

MODIFIED DIETZ AND ANNUALIZED MODIFIED DIETZ EXPLAINED

The “Modified Dietz” and the “Annualized Modified Dietz” are extremely precise and exact rate of return (RoR) formulas. They require all the transactional history as well as price history since the beginning of the account. Without this information, the rates of return will not be correct.

Note: Monthly returns are calculated using the Modified Dietz formula and then linked together to determine personal RORs over the specific time period. Monthly returns can be calculated for a period less than one month in the case when an initial purchase or final redemption occurs within the period. Here is a step-by-step description of the Modified Dietz formula with monthly returns.

Step One (calculating a monthly return using Modified Dietz formula)

$$R_{\text{month}} = \frac{MVE - MVB - \Sigma C1}{MVB + \Sigma C1W1}$$

Where:

R_{month} = rate of return for one month

MVE = market value at end of the month

MVB = market value at beginning of the month

ΣC1 = sum of individual cash flows within the month (contributions to portfolio are positive flows and withdrawals are negative flows, cash distributions are a negative cash flow, reinvested distributions are not considered a cash flow: net zero.

ΣC1W1 = sum of the individual cash flows C1, multiplied by their weight W1.

W1 = the proportion of the total number of days in the month that the cash flow C1 has been in (or out of) the portfolio.

$$= (CD - D1) / CD \rightarrow$$

Where:

CD = the total number of days in the month or period

D1 = is the number of days since the beginning of the month or period in which the cash flow C1 occurred.

Step Two (linking monthly returns)

$$((1+R1) \times (1+R2) \times (1+R3) \dots - 1)$$

Where:

R1, R2, R3 ... = return for month 1, return for month 2, return for month 3 ...

Example:

John Smith has \$1000 in Fund A at the beginning of month one. In the middle of the month, he makes a purchase of \$200, and at the end of the month his investment in Fund A is valued at \$1300.

Step One:

$$\begin{aligned} R1 &= \frac{MVE - MVB - \Sigma C1}{MVB + \Sigma C1W1} \\ &= \frac{\$1300 - \$1000 - \$200}{\$1000 + (\$200 \times 15/30)} \\ &= \frac{\$100}{\$1000 + \$100} \\ &= 9.1\% \end{aligned}$$

Assume the following monthly RORs to complete a 14-month period:

Month	ROR (percent)
Month1	9.1
Month2	1.2
Month3	3.4

Month4	1.7
Month5	6.3
Month6	1.5
Month7	-3.4
Month8	-1.2
Month9	5.0
Month10	2.3
Month11	2.1
Month12	0.1
Month 13	0.8
Month14	1.1

Step Two:

John Smith's 1 year ROR for Fund A is calculated by linking his monthly returns. The linked 1-year return is:

$$\begin{aligned}
 & ((1+R_1) \times (1+R_2) \times (1+R_3) \dots -1) \\
 = & ((1+.091) \times (1+.021) \times (1+.034) \times \\
 & (1+.017) \times (1+.063) \times (1+.015) \times \\
 & (1+(-.034)) \times (1+((-0.12)) \times (1+.05) \times \\
 & (1+.023) \times (1+.021) \times (1+.021) \times \\
 & (1+.001) -1)
 \end{aligned}$$

$$\begin{aligned}
 = & ((1.091) \times (1.012) \times (1.034) \times (1.017) \\
 & \times (1.063) \times (1.015) \times (.966) \times (.988) \times \\
 & (1.05) \times (1.023) \times (1.021) \times (1.001) - \\
 & 1)
 \end{aligned}$$

$$=31.3\% \text{ (The MD is 31.3\%)}$$

ANNUALIZED MODIFIED DIETZ (AMD):

Do not attempt to use this time-weighted rate of return unless the account has been open for at least a year. If the account has not been open for a year, then the rate of return will be extrapolated and will give an “**Estimated**” rate of return. **Also, all transaction history as well as price history is an absolute necessity when using AMD.** If this information is not complete, then this rate of return will be incorrect.

The AMD will be calculated using the above example of John Smith’s Fund A. Assume the monthly RORs to complete a 14-month period as listed on page 1.

Step Two:

John Smith’s AMD for Fund A is calculated by linking his monthly returns. The linked return is:

$$\begin{aligned} & ((1+R1) \times (1+R2) \times (1+R3) \dots -1) \\ & = ((1+.091) \times (1+.021) \times (1+.034) \times \\ & \quad (1+.017) \times (1+.063) \times (1+.015) \times \\ & \quad (1+(-.034)) \times (1+((-0.12)) \times (1+.05) \times \\ & \quad (1+.023) \times (1+.021) \times (1+.021) \times \\ & \quad (1+.001) \times (1+.008) \times (1+.011) - 1) \\ & = ((1.091) \times (1.012) \times (1.034) \times (1.017) \\ & \quad \times (1.063) \times (1.015) \times (.966) \times (.988) \times \\ & \quad (1.05) \times (1.023) \times (1.021) \times (1.001) \times \\ & \quad (1.008) \times (1.011) - 1) \\ & = 33.806\% \text{ Modified Dietz (14 months)} \end{aligned}$$

To annualize the modified dietz:

$$\begin{aligned} \text{AMD} &= (1 + \text{Modified Dietz})^{12/\text{number of months}} - 1 \\ &= ((1 + 0.338) ^{12/14} - 1) \\ &= ((1.338) ^{12/14} - 1) \\ &= ((1.338) ^{0.857} - 1) \\ &= 28.3\% \text{ (The AMD is 28.3\%)} \end{aligned}$$