

How saving for college really adds up

Calculating your personal rate of return with the Modified Dietz method

What's my personal rate of return?

Whether it's planning for retirement, saving for a home or preparing for a child's college education, your personal rate of return, or the investment performance of your portfolio over a certain period of time, is an important indication of your progress. Having a good understanding of this number, and how it compares relative to the market, can help you stay on track when it comes to meeting your savings goals.

How well am I doing?

Measuring your personal rate of return can help you make better investment decisions. The Modified Dietz method of calculating this figure, which takes into consideration timing and cash flows, is one standard industry approach that may offer some clarity. The potential benefit of this approach versus other fundamental time-weighted approaches: It doesn't require portfolio valuations at each point in time for every cash-flow event.

Here's how the Modified Dietz equation works:

$$\frac{\text{Ending market value} - \text{Beginning market value} - (\text{Additions} - \text{Withdrawals})}{\text{Beginning value} + \text{Time-weighted cash flows}} \times 100 = \text{Return}$$

As you prepare for your child's education, here's a hypothetical example of how this formula can be applied to your savings strategy and define your personal rate of return over the course of a year. Let's assume the following:

- Beginning balance as of January 1: **\$20,000**
- Ending balance as of December 31: **\$21,000**
- **\$500** addition made on June 30
- **\$250** withdrawal made on June 30

Because the addition and withdrawal were made halfway through the period, that addition and withdrawal would be assigned a weighting of 50%. So a \$500 addition would add \$250, and a \$250 withdrawal would deduct \$125 to the time-weighted cash flows.

$$\frac{21,000 - 20,000 - (500 - 250)}{20,000 + (250 - 125)} \times 100 = 3.73\%$$

Here's a more detailed example

The following is an expanded version of the Modified Dietz method and how to calculate a personal rate of return on a quarterly basis. In this example, we should assume you had a beginning balance of \$5,000 on January 1, and an ending balance of \$5,500 on March 31.

To begin, determine the total number of calendar days in the measured period: In our example above, January 1 through March 31 = **90 days**.

Following this, review the duration and cash flows of the portfolio that occurred each month*:

Date	Duration	Cash flow
January 15	15 days	+\$50
February 15	46 days	+\$50
February 23	54 days	+\$100
March 15	74 days	+\$50

} = \$150

When more than one transaction occurs in the same month, calculate the average date and corresponding duration:

Average of February 15 and February 23 = February 19

Average duration: $(46 + 54) / 2 = 50$ days

Then, calculate the weighted cash flow (WCF) for each month:

$$\text{WCF (Jan 15)} = \$50 \frac{(90 \text{ days} - 15 \text{ days})}{90 \text{ days}} = \$41.67$$

$$\text{WCF (Feb 19)} = \$150 \frac{(90 \text{ days} - 50 \text{ days})}{90 \text{ days}} = \$66.67$$

$$\text{WCF (Mar 15)} = \$50 \frac{(90 \text{ days} - 74 \text{ days})}{90 \text{ days}} = \$8.89$$

This gives you all the information you need to calculate the quarterly return. The sum of your weighted cash flow is your time-weighted cash flow.

Month	Beginning balance	Ending balance	Cash flows	Weighted cash flow (WCF)
January	\$5,000		\$50	\$41.67
February			150	66.67
March		\$5,500	50	8.89
Total			\$250	\$117.23

$$\text{Return} = \frac{\$5,500 - \$5,000 - \$250}{\$5,000 + \$117.23} = 0.0489 \times 100 = 4.89\%$$

* For mutual funds, portfolio additions consist of share purchases, exchanges or transfers of shares into your account. Withdrawals consist of redemptions, exchanges or transfers of shares out of your account, and any cash distributions received. Sales charges incurred by you will also affect your personal rate of return. For the purpose of these formulas, cash flow represents your additions and withdrawals.

Investments are not FDIC-insured, nor are they deposits of or guaranteed by a bank or any other entity, so they may lose value. Past results are not predictive of future returns.