New Zealand Portfolio Investment Entity (PIE) Performance Calculation Methodology

Morningstar Methodology Paper

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Introduction

This Methodology Paper details the Before-Tax and after-tax PIE return methodology, the treatment of a PIE funds non-PIE performance history, the assumptions necessary for calculations, and the Tax Cost Ratio calculation.

The New Zealand Government made significant changes to the taxation of managed funds in early 2007. One of these changes was the creation of a new legal type, a Portfolio Investment Entity (PIE).

PIE’s differ from traditional managed funds in a few important ways. The most significant of these is that they now pass all taxation through to the end investor. However fund management companies are required to calculate each unit-holder’s tax liability and forward the payment to (or collect the rebate from) the Inland Revenue Department (IRD) on behalf of unit-holders.

A unit-holder’s tax liability is calculated using their taxable income, tax credits and marginal tax rate. Investors can have one of three different marginal tax rates depending on external circumstances; 19.5%, 33% (reducing to 30% in April 2008), and 0% (for charities and PIE’s which invest in other PIE’s). As a result, the industry has adopted the Before-Tax return as the standard for presenting PIE performance.

From 1 October 2007, PIE funds started reporting untaxed tax unit prices and distributions. The industry standard is to supply research houses with unit prices and tax components on a daily basis. Using this information, Morningstar can calculate Before-Tax and after-tax performance for PIE funds.

The impact of taxation on the performance of an investment trust may be significant and in many cases pivotal to achieving an investor’s ultimate goal. We aim to assist investors in making informed investment decisions by enabling comparisons between funds’ after-tax returns as well as a funds ‘tax-effectiveness’. The tax effectiveness of a fund can be measured by the Tax Cost Ratio.

Please refer to the Morningstar Performance Calculation Methodology - Returns Paper in conjunction with this Methodology Paper.
Inputs

The minimum requirements for calculating standard investment fund performance are:
► Ex-Price
► Distributions

In addition to the list above, the minimum requirements for calculating Before-Tax performance for a PIE are:
► Foreign Tax Credits (FTC)
► Dividend Withholding Payments (DWP)
► Residential Withholding Taxation (RWT)
► Imputation Credits (IC)
► Future income tax benefit released (FITB), currently recorded as ‘Other’

While the distinction between the different tax credits above is of some importance to an institutional investor, for the purposes of our calculation, we can simply aggregate the individual daily amounts into a single value which we will call the Sum of All Tax Credits (TC).

Tax credit data (FTC, DWP, RWT, and IC) is received daily in per unit values. FITB may be collected each day, but is most likely collected at the end of each month and applied retrospectively. It may be provided as a total for the fund, in which case it needs to be converted to a per unit value. This will require an additional input, Total Units in the Fund.

An abridged example of a completed IMD collection form is presented in Appendix A.
Assumptions

- Investors are assumed to be New Zealand tax residents exposed to the complete set of local taxation rules.
- Investors are assumed to have purchased a single unit (notional units) of the fund at the funds inception.
- Units are infinitely divisible.
- All tax credits/concessions can be fully utilised immediately and are re-invested at the ex-distribution exit price (Ex-Price) at the end of each day.
Current Performance Methodology

**Total Return**
Morningstar measures a funds performance between two points in time by calculating the rate of growth in the notional Net Asset Value (NAV).

\[
TR = \frac{NAV_C}{NAV_P} - 1
\]

Where:
- \(TR\) = Total return
- \(NAV_C\) = the number net asset value at the end of the current period
- \(NAV_P\) = the number net asset value at the end of the previous period

The NAV for a fund at any point in time is calculated using the relevant ex-distribution exit unit prices (ex-price) and the number of notional units.

\[
NAV = EP \times UC
\]

Where:
- \(EP\) = the ex-price
- \(UC\) = the number of notional units at the end of the current period

The number of notional units is affected by the reinvestment of all distributions.

\[
UC = UP \times (1 + \frac{D}{EP})
\]

Where:
- \(UC\) = the number of notional units at the end of the current period
- \(UP\) = the number of notional units at the end of the previous period
- \(D\) = the distribution
- \(EP\) = the ex-price

**Capital Return**
Morningstar measures a funds capital return between two points by calculating the rate of growth in the ex-distribution exit prices.

\[
CR = \frac{EPC}{EPP} - 1
\]

Where:
- \(CR\) = Capital growth
**Income Return**

Morningstar measures a funds income return by subtracting the capital return from the total return.

\[ IR = TR - CR \]

Where:

| IR  | Income return |

Unlike the total return and the capital return, the income return cannot be geometrically linked. That is, it is not possible to compound monthly income returns to calculate an annual income return.
Before-Tax PIE Performance Methodology

Before-Tax PIE Total Return
The Before-Tax total return series will represent the returns of a fund before all taxes and with all distributions reinvested. This extends upon the basic performance calculation method and requires the accrual of tax credits (which represent tax that has already been paid) and future income tax benefits (arising for the use of the tax asset created by formation losses.)

