MORNINGSTAR®

Calendar Year Category Averages

Morningstar Methodology Paper
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Introduction

Morningstar calendar year category averages measure how a category performed over a specific year while correcting for the effects of survivorship-bias and category changes.

Survivorship bias is the tendency for mutual funds to be excluded from a database or study because they no longer exist. This can happen when a fund is liquidated or merged into another fund. When a fund liquidates, the holdings are sold and the proceeds are distributed to the shareholders. The fund ceases to exist and its historical performance is no longer considered in the calculation of bias category averages. When a fund merges with an existing fund, the 'surviving' fund into which the fund merged keeps its historical performance, and going forward from the merger point the two funds will exist as one. The prior history of the fund that merged is no longer taken into consideration in the calculation of bias category averages. Because of this survivorship-bias effect, bias category averages tend to skew higher than if those 'extinct' funds were included in the historical population. Morningstar calendar year category averages address the effect of survivorship-bias by including obsolete funds in the population for calculating the category average during the historical year when those funds were alive. For example, if a category includes 75 funds for the calendar year of 2000 but only 50 funds are currently active, Morningstar's category average data for 2000 is calculated based on the universe of 75 funds.

Funds change their investing style, when the character of a fund's holdings changes over a sustained period of time, Morningstar reassigns the fund to a category to better reflect its portfolio positioning over the previous three years. Historical calendar year performance is then recalculated to reflect the new category; this is not reflective of the funds investing style in the past. To correct for this, Morningstar calendar year category averages reflect any changes in the funds' category. For example, if a fund was in the large-growth category from 1992-1997 and changed to the large-blend category in 1998, we will measure its historical calendar-year performance against large-growth for 1992-1997. In 1998 and for each year thereafter, the fund will be measured against its new large-blend category.

Morningstar calculates calendar year category averages for open-end mutual funds, exchange-traded funds and closed-end funds in the United States and Europe, as well as, variable annuity underlying funds and sub accounts, hedge funds, separate accounts, custom funds and money market funds based in the United States.

Methodology

Calendar Year Category Averages

The calculation is simply the average of the calendar year returns for all funds (active and obsolete) in a given category. For example, Morningstar calculates a calendar year return for 1997 for the large-growth category by doing a simple arithmetic average of the 1997 calendar year returns for all funds that were assigned to the large-growth category as of 12/31/1997. This can include currently obsolete funds that were active during the 1997 calendar year.

Category Average

$$r_{yc} = \frac{\sum_{i=1}^{n} x_{yi}}{n}$$

Where:

x_{yc}	=	return for category c during year y
x_{yi}	=	return for fund i during year y
n	=	number of funds in category c for year y

Note: For funds with multiple share classes, each share class is counted as a separate "fund" for the purpose of creating calendar year category averages. Morningstar calendar year category averages include every type of share class available in Morningstar's database, (including retail funds, institutional funds, load-waived funds, qualified funds, etc).

Changes to a Fund's Morningstar Category Assignment

In an effort to distinguish funds by what they own, instead of the investment mandate from the prospectus, Morningstar developed the Morningstar Categories. Funds are assigned to categories based on their actual investment styles as measured by their underlying portfolio holdings. Morningstar conducts category reviews for the entire universe of funds semi-annually (May and November). At this time, funds that have changed their investment strategy are reassigned to a category that better agrees with their current style of investing. In addition, Morningstar reviews category assignments for recently-incepted funds on a quarterly basis. Categories for new funds are originally assigned based on the prospectus objective. Once the fund has an adequate number of portfolios, a category may be changed to better reflect how the fund has been investing.

Category changes affect Morningstar calendar year category averages in the following way:

- When a fund has a category change due to a change in investment style, it will be included in the historical calendar year category averages for the old category assignment for the time periods the fund was in the old category and going forward will contribute to category averages for the new category.

- Morningstar will at times add new categories to accommodate new and distinct investment styles that don't fit into any of the existing categories. For example, Morningstar added the long-short and target-date categories in recent years. In these instances, Morningstar's editorial team will determine which funds belong in this new category. Morningstar will calculate historical averages for a new category based on all the constituents in the new category on the day the new category is implemented and based on all obsolete funds that would have fallen into that category had they not gone obsolete (as determined by Morningstar's editorial team). Additionally, Morningstar will recalculate the category averages for those categories that supplied the population for the new category (e.g., many of the funds in the target-date categories used to be in the moderate allocation category), because those categories now contain fewer funds.

- Morningstar will at times delete a category. This can happen when there are not enough funds to populate the category, the investing style has fallen out of favor, or the category is being replaced by multiple categories. When this happens, Morningstar will delete the record for that category. Morningstar will not publish averages for categories that are no longer in use (e.g., Foreign Stock, Domestic Hybrid). Morningstar will recalculate averages for the categories where the funds were transferred after their category was deleted.