CHAPTER 3

Analysis of Financial Statements

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Need to Absorb - Purpose of financial statement analysis, common size analysis versus ratio analysis, trend/historical analysis versus benchmarking/competitive analysis, focus on calculating and interpreting ratios, also on ratio algebra (i.e., how changes in financial statements affects ratios), and limitations of ratio analysis.

Do not need to absorb - Dupont equation and how to use or interpret Dupont equation (Note, many people find the Dupont discussion useful in understanding ratio algebra) and qualitative factors in section 3-11.

Need to Read - Read the Chapter.

Need to Do - Make 100 on the quiz. I do not list suggested questions and problems below. This is because many of the questions are comprehensive rather than focused. But, after studying this chapter, you should be able to solve all of the end of chapter questions and problems, and self-test review questions. Rather than spending time completing those questions, I suggest you focus on the Chapter Quiz. Almost all of the end of chapter questions and problems are in my quiz database.

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Topics in Chapter

- Common Size analysis and Ratio analysis
- DuPont system
- Effects of improving ratios
- Limitations of ratio analysis
- Qualitative factors

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Standardized Financial Statements

- Common-Size Balance Sheets
  - Compute all accounts as a percent of total assets
- Common-Size Income Statements
  - Compute all line items as a percent of sales
- Standardized statements make it easier to compare financial information, particularly as the company grows
- They are also useful for comparing companies of different sizes, particularly within the same industry
- Methods presented here are being replaced by statistical methods

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Ratio Analysis

- Something/Something else
- Ratios allow for better comparison through time or between companies
- As we look at each ratio, ask yourself what the ratio is trying to measure and why that information is important
- Ratios are used both internally and externally

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Categories of Financial Ratios

- Short-term solvency or liquidity ratios
- Long-term solvency or financial leverage ratios
- Asset management or turnover ratios
- Profitability ratios
- Market value ratios

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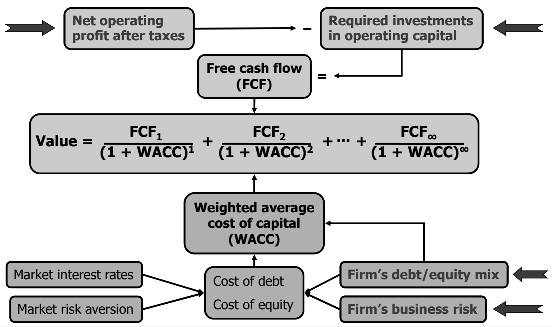
Determinants of Intrinsic Value: Using Ratio Analysis



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Overview

- Ratios facilitate comparison of:
  - One company over time (us to us/trend/historical)
  - One company versus other companies (us to them/competitive/benchmarking)
- Ratios are used by:
  - Lenders to determine creditworthiness
  - Stockholders to estimate future cash flows and risk
  - Managers to identify areas of weakness and strength

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Income Statement

	2013	2014E
Sales	$5,834,400	$7,035,600
COGS except depr.	4,980,000	5,800,000
Other expenses	720,000	612,960
Deprec.	116,960	120,000
Tot. op. costs	5,816,960	6,532,960
EBIT	17,440	502,640
Int. expense	176,000	80,000
EBT	(158,560)	422,640
Taxes (40%)	(63,424)	169,056
Net income	($ 95,136)	$ 253,584

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Balance Sheets: Assets

	2013	2014E
Cash	$ 7,282	$ 14,000
S-T invest.	20,000	71,632
AR	632,160	878,000
Inventories	1,287,360	1,716,480
Total CA	1,946,802	2,680,112
Net FA	939,790	836,840
Total assets	$2,886,592	$3,516,952

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Balance Sheets: Liabilities & Equity

	2013	2014E
Accts. payable	$ 324,000	$ 359,800
Notes payable	720,000	300,000
Accruals	284,960	380,000
Total CL	1,328,960	1,039,800
Long-term debt	1,000,000	500,000
Common stock	460,000	1,680,936
Ret. earnings	97,632	296,216
Total equity	557,632	1,977,152
Total L&E	$2,886,592	$3,516,952

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Other Data

	2013	2014E
Stock price	$6.00	$12.17
# of shares	100,000	250,000
EPS	-$0.95	$1.01
DPS	$0.11	$0.22
Book val. per sh.	$5.58	$7.91
Lease payments	$40,000	$40,000
Tax rate	0.4	0.4

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Liquidity Ratios

- Can the company meet its short-term obligations using the resources it currently has on hand?

