

Definitions of Accounting Items Used in Ratio Analysis

Item	Definition
Net interest expense after tax	$(\text{Interest expense} - \text{Interest income}) \times (1 - \text{Tax rate})^a$
Net operating profit after taxes (NOPAT)	Net income + Net interest expense after tax
Operating working capital	$(\text{Current assets} - \text{Cash and marketable securities}) - (\text{Current liabilities} - \text{Short-term debt and current portion of long-term debt})$
Net long-term assets	Total long-term assets - Non-interest-bearing long-term liabilities
Net debt	Total interest-bearing liabilities + Cash and marketable securities
Net assets	Operating working capital + Net long-term assets
Net capital	Net debt + Shareholders' equity

^aThe calculation of net interest expense treats interest expense and interest income as absolute values, independent of how these figures are reported in the income statement.

$$\text{ROE} = \frac{\text{Net income}}{\text{shareholders' equity}}$$

$$\begin{aligned} \text{ROE} &= \text{ROA} \times \text{Financial leverage} \\ &= \frac{\text{Net income}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Shareholders' equity}} \end{aligned}$$

$$\text{ROA} = \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}}$$

$$\begin{aligned} \text{ROE} &= \frac{\text{NOPAT}}{\text{Equity}} - \frac{(\text{Net interest expense after tax})}{\text{Equity}} \\ &= \frac{\text{NOPAT}}{\text{Net assets}} \times \frac{\text{Net assets}}{\text{Equity}} - \frac{\text{Net interest expense after tax}}{\text{Net debt}} \times \frac{\text{Net debt}}{\text{Equity}} \\ &= \frac{\text{NOPAT}}{\text{Net assets}} \times \left(1 + \frac{\text{Net debt}}{\text{Equity}} \right) - \frac{\text{Net interest expense after tax}}{\text{Net debt}} \times \frac{\text{Net debt}}{\text{Equity}} \\ &= \text{Operating ROA} + (\text{Operating ROA} - \text{Effective interest rate after tax}) \\ &\quad \times \text{Net financial leverage} \\ &= \text{Operating ROA} + \text{Spread} \times \text{Net financial leverage} \end{aligned}$$

$$\text{Operating ROA} = \frac{\text{NOPAT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Net assets}}$$

$$\text{Gross profit margin} = \frac{\text{Sales} - \text{Cost of sales}}{\text{Sales}}$$

$$\text{NOPAT margin} = \frac{\text{NOPAT}}{\text{Sales}}$$

$$\text{EBITDA margin} = \frac{\text{Earnings before interest, taxes, depreciation, and amortization}}{\text{Sales}}$$

$$\text{Operating working capital to sales ratio} = \frac{\text{Operating working capital}}{\text{Sales}}$$

$$\text{Operating working capital turnover} = \frac{\text{Sales}}{\text{Operating working capital}}$$

$$\text{Accounts receivable turnover} = \frac{\text{Sales}}{\text{Accounts receivable}}$$

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}^{12}}{\text{Inventory}}$$

$$\text{Accounts payable turnover} = \frac{\text{Purchases}}{\text{Accounts payable}} \quad \text{OR} \quad \frac{\text{Cost of goods sold}}{\text{Accounts payable}}$$

$$\text{Days' receivables} = \frac{\text{Accounts receivable}}{\text{Average sales per day}}$$

$$\text{Days' inventory} = \frac{\text{Inventory}}{\text{Average cost of goods sold per day}}$$

$$\text{Days' payables} = \frac{\text{Accounts payable}}{\text{Average purchases (or cost of goods sold) per day}}$$

$$\text{Net long-term asset turnover} = \frac{\text{Sales}}{\text{Net long-term assets}}$$

$$\text{PP\&E turnover} = \frac{\text{Sales}}{\text{Net property, plant, and equipment}}$$

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick ratio} = \frac{\text{Cash} + \text{Short-term investments} + \text{Accounts receivable}}{\text{Current liabilities}}$$

$$\text{Cash ratio} = \frac{\text{Cash} + \text{Marketable securities}}{\text{Current liabilities}}$$

$$\text{Operating cash flow ratio} = \frac{\text{Cash flow from operations}}{\text{Current liabilities}}$$

$$\text{Liabilities to equity ratio} = \frac{\text{Total liabilities}}{\text{Shareholders' equity}}$$

$$\text{Debt-to-equity ratio} = \frac{\text{Short-term debt} + \text{Long-term debt}}{\text{Shareholders' equity}}$$

Net-debt-to-equity ratio

$$= \frac{\text{Short-term debt} + \text{Long-term debt} - \text{Cash and marketable securities}}{\text{Shareholders' equity}}$$

Debt-to-capital ratio

$$= \frac{\text{Short-term debt} + \text{Long-term debt}}{\text{Short-term debt} + \text{Long-term debt} + \text{Shareholders' equity}}$$

Net-debt-to-net-capital ratio

$$= \frac{\text{Interest bearing liabilities} - \text{Cash and marketable securities}}{\text{Interest bearing liabilities} - \text{Cash and marketable securities} + \text{Shareholders' equity}}$$

$$\text{Interest coverage (earnings basis)} = \frac{\text{Net income} + \text{Interest expense} + \text{Tax expense}}{\text{Interest expense}}$$

Interest coverage (cash flow basis)

$$= \frac{\text{Cash flow from operations} + \text{Interest expense} + \text{Taxes paid}}{\text{Interest expense}}$$

$$\text{Divided payout ratio} = \frac{\text{Cash dividends paid}}{\text{Net income}}$$