



Standard Performance Calculation Methodology

Morningstar Research Paper
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Introduction

Morningstar calculates investment performance measures, returns, standard deviations, modern portfolio statistics and Sharpe indices for unlisted managed investments and market indices such as the ASX All Ordinaries Index and NZSE Gross Index.

We also calculate performance measure averages for like groupings of managed investments (such as the Morningstar indices). These calculated figures are designed to assist users to perform:

- ▶ fair comparisons between individual managed investments which may be considered to be peers;
- ▶ assessments relative to other types of investments;
- ▶ comparisons against peer group averages (i.e. Morningstar indices); and
- ▶ comparisons against market indices.

The fundamental fund comparisons that take place are based on the performance calculations of a fund universe that has varying attributes. Morningstar has taken all necessary steps to ensure that performance calculations are as closely aligned to IFSA industry standards, despite having fund details that are heterogeneous in nature.

The Performance Calculation Methodology Paper series provides a summary of the methodology adopted by Morningstar in Australia in calculating returns, standard deviations, and Sharpe indices and details of assumptions and/or definitions that we have adopted.

This document details the returns methodology, assumptions and background, any adjustments made and a glossary of terms. Refer to the other Methodology Paper in the series for the risk measures.

Calculating Returns

Morningstar provides data on distribution, growth, and total returns.

Growth Return

The percentage change in the Scheme's Soft Close Exit Price adjusted for any capital re-organisation (e.g. an issue of bonus units). Note that prior to the distribution date the Soft Close Exit Price may include a distribution component.)

Total Return

The percentage change in a continuing Scheme Holder's financial interest in a Scheme assuming the reinvestment of all distributions back into the Scheme (and no other acquisition or disposal/withdrawal) and adjusting for any capital re-organisation.

Distribution Return

The total return less growth return. To facilitate the calculation of total return and growth return measures, Morningstar maintains a Total Value Index and a Capital Value Index for all funds and indices.

Note: Morningstar reserves the right to change all or any of its calculation methods, terminology and assumptions behind those methods at any time.

Methodologies

The following sections outline the methodology adopted in calculating the performance returns that are based upon the generation of value indices.

Growth Return

To calculate the growth return of a fund between any two month-ends, Morningstar produces a Capital Value Index series for that fund. This index reflects monthly changes in the value of an investment in the fund over time. The method of calculating this series varies with the nature of the investment vehicle.

In the case of a unitised fund, a notional \$10,000 investment is made in units of the fund at its inception date using the soft close exit price at the end of the fund's first month of existence. (Note that because returns are measured from month-end to month-end, the first soft close exit price available after inception may not be used.) Where Morningstar does not have data from the commencement of the fund, the notional "investment" is made at the end of the first month for which data is available. The index series is then maintained by multiplying the number of units by the soft close exit price applicable to each month-end.

Note that, if the start/end date that the soft close exit price is struck coincides with the last day of a distribution period and the soft close exit price is cum-distribution, then the ex-price must be used to ensure comparability with market indices and peers. This also improves comparability with regard to the distribution return and an investor's income tax returns.

Alternative methods for cash trusts, common funds, and mortgage funds are described in the section on Total Value Indices below. Bonus issues and unit splits result in adjustments to the number of notional units held. For the Growth Return Index, no additional units are created for income distributions.

Fees and Charges

Morningstar collects fund unit prices and declared rates that are assumed to be net of all ongoing fees assessed against the fund and reflected in the fund unit prices and declared rates. Performance measures are based on these unit prices and declared rates. Morningstar does not adjust for entry or exit fees or charges, because these can vary from investor to investor and according to the timeframe examined. When using investment performance data calculated by Morningstar, an investor can make notional adjustments to account for costs such as initial fees.

Some fund managers charge additional ongoing fees on a per member basis or by cancelling units to pay fees. Where these fees are not included in the unit price, Morningstar is effectively able to enter the rate by which the growth return must be

reduced in order to ensure that maximum ongoing fees are reflected in performance figures. This function further reinforces the importance of effective peer comparisons between funds.

