IRR (Internal Rate of Return)

IRR is also known as Realized Return or Dollar-Weighted Return.

IRR is the annualized implied discount rate calculated from a series of cash flows. It is the return that equates the present value of all invested capital in an investment to the present value of all returns, or the discount rate that will provide a net present value of all cash flows equal to zero.

Said differently, IRR is the discount rate that equates the cost of an investment with the present value of the cash generated by that investment.

Calculation

Internal Rate of Return (IRR) provides a measure of the growth of a portfolio in absolute terms; it is the single rate of return that makes everything you put into the investment equal to everything you took out.

To calculate the internal rate of return, we can use either the trial and error method of calculation or estimation using average capital base.

The trial and error method requires the following data for the time period under consideration:

- The beginning portfolio values at beginning of the measurement period.
- All inflows of capital to the portfolio
- All outflows of capital from the portfolio
- The ending portfolio values at end of the measurement.

We assume that all deposits and withdrawals occur at the beginning of the day. Therefore, the portfolio value before a capital flow is the closing value of the portfolio on the day before the capital flow. The internal rate of return for the time period can be calculated as following: PV = Sum of (FVi/(1+r)ni) + FVe/(1+r)N

Where

PV is Begin Value

FVi is future value for cash flow i

ni is number of period for i

r is IRR FVe is End Value

N is number of period at the end

Note: For holding periods shorter than 3 months, we will use The Average Capital Base method and for all others we will use the Trial and Error method.

The Average Capital Base Method uses this formula to calculate IRR:

IRR = (End Value – Begin Value – Total Contributions + Total Withdrawals) / (Begin Value + Total Weighted Contributions – Total Weighted Withdrawals)

Where Total Weighted Contributions – Total Weighted Withdrawals = Sum of (Each Change in Capital Xi (Days Left in Period for Xi / Total Days in Period))

Multiple solutions might exist for Trial and Error method. We will use the one that is closest to 0 as our solution.

Cash flows for different transaction types

Basic assumptions:

- For any period that IRR is measured we will use daily cash flows for that period with the beginning and ending market value of that period.
- A cash flow of zero is assumed for any day in which no cash flow transactions took place.
- Multiple cash flows taking place on a given day are netted to produce a single figure for the day.
- For any period that TWR is measured we will use monthly IRR and chained together to produce period TWR, in case there is a large cash flow (let's fix it to 10% of total assets of the unit we are measuring TWR) that happened between month end then we will need to valuate the sub-period IRR before and after such cash flow and chain them to produce that month's TWR.
- If a cash symbol is assigned to an account for all the funding of and proceed from a transaction, then only the transaction types denoted with external cash flow should be considered as cash flows for purpose of IRR of the account.

- If a cash symbol is not assigned to an account then we consider that all the funding and/or proceed is from out of pocket. The cash flow status for different transaction types in the following table apply for the purpose of IRR of the account.
- If a cash symbol is assigned to an account for all the funding of and proceed from a transaction, then we will use Use trade date field in setting and Default Settlement date field in security type to determine the date when the cash credit or debit takes place in the cash symbol.
- For calculation of IRR of a holding or an asset class or a security type or anything that's a subset of the account then all the cash in and out of this subset should be considered.
- Expenses and fees transaction are kept separately from security transactions.
- When calculating IRR and/or TWR net of fees, management fee transaction will be considered not as a cash flow but as a factor that changes the market value of an account. For the calculation of IRR and/or TWR net of fee of a subset of an account then the management fee will be proportionally allocated among all the subsets in an account according to the categorization used.
- For transaction types that open a position, the cost basis is the same as the flow value in most cases except in where cost basis is described in the notes. For transaction types that close a position the proceeds is the same as the flow value in most cases as well.
- Sell call option to open is used to model write call option, and sell put option to open is used to model write put option.
- For write options we will not link the underlying security to a particular holding.