

MSCI LIBERTYQ GLOBAL EQUITY INDEX METHODOLOGY

August 2021

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1 Introduction

MSCI Indexes are constructed and maintained in accordance with the MSCI Global Investable Market Indexes Methodology and calculated as per the MSCI Index Calculation Methodology. This methodology book provides a description of the rules and guidelines followed by MSCI for the construction and maintenance of the LibertyQ Global Equity Index. The LibertyQ Global Equity Index (“Index”) is designed to represent the performance of a strategy that seeks exposure to four style factors – Quality, Value, Momentum and Low Volatility.

2 Index Construction Methodology

2.1 DEFINING THE ELIGIBLE UNIVERSE

The eligible universe includes all the constituents of the MSCI ACWI Index (herein, the “Parent Index”), except the security, Franklin Resources¹.

2.2 DETERMINATION OF FACTOR SCORE

2.2.1 CALCULATING THE Z-SCORE FOR EACH INDIVIDUAL FACTOR

The z-score for a factor is computed by combining the region relative z-scores of individual descriptors defined for each factor.

In the first step, the z-score for a descriptor for each security is calculated as described below.

$$Z = \frac{(x - \mu)}{\sigma}$$

Where:

- z is the individual descriptor z-score
- x is the descriptor value for a given security included in the Parent Index
- μ is the equal weighted mean of the descriptor values of all the securities included in the Parent Index
- σ is the equal weighted standard deviation of the descriptor values of all the securities included in the Parent Index

Z-scores are then winsorized at +/-3 (i.e., the z-scores above 3 are capped at 3 and z-scores below -3 are floored at -3). If a z-score of an individual descriptor is not computed due to the unavailability of the underlying descriptor data, the universe average z-score is used.

A region relative z-score is then computed for a descriptor by standardizing the individual descriptor z-scores within the sector groups for each region.

The three sector groups defined to apply region relative z-scores are:

¹ MSCI Security Code: 25998.01

- a.) Securities belonging to the GICS “Financials” Sector (Sector “40” of the Global Industry Classification Standard (GICS®))
- b.) Securities belonging to the GICS Real Estate Sector (Sector “60” of the Global Industry Classification Standard (GICS®))
- c.) Securities belonging to all the other GICS sectors except “Financials” and “Real Estate” Sectors

The regions selected to compute region relative z-scores within each sector group are:

- a.) North America
- b.) Europe & Middle East
- c.) Emerging Markets
- d.) Pacific

Please refer to Appendix I for further details on region definitions.

$$Z_{\text{reg_rel}} = \frac{(z - \mu_{\text{reg_rel}})}{\sigma_{\text{reg_rel}}}$$

Where:

- $Z_{\text{reg_rel}}$ is the region relative z-score for a descriptor
- z is the individual descriptor z-score for a given security within a sector group for each region
- $\mu_{\text{reg_rel}}$ is the equal weighted mean of the descriptor z-scores of all the securities included in a sector group for each region
- $\sigma_{\text{reg_rel}}$ is the equal weighted standard deviation of the descriptor z-scores of all the securities included a sector group for each region

A region relative z-score for each sector group universe is then winsorized at +/- 3.

The Factors and the individual descriptors defining each of the four factors are as follows:

(i) Quality Factor

Computed by equal weighting the region relative z-scores of the relevant descriptor as follows:

For all the securities in the GICS Financials and Real Estate Sectors

- a.) Return on Equity (ROE)
- b.) Negative of Earnings Variability
- c.) Cash ROA

For all the securities except for "Financials" and "Real Estate" Sectors

- a.) Return on Equity (ROE)
- b.) Negative of Earnings Variability
- c.) Cash ROA
- d.) Negative of Leverage

(ii) Value Factor

Computed by weighting the region relative z-scores of the relevant descriptor as follows:

For all the securities in the GICS "Financials" and "Real Estate" Sectors

- a.) Inverse of Price to Book Value (P/B) with a weight of 66.66%
- b.) Dividend Yield (DY) with a weight of 33.33%

For all the securities except for "Financials" and "Real Estate" Sectors

- a) Inverse of Price to Earnings (P/E) with a weight of 33.33%
- b) Inverse of Price to Forward Earnings (P/E fwd) with a weight of 33.33%
- c) Dividend Yield (DY) with a weight of 33.33%

(iii) Momentum Factor

Computed by equal weighting the region relative z-scores of the following descriptors

- a.) 6-month Risk-adjusted Price Momentum

b.) 12-month Risk-adjusted Price Momentum

(iv) Volatility Factor

a.) Region relative z-score of negative of Historical Beta estimated over the trailing 104 weekly returns

Please refer to Appendix II for further details on the calculation of each factor.

