Morningstar Methodology Enhancements
Effective for Periods ending Oct. 31, 2016

Introduction

Morningstar strives to update its methodologies to reflect changes in the investment landscape, our enhanced coverage, and our evolving research opinions. Three methodologies will be revised on Oct. 31.

1. Morningstar Ratings for Funds (Star Rating) methodology
2. Morningstar Global Fixed-Income Sectors, methodology
3. Morningstar Extended Performance methodology

Frequently Asked Questions

What will change with the Morningstar Rating for funds methodology on Oct. 31, 2016?
The changes vary by region and are intended to simplify our global methodologies. Empirical data indicates that few investors pay loads—this is true both globally and in the United States. Therefore, we're removing them from our Morningstar Rating for funds (commonly known as the star rating) calculation in regions where returns are load-adjusted within the rating. Additionally, in some regions exchange-traded funds are excluded from the ratings bell curve. Now, regulated investment companies providing equivalent investor protections will be fully rated against each other. Notes and other exchange-listed products not following investment company laws are excluded from calculations on a going-forward basis. Lastly, minor features have also been removed or modified, including the similarity matrix and the percentile ranking formula.

These methodologies previously were customized based upon local market evaluations. We now believe our Morningstar Risk-Adjusted Return, or MRAR, calculation, which drives our rating, should be more globally consistent. The following table summarizes the changes to each region.

Calculation Region	Methodology Change to Star Rating and Rankings
Canada Japan	Star rating percentile-ranking adjustment Removal of ETN from ratings
Australia	Star rating percentile-ranking adjustment

	ETFs receive ratings within open-end peer group (not presently rated)
New Zealand	Star rating percentile-ranking adjustment *ETFs remain unrated because of performance-reporting differences*
Europe, Asia, and Africa open markets; and Brazil Chile China India Korea Malaysia Thailand	Star rating percentile-ranking adjustment Removal of ETN from ratings Removal of load adjustment
U.S.	Star rating percentile-ranking adjustment Removal of ETN from ratings Removal of load adjustment ETFs move into the open-end peer group

Why was the load adjustment removed from the Morningstar Return rating?
We believe that the load adjustment has become an anachronism as fewer and fewer investors pay any loads, let alone the maximum (or capped loads). Sales charges used to be a primary way that investors paid for advice. Now, investors pay for advice in many different ways, often outside of the fund structure. Penalizing funds for their loads in this context seems arbitrary. This change will bring the U.S. and Europe/Asia/Africa, or EAA, in line with the star rating calculations in all other regions where exchange-traded funds are included with open-end funds and where we do not adjust for frequently waived loads.

How were star ratings calculated for ETFs prior to this change?
This varied by country or region. In the U.S., ETFs did not form part of the ratings universe. Unlisted open-end mutual funds were rated, and then the share classes with highest MRAR value with 4, 3, 2, or 1 stars were identified as breakpoints. The MRARs of subject ETFs were then overlaid against the breakpoints to determine which rating applied. This overlay calculation will continue for collective investment trusts.

For the Australian market, the ETFs did not previously receive a star rating.

In Canada, as well as EAA regions and countries, the ETFs were already part of the main star rating universe alongside the open-end funds.

Are the star ratings calculated globally or by country/region?
Generally, Morningstar Ratings are calculated within based upon peer groups of funds that are based upon the choices available for investors to purchase in the context of sales regulations. Some markets, such as Singapore, are "open" and allow both locally domiciled funds as well as foreign funds following an acceptable regulatory regime (primarily the European UCIT regulations). Other markets, such as the U.S. and Canada, only permit sales of funds following local regulations; these markets are considered "closed." (The U.S. even has punitive tax policies restricting sales to individuals not filing U.S. taxes.) Funds from closed markets are rated against each other, while funds from

open markets are rated with other open markets. Occasionally, this leads to funds syndicated in one country being not fully available to other countries, despite the inclusion within a single ratings curve, as open conditions between markets are not always reciprocal (for example, Puerto Rico and the U.S., or Hong Kong into Europe). Lastly, some markets are open for institutional investors but not retail investors (Japan, Chile). These markets are treated as closed for ratings purposes.

