BUSN 233 - Corp. Financial Management

chapter 3

Financial statement Analysis using Ratios

TOPICS:

1. Why use Financial statements?
2. Problems with Financial statement Analysis
3. calculating Financial statement Ratios:
   1. Common size statements
   2. Ratios
4. why do we use Ratios to Analyze Financial statements

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Chapter 3

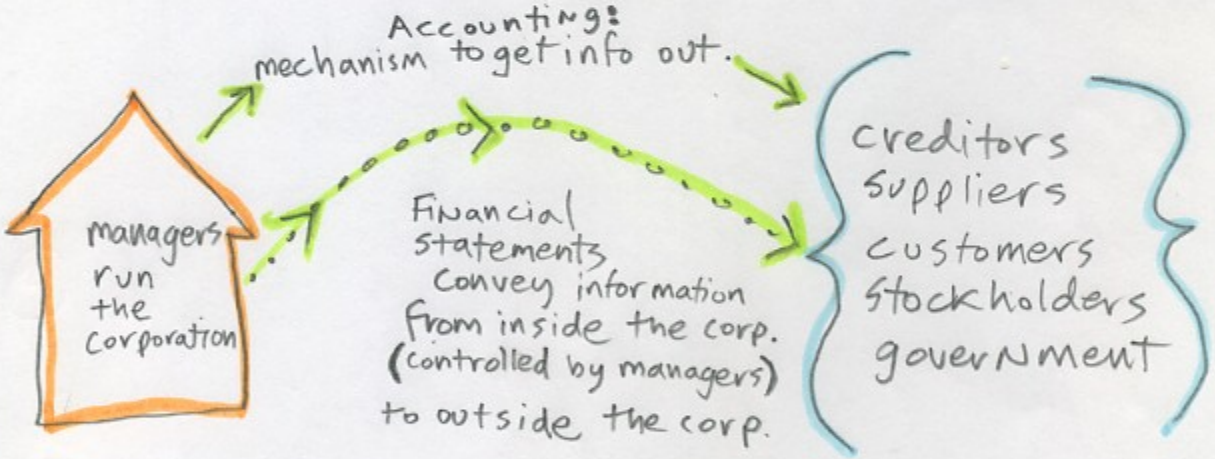
Financial statement Analysis with Ratios

(2)

(1) Why use Financial statements?

Financial statements such as the Balance sheet and Income Statement are accounting information.

Although financial managers would prefer market value information, accounting information is often the best information we have about the corporation.



(2) Problems with Financial statement Analysis:

1. Accounting Rules in the united states allow for different firms to use different accounting procedures.
2. International Rules can be very different.

(Sometimes comparing corps. is tricky)

3. some conglomerates do not have parallel peers or industries.
4. Analysts may use different techniques for calculating ratios
5. Accounting & Finance Tricks.

3 calculating Financial statement Ratios

what is a Ratio?

A ratio shows the relationship between between one number (and unit) and a second number (and unit) using division.

Example: Find the ratio of current assets ... to current liabilities

Current Assets = CA = $200
Current Liabilities = CL = $100

① of part goes in numerator
② number = 200
③ unit = CA in $

$$\frac{\$200\ CA}{\$100\ CL}$$

① to part goes in denominator
② number = 100
③ unit = CL in $

$$\frac{\$200\ CA}{\$100\ CL} = \frac{\$2\ CA}{\$1\ CL}$$

$$\frac{CA}{CL} = \frac{\$200\ CA}{\$100\ CL} = \frac{\$2\ CA}{\$1\ CL} = \{\text{For every one dollar of CL we have \$2 of CA}\}$$

Most Important Hint:

If you keep the unit in the numerator & denominator the meaning of the ratio (its definition) will be obvious

Common sized Financial statements:

① A standardized Financial statement presenting all items in % terms.
② Balance sheet items are shown as a % of Total Assets (TA or TL+TE)
③ Income Statement items are shown as a % of sales (Net sales)

Example:

I/S	
Net sales	$100
COGS	25
otherEX	15
EBIT	60
Int	10
Tax	17
NI	33

100 ÷ 100 = 1 ⇒ 100%
25 ÷ 100 = .25 ⇒ 25%
15 ÷ 100 = .15 ⇒ 15%
60 ÷ 100 = .60 ⇒ 60%
10 ÷ 100 = .10 ⇒ 10%
17 ÷ 100 = .17 ⇒ 17%
33 ÷ 100 = .33 ⇒ 33%

I/S	
Net sales	100%
COGS	25%
otherEX	15%
EBIT	60%
Int	10%
Tax	17%
NI	33%

4 Why do we use Ratios to Analyze Financial statements:

① we can see relationships between numbers.

