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Index Methodology

MSCI Momentum Indexes Methodology

December 2013

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Section 1: Introduction

The MSCI Momentum Indexes aim to reflect the performance of an Equity Momentum strategy. High Momentum companies are characterized in the literature as companies with high price performance in the recent history, up to 12-months. High Momentum companies tend to continue their high price performance over the near term, typically over a 6 -12 month period. Many active equity strategies emphasize Momentum factor as an important factor in security selection and portfolio construction.

MSCI categorizes the MSCI Momentum Indexes as part of the family of MSCI Factor Indexes (Risk Premia), which reflect the systematic elements of particular investment styles or strategies. While capitalization weighted indexes represent the broad market beta, investors increasingly recognize that there are additional sources of systematic return associated with particular investment styles and strategies, such as value, momentum, volatility, quality etc. that could be represented through alternatively weighted indexes. The Momentum factor is complementary to other systematic factors such as Size, Value and Low Volatility and may provide diversification to a factor portfolio.

The MSCI Momentum Indexes aim to reflect the performance of the Momentum factor with a simple and transparent methodology while maintaining reasonably high investment capacity and liquidity of constituent companies, with moderate Index turnover.

The potential applications of the MSCI Momentum Indexes for institutional investors include:

- Strategic asset allocation: seeking equity market exposure to the Momentum factor
- Portfolio diversification: combined with other systematic factors
- Investment research: tools to study the characteristics of Momentum strategies

Section 2: Index Construction Methodology

Section 2.1: Applicable Universe

The applicable universe includes all the existing constituents of an underlying MSCI Parent Index (herein, a “Parent Index”). This approach aims to provide an opportunity set with sufficient liquidity and capacity. The relevant Parent Index would be any country or regional MSCI Index.

Section 2.2: Determination of Momentum Score

The Momentum value for each security is calculated by combining recent 12-month and 6-month local price performance of the security.

$$\text{6-month Price Momentum} = (P_{T-1}/P_{T-7}) - 1 - (\text{Local Risk-free rate})$$

$$\text{12-month Price Momentum} = ((P_{T-1}/P_{T-13}) - 1) - (\text{Local Risk-free rate})$$

Where, P_{T-1} = Security Local Price one month prior to the rebalancing date (T)

P_{T-7} = Security Local Price seven months prior to the rebalancing date (T)

P_{T-13} = Security Local Price thirteen months prior to the rebalancing date (T)

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. In the absence of Momentum value, security is not considered for inclusion in the MSCI Momentum Index.

Local risk free rates are the short-term rates in local currency of the country, typically the 3M LIBOR rate or short-term deposit rate. The details of the same are provided in Appendix V

2.2.1: Risk-adjusted Momentum Value

A Momentum value computed above is further adjusted with corresponding volatility of the security.

$$\text{Risk-adjusted Price Momentum}_i = \text{Price Momentum}_i / \sigma_i$$

Where σ_i = Annualized Standard Deviation of weekly local price returns over the period of 3 years.

2.2.2: Calculating the Momentum Score

Risk-adjusted Price Momentums computed above are standardized into z-scores. The z-scores are combined in equal proportion and standardized to arrive at a single Momentum Z-score (Z)

$$Z = \text{6-month Momentum Z-score} * 0.5 + \text{12-month Momentum Z-score} * 0.5$$

The Momentum Z-score is winsorized at +/- 3 i.e. the Z-scores above 3 are capped at 3 and Z-scores below -3 are capped at -3.

The Momentum Score is then computed from the Momentum Z-Score as follows:

$$\text{Momentum Score} = \begin{cases} 1 + Z & , Z > 0 \\ (1 - Z)^{-1} & , Z < 0 \end{cases}$$

Section 2.3: Security Selection

The MSCI Momentum Indexes are constructed with a fixed number of securities approach. All the existing constituents of the relevant Parent Index are ranked in the descending order of their unwinsorized Momentum Z-score . If multiple securities have the same unwinsorized Momentum Z-score, then the security having a higher weight in the Parent Index is given a higher rank. A fixed number of securities with the highest positive Momentum Z-scores are predetermined for every MSCI Momentum Index at initial construction with an aim to attain a high exposure to the Momentum factor while maintaining sufficient index market capitalization and number of securities coverage. Rules for arriving at a fixed number of constituents at initial construction are explained in Appendix I. The fixed number for security selection determined at initial construction is evaluated at every Semi-Annual Index Review (SAIR) to ensure that the Momentum universe has sufficient index market capitalization coverage. Rules for evaluating the fixed number of constituents at every SAIR are explained in Appendix I.

