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# Construction Rules for the Morningstar® Bond Indexes

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## Morningstar Indexes

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### Overview

The Morningstar bond indexes were created to provide bond investors with accurate benchmarks for performance measurement and to offer discrete building blocks for portfolio construction. These indexes provide an accurate, broad depiction of the performance and fundamental characteristics of the bond markets. There are four key features underlying the design and construction of the Morningstar bond indexes:

- ▶ Transparent and objective rules. Index construction is governed by a clear set of well-documented rules for security selection and exclusion, as well as reconstitution.
- ▶ The right balance between comprehensive market coverage and investability. Indexes are broad and inclusive enough to incorporate the prominent characteristics of active managers' portfolios and fulfill a market-monitoring function while still maintaining a focus on investability.
- ▶ Non-overlapping and hierarchical structure. Each index offers discrete exposure—without any overlap—to specific underlying bond sectors. This clear family-level organizational scheme affords the following benefits:
  - ▶ Distinct indexes serve as ideal tools for performance benchmarking and portfolio construction.
  - ▶ Well-suited for accurate analysis and attribution of performance in active strategies.
  - ▶ Avoiding overlap is critical in reducing concentration risk for users employing collections of indexes to build customized portfolios.
  - ▶ Finally, slicing the bond market into distinct pieces suits the needs of investors who are trying to match specific liabilities or manage specific risk exposures.
- ▶ Open access to index-level data and metrics to all users. Morningstar makes its bond index data available to all users through our products and websites.

This index does not incorporate Environmental, Social, or Governance (ESG) criteria.

### Index Inception Date and Performance Inception Date

The performance inception date is when the first back-tested index value was calculated. The index inception date is the date that the index was placed in-service. The dates for each index are found in the appendix.

## **Morningstar Bond Indexes General Methodology**

### **Assigning Securities to Morningstar Bond Indexes**

The general index methodology applies to all Morningstar indexes unless otherwise indicated.

At each rebalancing date, eligibility rules for each index are applied based on the criteria described in each section. Each criterion is applied only to the survivors of the criteria applied previously.

- ▶ Securities must have a fixed coupon rate and a stated final maturity.
- ▶ Bonds with “make-whole” calls or first-call dates within one year of final maturity are included. All other callable bonds are excluded.
- ▶ Securities entering the indexes must have a minimum of 24 months to final maturity at the time of inclusion to qualify for the index.
- ▶ Securities must have a minimum of 12 months to final maturity to remain in the indexes.
- ▶ All securities must have an investment-grade composite rating to be eligible for the Global Core Bond indexes.

### **General Exclusions**

The following exclusions apply to all Morningstar bond indexes unless otherwise indicated:

- ▶ Bonds with embedded options, such as puts and scheduled calls, are excluded from the Global Core Bond indexes except for options pertaining to structured securities, unless otherwise noted.
- ▶ Perpetual bonds
- ▶ Zero coupon bonds
- ▶ Step-up coupon bonds
- ▶ Fixed-to-floating rate and fixed-to-variable rate bonds
- ▶ Payment-in-kind (PIK) bonds
- ▶ Amortizing bonds
- ▶ Loans
- ▶ Sukuk (Islamic bonds)
- ▶ Subordinated debt
- ▶ Capital securities and contingent capital securities
- ▶ Convertible bonds
- ▶ Securitized corporate securities, such as pass-through trust certificates

### **Number of Constituents**

The number of constituents in the indexes is subject to the selection and eligibility criteria at the time of rebalance.

### **Index Weighting**

The indexes are market-capitalization-weighted unless stated otherwise.

### Tenor Indexes

- ▶ The tenor indexes deconstruct the Morningstar fixed-income indexes by term to produce the 1-5 Year Bond Index, 5-10 Year Bond Index and 10+ Year Bond Index. These are also referred to as short term, intermediate term, and long term, respectively.
- ▶ All indexes follow the below maturity breakpoints:
  - ▶ Short term: Greater than one year, less than five years.
  - ▶ Intermediate term: At least five years, less than 10 years.
  - ▶ Long term: At least 10 years.
- ▶ The following three indexes have an additional 1-3 year index tenor:
  - ▶ US Core Bond Index
  - ▶ UK Core Index
  - ▶ European Core Index
- ▶ A new security with a term to maturity of exactly 5 or 10-years on the rebalance date will qualify as a constituent in the next shortest tenor relevant to a specific index. For example, a new issue security with a remaining term of exactly 10 years on the rebalance date would go into the intermediate tenor since it would shorten to less than 10-years on the first day of the forward month.

### Required Minimum Balances for Index Inclusion

A major differentiating factor for each fixed-income index is the minimum par amount outstanding that is required for a security to be included in an index. These amounts are defined by currency and asset class.

The minimum par amounts outstanding (minimum balances) per security for index inclusion are listed in the table below in millions. The amounts are monitored at each rebalancing to determine security inclusions or exclusions.

Local Currency	USD	CAD	EUR	GBP	JPY	AUD	CHF	SEK	DKK	NOK	NZD	EM USD
<b>Treasury / Sovereign</b>	10,000	2,000	2,000	2,000	500,000	2,000	1,000	10,000	10,000	10,000	2,000	500
<b>Inflation Protected</b>	10,000	2,000	2,000	2,000	500,000	1,000						
<b>Government-Related</b>	1,000	300	500	250	25,000	300	300	1,000				500
<b>Corporate</b>	500	200	500	250	20,000	200	300	1,000				300
<b>Securitized/Covered</b>				200								
<b>MBS</b>	1000											
<b>CMBS</b>	150											
<b>ABS</b>	150											
<b>Covered</b>			500				300	1,000				
<b>High Yield</b>	250	100	250	100								
<b>Treasury KRW</b>												1,000,000

**Notes:**

- The government-related sector includes foreign sovereign and sovereign-guaranteed securities; foreign and domestic agency securities; supranational; and U.S. taxable municipals.
- Not every asset class in the chart above is published as a stand-alone index.
- Prior to 12/31/15 the min par amount required for inclusion in the US High Yield Bond Index was \$100 million.

**Morningstar Global Core Bond Index Families**

The six Morningstar Global Core Bond Index families share a common construction methodology, differing only with respect to those rules that are specific to a region or currency. Each family is composed of securities denominated in its home currency except for the European Union, where the single common currency is the euro. There are no restrictions on the country of risk.

**Regional Core Bond Indexes**

- ▶ U.S.
- ▶ Canada
- ▶ U.K.
- ▶ European Union
- ▶ Japan
- ▶ Australia

Two additional Core Bond Indexes are available: Morningstar Swiss Core Bond Index and Morningstar Sweden Core Bond Index. These two indexes are not part of the Global Core Bond Index Family and do not have separate stand-alone corporate or securitized asset class indexes. However, treasury indexes are available.

**Assigning Securities to the Morningstar Global Core Bond Index Families**

To qualify for the Morningstar Global Core Bond Index family, a security must meet [all the general rules mentioned above](#):

**Asset Classes**

The indexes aggregate securities into identical broad, non-overlapping asset classes:

- ▶ Domestic treasury
- ▶ Foreign treasury, domestic or foreign government related and supranational
- ▶ Securitized and collateralized
- ▶ Corporate

### Domestic Treasury Asset Class

The regional domestic treasury indexes must meet all the inclusion criteria established for the Global Treasury Bond Index section. Refer to the “Required Minimum Balances for Index Inclusion”, for more information.

- ▶ The domestic treasury asset class consists of the domestic treasury debt publicly issued by a sovereign government in its home currency.
- ▶ The domestic treasury component of each regional core bond index is identical to the country-specific index found in the subsequent section for Global Treasury Bond Index family:

### Government-Related Asset Class

- ▶ Securities in this asset class consist of the sovereign bonds, foreign and domestic agency securities, government-sponsored enterprises, and supranational securities denominated in the index’s home currency without regard to the country of issuance.
- ▶ The government-related securities must meet all the inclusion criteria established for the country-specific indexes defined in the Global Treasury Bond Index section.
- ▶ This asset class is not published as a stand-alone index. It is included in each Core Bond Index.

### Corporate Bond Asset Class

Each Global Corporate Bond Index follows identical rules except as individually noted:

- ▶ Bonds issued by a quasi-sovereign issuer, defined as a corporation with more than 50% government ownership, are eligible.
- ▶ Corporate securities for each regional index must be denominated in that region’s home currency. There is no restriction of the country of origin. For example, securities in the Eurozone Corporate Bond Index must be denominated in euro, and securities in the UK Corporate Bond Index must be denominated in British pound sterling.

### Securitized Assets and Covered Bonds

Most Regional Core Bond Indexes contain securitized assets specific to their region which are included as asset class components in their respective core bond indexes. However, securitized/covered bonds are not included in the Canada, Japan and Australia core bond indexes.

