

MSCI FIXED INCOME MULTI- FACTOR INDEXES METHODOLOGY

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1 Introduction

The MSCI Fixed Income Multi-Factor Indexes are designed to reflect the performance of a strategy that seeks higher exposure to four style factors - Value, Low Risk, Low Size and Carry.

The MSCI Fixed Income Multi-Factor 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.

Single factor indexes reflect the performance of systematic exposures to certain bond characteristics. The MSCI Fixed Income Multi-Factor Indexes are constructed from the bond-level upwards using individual bond exposures to four factors identified above, rather than by combining the aggregate exposures of separate single factor indexes.

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 multi-factor Score

The multi-factor score for each constituent is computed using four factor scores, namely Value, Low Risk, Issuer Size and Carry.

2.2.1 Calculation of the alpha score

$$\alpha_i = 0.25 * F_{1,i} + 0.25 * F_{2,i} + 0.25 * F_{3,i} + 0.25 * F_{4,i}$$

Where,

$F_{1,i}$ = Factor exposure of each security i for each of the target factors.

The factor exposures for the target factors are sourced as follows:

1. Value – Factor exposure for each security taken from the MSCI Fixed Income Value Factor index. The full details of the calculation are available in the MSCI Fixed Income Value Indexes methodology.
2. Low Risk – Factor exposure for each security taken from the MSCI Fixed Income Low Risk Factor index. The full details of the calculation are available in the MSCI Fixed Income Low Risk Indexes methodology.
3. Size – Factor exposure for each security taken from the MSCI Fixed Income Size Factor index. The full details of the calculation are available in the MSCI Fixed Income Size Indexes methodology.
4. Carry – Factor exposure for each security taken from the MSCI Fixed Income Carry Factor index. The full details of the calculation are available in the MSCI Fixed Income Carry Indexes methodology.

The aggregate alpha score is re-normalized by applying a z-score resulting in Z_T^j .

2.2.2 Calculating the final multi-factor score

The final multi-factor score is computed as follows:

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

Where: Z_T^j is a multi-factor z-score computed for each rebalancing as highlighted in previous step for each constituent

2.3 Security Selection

The MSCI Fixed Income Multi-Factor 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 approaches

For the high exposure variant, all the existing constituents of the relevant Parent Index are ranked based on their Final Multi-Factor Scores. If multiple securities have the same Final Multi-Factor 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 Multi-Factor Scores are predetermined for every MSCI Multi-Factor Index at initial construction with an aim to attain a greater weight in the Multi-Factor 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 I. 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 I.

2.4 Weighting Scheme

The securities selected in the previous step are assigned weights in the proportion of Issuance weight* Final Multi-Factor 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 Multi-Factor 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 Multi-Factor Indexes are rebalanced on a quarterly basis, usually as of the close of the last business day of a month. All variables are taken as of three days prior to the index rebalancing.

This approach aims to capture timely updates to the Multi-Factor characteristics of the companies and coincide with the rebalancing frequency of the relevant Parent Index. The pro forma MSCI Fixed Income Multi-Factor 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 Multi-Factor Index contains 400 securities then the buffers are applied between rank 201 and 600. The securities in the Parent Index with a multi-factor score rank at or above 200 will be added to the MSCI Fixed Income Multi-Factor Index on a priority basis. The existing constituents that have a multi-factor score rank between 201 and 600 are then successively added until the number of securities in the MSCI Fixed Income Multi-Factor Index reaches 400. If the number of securities is below 400 after this step, the remaining securities in the Parent Index with the highest multi-factor score rank are added until the number of securities in the MSCI Fixed Income Multi-Factor 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 multi-factor score rank are added until the number of securities in the MSCI Fixed Income Multi-Factor Index reaches the Minimum Number of securities.

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:

