

1.2. Financial Ratios

1.2.1. Profit Margin

For calculating the profit margin, the profit is divided by the revenue. When talking about the profit margin it is important to specify which specific profit figure is used (e.g. operating profit, earnings before income and taxes, etc.).

For example, if revenue is \$1,000 and profit \$200, the profit margin is 20% (200 divided by 1,000). If sales prices increase by 10% (and all other factors remain the same), the profit margin is increasing by approx. 36% to approx. 27% (profit of 300 divided by revenue of 1,100).

$$\text{Profit Margin} = \frac{\text{Profit}}{\text{Revenue}}$$

1.2.2. Return on Investment (ROI)

The return on investment shows the profit in relation to the capital invested. At the same time, the return on investment equals the profit margin times the turnover ratio.

$$\text{ROI} = \frac{\text{Profit}}{\text{Capital invested}} = \frac{\text{Profit}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Capital}}$$

1.2.3. Compound Annual Growth Rate (CAGR)

The compound annual growth rate (CAGR) is a popular measure for the average growth rate over multiple time periods. Let's look at the following example:

- Year 1: 500
- Year 2: 600
- Year 3: 900
- Year 4: 1,700
- Year 5: 1,800

In order to calculate the average growth rate over this five time periods, the following CAGR formula can be used:

$$\text{CAGR} = \left(\frac{\text{Ending value}}{\text{Beginning value}} \right)^{\frac{1}{\text{Number of periods}}} - 1$$

For our example, the CAGR is calculated as follows:

$$\text{CAGR} = \left(\frac{1,800}{500} \right)^{\frac{1}{5}} - 1 = 0.29199 = 29.20\%$$

1.2.4. Net Present Value (NPV)

The net present value concept has its background in the investment area and aims to make future payments comparable by discounting them to one specific point in time.

The NPV is therefore the sum of all positive and negative cash flows of an investment. By using a calculatory interest rate investments with different positive and negative cash flows can be compared to each other.

For example, one investment has the following cash flows:

- Today: -100
- In 1 year: +30
- In 2 years: +15
- In 3 years: +25
- In 4 years: +40

When simply summing up the positive and negative cash flows of this investment, the total is +10 and therefore it looks like a good investment.

However, positive cash flows in the future are worth less today and are therefore discounted, e.g. with a calculatory interest rate of 5%. This means that the cash flow of +30 in 1 year needs to be discounted by 1 year, the cash flow of +15 in 2 years by 2 years, etc. All discounted cash flows add up to a total of -3.3. Therefore, considering a calculatory interest rate and discounting future cash flows shows that the sum of the discounted cash flows is negative and thus not a good investment.