- ▶ Securitized assets in the US Core Bond Index consist of U.S. mortgage-backed securities, asset-backed securities, and commercial mortgage-backed securities. There are three securitized asset indexes for the U.S.:
  - ▶ Morningstar US Mortgage-Backed Securities Index
  - ▶ Morningstar US Asset-Backed Securities Index
  - ▶ Morningstar US Commercial Mortgage-Backed Securities Index

These indexes are components of the US Core Bond Index. Detailed construction rules for these indexes can be found in the [US Core Bond Index family section](#).

- ▶ European markets have developed a different model for the securitization of pooled assets. The “covered bond” model allows issuers to sell bonds that are secured by a pool of eligible assets, often residential or commercial real estate. The collateral is referred to as a “cover pool,” which is pledged to the investor but remains on the balance sheet of the issuer. Investors have recourse to both the cover pool and the general credit of the issuer. There are four securitized assets and covered bond indexes:

- ▶ Morningstar Eurozone Covered Bond Index
- ▶ Morningstar UK Securitized Assets Index
- ▶ Morningstar Swiss Securitized Assets Index
- ▶ Morningstar Sweden Securitized Assets Index

Only the Eurozone and UK securitized asset classes are published as stand-alone indexes.

### **Morningstar US Core Bond Index Family**

The Morningstar US Core Bond Index family is a set of 13 indexes differentiated by asset class and term:

#### **Asset Class Indexes**

- ▶ US Government Bond Index.
- ▶ US Corporate Bond Index
- ▶ US Mortgage-Backed Securities Index
- ▶ US Commercial Mortgage-Backed Securities Index
- ▶ US Asset-Backed Securities Index
- ▶ The US Government/Corporate index combines the US Government and US Corporate indexes into one entity.
- ▶ The US Government Bond index combines the US Treasury and US Government Related and Agency indexes into one entity. The US Government Related and Agency is not available as a stand-alone index.

#### **US Term Structure Indexes**

Short, intermediate, and long tenor term structure indexes are available for the following asset class indexes in the US Core Bond Index family:

- ▶ US Core Bond Index
- ▶ US Government Bond Index
- ▶ US Treasury Bond Index
- ▶ US Corporate Bond Index

Note: The three U.S. securitized asset indexes are grouped into tenors based on average life: Short-term is one to five years, and intermediate-term is greater than five years. There is no long-term index.

### Assigning Securities to the Morningstar US Core Bond Index

The Morningstar US Core Bond Index aggregates the securities contained in the following indexes:

- ▶ Morningstar US Government Bond Index
- ▶ Morningstar US Corporate Bond Index
- ▶ Morningstar US Mortgage Bond Index
- ▶ Morningstar US Commercial Mortgage-Backed Securities Index
- ▶ Morningstar US Asset-Backed Securities Index

### Assigning Securities to the Morningstar US Government Bond Index

The US Government Bond Index is a composite of the following two subindexes:

- ▶ Morningstar US Treasury Bond Index: This index is identical to the U.S. country-specific index that is part of the Global Treasury Bond Index family and follows the same rules.
- ▶ Morningstar US Composite Government and Agency Bond Index: This index consists of U.S.-dollar-denominated debt issued in the U.S. domestic market by sovereign governments, foreign or domestic government-related agencies, supranationals and U.S. taxable municipals. For inclusion in the index, securities must meet all the other criteria established for the US Treasury Bond Index.

### Assigning Securities to the Morningstar US Corporate Bond Index

To qualify for the US Corporate Bond Index, a security must meet the [general criteria](#) described above, along with the following criteria:

- ▶ Bonds issued by corporate and quasi-sovereign issuers, defined as corporations with more than 50% government ownership, are eligible for the index.
- ▶ Bonds must be SEC registered, or 144a securities. REG S bonds are excluded.
- ▶ “Paired” or “duplicate” bonds refer to bonds of the same issuer, having identical dated dates, maturity dates, and coupons. When this situation arises, only one bond will be included in the index using the following hierarchy: first SEC-registered bonds, then 144a private placements.

### Assigning Securities to Morningstar US Mortgage-Backed Securities Index

The index tracks the performance of U.S.-dollar-denominated investment-grade fixed-rate residential mortgage-backed securities publicly issued in the U.S. domestic market.

- ▶ Index constituents must be U.S.-dollar-denominated fixed-rate residential mortgage pass-through securities publicly issued by U.S. agencies in the U.S. domestic market.
- ▶ Only 15- and 30-year fixed-rate mortgage pools are eligible for the index.
- ▶ Pools are required to have at least one-year remaining term to final maturity.
- ▶ The minimum amount outstanding per generic coupon must be at least \$5 billion.
- ▶ The minimum amount per production year within each combination of issuer, original term, and coupon must be at least \$1 billion.
- ▶ For aggregation purposes, all securities are grouped into tenors based on average life: Short term is one to five years, and intermediate term is greater than five years.

- ▶ Accrued interest is calculated assuming same-day settlement.

### **Assigning Securities to the Morningstar US Commercial Mortgage-Backed Securities Index**

The index tracks the performance of U.S.-dollar-denominated investment-grade fixed-rate commercial mortgage-backed securities publicly issued in the U.S. domestic market.

- ▶ U.S. agency and 144a securities qualify for the index.
- ▶ Securities must meet the following requirements:
  - ▶ At least one-year remaining term to final maturity and at least one-month to the last expected cash flow.
  - ▶ A fixed-rate coupon with a stated final maturity.
  - ▶ An investment-grade rating.
  - ▶ An original deal size for the collateral group of at least \$500 million.
  - ▶ A current outstanding deal size for the collateral group that is greater than or equal to 10% of the original deal size.
  - ▶ At least \$150 million current amount outstanding per tranche.
- ▶ Securities are grouped into tenors based on average life: Short term is one to five years, and intermediate term is greater than five years.
- ▶ The following securities do not qualify for the index: floating-rate or fixed-to-floating-rate securities; perpetual securities; interest- or principal-only tranches of qualifying deals; and resecutitized deals.
- ▶ Only senior securitized bonds are eligible.

### **Assigning Securities to the Morningstar US Asset-Backed Securities Index**

The index tracks the performance of U.S.-dollar-denominated investment-grade asset-backed securities publicly issued in the U.S. domestic market.

- ▶ Securities must meet the following requirements:
  - ▶ At least one-year remaining term to final maturity and at least one-month to the last expected cash flow.
  - ▶ A fixed-rate coupon with a stated final maturity.
  - ▶ An investment-grade rating.
  - ▶ An original deal size for the collateral group of at least \$500 million.
  - ▶ A current outstanding deal size for the collateral group that is greater than or equal to 10% of the original deal size.
  - ▶ At least \$150 million current amount outstanding per tranche.
- ▶ Securities are grouped into tenors based on average life: Short term is one to five years, and intermediate term is greater than five years.
- ▶ The following securities do not qualify for the index: floating-rate or fixed-to-floating-rate securities; perpetual securities; interest- or principal-only tranches of qualifying deals; and re-securitized deals.
- ▶ Home equity loans, manufactured housing, and utility securities are excluded from the US Asset-Backed Securities Index.



- ▶ 144a securities qualify for the index.
- ▶ Only senior securitized bonds are eligible.

### **Rules Specific to the Regional Core Bond Indexes**

#### **Morningstar Canada Liquid Bond Index**

The Canadian bond market is principally composed of Canadian government, Canadian government guaranteed, provincial, and provincial-guaranteed issuers. To have a more balanced weighting between government entities and Canadian corporate bonds, the Canada Liquid Bond Index is constrained such that Canadian government, Canadian government-guaranteed, provincial, and provincial-guaranteed issuers are capped at 50% of the market value of the overall index.

The remaining 50% is allocated to the corporate sector. This constraint helps the index avoid excessive exposure to sovereign or government entities and promotes diversification. Only corporate issuers domiciled in Canada are eligible for the index.

#### **Assigning Securities to the Morningstar Canada Liquid Bond Index**

This index is identical to the Canada Core Bond Index with the following exceptions:

- ▶ The index excludes supranational issuers.
- ▶ All issuers must be Canadian domiciled entities.
- ▶ The minimum par value for inclusion is CAD \$250 million.
- ▶ Subordinated and fixed-to-floating rate securities are eligible.
- ▶ The addition of a capping methodology is described under index weighting. The weighting scheme ensures that the public and private sectors will have equal aggregate weighting in the index.

#### **Index Weighting**

- ▶ Canadian government, Canadian government-guaranteed, provincial, and provincial guaranteed issuers are capped at 50% of the index on a pro-rata basis, and the excess weight is redistributed on a par-weighted basis to the corporate issuers in the index.

### **Morningstar European Securitized and Covered Bond Indexes**

#### **Assigning Securities to the Morningstar European Covered Bond Indexes**

There are four covered bond indexes in this series differentiated by country and currency: Eurozone (euro), UK (pound sterling), Switzerland (Swiss franc), and Sweden (Swedish krona). Each index is an asset class in its respective regional core bond Index.