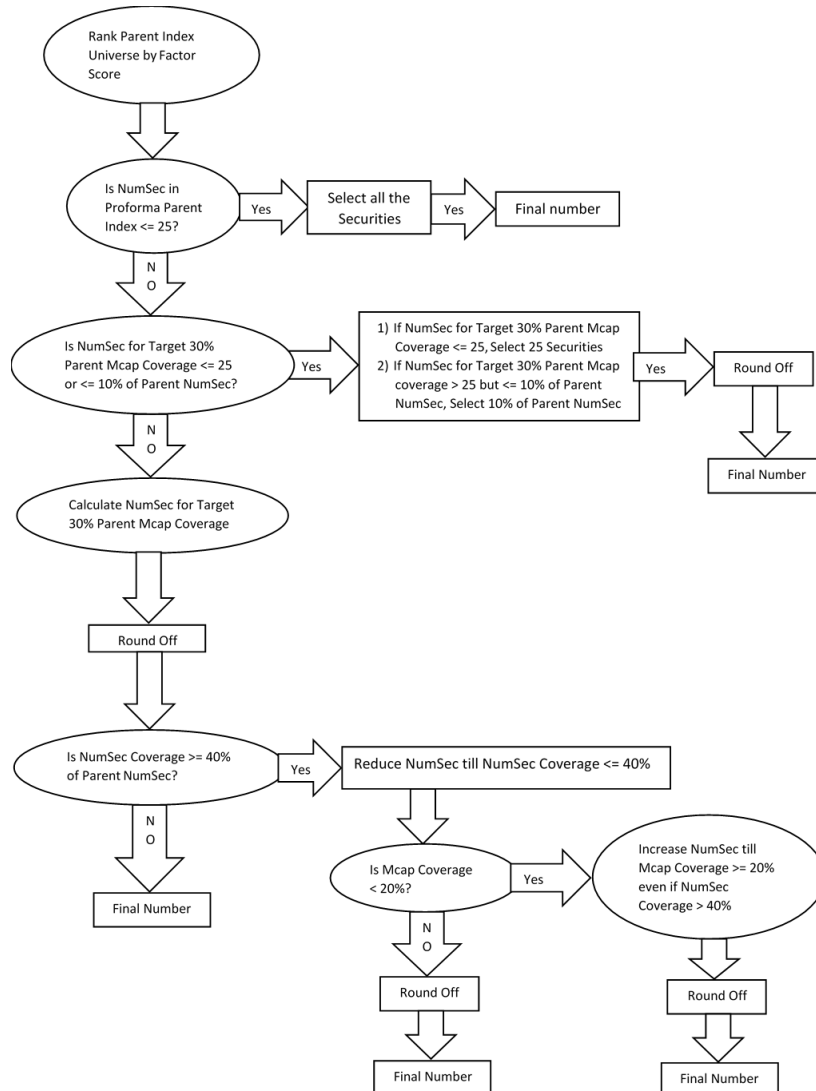
$$\text{Effective pro forma constituent weight} = x + (y-x)/2$$

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

Rank the securities in the proforma parent universe in the descending order of final multi-factor score

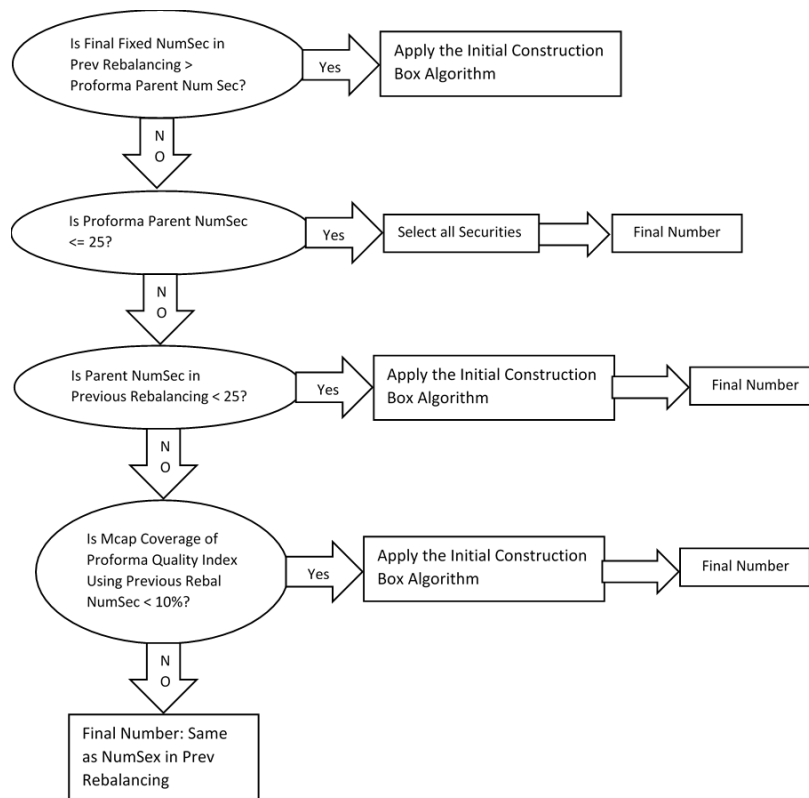


Rounding Off Rules:

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



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* = toll free

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