

Financial Accounting Recitation 6 (FSA)

MIT Sloan School of Management

Finance at MIT

Where ingenuity drives results

Agenda

Financial Statement Analysis and Ratios

- Liquidity & Solvency Ratios
- Profitability Ratios
- Efficiency Ratios
- Dupont Analysis

Consider Three Kinds of Ratios

Liquidity and Solvency Ratios:

- Does the company have the ability to pay its bills?

Profitability Ratios:

- How well is the company generating profits?

“Efficiency” Ratios:

- Is company led efficiently?

Solvency and Liquidity Ratios

Liquidity/Solvency:

$$\text{Leverage} = \frac{\text{Total Liabilities}}{\text{Total Shareholders' Equity}}$$

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

Profitability Ratios

Margins:

$$\text{Net Margin (\%)} = \frac{\text{Net Income}}{\text{Revenue}}$$

$$\text{Gross Margin (\%)} = \frac{\text{Revenue} - \text{COGS}}{\text{Revenue}}$$

Return on Investment:

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

$$ROE = \frac{\text{Net Income}}{\text{Shareholders' Equity}}$$

Operating Efficiency

$$A/R \text{ Turnover} = \frac{\text{Revenue}}{\text{Net Accounts Receivable}}$$

- High credit sales but low A/R balance would imply that you've collected cash on your credit revenues quickly

$$\text{Inventory Turnover} = \frac{\text{COGS}}{\text{Inventory}}$$

- High COGS (expense when we sell the product) and low inventory would imply that you turn your inventory around quickly

$$\text{Days Receivable} = \frac{365}{A/R \text{ Turnover}}$$

- Measures the average number of days that the receivable is outstanding before it is collected

Changes in Ratios

Type	Before	Add/Subtract for <i>both</i> numerator and denominator	After	Change
Ratio > 1	$\frac{3}{2}$	$\frac{3 + 1}{2 + 1}$	$\frac{4}{3}$	Decrease ($\frac{3}{2} > \frac{4}{3}$)
Ratio > 1	$\frac{3}{2}$	$\frac{3 - 1}{2 - 1}$	2	Increase ($\frac{3}{2} < 2$)
Ratio < 1	$\frac{1}{2}$	$\frac{1 + 1}{2 + 1}$	$\frac{2}{3}$	Increase ($\frac{1}{2} < \frac{2}{3}$)
Ratio < 1	$\frac{1}{2}$	$\frac{1 - 1}{2 - 1}$	0	Decrease ($\frac{1}{2} > 0$)

- Check what your initial ratio is (above or below 1?)
- Check whether your transaction will affect the denominator, numerator, both, or none!

Solvency/Liquidity

(in millions USD)	Walmart	Sears
Abbreviated balance sheet	2003	2003
Cash	2,758	9,057
Accounts Receivables (net)	2,108	1,956
Inventory	24,891	5,335
Current assets	30,483	18,196
Total assets	94,685	27,723
Current liabilities	32,617	13,759
Total liabilities	55,348	21,322
Total shareholders' equity	39,337	6,401
Total liabilities + SE	94,685	27,723

$$\text{Walmart Current Ratio} = \text{Current Assets} / \text{Current Liabilities} \\ = 30,483 / 32,617 = 0.93$$

$$\text{Sears Current Ratio} = 18,196 / 13,759 = 1.32$$

$$\text{Walmart Leverage ratio} = \text{Total Liabilities} / \text{Total S/E} \\ = 55,348 / 39,337 = 1.41$$

$$\text{Sears Leverage ratio} = 21,322 / 6,401 = 3.33$$

Sears' D/E Ratio

$$\text{Sears Debt-Equity ratio} = \text{Total Liabilities} / \text{Total S/E} \\ = 3.33$$

In 2003, how would Sears' Debt/Equity ratio change if:

- Sears pays more dividends in 2003
 - D/E would increase
- Sears writes off more receivables in 2003
 - D/E would not change
- Sears issues \$1bn of long-term debt in 2003
 - D/E would increase
- Sears issues \$1bn of long-term debt and \$1 bn of stock in 2003
 - D/E would decrease

Profitability

(in millions USD)	Walmart	Sears
Abbreviated income statement	2003	2003
Revenue	246,525	41,124
COGS	191,838	26,231
Net income	8,039	3,397

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$$\text{Walmart Net Margin} = \text{Net Income} / \text{Revenues} \\ = 8,039 / 246,565 = 3.26\%$$

$$\text{Sears Net Margin} = 3,397 / 41,124 = 8.26\%$$

$$\text{Walmart ROE} = \text{Net Income} / \text{Ending Total SE} \\ = 8,039 / 39,337 = 20.43\%$$

$$\text{Sears ROE} = 3,397 / 6,401 = 53.07\%$$

Walmart's ROE

Walmart ROE

$$\begin{aligned} &= \text{Net Income} / \text{Ending Total SE} \\ &= 8,039 / 39,337 = 20.43\% \end{aligned}$$

