
The Morningstar Rating™ for Funds

Data Content Guide

Morningstar Data Content

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Data Content Details

Version: 1.0

Description: This document describes the calculation of the Morningstar Rating and provides some theoretical background for the methodology.

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Background

This document describes the rationale for, and the formulas and procedures used in, calculating the Morningstar Rating™ for funds (commonly called the “star rating”). This methodology applies to funds receiving a star rating from Morningstar.

The Morningstar Rating has the following key characteristics:

- ▶ The peer group for each fund’s rating is its Morningstar Category.™
- ▶ Ratings are based on funds’ risk-adjusted returns.

The original Morningstar Rating was introduced in 1985 and was often used to help investors and advisors choose one or a few funds from among the many available within broadly defined asset classes. Over time, though, increasing emphasis had been placed on the importance of funds as portfolio components rather than “stand-alone” investments. In this context, it was important that funds within a particular rating group be valid substitutes for one another in the construction of a diversified portfolio. For this reason, Morningstar now assigns ratings based on comparisons of all funds within a specific Morningstar Category, rather than all funds in a broad asset class.

Definition of the Dataset

The Morningstar Rating measures how funds have performed on a risk-adjusted basis against their category peers. It gives investors the ability to quickly and easily identify funds that are worthy of further research. The Morningstar Rating is calculated for three years, five years, and 10 years, and the overall rating is a weighted average of the time-period ratings.

Morningstar Risk-Adjusted Return is calculated based on expected utility theory, a framework that recognizes that investors are risk-averse and willing to give up some portion of expected return in exchange for greater certainty of return. Morningstar calculates risk-adjusted return by adjusting total return for the risk-free rate and risk.

Content

The following data points are calculated for each fund share class according to the return periods available:

Morningstar Return 3 Years

Morningstar Return 5 Years

Morningstar Return 10 Years

Morningstar Risk-Adjusted Return 3 Years
Morningstar Risk-Adjusted Return 5 Years
Morningstar Risk-Adjusted Return 10 Years
Morningstar Risk 3 Years
Morningstar Risk 5 Years
Morningstar Risk 10 Years
Morningstar Rating 3 Years
Morningstar Rating 5 Years
Morningstar Rating 10 Years
Morningstar Rating Overall

Inputs/Sources/Timings

The major components that are used to assign the Morningstar Rating are the risk-adjusted return and the category peer group. The calculation of the risk-adjusted return is covered in the *Calculation Details* section. This section looks at just what is meant by the term “risk-adjusted” and discusses why the Morningstar Category is used for the peer groupings.

Morningstar calculates ratings for a given month on either the second or fourth business day of the following month, depending on the market. Some universes in particular markets may be calculated on a different schedule. The new ratings will usually be available in products the next day.

What is a risk-adjusted return?

The star rating is based on risk-adjusted performance. However, different aspects of portfolio theory suggest various interpretations of the phrase “risk-adjusted.” As the term is most commonly used, to “risk adjust” the returns of two funds, means to equalize their risk levels before comparing them. The Sharpe ratio is consistent with this interpretation of “risk-adjusted.”

But the Sharpe ratio does not always produce intuitive results. If two funds have equal positive average excess returns, the one that has experienced lower return volatility receives a higher Sharpe ratio score. However, if the average excess returns are equal and negative, the fund with higher volatility receives the higher score because it experienced fewer losses per unit of risk. While this result is consistent with portfolio theory, many retail investors find it counterintuitive. Unless advised appropriately, investors may be reluctant to accept a fund rating based on the Sharpe ratio, or similar measures, in periods when the majority of the funds have negative excess returns.

Standard deviation is another common measure of risk, but it is not always a good measure of fund volatility or consistent with investor preferences. First, any risk-adjusted return measure that is based on standard deviation assumes that the riskiness of a fund’s excess returns is well captured by standard deviation, as would be the case if excess return were normally or lognormally distributed, which is not always the case. Also, standard deviation measures variation both above and below the mean equally. But investors are generally risk-averse and dislike downside variation more than upside variation.

Morningstar gives more weight to downside variation when calculating Morningstar Risk-Adjusted Return and does not make any assumptions about the distribution of excess returns.

The other commonly accepted meaning of “risk-adjusted” is based on assumed investor preferences. Under this approach, higher return is “good” and higher risk is “bad” under all circumstances, without regard to how these two outcomes are combined. Hence, when grading funds, return should be rewarded and risk penalized in all cases. The Morningstar Risk-Adjusted Return measure described in the *Calculation Description* section has this property.

Why is the Morningstar Category used for peer group comparisons?

Morningstar uses the Morningstar Category as the primary peer group for a number of calculations, including percentile ranks, fund-versus-category-average comparisons, and the Morningstar Rating. The Morningstar Rating compares funds’ risk-adjusted historical returns, and its usefulness depends, in part, on which funds are compared with each other.

It can be assumed that the returns of major asset classes (domestic equities, foreign equities, domestic bonds, and so on) will, over lengthy periods of time, be commensurate with their risk. However, asset-class relative returns may not reflect relative risk over ordinary investor time horizons. For instance, in a declining interest-rate environment, investment-grade bond returns can exceed equity returns despite the higher long-term risk of equities; such a situation might continue for months or even years. Under these circumstances, many bond funds outperform equity funds for reasons unrelated to the skills of the fund managers.

A general principle that applies to the calculation of fund star ratings follows from this fact; that is, the relative star ratings of two funds should be affected more by manager skill than by market circumstances or events that lie beyond the fund managers’ control.

Another general principle is that peer groups should reflect the investment opportunities for investors. So, categories are defined, and funds are rated within each of the major markets around the world. Morningstar supports different category schemes for different markets based on the investment needs and perspectives of local investors. For example, Morningstar rates high-yield bond funds domiciled in Europe against other European high-yield bond funds. For more information about available categories, please contact your local Morningstar office.

A style profile may be considered a summary of a fund’s risk-factor exposures. Fund categories define groups of funds whose members are similar enough in their risk-factor exposures that return comparisons between them are useful.

The risk factors on which fund categories are based can relate to value-growth orientation; capitalization; industry sector, geographic region, and country weights; duration and credit quality; historical return volatility; beta; and many other investment style factors. The specific factors used are

considered to be a) important in explaining fund-return differences and b) actively controlled by the fund managers.

Because the funds in a given category are similar in their risk-factor exposures, the observed return differences among them relate primarily to security selection (“stock-picking”) or to variation in the timing and amount of exposure to the risk factors that collectively define the category (“asset weighting”). Each of these, over time, may be presumed to have been a skill-related effect.

If all members of a fund category were uniform and consistent in their risk factor exposures, and the risk factors were comprehensive, there would be no need to risk-adjust returns when creating category-based star ratings. However, even within a tightly defined category, the risk exposures of individual funds vary over time. Also, no style profile or category definition is comprehensive enough to capture all risk factors that affect the returns of the funds within a category.

In extreme cases where the funds in a category vary widely in their risk factor exposures (that is, it is a “convenience category”), a star rating would have little value and is not assigned. For example, in the United States, ratings are not assigned to funds in the bear-market category because these funds short very different parts of the market. In Europe, ratings are not assigned to funds in the guaranteed category.

The following considerations apply when Morningstar defines fund categories:

- ▶ Funds are grouped by the types of investment exposures that dominate their portfolios.
- ▶ In general, a single return benchmark should form a valid basis for evaluating the returns for all funds in a single category (that is, for performance attribution).
- ▶ In general, funds in the same category can be considered reasonable substitutes for the purposes of portfolio construction.
- ▶ Category membership is based on a fund’s long-term or “normal” style profile, based on three years of portfolio statistics. Supplemental analysis includes returns-based style analysis, review of strategy disclosure from fund literature, and qualitative review by analysts.

