

# 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:

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

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

## 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
<b>Total assets</b>	<b>94,685</b>	<b>27,723</b>
Current liabilities	32,617	13,759
Total liabilities	55,348	21,322
Total shareholders' equity	39,337	6,401
<b>Total liabilities + SE</b>	<b>94,685</b>	<b>27,723</b>

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

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

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

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



# 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

writes off: reduce A/R and allowance, no change to A, E, L

# 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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<b>Total liabilities + SE</b>	<b>94,685</b>	<b>27,723</b>

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

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

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

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

# Walmart's ROE

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

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    both numerator and denominator increase by the same amount

# 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.

$$ROE = NI / Equity$$

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

leverage has different definitions

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

# 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)

Current assets: cash, cash equivalents, accounts receivable, stock inventory, marketable securities, pre-paid expenses, and other liquid assets

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

Current liabilities: A/P, accrued expenses, taxes payable, short-term debt, payroll liabilities, dividends declared, unearned revenue

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

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

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

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

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

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

# Question 1: Ratios and BSE entries

Event/Transaction	Financial Statement Effects
<p>(a) Accrued bad debt expense of \$12,000.</p> <p>allowance for doubtful accounts</p> <p>A/r   - Allow For D/a   =   R/E</p> <p>12,000   -12,000</p> <p>contra asset</p>	<p>Current Ratio:   <b>Decrease</b></p> <p>current assets decrease</p> <p>Return on Assets:   <b>Decrease</b></p> <p>both numerator and denominator decrease by the same amount</p> <p>Leverage ratio:   <b>Increase</b></p> <p>retained earnings decreases but liabilities do not</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> <p>Cash   PPE   - Accum Dep   =   R/E</p> <p>5,000   -20,000   -14,000   -1,000</p>	<p>Leverage ratio:   equity decreases, no change in liabilities</p> <p><b>Increase</b></p> <p>Current ratio:   <b>Increase</b></p> <p>cash increases, no change in current liabilities.</p> <p>Net Income:   <b>Decrease</b></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)	$\$94,462 / \$36,834 = 2.56$