Section 2.4: Weighting Scheme

For a given rebalancing effective date, all the securities eligible for inclusion in the MSCI Momentum Indexes are weighted by the product of their market capitalization weight in the Parent Index and the Momentum Score computed in Sect. 2.2.2 above.

$$\text{Momentum Weight} = \text{Momentum Score} * \text{Market Capitalization Weight in the Parent Index}$$

The above weights are then normalized to 100%. The final security level inclusion factor is determined as the ratio of the final security level weight and the security level pro forma market capitalization weight in the relevant Parent Index. To mitigate the impact of stock-specific risk, the issuer weight will be capped at a specific level as described in Appendix II.

Section 3: Maintaining MSCI Momentum Indexes

Section 3.1: Semi-Annual Index Reviews

The MSCI Momentum 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 Semi-Annual Index Review (SAIR) of the MSCI Global Investable Market Indexes.

In addition to the two Semi-Annual Index Reviews in May and November, MSCI Momentum Indexes undergo ad-hoc rebalancing subject to meeting certain trigger criteria. The details of the ad-hoc rebalancing are provided in Appendix III. The trigger condition for ad-hoc rebalancing is checked every month as detailed in Appendix III.

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

Section 3.1.1: Buffer Rules:

To reduce Index turnover and enhance Index stability, buffer rules are applied at 50% of the fixed number of securities in the MSCI Momentum Indexes.

For example, the MSCI ACWI Momentum Index targets 500 securities and the buffers are applied between rank 251 and 750. The securities in the Parent Index with a Momentum rank at or above 250 will be added to the MSCI ACWI Momentum Index on a priority basis. The existing constituents that have a Momentum rank between 251 and 750 are then successively added until the number of securities in the MSCI ACWI Momentum Index reaches 500. If the number of securities is below 500 after this step, the remaining securities in the Parent Index with the highest Momentum rank are added until the number of securities in the MSCI ACWI Momentum Index reaches 500.

Section 3.2: Ongoing Event Related changes

In general, the MSCI Momentum Indexes follow the event maintenance of the Parent Index.

Section 3.2.1: IPOs and other early inclusions

IPOs and other newly listed securities will only be considered for inclusion at the next MSCI Index review in the MSCI Momentum Index, even if they qualify for early inclusion in the Parent Index.

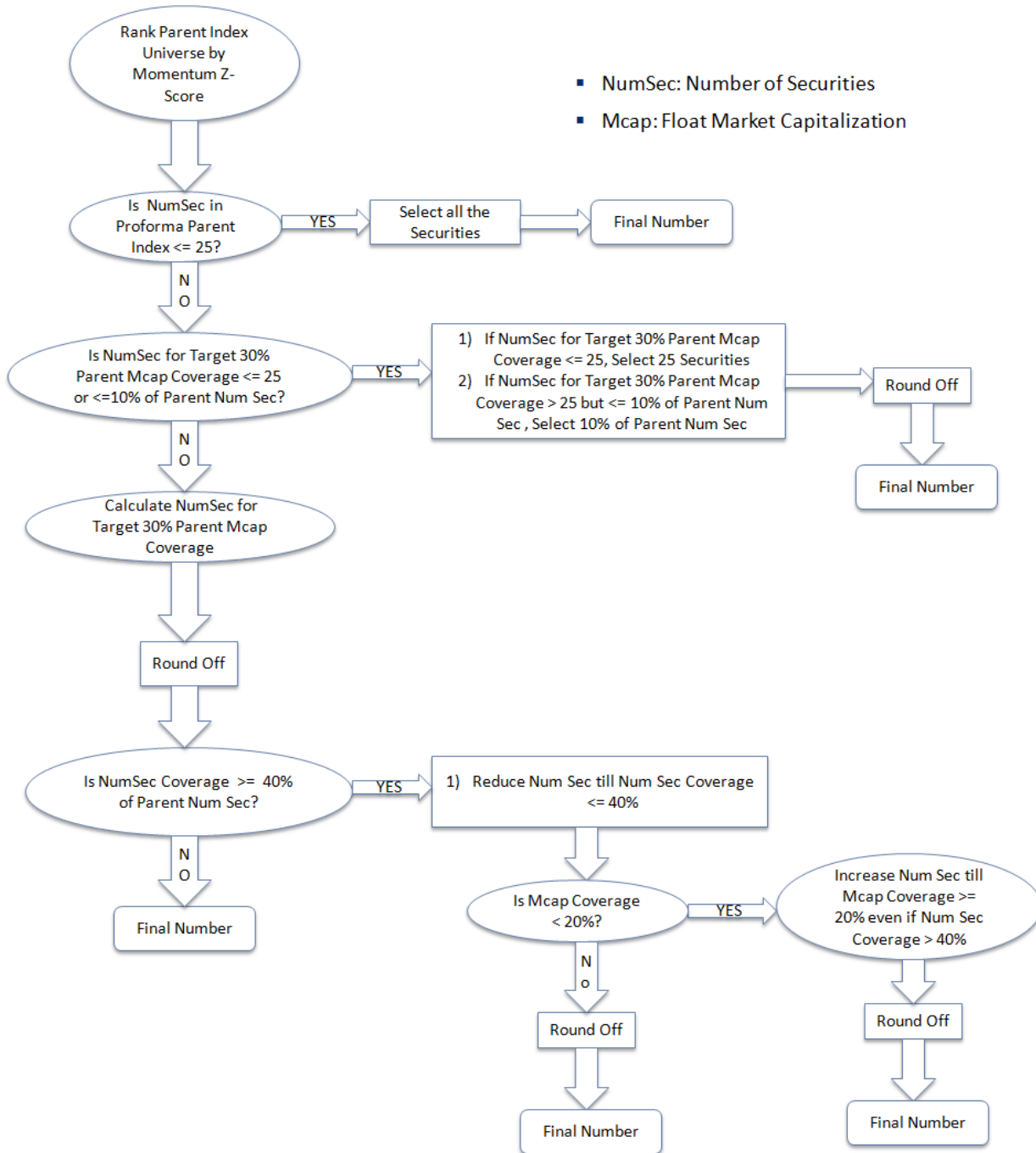
Section 3.2.2: Additions and Deletions due to corporate events

