

## **Appendix #1**

### **Calculating Your Investment Performance**

The Association of Investment Management and Research (AIMR) in Charlottesville, Virginia develops and maintains performance presentation standards for the investment industry. The Security and Exchange Commission has final approval over the standards. The information in this appendix is derived from the AIMR Performance Presentation Standards Handbook available through AIMR.<sup>1</sup>

You can measure the performance of an account in many different ways, but *time weighting* is the industry standard. A time-weighted-return (TWR) measures the performance of an account over a specific period of time. These units of time are linked together to form longer returns. For example, monthly returns are linked together to establish quarterly returns, which are linked to establish annual returns, and so forth.

Starting in the year 2000, AIMR requires performance to be calculated monthly. However, a quarterly calculation works fine for the average investor that does not make large deposits or withdrawals. For quarters with large deposits or withdrawals, a person should calculate monthly. Daily calculations of return are the most accurate, however, it can be costly and requires a fairly sophisticated methodology.

It is important to understand exactly what a TWR measures, so you will not be misled. A TWR accurately measures the performance of an account over a specific period of time, and not the amount of money gained or lost in the account. A TWR is strictly an accounting measure used to compare one account against another. It does tell you actual dollars gained or lost. Nevertheless, it will help you keep track of your investments and your investment advisors.

The following guide will help you calculate your personal TWR:

1. Assume you begin the year with \$100 in an account and by the end of the first quarter (March 31) the account's value is \$110.
2. The basic formula is fairly straightforward. Take the ending balance minus beginning balance divided by the beginning balance. For example, the balance was \$100 on January 1 and ended at \$110 on March 31. The \$10 gain is divided by \$100 for a return of 10%. This assumes no contributions or withdrawals were made during the quarter.

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<sup>1</sup> The Association of Investment Management and Research is located in Charlottesville, Virginia. A copy of the AIMR Performance Presentation Standard Handbook is available from AIMR at a nominal fee. Phone 804-980-3668 or visit the AIMR web site at <http://www.aimr.com>.

Beginning Balance (BB)	Ending Balance (EB)	$(EB - BB) / BB$	Quarterly Return
\$100	\$110	$(110 - 100) / 100$	.10 = 10.0%

3. The calculation becomes more complex if money is added or subtracted from the account. The formula now expands to the (ending balance – ½ contributions + ½ withdrawals) divided by (beginning balance + ½ contribution – ½ withdrawals) minus 1. Assume your beginning balance was \$100, the ending balance was 110, and you added \$5 in the middle of the period.

Beginning Balance (BB)	Contribution [C] or Withdrawal (W)	Ending Balance (EB)	$[(EB - \frac{1}{2} C + \frac{1}{2} W) / (BB + \frac{1}{2} C - \frac{1}{2} W)] - 1$	Quarterly Return
\$100	\$5	\$110	$[(110 - 2.5) / (100 + 2.5)] - 1$	.049 = 4.9%

4. Calculating annual return requires linking quarterly returns together. This is accomplished by adding a “1” to each quarterly return and multiplying them together, then subtracting “1” at the end. Assume the first quarter return was 4.9%, second quarter was 1.1%, third quarter was –1.6%, and fourth quarter was 2.0%. The return for the year is as follows:

#### Linking Quarterly Returns

Quarter	Percent Return	Change to Decimal	Add “1”	Multiply
First	4.9%	.049	1.049	1.049
Second	1.1%	.011	1.011	x 1.011
Third	-1.6%	-.016	0.984	x 0.984
Forth	2.0%	.020	1.020	x 1.020
Multiply four quarters and subtract 1				

Multiply and subtract “1” =  $(1.049 \times 1.011 \times 0.984 \times 1.020) - 1 = .0644$  or 6.44%.

5. The annual return for the example is 6.44%. This figure should be compared to an appropriate index to determine if the account was performing up to expectations. If the account was invested in large US stocks, an appropriate benchmark may be the S&P 500. A complete list of index returns can be found in Barrons at the end of each quarter. Barrons also lists Lipper Mutual Fund returns to help you compare the performance of your fund to the average mutual fund in its category.

#### Finding Annual Returns Using Quarterly Data

Beginning Quarterly Balance (BB)	Contributions or Withdrawals (CW)	Ending Quarterly Balance (EB)	Quarterly Return $(EB - \frac{1}{2} C + \frac{1}{2} W) / (BB + \frac{1}{2} C - \frac{1}{2} W)$	Multiply Quarterly Returns
1 <sup>st</sup> Quarter				
2 <sup>nd</sup> Quarter				X
3 <sup>rd</sup> Quarter				X
4 <sup>th</sup> Quarter				X
Subtract “1” from total =				

In some quarters, large a contribution or withdrawal can distort returns. During periods of large cash flows, it is better to link returns monthly to find an accurate quarterly return. To do this, calculate the quarterly return (do not subtract 1) then link the three monthly returns together and then subtract 1.

### Finding Quarterly Returns Using Monthly Data

<b>Beginning Monthly Balance (BB)</b>	<b>Contributions or Withdrawals (CW)</b>	<b>Ending Monthly Balance (EB)</b>	<b>Monthly Return <math>(EB - \frac{1}{2}C + \frac{1}{2}W) / (BB + \frac{1}{2}C - \frac{1}{2}W)</math></b>	<b>Multiply Monthly Returns</b>
Month 1				
Month 2				X
Month 3				X
Subtract "1" from total =				

I recommend calculating a return for your account in aggregate. This means adding all your accounts together and treating them as one account for the purpose of a return calculation. This gives you an idea of the total performance of the portfolio, not just the performance of specific accounts. It is in the aggregate where the performance gap is most prevalent.