Chapter 3 Lecture - Working with Financial Statements

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Learning Objectives

After studying this chapter, you should be able to:

LO 1 Standardize financial statements for comparison purposes.

LO 2 Compute and, more important, interpret some common ratios.

LO 3 Assess the determinants of a firm's profitability and growth.

LO 4 Identify and explain some of the problems and pitfalls in financial statement analysis.

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Standardized Financial Statements

- **Common-Size Balance Sheets**
  - **All accounts = percent of total assets (%TA)**
- **Common-Size Income Statements**
  - **All line items = percent of sales or revenue (%SLS)**
- **Standardized statements are useful for:**
  - **Comparing financial information year-to-year**
  - **Comparing companies of different sizes, particularly within the same industry**

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Prufrock Corporation Balance Sheets

TABLE 3.1

PRUFROCK CORPORATION
Balance Sheets as of December 31, 2015 and 2016
($ in millions)

	2015	2016
Assets		
Current assets		
Cash	$ 84	$ 98
Accounts receivable	165	188
Inventory	393	422
Total	$ 642	$ 708
Fixed assets		
Net plant and equipment	$2,731	$2,880
Total assets	$3,373	$3,588
Liabilities and Owners' Equity		
Current liabilities		
Accounts payable	$ 312	$ 344
Notes payable	231	196
Total	$ 543	$ 540
Long-term debt	$ 531	$ 457
Owners' equity		
Common stock and paid-in surplus	$ 500	$ 550
Retained earnings	1,799	2,041
Total	$2,299	$2,591
Total liabilities and owners' equity	$3,373	$3,588

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Chapter 3 Lecture - Working with Financial Statements

Prufrock Corporation
Common-Size Balance Sheets

TABLE 3.2

PRUFROCK CORPORATION
Common-Size Balance Sheets
December 31, 2015 and 2016

	2015	2016	Change
Assets			
Current assets			
Cash	2.5%	2.7%	+ .2%
Accounts receivable	4.9	5.2	+ .3
Inventory	11.7	11.8	+ .1
Total	19.0	19.7	+ .7
Fixed assets			
Net plant and equipment	81.0	80.3	− .7
Total assets	100.0%	100.0%	0%
Liabilities and Owners' Equity			
Current liabilities			
Accounts payable	9.2%	9.6%	+ .3%
Notes payable	6.8	5.5	− 1.4
Total	16.1	15.1	− 1.0
Long-term debt	15.7	12.7	− 3.0
Owners' equity			
Common stock and paid-in surplus	14.8	15.3	+ .5
Retained earnings	53.3	56.9	+ 3.5
Total	68.2	72.2	+ 4.1
Total liabilities and owners' equity	100.0%	100.0%	0%

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Prufrock Corporation
Income Statement

TABLE 3.3

PRUFROCK CORPORATION
2016 Income Statement
($ in millions)

Sales		$2,311
Cost of goods sold		1,344
Depreciation		276
Earnings before interest and taxes		$ 691
Interest paid		141
Taxable income		$ 550
Taxes (34%)		187
Net income		$ 363
Dividends	$121	
Addition to retained earnings	242	

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Prufrock Corporation
Common-Size Income Statement

TABLE 3.4

PRUFROCK CORPORATION
Common-Size Income Statement
2016

Sales		100.0%
Cost of goods sold		58.2
Depreciation		11.9
Earnings before interest and taxes		29.9
Interest paid		6.1
Taxable income		23.8
Taxes (34%)		8.1
Net income		15.7%
Dividends	5.2%	
Addition to retained earnings	10.5	

Tells us what happened to each dollar of sales

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Ratio Analysis

- Allow for better comparison through time or between companies
- Used both internally and externally
- For each ratio, ask yourself:
  - What the ratio is trying to measure
  - Why that information is important

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Categories of Financial Ratios

- **Liquidity ratios** or Short-term solvency
- **Financial leverage ratios** or Long-term solvency ratios
- **Asset management** or Turnover ratios
- **Profitability ratios**
- **Market value ratios**