2.2.2. CALCULATING THE COMPOSITE FACTOR Z-SCORE

The Composite Factor Z-Score is computed from the factor z-scores as described below.

$$Z_{Comp} = 0.50 * Z_{Quality} + 0.30 * Z_{Value} + 0.10 * Z_{Momentum} + 0.10 * Z_{Volatility}$$

Where:

- Z_{Comp} is composite factor z-score
- $Z_{Quality}$ is the quality factor z-score as calculated in the previous section
- Z_{Value} is the value factor z-score as calculated in the previous section
- $Z_{Momentum}$ is the momentum factor z-score as calculated in the previous section
- $Z_{Volatility}$ is the volatility factor z-score as calculated in the previous section

2.2.3. CALCULATING THE FINAL FACTOR SCORE

The Final Factor Score is computed from the composite factor z-score as follows:

$$Final\ Factor\ Score = \begin{cases} 1 + Z, & Z \geq 0 \\ (1 - Z)^{-1}, & Z < 0 \end{cases}$$

Where Z is the Composite Factor z-score determined in the previous step.

2.3 SECURITY SELECTION & WEIGHTING SCHEME

The LibertyQ Global Equity Index targets 25% of the number of securities from its Parent Index. All the constituents of the Parent Index are ranked based on their Composite Factor ZScore and target number of securities with the highest rank, are selected.

The securities included are assigned weights in the proportion of Market Cap Weight*Final Factor Score.

3 Maintaining the Index

3.1 SEMI-ANNUAL INDEX REVIEWS

The LibertyQ Global Equity Index is 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 Semi-Annual Index Reviews (SAIRs) of the MSCI Global Investable Market Indexes. Descriptor data as of the end of April and October are used respectively. The pro forma Index is typically announced nine business days before the effective date.

At each rebalancing, a constraint factor (CF) is calculated for each constituent in the Index. The constraint factor is defined as the weight in the Index at the time of the rebalancing divided by the weight in the Parent Index. The constraint factor as well as the constituents in the Index remains constant between Index Reviews except in case of corporate events as described in section 3.2.

3.1.1 BUFFER RULES

To reduce turnover and enhance Index stability, buffer rules are applied as follows:

Security Selection Buffer

A security selection buffer of 50% is applied at each Index Review.

For example, the Index targets 25% of the number of securities in the Parent Index. and if 25% of the number of securities in the Parent Index equals 'x' number of securities, then buffers are applied between rank $((x/2)+1)$ and $x+(x/2)$. The securities in the Parent Index with a final factor score rank at or below $x/2$ will be added to the Index on a priority basis. Existing constituents that have a final factor score between $((x/2)+1)$ and $x+(x/2)$ are then successively added until the number of securities reaches x. If the number of the securities is below x after this step, the remaining securities in the Parent Index with the highest final factor score rank are added until the number of securities in the Index reaches x

Turnover Buffer

A turnover buffer of 50% is applied at each Index Review. For example, if the ongoing rebalancing results in changing the weight of a security from x% to y% in the Index, then the effective change in weight will be:

$$\text{Effective pro forma constituent weight} = x + (y-x)/2$$

The turnover buffer is applied on the uncapped weights of existing and pro forma constituents and is not applied on deletions. After the turnover buffers are applied, weight capping of 1% is applied at the issuer level.

3.2 ONGOING EVENT RELATED CHANGES

The general treatment of corporate events in the LibertyQ Global Equity Index 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 LibertyQ Global Equity Index, the changes made to the Parent Index during intermediate Index Reviews will be neutralized in the LibertyQ Global Equity Index.

The following section briefly describes the treatment of common corporate events within the LibertyQ Global Equity Index.

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:
www.msci.com/index-methodology

Appendix I: Region / Country Definitions

The Parent Index is composed of developed and emerging market countries. Currently, this includes the following countries, under each defined region:

Europe & Middle East	Emerging Markets	Pacific	North America
AUSTRIA	BRAZIL	AUSTRALIA	CANADA
BELGIUM	CHILE	HONG KONG	USA
DENMARK	CHINA	JAPAN	
FINLAND	COLOMBIA	NEW ZEALAND	
FRANCE	CZECH REPUBLIC	SINGAPORE	
GERMANY	EGYPT		
IRELAND	GREECE		
ISRAEL	HUNGARY		
ITALY	INDIA		
NETHERLANDS	INDONESIA		
NORWAY	KOREA		
PORTUGAL	MALAYSIA		
SPAIN	MEXICO		
SWEDEN	PAKISTAN		
SWITZERLAND	PERU		
UNITED KINGDOM	PHILIPPINES		
	POLAND		
	QATAR		
	RUSSIA		
	SOUTH AFRICA		
	TAIWAN		
	THAILAND		
	TURKEY		
	UAE		

Whenever MSCI changes the country constituents of the Parent Index, the constituent countries of this Index will change accordingly. Changes in the constituent companies of the MSCI Standard Country Indexes that comprise this Index will also be reflected in this Index.