Limitations/Exceptions

Morningstar Ratings are calculated for fund share classes that have at least 36 continuous monthly returns up to (and including) the month the Morningstar Rating is being calculated for. The fund share classes must be in a Morningstar category that is rated (see the *Inputs/Sources/Timing* section) and that has at least five distinct funds (in this case master/feeder funds would be considered as the same fund since they share a portfolio). Virtual share classes are not rated. Other exceptions are suspended structures and ratings suspensions (see below for details).

About Suspended Structures

From time to time Morningstar analysts become aware of novel vehicle structures that are not significant or unique enough to generate the launch of a new Morningstar Category or product universe; however, comparison to other funds in their assigned category would be inappropriate. Some examples

are funds only offered to restricted investors (including internal master/feeder), negotiated fee share classes in Canada and Australia, exemptions on daily dealing, exchange-traded notes, among others. These investments are frequently in our databases with a category assignment of an otherwise rated category, but we have excluded the specific operating attributes from rated products.

About Rating Suspensions

Over many years, Morningstar has observed shifts of funds across categories. In general, the category changes do not represent a change in the character of the fund. Generally, short-term bond funds do not become mid-cap-growth funds, nor do U.S. large-blend funds become diversified emerging-markets funds. However, Morningstar reserves the right to suspend a fund's rating if it has undergone a significant change in investment strategy. In these cases, it is misleading to compare the fund's prior performance with its current category. Morningstar also reserves the right to suspend the rating for an actively managed fund that held 100% cash for more than a year after its inception date. (This policy does not apply to money market funds, which are unrated.) The suspensions are identified as Significant Restructures.

The process for reviewing suspensions is as follows:

- ▶ A fund becomes eligible for a suspension if it has changed broad asset classes or if it has an exceptionally long period of time in cash. A broad asset class is a collection of similar categories—for example, international stock, taxable bond, or balanced. Broad asset classes are defined in the category systems that are in place in different markets around the world.

- ▶ If a fund is eligible for a suspension, Morningstar will review the situation and determine if the suspension should take place. Not all broad asset-class changes will require a rating suspension. For example, a conservative-allocation fund moving to a bond category is not a significant enough change to merit a suspension.

- ▶ Morningstar will suspend the rating after the strategy change and will mark that suspension date in our systems. Three years after the suspension date, the fund will be eligible for a three-year rating and overall rating. Then, as the fund accumulates five and 10 years of performance in the new style, Morningstar will add the five- and 10-year ratings.

Markets and Universes

In almost all regions, the Morningstar ratings for most universes are calculated separately, with a few exceptions. Exchange-traded funds are usually combined with regular open-ended funds, except India, where they are rated separately, and New Zealand where they are not rated (due to special tax treatment of their distributions). Because New Zealand has relatively few funds in general, all universes (excluding ETFs) are combined for rating purposes. U.K. life and pension funds are rated separately using the Association of British Insurers, or ABI, fund sectors (for more information about the ABI sectors see <https://www.abi.org.uk/data-and-resources/tools-and-resources/abi-life-and-pension-funds-the-abi-sectors/>).

Some universes are rated based on an overlay of the star rating band breakpoints of the ranked MRARs in another universe. The primary examples are the VA Underlying funds universe in the United States and closed-end funds in the EAA. These universes use the breakpoints of the combined open-end and ETF universes for their regions. (See the discussion in the *Ratings Curve and Ratings Overlay* section in the *Calculation Description* section).

Calculation Description

There are three steps to calculate Morningstar Risk-Adjusted Return. The calculations are done on a monthly basis first and then the results are annualized.

- 1) Total Return: Calculate monthly total returns for the fund. Do an additional adjustment for tax-advantaged dividends where appropriate.
- 2) Morningstar Return: Calculate or collect monthly total returns for the appropriate risk-free rate. Adjust returns for the risk-free rate to get Morningstar Return.
- 3) Morningstar Risk-Adjusted Return: Adjust Morningstar Return for risk to get MRAR. Morningstar Risk is then calculated as the difference between Morningstar Return and Morningstar Risk-Adjusted Return.

The annualized returns are the same or lower after each adjustment, as shown in Exhibit 1.

	3-Year Annualized Returns Are the Same or Lower After Each Adjustment				
	Total Return %	Adjust for Risk-Free Rate ↓	Morningstar Return %	Adjust for Risk ↓	Morningstar Risk-Adjusted Return % Morningstar Risk
Focus Fund A	6.6		6.53		5.55 0.98
Growth Fund Inv	10.21		10.14		8.72 1.42

Morningstar calculates percentile ranks in category for all these data points. By studying these percentile ranks as shown in Exhibit 2, one can determine which factor had the most impact on the fund's rating.

	3-Year Percentile Ranks Decomposition			
	Total Return % Rank	Morningstar Return % Rank	Morningstar Risk-Adjusted Return % Rank	Morningstar Risk
Focus Fund A	83	84	83	0.98
Growth Fund Inv	51	52	53	1.42

Total Return

Morningstar calculates a fund's total return for a given month, t , as follows:

$$[1] \quad TR_t = \left\{ \frac{P_e}{P_b} \prod_{i=1}^n \left(1 + \frac{D_i}{P_i} \right) \right\} - 1$$

where

TR_t = total return for the fund for month t

P_e = end of month NAV per share

P_b = beginning of month NAV per share

D_i = per share distribution at time i

P_i = reinvestment NAV per share at time i

n = number of distributions during the month

Distributions include dividends, distributed capital gains, and return of capital. This calculation assumes that the investor incurs no transaction fees and reinvests all distributions paid during the month.

The cumulative total return is:

$$[2] \quad TR_c = \prod_{t=1}^T (1 + TR_t) - 1$$

where

TR_c = cumulative return for the fund

TR_t = total return for the fund for month t

T = number of months in the period (for example, 36, 60, or 120 for three, five, or 10 years)

Tax Adjustment

In reality, an investor's total return will be reduced by any taxes that must be paid on income and capital gains. Morningstar does not adjust for these taxes for MRAR and the Morningstar Rating, because one single tax rate does not reflect the experience of all investors.

Morningstar will adjust for taxes in the MRAR calculation if most investors in that fund qualify for the same tax treatment. For example, Morningstar adjusts the dividends paid by U.S. municipal-bond funds to reflect their exemption from U.S. federal taxes. For single-state municipal-bond funds, there is an additional adjustment for state taxes. Morningstar adjusts these dividends to an equivalent pretax level for the purpose of calculating risk-adjusted return. This adjustment will make a difference for funds that distribute income only versus funds that distribute a combination of income and capital gains.

Morningstar adjusts these municipal-bond dividends with the following formula:

$$[3] \quad TDiv_i = \frac{Div_i}{(1 - t_{Si})(1 - t_{Fi})}$$

where

$TDiv_i$ = tax-adjusted dividend per share at time i

Div_i = actual dividend per share at time i

t_{Si} = maximum state tax rate at time i (for single-state municipal-bond funds)

t_{Fi} = maximum federal tax rate at time i

For the purpose of calculating the total returns that are used to calculate MRAR, Morningstar uses $TDiv_i$ in place of D_i in equation [1] for U.S. municipal-bond funds. This tax adjustment is not part of the standard depictions of total return for these funds.

Morningstar Return

Next, Morningstar adjusts the fund's monthly returns for the risk-free rate. Because investors always have an option to invest at the risk-free rate, Morningstar measures only the amount by which fund returns have exceeded that risk-free rate. This adjustment also accounts for how the risk-free rate has changed over time.

For each historical month, Morningstar calculates the fund's geometric excess return over the risk-free rate.

$$[4] \quad ER_t = \frac{1+TR_t}{1+RF_t} - 1$$

where

ER_t = the geometric excess return for the fund for month t

TR_t = the total return for the fund for month t

RF_t = the total return for the risk-free rate for month t

Morningstar selects a risk-free rate that is appropriate for the investor, and this varies for different Morningstar offices around the world. The risk-free rate is selected based on the primary currency of the investment, rather than where the fund invests. *Appendix 1* lists the risk-free rates applied by currency.