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Common Financial Ratios

I. Short-term solvency, or liquidity, ratios

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

$$\text{Cash ratio} = \frac{\text{Cash}}{\text{Current liabilities}}$$

II. Long-term solvency, or financial leverage, ratios

$$\text{Total debt ratio} = \frac{\text{Total assets} - \text{Total equity}}{\text{Total assets}}$$

$$\text{Debt-equity ratio} = \text{Total debt}/\text{Total equity}$$

$$\text{Equity multiplier} = \text{Total assets}/\text{Total equity}$$

$$\text{Times interest earned ratio} = \frac{\text{EBIT}}{\text{Interest}}$$

$$\text{Cash coverage ratio} = \frac{\text{EBIT} + \text{Depreciation}}{\text{Interest}}$$

III. Asset utilization, or turnover, ratios

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Inventory}}$$

$$\text{Days' sales in inventory} = \frac{\text{365 days}}{\text{Inventory turnover}}$$

$$\text{Receivables turnover} = \frac{\text{Sales}}{\text{Accounts receivable}}$$

$$\text{Payables turnover} = \frac{\text{Cost of goods sold}}{\text{Accounts payable}}$$

$$\text{Days' sales in receivables} = \frac{\text{365 days}}{\text{Receivables turnover}}$$

$$\text{Days' costs in payables} = \frac{\text{365 days}}{\text{Payables turnover}}$$

$$\text{Total asset turnover} = \frac{\text{Sales}}{\text{Total assets}}$$

$$\text{Capital intensity} = \frac{\text{Total assets}}{\text{Sales}}$$

IV. Profitability ratios

$$\text{Profit margin} = \frac{\text{Net Income}}{\text{Sales}}$$

$$\text{Return on assets (ROA)} = \frac{\text{Net income}}{\text{Total assets}}$$

$$\text{Return on equity (ROE)} = \frac{\text{Net income}}{\text{Total equity}}$$

$$\text{ROE} = \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Equity}}$$

V. Market value ratios

$$\text{Price-earnings ratio} = \frac{\text{Price per share}}{\text{Earnings per share}}$$

$$\text{Price-sales ratio} = \frac{\text{Price per share}}{\text{Sales per share}}$$

$$\text{Market-to-book ratio} = \frac{\text{Market value per share}}{\text{Book value per share}}$$

$$\text{EBITDA ratio} = \frac{\text{Enterprise value}}{\text{EBITDA}}$$

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Liquidity Ratios

PRUFROCK
Balance Sheet - 2016

ASSETS		Liabilities & Owners Equity	
Current Assets		Current Liabilities	
Cash	$ 98	Accounts Payable	$ 344
Accounts Receivable	$ 188	Notes Payable	$ 196
Inventory	$ 422	Total	$ 540
Total	$ 708	Long term debt	$ 457
		Owners' Equity	
		Common Stock and paid in surplus	$ 550
Fixed Assets		Retained Earnings	$ 2,041
Net Plant & Equipment	$ 2,880	Total	$ 2,591
Total Asets	$ 3,588	Total Liabilties & Owners' Equity	$ 3,588

- **Current Ratio** = CA / CL
  - 708 / 540 = 1.31 times
- **Quick Ratio** = (CA – Inventory) / CL
  - "Acid Test"
  - (708-422) / 540 = 0.53 times
- **Cash Ratio** = Cash / CL
  - 98/ 540 = .18 times

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Financial Leverage Ratios

PRUFROCK
Balance Sheet - 2016

ASSETS		Liabilities & Owners Equity	
Current Assets		Current Liabilities	
Cash	$ 98	Accounts Payable	$ 344
Accounts Receivable	$ 188	Notes Payable	$ 196
Inventory	$ 422	Total	$ 540
Total	$ 708	Long term debt	$ 457
		Owners' Equity	
		Common Stock and paid in surplus	$ 550
Fixed Assets		Retained Earnings	$ 2,041
Net Plant & Equipment	$ 2,880	Total	$ 2,591
Total Assets	$ 3,588	Total Liabilties & Owners' Equity	$ 3,588

