
Construction Rules for the Morningstar® US Bond Market Yield-Optimized IndexSM

Morningstar Indexes

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Contents

1 Overview

2 Index Construction

2.1 Assigning ETFs to the Index

2.2 Index Weighting

3 Index Maintenance and Calculation

3.1 Index Maintenance

3.2 Index Calculation and Price Data

4 Methodology Review and Index Cessation Policy

5 Data Correction and Precision

5.1 Intraday Index Data Corrections

5.2 Index-Related Data and Divisor Corrections

5.3 Computational and Reporting Precision

6 Appendixes

6.1 Glossary

6.2 Modification to Rule book

7 About Morningstar

Overview

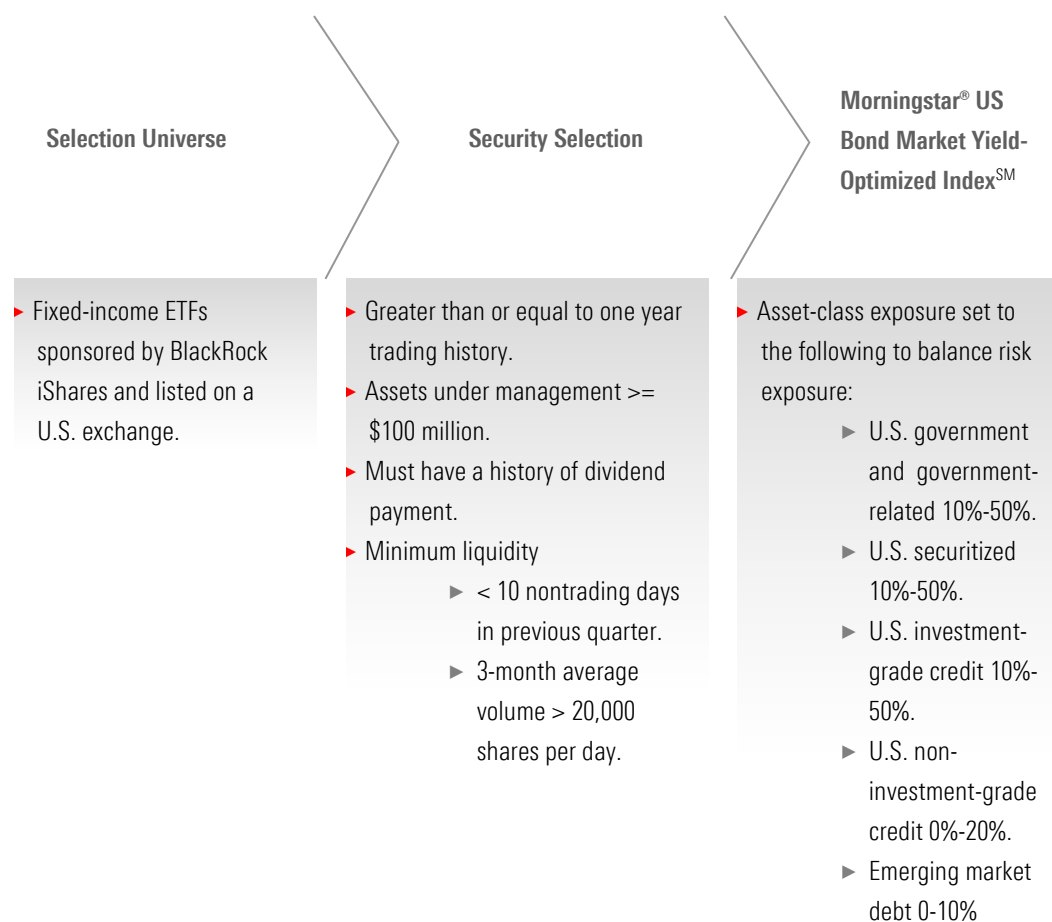
The Morningstar® US Bond Market Yield-Optimized IndexSM is a broadly diversified index that targets securities that seek to deliver a high level of current income while maintaining long-term capital appreciation. The index consists of a comprehensive set of exchange-traded funds that collectively target various asset classes within the fixed-income category. The iShares ETF platform consists of government bonds, securitized bonds, and credit bonds.

Index Inception Date and Performance Inception Date

The inception date of the index is March 5, 2014, and the performance inception date of the index is February 29, 2012, when the first back-tested index value was calculated.

Index Construction

Exhibit 1 Morningstar US Bond Market Yield-Optimized Index Construction Process



For additional details, refer to the "Assigning ETFs to the Index" section.