Example: Net sales = $5000 and NI = $200

$$\left\{\begin{matrix}\text{Profit}\\ \text{Margin}\end{matrix}\right\} = \frac{\$\text{Net Income}}{\$\text{Net Sales}} = \frac{\$200\ \text{NI}}{\$5000\ \text{NS}} = \frac{\$.04\ \text{NI}}{\$1.00\ \text{NS}}$$

meaning: "For every $1 we sell, we earn $.04 in profit"

② we can see trends over time without the distortions of different number sizes.

Cash 2001 = $200
Total Assets 2001 = $2000

Cash 2008 = $600
Total Assets 2008 = $5000

Although the cash is 3 times bigger in 2008 (200*3 = 600)

$$\frac{\text{Cash 2001}}{\text{TA 2001}} = \frac{\$.1\ \text{cash}}{\$1\ \text{TA}} \text{ or } 10\%$$

$$\frac{\text{cash 2008}}{\text{TA 2008}} = \frac{\$.12\ \text{cash}}{\$1\ \text{TA}} \text{ or } 12\%$$

meaning: "Although the cash amount in 2008 is 3 times bigger than in 2001, as a % of total assets it has gone from 10% in 2001 to 12% in 2008: there has not been much change."

③ We can compare small and big companies without the distortions of different number sizes (compare different size companies)

2006 a

MFST cash = 23 B.
MFST TA = 63 B.
GOOG cash = 11 B
GOOG TA = 19 B.

Although Microsoft has twice as much cash as Google

$$\frac{23}{63} \approx .37 \text{ or } 37\%$$

$$\frac{11}{19} \approx .58 \text{ or } 58\%$$

meaning: "Although MFST has twice as much cash as GOOG, MFST has only 37% of its assets in cash, compared to GOOG's 58%."

(4) we can compare Financial statements that are in different currencies (but be careful of different Accounting methods)

company 1 Equity = $1018.74
company 1 TA = $2037.49
} dollars

$\frac{\$2037.49\ TA}{\$1018.74\ E} = \frac{\$2\ TA}{\$1\ E}$ or 200%

company 2 Equity = £500
company 2 TA = £1000
} pounds

$\frac{£1000\ TA}{£500\ E} = \frac{£2\ TA}{£1\ E}$ or 200%

meaning: "Although the currencies are different we can see that both companies have 2 units of Assets for every 1 unit of Equity. In other words, because of the use of debt (2TA = 1D + 1E), both corporations have "leveraged up" by 200%."

(5) Ratio Analysis & common sized Financial Statements are a convenient way to look at and compare financial statements for different companies and across time. Many people use Ratio Analysis & common sized Financial statements, such as:

All use ratios to figure out where to look more closely:
"Management by Exception"

creditors: "should we loan?"
Stockholders: "Are managers doing a good job?"
Auditors: "where do we need to look closely?"
suppliers: "should we extend credit?"
employees: "Should we work for this company?"
stock brokers: "should we invest?"
Investment Bankers: "should we underwrite?"
Research Analysts: "Is this company good?"
contract writers: "Debt contracts & Manager compensation contracts use Ratio

Liquidity Ratios: can they cover short term bills? (measure of short term Liquidity)

Current Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{CA}{CL}$ = "For every $1 of CL, how many dollars of CA are there?"