- **Total Debt Ratio** = (TA – TE) / TA
  - (3,588 – 2,591) / 3,588 = 0.28 times
- **Debt/Equity** = TD / TE
  - (0.28 / 0.72) = 0.38 times
- **Equity Multiplier** = TA/TE = 1 + D/E
  - ($1 / 0.72) = (1 + 0.38) = 1.38

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Financial Leverage Ratios

PRUFROCK Income Statement - 2016		
Sales	$	2,311
COGS	$	1,344
Depreciation	$	276
EBIT	$	691
Interest	$	141
Taxable Income	$	550
Taxes	$	187
Net Income	$	363
Dividends	$	121
Addition to RE	$	242

- **Times Interest Earned** = EBIT / Interest
  - 691 / 141 = 4.9 times
- **Cash Coverage** = (EBIT + Depreciation) / Interest
  - (691 + 276) / 141 = 6.9 times

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Asset Management: Inventory Ratios

PRUFROCK Balance Sheet - 2016			
ASSETS		Liabilities & Owners Equity	
Current Assets		Current Liabilities	
Cash	$ 98	Accounts Payable	$ 344
Accounts Receivable	$ 188	Notes Payable	$ 196
Inventory	$ 422	Total	$ 540
Total	$ 708	Long term debt	$ 457
		Owners' Equity	
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Taxable Income	$ 550
Taxes	$ 187
Net Income	$ 363
Dividends	$ 121
Addition to RE	$ 242

- **Inventory Turnover** = COGS / Inventory
  - 1,344 / 422 = 3.2 times
- **Days' Sales in Inventory** = 365 / Inventory Turnover
  - 365 / 3.2 = 115 days

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Asset Management: Receivables Ratios

PRUFROCK Balance Sheet - 2016			
ASSETS		Liabilities & Owners Equity	
Current Assets		Current Liabilities	
Cash	$ 98	Accounts Payable	$ 344
Accounts Receivable	$ 188	Notes Payable	$ 196
Inventory	$ 422	Total	$ 540
Total	$ 708	Long term debt	$ 457
		Owners' Equity	
		Common Stock and paid in surplus	$ 550
Fixed Assets		Retained Earnings	$ 2,041
Net Plant & Equipment	$ 2,880	Total	$ 2,591
Total Assets	$ 3,588	Total Liabilities & Owners' Equity	$ 3,588

PRUFROCK Income Statement - 2016	
Sales	$ 2,311
COGS	$ 1,344
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Interest	$ 141
Taxable Income	$ 550
Taxes	$ 187
Net Income	$ 363
Dividends	$ 121
Addition to RE	$ 242

- **Receivables Turnover** = Sales / AR
  - 2,311 / 188 = 12.3 times
- **Days' Sales in Receivables** = 365 / Receivables Turnover
  - 365 / 12.3 = 30 days

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Asset Management: Payables Ratios

PRUFROCK Balance Sheet - 2016			
ASSETS		Liabilities & Owners Equity	
Current Assets		Current Liabilities	
Cash	$ 98	Accounts Payable	$ 344
Accounts Receivable	$ 188	Notes Payable	$ 196
Inventory	$ 422	Total	$ 540
Total	$ 708	Long term debt	$ 457
		Owners' Equity	
		Common Stock and paid in surplus	$ 550
Fixed Assets		Retained Earnings	$ 2,041
Net Plant & Equipment	$ 2,880	Total	$ 2,591
Total Assets	$ 3,588	Total Liabilities & Owners' Equity	$ 3,588

PRUFROCK Income Statement - 2016	
Sales	$ 2,311
COGS	$ 1,344
Depreciation	$ 276
EBIT	$ 691
Interest	$ 141
Taxable Income	$ 550
Taxes	$ 187
Net Income	$ 363
Dividends	$ 121
Addition to RE	$ 242