The annualized geometric mean of these excess returns is known as Morningstar Return.

$$[5] \quad \text{Morningstar Return} = \left[\prod_{t=1}^T (1 + ER_t) \right]^{\frac{12}{T}} - 1$$

where

T = number of months in the period (for example, 36, 60, or 120 for three, five, or 10 years)

Morningstar Risk-Adjusted Return

Next, Morningstar adjusts for risk. Morningstar uses expected utility theory (described in *Appendix 3*) to model how investors trade off return and risk. Morningstar Risk-Adjusted Return is the guaranteed return that provides the same level of utility to the investor as the specific combination of returns exhibited by the fund.

The formal equation for Morningstar Risk-Adjusted Return, equation [16] in *Appendix 3*, uses the parameter “gamma” to describe the model investor’s sensitivity to risk. Morningstar sets that value equal to 2, so Morningstar Risk-Adjusted Return is calculated as follows:

$$[6] \quad MRAR(2) = \left[\frac{1}{T} \sum_{t=1}^T (1 + ER_t)^{-2} \right]^{-\frac{12}{2}} - 1$$

The section inside the brackets determines the investor’s average utility from this fund’s monthly excess returns over 36, 60, or 120 months. Then, that level of utility is converted into a return by taking it to the power of negative one half. Lastly, Morningstar annualizes the result by taking it to the power of 12.

Morningstar Risk

Because MRAR is expressed as an annualized return, we can derive a risk component, Morningstar Risk, as the difference between Morningstar Return (adjusted for the risk-free rate) and MRAR (adjusted for the risk-free rate and risk). This can be expressed as equation [18], which is derived in *Appendix 3*.

$$[18] \quad \text{Morningstar Risk} = MRAR(0) - MRAR(2)$$

Morningstar Risk is always greater than or equal to zero.

The Morningstar Rating: Three, Five, and 10 Year

The Morningstar Rating is based on Morningstar Risk-Adjusted Return, using Morningstar Risk-Adjusted Return % Rank for funds in a category. Morningstar calculates ratings for the three-, five-, and 10-year periods, and then the overall Morningstar Rating is based on a weighted average of the available time-period ratings.

Three-, Five-, and 10-Year Ratings

Investments must have at least 36 continuous months of total returns in order to receive a rating. For each time period (three, five, and 10 years), Morningstar ranks all funds in a category using Morningstar Risk-Adjusted Return, and the funds with the highest scores receive the most stars. A fund’s peer group for the three-, five-, and 10-year ratings is based on the fund’s current category. That is, there is no adjustment for historical category changes in the three-, five-, and 10-year ratings.

Morningstar rates each share class of a portfolio separately because each share class has different fees and total return time periods available. However, the distribution of funds among the star ratings depends on the number of portfolios evaluated within the category rather than the number of share classes. This policy prevents multi-share class funds from taking up a disproportionate amount of space in any one rating level. Please refer to the [Morningstar Absolute Ranks, Percentile Ranks, and Fractional Ranks methodology](#) document for more information on how Morningstar incorporates fractional weights into percentile ranks so that star ratings are based on distinct portfolios not distinct share classes.

Morningstar sets the distribution of funds across the rating levels, assigning three-year star ratings as follows:

- 1) All funds in the category are sorted by three-year MRAR % Rank in descending order.
- 2) Starting with the highest MRAR % Rank, those funds with a rank that meets but does not exceed 10% receive a 5-star rating.
- 3) Funds with a rank that meets but does not exceed 32.5% receive a 4-star rating.
- 4) Funds with a rank that meets but does not exceed 67.5% receive a 3-star rating.
- 5) Funds with a rank that meets but does not exceed 90% receive a 2-star rating.
- 6) The remaining funds receive 1 star.

If the data is available, five-year ratings are assigned using 60 months of data, and 10-year ratings are assigned using 120 months of data.

Morningstar Return and Morningstar Risk Rating

Morningstar uses the same bell curve and rating procedure above to assign scores for Morningstar Return and Morningstar Risk for three, five, and 10 years. Funds are scored from 1 to 5, and these scores are typically expressed as word labels in Morningstar products as shown in Exhibit 3.

Exhibit 3 Morningstar Risk and Return Rating Legend

Score	Percent	Word Label
5	Top 10%	High
4	Next 22.5%	Above Average
3	Next 35%	Average
2	Next 22.5%	Below Average
1	Bottom 10%	Low

The word label High is generally good for Morningstar Return and Low is generally good for Morningstar Risk.

The Morningstar Return Score and Morningstar Risk Rating are helpful when funds have the same rating and similar MRARs but different levels of risk. All of the funds in Exhibit 4 got 3 stars and Average Morningstar return, but they took very different levels of risk to achieve that rating.

Exhibit 4 Different Levels of Risk Achieve the Same Rating

Name	Morningstar Rating 3 Yr	Morningstar Risk-Adj Return 3 Yr	Morningstar Return 3 Yr	Morningstar Return Rating 3 Yr	Morningstar Risk 3 Yr	Morningstar Risk Rating 3 Yr
Fund 1	3	23.45	26.48	Average	3.03	Above Avg
Fund 2	3	23.15	25.05	Average	1.91	Average
Fund 3	3	22.52	24.29	Average	1.78	Below Avg
Fund 4	3	21.28	23.84	Average	2.57	Average
Fund 5	3	20.72	21.64	Average	0.92	Low

Ratings Curve and Ratings Overlay

Morningstar peer groups at times contain multiple legal structures and vehicle types. In many markets there are several different legal vehicle types that are ready substitutes for one another despite technical differences. For example, in Europe many retail funds are structured as Fond common du placement, a partnership structure, rather than SICAV, or open-end investment company; the differences are highly technical and will rarely have an impact on the investor's choice. Therefore, we consider both legal structures open-end funds. Similarly, Morningstar now considers exchange-traded funds to be direct substitutes for open-end funds. This treatment has been in place in many regions since 2007 but was first applied to the United States in 2016, after using an overlay since March 2006.

In some situations, fund products are managed similarly but have a wrapper or structure that makes them poor substitutes. In these cases, Morningstar calculates the MRAR for the primary category peer group and assigns star ratings based on the above ranking calculations. The highest MRAR for each rating is mapped as a breakpoint for other investment types. The MRAR of the substitute product is then mapped to the primary group's breakpoints and assigned a star rating based on an overlay. This is applied to limited distribution collective U.S. investment trusts, as well as extended performance for open-end funds.

The Overall Morningstar Rating

An overall star rating for each fund is based on a weighted average (rounded to the nearest integer) of the number of stars assigned to it in the three-, five-, and 10-year rating periods as shown in Exhibit 5.

Exhibit 5	Overall Rating Weightings
Months of Total Returns	Overall (Weighted) Morningstar Rating
36-59	100% three-year rating
60-119	60% five-year rating 40% three-year rating
120 or more	50% 10-year rating 30% five-year rating 20% three-year rating

For example, the weighted average of the ratings in Exhibit 6 is 2.5, and this rounds up to an overall rating of 3 stars.

Exhibit 6 Example Overall Calculation

Period	Rating	Weight %	Contribution
10-year	3	50	1.5
Five-year	2	30	0.6
Three-year	2	20	0.4
Total			2.5

While the 10-year overall star rating formula seems to give the most weight to the 10-year period, the most recent three-year period actually has the greatest impact because it is included in all three rating periods.

