

# **WISDOMTREE RULES-BASED METHODOLOGY**

**U.S. Corporate Bond Index Family**

**Last Updated September 2019**

## **Overview of Core Index Methodology**

Each index is designed to capture the performance of selected issuers in the US investment grade corporate bond market that are deemed to have favorable fundamental and income characteristics. Each index employs a multi-step process, which screens on fundamentals to identify bonds with favorable characteristics and then tilts to those which offer favorable income characteristics (screen for favorable bonds and tilt towards income). The goal is to improve the risk-adjusted performance of traditional market-capitalization approaches of corporate bond indices.

Each index utilizes a screen and tilt approach to isolate bonds that have favorable fundamentals and tilts to those bonds with favorable income and valuation characteristics. Each index defines the universe, scores the individual issues against their industry sector peers based on fundamental metrics distinguishing cash flow, profitability, and leverage and creates a composite rank, which aggregates these. The securities with the lowest fundamental ranks in each sector are then discarded. A valuation or income tilt score with adjustments accounting for the probability of default and the duration effect is then applied to the market capitalization of each remaining security. The valuation tilt score incorporates the incremental income offered over Treasuries with similar maturities within the context of the credit risk and the interest rate risk they entail. The valuation tilt scores are ranked by sector and this percentile ranking is translated into a multiplier, which is applied to the market cap of the securities to determine the issue's weighting within the index. As a final step, issuer exposure within the index is capped at 5% with the excess exposure then distributed to the remaining securities on a pro-rata basis. Each index is rebalanced on a quarterly basis, with bonds removed monthly due to rating changes, if any.

## **Relevant Indices in the Family (Definition in Detailed Steps)**

- WisdomTree U.S. Corporate Bond Index
- WisdomTree U.S. BBB Corporate Bond Index
- WisdomTree U.S. Short-term Corporate Bond Index
- WisdomTree U.S. Short-term BBB Corporate Bond Index

## **Index Methodology**

### **1. Index Universe**

Each index is comprised of corporate bonds of public issuers domiciled in the United States. All eligible bonds are denominated in US dollars.

#### **1.1. Coupon Type**

Each issue must pay fixed-rate coupons.

#### **1.2. Liquidity**

For the WisdomTree U.S. Corporate Bond Index or the WisdomTree U.S. Short-term Corporate Bond Index or the WisdomTree U.S. Short-term BBB Corporate Bond Index, each issue must have at least \$350 million in par amount outstanding. For the WisdomTree U.S. BBB Corporate Bond Index, each issue must have at least \$500 million in par amount outstanding. Each issue must have a remaining maturity of at least one year, or equivalent of 365.25 days.

#### **1.3 Rating**

Each issue must be rated investment grade (at least BBB- or Baa3) by Standard & Poor's or Moody's. The final rating is determined by the average rating from the two rating agencies.

For the WisdomTree U.S. Short-term BBB Corporate Bond Index or the WisdomTree U.S. BBB Corporate Bond Index, each issue must have a maximum equivalent rating of BBB+ and minimum equivalent rating of BBB- by Standard & Poor's or Moody's.

#### **1.4 Short Term**

For the WisdomTree U.S. Short-term Corporate Bond Index or the WisdomTree U.S. Short-term BBB Corporate Bond Index, each issue must have at least one year to maturity and at most five years to maturity.

#### **1.5 Sector**

Each issue is classified into one of three sectors: Industrial, Financial, or Utility. Government, quasi government, foreign agencies, or supra-national issuers are excluded.

### **2. Rating Change**

In the case that an issue (i) is downgraded to junk bond status (below Baa3 or BBB-), (ii) for WisdomTree U.S. Short-term BBB Corporate Bond Index and WisdomTree U.S. BBB Corporate Bond Index, if an issue has a rating change to above BBB+, or (iii) if the issuer has defaulted, the issue(s) would be removed from the index at the end of the

month when the downgrade/rating change/default event is announced. The value associated with any such issue(s) is applied to the remaining index constituents pro rata at the end of the month.

### 3. Factor Definition

#### 3.1 Free Cash Flow over Debt Service (FCFD)

Three-year annual weighted average of free cash flow over debt service, where debt service is calculated as Short Term Debt plus Interest payments plus Lease payments.

#### 3.2 Negative of the Leverage Ratio (NLEV)

Leveraged ratio is defined as the last four-quarter average of Total Debt over Total Asset.

#### 3.3 Return on Invested Capital (ROIC)

Net Income over Shareholder's Equity plus Long Term Debt.

The final factor score is determined by the average of the three factors after normalization. Normalization refers to adjusting values measured on different scales to a notionally common scale prior to averaging. If only one of the three factors is unavailable, it will not contribute to the final factor score. If more than one factor is not available for the issue, there will be no final factor score assigned to this issue and it will be excluded from the index.