↓ commonly used in Debt contracts

- ★ Above 1 is generally good.
- ★ Below 1 is generally not good. (Big corporations, it may be ok)
- ★ A high $\frac{CA}{CL}$ could mean they are saving up cash to make a big asset purchase, or it could mean they do not see many profitable assets to buy (cash usually earns a lower return than Fixed Assets).
- ★ Low could mean they will have a hard time paying bills.
- ★ if you incur long-term debt: $\frac{CA\uparrow}{CL\uparrow}$, $\left(\frac{CA}{CL}\right)\uparrow$
- ★ if you pay off short term creditors: $\frac{CA\downarrow}{CL\downarrow}$, $\left(\frac{CA}{CL}\right)\downarrow$ $\frac{5}{2}=2.5$ $\frac{(5-1)}{2-1}=\frac{4}{1}$
- ★ Buy Inv. with cash: $\frac{CA}{CL}$ stay same → "you just trade cash for Inv."
- ★ sell Inv. for more than on books: → $\left(\frac{CA}{CL}\right)\uparrow$ →
- ★ $\frac{CA}{CL}$ is a measure of short term liquidity

Quick Ratio (Acid-test) $\frac{\text{current Assets - Inventory}}{CL} = \frac{CA - Inv.}{CL}$

★ Why take out Inv.? } Inv. may be hard to sell, obsolete, or below market value.

→ ★ Using cash to buy inventory reduces Quick Ratio.

★ $\frac{CA-INV}{CL}$ is a measure of immediate short term liquidity.

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cash Ratio = $\frac{\text{cash}}{CL}$ = "If you had to pay it all off Now, could you?"

★ $\frac{\text{cash}}{CL}$ is a measure of "right-Now" short term liquidity

Leverage or Solvency Ratios:

Leverage: "How much debt do we have?"

Solvency: "Do you have enough money to cover expenses & debt."

variables: Assets = Liabilities + Owners' Equity = $A = L + E$

or

$A = D + E$.

↳ "D is for debt"

Total Debt Ratio = $\frac{\text{Total Assets} - \text{Total Equity}}{\text{Total Assets}}$ or $\frac{TL}{TA}$ or $\frac{D}{A}$

★ "Amount of Debt for every #1 of Assets"

★ "How much of every $1 of assets is financed with debt?"

★ Generally, above $.50 is not good.

Debt/Equity Ratio = $\frac{\text{Total Debt}}{\text{Total Equity}} = \frac{D}{E}$ = "for every $1 of Equity, how much debt do we have?"

★ Generally, above 1 is not good.

Equity Multiplier = $\frac{\text{Total Assets}}{\text{Total Equity}} = \frac{TA}{TE} = \frac{A}{E}$ = "for every $1 of Equity, how many $ of Assets do we have?"

Relationship between Ratios

If you know $\frac{D}{A} = .2$ Then you know $\frac{D}{A} = \frac{2}{10}$ Then you know $E = A - D$, $8 = 10 - 2$, $E = 8$ Then you know $\frac{D}{E} = \frac{2}{8} = .25$, $\frac{A}{E} = \frac{10}{8} = 1.2$

Notice ⇒ $\frac{A}{E} = \frac{E+D}{E} = \frac{E}{E} + \frac{D}{E} = 1 + \frac{D}{E}$ Thus if you know $\frac{D}{E} = .25$ then $\frac{A}{E} = 1 + .25 = 1.25$

Times Interest Earned = $\frac{EBIT}{\text{Interest}}$ = "How many times over interest can be paid."

Cash Coverage Ratio = $\frac{EBIT + \text{Depreciation}}{\text{Interest}} = \frac{EBITD}{\text{Interest}}$

★ "how many times over interest can be paid for corp. with lots of depreciation"