Appendix 1: Risk-Free Rates Applied by Currency

Currency	Risk-Free Rate
Australian Dollar	RBA Bank accepted Bills 90 Days
Brazilian Real	Brazil CDI
Canadian Dollar	Morningstar CAD O/N Cash GR CAD
Chilean Peso	Chile PDBC 30-Day Monthly
Chinese Yuan Renminbi	RMB 3-month Lump-Sum Deposit
Danish Krone	Morningstar DKK 1M Cash GR DKK
Euro	Morningstar EUR 1M Cash GR EUR
Hong Kong Dollar	Morningstar HKD 1M Kong Cash GR HKD
Indian Rupee	FBIL MIBOR Overnight
Indonesian Rupiah	Morningstar IDR 1M Cash GR IDR
Japanese Yen	Morningstar JPY 1M Cash GR JPY
Malaysian Ringgit	Morningstar MYR 1M Cash GR MYR
Mexican Peso	Cat 80%IMF Mexico T-Bill&20%Pip CETES
New Israeli Shekel	Israel T-Bill 3-Month
New Zealand Dollar	NZ 90 Day Treasury Bills Issue Rate
Norwegian Krone	Morningstar NOK 1M Cash GR NOK
Singapore Dollar	Morningstar SGD O/N Cash GR SGD
South African Rand	Morningstar ZAR 1M Cash GR ZAR
South Korean Won	KBP CD
Swedish Krona	Morningstar SEK 1M Cash GR SEK
Swiss Franc	Morningstar CHF 1M Cash GR CHF
Thai Baht	Thailand 91-day T-bill
U.K. Pound Sterling	Morningstar GBP 1M Cash GR GBP
U.S. Dollar	USTREAS T-Bill Auction Ave 3 Mon

Appendix 2: Star Ratings for Separately Managed Accounts and Models

SMA and models must pass certain guardrails to receive star ratings. The guardrails help ensure that rated SMA and model peer groups meet a high standard of transparency and verification across their holding and return profiles. Both universes receive star ratings on a quarterly basis with a one-month lag. The model universe is rated using an overlay against the SMA peer-group breakpoints. SMAs and models are rated only in the United States currently.

Requirements for SMAs and models to receive star ratings are as follows:

Separately Managed Accounts

- 1) Consecutive monthly returns for any of the applicable standard rating periods (three, five, or 10 years).
- 2) Must have at least one representative portfolio.
- 3) Provider firm must be GIPS-compliant (<https://www.gipsstandards.org/>).

Models

- 1) Consecutive monthly returns for any of the applicable rating periods.
- 2) Quarterly holdings for each star rating period. (The last quarter-end portfolio is not required for that production period.)
- 3) Provider firm must be GIPS-compliant OR the provider must have \$10 billion-plus in 1940 Act-regulated vehicles.
- 4) Only 18 months of pre-activation performance will be allowed for star rating calculation. Examples of this guardrail are as follows:
 - A) For Production Schedule January 2022 (Using MRAR data ended 12/31/2021): Model A submitted five years' worth of pre-activation performance and was activated in our database on 7/1/2020. It is now eligible to receive a star rating as the 18-month pre-activation performance plus the 18-month post-activation performance satisfy the 36-month requirement.
 - B) For Production Schedule January 2022 (Using MRAR data ended 12/31/2021): Model B submitted 20 years' worth of pre-activation performance and was activated in our database on 9/1/2020. It is not eligible to receive a star rating as the 18-month pre-activation performance plus the 16-month post-activation performance do not satisfy the 36-month requirement.
- 5) Models may receive an exception to the 18-month rule if a model is tied to a rated SMA by Morningstar StrategyId. In this case, a model's performance back to the start date of the SMA is allowed. An example of this guardrail is as follows:
 - A) In the above example 4B, if that model is tied by StrategyId to a rated SMA with an inception date of 1/1/2001, the model would be eligible for a three-, five-, and 10-year star rating for January 2022 production.

Appendix 3: Expected Utility Theory

Expected Utility Theory

Morningstar Risk-Adjusted Return is motivated by expected utility theory, according to which an investor ranks alternative portfolios using the mathematical expectation of a function (called the utility function) of the ending value of each portfolio. This is a helpful framework to model decision-making under uncertainty.

Let W be the ending wealth within a portfolio being considered and $u(\cdot)$ be the investor's utility function. The expected utility of the portfolio is $E[u(W)]$.

The form of the utility function that is used often in portfolio theory has the following characteristics:

- 1) More expected wealth is always better than less expected wealth. This means that the utility function must always be positively sloped, so $u'(\cdot) > 0$.
- 2) The utility function must imply risk aversion, and risk is always penalized. The investor prefers a riskless portfolio with a known end-of-period value to a risky portfolio with the same expected value. For example, a fund that produces a steady 2% return each month is more attractive than a fund that has volatile monthly returns that average out to 2% per month. This can be written as:

$$[7] \quad u(E[W]) > E[u(W)]$$

From probability theory, it follows that this can be true only if $u(\cdot)$ is everywhere a concave function, so $u''(\cdot) < 0$.

- 3) No particular distribution of excess returns is assumed. Expected utility theory does not rely on any assumptions about whether a fund's returns distribution, other than that it be well-behaved, is normally or lognormally distributed. This is in contrast to other measures of risk-adjusted return that use standard deviation or variance as the main measure of risk. While many funds' returns are approximately lognormally distributed, utility theory will also work for those that are not, such as funds that use extensive options strategies.
- 4) The investor's beginning-of-period wealth has no effect on the ranking of portfolios. It is reasonable to assume that the investor's risk aversion does not change with the level of investor wealth--that is, those more-wealthy individuals are not universally more or less risk-averse than less-wealthy individuals. Individuals with the same attitudes toward risk and the same opportunity set will choose the same investments, regardless of their level of wealth.

One form of a utility function that has these characteristics and that is used often in portfolio theory is called "constant relative risk aversion." Relative risk aversion, or RRA, describes the degree to

which wealth affects an investor's level of risk aversion, and this is measured based on the shape of the utility function with respect to wealth:

$$[8] \quad RRA(W) = -\frac{Wu''(W)}{u'(W)}$$

By assuming that RRA is a constant value (that is, the level of wealth will not change the investor's attitude toward risk), the equations for the utility function can be written as follows:

$$[9] \quad u(W) = \begin{cases} -\frac{W^{-\gamma}}{\gamma} & \gamma > -1, \gamma \neq 0 \\ \ln(W) & \gamma = 0 \end{cases}$$

where: γ is a parameter that describes the degree of risk aversion, specifically $RRA(\cdot) = \gamma + 1$.

Because end-of-period wealth (W) is a function of beginning wealth and total return, these equations can be rewritten as follows, where there is a certain level of utility associated with each level of total return.

$$[10] \quad u(W_0(1 + TR)) = \begin{cases} W_0^{-\gamma} u(1 + TR) & \gamma > -1, \gamma \neq 0 \\ \ln(W_0) + u(1 + TR) & \gamma = 0 \end{cases}$$

where:

W_0 = beginning-of-period wealth

TR = total return on the portfolio being evaluated so that $W = W_0(1 + TR)$

The value of W_0 does not affect the curvature of utility as a function of TR , and so it does not affect how the investor ranks portfolios.

Degree of Risk Aversion

Gamma (γ) represents the degree of risk aversion. In theory, it can be any number of value.

When γ is less than negative 1, the investor is risk-loving, rather than risk-averse. This investor might be indifferent between a steady fund that always earns 2.5% each month and a volatile fund that is expected to earn 2% on average each month. This investor likes risk.

When γ is negative 1, the degree of risk aversion is zero, meaning that the investor is indifferent between a riskless choice and a risky choice as long as the arithmetic average expected return is the same. This investor is indifferent between a steady fund that always earns 2% per month and a volatile fund that is expected to earn 2% on average (for example, equal likelihood of negative 4%, 2%, or 8% each month), even though the volatile fund could lose money.

When γ is 0, the investor is indifferent between a riskless choice and a risky choice as long as the geometric average expected return is the same. This investor is indifferent between a steady fund that

always earns 1.88% and a volatile fund expected to earn 2% on average, with an equal likelihood of negative 4%, 2%, or 8% each month. (The geometric average of those volatile expected returns is 1.88%.) An initial investment in either portfolio is expected to grow to the same amount after one year.

The risk premium is the amount of extra expected return demanded by the investor to compensate for the possibility of losing money in the risky portfolio versus the riskless portfolio. When γ is 0, this investor requires a risk premium of 0.12% per month, the difference between the arithmetic average return of the risky portfolio and the riskless return. In this case, the riskless return is the same as the geometric average return.

