

Ratios and Financial Analysis

Ratios and Financial Analysis

Chapter 4
Ratios : Why

- » Comparability among firms of different sizes
- » Provides a profile of the firm

Caution:

- » Economic assumption of Linearity – Proportionality
- » Nonlinearity can cause problems:
- » Fixed costs, EOQ for inventories

Benchmarks: Is high Current ratio good? For whom?
 Industry-wide norms.
 Accounting Methods; Timing & Window Dressing
 Current ratio: 300/200 to 200/100 is it getting better?

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Negative numbers

Common Size Statements

Firm	Payout Ratios	Dividend	Income
A		\$1,000	\$5,000
B	20.00%	\$1,000	\$3,000
C	33.33%	\$1,000	\$(5,000)
	-20.00%		

All figures divided by the same figure

Balance Sheet: Divide by
 Total Assets = Liabilities + Equity

Income Statement: Divide by
 Revenue

Analysis across statements (activity analysis) not possible.
 i.e. can not divide a Income Statement by Balance Sheet number

Who has the highest payout ratio ? NOT B

Industry Comparison [Robert Morris Associates]
 Yahoo Finance

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1 Activity Analysis

2 Liquidity Analysis

- An Income Statement ÷ A Balance Sheet Figure
- Inventory Turnover = $\frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$
- Receivables Turnover = $\frac{\text{Sales}}{\text{Average Receivables}}$
- Fixed Asset Turnover = $\frac{\text{Sales}}{\text{Average Fixed Assets}}$
- Asset Turnover = $\frac{\text{Sales}}{\text{Average Total Assets}}$
- [365 / Turnover] is days outstanding.
- More Turnover is it always good / bad
- Payables Turnover = $\frac{\text{Purchases}}{\text{Average Payables}}$

Cash Cycle= $\frac{\text{Days Inventory Outstanding} + \text{Days Receivables Outstanding} - \text{Days Payable Outstanding}}{\text{Current Assets} / \text{Current Liabilities}}$

Current Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

Quick Ratio = $\frac{\text{Cash} + \text{Marketable Securities} + \text{Accounts receivable}}{\text{Current Liabilities}}$

Cash flow from operations ratio = $\frac{\text{Cash flow from operations}}{\text{Current Liabilities}}$

Dell: 2004 10-K Look at pages 22 and 31

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3 Long term Debt and Solvency Analysis

Important for Bond Covenants

Debt = Short-term debt + Long-term debt

Total capital = Debt + Equity

$$\text{Debt to Equity} = \frac{\text{Debt}}{\text{Equity}}$$

$$\text{Times Interest Earned} = \frac{\text{Earnings Before Interest \& Taxes}}{\text{Interest Expense}}$$

$$\text{Debt to total capital} = \frac{\text{Debt}}{\text{Total capital}}$$

$$\text{Leverage} = \frac{\text{Total Assets}}{\text{Equity}}$$

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Balance Sheet - reported

Assets	Short-term Payables
	Short-term debt
	Long-term Payables <small>e.g. retirement benefits, Deferred taxes</small>
	Long-term debt
	Equity

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Balance Sheet - rearrange

Assets	Short-term Payables	No Interest Paid
	Long-term Payables <small>e.g. retirement benefits Deferred taxes</small>	
	Short-term debt	Interest Paid
	Long-term debt	
	Equity	

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Balance Sheet

Assets	Operating Liabilities	Cost/return 0
	Debt	Int. Exp • (1-t)
	Equity	Net Income

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Returns

Cost/return			
0	Operating Liabilities		
Int. Exp • (1-t)	Debt	÷	After tax Interest Rate
Net Income	Equity	÷	ROE

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4-1 Profitability Analysis

$$\text{Gross Margin} = \frac{\text{Gross Profit}}{\text{Sales}}$$

$$\text{Margin Before Interest \& Taxes} = \frac{\text{EBIT}}{\text{Sales}}$$

$$\text{Return on Assets} = \frac{\text{Net Income} + (1-t) \text{ Interest Expense}}{\text{Average[Assets]}}$$

$$= \frac{\text{NOPAT}}{\text{Average[Assets]}}$$

$$= \frac{\text{EBIT}(1-t)}{\text{Average[Assets]}}$$

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4-2 Profitability Analysis

$$\begin{aligned} \text{Return on Total capital (ROTC)} &= \frac{\text{Net Income} + (1-t) \text{ Interest Expense}}{\text{Debt} + \text{Equity}} \\ &= \frac{\text{NOPAT}}{\text{Debt} + \text{Equity}} \\ &= \frac{\text{EBIT}(1-t)}{\text{Debt} + \text{Equity}} \end{aligned}$$

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Equity}}$$

Debt = average Debt; Equity = Average Equity

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Ratios – Integrated Analysis

Economic relationships:
higher sales leads to higher inventories

Overlap of components:
Asset TO ratio is related to individual TO ratios.