Each index tracks the performance of investment grade securitized and collateralized debt publicly issued in the eurobond or euro-member domestic markets, or, in the case of Sterling, the U.K. domestic market, including pfandbriefe and non-pfandbrief covered bonds, mortgage-backed securities and asset-backed securities.

- ▶ Securities must meet the following requirements:
  - ▶ At least one-year remaining term to final maturity to remain in the index and at least two years remaining maturity at the time of inclusion.
  - ▶ A fixed-rate coupon with a stated final maturity or a stated extendible maturity.

- ▶ An investment-grade rating.
- ▶ Only senior securitized bonds are eligible.
- ▶ The following securities do not qualify for the index: floating-rate or fixed-to-floating-rate securities; perpetual securities; zero coupon securities.

### **Covered Bond Index Specific Rules**

- ▶ Morningstar Eurozone Covered Bond Index
  - ▶ Each security must have at least EUR 500 million current face amount outstanding issued in the Eurobond or Euro-member domestic markets.
  - ▶ Each issuer must have at least EUR 1 billion current face amount outstanding.
- ▶ Morningstar UK Securitized Assets Index
  - ▶ Each security must have at least GBP 200 million current face amount outstanding issued in the Eurobond or U.K. domestic market.
- ▶ Morningstar Switzerland Securitized Assets Index
  - ▶ Each security must have at least CHF 300 million current face amount outstanding.
- ▶ Morningstar Sweden Securitized Assets Index
  - ▶ Each security must have at least SEK 1 billion current face amount outstanding.

These minimum face amounts can also be found in the “Required Minimum Balances” section. The Switzerland and Sweden securitized asset indexes are components of their respective Core Bond Indexes but are not separately published.

### **Morningstar Global Government-Related Bond Indexes**

#### **Assigning Securities to the Morningstar Government Related Bond Indexes**

Each regional core bond index contains a “government-related” asset class ([see Page 5](#)). Only the US and Canadian indexes have independent, stand-alone government-related indexes. The minimum balances required for index inclusion are found [on Page 3](#).

### **Morningstar Global Corporate Bond Indexes**

#### **Assigning Securities to the Morningstar Corporate Bond Indexes**

Each regional core bond index contains a corporate bond asset class. The rules for inclusion or exclusion follow the general methodology [found on Page 2](#) and the minimum balances on [Page 3](#). The Swiss and Swedish corporate bond asset classes do not have stand-alone, published indexes.

### **Morningstar Global Treasury Bond Index Family**

Securities in the Global Treasury Bond Index family consist of the domestic treasury debt publicly issued by each eligible sovereign government in its home currency, or in the case of eurozone countries, eligible treasury debt issued in euros. Government-related, and government agency debt are not included. The Morningstar Global Treasury Bond Index family consists of the following broad indexes and country-specific indexes:

### Broad Indexes

- ▶ Morningstar Global Treasury Bond Index
- ▶ Morningstar Global ex-US Treasury Bond Index
- ▶ Morningstar Global ex-Japan Treasury Bond Index

In addition to the countries that have separate indexes mentioned below under Country Indexes, the eligible securities of New Zealand, Denmark, and Norway are included in their home currencies in the Morningstar Global Treasury Bond Index.

### Country Indexes

- ▶ Morningstar US Treasury Bond Index
- ▶ Morningstar Canada Treasury Bond Index
- ▶ Morningstar Eurozone Treasury Bond Index
- ▶ Morningstar Switzerland Treasury Bond Index
- ▶ Morningstar Sweden Treasury Bond Index
- ▶ Morningstar UK GILT Bond Index
- ▶ Morningstar Japan Treasury Bond Index
- ▶ Morningstar Australia Treasury Bond Index
- ▶ Morningstar Korea Treasury Bond Index

Notes: (1) Morningstar Switzerland Treasury Bond Index and Morningstar Sweden Treasury Bond Index are a part of their respective Core Bond Indexes but are not included in the Global Core Bond Index. (2) Morningstar Korea Treasury Bond Index is not included in the Global Core Bond Index or any other index family.

### Assigning Securities to the Morningstar Global Treasury Bond Index Family

To qualify for the Morningstar Global Treasury Bond Index family, a security must meet the following additional criteria along with [the general rules mentioned above](#):

- ▶ Securities in the Morningstar Japan Treasury Bond Index are added to the index at least one month after they are issued and must be listed on the Tokyo Stock Exchange.
- ▶ The securities in each country index consist of a single currency.
- ▶ Zero-coupon bonds are eligible for the Global Treasury Bond Index family.
- ▶ Minimum balances for inclusion in the Global Treasury Bond Index family are found in the table on Page 3.

### Morningstar Global Inflation-Linked Securities Index Family

The Morningstar Global Inflation-Linked Securities Indexes consist of the inflation-linked securities issued by each country in the Global Treasury Bond Index family. It consists of the following specific indexes:

- ▶ Morningstar US Treasury Inflation-Protected Securities Index
- ▶ Morningstar US 1-5 Year Treasury Inflation-Protected Securities Index
- ▶ Morningstar US 5-10 Year Treasury Inflation-Protected Securities Index

- ▶ Morningstar US 10+ Year Treasury Inflation-Protected Securities Index
- ▶ Morningstar Canada Treasury Inflation-Linked Securities Index.
- ▶ Morningstar Eurozone Treasury Inflation-Linked Securities Index.
- ▶ Morningstar UK Treasury Inflation-Linked Securities Index.
- ▶ Morningstar Japan Treasury Inflation-Linked Securities Index.
- ▶ Morningstar Australia Treasury Inflation Linked Securities Index.

### Assigning Securities to the Morningstar Global Inflation-Linked Bond Indexes

To qualify for the Morningstar Global Inflation-Linked Bond Index family, a security must meet the following additional criteria, along with [the general rules mentioned above](#):

- ▶ Only inflation-linked bonds issued by each sovereign government and denominated in its home currency are eligible for each index.
- ▶ Minimum balances for inclusion in the Global Inflation-Linked Bond Index family are found in the table on Page 3.

### Morningstar Global High Yield Bond Index Family

The Morningstar Global High Yield Bond Index Family consists of the following specific indexes which track the performance of the local currency denominated below investment-grade corporate debt publicly issued in its respective domestic market.

- ▶ Morningstar US High Yield Bond (USD)
- ▶ Morningstar Eurozone High Yield Bond Index (EUR)
- ▶ Morningstar UK High Yield Bond Index (GBP)
- ▶ Morningstar Canada High Yield Bond Index (CAD)
- ▶ Morningstar Global High Yield Bond Index (Multi-Currency) aggregates the regional/currency indexes into a single composite index.

### Index Weighting

- ▶ Issuers in the US High Yield Index are capped at 2% of the market value of the index with the excess weight redistributed on a par-weighted basis to the remaining issuers in the index.
- ▶ The Eurozone, UK, Canada and Global High Yield Indexes are market capitalization rated.

### Minimum Par Value

The minimum par amount outstanding (minimum balance) per security for inclusion in each high yield index by currency is listed in the table on page 3 and below. The amounts are monitored at each rebalancing to determine security inclusions or exclusions.

- ▶ USD 250 Million for Morningstar US High Yield.
- ▶ EUR 250 Million for Morningstar Eurozone High Yield Bond since Sep 30, 2016.
- ▶ GBP 100 Million for Morningstar UK High Yield Bond since Sep 30, 2016.
- ▶ CAD 100 Million for Morningstar Canada High Yield Bond since Dec 31, 2004.

**Note:** The back tests for the high yield indexes reflect the following historical minimum par values.

- ▶ USD 100 Million prior to Aug 31, 2016.
- ▶ EUR 50 Million prior to Nov 30, 2004; 100 Million between Dec 31, 2004 and Aug 31, 2016.
- ▶ GBP 50 Million prior to Aug 31, 2016.
- ▶ CAD 50 Million prior to Nov 30, 2004.

### General Exclusions for High Yield Bond Indexes

The following exclusions apply to the Morningstar High Yield Bond Indexes:

- ▶ Sukuk (Islamic bonds).
- ▶ Municipal bonds.
- ▶ Loans.
- ▶ Zero coupon bonds.
- ▶ Step-up coupon bonds.
- ▶ Fixed-to-variable rate bonds.
- ▶ Payment-in-kind (PIK) bonds.
- ▶ Amortizing (sinking fund) bonds.
- ▶ Convertible, equity linked and preferred securities.
- ▶ Securitized corporate securities, such as pass-through trust certificates.
- ▶ Securities in legal default.