Our current rating regions are listed below. The EAA includes open markets accepting UCIT funds.

Australia
Brazil
Canada
Chile
China
EAA (Europe, Africa, Asia)
India
Japan
Korea
Malaysia
Mexico
New Zealand
Thailand
U.S.

Why was my A share load-waived report replaced with just an A share report?
Morningstar is removing the hypothetical load-waived share class from our data. These virtual share classes were created to show the star rating applicable to A class funds where the load had been waived; these are generally available to investors in 401(k) plans or fee-based accounts. All other information was identical between the two share classes. As the star rating calculation will no longer include load adjustment, there is no longer a requirement to provide ratings for when loads are waived separately from A shares sold on a commission basis.

Why did my fund's star rating move 2 stars in one month?
This was likely due to multiple factors, including relative performance, Morningstar Category changes for the fund or peers, peer funds liquidating, or reaching a three-year history. To estimate the overall impact, we compared April 2016 ratings under the existing methodology to the new methodology. This test indicated that less than 1% of funds globally would have had a rating change greater than 1 star compared with the active methodology. More than 80% of share classes would have had the same rating under the new methodology.

In the U.S., with the removal of the load adjustment and load-waived shares, approximately 4% of A share funds would move up 2 stars but 55% would have moved up by 1 star.

If the star ratings no longer include loads, does that mean I shouldn't care about them as an investor?

Investors should care about all charges on their investments. However, we believe in many cases the stated loads are not applied and the end investors often do not pay them. Thus, we think it is no longer appropriate to include these one-time charges in a relative performance measure.

Why did a fund's star rating change from one month to the next?
The following are some of the most common reasons why a fund's star rating may change:

- The fund's risk-adjusted return was very close to a breakpoint between rating levels (10%; 32.5%; 67.5%; 90%) and slipped slightly over (or under) the breakpoint from one month to the next.
- There are more (or fewer) share classes with a three-year history in the fund's category.
- The fund recently changed its category and now is being compared with a new peer group.
- The fund recently hit its five- or 10-year anniversary, so additional time periods are being included in the overall rating.
- The fund is less than five years old. Without any longer periods to stabilize the rating, volatility in the three-year rating produces volatility in the overall rating.
- The fund just rolled off a period of very strong performance three, five, or 10 years ago.

Why are you merging the U.S. ETF and open-end funds and ranking them in the same universe?
Morningstar believes that end investors do not see a material difference between U.S. ETFs and open-end funds when choosing their investment portfolios, but rather see them as substitutable. As such, it makes sense for Morningstar to rank and rate them together to allow end investors to compare them directly.

Will historical ETF star ratings be changed?
No. We consider the star rating as a statement of record, and we will not be changing any historical ratings.

How can I predict my fund's star rating?
There is no way to predict a fund's future star rating with absolute certainty, but there are ways to evaluate how a fund ranks on a risk-adjusted basis against its peers.

Calculate a custom-period MRAR: For example, calculate a 35-month MRAR for a fund that is one month shy of its three-year anniversary, and compare that with the 35-month MRARs of all other funds in that category. Percentile-ranking the population will provide a rough estimate of how the subject fund ranks. To be even more precise, provide fractional weightings to multishare funds to determine how the ratings would be distributed.

Estimate returns: Fill in monthly returns prior to a fund's inception in order to obtain 36, 60, or 120 months of performance. For example, if a fund is 35 months old, estimate the fund's monthly return for the month prior to the fund's inception. Then, calculate a three-year MRAR for the fund and compare it with the three-year MRARs for the other funds in the category to determine how it would have been rated. These estimated monthly returns can be category average monthly returns or other estimates based on similar funds or older share classes.

