

Total Return Index

Morningstar Methodology Paper

Morningstar Research

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The Morningstar Total Return Index is not a conventional index like a passive basket of securities. It is referring to the index level of a fund's total return and is often associated with wealth accumulation such as growth of \$10,000. The Morningstar Total Return Index is calculated at the fund level and represents the value over time of one share purchased and owned since inception, assuming that all dividends and distributions are reinvested. Using the Morningstar Total Return Index, one can easily generate a graph of total performance of a fund, as well as calculate total return for any start date, end date combination.

Methodology

Assumptions

There are three assumptions made in the calculation of the Morningstar Total Return Index:

1. There are no transaction costs, redemption costs and taxes;
2. Distributions are reinvested on the reinvest dates;
3. Daily dividend values are available for daily dividend funds.

For daily dividend funds, their daily dividend values are assumed to be zero if this information is not reported. This situation is very rare, and these funds' dividend distributions will be included upon reinvestment. In such cases, the accuracy level depends on the dividend amount's proportion relative to the net asset value and the number of days since the last dividend distribution.

The frequency of the index is daily. If there is no daily dividend declared on nonprice days, such as weekends and national holidays, the last business day's balance is carried forward.

Total Return Index Calculation Based on Net Asset Value

The Morningstar Total Return Index represents the value of one share purchased and owned since fund inception assuming the reinvestment of all distributions on the reinvest date.

These formulas assume distributions can be compounded.

The calculation is shown in Exhibit 1

Exhibit 1

$$TRI_t = TRI_0 \cdot \frac{(N_t + AD_t) \cdot DF_t}{N_0}$$

$$DF_t = \prod_{i=1}^t \left(1 + \frac{D_i}{ND_i} + \frac{C_i}{NC_i} \right)$$

$$AD_t = \sum_{j=d+1}^t DD_j$$

Exhibit 1 Continued

where

TRI_t = total index return for time period t
 DF_t = distribution factor for time period t
 AD_t = accrued daily dividend, cumulative for time periods $(d + 1)$ to t
 TRI_0 = total return index for the beginning of the period
 N_t = net asset value at time period t
 N_0 = net asset value at the beginning of the period
 D_i = dividend distribution (per share) with reinvest date i
 ND_i = reinvest price of dividend distribution with reinvest date i
 C_i = capital gains distribution (per share) with reinvestment date i
 NC_i = reinvest price of capital gains distribution with reinvest date i
 DD_i = daily dividend rate (per share) on date j , assumed to be zero if information is unavailable for the desired fund
 d = excluding date of the last dividend distribution

If a fund's historical NAV, distributions, and daily dividends are reported in different currencies, these values will be translated to the present currency denomination to maintain historical currency consistency during calculation.

To calculate the Market Total Return Index, the market closing price is used in place of the NAV.

Total Return Index Calculation Based on Total Return

Exhibit 1 calculates a total return index based on the fund's NAV and is applicable in most cases. In situations where funds' total returns are reported but their NAV are not available, the total return index is calculated as follows.

Exhibit 2

$$TRI_t = TRI_0 \cdot (1 + CR_t) = TRI_{t-1} \cdot (1 + R_t)$$

where

TRI_t = total return index on day t
 TRI_0 = total return index at the beginning of the period
 CR_t = total return cumulative from the beginning to day t , expressed in decimal format
 TRI_{t-1} = total return index on day $t - 1$, the day prior to day t
 R_t = total return on day t , expressed in decimal format

If the frequency of the total return is monthly or quarterly, the Total Return Index is updated monthly or quarterly. Intramonth or intraquarter daily values are carried over from the previous update. For example, assume a fund has monthly total returns and no NAV. If the fund's Total Return Index is 125.46 on June 30, the daily Total Return Index will be this same value until July 30. The fund's return for the month of July will be reflected in the July 31 Total Return Index.

Extended Performance Total Return Index

The extended performance methodology lengthens the performance data that are available for the younger investment by “filling in the gap” between the inception date of the new share class or distribution channel and the inception date of the original portfolio. This helps investors see how the portfolio as a whole has performed over time. Please read the Morningstar Extended Performance Methodology for details.

This methodology document focuses on adapting the monthly extended return methodology into the daily format required for Total Return Index calculation. The Total Return Index formula used in extended performance is the same as in Exhibit 4, but the daily extended performance is used instead of the fund's actual daily performance. The daily extended performance is calculated as follows.

Exhibit 3

$$R'_{c,t} = \frac{1 + R_{p,t}}{1 + fd} - 1$$

$$fd = (1 + f_A)^{\frac{1}{12m}} - 1$$

where

$R'_{c,t}$ = extended performance pre-inception daily return for the child on day t , expressed in decimal format

$R_{p,t}$ = the parent fund's historical daily return on day t , expressed in decimal format

f_p = daily fee adjustment factor, expressed in decimal format

f_A = annual fee adjustment factor, expressed in decimal format

m = number of days in the month

As stated in the Morningstar Extended Performance Methodology, if the child fund started in the middle of a month (for example, March 15), Morningstar will use the adjusted parent fund return for the full month, rather than a partial month of adjusted parent returns (March 1-15) plus a partial month of actual child returns (March 15-31). ■■

Methodology Changes

The following is a timeline of significant methodology changes to the Morningstar ranking methodologies.

Date

August 2017

Description

Removal of the sections on category and sector average calculation. These can now be found in the Morningstar Category Average Methodology paper.
