

# **MSCI USA SELECT STRONG- BALANCE-SHEET VOLATILITY FILTERED INDEX**

**September 2022**

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# 1 Introduction

The MSCI USA Select Strong-Balance-Sheet Volatility Filtered Index (the “Index”) aims to represent the performance of the 250 stocks with highest Merton’s “Distance to Default” score from MSCI USA Small Cap Index. A simplified version of the model is used to select companies with lower probability of credit default according to the score. The Index also aims to have lower volatility than the MSCI USA Small Cap Index.

## 2 Constructing the Index

The Index is constructed from the MSCI USA Small Cap Index (the “Parent Index”).

The following steps are applied at initial construction as well as subsequent Index Reviews:

- Determine the Eligible Universe
- Security selection based on equity volatility and simplified Distance to Default Score
- Weighting Scheme

### 2.1 ELIGIBLE UNIVERSE

#### 2.1.1 GICS® INDUSTRY SCREEN

The Index excludes stocks that belong to the following GICS® Industries:

GICS® Industry	GICS® Industry Code
Real Estate	60
Financials	40

This approach excludes ‘Financials’ and ‘Real Estate’ securities to prevent a distorted Merton’s Distance to Default score.

#### 2.1.2 LIQUIDITY CRITERIA

Securities with 6-month ADTV (Annualized Daily Traded Value) greater than or equal to USD 3 Million are eligible for inclusion in the Index.

ADTV is calculated as:

$$ADTV_{6M} = \frac{ATV_{6M}}{252}$$

where  $ATV_{6M}$  is 6-month Annualized Traded Volume of the security<sup>1</sup>.

To avoid multiple securities of the same company in the final index, only the most liquid security for each issuer per its 6-month ADTV, is eligible for inclusion in the

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<sup>1</sup> MSCI Index Calculation Methodology at <https://www.msci.com/index-methodology>

Index. For any issuer, should two securities have the same 6-month ADTV, the one with the higher free float-adjusted market capitalization is included.

## 2.2 SECURITY SELECTION BASED ON EQUITY VOLATILITY AND SIMPLIFIED DISTANCE TO DEFAULT SCORE

The securities from the Eligible Universe are ranked in ascending order of their 6-month historical price volatility of the security  $\sigma_E(i, t)$ . The top 80% securities with lowest price volatility are selected for inclusion in the Index.

Subsequently, the top 250 securities, ranked in descending order of their latest 'Distance to Default' score, are selected for inclusion in the Index.

The score is based on a simplified version of Merton's Distance to Default score which hypothesizes that equity is a call option on the value of the firm. The strike price of this option is equal to the value of the debt. By put-call parity, the value of a firm's debt is then equal to a risk-free bond less a put on the debt.

*Distance to Default*( $i, t$ ) =

$$\frac{\ln\left(\frac{Mkt\ Cap(i, t) + (Current\ Liabilities(i, t) + 0.5 * Long\ Term\ liabilities(i, t))}{(Current\ Liabilities(i, t) + 0.5 * (Long\ Term\ liabilities(i, t)))}\right) + (Rate(t) - \frac{\sigma_A^2(i, t)}{2})}{\sigma_A(i, t)}$$

where:

$$\begin{aligned} \sigma_A(i, t) &= \frac{Mkt\ Cap(i, t)}{Mkt\ Cap(i, t) + (Current\ Liabilities(i, t) + 0.5 * Long\ Term\ liabilities(i, t))} \sigma_E(i, t) \\ &+ \frac{(Current\ Liabilities(i, t) + 0.5 * Long\ Term\ liabilities(i, t))}{Mkt\ Cap(i, t) + (Current\ Liabilities(i, t) + 0.5 * Long\ Term\ liabilities(i, t))} \sigma_D(i, t) \end{aligned}$$

$$\sigma_D(i, t) = 0.05 + 0.25 * \sigma_E(i, t)$$

$\sigma_E(i, t)$  is the 6-month historical price volatility of the security (i) calculated as the standard deviation of daily price changes over the 126 weekdays up to Review Date t (included)

*Current Liabilities*( $i, t$ ) are the latest available liabilities of the security (i) on date (t) that need to be settled within 1 year.