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Forecasted Current and Quick Ratios for 2014.

$$CR_{14} = \frac{CA}{CL} = \frac{\$2,680}{\$1,040} = 2.58.$$

$$QR_{14} = \frac{CA - Inv.}{CL}$$

$$= \frac{\$2,680 - \$1,716}{\$1,040} = 0.93.$$

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Comments on CR and QR

	2014E	2013	2012	Ind.
CR	2.58	1.46	2.3	2.7
QR	0.93	0.5	0.8	1.0

- Expected to improve but still below the industry average.
- Liquidity position is weak.

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Asset Management Ratios

- How efficiently does the firm use its assets?
- How much does the firm have tied up in assets for each dollar of sales?

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Inventory Turnover Ratio vs. Industry Average

$$\text{Inv. Turnover} = \frac{\text{COGS}}{\text{Inventories}}$$

$$= \frac{\$5{,}800 + \$120}{\$1{,}716} = 3.45.$$

	2014E	2013	2012	Ind.
Inv. T.	3.45	4.0	4.0	6.1

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Comments on Inventory Turnover

- Inventory turnover is below industry average.
- Firm might have old inventory, or its control might be poor.
- No improvement is currently forecasted.

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DSO: average number of days from sale until cash received.

$$\text{DSO} = \frac{\text{Receivables}}{\text{Average sales per day}}$$

$$= \frac{\text{Receivables}}{\text{Sales/365}} = \frac{\$878}{\$7{,}036/365}$$

$$= 45.5 \text{ days.}$$

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Appraisal of DSO

- Firm collects too slowly, and situation is getting worse.
- Poor credit policy.

	2014	2013	2012	Ind.
DSO	45.5	39.5	37.4	32.0

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Fixed Assets and Total Assets Turnover Ratios

$$\text{Fixed assets turnover} = \frac{\text{Sales}}{\text{Net fixed assets}} = \frac{\$7{,}036}{\$837} = 8.41.$$

$$\text{Total assets turnover} = \frac{\text{Sales}}{\text{Total assets}} = \frac{\$7{,}036}{\$3{,}517} = 2.00.$$

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Fixed Assets and Total Assets Turnover Ratios

- FA turnover is expected to exceed industry average. Good.
- TA turnover not up to industry average. Caused by excessive current assets (A/R and inventory).

	2014E	2013	2012	Ind.
FA TO	8.4	6.2	10.0	7.0
TA TO	2.0	2.0	2.3	2.5

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Debt Management Ratios

- Does the company have too much debt?
- Can the company's earnings meet its debt servicing requirements?

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Leverage Ratios: Debt Ratio

$$\text{Debt ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

$$= \frac{\$300 + \$500}{\$3,517} = 22.7\%.$$

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Leverage Ratios: Liabilities-to-Assets Ratio

$$\text{Liabilities/TA ratio} = \frac{\text{Total liabilities}}{\text{Total assets}}$$

$$= \frac{\$1,039.8 + \$500}{\$3,517}$$

$$= 43.8\%.$$

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Times Interest Earned Ratio

$$\text{TIE} = \frac{\text{EBIT}}{\text{Int. expense}}$$

$$= \frac{\$502.6}{\$80} = 6.3.$$

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EBITDA Coverage (EC)

$$\frac{\text{EBIT + Depr. \& Amort. + Lease payments}}{\text{Interest expense} + \text{Lease pmt.} + \text{Loan pmt.}}$$

$$= \frac{\$502.6 + \$120 + \$40}{\$80 + \$40 + \$0} = 5.5.$$

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Debt Management Ratios vs. Industry Averages

	2014E	2013	2012	Ind.
D/TA	22.7%	59.6%	35.6%	32.0%
TL/TA	43.8%	80.7%	54.8%	50.0%
TIE	6.3	0.1	3.3	6.2
EC	5.5	0.8	2.6	8.0

Recapitalization improved situation, but lease payments drag down EC.

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Profitability Ratios

- What is the company's rate of return on:
  - Sales?
  - Assets?

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Profit Margins

Net profit margin (PM):

$$PM = \frac{NI}{Sales} = \frac{\$253.6}{\$7{,}036} = 3.6\%.$$

Operating profit margin (OM):

$$OM = \frac{EBIT}{Sales} = \frac{\$503}{\$7{,}036} = 7.1\%.$$

(More…)

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Profit Margins (Continued)

Gross profit margin (GPM):

$$GPM = \frac{Sales - COGS}{Sales} = \frac{\$7{,}036 - \$5{,}800}{\$7{,}036}$$

$$GPM = \frac{\$1{,}236}{\$7{,}036} = 17.6\%.$$

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Profit Margins vs. Industry Averages

	2014E	2013	2012	Ind.
PM	3.6%	-1.6%	2.6%	3.6%
OPM	7.1	0.3	6.1	7.1
GPM	17.6	14.6	16.6	15.5

Very bad in 2013, but projected to meet or exceed industry average in 2014.