Assigning ETFs to the Index

Selection Universe

At each reconstitution, securities for Morningstar US Bond Market Yield-Optimized Index are derived from fixed-income ETFs with fund sponsor iShares, a subsidiary of BlackRock. The ETF must fall in the following broad sectors and be listed on a U.S. exchange:

- ▶ U.S. government and government-related¹
- ▶ U.S. securitized
- ▶ U.S. investment-grade credit

¹ Government-related includes agency, Treasury Inflation-Protected Securities, local authorities, sovereign, and supranational.

- ▶ U.S. non-investment-grade credit
- ▶ Emerging market debt

The following ETF categories are not eligible:

- ▶ Non-taxable bonds

Security Selection

To be eligible for the index, all constituents must meet the following criteria in sequence:

- ▶ ETF must have at least one year of trading history.
- ▶ ETF must have at least \$100 million in assets under management.
- ▶ ETF must have a history of dividend payment.
- ▶ ETF must have fewer than 10 nontrading days in the previous quarter.
- ▶ ETF must have a three-month average trading volume greater than 20,000 shares per day.

Number of ETFs

The number of ETFs in the index is subject to the selection and eligibility criteria at the time of reconstitution.

Index Weighting

To maintain broad exposure and diversification, the index will maintain a weight allocation at each rebalance of:

- ▶ 10%-50% U.S. government and government-related
 - ▶ 0%-10% TIPS exposure
- ▶ 10%-50% U.S. securitized
- ▶ 10%-50% U.S. investment-grade credit
 - ▶ 0%-10% floating-rate exposure
- ▶ 0%-20% U.S. non-investment-grade credit
- ▶ 0-10% Emerging market debt

In addition, the following security-level weight constraints are applied:

- ▶ Maximum single security position is 30%.
- ▶ Maximum position for securities with less than \$500 million in assets under management is 10%.

Portfolio Weight Calculation

Securities that meet the security selection criteria are selected and assigned a weight according to a variant of the mean-variance optimization equation developed by Morningstar. The equation creates an optimal portfolio based on the return, standard deviation, correlation, and yield of the eligible securities. The weight of each select constituent of the portfolio is given by maximizing portfolio yield y_p such that expected portfolio risk σ_p is less than or equal to expected aggregate bond risk σ_m and the sector weight and the maximum per-sector and per-constituent allocation constraints are satisfied.

$$\max y_p(w): \sigma_p(w) \leq \sigma_m$$

Where:

$$y_p = w'y = \sum_{i=1}^n (w_i y_i)$$

$$\sigma_p = \sqrt{w'Vw}$$

w	=	vector of constituents' weights
y	=	vector of constituents' current yield to maturity (less management fees)
V	=	variance-covariance matrix of last 36 months of total market returns
σ_m	=	trailing 36-month volatility of iShares Core Total Aggregate US Bond ETF (AGG)
n	=	number of eligible constituents

As noted above, co-variances used in the optimizer are calculated using the past 36 months of total market returns.²

Index Maintenance and Calculation

Scheduled Maintenance

The index is reconstituted and rebalanced quarterly and is implemented after the close of business on the last business day of February, May, August and November and is effective the following business day. The market data used for reconstitution and rebalance is as of previous month end.

Refer to Appendix 1 for details about reconstitution and rebalance.

Index Calculation and Price Data

Index Calculation

The value (price) and total return of the index is calculated using a Laspeyres' formula. The only difference is that the divisor D_t is different for the two (total return and price return) indexes:

² For securities with less than 36 months of performance, the prospectus benchmark is used to proxy the ETF performance.

$$Index(t) = \left(\frac{M(t)}{B(t)} \right) * BaseIndexValue$$

$$M(t) = \sum_{i=1}^n (p_{i(t)} * q_{i(t)})$$

$$B(t) = C(t) \sum_{i=1}^n (p_{i(0)} * q_{i(0)})$$

The above formula can be simplified as: $Index(t) = \frac{M(t)}{D(t)}$

Where

D(t)	=	divisor at time (t) = B(t)/Base Index Value
n	=	number of constituents in the index
pi(0)	=	closing price of constituent i at the base date
qi(0)	=	number of shares held in index of constituent i at the base
pi(t)	=	price of constituent i at time (t)
qi(t)	=	number of shares in index of constituent i at time (t)
C(t)	=	adjustment factor for the base date market capitalization
t	=	time the index is calculated
M(t)	=	market capitalization of the index at time (t)
B(t)	=	adjusted base date market capitalization of the index at time (t)

Distributions are reinvested proportionally in the index sample of the total return index variant

Divisor Adjustments

To avoid distortions caused by corporate actions, that affect the share capital of index constituents, the divisor of the index is adjusted accordingly. The following formula will be used for divisor adjustments due to corporate action.

