MSCI FIXED INCOME VALUE INDEXES METHODOLOGY

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Contents

1   Introduction

The MSCI Fixed Income Value Indexes are designed to represent the performance of a set of companies that exhibit relatively higher value characteristics within the parent universe of bonds.

The MSCI Fixed Income Value Indexes are part of the MSCI Fixed Income Factor Indexes, which are designed to represent the performance of the systematic elements of particular investment styles or strategies. While issuance weighted indexes aim to represent the broad market beta, these alternatively weighted indexes aim to represent additional sources of systematic return associated with particular investment styles and strategies, such as Carry, Size, Volatility, etc.

2 Index Construction Methodology

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.

2.2 Determination of Value Score

The value score for each constituent is computed using four bond level descriptors, namely OAS, log duration, credit rating and issuer size. It is calculated by finding out residual of regression of a bond's OAS z-score with z-scores of other three bond level descriptors.

2.2.1 Definitions of descriptors used

The value score calculation is done using 5 descriptors. Following are the definitions of descriptors used –

1. OAS – option adjusted spread of a bond

2. DTS – Effective Duration * OAS

3. Log Duration – natural log of effective duration of a bond

4. Credit Rating – rating on a scale of 0 to 9 based on ratings provided by Moody's and S&P

5. Issuer Size – negative of natural log of issuer notional amount of bonds outstanding

2.2.2 Calculating the Z-score for each individual variable

The z-score for each of four variables for each constituent is calculated using the mean and standard deviation of respective variables. The z-score for each individual variable is computed on a **DTS relative basis**.

The latest available data at the time of rebalancing is used for the individual value descriptors. All z- scores are winsorized at +/- 3.

2.2.3 Calculating the DTS relative variable z-score

The parent index is segmented into five universes using quintile segmentation technique. The segmentation is performed on DTS variable. After dividing parent

index into five universes, z-score for each of the four variables, namely OAS, log duration and issuer size, is calculated using the mean and standard deviation of respective variables with-in respective universe segment.

2.2.4 Calculating the value descriptor

The value descriptor is defined as the residual of multi-variate cross-sectional regression of z-score of OAS with z-scores of log duration, z-scores of size of a constituent and credit rating. The computation is done either using full universe (MSCI parent index) or DTS relative approach, depending on the use case. The regression equation for a particular constituent is as follows:

$$OAS\ Zscore_j = \beta_1 * LogDuration\ Zscore_j + \sum_i \beta_{2,i} * 1_{Rating_{2,i}}(CreditRating)_j + \beta_3 * Size\ Zscore_j + Residual_j$$

$$1_{Rating_{2,i}}(CreditRating) = \begin{cases} 1\ if\ CreditRating_{2,i} = CreditRating \\ 0\ otherwise \end{cases}$$

2.2.5 Calculating the value z-score

After calculating the value descriptor, a value z-score for each constituent is computed using **Sector relative Z-Score**. A sector relative score is derived by standardizing the value descriptor within each sector. A sector relative score is winsorized at +/- 3.

2.2.6 Calculating the final value score

The final value score is computed as follows:

$$Final\ Value\ Score = \begin{cases} 1 + Z_{rel,T}^j\ , & Z_T^j \geq 0 \\ \left(1 - Z_{rel,T}^j\right)^{-1}, & Z_T^j < 0 \end{cases}$$

where Z_T^j is a value z-score computed for each rebalancing as highlighted in previous step for each constituent.

2.3 Security Selection

The MSCI Fixed Income Value Indexes are constructed in the following variants:

1) Tilted exposures – taking all constituents of parent index
2) High exposures – selecting a subset of constituents within parent index and constructed with a fixed number of securities approach

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For high exposure variant, all the existing constituents of the relevant Parent Index are ranked based on their Final Value Scores. If multiple securities have the same Final Value Scores, then the security having a higher weight in the Parent Index is given a higher rank. A minimum number of securities with the highest positive Final Value Scores are predetermined for every MSCI Value Index at initial construction with an aim to attain a greater weight in the Value factor while maintaining sufficient index issuance outstanding notional amount and number of security coverage. Rules for arriving at a minimum number of securities at initial construction are explained in Appendix. The minimum number for security selection determined at initial construction is evaluated at every Quarterly Index Review. Rules for evaluating the minimum number of securities at index review are also explained in Appendix.