- **Payables Turnover** = COGS / AP
  - 1,344 / 344 = 3.9 times
- **Days' Costs in Payables** = 365 / Payables Turnover
  - 365 / 3.9 = 94 days

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Asset Management: Asset Turnover Ratios

PRUFROCK Balance Sheet - 2016				PRUFROCK Income Statement - 2016	
ASSETS		Liabilities & Owners Equity		Sales	$ 2,311
Current Assets		Current Liabilities		COGS	$ 1,344
Cash	$ 98	Accounts Payable	$ 344	Depreciation	$ 276
Accounts Receivable	$ 188	Notes Payable	$ 196	EBIT	$ 691
Inventory	$ 422	Total	$ 540	Interest	$ 141
Total	$ 708	Long term debt	$ 457	Taxable Income	$ 550
		Owners' Equity		Taxes	$ 187
		Common Stock and paid in surplus	$ 550	Net Income	$ 363
Fixed Assets		Retained Earnings	$ 2,041		
Net Plant & Equipment	$ 2,880	Total	$ 2,591	Dividends	$ 121
Total Asets	$ 3,588	Total Liabilties & Owners' Equity	$ 3,588	Addition to RE	$ 242

- **Total Asset Turnover** = Sales / Total Assets
  - 2,311 / 3,588 = 0.64 times
- **Capital Intensity Ratio** = 1/TAT
  - 1 / 0.64 = 1.56

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Profitability Measures

PRUFROCK Balance Sheet - 2016				PRUFROCK Income Statement - 2016	
ASSETS		Liabilities & Owners Equity		Sales	$ 2,311
Current Assets		Current Liabilities		COGS	$ 1,344
Cash	$ 98	Accounts Payable	$ 344	Depreciation	$ 276
Accounts Receivable	$ 188	Notes Payable	$ 196	EBIT	$ 691
Inventory	$ 422	Total	$ 540	Interest	$ 141
Total	$ 708	Long term debt	$ 457	Taxable Income	$ 550
		Owners' Equity		Taxes	$ 187
		Common Stock and paid in surplus	$ 550	Net Income	$ 363
Fixed Assets		Retained Earnings	$ 2,041		
Net Plant & Equipment	$ 2,880	Total	$ 2,591	Dividends	$ 121
Total Asets	$ 3,588	Total Liabilties & Owners' Equity	$ 3,588	Addition to RE	$ 242

- **Profit Margin** = NI / Sales
  = 363 / 2,311 = 15.70%
- **Return on Assets (ROA)** = NI / TA
  = 363 / 3,588 = 10.12%
- **Return on Equity (ROE)** = NI / TE
  = 363 / 2,591 = 14.01%

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Market Value Measures

- **Market Price = $88 per share = PPS**
- **Shares outstanding = 33 million**

- **Earnings per Share = EPS = 363 / 33 = $11**
- **PE ratio = PPS / EPS**
  - **$88 / $11 = 8 times**
- **Price/Sales ratio = PPS/Sales per share**
  - **$88 / ($2,311 / 33) = 1.26 times**
- **Market-to-book ratio = PPS / Book value per share**
  - **Book value per share = Total Equity/shares outstanding**
    = $2,591 / 33 = $78.52
  - **Market-to-Book = $88 / 78.52 = 1.12 times**

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Market Value Measures

- **Enterprise value = Total market value of the stock + Book value of all liabilities – Cash**

  EV = ($88 x 33) + (3,588 – 2,591) – (98) = 3,803

- **EBITDA ratio = Enterprise value / EBITDA**
  - **EBITDA = EBIT + Depreciation & Amortization**
    = (691 + 276) = 967
  - **EBITDA ratio = (3,803 / 967) = 3.93 times**