When γ is greater than 0, the investor demands a larger risk premium for choosing the risky portfolio. Specifically, the risk premium must be larger than the difference between the arithmetic and geometric average returns. With $\gamma=2$ the investor is indifferent between a steady fund that always earns 1.65% per month and the volatile fund above that is expected to earn 2% on average, with equal likelihood of obtaining negative 4%, 2%, or 8% each month. In this case, the risk premium is 0.35% per month.

In practice, most models assume investors are risk-averse and therefore, γ must be greater than negative 1.

Morningstar's Formulation of Utility Theory

Morningstar uses expected utility theory with a few specific conditions as the basis for Morningstar Risk-Adjusted Return. Morningstar recognizes that the investor always has a choice to buy a risk-free asset instead of holding a risky portfolio. Therefore, Morningstar measures a fund's excess returns over and above the risk-free rate (RF). In comparing risky portfolios to the risk-free asset, we assume that the investor initially has all wealth invested in the risk-free asset and beginning-of-period wealth is such that end-of-period wealth, so invested, will be USD 1.

Hence:

$$[11] \quad W_0 = \frac{1}{1+RF}$$

The utility function can be restated in terms of total return (TR), the risk-free rate (RF), and geometric excess returns (ER) as follows:

$$[12] \quad u(W_0(1 + TR)) = u\left(\frac{1+TR}{1+RF}\right) = u(1 + ER) = \begin{cases} -\frac{(1+ER)^{-\gamma}}{\gamma} & \gamma > -1, \gamma \neq 0 \\ \ln(1 + ER) & \gamma = 0 \end{cases}$$

where:

$$[13] \quad ER = \text{the geometric excess return} = \frac{1+TR}{1+RF} - 1$$

Applying expected utility theory to risk-adjusted return implies that it is possible to quantify how investors feel about one distribution of returns versus another. A return distribution with high expected return and low risk is preferable to one with low expected return and high risk. But investors typically face a trade-off between risk and return. At some point, the level of risk becomes too high, and the investor is willing to settle for a lower expected return to reduce risk. (Or, the level of expected return becomes too low, and the investor is willing to take on more risk in order to potentially achieve higher returns.)

Morningstar uses expected utility theory to determine how much return a model investor is willing to trade off, reducing the risk of loss. Morningstar Risk-Adjusted Return measures the guaranteed riskless return that provides the same level of utility to the investor as the variable excess returns of the risky portfolio. We call this riskless return the “certainty equivalent” geometric excess return.

For example, an investor might be indifferent between a moderately risky fund generating 12% return (what we observe) and a riskless fund generating 8% return (as determined by the utility function). In that case, the investor is willing to give up 4% in return in order to remove the risk. By converting all return series to their riskless equivalents, Morningstar can compare one fund with another on a risk-adjusted basis. This equalizes the playing field for funds in the same category that have different exposures to risk factors.

Let $ER^{CE}(\gamma)$ denote the certainty equivalent geometric excess return for a given value of γ . The following formula states that the level of utility is the same between the certainty equivalent geometric excess return and the expected excess returns of the fund:

$$[14] \quad u(1 + ER^{CE}(\gamma)) = E[u(1 + ER)]$$

Hence,

$$[15] \quad 1 + ER^{CE} = \begin{cases} (E[(1 + ER)^{-\gamma}])^{-\frac{1}{\gamma}}, & \gamma > -1, \gamma \neq 0 \\ e^{E[\ln(1+ER)]}, & \gamma = 0 \end{cases}$$

Morningstar defines Morningstar Risk-Adjusted Return, $MRAR(\gamma)$, as the annualized value of the certainty equivalent, ER^{CE} , using the time-series average of $(1 + ER)^{-\gamma}$ as an estimate of $E[(1 + ER)^{-\gamma}]$. That is, Morningstar uses historical excess returns as the basis for expected excess returns rather than relying on analysts’ forecasts or other probabilities of future returns.

With $\gamma \neq 0$, Morningstar Risk-Adjusted Return is defined as follows:

$$[16] \quad MRAR(\gamma) = \left[\frac{1}{T} \sum_{t=1}^T (1 + ER_t)^{-\gamma} \right]^{\frac{12}{\gamma}} - 1$$

where:

$$ER_t = \text{the geometric excess return in month } t = \frac{1+TR_t}{1+RF_t} - 1$$

$$TR_t = \text{total return for the fund in month } t$$

RF_t = return for the risk-free asset in month t

T = the number of months in the time period

When $\gamma = 0$, $MRAR$ is the annualized geometric mean of the excess returns:

$$[17] \quad MRAR(0) = \left[\prod_{t=1}^T (1 + ER_t) \right]^{\frac{12}{T}} - 1$$

A rating system based solely on performance would rank funds on their geometric mean return, or equivalently, $MRAR(0)$ or Morningstar Return. A rating system that provides a heavier penalty for risk requires that $\gamma > 0$.

Morningstar's analysts have concluded that $\gamma = 2$ results in fund rankings that are consistent with the risk tolerances of typical retail investors. Hence, Morningstar uses a γ equal to two in the calculation of its star ratings.

Because $MRAR$ is expressed as an annualized return, it can be decomposed into a return component, Morningstar Return or $MRAR(0)$, and a risk component, Morningstar Risk. Morningstar Risk is calculated as Morningstar Return – Morningstar Risk-Adjusted Return, or:

$$[18] \quad \text{Morningstar Risk} = MRAR(0) - MRAR(2)$$

Illustration of the Utility Function

Morningstar uses a utility function to model how investors trade off return and risk. It follows the form:

$$[19] \quad U = z + w(1 + ER)^{-\gamma}$$

where:

U = the model investor's utility or satisfaction from each monthly return

z = any number

w = any negative number

ER = the monthly geometric excess return for the fund (adjusted for the risk-free rate)

γ = a parameter that expresses an investor's sensitivity to risk

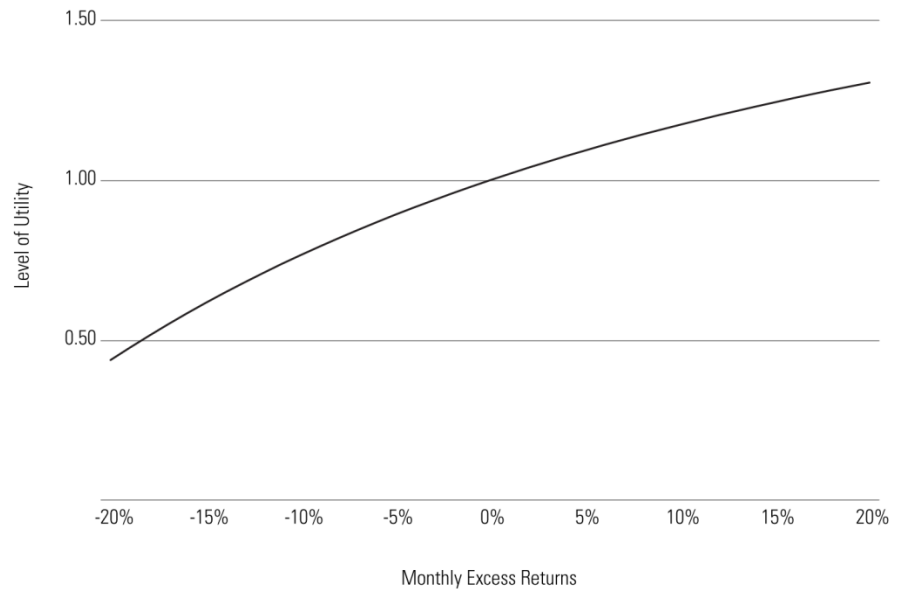
As stated earlier, Morningstar sets $\gamma = 2$ to illustrate a model investor's sensitivity to risk. With $z = 2$ and $w = -1$, the utility function looks like this:

$$[20] \quad U = 2 - (1 + ER)^{-2}$$

Investors have a certain level of utility or satisfaction for each level of monthly return. The utility function can be graphed as shown in Exhibit 7.