### 4. Fundamental Cut

The final factor score is ranked within each sector, and the bonds with the lowest 20% factor scores from each sector are removed. The issues with no factor score available are excluded from the index.

The *reference constituents* are defined as all the remaining bonds after the fundamental cut that are still included in each index universe.

### 5. Distance-to-Default (D2D) and Probability of Default (PD) Measure

D2D is obtained using Merton's formula. Denote  $\sigma_{EE}$  as the annualized volatility of trailing 1 year daily equity price changes, the firm's asset volatility  $\sigma$  is estimated by:

$$\sigma^2 = \frac{\sigma_E^2}{1 + L} + \frac{(0.05 + 0.25 * \sigma^2) E}{1 + 1/L}, \text{ where } LL = \frac{\text{Total Debt}}{\text{Common Shares Outstanding} * \text{Equity Price}}$$

The distance to default of a firm is calculated as:

$$DD2DD = \frac{\ln \left( 100 * \frac{\text{Short Term Debt} + \text{Long Term Debt}}{\text{Total Assets}} * \text{Default Barrier} \right)}{\sigma} + \frac{RR_{EE} - 0.5\sigma^2}{\sigma},$$

where Default Barrier = Short Term Debt + 0.5 \* Long Term Debt and  $RR_{EE}$  refers to the equity return.

Correspondingly, each index uses a PD measure given by a transformation of the D2D:

$$PPDD = 1 - \frac{e^{-0.5+0.75*DD2DD}}{1 + e^{-0.5+0.75*DD2DD}}$$

## 6. Income Tilt and Amount Outstanding Adjustment

For each issue an income tilt score is obtained by

$$\frac{OAS(1-PPDD)}{\ln(\text{Effective Duration})}$$

where OAS stands for option-adjusted spread, and PD refers to the probability of default.

The income tilt scores are ranked (in descending order) within each sector.

The amount outstanding of each issue is adjusted by  $2\alpha$  (a constant between 0 and 2), where  $\alpha$  is the percentage rank of the issue's tilt score within its sector. For an issue with the top tilt score within its sector, its market value weight in the index would be doubled; for an issue with the worst tilt score within its sector, its market value weight in the index would be set to 0.

Issues with no income tilt score are removed from each index.

## 7. Issuer Cap

An issuer cap of 5% in total market value is applied to each index. Issues with the same ultimate parent ticker are aggregated under the same issuer.

If an issuer in an index exceeds the cap, the total market value of the issues under this issuer would be scaled down to honor the cap at rebalance.

## 8. Index Constitution and Rebalancing

Each index is rebalanced quarterly on the last business days of February, May, August, and November.

### 8.1 Determination of the Reference Constituents

The reference constituents are determined ten business days (T-10) preceding each rebalancing date.

### 8.2 Determination of Constituent Weights

Five business days (T-5) preceding each rebalancing date, the tilt step and the issuer cap are performed on the reference constituents based on the most current pricing data. The corresponding T-5 constituent weights are applied to the index on the rebalancing date. This allows for advanced notice concerning potential weight changes in each index.

### **8.3 Exclusions prior to Rebalancing**

If an issue in the T-10 reference constituents fails the index universe screening prior to the rebalancing date, it will be removed from each index.

### **8.4 Index Rebalancing**

On the rebalancing date, the index is updated to reflect the T-5 constituent weights, and the updated par amounts for the new constituents are calculated.

## **9. Exclusion due to Delayed or Unfiled Annual Report**

If a company filed an NT 10-K report stating that it is not going to file the annual 10-K report within the extension period as dictated by the SEC based on reasons involving financial or accounting aspects solely pertaining to this company, all bonds issued by this company will be excluded from the reference universe. If such company is already in the index, its bonds will be dropped on the 3rd business day after the filing.

If a company filed an NT 10-K report and subsequently did not file the annual 10-K report during the extension period based on reasons involving financial or accounting aspects solely pertaining to this company, all bonds issued by this company will be excluded from the reference universe. If such company is already in the index, its bonds will be dropped on the 3rd business day after the end of the extension period.

If a company has been excluded from the reference universe or the index due to the reasons listed above, it will need to file or restate its 10-K and then file the next 10-Q on time before the next reference universe determination date to be eligible for inclusion into the reference universe.

## **10. Index Maintenance**

Index Maintenance includes monitoring and implementing the adjustments for redemptions, conversions, calls, or other corporate actions.

If a bond is converted, called or redeemed early at any point between rebalancing periods, the bond will be removed from the index, and the weights of the remaining components are adjusted proportionately to reflect the change in composition of the index.

Any corporate action will be implemented after the close of trading on the day prior to the ex-date of such corporate actions. Whenever possible, changes to the index's components, such as deletions as a result of corporate actions, will be announced at least two business days prior to

their implementation date.