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Prufrock Ratios

Quick Ratio	0.53	Debt to Equity	0.38
Cash Ratio	0.18	Equity Multiplier	1.38
Asset Management Ratios		Times Interest Earned	4.9
Inventory Turnover	3.20	Cash Coverage	6.9
Days' Sales in Inventory	114	**Profitability Measures**	
Receivables Turnover	12.30	Profit Margin	15.70%
Days' Sales in Receivables	30	ROA	10.10%
Total Asset Turnover	0.64	ROE	14.00%
Capital Intensity Ratio	1.56		
Market Value Measures			
Market Price	$88.00		
Shares Outstanding	33 m		
EPS	$11.00	Price/Sales Ratio	1.26
PE Ratio	8.0	Book value per share	$78.52
Market to Book	1.12	EBITDA Ratio	3.93

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Financial Information Example for 2014 for Lowe's and Home Depot (millions of dollars)

	Lowe's	Home Depot
Sales	$56,226	$83,176
Net income	2,698	6,345
Current assets	10,080	15,302
Current liabilities	9,348	7,488
Total assets	31,287	39,946
Total debt	21,589	30,624
Total equity	9,968	9,322
Price per share	67.76	104.43
Book value per share	10.78	7.28
Earnings per share	2.92	4.96
Current ratio	1.08	2.04
Debt–equity ratio	2.19	3.29
Total asset turnover	1.80	2.08
Profit margin	4.80%	7.63%
ROE	27.07%	68.06%
ROA	8.48%	15.88%
Market-to-book ratio	6.29	14.34
Price–earnings ratio	23.23	21.07

TABLE 3.6

Financial information from 2014 for Lowe's and Home Depot (numbers in millions except for per-share data)

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The DuPont Identity

- Return on Equity = Net Income / Total Equity
  = Basic Formula
- ROE = PM * TAT * EM = DuPont Identity
  - PM (profit margin) = Net Income / Sales
  - TAT (Total asset turnover) = Sales / Total Assets
  - EM (Equity Multiplier) = Total Assets / Total Equity

$$ROE = \left(\frac{NI}{Sales}\right) \times \left(\frac{Sales}{TA}\right) \times \left(\frac{TA}{TE}\right) = \frac{NetIncome}{TotalEquity}$$

Profit Margin Asset Use Leverage = ROE

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Using the DuPont Identity

- **ROE = PM x TAT x EM**
  - **Profit margin**
    - **Measures firm's operating efficiency**
    - **How well does it control costs**
  - **Total asset turnover**
    - **Measures the firm's asset use efficiency**
    - **How well does it manage its assets**
  - **Equity multiplier**
    - **Measures the firm's financial leverage**
    - **EM = TA / TE = 1 + D/E ratio**

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Prufrock's DuPont Identity

PRUFROCK RECAP			
Liquidity Ratios		**Financial Leverage Ratios**	
Current Ratio	1.31	Total Debt Ratio	0.28
Quick Ratio	0.53	Debt to Equity	0.38
Cash Ratio	0.18	Equity Multiplier	1.38
Asset Management Ratios		Times Interest Earned	4.9
Inventory Turnover	3.20	Cash Coverage	6.9
Days' Sales in Inventory	114	**Profitability Measures**	
Receivables Turnover	12.30	Profit Margin	15.70%
Days' Sales in Receivables	30	ROA	10.10%
Total Asset Turnover	0.64	ROE	14.00%
Capital Intensity Ratio			
Market Value Measures			
Market Price	$88.00		
Shares Outstanding	33 m		
EPS	$11.00	Price/Sales Ratio	1.26
PE Ratio	8.0	Book value per share	$78.52
Market to Book	1.12	EBITDA Ratio	3.93

- **ROE = PM x TAT x EM**
  - PM = 15.7%
  - TAT = 0.64
  - EM = 1.39
- ROE = 0.157 x 0.64 x 1.39 = 14%

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Internal and Sustainable Growth
Payout and Retention Ratios

- **Dividend payout ratio =** $\dfrac{\textbf{Cash Dividends}}{\textbf{Net Income}}$