Exhibit 7 Investor's Utility Function

Investor's Utility Function



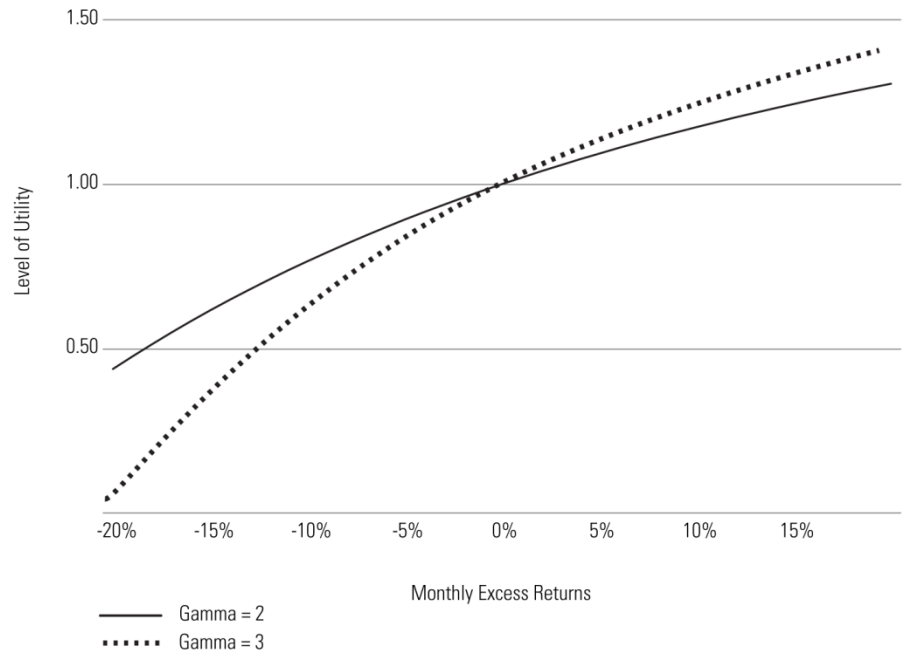
The model investor's utility function is concave, and there is decreasing marginal utility as returns increase. It is steeper for negative returns and starts flattening out for positive returns, and this puts more emphasis on downside variation.

Investors don't like to lose money and they experience more dissatisfaction with negative returns than satisfaction with positive returns. Moving from negative 20% to 0% produces a gain in utility of about 0.60, but moving from 0% to 20% only produces a gain in utility of about 0.30 in this example. When Morningstar averages the level of utility across many months for a fund, lower returns have much lower levels of utility or satisfaction, and this brings down the average.

If Morningstar used a higher value for γ to indicate a higher sensitivity to risk, the utility function would be even more concave, thereby giving greater penalties for downside variation. The dotted line in Exhibit 8 represents the utility function with $\gamma = 3$.

Exhibit 8 Investor's Utility Function

Investor's Utility Function



Morningstar plots the fund's monthly geometric excess returns on this utility curve and then determines the average level of utility provided by this particular combination of returns. See Exhibit 9. Morningstar then determines the level of monthly return (with no risk) that provides that same level of utility as the risky fund. This is called the certainty equivalent geometric excess return, which is the monthly expression of Morningstar Risk-Adjusted Return.

The average level of utility is converted into a return with the following equations, which are just versions of equations [19] and [20]. Because these equations subtract z and divide by w (the variables we previously added and multiplied), any values can be chosen for z and any negative values can be chosen for w .

$$[21] \quad ER = \left[\frac{1}{w} (U - z) \right]^{-\frac{1}{\gamma}} - 1$$

$$[22] \quad ER = [-(U - 2)]^{-\frac{1}{2}} - 1$$

Exhibit 9 Investor's Utility Function

Investor's Utility Function

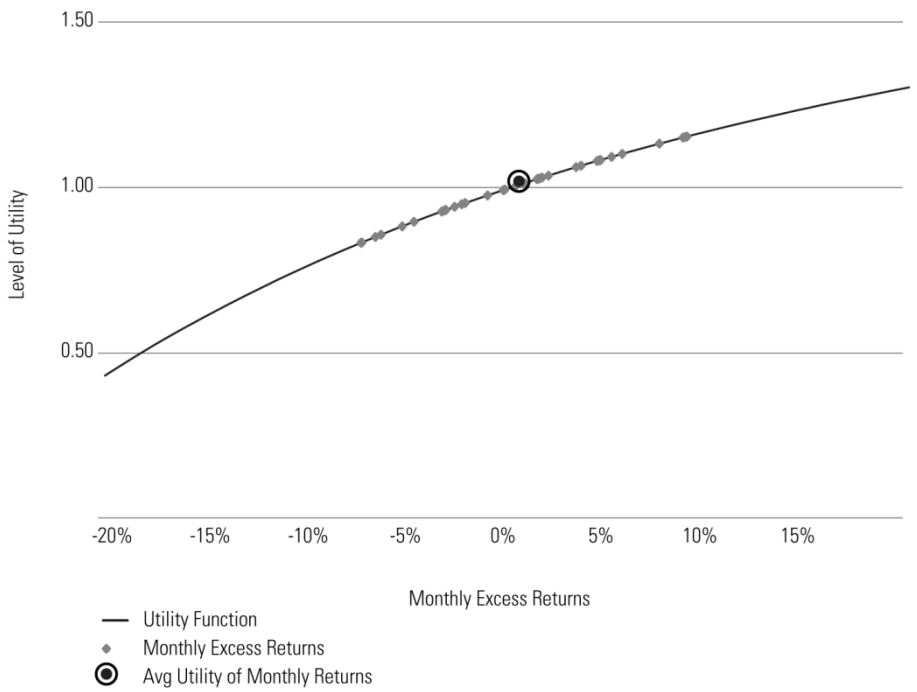
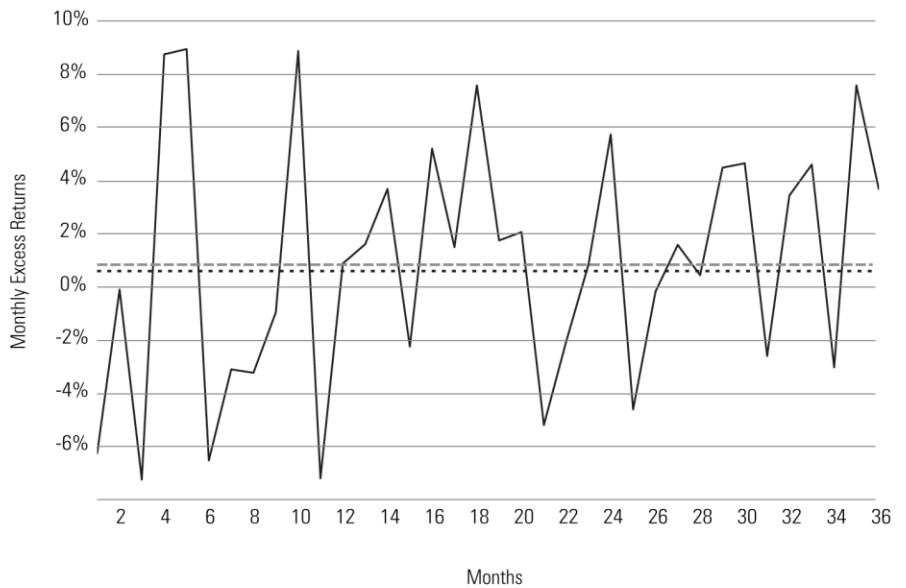


Exhibit 10 illustrates the monthly excess returns of the sample fund from the previous page. The arithmetic average of these monthly returns is 0.92%, and the geometric average monthly return is 0.81% per month. The average level of utility for this fund's 36 monthly excess returns is 1.012, and the certainty equivalent geometric excess return is 0.60% per month. The certainty equivalent return is less than the arithmetic or geometric averages because we set $\gamma = 0$. This investor is demanding a risk premium of 0.32% per month to invest in the risky portfolio.