Appendix II: Calculation of Variables

Factor	Descriptor	Computation Details
Quality	Return on Equity (ROE)	$\frac{\text{Trailing 12 months earnings per share}}{\text{Latest book value per share}}$
	Earnings Variability	Earnings variability is defined as the standard deviation of y-o-y earnings per share growth over the last five fiscal years
	Cash ROA	$\frac{\text{Latest Fiscal Year Net Operating Cash Flow}}{\text{Latest Fiscal Year Total Assets}}$
	Leverage	<p>Leverage is defined as the average of Market Leverage, Book Leverage and Debt to Assets.</p> <p>Market Leverage = $(ME + PE + LD)/ME$,</p> <p>Book Leverage = $(BE + PE + LD)/BE$,</p> <p>Debt to Assets = TD/TA</p> <p>Where ME = Market Value of Equity on the Last Trading day, PE = Book Value of the Preferred Equity, LD = Most recent Book Value of the Long-Term Debt, BE = Book Value of the Equity, TD = Total Debt, TA is most recent Book Value of Total Assets</p>
Value	Price to Earnings (P/E)	$\frac{\text{Current security price}}{\text{Trailing 12-month earnings per share}}$
	Price to Earnings (P/E fwd)	$\frac{\text{Current security price}}{\text{12-month forward earnings per share}}$
	Price to Book Value (P/B)	$\frac{\text{Current security price}}{\text{Latest book value per share}}$
	Dividend Yield (DY)	Trailing 12-months dividend per share/current security price

Momentum	<p>6-month Risk-adjusted Price Momentum</p> <p>12-month Risk-adjusted Price Momentum</p>	<p>6-month Price Momentum = $((PT-1/PT-7)-1) - (\text{Local Risk-free rate})$</p> <p>12-month Price Momentum = $((PT-1/PT-13)-1) - (\text{Local Risk-free rate})$</p> <p>Where, PT-1 = Security Local Price one month prior to the rebalancing date (T)</p> <p>PT-7 = Security Local Price seven months prior to the rebalancing date (T)</p> <p>PT-13 = Security Local Price thirteen months prior to the rebalancing date (T)</p> <p>Risk-adjusted Price Momentum = $\text{Price Momentum} / \sigma$</p> <p>Where σ = Annualized Standard Deviation of weekly local price returns over the period of 3 years.</p> <p>Local risk free rates are the short-term rates² in local currency of the country.</p> <p>The price performance is computed excluding recent 1-month. If 12-month Price Momentum is missing, only 6-month Price Momentum is used for computation of Momentum value. Momentum value is not computed if 6-month Price Momentum is not available and the respective universe average z-score is used.</p>
Volatility	Historical Beta (β)	<p>Computed as the slope coefficient in a time-series regression of local excess stock returns r against the cap-weighted local excess returns of the estimation universe R,</p> $r = \alpha + \beta R + e$ <p>The regression coefficients are estimated on the trailing 104 weeks of returns.</p>

² Short-term rates used for each country are as per Appendix IV of the MSCI Momentum Indexes methodology available at www.msci.com/index-methodology

The following sections have been modified since May 2016:

- Section 2.2.1: Included GICS Real Estate Sector in methodology to reflect changes to the GICS structure effective September 01, 2016

The following sections have been modified since August 2016:

- Appendix 1: Updated to reflect reclassification of Pakistan from the MSCI Frontier Markets Index to the MSCI Emerging Markets Index effective June 01, 2017

The following sections have been modified since May 2017:

- Appendix II in the previous version of the methodology book describing the Corporate Events treatment has been deleted. The details on the Corporate Events treatment are now included in Section 3.2.

The following sections have been modified since June 2017:

- Section 2.1: Updated to clarify the eligible universe for Index construction.
- Section 2.3: Updated the target number of securities for the LibertyQ Global Equity Index.
- Section 3.1.1: Updated the security selection buffer rules for the LibertyQ Global Equity Index.

The following sections have been modified effective August 2021:

- Appendix II has been updated to reflect the transition to short-term rates from LIBOR in the computation of Momentum factor.

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