- **Retention ratio or plowback ratio**

  = $\dfrac{\textbf{Addition to Retained Earnings}}{\textbf{Net Income}}$

Dividend payout ratio ("1 – b")
Retention ratio ("b")

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Internal and Sustainable Growth
Payout and Retention Ratios

PRUFROCK Balance Sheet - 2016					
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Current Assets			Current Liabilities		
Cash	$	98	Accounts Payable	$	344
Accounts Receivable	$	188	Notes Payable	$	196
Inventory	$	422	Total	$	540
Total	$	708	Long term debt	$	457
			Owners' Equity		
			Common Stock and paid in surplus	$	550
Fixed Assets			Retained Earnings	$	2,041
Net Plant & Equipment	$	2,880	Total	$	2,591
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PRUFROCK Income Statement - 2016		
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Depreciation	$	276
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Taxable Income	$	550
Taxes	$	187
Net Income	$	363
Dividends	$	121
Addition to RE	$	242

- Dividend payout ratio ("1 – b")

  = Cash dividends / Net income

  = (DIV / NI) = 121 / 363 = 33.3%
- Retention ratio ("b") = (NI – DIV) / NI

  = Addition to Retained Earnings / Net income

  = $242 / 363 = 66.7%

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The Internal Growth Rate

How much the firm can grow assets using retained earnings as the only source of financing.

$$\text{Internal Growth Rate} =$$

$$\frac{\text{ROA} \times \text{b}}{1\text{-}(\text{ROA} \times \text{b})} = \frac{.1012 \times .667}{1 - (1012 \times .667)} = 7.23\%$$

The Sustainable Growth Rate

How much the firm can grow by using internally generated funds and issuing debt to maintain a constant debt ratio.

$$\text{Sustainable Growth Rate} =$$

$$\frac{\text{ROE} \times \text{b}}{1\text{-}(\text{ROE} \times \text{b})} = \frac{.14 \times 0.667}{1\text{-}(0.14 \times 0.667)} = 10.29\%$$

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Determinants of Growth

- Profit margin – operating efficiency
- Total asset turnover – asset use efficiency
- Financial leverage – choice of optimal debt ratio
- Dividend policy – choice of how much to pay to shareholders versus reinvesting in the firm

TABLE 3.7

DuPont analysis for Yahoo! and Google

Yahoo!							
Year	ROE	=	Profit margin	×	Total asset turnover	×	Equity multiplier
2014	.4%	=	3.1%	×	.075	×	1.60
2013	4.5%	=	12.6%	×	.279	×	1.29
2012	3.9%	=	11.4%	×	.292	×	1.17
Google							
Year	ROE	=	Profit margin	×	Total asset turnover	×	Equity multiplier
2014	13.8%	=	21.9%	×	.503	×	1.25
2013	15.3%	=	24.0%	×	.501	×	1.27
2012	16.1%	=	25.1%	×	.491	×	1.31

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Why Evaluate Financial Statements?

- Internal uses
  - Performance evaluation – compensation and comparison between divisions
  - Planning for the future – guide in estimating future cash flows
- External uses
  - Creditors
  - Suppliers
  - Customers
  - Stockholders

Benchmarking

- Ratios need to be compared to something
- Time-Trend Analysis
  - How the firm's performance is changing through time
  - Internal and external uses
- Peer Group Analysis
  - Compare to similar companies or within industries
  - SIC and NAICS codes

http://siccode.com/en/

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Problems with Financial Analysis

- Conglomerates
  - No readily available comparables
- Global competitors
- Different accounting procedures
- Different fiscal year ends
- Differences in capital structure
- Seasonal variations and one-time events

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Example: Work the Web

- The Internet makes ratio analysis much easier than it has been in the past
- Click on the Web surfer to go to www.reuters.com or http://www.bloomberg.com/research/common/symbollookup/symbollookup.asp
  - Choose a company and enter its ticker symbol
  - Click on "Financial Results" and "Key Ratios" to compare the firm to its industry and the S&P 500 for various ratio categories
  - Change the ratio category using the links to the left of the chart.

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