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Ratios as composite of other ratios

$$\begin{aligned} \text{ROA} &= \frac{\text{Margin Before Interest \& taxes}}{\text{Interest \& taxes}} \times \frac{\text{Asset Turnover}}{\text{Sales}} \times (1-t) \\ &= \frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times (1-t) \end{aligned}$$

Page 148

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4-12 : ROE and ROA (Book)

$$\begin{aligned} \text{ROE} &= \frac{\text{Net Income}}{\text{Equity}} \\ &= \frac{\text{NI} + (1-t) \text{ Interest Exp}}{\text{Equity}} - \frac{(1-t) \text{ Interest Exp}}{\text{Equity}} \\ &= \frac{\text{NI} + (1-t) \text{ Interest Exp}}{\text{Assets}} \cdot \frac{\text{Assets}}{\text{Equity}} - \frac{(1-t) \text{ Interest Exp}}{\text{Assets}} \cdot \frac{\text{Assets}}{\text{Equity}} \\ &= \left[\text{ROA} - \frac{(1-t) \text{ Interest Exp}}{\text{Assets}} \right] \frac{\text{Assets}}{\text{Equity}} \end{aligned}$$

:page 142 last
[also in 4-12]

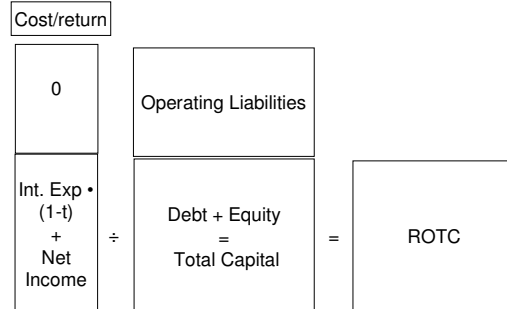
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M1: ROE from ROA

$$\begin{aligned} \text{ROE} &= \left[\text{ROA} - \frac{(1-t) \text{ Int Exp}}{\text{Assets}} \right] \frac{\text{Assets}}{\text{Equity}} \\ &= \text{ROA} \cdot \frac{\text{Equity} + \text{Oper Liab} + \text{Debt}}{\text{Equity}} - \frac{(1-t) \text{ Int Exp}}{\text{Debt}} \cdot \frac{\text{Debt}}{\text{Equity}} \\ &= \text{ROA} + \left[\text{ROA} - \frac{(1-t) \text{ Int Exp}}{\text{Debt}} \right] \cdot \frac{\text{Oper Liab}}{\text{Equity}} \end{aligned}$$

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Returns



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M2a: ROE from ROTC

$$\begin{aligned}
 \text{ROE} &= \frac{\text{Net Income}}{\text{Equity}} \\
 &= \frac{\text{NI} + (1-t) \text{Interest Exp} - (1-t) \text{Interest Exp}}{\text{Equity}} \\
 &= \frac{\text{NI} + (1-t) \text{Interest Exp}}{\text{Equity} + \text{Debt}} \cdot \frac{\text{Equity} + \text{Debt}}{\text{Equity}} \\
 &\quad - \frac{(1-t) \text{Interest Exp}}{\text{Debt}} \cdot \frac{\text{Debt}}{\text{Equity}} \\
 &= \text{ROTC} \left[1 + \frac{\text{Debt}}{\text{Equity}} \right] - (1-t) \text{Interest rate} \cdot \frac{\text{Debt}}{\text{Equity}} \\
 &= \text{ROTC} + \left[\text{ROTC} - (1-t) \text{Interest rate} \right] \frac{\text{Debt}}{\text{Equity}}
 \end{aligned}$$

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M2b: ROTC through ROA

$$\begin{aligned}
 \text{ROTC} &= \frac{\text{NI} + (1-t) \text{Interest Exp}}{\text{Debt} + \text{Equity}} \\
 &= \frac{\text{NI} + (1-t) \text{Interest Exp}}{\text{Assets}} \cdot \frac{\text{Debt} + \text{Equity} + \text{Oper Liab}}{\text{Debt} + \text{Equity}} \\
 &= \text{ROA} + \text{ROA} \cdot \frac{\text{Oper Liab}}{\text{Equity}}
 \end{aligned}$$

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Total leverage

$$\begin{aligned}
 \text{Total Leverage} &= \frac{\text{Change in Net Income}}{\text{Net Income}} \cdot \frac{\text{Revenue}}{\text{Change in Revenue}} \\
 &= \frac{\text{Change in units} \times \text{CM per unit} \times (1 - \text{Tax rate})}{\text{Net Income}} \\
 &\quad \cdot \frac{\text{Units} \times \text{Unit price}}{\text{Change in Units} \times \text{Unit Price}} \\
 &= \frac{\text{Units} \times \text{CM per unit} \times (1 - \text{Tax rate})}{\text{Net Income}} \\
 &= \frac{\text{Contribution Margin After Tax}}{\text{Net Income}}
 \end{aligned}$$

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Total leverage Components

$$\begin{aligned}
 &\text{Operating Leverage} \cdot \text{Financial Leverage} \\
 &= \frac{\text{Contribution Margin After Tax}}{\text{NOPAT}} \cdot \frac{\text{NOPAT}}{\text{Net Income}} \\
 &= \frac{\text{Contribution Margin After Tax}}{\text{Net Income}}
 \end{aligned}$$

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