The general treatment of additions and deletions due to corporate events aims at minimizing the turnover in the MSCI Momentum Indexes. A constituent deleted from Parent Index following a corporate event or during the Quarterly Index Review of the Parent Index will be simultaneously deleted from the MSCI Momentum Index.

Please refer to Appendix IV for more details on the treatment of corporate events.

Appendix I: Rules To Determine Fixed Number of Securities at Initial Construction and in Ongoing Rebalancing

Algorithm to Determine Fixed Number of Securities at Initial Construction



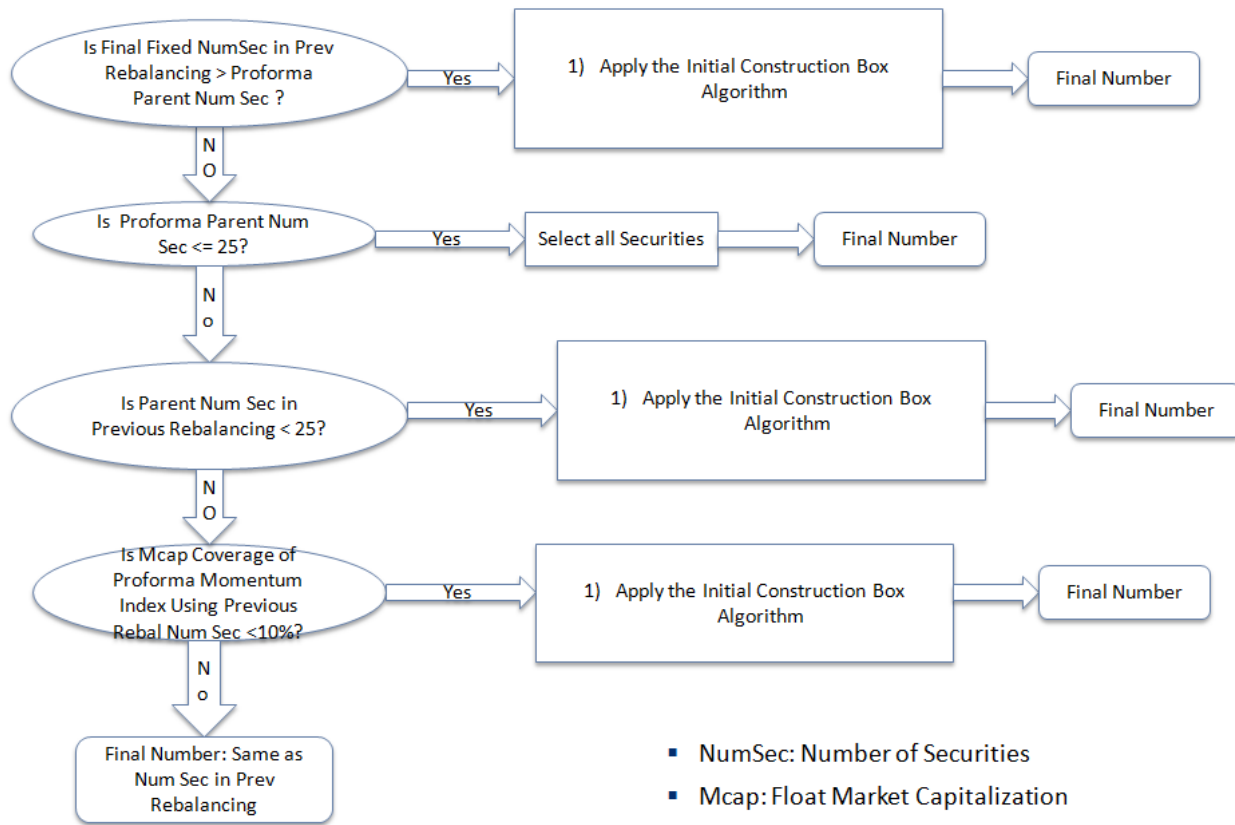
- NumSec: Number of Securities
- Mcap: Float Market Capitalization