How does the fund's expense ratio affect the star rating?
The share class' expense ratio is taken into account in the performance of the share class itself and so will be included in the star rating calculation.

Why didn't my fund get a star rating?
There are a few reasons why a fund would not get a rating. 1) The fund is not three years old yet. 2) The fund's rating has been suspended. 3) There are a few "convenience" categories that are not rated because the group contains different funds with different risk factors. For example, Morningstar does not rate funds in the U.S. bear market category or the Europe guaranteed category. 4) If the category is small, the sample may not be robust enough to calculate a rating. Morningstar requires at least five distinct portfolios in a category for a specific time period in order to calculate that rating.

Why is the Morningstar Risk rating so high for my fund?
The risk rating tends to be high when the fund has experienced high variability in its monthly returns and/or when it has some instances of strongly negative monthly returns. While the risk rating and standard deviation are not the same, there is often a high correlation between the two measures. Standard deviation measures variation both above and below the mean equally, but the risk rating gives more weight to downside variation. If the fund has had both upside and downside variation, its percentile rank in category for standard deviation is usually very close to its percentile rank in category for the risk rating.

Will this change have an impact on firm-level data points?
Morningstar calculates about 40 data points that consider all of the funds offered by asset-management companies, including Firm Average Morningstar Rating Overall and Firm Risk-Adjusted Success Ratio 5 Year. These calculations previously included open-end funds only, but after Oct. 31, 2016, the calculations will include open-end funds as well as exchange-traded funds. For firms that do not offer exchange-traded funds, these calculations will be unchanged, but we expect some changes to the resulting firm calculations for asset managers that offer both open-end and exchange-traded funds.

What is changing with the fee-level calculations?
Like the firm-level data points, fee-level calculations previously only considered open-end funds in their comparison groups. But after Oct. 31, 2016, exchange-traded funds also will be considered along with open-end funds in fee-level comparison groups, the resulting peer-group percentile ranks, and corresponding Fee Level labels, such as Low, Average, and High.

How many ETFs currently have a quantitative Morningstar Rating?
Virtually all ETFs with three years of live performance history will have a quantitative Morningstar Rating.

Exceptions include those ETFs that fall into one of our "trading" categories (for example, leveraged and inverse ETFs) and some types of commodity funds (for example, gold ETFs), among others.

Also, effective Oct. 31, 2016, all nonfund exchange-traded products (exchange-traded notes, exchange-traded commodities, and so on) will no longer receive a Morningstar Rating as they are not regulated funds.

What is the situation with closed-end funds? Are the star ratings currently calculated using an overlay, and has there been any discussion about folding these into the main open-end/ETF universe?
Closed-end funds are rated on their own and Morningstar doesn't have any plans to change that at this time. Unlike exchange-listed (ETF), or over-the-counter distributed (traditional mutual funds) open-end funds, closed-end funds do

not need to meet frequent liquidity requirements for investors. In some markets, closed-end funds are permitted to issue senior securities, purchase underlying holdings without consideration of the position's liquidity, and have portfolios that are more concentrated than open-end funds.

Will ETFs now be treated as an open-end product type (with no separate tab in Direct, for example) and a distinct share class, or will they continue to be treated as a separate product for data purposes (even if combined for Morningstar star rating purposes)? Put another way, if someone asks for a data feed for open-end funds, will they now get ETFs as well? If so, would they be able to screen them out (ETF = NO)?
Presently, Morningstar products publish various outputs combining or separating investment vehicles based upon a multitude of attributes. Morningstar products can continue to deliver unlisted mutual funds and ETFs separately, screening for exchange listed characteristics prior to client delivery. The result (which already occurs in Europe) will be that absolute ranks will have holes within some product displays. Our calculation methodology reflects our research opinion on equivalence of the investment vehicle's structural protection and substitutability.