Taxation

Where tax is paid by the scheme, such as with an insurance bond or Pooled Superannuation Trust (PST), investment performance figures are calculated net of tax. Total Return - to calculate the total return of a fund between any two month-ends, Morningstar produces a Total Value Index series for that fund which reflects changes in the value of an investment in the fund over time. The Index is calculated in the same way as the index for the growth return, except that the Total Return Index assumes that all distributions are reinvested.

Growth Return Index

Is calculated on the basis that distributions are not reinvested. Other differences in the calculation methodology of the growth return are noted below.

Income Not Included in a Unit Price

For funds where income and realised capital gains are not included in the unit price, a separate 'additional income' amount is collected from the fund manager at each month-end. The unit price generally represents the initial investment plus any unrealised capital gains.

"Additional Income"

This figure represents an approximation of the distributions to which the unitholder is entitled at the end of the given month. The additional income will generally be paid to the unitholder upon withdrawal from the scheme. Normally the additional income at the end of a distribution period will equal the actual distribution amount paid to the investor for the period.

For calculations of both the total return and the growth return, the additional income amount is notionally added to the end of month soft close exit price, where applicable.

Additional income is also available in the Morningstar Licensed Data Feed.

Reinvestment of Cash Distributions - If there is a cash distribution from the fund, to calculate the Morningstar Total Return Index this distribution is notionally reinvested in the fund at the end of the accrual period to which the distribution relates, using the Ex-Price at the end of the period. The distribution figure used in the calculation is the cents-per-unit amount distributed for a unit held for the entire accrual period.

New units are notionally purchased and added to the total number of notional units already held, and the index values from this date forward are calculated using the new number of notional units.

If a bonus unit distribution and a cash distribution are made at the same time, then the calculation will reflect the order specified by the fund manager at the time of distribution.

Fees and Charges - as for growth returns, the Total Return Index is net of all ongoing fees and charges, which are reflected in the unit price and rates.

Distribution Return: **Distribution Return = Total Return - Growth Return**

Distribution Returns using this methodology are available in Morningstar Adviser Work Station. For users of the Morningstar Licensed Data Feed electronic service, the distribution return can be determined from the Capital Value Index and Total Value Index.

Assumptions and Background

Growth Returns

To measure the growth returns to investors, Morningstar's calculations use the month-end soft close exit prices of a fund. Managers are requested to supply month-end soft close exit prices on a net of on-going fees and charges and tax basis for calculation purposes. If the start/end date that the soft close exit price is struck coincides with the last day of a distribution period and the soft close exit price is cum-distribution, then the ex-price must be used to ensure comparability with market indices and peers.

Total Returns Include Reinvestment of Distributions

In determining the total return of each fund, Morningstar assumes reinvestment of all cash and bonus unit distributions in order to account for variations in the size and timing of distributions. This assumption enables the measurement of all returns generated by the fund, and preserves the time value of money (the concept that earlier distributions are worth more than later distributions).

Many investors may not in fact reinvest all distributions, but it is not our purpose to determine returns for particular investors. Our objective is to determine representative returns which an actual investor may have achieved and which consistently measure the performance in management of fund assets from month-end to month-end (excluding effects of initial charges and exit fees).

These returns will allow comparisons between funds and with other types of investment on a post fees, charges and tax basis. This is not the same as measuring the return on the underlying assets of the fund. (It is possible to measure a return including income without assuming reinvestment of income. Morningstar growth returns are distinct from total returns, and measure separately only the changes in end month soft close unit prices with adjustments for bonus units issued or unit splits.)

Compounded and Non-annualised Returns

Compound percent per annum returns are calculated for time periods of one year or longer, and non-annualised returns for time periods less than one year. Annualising shorter-term returns may imply that the returns are generally sustainable.

Classification of Funds

Morningstar classifies funds into peer groups can be compared which are used for performance calculations, peer group rankings and ratings. (For further details on the classification system and the ratings calculation, refer to the Morningstar Classifications Policy and the Morningstar Rating Methodology respectively.)

