion in the Index.

#### 3.2.2 ESG RATINGS ELIGIBILITY

The MSCI World Demographic and Technology Change ESG Select 30 Index uses MSCI ESG Ratings to rate companies based on the environmental, social, or governance impact of their operations and/or products and services. Companies are required to have an MSCI ESG Ratings of BB or above to be eligible for inclusion the Index.

#### 3.2.3 VALUES AND CLIMATE CHANGE-BASED EXCLUSIONS

The MSCI World Demographic and Technology Change ESG Select 30 Index uses MSCI ESG Business Involvement Screening Research and MSCI Climate Change Metrics to identify companies that are involved in the following business activities. Companies that meet the values- and climate change-based criteria below are

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<sup>1</sup> For further details about MSCI’s Thematic Indexes please refer to <https://www.msci.com/thematic-investing/megatrends>

excluded from the MSCI World Demographic and Technology Change ESG Select 30 Index. Please refer to Appendix 1 for details on these criteria.

- Adult Entertainment
- Gambling
- Tobacco
- Controversial Weapons
- Nuclear Weapons
- Conventional Weapons
- Thermal Coal Mining
- Unconventional Oil & Gas Extraction
- Conventional Oil & Gas Extraction
- Thermal Coal-based Power Generation
- Oil & Gas-based Power Generation

### 3.3 ADDITIONAL SCREENS

#### 3.3.1 LIQUIDITY SCREEN

The remaining securities from above are subsequently screened for 3-month ADTV to be greater than USD 10 Million.

ADTV is defined as Average Daily Traded Volume and is calculated as:

$$ADTV_{3M} = \frac{ATV_{3M}^2}{252}$$

Where  $ATV_{3M}$  is annualized 3-month Average Traded Volume of the security.

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<sup>2</sup> MSCI Index Calculation Methodology at  
<https://www.msci.com/index-methodology>

MSCI Global Investable Market Indexes Methodology at  
<https://www.msci.com/index-methodology>

## 3.4 SECURITY SELECTION

The securities from the eligible universe are subsequently filtered to include a single security per issuer. For issuers having multiple securities which are part of the eligible universe, the security with the highest 3-month ADTV is selected.

From the securities remaining post screenings, the selection is performed using the optimization process described under 3.5 and 3.6 wherein we target to select 30 securities.

## 3.5 WEIGHTING SCHEME

The weights of the securities are an outcome of the optimization process. The optimization relies on factor exposures for all the securities in the remaining universe and the factor covariance matrix of the relevant Barra Equity Model<sup>3</sup>. The optimization is performed using EUR as the base currency. The optimization objective is to maximize risk adjusted portfolio alpha score (representative of the exposure to dividend yield factor) where the portfolio alpha score equals to the weighted average of stock level alpha scores under various optimization constraints.

### CALCULATION OF THE ALPHA SCORE

$$\alpha_{Port} = \sum w(i) * \alpha(i)$$

Where,

$\alpha_{Port}$  = Portfolio alpha score

$w(i)$  = Weight of security  $i$  in the portfolio

$\alpha(i) = 0.5 * DY(i) + 0.5 * LVF(i)$

$DY(i)$  = Factor exposure of each security  $i$  to the target Barra Equity Model<sup>4</sup> Dividend Yield factor

$LVF(i)$  = Factor exposure of each security  $i$  to the target Barra Equity Model<sup>5</sup> Low Volatility factor

<sup>3</sup> Please Refer to Appendix II

<sup>4</sup> Please Refer to Appendix II

<sup>5</sup> Please Refer to Appendix II



### 3.6 OPTIMIZATION CONSTRAINTS

The MSCI World Demographic and Technology Change ESG Select 30 Index is constructed using the Barra Open Optimizer in combination with the relevant Barra Equity Model. The optimization uses the above selected securities as the universe of eligible securities and the specified optimization objective and constraints to determine MSCI World Demographic and Technology Change ESG Select 30 Index.

The Barra Open Optimizer determines the optimal solution, to achieve relatively high exposure to dividend yield factor by maximizing the exposure to the dividend yield factor less a penalty for the common factor and stock-specific risk characteristics of each potential constituent.

