

TECHNICAL DIRECTION PAPER

Calculation of Fund Returns



Objective: The creation of uniformity among superannuation funds in the calculation of return

Background.

Performance measurement of superannuation in PNG is at its infancy. Superannuation funds on the whole tell members what interest rate they are crediting to their accounts, and the prevailing mindset is that what is credited is the actual return to the Fund. In reality, the return composition can be both current income and reserve income from previous years. A further complication arises in that some of the major funds historically calculate their return on the opening members account balance from the previous year. This anomaly was probably the result of unsophisticated technology, not enabling time-weighted returns. The result of this method was that returns were overstated by upwards of half a percent.

It is the intention of this paper to start off with a bare bones approach and over time expand as the market in PNG becomes more sophisticated in terms of performance measurement. Needless to say the time weighted return is the preferred performance measurement approach. This approach is the standard approach internationally.

Both Aon Consulting and Financial Synergy, the two major administration service providers, both have the capability to credit income on a time-weighted basis. As a result time weighted returns will be the normal expected calculation method of most Funds in Papua New Guinea.

Time Weighted Return.

The preferred performance return calculation is the time weighted return calculation, which can be summarized in the following

According to the Association of Investment Management and Research (“AIMR”), “Time-weighted rate of return allows the evaluation of investment management skill between any two time periods without regard to the total amount invested at any time during that time period. The measure is independent of the total amount invested because the manager normally does not control the inflow and outflow of money.” (AIMR, *AIMR Performance Presentation Standards Handbook*, 1997. P. 64).

In calculating a time-weighted return, a portfolio is evaluated each time there is a cash flow transaction in the account (i.e., new purchases and sales, dividend and income payments, deposits or withdrawals). The performances of periods between cash flows are linked together to reflect a return for the whole period. Daily transaction data is used in the linking of each cash flow so that we may achieve the most accurate return calculation.

Calculation of Time Weighted Return - Example

The example below illustrates the mechanics of TWR for the hypothetical Fund (numbers in bold are used for the TWR calculation).

Fund	December 31 2000	Q1 2001	Q2 2001	Q3 2001	Q4 2001
Beginning portfolio value		1000	370	81	7.8
Gain or (loss) for the quarter %		10%	3%	(4%)	6%

Gain or (loss) for the quarter \$	100	11	(3.2)	0.5
Quarterly cash inflows/(outflows)	(730)	(300)	(70)	0
Ending portfolio value	1000	370	81	7.8
			8.3	

On December 31, 2000, the Fund had \$1000 in assets. During the first quarter of 2001 it had a 10% return, but this return ranked far below its peers, so \$730 exited the fund. In the second quarter, the Fund earned 3% and \$300 more dollars came out. In the third quarter, the fund lost 4% and \$70 was withdrawn. In the fourth quarter, the Fund gained 6% and did not lose assets.

What is the annual TWR for the Fund?

The TWR formula in this case is

$$[(1+R_1)(1+R_2)(1+R_3)(1+R_4)] - 1 = \text{TWR, where R is the quarterly return.}$$

Using the quarterly return numbers from above gives the following result:

$$[(1.1)(1.03)(.96)(1.06)] - 1 = 15.3\% = \text{Annual TWR}$$

Thus, the Fund earned a 15.3% return.

For those Funds who do not have the technology to determine the time weighted return as calculated above on daily intervals, the recommend course of action is the Dietz time weighted return methodology on an annual basis. This return methodology can be less accurate because of the assumptions that the cash flow will fall half way through the year. In reality the cash flow can be uneven right through out the year and as such the return calculated by this method can be influenced by lumpy withdrawals or contributions.

Dietz Method

$$I^{DIE} = \frac{MV_T - MV_{T-1} - \sum CF}{MV_{T-1} + 0.5 \cdot \sum CF}$$

Where MV_t Market Value period 1
 MV_{t-1} Market Value period 0
 CF Net Contribution Cashflow

Example

	(000)
MV _t	326,300
MV _{t-1}	267,505
CF	25,308
Return =	11.953%

Looking at it from another angle. Every contribution or deduction that hits a member's account gets full interest pro-rated for the exact number of days between the date of transaction and the following review date (ie December 31 balance).

Interest Rate	4.000%			
Period End Date	30-06-01			
Period Start Date	30-06-00			
Opening Balance	Nil			
Ending Balance	\$2,268.80			
Cont Eff Date	Amount	Days	PD Interest	End Bal
30-06-01	\$ -	0	\$ -	
13-06-01	\$ -	17	\$ -	
01-05-01	\$ 229.17	60	\$ 1.51	
02-04-01	\$ 221.42	89	\$ 2.16	
28-02-01	\$ 221.42	122	\$ 2.96	
07-02-01	\$ 221.42	143	\$ 3.47	
02-02-01	\$ 157.10	148	\$ 2.55	
31-12-00	\$ 64.32	181	\$ 1.28	
01-12-00	\$ 221.42	211	\$ 5.12	
01-11-00	\$ 221.42	241	\$ 5.85	
03-10-00	\$ 221.42	270	\$ 6.55	
01-09-00	\$ 221.42	302	\$ 7.33	
01-08-00	\$ 221.42	333	\$ 8.08	
TOTALS	\$ 2,221.95		\$ 46.85	\$2268.80

Time Weighted Return =4.00%
Deitz TWR= 4.22%

Reporting of Returns

In reporting returns to Fund Members and the market place, it is expected that Fund and member returns will be

- Calculated on a time weighted basis only
- Returns calculated on the opening member balance method is not allowed under any circumstances
- If reserves have been used in the return calculation, the amount of the return attributable to reserves is also to be stated as a percentage
- The return will be reported on a net of tax and fees basis
- Member accreditation figures are to include the percentage attributable to reserves
- Member accreditation figures are to be reported net of tax and fees

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