Before-Tax PIE Total Return Calculation
The calculation of the daily tax-credit unit-adjustment is central to the Before-Tax return series. The daily tax-credit unit-adjustment describes a process similar to that of an ordinary cash distribution. The result of this unit-adjustment, as with any ordinary cash distribution, is a change in the number of notional units. The change in the number of notional units is a function of the sum of all taxation credits and concessions and the ex-price.

The simple formula for the daily tax-credit unit-adjustment is:

\[ UC = UP \times (1 + \frac{TC}{EP}) \]

Where:

\[ UC \quad = \quad \text{the number of notional units at the end of the current day} \]
\[ UP \quad = \quad \text{the number of notional units at the end of the previous day} \]
\[ TC \quad = \quad \text{the sum of all tax credits} \]
\[ EP \quad = \quad \text{the ex-price} \]

As this tax-credit unit-adjustment occurs every day, there will be times when it coincides with an ordinary cash distribution. In this case, the formula for the daily tax-credit unit-adjustment would be:

\[ UC = UP \times (1 + \frac{TC + D}{EP}) \]

Or,

\[ UC = UP \times (1 + \frac{TC}{EP} + \frac{D}{EP}) \]

Where:

\[ D \quad = \quad \text{the ordinary cash distribution} \]
**Before-Tax PIE Total Return Example**

The following practical example will use the data from 30 January 2008 and 31 January 2008 in Appendix A to illustrate the method of calculating a Before-Tax total return for a PIE. For simplicity we will assume the number of units on 30 January 2008 is equal to one.

<table>
<thead>
<tr>
<th>Ex-price 30 January 2008</th>
<th>= 1.0609112</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex-price 31 January 2008*</td>
<td>= 1.0620123</td>
</tr>
<tr>
<td>Sum of all tax credits</td>
<td>= 0.0001464 (FTC)+ 0.00 (DWP)+ 0.0 (RWT)+ 0.0001464 (IC) = 0.0002928</td>
</tr>
<tr>
<td>Initial notional units</td>
<td>= 1.0000000</td>
</tr>
</tbody>
</table>

Firstly, we need to calculate the initial NAV, which is the NAV for the previous day.

\[ \text{NAVP} = 1.0609112 \times 1.0000000 = 1.0609112 \]

Secondly we need to calculate the NAV for the current day, but in order to do that we need to calculate the number of units at the end of the current day.

\[ \text{UC} = 1.0000000 \times \left(1 + \frac{0.0002928}{1.0620123}\right) \]
\[ \text{UC} = 1.0000000 \times (1.0002757) \]
\[ \text{UC} = 1.0002757 \]

Therefore,

\[ \text{NAVC} = 1.0620123 \times 1.0002757 \]
\[ \text{NAVC} = 1.0623051 \]

And,

\[ \text{TR} = (1.0623051 / 1.069112) – 1 \]
\[ \text{TR} = 1.0013139 – 1 \]
\[ \text{TR} = 0.0013139, \text{ or 0.13139%} \]

The primary purpose of this example is to illustrate the daily adjustment to the number of notional units. At this stage Morningstar does not calculate and publish daily returns for New Zealand managed funds. However, we will be making a daily adjustment to the number of notional units, which will allow for daily compounding of all tax credits.

**Before-Tax Pre-inception PIE Performance History**

Funds that converted to PIE on 1 October 2007 will have a relevant return history that needs to be captured in longer dated historical returns going forward. In order to maintain symmetry between the return series before and after PIE conversion Morningstar will be adjusting the previous after-tax returns to reflect an estimate of the tax paid.
Morningstar has opted for a simple method of adjustment for the historical returns. Each month in the pre-PIE after-tax monthly return series will be ‘grossed up’ using the following formula.

$$MGR = \frac{MNR}{1 - TXR}$$

Where:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGR</td>
<td>Monthly gross total return (estimated monthly Before-Tax return)</td>
</tr>
<tr>
<td>MNR</td>
<td>Monthly net total return (actual monthly after-tax return)</td>
</tr>
<tr>
<td>TXR</td>
<td>The relevant tax rate (i.e. Unit Trusts and Super Funds 33%, GIF’s 19.5% and Passive Funds 0%)</td>
</tr>
</tbody>
</table>
## INVESTMENT MANAGEMENT DATA FORM

**Form MSTAR001NZ: Unit Prices - Unit-Linked Products or Mandates**

**(For After and Before Tax and Fees Unit Prices)**

<table>
<thead>
<tr>
<th>APIR PIC Ticker</th>
<th>Product Name</th>
<th>Unit Price Information</th>
<th>Fund Type</th>
<th>Taxation Component Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>98765</td>
<td>Fund XYZ</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Additional Details
- **Manager:** Email: data.nz@morningstar.com
- **Prepared by:** See second worksheet for example
- **Date of Preparation:** Mandatory fields
- **Version 1.1**