Rounding Off Rules:

Upward rounding off is done depending on NumSec Obtained in the Previous Box Step

- If NumSec in Previous Step < 100, Nearest Rounding = 10 Securities
- If NumSec in Previous Step >= 100 but < 300, Nearest Rounding = 25 Securities
- If NumSec in Previous Step >= 300, Nearest Rounding = 50 Securities

Algorithm to reevaluate Fixed Number of Securities at Semi Annual Rebalancing



Appendix II: Issuer Weight Capping

For Broad Regional/Country Indexes issuer weight is capped at 5%. For other narrow Country/Regional Indexes issuer weight is capped at maximum issuer weight in the Parent Index.

Narrow Country/Regional Index is defined as an index for which maximum market cap weight in the Parent Index is greater than 10%.

For the following broad regional Momentum Indexes, the issuer weight is capped at 5%:

1. MSCI ACWI Momentum Index
2. MSCI USA Momentum Index

Appendix III: Conditional Rebalancing

In order to mitigate drawdown during periods characterized by spikes in market volatility, MSCI Momentum Indexes are rebalanced on an ad-hoc basis in addition to the two scheduled Semi-Annual Index Reviews in May and November, subject to meeting certain trigger criteria that are described below. The steps for triggering ad-hoc rebalancing are described as follows:

1. At every T-9 date (where T is a month-end date), annualized volatility of the Parent Index (V_t) is computed. The annualized volatility is computed using trailing 3-months daily returns of the index as of month-end date of the previous month.

Annualized Volatility $V_t = \sqrt{250} * (\text{standard deviation of daily returns over trailing 3 months})$

2. The monthly change in volatility is computed as

$$\delta = (V_t / V_{t-1}) - 1$$

where V_{t-1} = Annualized Volatility computed at T-9 of previous month

3. If $\delta > \text{Threshold}$, ad-hoc rebalancing is triggered in that month at T-9 date.
4. Threshold is defined as,

Threshold = 95th percentile of monthly changes in volatility over available history of the Reference Index

- Reference Index for MSCI Momentum Indexes based on countries/regions categorized under Developed Markets is MSCI World Index.
- Reference Index for MSCI Momentum Indexes based on countries/regions categorized under Emerging Markets is MSCI Emerging Markets Index
- Reference Index for MSCI ACWI Momentum Index is MSCI World Index

As the ad-hoc rebalancing is triggered due to recent changes in Momentum, only 6-month Price Momentum value is used to compute Momentum score at the ad-hoc rebalancing date, instead of the combination of 6-month and 12-month Price Momentum that is used in SAIR as described in Section 2.

Appendix IV: Corporate Events Treatment

This appendix describes the treatment of the most common corporate events in the MSCI Indexes. Details regarding the treatment of all other corporate events not covered in this appendix can be found in the MSCI Corporate Events Methodology book, available at

<http://www.msci.com/products/indexes/size/methodology.html>

Event Type	Event details	Action
Acquisition	Momentum Index constituent acquires another Momentum Index constituent	Maintain acquiring company and remove acquired company
	Momentum Index constituent acquires non Momentum Index constituent	Maintain acquiring company
	Non Momentum Index constituent acquires Momentum Index constituent	Remove acquired company without adding acquiring company
Merger	Momentum Index constituent merges with Momentum Index constituent	Add new company with a constraint factor that is the weighted average of the two constituents
	Momentum Index constituent merges with non Momentum Index constituent	Add new company if MSCI links its price history to the Momentum Index constituent. New company not added if price history is linked to the non Momentum Index constituent
IPO	IPO added to Parent Index	Security will be considered for inclusion in the Momentum Index at the next Semi-Annual Index Review
Spin-off	Momentum Index constituent spins off security	Spun-off security will not be added to the Momentum Index, even if it is included in the Parent Index
Conversion	Security A converted to B, A deleted from Parent Index, B added	B will not be added to the Momentum Index
Country Reclassification	Domicile of company reviewed: Security A deleted from country A, security B added to country B	B will not be added to the Momentum Index
Stock exchange reclassification	Stock exchange (price source) of company reviewed: Security A	B will not be added to the Momentum Index