Can you give us a list of the ETF legal structures that are going to be star-rated, versus those that are not (such as ETNs, ETCs, and so on)?
The legal structures for ETFs around the world are not always consistent. In the U.S., some are grantor trusts, others are unit investment trusts, and more recently they are open-end investment companies like other mutual funds that are listed on an exchange. In Europe and other regions, the legal structures for mutual funds and ETFs are virtually identical and all follow the same set of regulations.

Will cross-listings obtain a star rating, or is it just the primary share?
Cross-listed ETFs are already not given a star rating via the current process, and that will not change under the new process. Technically they will be part of the combined universe but virtual classes/cross-listings do not qualify for a rating (however, products can "inherit" the rating from the primary listing).

What are the changes to the extended performance estimate?
Morningstar is moving from assigning extended performance from the "Oldest Share Class" that is currently active to being able to "chain" link extended performance using the active "Oldest Share Class" first, then any dormant or liquidated share classes that date back to the original inception of the fund or original entry into our database. This will result in many surviving share classes having a longer performance history.

Why are you making this change?
As global regulations continue to change, we have observed a larger number of legacy share classes being retired. In certain markets, this has been predicated by a ban on embedded commissions, while in other markets, this has been organic based upon the changing preferences of investors and their advisors. Overall, this will result in wider availability of extended performance calculations.

What is the Oldest Share Class Methodology?
Given the changes to our extended performance process, we identified a gap in the transparency of our methodologies. We are now changing the logic used to assign the oldest share class, which is frequently used to filter investments within our products, and it will go into effect on Oct. 31, 2016. The rules are designed to select an active share class, freely available to investors, that is not currency-hedged and has the lowest fee, in the event that more

than one share class of a fund has the earliest inception date. The old rules referenced the share class type initially and then, if still tied, chose the share class that was first in terms of alphabetical order.

What are the changes to the Global Fixed Income Sector Classifications?

Within Morningstar's fixed-income classification processes, we use instrument attributes to determine which positions should be treated as cash and cash equivalents. Morningstar previously based the assignment on an instrument being an eligible type of fixed-income instrument with a maturity of no more than 364 days. Morningstar will reduce it to 92 days to align with regulations and the broader investment industry. Additionally, we're making minor refinements to the determination of which securities, accounts, loans, and derivatives will be subject to this reclassification to cash.

Does this affect asset-allocation estimates?

The values assigned in our fixed-income cash primary sector reconcile to the cash within our asset-allocation display. There will be changes to cash allocations for a large number of portfolios.

Isn't there a standard definition for cash equivalents?

At present, no single generally accepted definition has been adopted by the global investment industry. We have considered a wide variety of factors when updating our methodology, including: definitions within accounting principles; banking and insurance regulations; recommendation of global investment associations; practices of major asset managers; and investor feedback.

Will your cash calculations now match the percentages published on fund websites?

We expect there to remain differences between our portfolio asset allocations and those from fund companies. In many cases, we expect our differences to be greatly reduced from those that appear today.

Without a formal regulatory definition of cash equivalents, as well as more-uniform reporting of all investment positions, we do not believe that funds, their service providers, or other research companies will calculate identical values.

What other factors contribute to these differences?

There are many factors that cause differences in portfolio-exposure estimates. Firms define the cutoff between bond and cash differently. While not comprehensive, there are methodology and data differences that cause the majority of this variation: Some asset managers base their value on spread-duration, a measure of credit and interest-rate sensitivity; the types of issues and issuers that are included in cash differ across portfolio accounting; portfolio managers and third-party firms have different access to the full holdings; and portfolio reporting to third parties is frequently delivered on a cash basis, while funds have access to accrual accounting.

Will portfolio information be restated to provide apples-to-apples comparisons of portfolios reported on different dates?

Morningstar will recalculate five years of portfolio data to reflect the changes to our estimate of cash and equivalents. After Oct. 31, 2016, restated portfolio data will be available for portfolios dated November 2011 and later.