Subcategory Indices

Morningstar produces benchmark indices of groups of like funds (peer groups) based on simple averages of monthly returns for all funds in each grouping.

The Morningstar Indices are calculated from the returns of funds by treating the whole group of funds comprising the index as one portfolio of securities. A simple average of the returns of each active fund at the time in the group is calculated each month. These monthly averages are then used to create a return index for the group. By using its total value index, the returns, Sharpe ratios and Standard Deviation for the index are calculated for the Morningstar Index. (For further details on the indices calculation, refer to the Morningstar Indices paper.)

Adjustments Where Required

Bonus Units

If bonus units are issued, the number of units must be adjusted as at the date of the bonus issue using the bonus issue rate of “x” new units for every “y” existing units. Index values from this date forward are calculated using the new number of units.

Time-Related Bonus Units - where time-related bonus units have been issued, new notional units are allotted as at the end of each month during the bonus unit distribution period, using the rate declared and the number of days since the start of the bonus unit distribution.

If there are income distributions during the bonus unit distribution period, the additional income units are allotted for the bonus unit distribution, and additional bonus units are allotted on the reinvested income units.

Total Value Indices

Cash Trusts and Common Funds - for some cash trusts, cash common funds, and cash group investment funds ('cash funds'), indices of total value must be generated slightly differently. For Cash funds, returns are generally quoted on a daily or weekly basis, and the unit price is usually constant. This means that for these funds, total return equals the distribution return. The weekly returns are simple averages of the daily figures. The week is Saturday to Friday inclusive. Morningstar does not calculate a weekly return if less than three daily return figures in that week are available from the manager. A weekly average figure from the manager is inserted in its place. The monthly return is a simple average of the weekly figures. The previous month end's total value index is increased by the monthly average total return (not annualised) to calculate the total value index figure for the end of the subsequent month.

When income is rolled up in the unit price, returns are calculated as for other unit-linked funds as described above.

Total Value Indices

Mortgage and Declared Rate Funds- during periods between distributions (or declared rates), the month-end total value index is increased by the amount from the end of the previous months that an investor would receive on exit at the end of each month. For mortgage funds, this is generally an interim cents-per-unit amount, which is notionally added to the current exit price to estimate the value to an investor leaving at that date.

Where an interim cents-per-unit amount is not provided by the manager, but an earning rate can be estimated, that figure is used. If either figure cannot be provided for a fund, then calculations are only made when actual distribution amounts are available.

For declared rate funds, the interim rate set for those leaving the fund is used to estimate the end of month total value index figure. The total value index figure at the date the last declared rate was set is increased on a day-weighted basis by the interim rate. This becomes the end of month total value index for the current month.

As the declared rate of a distribution (for mortgage funds) or earnings rate (for declared rate funds) is the rate of return for the funds over the time period, Morningstar assumes that this rate of return has been earned evenly over the time period to which it applies. The rate of return is apportioned on a day-weighted basis to increase the total return index by increments on each month end between the start and end of the period.

Additional Fees

Where month-end soft close exit prices are not reflective of the maximum ongoing fees charged by the fund, an adjustment is necessary to accommodate for effective peer comparisons. The unit price data will continue to be displayed, however both the growth and total returns will be adjusted by a percentage amount (supplied by the fund manager) to reflect the maximum fees charged to investors.

Backward Pricing vs Forward Pricing

Soft close unit prices are supplied by various fund managers which employ differing pricing methodologies. Backward pricing funds generate soft close prices that have a one to two days lag between the valuation point and the effective date of the prices applicable to investors. Forward pricing funds do not suffer from such a time lag, as such the valuation point is consistent with the date of the prices applicable to investors. Performance is calculated as at a consistent month end date, however those funds that backward price are based on valuations at different dates with a 1 to 2 days lag, hence peer comparisons can suffer due to alternate pricing methods. Regardless of which pricing methodology is used, Morningstar is effectively able to maintain strict peer comparisons with sophisticated signals that are able to identify the effective valuation dates for all funds, therefore calculating performance at consistent valuation points.