Note: No divisor adjustments are necessary for constituent splits, since market capitalization does not change and the share number and share price are adjusted before the opening of trading on the split's ex-date.

$$D(t+1) = D(t) * \frac{(\sum_i^n P_i(t) * Q_i(t)) + \Delta MV(t+1)}{(\sum_i^n P_i(t) * Q_i(t))}$$

Where:

$D(t)$	=	divisor at time (t)
$D(t+1)$	=	divisor at time (t + 1)
$P_i(t)$	=	price of constituent i at time (t)
$q_i(t)$	=	number of shares of constituent i at time (t)
$\Delta MC(t+1)$	=	add new components' market capitalization and adjusted market capitalization

(calculated with adjusted closing prices and shares effective at time t+1 and/or minus market capitalization of constituents to be deleted)

Note: If the current trading price of a constituent is unavailable, the previous trading session's closing price is used. However, if the constituent is affected by any corporate action that requires an adjustment, then the adjusted price is used.

Distribution Reinvestment

Distributions are reinvested proportionally into the index sample on the ex-date. The ex-date rather than the pay date is used because the marketplace price adjustment for the distribution occurs on the ex-date. A divisor adjustment for the total-return index variant is performed to reflect distribution reinvestment. The total distributions paid by all constituents in the index on the ex-date are considered a market value change and the divisor is adjusted accordingly.

Price Data

Price data is the end-of-day total-return index level of index constituents calculated by third parties for index-level calculation.

Methodology Review and Index Cessation Policy

The index methodology is continually reviewed to ensure it achieves all stated objectives. These reviews take into account corporate action treatment, selection, and maintenance procedures. Subscribers to the index will be notified before any methodology changes are made. For more details, refer to the [Morningstar Index Methodology Change Process](#).

Morningstar also notifies all subscribers and stakeholders of the index that circumstances might arise that require a material change to the index, or a possible cessation of the index. Circumstances that could lead to an index cessation include, but are not limited to, market structure change, product definition change, inadequate supply of data, insufficient revenue associated with the index, insufficient number of clients using the index, and/or other external factors beyond the control of the Morningstar Index Committee.

Because the cessation of the index or benchmark index could disrupt subscriber products that reference this index, all subscribers are encouraged to have robust fallback procedures if an index is terminated. For more details, refer to the [Morningstar Index Cessation Process](#).

Data Correction and Precision

Intraday Index Data Corrections

Commercially reasonable efforts are made to ensure the accuracy of data used in real-time index calculations. If incorrect price or corporate action data affect index daily highs or lows, they are corrected retroactively as soon as is feasible.

Index-Related Data and Divisor Corrections

Incorrect pricing and corporate action data for individual issues in the database will be corrected upon detection. In addition, an incorrect divisor of an index, if discovered within five days of its occurrence, will always be fixed retroactively on the day it is discovered to prevent an error from being carried forward. Commercially reasonable efforts are made to correct an older error subject to its significance and feasibility.

For more details, refer to the [Recalculation Guidelines](#).

Computational and Reporting Precision

For reporting purposes, index values are rounded to two decimal places and divisors are rounded to appropriate decimal places.

Appendixes

Appendix 1: Glossary

Terms	Description
Reconstitution	During each reconstitution, the steps mentioned in the index construction process are performed, resulting in membership reset.
Rebalance	During each rebalance, the weights are adjusted.

Appendix 2: Modification to Rule book

Section	Description	Update Date
Overview and Selection universe	Emerging Market Debt is added to the broad sector	Aug 2016
Index weighting	Modified flooring to 10% for U.S. Government and Government Related, U.S. Securitized and U.S. Investment Grade Credit. Also added Emerging Market Debt with 0-10% range	Aug 2016

About Morningstar, Inc.

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About Morningstar Indexes

Morningstar® Indexes combine the science and art of indexing to give investors a clearer view into the world's financial markets. Our indexes are based on transparent, rules-based methodologies that are thoroughly back-tested and supported by original research. Covering all major asset classes, our indexes originate from the Morningstar Investment Research Ecosystem — our network of accomplished analysts and researchers working to interpret and improve the investment landscape. Clients such as exchange-traded fund providers and other asset management firms work with our team of experts to create distinct, investor-focused products based on our indexes. Morningstar Indexes also serve as a precise benchmarking resource.

Morningstar Index Committee

The [Morningstar Index Committee](#) is currently comprised of senior officials who possess the appropriate levels of knowledge in relation to Indexes. A wide array of business groups are represented to allow for a broad voice to be heard and for a wider view to be expressed in evaluating all subjects brought up during Committee meetings. The Committee seeks to create indexes of the highest quality that meet the recognized qualities of a good benchmark.

For More Information

For any queries, reach out to us via our [communication page](#).



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