

Estimated Net Cash Flow Methodology

Methodology

Morningstar Research
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Introduction

Morningstar calculates estimated net cash flow for global open-end funds and ETFs, an estimate of the money put in or withdrawn by fund investors, accounting for reinvestment of distributions. We use total net assets and returns as a basis of the calculation. For US-domiciled ETFs, daily shares outstanding are used. Flows are computed monthly and daily, if the data affords it. The disclosure of daily net assets is at the discretion of the fund provider.

Monthly cash flows (months with no distributions)

The cash flow estimate for a month C is the difference in the beginning and ending total net assets TNA that cannot be explained by the monthly total return r .

$$C_t = TNA_t - TNA_{t-1}(1 + r_t)$$

Cash flows (months with distributions)

If the above calculation were used to calculate cash flows for months with distributions then it would assume that 100% of investors reinvested their distributions. This does not represent reality in most cases. By overstating the reinvestment rates, we would be underestimating inflows by attributing asset growth to dividend reinvestment rather than attributing that growth to net new flows. In months in which there is a distribution, Morningstar adds back the distributions (estimated) that were cashed out. The cashed-out distributions were not reinvested so they do not contribute to growth in TNA. Therefore, the growth of TNA should be attributed to net new cash flows.

$$C_t = TNA_t - TNA_{t-1}(1 + r_t) + \left(\left(\frac{TNA_{t-1}}{p_{t-1}} \right) * \sum_{i=1}^t d_i \right) * (1 - b)$$

Where:

C_t = net cash flows for month t

TNA_{t-1} = beginning of the month total net assets (ending TNA of previous month)

TNA_t = end of the month total net assets

r_t = monthly return for month t

d_i = distribution (capital gain or dividend) during month t

p_{t-1} = beginning of the month NAV (ending NAV of previous month)

b = reinvestment rate

Reinvestment rates for monthly cash flows

For U.S. 1940 Act Funds, we apply the fund-level reinvestment rate determined using distribution data disclosed in semi-annual N-SAR reports. Because we have found little variation over time in individual fund reinvestment rates, we take the current rate and apply it historically.

If for some reason (badly formatted or missing N-SAR filing, or a new fund) the N-SAR-derived reinvestment rate is not available, the reinvestment rate is assigned based on the fund category, according to the following broad category groups:

US Stock	90%
Balanced	88%
International Stock	90%
Alternative	90%
Taxable Bond	75%
Municipal Bond	66%

For Europe-domiciled funds that have the Income/Accumulation attribute, we apply a 0% reinvestment rate for Income ("Inc") share classes and 100% for Accumulation ("Acc") share classes. If the Inc/Acc attribute is null or ambiguous, we apply a 0% rate. For Sweden, the rate is assumed to be 100% up until 31 Dec 2011 as Inc fund distributions were also reinvested until then, after which the general Europe-domiciled rule is followed.

For all other domiciles the reinvestment rate is set according to the fund category. If a reinvestment rate cannot be determined, the rate is set to 0%.

Fund-level flow calculation

In some fund domiciles it is customary to report fund size rather than share-class level net assets. In these cases, we compute fund-level flow using the same calculation as above, but with the total return and fund sizes of the oldest share class.

Inception month flow calculation

The calculation is identical to the Monthly Cash Flows algorithm above, except that TNA_{t-1} is the inception date instead of the previous month-end, and r is the partial-month return. If inception-date net assets are not provided, the estimated net flow is the month-end total net assets in the inception month. Assets collected in pre-inception subscription periods are not included in the flow estimate. Mergers of share classes into new share classes are handled as any other merger.

Mergers

In the case of fund share class mergers, Morningstar makes an adjustment to the cash flow estimate during the month of the merger. The month of the merger is the month in which the assets of all the obsolete share classes have moved to the surviving fund share class. Morningstar makes the following adjustment to the estimated cash flow calculation:

$$C_t = TNAS_t - \left(TNAS_{t-1} + \sum_{j=1}^n TNAO_j \right) * (1 + r_t)$$

Where

C_t = net cash flow for the surviving fund share class in month t

$TNAS_{t-1}$ = the TNA of the surviving fund share class at the start of the month

$TNAS_t$ = the TNA of the surviving fund share class at the end of the month

$TNAO_j$ = the TNA of obsolete share class j closest to the obsolete date

n = number of obsolete share classes merging into the surviving fund share class

r_t = return of the surviving fund share class in month t

If the surviving fund share class has a distribution, the assets in the distribution reinvestment term of the formula consists only of the assets of the surviving fund share class, not the assets of the fund share classes merging in:

$$C_t = TNAS_t - \left(TNAS_{t-1} + \sum_{j=1}^n TNAO_j \right) * (1 + r_t) + \left(\left(\frac{TNAS_{t-1}}{p_{t-1}} \right) * \sum_{i=1}^t d_i \right) * (1 - b)$$

U.S. ETF flow calculation

We obtain shares outstanding from all US-domiciled ETF providers. Along with NAV, this enables us to compute actual assets created (or destroyed) daily. These daily values are summed to display monthly flows. These flows are, in effect, actual net flows.

$$C_d = (Shares_d * NAV_d) - (Shares_{d-1} * NAV_{d-1}) * (1 + r_d)$$

Where:

C_d = net cash flows for day d

$Shares_{d-1}$ = beginning of day total shares outstanding (end of previous day)

$Shares_d$ = end of day total shares outstanding

NAV_{d-1} = beginning of day NAV (end of previous day)

NAV_d = end of day NAV

r_d = return for day d based on NAV