### Assigning Securities to the Morningstar High Yield Bond Indexes

This methodology is specific to the high yield asset class. To qualify for inclusion, a security must meet the following general criteria:

- ▶ All securities must have a below investment-grade composite rating to be eligible for the Global High Yield Bond indexes and must be rated “CCC” or above at time of inclusion. Included securities falling below “CCC” are retained in the index.
- ▶ Qualifying securities must have a risk exposure to countries from developed markets:
  - Member countries of the FX-G10: US, Canada, UK, Euro member countries, Switzerland, Sweden, Norway, Japan, Australia and New Zealand plus Western European countries.
  - Territories of the US and Western Europe also qualify for inclusion.
  - Singapore and Hong Kong are classified by Morningstar as developed markets.
- ▶ Securities entering the indexes must have a minimum of 24 months to final maturity at the time of inclusion to qualify for the index.
- ▶ Securities must have a minimum of 12 months to final maturity to remain in the indexes.
- ▶ Securities must have a fixed coupon rate and a stated final maturity except for fixed-to-floating rate bonds which are callable within the fixed-rate period. These securities are included and removed one-year prior to the last call date before the transition from fixed-to-floating rate.
- ▶ Callable and puttable bonds are included.

- For the US High Yield Index, 144a securities and seasoned REG S securities are included.

### **Morningstar Emerging Markets Bond Index Family**

The Morningstar Emerging Markets Bond Index Family is designed to provide diversified exposure to credit-sensitive, U.S.-dollar-denominated sovereign and corporate debt domiciled in emerging markets through the most liquid issues in the market. The index methodology balances the need for adequate market coverage with ease of replication and diversification. This is achieved by excluding smaller issues that are difficult to purchase and that impose heavier transaction costs. It is also achieved through country weighting constraints that are meant to ensure diversified exposure.

The Morningstar Emerging Markets Bond Index Family consists of four indexes:

- Morningstar Emerging Markets Sovereign Bond Index consists of sovereign bonds from qualified Emerging Market countries without restrictions on the credit ratings of the constituent securities.
- Morningstar Emerging Markets Corporate Bond Index consists of both investment grade and high yield emerging market corporate securities plus the securities of quasi-sovereign (government related) issuers.
- Morningstar Emerging Markets High-Yield Bond Index aggregates the high yield securities of the Sovereign Bond Index and the Morningstar Corporate Bond Index into one index.
- Morningstar Emerging Markets Composite Bond Index aggregates the securities of the Sovereign Bond Index and the Corporate Bond Index into one index without regard to credit ratings. This is the most comprehensive index in the Emerging Markets Bond Index Family.

### **Country Inclusion Criteria**

Morningstar Indexes classifies countries as emerging for defining the investable universe. To arrive at the selection of emerging-market countries, Morningstar Indexes includes countries classified by the World Bank as low-income, middle-income, or upper-middle-income, or, by the International Monetary Fund as a nonadvanced country. A country classified as high-income by the World Bank or advanced by the IMF may still be included in the index if the government, legal, institutional, regulatory, or other criteria indicate that the country should be classified as emerging. In addition, to be eligible for emerging-market status, a country must have debt eligible for the index.

### **Additional Country Inclusion Criteria**

Additional criteria are then applied to each country to identify characteristics of development and economic freedom that may include or exclude a country from the final selection. Conversely, exclusion from final selection may occur when an otherwise emerging-market country exhibits characteristics that demonstrate a developed bond market or when an emerging-market country's bond market is deemed non-investable.

Additional criteria used to classify emerging-market status include:

- ▶ Market regulatory authority
- ▶ Legal infrastructure and recourse
- ▶ Foreign ownership
- ▶ Repatriation (full/partial) of capital
- ▶ Foreign exchange market
- ▶ Custodian services
- ▶ Competitive brokerage services and trading cost
- ▶ Adequate liquidity
- ▶ Visibility and timely trade reporting process

### Country Review

Morningstar Indexes reviews and announces the list of eligible countries annually in August, and it takes effect at the June rebalancing in the following year. The list of eligible emerging market countries may be found on the Morningstar Indexes website.

### Assigning Securities to the Morningstar Emerging Markets Bond Indexes

To qualify for the Morningstar Emerging Market Bond Index family, a security must meet the following general criteria:

- ▶ The indexes only include bonds from countries that are approved for the Morningstar Emerging Markets Country List for Bonds.
- ▶ All bonds must be U.S.-dollar-denominated bonds.
- ▶ All bonds must have at least one rating from a Nationally Recognized Statistical Rating Organization.
- ▶ Only fixed-rate coupon bonds with stated final maturities are included in the index.
- ▶ All securities must have a minimum of 30 months to maturity at time of inclusion.
- ▶ All securities must have a minimum of 12 months remaining to maturity.
- ▶ Securities with embedded options, such as calls and puts, and sinking fund bonds are included in the index.
- ▶ Securities issued under Regulation S only will be included in the index at the next rebalancing after a 40-day seasoning period.
- ▶ Securities issued only under Rule 144a only will be included in the index at the next rebalancing.
- ▶ For securities issued under both Regulation S and Rule 144a for the same issuer, only the Regulation S version of the bond will be included in the index at the next rebalancing after a 40-day seasoning period.
- ▶ Issuers in default will be removed at the next rebalancing.
- ▶ Illiquid bonds are excluded or eliminated from the index. A bond is deemed illiquid when consistent pricing is unavailable or becomes unavailable.

**General Exclusions for Emerging Market Bond Indexes**

The following exclusions apply to the Morningstar Emerging Markets Bond Indexes.

- ▶ Sukuk (Islamic bonds).
- ▶ Municipal bonds.
- ▶ Loans.
- ▶ Non-callable perpetual bonds.
- ▶ Zero coupon bonds.
- ▶ Step-up coupon bonds.
- ▶ Fixed-to-floating rate and fixed-to-variable rate bonds.
- ▶ Payment-in-kind (PIK) bonds.
- ▶ Convertible, equity linked and preferred securities.
- ▶ Securitized corporate securities, such as pass-through trust certificates.
- ▶ Securities in legal default.

**Assigning Securities to the Morningstar Emerging Markets Sovereign Bond Index**

Along with the rules mentioned above for the Morningstar Emerging Markets Bond Index family, the following rules apply only to the Emerging Markets Sovereign Bond Index:

- ▶ Only bonds issued by a country or its central bank (sovereign bonds) are included in the index.
- ▶ Development banks and sovereign-owned companies or entities (quasi-sovereign) are not included in the index.
- ▶ Only senior and secured bonds are included.
- ▶ There are no ratings restrictions on the country of risk.
- ▶ A minimum of \$500 million remaining face amount outstanding for the issue is required for a bond to be included in the index.

**Sovereign Bond Index Weighting**

The index is market-capitalization-weighted with country capping. The index is constrained so that no single country has a market weight greater than 15% of the market value of the overall index. Each month, all sovereigns are capped at 15%, and the excess weight is redistributed on a market-weighted basis to the other issuers in the index.

**Assigning Securities to the Morningstar Emerging Markets Corporate Bond Index**

Along with the rules mentioned above for the Morningstar Emerging Markets Bond Index family, the following rules apply only to the Emerging Markets Corporate Bond Index.

- ▶ There are no ratings restrictions on the country of risk.
- ▶ Bonds issued by corporate and quasi-sovereign issuers are eligible. No Treasury or sovereign issues are included in the index.
- ▶ The composite credit rating of each security must be rated "CCC" or above at time of inclusion. However, included securities falling below "CCC" are retained in the index.



- ▶ A minimum of \$500 million remaining face amount outstanding is required for each security with a composite credit rating of BBB- or above (investment Grade) to be included in the index.
- ▶ A minimum of \$300 million remaining face amount outstanding is required for each security with a composite credit rating of BB+ or below (High Yield) to be included in the index.

### **Corporate Bond Index Weighting**

The index is market-capitalization weighted with capping.

- ▶ The index is constrained so that no single issuer has a market weight greater than 15% of the market value of the index portfolio,
- ▶ Corporate and quasi-sovereign issuers under 5% are capped<sup>1</sup> at 4.75% and the sum of all issuers over 5% is capped at 48%.
- ▶ In instances where an issuer exceeds the capping threshold, the excess weight due to capping is redistributed on a market-weighted, pro-rata basis to the remaining constituents. Corporate issuers within the same “issuer family” are aggregated as a single issuer for this purpose. Similarly, quasi-sovereign issuers controlled by the same government are aggregated as a single issuer.

### **Assigning Securities to the Morningstar Emerging Markets High Yield Corporate and Sovereign Bond Index**

The Morningstar Emerging Markets High Yield Bond Index provides a benchmark for below investment-grade emerging market sovereign and corporate debt that represents the characteristics, pricing, and total return performance of the U.S. dollar-denominated emerging market high yield universe.

To qualify for the Emerging Markets High Yield Bond Index, a security must be in the Emerging Markets Sovereign Bond Index or Emerging Markets Corporate Bond Index and have a below investment grade composite credit rating.

### **High Yield Corporate and Sovereign Bond Index Weighting**

The index is market-capitalization weighted with capping.

- ▶ The index is constrained so that no single issuer has a market weight greater than 15% of the market value of the index portfolio,
- ▶ Issuers under 5% are capped<sup>1</sup> at 4.75% and the sum of all issuers over 5% is capped at 48%.
- ▶ In instances where an issuer exceeds the capping threshold, the excess weight due to capping is redistributed on a market-weighted, pro-rata basis to the remaining constituents. Sovereign and quasi-sovereign issuers controlled by the same government are aggregated as a single issuer for this purpose. Similarly, corporate issuers within the same “issuer family” are aggregated as a single issuer.