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Basic Earning Power (BEP)

$$BEP = \frac{EBIT}{\text{Total assets}}$$

$$= \frac{\$502.6}{\$3,517} = 14.3\%.$$

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Basic Earning Power vs. Industry Average

- BEP removes effect of taxes and financial leverage. Useful for comparison.
- Projected to be below average.
- Room for improvement.

	2014E	2013	2012	Ind.
BEP	14.3%	0.6%	14.2%	17.8%

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Return on Assets (ROA) and Return on Equity (ROE)

$$ROA = \frac{NI}{\text{Total assets}}$$

$$= \frac{\$253.6}{\$3,517} = 7.2\%.$$

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Return on Assets (ROA) and Return on Equity (ROE)

$$ROE = \frac{NI}{\text{Common Equity}}$$

$$= \frac{\$253.6}{\$1,977} = 12.8\%.$$

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ROA and ROE vs. Industry Averages

	2014E	2013	2012	Ind.
ROA	7.2%	-3.3%	6.0%	9.0%
ROE	12.8%	-17.1%	13.3%	18.0%

Both below average but improving.

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Effects of Debt on ROA and ROE

- ROA is lowered by debt--interest expense lowers net income, which also lowers ROA.
- However, the use of debt lowers equity, and if equity is lowered more than net income, ROE would increase.

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Market Value Ratios

- Market value ratios incorporate the:
  - High current levels of earnings and cash flow *increase* market value ratios
  - High expected growth in earnings and cash flow *increases* market value ratios
  - High risk of expected growth in earnings and cash flow *decreases* market value ratios

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Calculate and appraise the P/E, P/CF, and M/B ratios.

Price = $12.17.

$$\text{EPS} = \frac{\text{NI}}{\text{Shares out.}} = \frac{\$253.6}{250} = \$1.01.$$

$$\text{P/E} = \frac{\text{Price per share}}{\text{EPS}} = \frac{\$12.17}{\$1.01} = 12.$$

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Market Based Ratios

$$\text{CF per share} = \frac{\text{NI + Depr.}}{\text{Shares out.}}$$

$$= \frac{\$253.6 + \$120.0}{250} = \$1.49.$$

$$\text{P/CF} = \frac{\text{Price per share}}{\text{Cash flow per share}}$$

$$= \frac{\$12.17}{\$1.49} = 8.2.$$

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Market Based Ratios (Continued)

$$\text{BVPS} = \frac{\text{Com. equity}}{\text{Shares out.}}$$

$$= \frac{\$1{,}977}{250} = \$7.91.$$

$$\text{M/B} = \frac{\text{Mkt. price per share}}{\text{Book value per share}}$$

$$= \frac{\$12.17}{\$7.91} = 1.54.$$

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Interpreting Market Based Ratios

- P/E: How much investors will pay for $1 of earnings. Higher is better.
- M/B: How much paid for $1 of book value. Higher is better.
- P/E and M/B are high if ROE is high, risk is low.

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Comparison with Industry Averages

	2014E	2013	2012	Ind.
P/E	12.0	-6.3	9.7	14.2
P/CF	8.2	27.5	8.0	7.6
M/B	1.5	1.1	1.3	2.9

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Common Size Balance Sheets: Divide all items by Total Assets

Assets	2012	2013	2014E	Ind.
Cash	0.6%	0.3%	0.4%	0.3%
ST Inv.	3.3%	0.7%	2.0%	0.3%
AR	23.9%	21.9%	25.0%	22.4%
Invent.	48.7%	44.6%	48.8%	41.2%
Total CA	76.5%	67.4%	76.2%	64.1%
Net FA	23.5%	32.6%	23.8%	35.9%
TA	100.0%	100.0%	100.0%	100.0%

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Divide all items by Total Liabilities & Equity

Liab. & Eq.	2012	2013	2014E	Ind.
AP	9.9%	11.2%	10.2%	11.9%
Notes pay.	13.6%	24.9%	8.5%	2.4%
Accruals	9.3%	9.9%	10.8%	9.5%
Total CL	32.8%	46.0%	29.6%	23.7%
LT Debt	22.0%	34.6%	14.2%	26.3%
Total eq.	45.2%	19.3%	56.2%	50.0%
Total L&E	100.0%	100.0%	100.0%	100.0%

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Analysis of Common Size Balance Sheets

- Computron has higher proportion of inventory and current assets than Industry.
- Computron now has more equity (which means LESS debt) than Industry.
- Computron has more short-term debt than industry, but less long-term debt than industry.