Comparing Returns

Compound percent per annum returns may be calculated from "point-to-point" over one year to 10 year time periods ('n') ending at each month end. Returns are calculated using the Morningstar Total Value Index series as follows:

$$\text{Annualised Total Return} = \left\{ \left[\frac{F}{I} \right]^{1/n} - 1 \right\} * 100 \text{ (\% per annum)}$$

where "F" is the (final) total value index figure for the month at the end of the time period and "I" is the (initial) index value for the month at the beginning of the time period.

The same formula is used for calculating growth returns, except that in this case 'F' is replaced by "Fc", the final figure for the Capital Value Index, and "I" is replaced by "Ic", the initial value for the Capital Value Index.

Where the period is less than one year, "n" is set to 1 to produce returns, which are not annualised. Non-annualised returns are calculated from "point-to-point" over six, three and one month time periods all ending at the date indicated.

$$\text{Non-Annualised Total Return} = \{(F/I) - 1\} * 100 (\%)$$

All calculations are nominally from end of month to end of month. Where a soft close exit price for daily priced funds is not available or a soft close exit price is not available within the last seven days of the month for all other less regularly priced funds, a return cannot be calculated and, "NAv" appears in Morningstar performance tables. Similarly, time periods for which a return is not applicable are indicated with dashes ('----') or 'NAp'. Special characters or no data are provided for these situations in the Morningstar Licensed Data Feed.

Glossary of Terms

Growth Return

To calculate the growth return of a fund between any two month-ends, Morningstar produces a Capital Value Index series for that fund. This index reflects monthly changes in the value of an investment in the fund over time. The method of calculating this series varies with the nature of the investment vehicle.

Unit Prices/Distribution

Cum-Distribution

Cum-Distribution means that there is income included in the unit price.

Soft Close Exit Prices

Soft Close Exit Prices for a particular day refers to the exit price used to process withdrawals during the normal course of business on that day.

Ex-Price

Ex-Price means the last Cum-Distribution Soft Close Exit Price calculated at the end of a distribution period less the distribution payment associated with that distribution period (i.e. the Ex-Price must not reflect market movements after the end of the distribution period).

Distribution

Distribution means the cash amount (in cents per unit) that is paid to continuing scheme holders after the end of a distribution period. Note that this should be interpreted to include income, realised capital gain and any return of capital.

Examples of Calculation of Distribution & Growth Returns

1. Fact	\$
Price 30 June 2001	
End of month cum-distribution soft close exit price 30/06/01 (no distributions were made at 30 June 2001)	0.67960
Distributions	
30/09/01 - \$ per unit	0.002914
30/09/01 - Ex-Price	0.685800
31/03/02 - \$ per unit	0.008632
31/03/02 - Ex-Price	0.722100
30/06/02 - \$ per unit	0.002700
30/06/02 - Ex-Prices	0.723900
Price 30 June 2002	
End of month cum-distribution soft close exit price 30/06/02	0.726600
End of month Ex-Price	0.723900
Distribution	0.002700
Total	0.726600

2. Total Return Calculation 1 Yr to 30 June 2002	\$	Unit	Return %
Value of units at 30/06/01 10,000*0.6796	6,796	10,000	
30/09/01 distribution -10,000 @ \$0.002914 = \$29.14		10,042.49	
Reinvest \$29.14 @ \$0.6858 = 42.49 units			
31/03/02distribution-10,042.5@\$0.008632= \$86.69	0.9903	10,162.54	
Reinvest \$86.69 @ \$ 0.7221 = 120.05 units			
30/06/02distribution -10,162.5 @ \$0.002700= \$27.44		10,200.44	
Reinvest \$27.44 @ \$ 0.72390 = 37.9 units			
Value of units at 30/06/02 10,200.44 @ 0.723900	7,384	10,200.44	
Total Return ((7384/6796)-1) * 100			8.65

3. Growth Return Calculation 1 Yr to 30 June 2002	\$	Unit	Return %
End of month soft close exit price 30 June 2001	0.67960		
End of month Ex-Price 30 June 2002	0.72390		
Growth return ((0.72390/0.6796)-1) *100			6.52