At each quarterly rebalance, the following optimization constraints are applied which aim to ensure investability while achieving relatively higher dividend yield and lower volatility:

No.	Parameter	Constraint
1	Number of Constituents	30
2	Maximum weight of a single security	5%
3	Minimum weight of a single security	0.50%
4	Maximum weight to USA	70%
5	Maximum weight to Other Countries	30%
6	Maximum Weight to a GICS sector	30%
7	Maximum One-Way Turnover	100%
8	The portfolio risk currency	EUR
9	Specific Risk Aversion	0.0015
10	Common Factor Risk Aversion	0.015
11	Active Exposure to Size, Momentum, Profitability and Growth Barra style factors	(-0.25,+0.25)

## 4 Maintenance of the Index

### 4.1 QUARTERLY INDEX REVIEWS

The MSCI World Demographic and Technology Change ESG Select 30 Index is reviewed on a quarterly basis, coinciding with the May and November Semi-Annual Index Reviews and the February and August Quarterly Index Reviews of the Parent Index.

The pro forma Index is typically announced nine business days before the effective date.

### 4.2 ONGOING EVENT RELATED CHANGES

The following section briefly describes the treatment of common corporate events within MSCI World Demographic and Technology Change ESG Select 30 Index.

No new securities will be added (except where noted below) to the Index between Index Reviews. For cases where additions are noted below, securities will be added to the Index only if added to the Parent Index. Parent Index deletions will be reflected simultaneously.

## EVENT TYPE

## EVENT DETAILS

### New additions to the Index

A new security added to the Parent Index (such as IPO and other early inclusions) will not be added to the MSCI World Demographic and Technology Change ESG Select 30 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 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-MSCI 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>

## Appendix I: Values and Climate Change-Based Exclusion Criteria

The MSCI World Demographic and Technology Change ESG Select 30 Index is constructed with an aim to reflect the performance of companies that are consistent with specific values- and climate change-based criteria.

### Values-based Exclusions Criteria

- **Adult Entertainment**
  - All companies that have an industry tie to adult entertainment, including the producer, distributor, retailer, or ownership categories. In particular, the screen excludes companies that produce, direct, publish, retail, or distribute adult entertainment materials, as well as have ownership ties.
- **Gambling**
  - All companies that have an industry tie to gambling through the operation, support, licensing, or ownership categories. In particular, the screen excludes companies that own or operate gambling facilities, provide key products or services fundamental to gambling operations, license their company name or brand name to gambling products, or have ownership ties.
- **Tobacco**
  - All companies deriving 10% or more aggregate revenue from the production, distribution, retail and supply of tobacco-related products
- **Controversial Weapons**
  - All companies with any tie to Controversial Weapons (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 Global Ex-Controversial Weapons Indexes available at <https://www.msci.com>
- **Nuclear Weapons**
  - All companies that manufacture nuclear warheads and/or whole nuclear missiles
  - All companies that manufacture components that were developed or are significantly modified for exclusive use in nuclear weapons (warheads and missiles)

- All companies that manufacture or assemble delivery platforms that were developed or significantly modified for the exclusive delivery of nuclear weapons
- All companies that provide auxiliary services related to nuclear weapons
- All companies that manufacture components that were not developed or not significantly modified for exclusive use in nuclear weapons (warheads and missiles) but can be used in nuclear weapons
- All companies that manufacture or assemble delivery platforms that were not developed or not significantly modified for the exclusive delivery of nuclear weapons but have the capability to deliver nuclear weapons
- All companies that manufacture components for nuclear-exclusive delivery platforms
- **Weapons**
  - All companies deriving 10% or more aggregate revenue from weapons systems, components, and support systems and services

## **Climate Change-based Exclusions Criteria**

- **Thermal Coal Mining**
  - All companies deriving 10% or more revenue (either reported or estimated) from the mining of thermal coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties. It excludes: revenue from metallurgical coal; coal mined for internal power generation (e.g. in the case of vertically integrated power producers); intra-company sales of mined thermal coal; and revenue from coal trading
- **Unconventional Oil & Gas Extraction**
  - All companies deriving more than 0% revenue (either reported or estimated) from unconventional oil and gas production. It includes revenue from the production of oil sands, oil shale (kerogen-rich deposits), shale gas, shale oil, coal seam gas, and coal bed methane, as well as revenue from onshore or offshore oil and gas production in the Arctic region. It excludes revenue from conventional oil and gas production including deepwater, shallow water, and other onshore/offshore oil and gas.
- **Conventional Oil & Gas Extraction**
  - All companies deriving more than 0% revenue (either reported or estimated) from conventional oil and gas production and are deriving less than 40% revenue from products, services, or infrastructure projects supporting the development or delivery of renewable energy and alternative fuels.