Exhibit 10 Volatile Monthly Returns and Certainty Equivalent

Volatile Monthly Returns and Certainty Equivalent



		Monthly	Annual
—	Monthly Excess Returns		
- - - -	Average Excess Return	Morningstar Return	0.81% 10.20%
.	Certainty Equivalent	Morningstar Risk-Adjusted Return	0.60% 7.40%

The monthly 0.81% geometric excess return is annualized as a Morningstar Return of 10.20%. The 0.60% certainty equivalent is annualized as a Morningstar Risk-Adjusted Return of 7.40%. Morningstar Risk is the difference between Morningstar Return and MRAR, or 2.80% in this case. Morningstar Risk represents how much return the model investor is willing to give up to eliminate risk in the portfolio.

Data Content History

Date	Description
June 30, 2023	Version 1.0 Data Content Guide created from methodology paper.
Feb. 28, 2023	Risk-free rate indexes for Canada, Denmark, eurozone, Hong Kong, Malaysia, Norway, Sweden, and Switzerland updated as of October 2021.
	Risk-free rate indexes for Indonesia, Japan, Singapore, South Africa, and United Kingdom updated as of April 2022.
Oct. 31, 2016	Removed load adjustment from star ratings calculations in the United States and Europe.
	Removed load-waived hypothetical share classes from the ratings.
	Merged U.S. exchange-traded funds and open-end funds as a single population for comparison and eliminated the overlay.
	Removed similarity matrix for overall rating with category changes.
	Merged methodology with the Ibbotson Stars in Japan.
Oct. 31, 2006	Europe: Introduced five-year and 10-year ratings and an overall rating that is based on a weighted average of the three-year, five-year, and 10-year ratings. Started to apply deferred loads and redemption fees to risk-adjusted return calculation.
Sept. 30, 2006	Released a new version of the methodology document that is more appropriate for a global audience.
	The U.S. calculations did not change. Also, the document was revised in order to offer more explanations on certain topics and to clarify the order of the calculations. Added rating suspension policy.
March 1, 2006	United States: Began rating exchange-traded funds by overlay on open-end funds.
July 31, 2006	United States: Minor changes implemented. Removed the function that rounded variables n1-n5 (the rating breakpoints) to integers. Changed the logic for assigning ratings to look for all funds up to but not exceeding each breakpoint, instead of all funds reaching or just exceeding each breakpoint.
June 30, 2002	United States: Implemented significant enhancements to the rating, including category peer groups, fractional weights for multi-share class funds, category change adjustment, and more-robust risk-adjustment process (Morningstar Risk-Adjusted Return).
March 31, 2001	Europe: Introduced three-year (=overall) Morningstar Rating based on category peer groups.
1985	United States: Introduced Morningstar Rating (three-year, five-year, 10-year, overall) based on broad asset-class peer groups.

Frequently Asked Questions

Why do some share classes not have a Morningstar Rating?

There are several possible reasons. Share classes that are restricted to certain investors will not be rated. They may be offered under a different offering document than a prospectus, which means that they can only be purchased by investors that are qualified to invest in them (the qualifications vary by jurisdiction). In Canada and Australia, share classes where the management fee is negotiated with the investor and paid directly by the investor are not rated.

Sometimes it's the entire fund, not just a share class that is not rated. The most likely reason, if the fund isn't restricted, is that the fund is in a category that is not rated. Such categories are typically made up of funds that are not comparable to each other. This includes money market funds. See the discussion on Category Peer Groups in the *Inputs/Sources/Timing* section for more details.

The fund may be an investment type that Morningstar doesn't rate, such as hedge funds or New Zealand exchange-traded funds.

The share class may not have 36 months of continuous returns yet, the shortest rating period, or the 36 months includes a period of dormancy (the inception date of the share class may be more than 36 months ago, but the performance start date would be reset to when the dormancy ends). However, at the fund level, a nonrestricted fund that has more than three years of returns in a rated category may still not have a rating. This is most likely caused by a major change in its investment strategy. This would be tagged as a significant restructure, which essentially resets the rating clock. Three years after the restructure date the fund will be eligible for a three-year rating and overall rating. See the *Ratings Suspension* section in the *Limits/Exceptions* section for more details.

Finally, the fund may not have submitted its price and distribution data in time to be included in the calculation. See the *Inputs/Sources/Timings* section for more information.

The methodology says that there should be as many 1-star funds as 5-star funds, and as many 2-star funds as 4-star funds, yet when I count them, this is often not the case. Why is this?

This may be due to several different reasons, depending on whether the rating is based upon a single period or is the overall rating.

When talking about **ratings in a single rating period**, such as the 3-Year Morningstar Rating, the reason is because of fractional weighting. To be precise, we shouldn't be referring to funds when we are talking about star ratings, but rather share classes of funds. This is because not all share classes of a fund will necessarily receive the same star rating. Multiple share classes exist to serve the needs of different classes of investors. There can be many differences between share classes, such as differing minimum and ongoing investment amounts, whether there are commissions or other charges, or other purchase qualifications. All of them will likely result in a different cost as captured in expense ratios and other ongoing charges. These fees will result in different monthly rates of returns for the various share

classes of the fund. This will result in different Morningstar Risk Adjusted Returns, or MRARs, for each share class, and once they receive a percentile ranking, they may end up on different sides of the breakpoints for the five rating bands. See the *Calculation Description* section for more details.

Just because the various share classes of a fund can have different star ratings is itself not the reason that you have observed different number of stars between rating bands; but rather it is the reason why we must talk about ratings for share classes not funds. This focus on share classes instead of funds is important because not all funds have the same number of share classes. There is no real limit to how many share classes a fund can have, so a fund with dozens of share classes (which is very possible) could have an advantage if all share classes are counted equally. For example, in a hypothetical category of 10 funds where nine of the funds have only one share class each and the tenth fund has nine share classes, there are a total of 18 share classes. The fund with nine share classes represents 50% of the category on the basis of share classes. Using fractional weighting, each fund has a weight of one, and funds with more than one share class share that weight of one across all their share classes. In our example, each of the nine share classes of the 10th fund would have a weight of one ninth. Fractional weighting prevents multi-share class funds from taking up a disproportionate amount of space in any rating level. The distribution of funds across the five rating bands is done on the basis of the percentage of funds, not on the basis of the percentage of share classes. Please refer to the [Morningstar Absolute Ranks, Percentile Ranks, and Fractional Ranks methodology](#) document for more information on how Morningstar incorporates fractional weights into percentile ranks so that star ratings are based on distinct portfolios not distinct share classes.

On the other hand, when talking about **the overall rating**, the percentage distribution of the five rating bands is not used to determine the overall rating. See the subsection *The Overall Morningstar Rating* in the *Calculation Description* section. The overall rating for a fund is a weighted combination of its ratings for each of the three rating periods as described in Exhibit 5. Exhibit 6 shows an example. Not all funds have ratings for all three rating periods, so the overall rating for a fund is dependent on multiple factors, namely how many rating periods they have and what those ratings are. The resulting overall ratings will almost certainly not follow the same symmetrical distribution as each of the three rating periods, because the symmetrical distribution is not used to calculate the overall rating.

I see reports that show the stars as outlines, whereas everywhere else they are displayed as solid stars. What do they mean?

