

Detail of Alternative ROE Decomposition

$$\begin{aligned} \text{ROE} &= \frac{\text{NOPAT} + \text{NIPAT}}{\text{Equity}} - \frac{\text{Interest expense after tax}}{\text{Equity}} \\ &= \frac{\text{NOPAT} + \text{NIPAT}}{\text{Business assets}} \times \frac{\text{Business assets}}{\text{Equity}} - \frac{\text{Interest expense after tax}}{\text{Debt}} \times \frac{\text{Debt}}{\text{Equity}} \\ &= \frac{\text{NOPAT} + \text{NIPAT}}{\text{Business assets}} \left(\frac{\text{Equity} + \text{Debt}}{\text{Equity}} \right) - \frac{\text{Interest expense after tax}}{\text{Debt}} \times \frac{\text{Debt}}{\text{Equity}} \\ &= \frac{\text{NOPAT} + \text{NIPAT}}{\text{Business assets}} \left(1 + \frac{\text{Debt}}{\text{Equity}} \right) - \frac{\text{Interest expense after tax}}{\text{Debt}} \times \frac{\text{Debt}}{\text{Equity}} \\ &= \text{Return on business assets} + \\ &\quad (\text{Return on business assets} - \text{Effective interest rate after tax}) \times \text{Financial leverage} \\ &= \text{Return on business assets} + \text{Spread} \times \text{Financial leverage} \end{aligned}$$

Detail of Alternative ROE Decomposition

$$\begin{aligned}
 \text{ROBA} &= \frac{\text{NOPAT}}{\text{Business Assets}} + \frac{\text{NIPAT}}{\text{Business Assets}} \\
 &= \frac{\text{NOPAT} * \text{Sales}}{\text{Operating assets} * \text{Sales}} \times \frac{\text{Operating assets}}{\text{Business assets}} + \frac{\text{NIPAT}}{\text{Investment assets}} \times \frac{\text{Investment assets}}{\text{Business assets}} \\
 &= \frac{\text{NOPAT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Operating assets}} \times \frac{\text{Operating assets}}{\text{Business assets}} + \frac{\text{NIPAT}}{\text{Investment assets}} \times \frac{\text{Investment assets}}{\text{Business assets}} \\
 &= \text{NOPAT MARGIN} \times \text{OPERATING ASSET TURNOVER} \times \frac{\text{Operating assets}}{\text{Business assets}} + \text{Return on non-operating Investments} \times \frac{\text{Investment assets}}{\text{Business assets}}
 \end{aligned}$$

$$\text{ROE} = \text{NOPAT MARGIN} \times \text{OPERATING ASSET TURNOVER} \times \frac{\text{Operating assets}}{\text{Business assets}} + \text{Return on non-operating Investments} \times \frac{\text{Investment assets}}{\text{Business assets}} + \text{Spread} \times \text{Financial leverage}$$