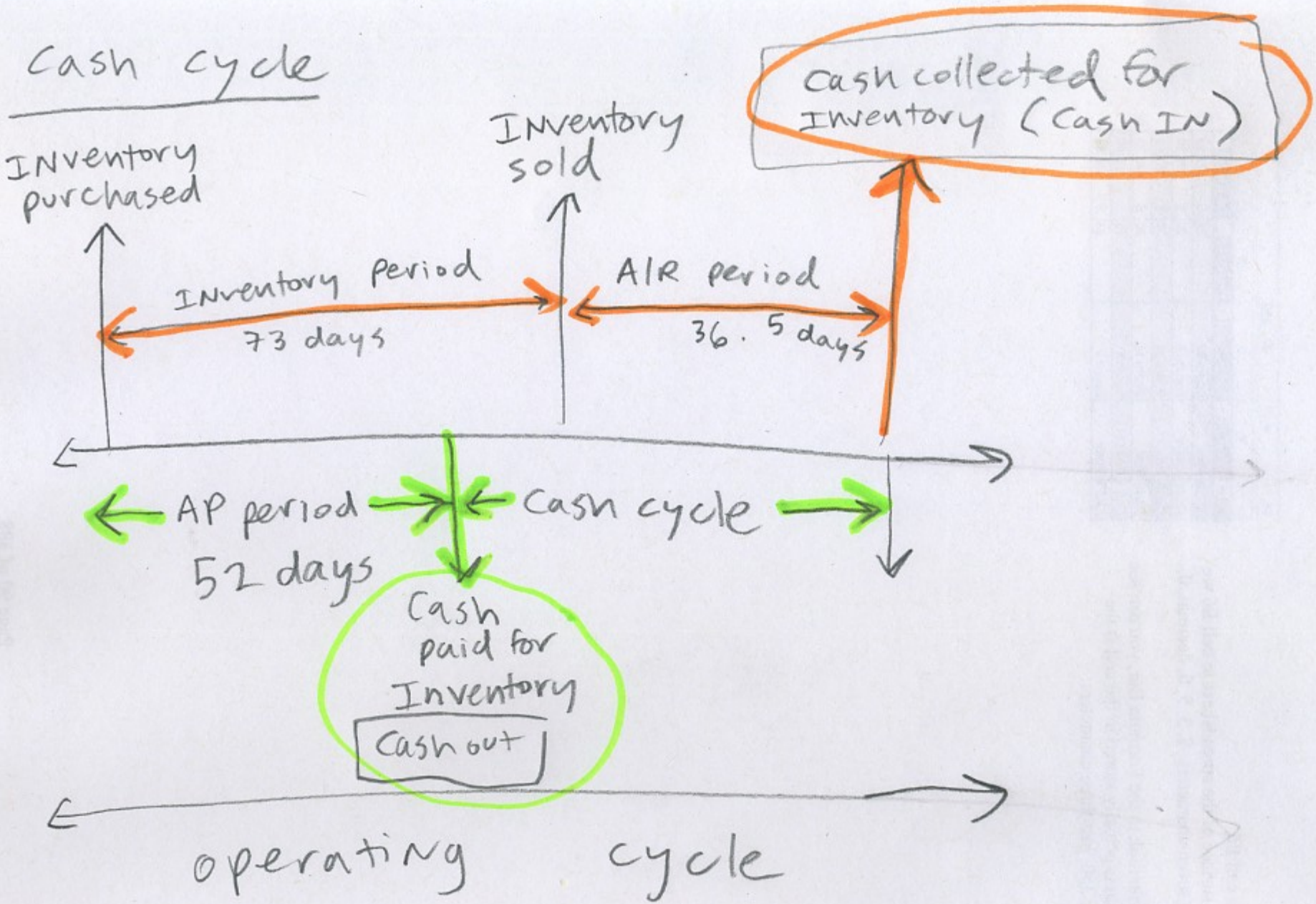
Asset utilization Ratios: "How efficiently are we using Assets?"

Total Asset Turnover $= \frac{\text{sales}}{\text{Total Assets}} = \frac{\text{Net sales}}{\text{Assets}} = \frac{S}{A}$

- ★ "This tells us what sales we are getting for every $1 of Assets"
- ★ The higher it is the better $\frac{\$3}{\$1}$ is better than $\frac{\$2}{\$1}$
- ★ If corp. has newer assets that have not been depreciated, book value for assets may be high and temporarily lower ratio.
- ★ If corp. has older assets that have been fully depreciated, this could artificially increase the ratio.

Capital Intensity Ratio $= \frac{A}{S} =$ "for every $1 of sales, how many dollars of assets did we need?"