*Long Term liabilities* ( $i, t$ ) are the latest available Liabilities of the security (i) on date (t) that need to be settled beyond a year.

For the May, August, November and February Quarterly Index Reviews, the fundamental data as of the end of April, July, October, and January respectively is used.

$Mkt\ Cap(i, t)$  is the latest equity market cap for security  $i$  available on date  $t$

$Rate_t$  is the latest 3-month Libor rate available from date  $t$

## 2.3 WEIGHTING SCHEME

Each selected security is assigned an equal weight at initial construction and at every Index Review.

## 3 Maintaining the MSCI USA Select Strong Balance Sheet Volatility Filtered Index

### 3.1 QUARTERLY INDEX REVIEWS

The Index is reviewed on a quarterly basis as per the steps described in Section 2, coinciding with the May and November Semi-Annual Index Reviews and the February and August Quarterly Index Reviews of the Parent Index. The Index is rebalanced over five days T-4, T-3, T-2, T-1, and T, where T is the effective date of the May and November Semi-Annual Index Reviews (SAIR) and the February and August Quarterly Index Reviews of the Parent Index.

The pro forma of the Index (herein, “Pro forma Index”) in general are announced nine business days before T (T-9).

#### 3.1.1 SECURITY SELECTION BUFFER

A security selection buffer of 50% is applied during the on-going Index Reviews. For example, the Index targets 250 securities and the buffers are applied between rank 126 and 375. The securities in the Parent Index with a Merton’s Distance to Default score rank at or above 125 will be added to the Index on a priority basis. Existing constituents that have a Merton’s Distance to Default score rank between 126 and 375 are then successively added until the number of securities in the Index reaches 250. If the number of securities is below 250 after this step, the remaining securities in the Parent Index with the highest Merton’s Distance to Default score rank are added until the number of securities in the Index reaches 250.

#### 3.1.2 STAGGERED REBALANCE

The rebalance changes of the Pro forma Index are then staggered for implementation by spreading the change in Index Number of Shares (NOS) for each security over five days leading into the rebalancing effective date (T). For each  $t \in \{T-4, T-3, T-2, T-1, T\}$ , number of shares for each security included in the Index (*Staggered Index NOS (t)*) are calculated as below:

$$\text{Staggered Index NOS (t)} = \text{Pro forma Index NOS (t)} + [\text{Adjusted Pro forma Index NOS (T)} - \text{Pro forma Index NOS (t)}] * (N/5)$$

Where:

*t* : Effective date of the staggering

*T*: Rebalancing effective date of the Pro forma Index

*Pro forma Index NOS (t): It is the number of shares of a security in the Pro forma Index effective on t (as of close t - 1). It is calculated as a product of the end of day security number of shares on t - 1 and Full Market Cap Adjustment Factor<sup>2</sup> in the Pro forma Index on t*

*Adjusted Pro forma Index NOS (T) : Pro forma Index NOS (T) adjusted for change in number of shares due to events like Rights Issues, Split, Consolidation, Stock Dividend, effective between t and T*

*N = nth day of staggering, e. g. t - 4 is 1st day of staggering*

### 3.2 ONGOING EVENT RELATED CHANGES

The following section briefly describes the treatment of common corporate events within the 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
<b>New additions to the Parent Index</b>	A new security added to the Parent Index (such as IPO and other early inclusions) will not be added to the index.
<b>Spin-Offs</b>	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.
<b>Merger/Acquisition</b>	For Mergers and Acquisitions, the acquirer's post event weight will account for the proportionate amount of shares involved in deal

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<sup>2</sup> Full Market Cap Adjustment Factor (FMCAF): A factor that is used in index constituent weighting calculation defined as (Inclusion Factor (i.e. FIF)) \*(Constraint Factor) \* (Variable Weighting Factor). For more details, please refer to section 2.7 of the MSCI Corporate Events Methodology book at <http://www.msci.com/index-methodology>

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 be kept in the Index if there are changes in its characteristics (country, sector, size segment, etc.) Reevaluation for 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.

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