Investment Ratios

RETURN
ON
INVESTMENT

Investment Ratios…

"Return on…" Ratios

Is the company making a good return on its investment in plant and equipment?

Are the shareholder's making a good return from their investment in the company?

The "Return on Investment" ratios:

- ✓ Return on Assets, ROA
- ✓ Return on Equity, ROE
- ✓ Return on Invested Capital, ROIC

Return on Assets (ROA)…

ROA is an indicator of whether the investments made *by* the company have worked out…

$$\text{ROA} = \frac{\text{Net income}}{\text{Total Assets}}$$

An ROA of 10% means an investment in an asset by the company will yield a 10% return. (A $100 investment in a piece of equipment returns $10 in net profit.)

Tesla's ROA in 2021: 10.6%

Apple's ROA in 2021: 29.2%

Investment Ratios

Clearly, a high profit margin and high asset turnover are ideal, but not easy to achieve.

The DuPont Formula

Years ago, DuPont Chemical Co's accountants showed that ROA is made up of two important components:

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}} = \underbrace{\frac{Net\ Income}{Revenues}}_{\text{Net Margin}} \times \underbrace{\frac{Revenues}{Total\ Assets}}_{\text{Asset Turnover}}$$

Example of how this works:

- Outsourcing improves Asset Turnover but reduces Net Margins (because you now pay someone else).
- Vertical integration improves Net Margins but reduces Asset Turnover (since you need more assets in a vertically integrated company).

Return on Equity (ROE)…

ROE is an indicator of whether the company is a good investment or not.

$$\text{ROE} = \frac{\text{Net Income}}{\text{Shareholder Equity}}$$

An ROE of 25% means an investment in the company will yield a 25% return.
(A $100 investment returns $25 in net profit.)

ROE tells investors whether the company is a good investment or not.

ROE tells managers whether to invest the company's earnings back into the company or not.

Tesla's ROE in 2021: 23.9%

Apple's ROE in 2021: 145%!

Return on Equity (ROE)…

Some Challenges with ROE…

One problem with ROE is that more debt actually makes the ROE look better than it really is…

Let's see what happens with a company that starts with $1M in Shareholder Equity, no debt and Operating Income (EBIT) of $200K.

EBIT	Debt	Interest (at 10%)	Income Before Tax	Tax (at 30%)	Net Income	Shareholder Equity	ROE
$200,000	$0	$0	$200,000	$60,000	$140,000	$1,000,000	**14.0%**
$200,000	$100,000	$10,000	$190,000	$57,000	$133,000	$900,000	**14.8%**
$200,000	$400,000	$40,000	$160,000	$48,000	$112,000	$600,000	**18.7%**
$200,000	$800,000	$80,000	$120,000	$36,000	$84,000	$200,000	**42.0%**

Operationally, profitability is the same.

$140,000 / $1,000,000

Even though the earnings are the same, the ROE varies widely based on how the company is financially structured (liabilities + shareholder equity)

The greater the debt, the higher the ROE!

Return on Equity (ROE)…

Some Challenges with ROE…

And too much debt, while making the ROE look good, can create other problems…

EBIT	Debt	Interest (at 10%)	Times Interest Earned Ratio
$200,000	$0	$0	---
$200,000	$100,000	$10,000	20
$200,000	$400,000	$40,000	5
$200,000	$800,000	$80,000	2.5

$$TIE = \frac{EBIT}{Interest\ Expense}$$

Boosting the ROE by adding more debt leads to a decrease in the TIE ratio; any downturn in the business creates problems paying interest on the debt.

Bottom Line: You need to look at many ratios to really understand what is going on!

Return on Invested Capital (ROIC)…

A ratio that indicates profitability without the confounding effects of how the company funds operations:

$$\text{ROIC} = \frac{\text{EBIT}\ (1\ - \text{Tax Rate})}{\text{Total Invested Capital}}$$

Where:

- *EBIT (1-T) is the Operating Profit less Taxes*
- *Total Invested Capital = Debt + Equity, all the sources of cash used by the company.*

Comparing Investment Ratios…

Example: Take 2 companies, A and B, that are very similar in what they do and what they earn but have very different ways how they finance the business.

	Company A	Company B
Cash from Debt (at 10% Interest)	$900	$0
Cash from Equity Investments	$100	$1,000
Total Assets (“Total Invested Capital”)	$1,000	$1,000
Operating Income (EBIT)	$120	$120
Less Interest Expense	$90	$0
Income Before Taxes	$30	$120
Less Taxes (Federal & State: 30%)	$9	$36
Net Income	$21	$84
ROE	**21.0%**	**8.4%**
ROA	**2.1%**	**8.4%**
ROIC	**8.4%**	**8.4%**

A & B are funded very differently: A has a lot of debt and B has all equity.

A & B have the same operating profit, which is adjusted by interest payments and income taxes.

ROE & ROA give very different results for A & B; only ROIC reflects the similarity in A & B’s earning potential.

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ROE = Net Income / Shareholder Equity

A: $21 / $100 = 21.0%
B: $84 / $1,000 = 8.4%

ROA = Net Income / Total Assets

A: $21 / $1,000 = 2.1%
B: $84 / $1,000 = 8.4%

ROIC = EBIT (1-Tax Rate) / Total Invested Capital

A: $120 (1-0.3) / ($900 + $100) = 8.4%
B: $120 (1-0.3) / ($0 + $1000) = 8.4%

Another Interesting Ratio…

Revenues per Employee

Indicates a company's productivity degree of vertical integration (e.g., how much outsourcing) and value-added capabilities:

$$\text{Revenues per Employee} = \frac{\text{Revenues}}{\text{\# of Employees}}$$

Google/Alphabet

At the end of 2021:
Revenues: $258B
Employees: 156,500

$/Employee = $1.65M !

At the end of 2021:
Revenues: $97B
Employees: 534,000

$/Employee = $181,648 !

Main Takeaways…

Investment ratios help both managers and investors gauge the company's profitability and investment potential.

The Return on Assets, ROA, is a measure of the company's profitability based on its investment in its assets.

The Return on Equity, ROE, is a measure of the company's profitability based on its investments coming from equity.

The Return on Invested Capital, ROIC, is a measure of the company's profitability, excluding issues of how the company is financed.

Next Time…

Market Value Ratios

Credits & References

Slide 1: Hand with marker writing the word ROI - Return on Investment by gustavofrazao, Adobe Stock (89992321.jpeg).

Slide 11: Google and UPS logos, google.com and ups.com (accessed June 10, 2022).

Slide 13: PE Ratio Price to Earnings Stock Ticker Buildings 3d Illustration by iQoncept, Adobe Stock (253725986.jpeg).