Time-Weighted Rate of Return (TWRR)

The performance returns shown on the client performance reports is calculated using the Time-Weighted Rate of Return (TWRR) formula. This approach is widely accepted as the industry standard for client performance presentation.

Time-Weighted Rate of Return

The timing of external cash flows (contributions, withdrawals and fees), into and out of an account, can influence the investment's returns. A TWRR provides a fair assessment of how well an account has been managed by discounting this influence.

To compute the TWRR, the account history is divided into sub-periods, representing the interval between significant cash flow events or valuation dates. The TWRR is computed by geometrically linking the rate of return for each sub-period.

In mathematical terms:

$$TWRR = R_1 \times R_2 \ldots R_n - 1$$

$$R_i = \frac{EndingMarketValue_i}{StartingMarketValue_i}$$

Consider the following example:

Date	Event	Total Account Market Value		Sub-period Rate of Return
		Before event	After event	
01/01	Period Start		$200,000	
03/18	$100,000 Contribution	$205,000	$305,000	2.50%
06/12	$50,000 Withdrawal	$308,050	$258,050	1.00%
12/31	Period End		$263,211	2.00%
			TWRR	5.60%

The TWRR is obtained by the following computation:

$$TWRR = \frac{205{,}000}{200{,}000} \times \frac{308{,}050}{305{,}000} \times \frac{263{,}211}{258{,}050} - 1 = 5.60\%$$

Annualized Performance

When the period is greater than one year, the cumulative return is annualized to show the average annual return over the period. For example, assume TWRR for an account over a 3.5 year period is computed to be 26.0%. Annualizing this cumulative return results in a 6.8% annual return.

In mathematical terms:

$$AnualizedTWRR = (1 + .26)\text{^}(12 / 42) - 1 = 6.8\%$$

Account Rollup Performance

The TWRR approach is used to compute the rollup performance across multiple accounts owned by the single client. The formula is applied to the combined holdings and activity of all the accounts. This effectively causes each account to contribute to the rollup performance proportional to its market value.

Consider the following example:

Date	Event	Account 1 Market Value	TWRR	Event	Account 2 Market Value	TWRR
01/01	Period Start	$200,000				
03/20	New Account Opening	$205,000	2.50%	Account Opened	$50,000	
12/31	Period End	$209,100	2.00%	Period End	$65,050	30.10%
		TWRR	4.55%		**TWRR**	30.10%

For the Rollup Performance this would show as below.

Date	Event	Rollup Market Value Before event	Rollup Market Value After event	TWRR
01/01	Period Start		$200,000	
03/20	$50,000 Contribution	$205,000	$255,000	2.50%
12/31	Period End		$274,150	7.51%
			TWRR	10.20%

Why does an account showing a market value gain have a negative TWRR?

Under certain circumstances, well-timed cash flows during a period can cause an account that has an overall gain in market value to show a negative TWRR. In this case the negative TWRR is the result of discounting the cash flow effect in the TWRR calculations to provide a more fair assessment of the quality of management of the account.

In the following example, the account is "up" by $1,600 for the period but the TWRR is negative:

Date	Event	Total Account Market Value Before event	Total Account Market Value After event	Sub-period Rate of Return
01/01	Period Start		$200,000	
05/08	$100,000 Contribution	$190,000	$290,000	-5.00%
12/31	Period End		$301,600	4.00%
				TWRR -1.20%

The TWRR is obtained as follows:

$$TWRR = \frac{190{,}000}{200{,}000} \times \frac{301{,}600}{290{,}000} - 1 = -1.20\%$$

The positive return of the second period (4.0%) does not offset the negative return of the first period (-5.0%) enough to make the resulting return positive. However, the second period positive return affected a larger investment and therefore resulted in a net gain in total account market value.