### **Additional Inclusion/Exclusion Criteria for EM High Yield Bond Index**

Securities entering or leaving the index as a result of credit rating changes are subject to a three-month phase-in or phase-out if the current or expected weight in the index is greater than or equal to 9%. The

<sup>1</sup> Note: the 48% cap rule takes precedence over the 4.75% cap. The latter will be relaxed in case a feasible solution cannot be obtained.

changes will be implemented by taking a pro rata share (one third) of each affected security in each “adjustment” month.

Corporate issuers (securities) within the same “issuer family” are aggregated as a single issuer for this purpose. Sovereign and quasi-sovereign issuers controlled by the same government are also aggregated as a single issuer for this purpose.

### **Assigning Securities to the Morningstar Emerging Markets Composite Bond Index**

The Morningstar Emerging Markets Composite Bond Index aggregates the securities contained in the Morningstar Emerging Markets Sovereign Bond Index and the Morningstar Emerging Markets Corporate Bond Index.

### **Emerging Markets Composite Bond Index Weighting**

The index is market-capitalization weighted with capping.

- ▶ The index is constrained so that no single issuer has a market weight greater than 15% of the market value of the index portfolio,
- ▶ Issuers under 5% are capped<sup>2</sup> at 4.75% and the sum of all issuers over 5% is capped at 48%.
- ▶ In instances where an issuer exceeds the capping threshold, the excess weight due to capping is redistributed on a market-weighted, pro-rata basis to the remaining constituents. Sovereign and quasi-sovereign issuers controlled by the same government are aggregated as a single issuer for this purpose. Similarly, corporate issuers within the same “issuer family” are aggregated as a single issuer.

### **Morningstar Asian Broad Market Bond Index Family**

The Morningstar Asian Broad Market Bond Index family consists of the following indexes:

Asia USD Broad Market Bond Index and China USD Broad Market Bond Index.

Both Indexes share the same construction rules except that the Morningstar China USD Broad Market Bond Index is a country specific sub-index of the Asia USD Broad Bond Index.

The Morningstar Broad Market Indexes are like the Morningstar Core Bond Indexes except that the Broad Market Indexes include high yield securities. Asset classes eligible for index inclusion are domestic treasuries, government related entities, corporate investment grade and corporate high yield bonds,

### **Assigning Securities to the Morningstar Asian Bond Index**

To qualify for the Morningstar Asian Bond Index a security must meet the following general inclusion criteria:

- ▶ Country inclusion criteria:  
The index includes all eligible bonds from Asian countries that are approved for the “Morningstar Emerging Markets Country List for Bonds”. Bonds from Singapore and Hong Kong,

<sup>2</sup> Note: the 48% cap rule takes precedence over the 4.75% cap. The latter will be relaxed in case a feasible solution cannot be obtained.

considered by Morningstar to be developed markets, are also included in the index. Japanese bonds are excluded.

- ▶ All bonds must be U.S.-dollar-denominated.
- ▶ There are no rating restrictions on the country of risk.
- ▶ All bonds must have at least one rating from a Nationally Recognized Statistical Rating Organization.
- ▶ All securities must have a minimum of 30 months to maturity at time of inclusion.
- ▶ All securities must have a minimum of 12 months remaining to maturity.
- ▶ Securities must have a fixed coupon rate except for fixed-to-floating rate bonds callable within the fixed-rate period which are included and removed one-year prior to the last call date before the transition from fixed-to-floating rate.
- ▶ Securities must have a stated final maturity except for callable perpetual securities which are included provided they are at least one year from the first call date.
- ▶ Callable, puttable and sinking fund bonds are included in the index.
- ▶ Securities issued under Regulation S only will be included in the index at the next rebalancing after a 40-day seasoning period.
- ▶ Securities issued only under Rule 144a only will be included in the index at the next rebalancing.
- ▶ For securities issued under both Regulation S and Rule 144a for the same issuer, only the Regulation S version of the bond will be included in the index at the next rebalancing after a 40-day seasoning period.
- ▶ Issuers in default will be removed at the next rebalancing.
- ▶ Illiquid bonds are excluded or eliminated from the index. A bond is deemed illiquid when consistent pricing is unavailable or becomes unavailable.

#### **General Exclusions to the Asian USD Broad Market Bond Indexes**

- ▶ Sukuk (Islamic bonds).
- ▶ Municipal bonds.
- ▶ Loans.
- ▶ Zero coupon bonds.
- ▶ Step-up coupon bonds.
- ▶ Fixed-to-variable rate bonds.
- ▶ Payment-in-kind (PIK) bonds.
- ▶ Convertible, equity linked and preferred securities.
- ▶ Securitized corporate securities, such as pass-through trust certificates.
- ▶ Securities in legal default.

#### **Rules Specific to Sovereign Bonds**

- ▶ Only bonds issued by a country or its central bank (sovereign bonds) are included in the index.
- ▶ Development banks are excluded from the indexes.
- ▶ Only senior and secured bonds are included.

- ▶ There are no ratings restrictions on the country of risk.
- ▶ A minimum of \$500 million remaining face amount outstanding for the issue is required for a bond to be included in the index.

### Rules Specific to Corporate Bonds

Along with the rules mentioned above for the Morningstar Asian USD Broad Market Index family, the following rules apply only to the Corporate and Government Related asset class.

- ▶ The composite credit rating of each security must be rated “CCC” or above at time of inclusion. However, included securities falling below “CCC” are retained in the index.
- ▶ A minimum of \$500 million remaining face amount outstanding is required for each security with a composite credit rating of BBB- or above (investment Grade) to be included in the index.
- ▶ A minimum of \$300 million remaining face amount outstanding is required for each security with a composite credit rating of BB+ or below (High Yield) to be included in the index.

### Asian USD Broad Market Index Weighting

The index is market-capitalization weighted with capping.

- ▶ The index is constrained so that no single issuer has a market weight greater than 15% of the market value of the index portfolio,
- ▶ Issuers under 5% are capped<sup>3</sup> at 4.75% and the sum of all issuers over 5% is capped at 48%.

In instances where an issuer exceeds the capping threshold, the excess weight due to capping is redistributed on a market-weighted, pro-rata basis to the remaining constituents. Sovereign and quasi-sovereign issuers controlled by the same government are aggregated as a single issuer for this purpose. Similarly, corporate issuers within the same “issuer family” are aggregated as a single issuer.

### Morningstar Cash Indexes

Morningstar Cash Indexes are maintained for each currency in the Core Bond and Global Treasury Index families. These indexes are used to track the return on cash as an asset class when cash is used as a component in an asset-allocation strategy. They are not part of the Core Bond Index Family.

Each index tracks the performance of a synthetic asset purchased at par on the previous month-end, carrying an interest rate equal to the average of the currency specific one-month Libor and one-month Libid rates. The asset is held for one month and sold at month-end. The asset price remains constant, at par, throughout the month. During the month, interest income is accrued evenly each day. At rebalancing, the proceeds (interest income) are rolled into a new asset and the interest rate is reset.

Morningstar also maintains a separate US Cash Treasury Bill Index that is used to measure the performance of cash collateral in Morningstar commodity Indexes.

<sup>3</sup> Note: the 48% cap rule takes precedence over the 4.75% cap. The latter will be relaxed in case a feasible solution cannot be obtained.

## General Methodology for Morningstar Indexes

### Sector Classification

The Morningstar Bond Indexes use a four-tier classification schema segmenting constituent securities by asset class (Level 1), broad-sector (Level 2), sector (Level 3) and sub-sector (Level 4). The following table shows the taxonomy of the first three levels.

L1	Sovereign
L1	Quasi-Sovereign & Foreign Government
L2	Quasi & Foreign Government
L3	Foreign Sovereign
L3	Government Guaranteed
L3	Agency
L3	Local-Authority
L3	U.S. Taxable Municipal
L3	Supranational
L1	Corporate
L2	Financial
L2	Industrials
L2	Utility
L1	Securitized/Collateralized
L2	Covered
L2	Securitized
L3	Mortgage Backed
L3	Asset Backed
L3	Commercial Mortgage Backed

### Country Designation

Unless otherwise noted, the standard country designation used is country of risk.

The methodology for determining country of risk is as follows:

- ▶ Sovereign debt (local and foreign currency debt): the country of risk is the same as the issuing country.
- ▶ Agency and Local Authority debt: the country of risk is the country in which the obligor resides.
- ▶ Supranational debt: the country of risk is "supranational".
- ▶ Collateralized/securitized asset classes: the country of risk is based on the location of the collateral.

- ▶ Corporate debt: the country of risk is based on the physical location of the issuer's operating headquarters, or, the location of a majority of the operating assets. Bank branch issues are assigned the country of risk of the parent entity.
- ▶ Securities with a guarantee are assigned the guarantor's country of risk.