2.4   Weighting Scheme

The securities selected in the previous step are assigned weights in the proportion of Issuance weight* Final Value Score and normalized to sum to 1.

These weights are then updated to implement **sector neutrality** i.e. the weight of each sector in the MSCI Fixed Income Value Index is equated with the weight of that sector in the Parent Index. This is done by normalizing the weights of the constituents within each sector to reflect the effective Parent Index sector weight.

The final security level inclusion factor is determined as the ratio of the final security level weight and the security level pro forma issuance weight in the relevant Parent Index.

3   Maintaining the Indexes

3.1   Quarterly Index Reviews

The MSCI Fixed Income Value Indexes are rebalanced on a quarterly basis, usually as of the close of the last business day of a month. This approach aims to capture timely updates to the Value characteristics of the companies and coincide with the rebalancing frequency of the relevant Parent Index. The pro forma MSCI Fixed Income Value Indexes are in general announced three business days before the effective date.

Buffer Rules for High Exposure Indexes:

To reduce Index turnover and enhance index stability for high exposure indexes, buffer rules are applied as follows:

3.1.1   Security Selection Buffer

A security selection buffer of 50% is applied during the on-going index review.

For example, if the existing MSCI Fixed Income Value Index contains 400 securities then the buffers are applied between rank 201 and 600. The securities in the Parent Index with a value score rank at or above 200 will be added to the MSCI Fixed Income Value Index on a priority basis. The existing constituents that have a value score rank between 201 and 600 are then successively added until the number of securities in the MSCI Fixed Income Value Index reaches 400. If the number of securities is below 400 after this step, the remaining securities in the Parent Index with the highest value score rank are added until the number of securities in the MSCI Fixed Income Value Index reaches 400. If the number of securities is below the Minimum Number of securities (see Appendix I), the remaining securities in the Parent Index with the highest value score rank are added until the number of securities in the MSCI Fixed Income Value Index reaches the minimum number.

3.1.2   Turnover Buffer

A turnover buffer of 50% is applied during the on-going index review.

For example, if the on-going rebalancing results in changing the weight of a security from x% to y%, then the effective change in weight will be:

Effective pro forma constituent weight = x + (y-x)/2

The turnover buffer is not applied on deletions.

Appendix: Rules to Determine Minimum Number of Securities at Initial Construction and in Ongoing Rebalancing for high exposure indexes

Algorithm to Determine Minimum Number of Securities at Initial Construction
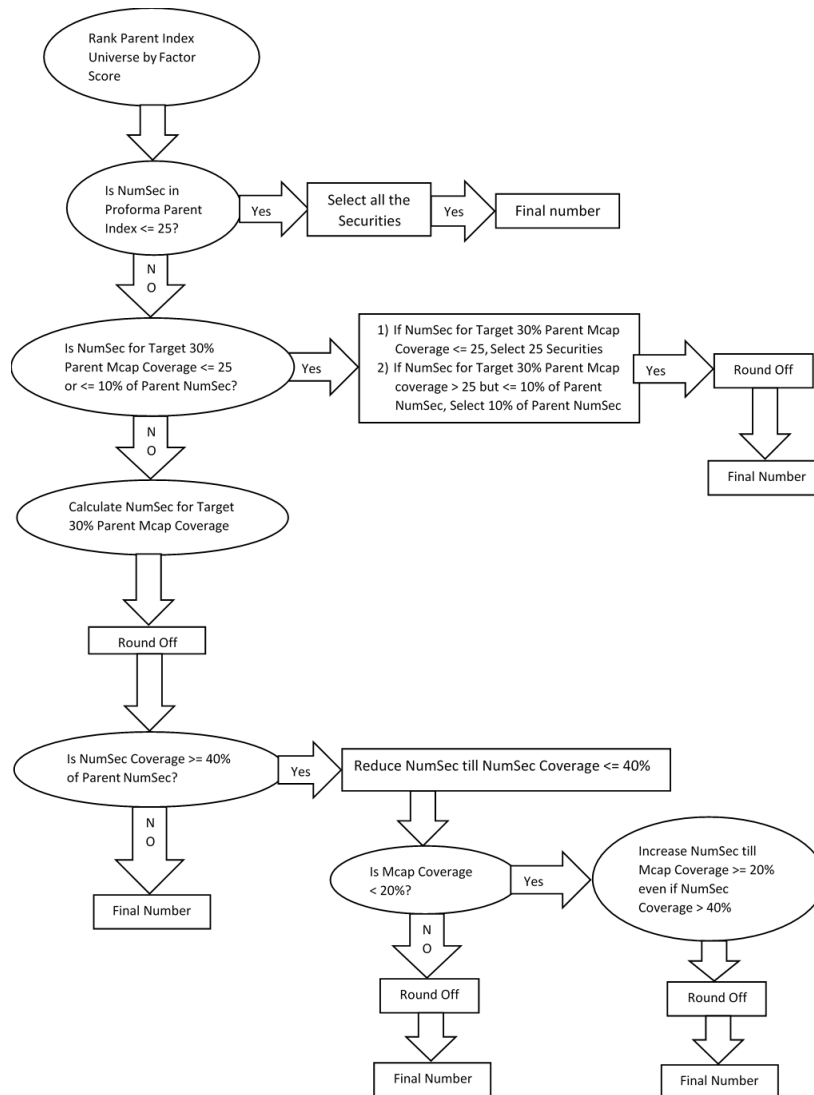
Rounding Off Rules:

Upward rounding off is done depending on minimum number of securities Obtained in the Previous Box Step

- If minimum number of securities in previous Step < 100, Nearest Rounding = 10 securities

- If minimum number of securities in previous Step > = 100 but < 300, Nearest Rounding = 25 securities

- If minimum number of securities in previous Step >= 300, Nearest Rounding = 50 securities

Algorithm to reevaluate Minimum Number of securities at Quarterly Rebalancing
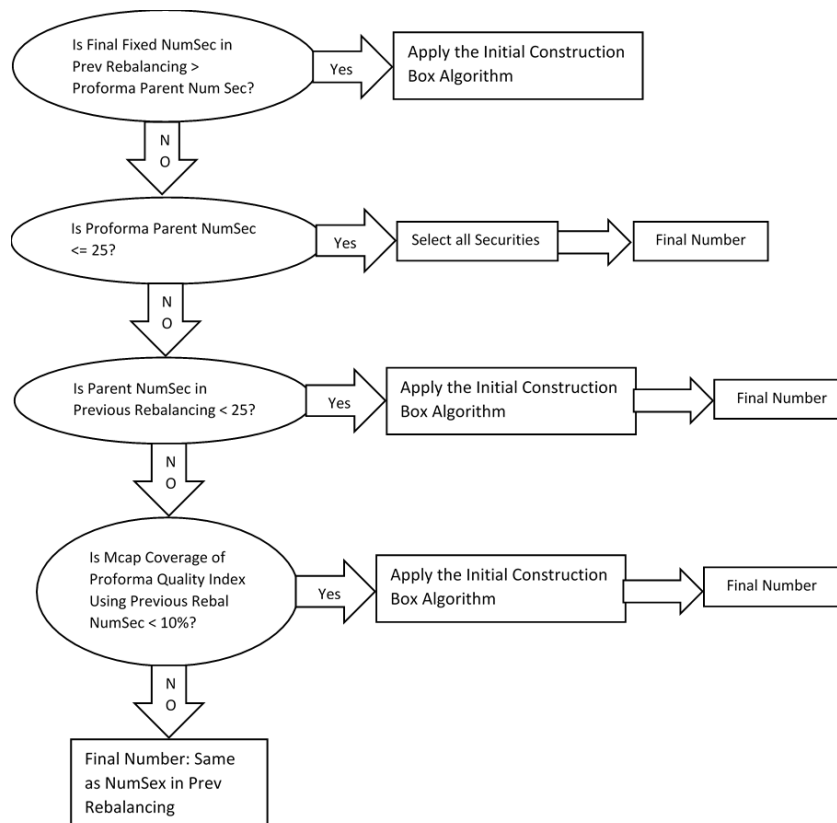
Contact us

clientservice@msci.com

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Americas	1 888 588 4567 *
Atlanta	+ 1 404 551 3212
Boston	+ 1 617 532 0920
Chicago	+ 1 312 675 0545
Monterrey	+ 52 81 1253 4020
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EUROPE, MIDDLE EAST & AFRICA

Cape Town	+ 27 21 673 0100
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Paris	0800 91 59 17 *

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China North	10800 852 1032 *
China South	10800 152 1032 *
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* = toll free

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