Event Type	Event details	Action
	deleted, security B added	
Other Events Resulting in Changes in Number of Shares and Foreign Inclusion Factors (FIF)	Changes in number of shares and subsequent FIF resulting from other events such as share placements and offerings, and debt-to-equity-swaps	No change in Constraint Factor

Appendix V: Short-Term Rates

Country	Short Term Rate Description
AUSTRALIA	Australian Dollar Domestic Interest Rate
AUSTRIA	Euro 3 Month BBA LIBOR
BELGIUM	Euro 3 Month BBA LIBOR
BRAZIL	Savings Rate, 1 Month
CANADA	Canadian Dollar 3 month Bank Bill (Yield Curve Constituent)
CHILE	Deposit Rate, 3 Month
CHINA	Deposit Rate, 3 Month
COLOMBIA	Deposit Rate
CZECH REPUBLIC	Czech Koruna Forward Rate Agreement (FRA) 3 month
DENMARK	Danish Krone 3 Month Deposit Rate
EGYPT	Discount Rate
EMU	Euro 3 Month BBA LIBOR
FINLAND	Euro 3 Month BBA LIBOR
FRANCE	Euro 3 Month BBA LIBOR
GERMANY	Euro 3 Month BBA LIBOR
GREECE	Euro 3 Month BBA LIBOR
HONG KONG	Hong Kong Dollar Forward Rate Agreement (FRA) 3 month
HUNGARY	BUBOR 3MTH APR3 (Bond Future)
INDIA	Indian Rupee 3 Month NSE MIBOR
INDONESIA	Indonesian Rupiah 1 Month JIBOR
IRELAND	Euro 3 Month BBA LIBOR
ISRAEL	Israeli Shekel Forward Rate Agreement (FRA), 3 Month
ITALY	Euro 3 Month BBA LIBOR
JAPAN	Japanese Yen 1 Month TIBOR
KOREA	Yield on stabilization bond based on Korea Securities Dealers Association
MALAYSIA	Kuala Lumpur 3-month KLIBOR
MEXICO	Treasury Bills, 1 Month
MOROCCO	Money Market Rate
NETHERLANDS	Euro 3 Month BBA LIBOR
NEW ZEALAND	Treasury Bills, 1 Month
NORWAY	NODF, Norges Bank key policy rate
PERU	Discount Rate
PHILIPPINES	Philippine Peso 3 Month PHIBOR
POLAND	Polish Zloty Forward Rate Agreement (FRA) 3 month
PORTUGAL	Euro 3 Month BBA LIBOR
RUSSIA	Discount Rate, 3 Month
SINGAPORE	Singapore Dollar 1 Month SIBOR
SOUTH AFRICA	South African Rand Forward Rate Agreement (FRA) 3 month

SPAIN	Euro 3 Month BBA LIBOR
SWEDEN	3-month STIBOR
SWITZERLAND	Swiss Franc Forward Rate Agreement (FRA) 3 month
TAIWAN	1-year time deposit rate at First Commercial Bank
THAILAND	Weighted average of interbank interest rate of five largest commercial banks in Thailand
TURKEY	Turkish Lira Forward Rate Agreement (FRA), 3 Month
UNITED KINGDOM	UK Pound Sterling Forward Rate Agreement (FRA) 3 month
USA	3-month T-Bill

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The company's flagship product offerings are: the MSCI indexes with approximately USD 8 trillion estimated to be benchmarked to them on a worldwide basis¹; Barra multi-asset class factor models, portfolio risk and performance analytics; RiskMetrics multi-asset class market and credit risk analytics; IPD real estate information, indexes and analytics; MSCI ESG (environmental, social and governance) Research screening, analysis and ratings; ISS corporate governance research, data and outsourced proxy voting and reporting services; and FEA valuation models and risk management software for the energy and commodities markets. MSCI is headquartered in New York, with research and commercial offices around the world.

¹ As of September 30, 2013, as reported on January 31, 2014 by eVestment, Lipper and Bloomberg

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