### **Composite Rating Algorithm**

Composite ratings are the simple averages of ratings from the three major rating agencies. The composite rating is calculated by assigning a numeric equivalent to each rating. The average of the numeric equivalents for each agency that rates a bond is rounded to the nearest integer and then converted back to an equivalent composite rating.

### **Cash Interest Accrued and Cash Received**

Except for U.S. securitized products (MBS, CMBS and ABS), accrued interest is calculated assuming next-day settlement. Accrued interest for U.S. securitized products assumes same-day settlement.

Cash received from interest payments during the month are retained in the index until the end of the month, and then removed as part of the rebalancing. Cash does not earn reinvestment income while it is held in the index. The accumulated cash is reinvested in the index at the next rebalancing.

Cash is not included in the portfolio as an investment. Instead, it is shown for each security as cash interest received. However, the total accumulated portfolio cash is identified in the index aggregations.

The total market value of the index is defined as the sum of the daily market value of the individual securities plus the total accumulated portfolio cash.

### **Pricing, Trading and Transaction Costs**

The index calculation agent uses third-party vendor pricing as the primary source of calculations. Bid-side prices are used for the daily bond index calculations and offer-side for adding new bonds to the index. Trading and settlement of securities follow local market conventions. The index does not take transaction costs (bid-offer spreads) or tax withholdings into account.

### **Foreign Exchange**

Closing currency spot and forward rates are obtained from WM/Reuters and represent closing forward rates fixed at 4 p.m. U.K. time. Earlier or later times may be chosen according to WM/Reuters' policy on national holidays, or as a result of technical difficulties, a failure in the supply of the relevant data source or special market conditions for specific currencies. Other sources may be used by exception where the appropriate rates are not available.

## Index Maintenance Rules

### Scheduled Maintenance

No changes are made to constituent holdings other than on month-end rebalancing dates. Changes to the portfolio reflect re-openings, buybacks, new issuance, exchanges, exercised options, or rating changes. The new universe of bonds is last month's composition after accounting for the additions and deletions triggered by the inclusion/exclusion criteria and liquidity assessments for each constituent. These characteristics stay constant throughout the month. The weightings are fixed, after the close, on the last calendar day of each month.

Unless otherwise specified, indexes are rebalanced on the last calendar day of the month, based on information available up to and including the rebalancing lock-out date. The term "information available" includes information received and/or processed after the rebalancing lock-out date, but which was announced or publicly available prior to the rebalancing lock-out date. The "rebalancing lock-out date" is the third business day before the last business day of the month, referred to as "T-3" where "T" is the last business day of the month.

Except as otherwise noted, no changes will be made to the index constituents after the rebalancing lock-out date unless Morningstar considers a change to be necessary to be consistent with changing market conditions. Changes that occur after the rebalancing lock-out date will be deferred until the following month-end rebalancing. This includes new issues, rating changes, balance changes and noncritical corporate actions. New index-eligible bonds that have not yet been priced will be added to the index at the rebalancing which occurs immediately after pricing becomes available.

A preliminary rebalancing report, or pro forma, indicating expected changes to the composition of the index will be available for review from the 15th day of each month until the day before the last business day of the month. The pro forma reports and portfolios may differ from the actual rebalanced index. The portfolio as of the first business day of each month reflects all changes and is frozen for the month.

### File Delivery Schedule

Index and constituent files are delivered daily on weekdays. However, if the month-end falls on a Saturday or a Sunday, then daily index and constituent files will be delivered on Saturday but not Sunday. All prices are carried forward (rolled) from the last business day and accrued interest is calculated for the new settlement date. One or two days of interest will be accrued depending on whether Saturday or Sunday is the last day of the month. The rebalanced portfolio for the forward month will also be delivered on Saturday if the last calendar day of the month falls on a weekend.

**Holiday Rules**

Weekdays on which WM Reuters does not publish closing foreign exchange rates are treated as “global holidays”. Indexes are not published on Global Holidays unless they fall on the last calendar day of the month. In that case, prices are updated in all local markets that are open. In markets that are closed, prices will be carried forward (rolled) from the prior business day and accrued interest will be calculated for the new settlement date.

Index files will not be delivered on New Year’s Day, Christmas Day, or Good Friday.

**Tenor**

For the application of the index inclusion and tenor rules, except for US mortgage-backed securities, the term of a security is measured from the effective date of the rebalanced portfolio to maturity. The tenor is set on the rebalance date of the portfolio.

For US mortgage-backed securities, the term of a security is measured from the rebalancing lock-out date based on the average life of the security. The tenor is set on the lock-out date of the rebalanced portfolio.

**Corporate Actions**

Securities that are announced as fully called are removed from the indexes at the rebalancing following the effective date of the call. Partial calls, tenders and exchanges occur in the month-end rebalancing following the announcement provided that the announcement is made on or before the rebalancing lock-out date. Otherwise, the corporate action is deferred until the following month-end rebalancing.

**Defaulted Securities**

Sovereign or corporate issues in legal default will be removed at the next rebalancing following the default event, provided this occurs on or before the rebalancing lock-out date. An issuer filing bankruptcy papers, or the local market equivalent, is in default. Defaulted securities that are restructured will be reinstated or included in an index as a new security when issued.

**Illiquid Securities**

Illiquid bonds are excluded or eliminated from the index. A bond is deemed illiquid when consistent pricing is unavailable or becomes unavailable. Bonds with limited liquidity may be removed at the discretion of the index committee. If a bond that is removed due to lack of pricing that bond will not qualify for any index thereafter, even if adequate pricing subsequently becomes available.

**Composite Rating**



Index constituent composite ratings are updated once a month as part of the rebalancing process. Composite rating changes take effect on the last calendar day of the month based on information available up to and including the rebalancing lock-out date (the third business day before the last business day of the month).

### Index Calculation Methodology

This section summarizes the computation of various security and portfolio total return measures for Morningstar Global Bond Indexes.

#### Calculating Index Values

The daily closing index value is a function of the prior month-end index value and the current month-to-date return:

$$IV_n = IV_0 \times (1 + TRR_n)$$

where:

IV<sub>n</sub> = closing Index value on day n

IV<sub>0</sub> = closing Index value on prior month-end

TRR<sub>n</sub> = month-to-date Index total return on day n

The month-to-date return of an Index (TRR<sub>n</sub>) is equal to the sum of the individual constituent returns times their respective beginning of month weights:

$$TRR_n = \sum_{i=1}^k B_i TRR_n \times B_i Wgt_0$$

where:

TRR<sub>n</sub> = Index month-to-date total return on day n

BiTRR<sub>n</sub> = month-to-date total return on day n of bond i

BiWgt<sub>0</sub> = beginning of month weight of bond i

Periodic returns between any two dates can be derived from the beginning and end of period Index values. Since Index values represent closing levels, period returns will include market movement on the end of period date but exclude market movement on the beginning of period date. Therefore, to capture returns for June, divide the June 30 Index value by the May 31 Index value:

$$TRR = (IV_n / IV_0) - 1$$

where:

TRR = periodic total return

IV<sub>n</sub> = closing Index value on the end of period date

IV<sub>0</sub> = closing Index value on the beginning of period date

Annualized returns are derived from period total returns:

$$AnnTRR_n = (1 + TRR_n)^{365/d} - 1$$

where:

AnnTRR<sub>n</sub> = annualized total return for period n

TRR<sub>n</sub> = periodic total return for period n

d = number of actual days in period n

### Calculating bond total returns in local currency terms

Month-to-date total returns are calculated daily for each bond in its currency of denomination (i.e., local currency total return).

$$BTRR_n = \frac{(P_n + AI_n) - (P_0 + AI_0) + C \times \left(1 + \frac{r}{d}\right)^t}{P_0 + AI_0}$$

where:

BTRR<sub>n</sub> = individual bond month-to-date total return on day n

P<sub>n</sub> = current day price

P<sub>0</sub> = prior month-end price

AI<sub>n</sub> = current day accrued interest

AI<sub>0</sub> = prior month-end accrued interest

C = coupon payments received during the period (including capital payments at current market value)

r = reinvestment rate (currently zero)

t = number of days between the receipt of the cash flow and day n

d = day count convention for reinvestment asset

### Calculating inflation-linked security total returns in local currency terms

Month-to-date total returns for inflation-linked securities are calculated daily for each bond in its currency of denomination (local total return). Inflation-linked returns include the impact of the change in inflation factor over time.

$$BTRR_n = \frac{f_n \left( P_n + AI_n + C \times \left( 1 + \frac{r}{d} \right)^t \right) - f_0 (P_0 + AI_0)}{f_0 (P_0 + AI_0)}$$

where:

BTRR<sub>n</sub> = individual bond month-to-date total return on day n

f<sub>n</sub> = current day inflation factor

$f_0$  = prior month-end inflation factor

$P_n$  = current-day price

$P_0$  = prior month-end price

$AI_n$  = current-day accrued interest

$AI_0$  = prior month-end accrued interest

$C$  = coupon payments received during the period (including capital payments at current market value)

