Morningstar® Investor Return™

Morningstar Methodology Paper
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Introduction

Morningstar® Investor Return™ (also known as dollar-weighted return) measures how the average investor fared in a fund over a period of time. Investor return incorporates the impact of cash inflows and outflows from purchases and sales and the growth in fund assets.

A fund's published total return reflects a buy and hold strategy. This information is widely available on fund family websites, in marketing material and from independent sources such as Morningstar. But, not all investors buy and hold. Investors move their money in and out of funds as they search for the best return.

In contrast to total returns, investor returns account for all cash flows into and out of the fund to measure how the average investor performed over time. Investor return is calculated in a similar manner as internal rate of return. Investor return measures the compound growth rate in the value of all dollars invested in the fund over the evaluation period. Investor return is the growth rate that will link the beginning total net assets plus all intermediate cash flows to the ending total net assets.

Morningstar calculates one, three, five and 10-year trailing and annual investor returns for open-end mutual funds and exchange-traded funds based in the United States.

What This Means for Investors

Investor returns tend to be lower than total returns. This implies that investors tend to get into funds at the wrong time.

	Monthly Total Return %	Growth of $10,000	Total Net Assets
		$10,000	
Jan 31	1.00%	$10,100	2,873,144,236
Feb 28	9.14%	$11,023	3,230,681,017
Mar 31	8.98%	$12,012	3,701,827,896
Apr 30	-2.60%	$11,700	3,714,420,265
May 31	-4.57%	$11,165	3,643,101,625
June 30	16.19%	$12,973	4,526,497,148
July 31	-0.52%	$12,906	4,990,098,844
Aug 31	9.80%	**$14,171**	**6,128,743,311**
Sep 30	-7.54%	$13,102	6,077,314,861
Oct 31	-3.78%	**$12,606**	**6,202,659,084**
Nov 30	-15.32%	$10,676	5,485,334,084
Dec 31	-2.96%	$10,360	5,502,824,031

The data above is for a large growth fund. The net assets grew rapidly to $6.1 billion in August. At this time, an initial investment of $10,000 would have grown to a high of $14,171. Since then, the fund suffered consecutive months of losses in September, October, November and December. But, investors continued to put money into the fund. In October, the fund hit its highest net assets for the year at $6.2 billion then hit its lowest monthly return of -15.32% the following month. Investors who purchased this fund in August did not have the same experience as those who purchased the fund in January.

An individual who bought the fund in January, held the fund until the end of the year, reinvested distributions, and did not make any additional purchases or sales would have received a total return of 3.60%. In contrast to total returns, investor returns measure the experience of the average investor in a fund. It is not one specific investor's experience, but rather a measure of the average return on all dollars invested. Investor returns place more weight on the months with higher assets. The investor return for this fund, over this time period, is -10.98%.

In many cases, poor investor returns can be attributed to investor behavior. Investors often suffer from poor timing and planning. Investors know they should hold a diversified portfolio, but many chase past performance and end up buying funds too late or selling too soon.

In addition to revealing patterns of investor behavior, investor returns can demonstrate how well fund families are preserving the investor experience. Fund families have a responsibility to produce funds that promote sound investment strategies. If these fund families instead promote trendy funds or short-term trading, they are not looking out for the investor's long term interest. Fund families that advertise short-term returns and promote high-risk funds will likely have funds with low investor returns relative to total returns. Investor returns are more valuable over longer time periods and are more volatile for specialty funds.

Methodology

Morningstar calculates investor returns in-house on a monthly basis using total net assets and returns for different time periods.

Cash Flows

In order to calculate investor returns, Morningstar first calculates the monthly cash inflows or outflows for each fund. The cash flow estimate for a month (C) is simply the difference in beginning and ending total net assets (TNA) that cannot be explained by the monthly total return (r).

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

TNA Estimates

In some cases, Morningstar is missing total net assets (TNA) for funds for historical months. Morningstar studied the practice of estimating TNA and cash flows for the historical gaps and determined that a reasonable assumption could be made in order to fill these TNA holes.

The underlying assumption is that TNA grew each month by the amount of the return (r) plus some constant cash flow each month. So, if TNA is missing for June and the TNAs from May 31 and July 31 are available, Morningstar assumes that the amount of the difference that can't be attributed to growth in return is due to cash flows. In addition, Morningstar assumes that this amount is divided equally between June and July cash flows. (The total excess will always be spread over n + 1 number of months for every n number of holes.)

Formally, the constant cash flow, (C), when missing n number of months of TNA is:

$$C = \frac{TNA_{n+1} - TNA_0\left(\prod_{t=1}^{n+1}(1 + r_t)\right)}{\left(1 + \sum_{t=1}^{n}\prod_{s=t+1}^{n+1}(1 + r_s)\right)}$$

The estimate TNA is therefore

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

Based on testing, it was deemed reasonable to fill up to six consecutive holes in TNA. If a fund has a time period with more than six consecutive holes, cash flows cannot be determined and no investor return will be calculated. If a fund is missing TNA at its inception, Morningstar will not attempt to estimate these. Morningstar also will not estimate missing TNA for the most-recent month.