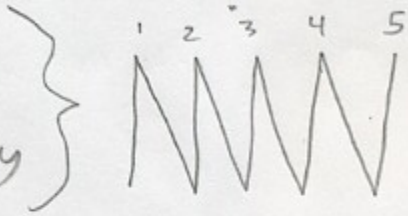
Cash cycle


Cash collected for Inventory (Cash IN)
Inventory purchased
Inventory sold
Inventory period
73 days
AIR period
36.5 days
AP period
52 days
Cash cycle
Cash paid for Inventory
Cash out
operating cycle

Asset utilization Ratios: number of days in cash cycle.

Inventory Turnover $= \frac{COGS}{Inventory} = \frac{COGS}{Inv.}$ = "how many times did we run inventory down to zero and then immediately restock?"

$\frac{COGS}{Inv.}$ ← COGS: All the Inv. we sold during year; Inv.: Inv. on shelves on last day



★ As long as we are not running out of stock and foregoing sales, the higher this ratio is the better.

Example: $\frac{COGS}{INV.} = \frac{5000}{1000} = \frac{\$5\ COGS}{\$1\ INV.} = 5$ times ← we had to have Inventory 5 different times on shelf.

Days' sales in Inventory (Days to sell Inventory) $= \frac{365\ days}{COGS/INV.}$ = "how long it took us to sell one load of Inventory" Example: $\frac{365}{5} = 73$ days

Receivables Turnover $= \frac{Net\ sales}{Accounts\ Receivables} = \frac{Sales}{AR}$ = "how many times did we collect all AR & then loan it out again per year."

Example: $\frac{Sales}{AR} = \frac{\$10{,}000}{1000} = 10$ times

Day's sales in Receivables (Days to collect AR) $= \frac{365\ days}{Sales/AR}$ = "Average time to collect AR." Example: $\frac{365\ days}{10} = 36.5$ days

Payables Turnover $= \frac{COGS}{Accounts\ Payable} = \frac{COGS}{AP}$ Example: $\frac{5600}{800} = 7$

Days to Pay Bills $= \frac{365\ days}{COGS/AP} = \frac{365\ days}{7} = 52$ days to pay bills.

Operating cycle = Days to sell inventory + Days to collect AR = 73 + 36.5 = 109.5

cash cycle = operating cycle − Days to Pay Bills = 109.5 − 52 = 57.5

Inventory turnover $= \frac{COGS}{Inv.}$ (9.5)

① We could use END # from B/S
- This would be good if you are looking into future

② We could use (End + Beg)/2 from 2 B/S
- This would be good if we are looking at past (like for Auditing)

$$\frac{COGS}{(INV_{End} + INV_{Beg})/2}$$

This is true for many Ratios that use B/S numbers

Profitability Ratios: "what is the return?"

{profit margin} = $\frac{\text{Net Income}}{\text{Net Sales}} = \frac{NI}{\text{sales}} = \frac{NI}{S} =$ "For every $1 of sales, how much profit do we get?"

"operational efficiency"

★ high $\frac{NI}{S}$ could mean managers are managing expenses well (keeping them low), or that the product/service could be superior to others and thus demand a high price

★ Low $\frac{NI}{S}$ could mean that expenses are not being managed well, or it could be that the corp. is "high volume - low margins" (like grocery stores)

{Return on Assets} $\frac{\text{Net Income}}{\text{Total Assets}} = \frac{NI}{A} = ROA =$ "Return on Investment" $= ROI$

★ What is the profit per $1 of asset.

★ $ROA = \frac{NI}{A} = \frac{NI}{A} * \frac{\text{sales}}{\text{sales}} = \frac{NI}{S} * \frac{S}{A}$

$\frac{NI}{S}$ ↓ Profit margin or "operational efficency"

$\frac{S}{A}$ → Asset efficency

{Return on Equity} $= \frac{NI}{\text{Total Equity}} = \frac{NI}{E} =$ "Return to owners." $= ROE$

★ when there is No debt $ROA = ROE$ {because $A = 0 + E$.}

★ when there is debt $ROE > ROA$ in order to pay the creditors.

★ The more debt the higher ROE - ROA must be.