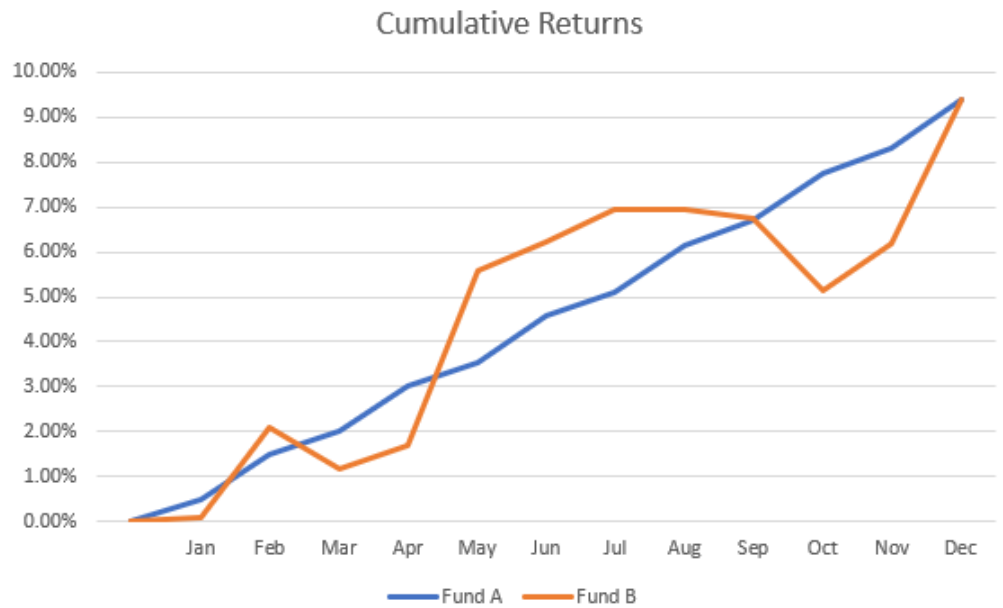
The hollow stars indicate that the Morningstar Rating was calculated using extended performance history. The extended performance capability lengthens the performance data that is available to younger investments by linking it to eligible share classes back to the oldest share class, active or inactive. If any portion of one of the three rating periods consists of extended performance, the star rating for that period is displayed as a hollow star. This applies to the U.S. market only. Please refer to the [Morningstar Extended Performance methodology](#) document for an explanation of the circumstances under which Morningstar considers funds eligible for extended performance, and how the calculation is performed. For the star rating calculation, extended performance is used the same way that actual returns are used to derive the Morningstar Risk Adjusted Return, or MRAR. However, instead of ranking

the MRAR against the MRARs of the other fund share classes in the category directly, it is evaluated against the MRAR breakpoints for the peer group to arrive at the star rating. That star rating is then displayed as a hollow star instead of a solid star. See the *Ratings Curve and Ratings Overlay* section of the *Calculation Description* section for more details about overlays.

Why would two funds with the same returns not have the same Morningstar Rating?

If the Morningstar Ratings of the two funds are not the same, the two funds must have different Morningstar Risk-Adjusted Returns. Looking at a very simple example that covers 12 months for two funds with identical cumulative 12-month returns in Exhibit 11, Fund A has more consistent monthly returns than Fund B (the actual minimum period required to receive a star rating is 36 months, but 12 months is sufficient to demonstrate what happens).

Exhibit 11



MRAR is calculated using equation [16] found in *Appendix 3*. Remember that Morningstar has determined that the value of γ , representing the investor’s level of risk aversion, is 2. This means that equation [16] becomes:

$$[23] \quad MRAR(2) = \left[\frac{1}{12} \sum_{t=1}^{12} (1 + ER_t)^{-2} \right]^{-6} - 1$$

Exhibit 12 shows the calculation of MRAR for the two funds:

Exhibit 12

MRAR

	Monthly Returns		(1+return) ⁽⁻²⁾		
	Fund A	Fund B	Fund A	Fund B	
Jan	0.50%	0.10%	0.9901	0.9980	
Feb	1.00%	2.00%	0.9803	0.9612	
Mar	0.50%	-0.90%	0.9901	1.0182	
Apr	1.00%	0.50%	0.9803	0.9901	
May	0.50%	3.82%	0.9901	0.9277	
Jun	1.00%	0.60%	0.9803	0.9881	
Jul	0.50%	0.70%	0.9901	0.9861	
Aug	1.00%	0.00%	0.9803	1.0000	
Sep	0.50%	-0.20%	0.9901	1.0040	
Oct	1.00%	-1.50%	0.9803	1.0307	
Nov	0.50%	1.00%	0.9901	0.9803	
Dec	1.00%	3.00%	0.9803	0.9426	
Cumulative Return	9.38%	9.38%			
			Sum	11.8222	11.8270
			Sum/12	0.9852	0.9856
			((Sum/12) ⁽⁻⁶⁾ -1 is MRAR	9.37%	9.10%

Fund A has delivered very consistent returns. Its MRAR of 9.37% is very close to its cumulative return of 9.38%, while the returns of Fund B have varied considerably, resulting in a lower MRAR of 9.10%. The rank of Fund A will be higher than that of Fund B.

Having different MRARs doesn't necessarily mean that the star ratings of the two funds must be different, but it does mean that their percentile ranking will be different. And depending on where the breakpoints are for the rating bands, they could end up having different star ratings if the breakpoint value is between the MRARs of the two funds.

In Canada, fund company marketing material that displays Morningstar Ratings also includes a one-year rating. Why is this? How is it calculated?

This is a requirement from the regulators of the fund industry in Canada. National Instrument 81-102 Investment Funds governs the operation of mutual funds offered under a prospectus. Regulatory documents can be obtained from the websites of any of the provincial or territorial securities regulators (for example, see the Securities Law section of the Ontario Securities Commission at <https://www.osc.ca/en>). Part 15.3(4)(b) and (c) of NI 81-102 state that ratings or rankings must be displayed for the same periods as standard performance. Part 15.8(2)(a) states that standard performance shall be reported over 10-, five-, three-, and one-year periods.

Morningstar uses the same methodology to calculate the one-year rating as it does for the three-year, five-year, and 10-year periods, except that it is over 12 months. The one-year rating is not used in the

calculation of the overall Morningstar Rating. The one-year rating is only provided to fund companies through the Essentials product, which is used by fund companies that want to license Morningstar Ratings to use in their marketing material. No other product displays the one-year rating, because Morningstar feels that one year is too short a time over which to look at the performance of a fund and to compare with other funds. Three years is the shortest period over which useful insight can be obtained, and longer periods are even more meaningful.

Why does the rating for a fund sometimes suddenly change significantly? I would expect that a fund that lags or leads its category for a while to eventually lose or gain a star, but how can it change by two or more stars in one month?

There are two main reasons for this, and it can be observed in either a single rating period or in the overall rating:

- a) An unusually low or high one-month return drops off the end of the history for one rating period or is added as the latest month, or
- b) a fund that only had a three-year rating has acquired enough return history to be also rated for five years (or also for 10 years), and the weighted combination of the multiple periods significantly affects the overall rating.

In the first situation involving a single rating period, a month in which a significant market event occurred that affects all funds, drops off the end of the history or is added as the latest month. In March 2020, coronavirus lockdowns and the subsequent market turmoil caused all markets to drop significantly. Not all funds were affected by the same amount, as the impact would depend on the returns of the securities in their portfolios. The three-year star ratings calculated as of March 31, 2023, stopped including the return of March 2020, and while there were periods of volatility during the subsequent recovery, nothing matched the market drop in March 2020. Not all funds were impacted equally by the March 2020 returns and all did not recover at the same rate, and therefore they were not impacted equally by excluding that return from their three-year star rating calculation. The same effect can occur on a smaller scale in a single country, region, or even industry sector.

In the second situation, funds gain sufficient return history to receive star ratings for another rating period. When a fund is rated for the three-year period, its overall rating is the same as its three-year rating. But once a fund is rated for more than one period, its overall rating is a weighted combination of its single-period ratings. This is explained in the *Overall Morningstar Rating* section in the *Calculation Description* section. For example, a 59-month-old fund that was receiving a 5-star rating overall due to its three-year 5-star rating, will drop to a 3-star overall rating upon being rated for 60 months if the five-year rating is a single star, losing 2 stars overall. Similarly, a fund that was rated 3 stars for the three-year period and 2 stars for the five-year period would have had an overall rating of 2 stars. If upon being rated for 120 months the fund receives a 5-star rating, the overall rating will jump to 4 stars, gaining 2 stars overall.