Investor Returns

Once monthly cash flows are available for the period in question, investor returns can be derived with an iterative process. As with an internal rate of return calculation, investor return is the constant monthly rate of return that makes the beginning assets equal to the ending assets with all monthly cash flows accounted for. Morningstar runs a program that attempts to solve for this constant rate of return, adjusting the estimate up and down until it converges on a solution. Then the monthly investor return (r) is annualized $((1 + R_{IR})^{12}-1)$.

Monthly investor returns can also be calculated with the internal rate of return (IRR) function in Microsoft Excel. For example, the monthly investor return over a 12-month period is IRR (TNA_0, CF_1, CF_2 …, CF_{11}, $(CF_{12} - TNA_{12})$).

The monthly investor return will be different depending on the time period being measured, even if the same months are being used in two different calculations. For example, a one-year investor return for the time period 12/31/2004-12/31/2005 has a monthly investor return of 0.99%. Over the three-year time period 12/31/2002-12/31/2005, the same fund has a monthly investor return of 1.21%.

Example

A great deal of cash came into this sample fund between December 31 and January 31. The cash flow for January is 187,540,480; this is simply the difference in ending and beginning total net assets (TNA) that cannot be explained by the monthly total return of 6.05%. In February and March, cash continued to come into the fund. In March, the TNA actually went down, but this decrease can be attributed to the poor return as cash continued to flow into the fund.

As with an IRR calculation, investor return is the constant monthly rate of return that makes the beginning assets equal to the ending assets with all monthly cash flows accounted for.

Investor Return Example:

	Total Net Assets	Monthly Total Return	Cash Flow	Constant monthly rate of return	Link beginning value to ending value
Dec 31	511,041,391				
Jan 31	729,525,427	6.05%	187,540,480	-0.48%	696,118,650
Feb 28	798,196,837	-2.09%	83,962,263	-0.48%	776,725,619
Mar 31	**795,933,571**	-3.16%	22,951,722	-0.48%	**795,933,571**

Total return 3 months = 0.55%
Investor return monthly = -0.48%
Investor return 3 months = -1.44%

Cash Flow = TNA ending – TNA beginning x (1+monthly total return)
Link beginning value to ending value = TNA beginning x (1+constant monthly rate of return) + cash flow

For this example, the investor who purchased on December 31 and followed a buy and hold strategy received the three-month total return of 0.55%. The average investor experience, however, is only -1.44%.

FAQ

1. **Why would a fund be missing investor return?**
   There are a couple of different reasons why a fund might be missing investor returns. For instance, if the fund is less than one year old, it will not have sufficient performance history, as Morningstar doesn't calculate investor returns for periods less than one year. Other reasons include if the fund is missing more than six consecutive TNAs during the time period in question; if the fund is missing its most recent TNA; or if the fund is missing TNA near its inception date and those dates overlap with the time period for the return.

2. **Why would an investor return be greater than a total return?**
   When this occurs, more investors participated in the fund's upswing and less investors participated in the fund's downswing. It is not a buy signal, but an indication that investors timed their purchases and sales of the fund well. Sometimes, it is a contrary indicator when an investment class is at the end of a strong bull market. For example, many specialty technology funds had high investor returns in 1999 when vast inflows coincided with the end of the technology bull market.

3. **Why don't you make an adjustment for dividend reinvestment rates when calculating cash flows?**
   Dividends that aren't reinvested are an outflow from the fund and this is captured in the change in total net assets. Dividends that are reinvested are not considered an inflow because the money never left the fund. Morningstar does not need to explicitly adjust for reinvestment rates because the change in total assets captures those outflows.

4. **What happens if a fund had a merger?**
   In the case of a merger, Morningstar treats the movement of net assets from the merging fund to the surviving fund as an inflow of cash. This may cause investor returns to be lower, because the inflow of cash would indicate that investors may have missed out on returns that occurred before the merger. Morningstar is currently investigating how mergers impact investor returns and may modify the methodology if needed in the future.

5. **Are investor returns adjusted for sales loads?**
   As with total return, Morningstar does not adjust investor returns for sales charges (such as front-end loads, deferred loads and redemption fees). The investor returns do account for management, administrative, 12b-1 fees and other costs taken out of assets.

Conclusion

Investor returns measure the experience of the average investor in a fund. It is not one particular investor's experience, but a measure of the average return on all dollars invested. Investor returns are not a substitute for total returns but can be used in combination with total returns. Comparing investor returns to total returns reveals how well investors timed their fund purchases and sales (investor behavior) and whether the fund promotes sound investment strategy (fund family behavior).