In 2003, how would Walmart's ROE change if:

- On 12/31/2003, Walmart paid a dividend
 - ROE would increase

- On 12/31/2003, Walmart wrote off more of their receivables
 - ROE is unaffected

- On 12/31/2003, Walmart sold one of their factories and gained \$2,000 on sale
 - ROE would increase

Sears' Operating Efficiency

- Let's define Inventory Turnover = $\frac{COGS}{Ending\ Inventory}$
- Sears Inventory Turnover = $\frac{26,231}{5,335} = 4.92$
- Assume that Sears uses LIFO. Under “normal circumstances” (i.e. rising prices and *no reduction in inventory*) would inventory turnover be higher or lower under FIFO?
- Effect on COGS:
 - Decrease
- Effect on Ending Inventory:
 - Increase
- Effect on Inventory Turnover:
 - Decrease

DuPont Decomposition

DuPont Analysis: decomposes ROE into ratios of solvency, profitability, and efficiency.

$$ROE = NI / Equity$$

$$ROE = \frac{NI}{Assets} * \frac{Assets}{Equity} = \text{ROA} * \text{Leverage}$$

$$ROE = \frac{NI}{Sales} * \frac{Sales}{Assets} * \frac{Assets}{Equity}$$
$$= \text{Profit Margin} * \text{Asset Turnover} * \text{Leverage}$$

DuPont Decomposition

$$\text{ROE} = \text{NI/SALES} * \text{SALES/ASSETS} * \text{ASSETS/EQUITY}$$

Return on sales Asset utilization Leverage

$$\begin{array}{ccccccc} \text{Walmart ROE} & = & 8,039/246,525 & * & 246,525/94,685 & * & 94,685/39,997 & = & 20.4\% \\ & & 3.26\% & & 2.60 & & 2.41 & & \end{array}$$

$$\begin{array}{ccccccc} \text{Sears ROE} & = & 3,397/41,124 & * & 41,124/27,723 & * & 27,723/6,401 & = & 53.1\% \\ & & 8.26\% & & 1.48 & & 4.33 & & \end{array}$$

- What happens if Sears pays out cash dividends at the end of the year?
 - Assets decrease (cash goes down)
 - Equity decreases (retained earnings goes down)
 - Asset Utilization goes up
 - Leverage goes up (b/c our ratio is greater than 1)
 - ROE increases

Use the following definitions to solve the practice problems

(All balance sheet items use ending values)

$$\text{Leverage} = \frac{\text{Total Liabilities}}{\text{Total Shareholders' Equity}}$$

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

$$\text{Net Margin (\%)} = \frac{\text{Net Income}}{\text{Revenue}}$$

$$\text{Gross Margin (\%)} = \frac{\text{Revenue} - \text{COGS}}{\text{Revenue}}$$

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

$$\text{ROE} = \frac{\text{Net Income}}{\text{Shareholders' Equity}}$$

$$\text{Asset Turnover} = \frac{\text{Revenue}}{\text{Total Assets}}$$

Question 1: Ratios and BSE entries

Event/Transaction	Financial Statement Effects
<p>(a) Accrued bad debt expense of \$12,000.</p> $\begin{array}{rcl} \text{A/r} & - \text{Allow For D/a} & = \\ & 12,000 & \text{R/E} \\ & & -12,000 \end{array}$	<p>Current Ratio: Decrease</p> <p>Return on Assets: Decrease</p> <p>Leverage ratio: Increase</p>
<p>(b) Sold property plant and equipment which cost \$20,000 and had accumulated depreciation of \$14,000 for \$5,000 in cash.</p> $\begin{array}{rcl} \text{Cash} & \text{PPE} & - \text{Accum Dep} & = & \text{R/E} \\ 5,000 & -20,000 & -14,000 & & -1,000 \end{array}$	<p>Leverage ratio: Increase</p> <p>Current ratio: Increase</p> <p>Net Income: Decrease</p>

Question 2: DuPont Analysis

Below is basic financial information of CVS for fiscal years 2016 and 2015. Conduct a DuPont analysis for fiscal year 2016. Use Total assets/Total shareholders' equity for leverage ratio.

Item	2016	2015
Total Assets	94,462	92,437
Shareholders' Equity	36,834	37,203
Revenue (Sales)	177,526	153,290
Net income	5,317	5,237

Question 2: DuPont Analysis (cont'd)

CVS	2016
ROE	$\$5,317 / \$36,834 = 14.44\%$
Profit Margin	$\$5,317 / \$177,526 = 3.00\%$
Asset Turnover	$\$177,526 / \$94,462 = 1.88$
Leverage (Assets/Equity)	$\$94,462 / \$36,834 = 2.56$