The Conventional Oil & Gas Extraction revenue includes revenue from the production of deep water, shallow water, and other onshore/offshore oil and gas. It excludes revenue from unconventional oil and gas production (oil sands, shale oil, shale gas) and onshore/offshore oil and gas production in the Arctic region.

- **Thermal Coal-based Power Generation**

- All companies generating 10% or more of their total electricity from thermal coal in a given year
- All companies that have 10% or more of installed capacity attributed to thermal coal in a given year
- All companies deriving 10% or more revenue (either reported or estimated) from thermal coal-based power generation

- **Oil & Gas-based Power Generation**

- All companies generating 30% or more of their total electricity from liquid fuel and natural gas in a given year
- All companies that have 30% or more of installed capacity attributed to liquid fuel and natural gas in a given year
- All companies deriving 30% or more revenue (either reported or estimated) from liquid fuel- and natural gas-based power generation

- **Nuclear Power-based Power Generation**

- All companies generating 30% or more of their total electricity from nuclear power in a given year
- All companies that have 30% or more of installed capacity attributed to nuclear sources in a given fiscal year
- All companies deriving 30% or more revenue (either reported or estimated) from ownership or operation of nuclear power plants

## Appendix II: New Release of BARRA® EQUITY MODEL or BARRA® OPTIMIZER

The methodology presently uses MSCI Barra Global Equity Model for Long-Term Investors (“GEMTL”) 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: HANDLING INFEASIBLE OPTIMIZATIONS

During the quarterly Index review, in the event that there is no optimal solution that satisfies all the optimization constraints defined in Section 3.5 the MSCI World Demographic and Technology Change ESG Select 30 Index will not be rebalanced for that Index review.



## Appendix IV: Definitions of Dividend Yield Factor and Low Volatility Factor in Barra Global Total Market Equity Model for Long Term Investors

The Dividend Yield and Low Volatility factors are described using MSCI's Barra Global Equity Model for Long-Term Investors (GEMTLT). The precise choice of component factors used to represent each broad factor group is governed by the current model used for the optimization, which may change with a new release of the Barra Equity Model.

### Dividend Yield

Definition =  $0.5 \cdot \text{DTOP} + 0.5 \cdot \text{DTOPF}$

Where

DTOP = Dividend Yield

Computed by dividing the trailing 12-month dividend per share by the price at the last month end.

DTOPF = Analyst-Predicted Dividend-to-Price

Computed by dividing the 12-month forward-looking dividend per share (DPS) by the current price. Forward-looking DPS are defined as a weighted average between the average analyst-predicted DPS for the current and next fiscal years.

### Low Volatility

Definition =  $(0.2 \cdot \text{BETA} + 0.8 \cdot \text{RESVOL}) \cdot -1$

BETA = Historical Beta

Computed as the slope coefficient from a time-series regression of stock excess returns against the cap-weighted excess returns of the estimation universe over a trailing window of 504 trading days, with a 252-day half-life.

The returns are aggregated over four-day windows to reduce the effect of non-synchronicity and auto-correlation.

RESVOL = Residual Volatility =  $0.4 \cdot \text{HSIGMA} + 0.4 \cdot \text{DASTD} + 0.2 \cdot \text{CMRA}$

HSIGMA = Historical Sigma

Computed as the volatility of the residual returns from the HBETA regression.

DASTD = Daily Standard Deviation

Computed as the volatility of daily excess returns over the past 252 trading days with a 42-day half-life.

CMRA = Cumulative Range

The cumulative excess log return over the past T months, with each month defined as the previous 21 trading days, is first computed as:

$$Z(t) = \sum_{\tau=0}^{T-1} \ln(1 + r_{t-\tau})$$

Where,  $r_t$  is the stock excess return for the month t. The CMRA description is then given by:

$$\text{CMRA}(t) = Z_{\max} - Z_{\min}$$

Where,  $Z_{\max} = \max\{Z(T)\}$ ,  $Z_{\min} = \min\{Z(T)\}$  for  $T = 1 \dots 12$ .

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