

INDEX METHODOLOGY

Northern Trust
50 South La Salle Street
Chicago, Illinois 60603
Nt_index_services@ntrs.com
northerntrust.com

INTRODUCTION

This document sets forth the methodology for the Northern Trust Credit-Scored US Long Corporate Bond Index.

The index is calculated and disseminated by Intercontinental Exchange Data Services (ICE).

OVERVIEW

Northern Trust Credit-Scored US Long Corporate Bond Index

The Northern Trust Credit-Scored US Long Corporate Bond Index is designed to measure the performance of a diversified universe of longer termⁱ maturity, US-dollar denominated bonds of companies with investment grade credit quality, and enhanced short-term and long-term solvency.

INDEX ELIGIBILITY

In order to be eligible for inclusion in the Northern Trust Credit-Scored US Long Corporate Bond Index, each bond issue must be:

- A constituent of the Northern Trust Investment Grade US Long Corporate Bond Index
- \$500mm or greater in terms of outstanding principal at each reconstitution
- Issued by a publically traded companyⁱⁱ

DETAILED METHODOLOGY

The construction of the index begins with a securities screen to determine eligible securities (defined in “Index Eligibility” section). Once all eligible securities have been identified, the securities’ are then optimized based on their exposure to quantitative factors such as:

- Credit-Scoreⁱⁱⁱ, as determined by Northern Trust’s Quantitative Research team’s proprietary scoring model^{iv}
- Option Adjusted Spread (OAS)^v
- Effective Duration^{vi}

The primary objective of the optimization is to maximize our exposure to the credit-score factor, and maintain a similar Option Adjusted Spread and Effective Duration profile relative to our eligible universe. In addition to that main objective, systematic risk is managed during the



optimization utilizing several constraints. These constraints are listed below (bounds show as relative weightings unless otherwise noted):

- Security level constraint: to limit an index constituent's maximum or minimum weight versus the eligible universe to either full underweight or three times (3.0x) the weight in the eligible universe
- Minimum absolute constituent constraint: to require that each index constituent has a weight of at least one basis point (0.01%)
- Minimum absolute turnover constraint: to require that index turnover at the constituent level is larger than one basis point (0.01%) for each change made during the reconstitution
- Credit-Score constraint: to remove bonds ranking in the lowest quintile in non-Financial sectors^{vii}
- Issuer level constraint: to limit each issuer's absolute weight to 5% or less
- Sector constraint: to limit the index's maximum or minimum sector weight exposure to +/-10% versus the eligible universe

All the systematic risk constraints are placed in the constraint hierarchy so when a solution is not feasible due to hard constraints, a relaxed solution is found.

Any changes to this methodology will be announced to clients at least sixty (60) days in advance prior to becoming effective.

RECONSTITUTION & REBALANCING

The Northern Trust Credit-Scored US Long Corporate Bond Index is reconstituted monthly^{viii} on the last business day of the month in which U.S. bond markets are open for trading^{ix}, and becomes effective immediately after the market close. Intra-period adjustments may be made at the discretion of the index provider in connection with errors, changes in eligibility, and corporate actions.

The Northern Trust Credit-Scored US Long Corporate Bond Index reserves the right to postpone each reconstitution date for up to one week with prior client notification of such a postponement.

All changes to constituents and weightings will be announced to clients at least two (2) days prior to the reconstitution or rebalancing date, and again with definitive weights after the close of the reconstitution or rebalancing date, before the following business day's market open.

Disclaimer: *Returns of the indexes do not typically reflect the deduction of investment management fees, trading costs or other expenses. It is not possible to invest directly in an index. Indexes are the property of their respective owners, all rights reserved*

ⁱ Longer maturity is defined as 10 years or longer to maturity date at the time of each reconstitution



-
- ii Issuer is required to have an active listing on one of the global equity exchanges
 - iii This factor seeks to identify companies that exhibit strength in both short-term and long term solvency
 - iv The core components of the proprietary credit scoring model are based on quantitative ranking of various metrics obtained from company filings and recent price activity. These scores have three components: Management Expertise (e.g. corporate finance activities), Profitability (e.g. assess the reliability and sustainability of financial performance) and Solvency (short and long term).
 - v A measurement of the spread of a security's rate of return and the risk-free rate of return, adjusted to account for any embedded options.
 - vi A measure of the sensitivity of the price of a bond to a change in interest rates, adjusted for embedded options, and commonly utilized to evaluate a bond's theoretical change in value given a shift in the yield curve.
 - vii Northern Trust's Asset Management team categorizes all issues present in the NT Investment Grade US Long Corporate Bond Index into the following sectors: Consumer, Energy, Financials, Industrials, and Telecom, Technology & Media (TTM).
 - viii Data used to strike the forward index is locked down for construction purposes eight business days prior to month end.
 - ix Per the US holiday schedule posted at www.sifma.org/services/holiday-schedule/