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Common Size Income Statement: Divide all items by Sales

	2012	2013	2014E	Ind.
Sales	100.0%	100.0%	100.0%	100.0%
COGS	83.4%	85.4%	82.4%	84.5%
Depr.	0.6%	2.0%	1.7%	4.0%
Other exp.	9.9%	12.3%	8.7%	4.4%
EBIT	6.1%	0.3%	7.1%	7.1%
Int. Exp.	1.8%	3.0%	1.1%	1.1%
Pre-tax earn.	4.3%	-2.7%	6.0%	5.9%
Taxes	1.7%	-1.1%	2.4%	2.4%
NI	2.6%	-1.6%	3.6%	3.6%

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Analysis of Common Size Income Statements

- Computron has lower COGS (86.7) than industry (84.5), but higher other expenses. Result is that Computron has similar EBIT (7.1) as industry.

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Percentage Change Analysis: % Change from First Year (2012)

Income St.	2012	2013	2014E
Sales	0.0%	70.0%	105.0%
COGS	0.0%	73.9%	102.5%
Depr.	0.0%	518.8%	534.9%
Other exp.	0.0%	111.8%	80.3%
EBIT	0.0%	-91.7%	140.4%
Int. Exp.	0.0%	181.6%	28.0%
EBT	0.0%	-208.2%	188.3%
Taxes	0.0%	-208.2%	188.3%
NI	0.0%	-208.2%	188.3%

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Analysis of Percent Change Income Statement

- We see that 2014 sales grew 105% from 2012, and that NI grew 188% from 2012.
- So Computron has become more profitable.

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Percentage Change Balance Sheets: Assets

Assets	2012	2013	2014E
Cash	0.0%	-19.1%	55.6%
ST Invest.	0.0%	-58.8%	47.4%
AR	0.0%	80.0%	150.0%
Invent.	0.0%	80.0%	140.0%
Total CA	0.0%	73.2%	138.4%
Net FA	0.0%	172.6%	142.7%
TA	0.0%	96.5%	139.4%

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Percentage Change Balance Sheets: Liabilities & Equity

Liab. & Eq.	2012	2013	2014E
AP	0.0%	122.5%	147.1%
Notes pay.	0.0%	260.0%	50.0%
Accruals	0.0%	109.5%	179.4%
Total CL	0.0%	175.9%	115.9%
LT Debt	0.0%	209.2%	54.6%
Total eq.	0.0%	-16.0%	197.9%
Total L&E	0.0%	96.5%	139.4%

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Analysis of Percent Change Balance Sheets

- We see that total assets grew 139%, while sales grew only 105%. So asset utilization remains a problem.

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Explain the DuPont System

- The DuPont system focuses on:
  - Expense control (PM)
  - Asset utilization (TATO)
  - Debt utilization (EM)
- It shows how these factors combine to determine the ROE.

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The DuPont System

$$\left(\begin{array}{c}\text{Profit}\\\text{margin}\end{array}\right)\left(\begin{array}{c}\text{TA}\\\text{turnover}\end{array}\right)\left(\begin{array}{c}\text{Equity}\\\text{multiplier}\end{array}\right) = \text{ROE}$$

$$\frac{\text{NI}}{\text{Sales}} \times \frac{\text{Sales}}{\text{TA}} \times \frac{\text{TA}}{\text{CE}} = \text{ROE}$$

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The DuPont System

$$\frac{NI}{Sales} \times \frac{Sales}{TA} \times \frac{TA}{CE} = ROE$$

2012:	2.6%	x	2.3	x	2.2 =		13.2%
2013:	-1.6%	x	2.0	x	5.2 =		-16.6%
2014:	3.6%	x	2.0	x	1.8 =		13.0%
Ind.:	3.6%	x	2.5	x	2.0 =		18.0%

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Potential Problems and Limitations of Ratio Analysis

- Comparison with industry averages is difficult if the firm operates many different divisions.
- Seasonal factors can distort ratios.
- Window dressing techniques can make statements and ratios look better.
- Different accounting and operating practices can distort comparisons.

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Qualitative Factors

- There is greater risk if:
  - revenues tied to a single customer
  - revenues tied to a single product
  - reliance on a single supplier?
  - High percentage of business is generated overseas?
- What is the competitive situation?
- What products are in the pipeline?
- What are the legal and regulatory issues?

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