$r$  = reinvestment rate (currently zero)

$t$  = number of days between the receipt of the cash flow and day  $n$

$d$  = day count convention for reinvestment asset

### U.S. mortgage pass-through total return formula

$$TRR = \frac{\left( (P_n + AI_n) - (P_0 + AI_0) + \left( \frac{C}{12} \times \left( 1 + \frac{r}{d \times 100} \right)^t \right) \right)}{P_0 + AI_0} + (1 - f) \times \frac{\left( \left( 100 \times \left( 1 + \frac{r}{d \times 100} \right)^t \right) - (P_n + AI_n) \right)}{P_0 + AI_0}$$

$$f = (1 - SPP) \times (1 - SMM)$$

$$SPP = \left( \frac{\frac{WAC_0}{1200}}{\left( 1 + \frac{WAC_0}{1200} \right)^{WAM_0} - 1} \right)$$

where:

TRR = month to date total return

$P_n$  = current day price (assuming cash settlement)

$P_0$  = prior month-end price (assuming cash settlement)

$AI_n$  = current day accrued interest (assuming cash settlement)

$AI_0$  = prior month-end accrued interest (assuming cash settlement)

$C$  = net coupon stated in percentage terms

$r$  = reinvestment rate stated in percentage terms (currently zero)

$d$  = day count for reinvestment asset

$t$  = time to/since cash flow payment date (settlement date minus cash flow payment date)

SPP = schedule principal payment percentage

SMM = single monthly mortality

CPR = most recently reported constant prepayment rate

WAC0 = weighted average gross coupon rate as of the previous month stated in percentage terms

WAM0 = remaining maturity (in terms of number of months) as of the previous month

**U.S. mortgage pass-through cash settlement price**

US mortgage pass-through cash settle prices are derived from the current month regular (forward) settlement price up to the date before the roll date using the following formula:

$$P_c = \left( (P_r + AI_r) \times \left( \frac{1}{\left(1 + \frac{r}{d \times 100}\right)^n} \right) \right) - AI_c$$

where:

P<sub>c</sub> = cash settle price

P<sub>r</sub> = regular (forward) settle price for current month settlement

AI<sub>c</sub> = cash settle accrued interest

AI<sub>r</sub> = regular (forward) settle accrued interest for current month settlement

r = 1-month Libid stated in percentage terms

n = number of days between cash settle date and regular (forward) settle date

d = number of days in the year based on Libor day-count convention (360)

US mortgage pass-through cash settle prices are derived from the next month regular (forward) settlement price on the roll date through the end of the month using the following formula:

$$P_c = \left( \left( \frac{C}{12} + 100 \times (1 - f_e) \right) \times \left( \frac{1}{\left(1 + \frac{r}{d \times 100}\right)^{n_1}} \right) \right) + \left( (P_r + AI_r) \times f_e \times \left( \frac{1}{\left(1 + \frac{r}{d \times 100}\right)^{n_2}} \right) \right) - AI_c$$

where:

P<sub>c</sub> = cash settle price

P<sub>r</sub> = regular (forward) settle price for next month settlement

AI<sub>c</sub> = cash settle accrued interest

AI<sub>r</sub> = regular (forward) settle accrued interest for next month settlement

r = 1-month Libid stated in percentage terms

n<sub>1</sub> = number of days between cash settle date and the next month cash flow payment date

n<sub>2</sub> = number of days between cash settle date and regular (forward) settle date

C = net coupon stated in percentage terms

f<sub>e</sub> = estimated factor based on most recently reported actual CPR

d = number of days in the year based on Libor day-count convention (360)

### U.S. ABS and CMBS total return formula

$$TRR = \frac{(P_n + AI_n) - (P_0 + AI_0) + (P_{CF} + I_{CF}) \left(1 + \frac{r}{d \times 100}\right)^t}{(P_0 + AI_0)} - \frac{(1 - f)(P_n + AI_n)}{(P_0 + AI_0)}$$

where:

TRR = individual bond month-to-date total return

P<sub>n</sub> = current-day price (assuming cash settlement)

P<sub>0</sub> = prior month-end price (assuming cash settlement)

AI<sub>n</sub> = current-day accrued interest (assuming cash settlement)

AI<sub>0</sub> = prior month-end accrued interest (assuming cash settlement)

ICF = interest cash flow received

PCF = principal cash flow received

f = end of period factor divided by the beginning of period factor

r = reinvestment rate (currently zero)

t = number of days between the receipt of the cash flow and day n

d = day count convention for the reinvestment asset

### Converting returns into another base currency unhedged

Unhedged returns are converted into a given base currency using the following formulas:

$$CRR = \frac{FX_n}{FX_0} - 1$$

$$TRR_{converted} = ((1 + TRR_{local}) \times (1 + CRR)) - 1$$

where:

CRR = currency return

FX<sub>n</sub> = end-of-period FX rate (stated in terms of the number of units of the base currency per one unit of the currency of denomination of the bond)

FX<sub>0</sub> = beginning-of-period FX rate (stated in terms of the number of units of the base currency per one unit of the currency of denomination of the bond)

TRR<sub>converted</sub> = total return of the bond converted into the base currency unhedged

TRR<sub>local</sub> = local total return of the bond

### Converting returns into another base currency hedged

Currency hedged index returns assume a rolling one-month forward hedge, where forward contracts are purchased in an amount equal to the full market value of the index (including accrued interest) at the beginning of the month. In addition to the formulas used to calculate unhedged converted returns, hedged returns require the following additional formulas:

$$CRUTRR = CRR \times (1 + TRR_{local})$$

$$FCR = \frac{FWD_0}{FX_0} - 1$$

$$HR = HP_{ct} \times (FCR - CRR)$$

$$TRR_{hedged} = TRR_{local} + CRUTRR + HR$$

$$HIV_n = HIV_0 \times (1 + TRR_{hedged})$$

where:

CRUTRR = currency return on unhedged local total return

FCR = forward contract return

FWD0 = beginning-of-period forward rate (stated in terms of the number of units of the base currency per one unit of the currency of denomination of the bond)

HR = hedge return

HPct = percentage hedged

TRRhedged = total return hedged into the base currency

HIVn = closing hedged Index value on day n

HIV0 = closing hedged Index value on prior month-end

### Analytical Portfolio and Security Calculations

Morningstar Indexes contain numerous analytical calculations related to duration, convexity, yield and spread. A few analytical calculations require additional explanation.

#### Key rate durations

Key-rates measure the duration sensitivity of a security to a shift at a single point on the par coupon yield curve. The sum of a bond's key rate durations (also referred to as partial durations) at the six measured nodes on the par coupon yield curve will generally match its effective duration. This measure allows greater granularity and precision when calculating the effect of non-parallel shifts in the yield curve on the price of a bond, and, by extension, the price of a portfolio.

#### Excess return (duration adjusted return)

Key-rate durations can be used to measure that portion of a bond's (or portfolio's) total return that is attributed solely to credit and optionality risks by removing interest rate and yield curve risk. The result is a curve-adjusted return.

#### Return attribution methodology

The performance of an individual bond or a bond portfolio is dependent on a few key risk/return factors: interest rates, credit and optionality. Return attribution decomposes these factors into discrete "return factors", which quantify their effect on security or portfolio total return.

- ▶ Return components due to the passage of time: coupon, amortization or accretion and change in the present value of a bond as its term shortens (roll). For MBS, an additional factor is the return attributable to the receipt of principal payments at par.
- ▶ Changes in the yield curve: general changes in the level of interest rates, referred to as parallel curve shift, and changes in the shape of the government par value yield curve (curve reshaping).
- ▶ Changes in spread.
- ▶ Changes in implied volatility.

The sum of these return factors equals the local currency total return.

### **Methodology Review and Index Cessation Policy**

The index methodology is continually reviewed to ensure it achieves all stated objectives. These reviews consider corporate action treatment, security 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**

#### **Index Data Corrections**

Incorrect pricing and corporate action data for individual issues in the database will be corrected upon detection. Commercially reasonable efforts are made to correct an older error subject to its significance and feasibility. For more details, refer to the [Recalculation Guidelines](#).

#### **Index Errors**

When errors are noted on the current index level, the calculation agent will make a best effort to address and correct the levels within one index calculation day of its publication. When historical errors are detected, the necessary change will be classified as immaterial or material according to criteria established by Morningstar.

#### **Computational and Reporting Precision**

All calculated and adjusted data are stored as real numbers. For reporting purposes, index values are rounded to two decimal places.

### Market Events

In the case of a significant market event (default, delayed payment, debt restructuring), any affected securities will not be removed until the next rebalancing date. Market prices and the index team's best estimate of how to treat the securities in question will be used to compute index returns.