★ $ROE = \frac{NI}{E} = \frac{NI}{E} * \frac{A}{A} * \frac{S}{S} = \frac{NI}{S} * \frac{S}{A} * \frac{A}{E}$ = Profit margin * Asset turn * Equity multiplier

In order to analyze what makes ROE change, it is useful to look at the ratio in these ways:

$$ROE = \frac{NI}{E}$$

$$ROE = \frac{NI}{E} * \frac{Sales}{Sales} * \frac{Asset}{Asset} = \frac{NI}{E} * \frac{S}{S} * \frac{A}{A}$$

$$ROE = \frac{NI}{S} * \frac{S}{A} * \frac{A}{E}$$

multiplication can be done in any order

$\frac{NI}{S}$ — Profit margin: "look at operational efficiency"

$\frac{S}{A}$ — asset turnover: "look at efficient use of assets to generate sales"

$\frac{A}{E}$ — Equity multiplier: "look at leverage"

$$ROE = ROA * \frac{A}{E} = ROA * \left(\frac{E+D}{E}\right) = ROA * \left(1 + \frac{D}{E}\right)$$

$$ROE = ROA * \left(1 + \frac{D}{E}\right)$$

Example:

	1998	1999
sales	6000	5600
NI	200	200
Equity	1000	1400
Assets	2000	2400

1998 $ROE = \frac{200}{1000} = .2$

$= \frac{200}{6000} * \frac{6000}{2000} * \frac{2000}{1000}$

$= .03\overline{3} * 3 * 2$

1999 $ROE = \frac{200}{1400} = .143$

$= \frac{200}{5600} * \frac{5600}{2400} * \frac{2400}{1400}$

$= .0357 * 2.3\overline{3} * 1.7$

ROE went down a lot, but not because of Profit Margin. Efficient use of assets & Leverage are to blame.

ROA, ROE & Growth

$$\text{Internal Growth Rate} = \frac{ROA * b}{1 - ROA * b}$$

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

$$b = \frac{\text{Addition to Retained Earnings}}{\text{Net Income}}$$

★ This is the maximum that the corp. can achieve with no external financing (Debt or Equity)

★ With no external financing, as time goes on the $\frac{\text{Debt}}{\text{Equity}} = \frac{D}{E}$ ratio will go down.

$$\text{Sustainable Growth Rate} = \frac{ROE * b}{1 - ROE * b}$$

Note: Be careful with b. The past is not always a good measure for future.

★ This is the maximum growth rate that can be achieved with no external financing except to maintain a constant $\frac{D}{E}$ ratio

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

Profit ↓ Asset efficency ↓ Leverage ↓

Making any of these go up will increase growth.

Dividend Policy determines b

Market value Ratios

* # of shares means # of stock outstanding.

$$\left\{\begin{array}{c}\text{Price-Earnings} \\ \text{Ratio}\end{array}\right\} = \frac{\left\{\frac{\text{Price per share}}{\#\text{ of shares}}\right\}}{\frac{\text{Net Income}}{\#\text{ of shares}}} = \text{, PE ratio} = \begin{array}{c}\text{"substitute"} \\ \downarrow \\ \text{surrogate of Growth}\end{array}$$

EPS {Earnings per share}

★ People look at PE ratio as surrogate for growth

★ Example: In Grocery Industry the average PE ratio = 17.5

$$\left\{\begin{array}{c}\text{Market to} \\ \text{Book} \\ \text{Ratio}\end{array}\right\} = \frac{\text{Price per share}}{\left\{\frac{\text{Equity Book value}}{\#\text{ of shares}}\right\}}$$

★ >1 means that the financial markets think the corp. is worth more than the book value for assets (This is common)

★ <1 means that financial markets think corp. is worth less than its book value for assets.

Who uses the ratios?

(1) Liquidity Ratios:

Creditors: "can they pay us back?"
Managers: "can we pay our bills or do we have extra cash we need to invest?"
Auditors: can they pay bills?"

(2) Leverage Ratios:

Creditors: "can they pay in long-run?"
Managers & Investors: "Is there too much or too little debt?"

(3) Turnover Ratios:

Managers & Investors: "Are they efficient?"

(4) Profit Ratios & Market value Ratios:

Managers & Investors: "Are we profitable or should we invest?"

(5) Growth Ratios:

Managers & Investors: "will company grow?" "should we invest?"