Since all bond indexes are calculated using month-to-date returns, errors in return calculations that occur only intramonth are self-correcting over time; that is, the impact on compounded total, excess, and price return levels are isolated to the affected dates and do not affect current index levels or index levels going forward. In this case, in which the error in returns calculations is limited in scope to intramonth dates, the change will generally be considered immaterial.

### Calculation Agent

Morningstar partners with a third-party calculation agent to calculate the Morningstar Bond Indexes. The calculation agent calculates the actual change in all measured characteristics of the respective indexes daily including the individual bonds that make up the indexes.

The calculation agent for Morningstar Indexes is ICE Data Indices, LLC or its affiliates ("ICE Data"). Information pertaining to the sections labeled General Methodology for Morningstar Indexes, Index Maintenance Rules and Index Calculation Methodology can be found in the ICE Data Services Bond Index Methodologies document. The latest version of this document may be found on the ICE Index Platform, under Publications/General Methodology located here: <https://indices.theice.com/publications/showPublications#>.

Additional information pertaining to the definition of data fields, taxonomy or analytical computations used in the Morningstar Bond Indexes may also be found in that document.

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## Appendix

### Index Inception Date

The inception date for most Morningstar Bond Indexes is Dec. 31, 1999, with the following exceptions.

INDEX	INCEPTION DATE
Morningstar Korea Treasury Bond	6/30/2000
Morningstar Sweden Core Bond	12/31/2012
Morningstar Switzerland Core Bond	1/31/2013

### Index Performance Inception Date

The performance inception dates will vary for each index.

INDEX	PERFORMANCE INCEPTION DATE
Morningstar Japan Treasury Bond	1-Apr-19
Morningstar Global ex-Japan Treasury Bond	1-Apr-19
Morningstar Emerging Markets Sovereign Bond	1-Jan-19
Morningstar Canada Treasury Bond	1-Apr-19
Morningstar US Treasury Bond	1-Apr-19
Morningstar US Composite Government and Agency Bond	1-Apr-19
Morningstar US Treasury Inflation-Protected Securities	1-Apr-19
Morningstar US Mortgage-Backed Securities	1-Apr-19
Morningstar US Commercial Mortgage-Backed Securities	1-Apr-19
Morningstar US Asset-Backed Securities	1-Apr-19
Morningstar Eurozone Corporate Bond	1-Apr-19
Morningstar Canada Corporate Bond	1-Apr-19
Morningstar Canada Government and Provincial Bond	1-Apr-19
Morningstar UK Gilt Bond	1-Apr-19
Morningstar Eurozone Treasury Bond	1-Apr-19
Morningstar Switzerland Treasury Bond	1-Apr-19
Morningstar Sweden Treasury Bond	1-Apr-19
Morningstar Australia Treasury Bond	1-Apr-19
Morningstar Global Treasury Bond	1-Apr-19
Morningstar Global ex-US Treasury Bond	1-Apr-19
Morningstar Canada Core Bond	1-May-19
Morningstar Canada Liquid Bond	1-May-19
Morningstar US Corporate Bond	1-May-19
Morningstar US Composite Government and Corporate Bond	1-May-19

Morningstar US Core Bond	1-May-19
Morningstar US 1-3 Yr Core Bond	1-May-19
Morningstar US 1-5 Yr Core Bond	1-May-19
Morningstar US 5-10 Yr Core Bond	1-May-19
Morningstar US 10+ Yr Core Bond	1-May-19
Morningstar US 1-5 Yr Treasury Inflation-Protected Securities	1-May-19
Morningstar US 5-10 Yr Treasury Inflation-Protected Securities	1-May-19
Morningstar US 10+ Yr Treasury Inflation-Protected Securities	1-May-19
Morningstar Eurozone Covered Bond	1-May-19
Morningstar Eurozone Core Bond	1-May-19
Morningstar Eurozone 1-3 Yr Core Bond	1-May-19
Morningstar Eurozone 1-5 Yr Core Bond	1-May-19
Morningstar Eurozone 5-10 Yr Core Bond	1-May-19
Morningstar Eurozone 10+ Yr Core Bond	1-May-19
Morningstar UK Corporate Bond	1-May-19
Morningstar UK Securitized Assets	1-May-19
Morningstar UK Core Bond	1-May-19
Morningstar UK 1-3 Yr Core Bond	1-May-19
Morningstar UK 1-5 Yr Core Bond	1-May-19
Morningstar UK 5-10 Yr Core Bond	1-May-19
Morningstar UK 10+ Yr Core Bond	1-May-19
Morningstar Australia Corporate Bond	1-May-19
Morningstar Australia Core Bond	1-May-19
Morningstar Japan Corporate Bond	1-Jun-19
Morningstar Canada Treasury Inflation-Linked Securities	1-Jun-19
Morningstar Australia Treasury Inflation-Linked Securities	1-Jun-19
Morningstar Eurozone Treasury Inflation-Linked Securities	1-Jun-19
Morningstar Japan Treasury Inflation-Linked Securities	1-Jun-19
Morningstar UK Treasury Inflation-Linked Securities	1-Jun-19
Morningstar Australia 1-5 Yr Core Bond	1-Jun-19
Morningstar Australia 5-10 Yr Core Bond	1-Jun-19
Morningstar Australia 10+ Yr Core Bond	1-Jun-19
Morningstar Japan Core Bond	1-Jul-19
Morningstar Eurozone 1-3 Yr Treasury Bond	1-Jul-19
Morningstar Eurozone 5-7 Yr Treasury Bond	1-Jul-19
Morningstar Sweden Core Bond	1-Jul-19
Morningstar Switzerland Core Bond	1-Jul-19
Morningstar US Cash	1-Jul-19
Morningstar Canada Cash	1-Jul-19
Morningstar UK Cash	1-Jul-19

Morningstar Eurozone Cash	1-Jul-19
Morningstar Switzerland Cash	1-Jul-19
Morningstar Sweden Cash	1-Jul-19
Morningstar Japan Cash	1-Jul-19
Morningstar Australia Cash	1-Jul-19
Morningstar Canada 1-5 Yr Core Bond	1-Jul-19
Morningstar Canada 5-10 Yr Core Bond	1-Jul-19
Morningstar Canada 10+ Yr Core Bond	1-Jul-19
Morningstar US 1-5 Yr Treasury Bond	1-Jul-19
Morningstar US 5-10 Yr Treasury Bond	1-Jul-19
Morningstar US 10+ Yr Treasury Bond	1-Jul-19
Morningstar US 1-5 Yr Composite Government and Agency Bond	1-Jul-19
Morningstar US 5-10 Yr Composite Government and Agency Bond	1-Jul-19
Morningstar US 10+ Yr Composite Government and Agency Bond	1-Jul-19
Morningstar Japan 1-5 Yr Core Bond	1-Jul-19
Morningstar Japan 5-10 Yr Core Bond	1-Jul-19
Morningstar Japan 10+ Yr Core Bond	1-Jul-19
Morningstar Korea Treasury Bond	1-Aug-19
Morningstar US 1-5 Yr Corporate Bond	1-Aug-19
Morningstar US 5-10 Yr Corporate Bond	1-Aug-19
Morningstar US 10+ Yr Corporate Bond	1-Aug-19
Morningstar US Cash T-bill	1-Aug-19
Morningstar Global Corporate Bond Index	1-Sep-19
Morningstar Global Treasury Inflation-Linked Securities	1-Sep-19
Morningstar Global Core Bond	1-Dec-19
Morningstar Global ex-US Core Bond	1-Dec-19
Morningstar Global ex-Eurozone Core Bond	1-Dec-19
Morningstar Global ex-UK Core Bond	1-Dec-19
Morningstar Global ex-Canada Core Bond	1-Dec-19
Morningstar Global ex-Japan Core Bond	1-Dec-19
Morningstar Global ex-Australia Core Bond	1-Dec-19
Morningstar US High-Yield Bond	1-Jan-20
Morningstar Eurozone High-Yield Bond	1-Jan-20
Morningstar UK High-Yield Bond	1-Jan-20
Morningstar Canada High-Yield Bond	1-Jan-20
Morningstar Global High-Yield Bond	1-Jan-20
Morningstar Emerging Markets Corporate Bond	1-Feb-20
Morningstar New Zealand Treasury Bond	1-Feb-20
Morningstar Emerging Markets Composite Bond	1-Mar-20
Morningstar New Zealand Cash	1-Mar-20

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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 Product Committee**

The Morningstar Index Product Committee is comprised of members who possess a wide array of knowledge in relation to Indexes. The Product Committee is responsible for the governance over the creation and maintenance of all Morningstar branded Indexes, ensuring the highest standards are continuously met. Any matters arising from exceptional or undocumented events will be resolved at the discretion of the Morningstar Index Product Committee.

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The Morningstar Index Oversight Committee is comprised of informed and qualified professionals who are responsible for the process governance of Morningstar branded Indexes. The Oversight Committee assesses and where appropriate challenges the decisions of Morningstar Indexes with regards to benchmark decisions.

**For More Information**

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



22 West Washington Street  
Chicago, IL 60602 USA

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