FIN2010 Financial Management
Financial Statement Analysis

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What is Financial Statement Analysis?

- Financial statement analysis is the process of examining and evaluating a company's financial statements to gain an understanding of its financial health and to make informed business decisions. It involves using various analytical tools and techniques to review and interpret the data contained in financial statements.

Why do We Need Financial Statement Analysis?

- External uses:
  - Stakeholders needs to understand the current conditions of the firm to make their investment or business decisions. E.g.,
    - Shareholders: Focus on the profitability and long-term health of the firm.
    - Bond holders: Focus on the solvency and long-term cash flow of the firm.
    - Suppliers: Focus on the liquidity of the firm.
- Internal uses:
  - Managers of the firm need to assess the current conditions of the firm to make better plan and control of business activities:
    - Control: Focus on return on investment for various assets and asset efficiency.
    - Plan: Focus on assessing the current financial position and evaluating potential firm opportunities.

Financial Ratio Analysis

- What is it?
  - A financial ratio is an index that relates two accounting numbers and is obtained by dividing one number by the other. We can extract useful information from financial statement analysis.
- How do we use it? Oftentimes, the number itself does not mean much, we need to compare a ratio with benchmarks.
  - Compare the ratios across time.
  - Compare the ratios among peers in an industry.

Things to be aware of about ratio analysis

- There is no underlying theory, so there is no way to know which ratios are most relevant and what is the best way of constructing a ratio.
  - Different people and different sources may compute these ratios in different way, and this may leads to much confusion.
  - We will introduce some commonly used measures. In reality, you may come up with your own measures when analyzing firms.
- Identifying peer firms can be difficult for diversified firms, making it hard to compare a firm against others.
- Globalization and international competition makes comparison more difficult because of differences in accounting regulations.

Different Categories of Financial Ratios

- Short-term solvency or liquidity ratios
  - A firm's ability to cover its current liabilities with its current assets.
- Long-term solvency or financial leverage ratios
  - A firm's ability to meet its obligations in the long run.
- Asset management or turnover ratios
  - How effectively or intensively a firm uses its assets to generate sales
- Profitability ratios
  - How efficiently a firm uses its assets to generate profits.

Basket Wonders' Balance Sheet (Asset Side)

Basket Wonders Balance Sheet (thousands) Dec. 31, 2007[a]

Cash	$ 90	
Account Receivable[c]	394	
Inventories	696	
Prepaid Expense[d]	5	
Accumulated Tax Prepay	10	
Current Assets[e]		$1,195
Fixed Assets (@Cost)[f]	1030	
Less: Acc. Depreciation[g]	(329)	
Net Fixed Assets		$ 701
Investment, LT		50
Other Assets, LT		223
Total Assets[b]		$2,169

a. How the firm stands on a specific date.
b. What BW owned.
c. Amounts owed by customers.
d. Future expense items already paid.
e. Cash/likely convertible to cash within 1 year.
f. Original amount paid.
g. Accumulated deductions for wear and tear.

Basket Wonders' Balance Sheet (Liability and Equity Side)

- Basket Wonders Balance Sheet (thousands) Dec. 31, 2007

Notes Payable	$ 290
Account Payable[c]	94
Accrued Taxes [d]	16
Other Accrued Liabability[d]	100
Current Liabability[e]	$500
Long-Term Debt [f]	530
Total Liability	$1,030
Common Stock[g]	200
Additional Paid-in Capital [g]	729
Retained Earnings[h]	210
Total Equity	$1,139
Total Liab/Equity[a,b]	$2,169

a. Assets = Liabilities + Equity.
b. What BW owed and ownership position.
c. Owed to suppliers for goods and services.
d. Unpaid wages, salaries, etc.
e. Debts payable < 1 year.
f. Debts payable > 1 year.
g. Original investment.
h. Earnings reinvested.

Basket Wonders' Income Statement

- Basket Wonders Statement of Earnings (in thousands) for Year Ending December 31, 2007[a]

Net Sales [b]	$	2,211
Cost of Goods Sold		1,599
Gross Profit	$	612
Depreciation Expense		30
SG&A Expenses [c]		372
EBIT[d]	$	210
Interest Expense[e]		59
EBT [f]	$	151
Income Taxes		60
EAT[g]	$	91
Cash Dividends		38
Increase in RE	$	53

a. Measures profitability over a time period.

b. Received, or receivable, from customers.

c. Selling, General & Administrative: advertisement, officers' salaries, etc.

d. Operating income.

e. Cost of borrowed funds.

f. Taxable income.

g. Amount earned for shareholders.

Liquidity Ratios

- One important concern about a firm is its ability to pay its bills over the short run without undue stress.
- Liquidity ratio measures a firm's ability to cover its current liabilities with its current assets.
- Commonly used ones:
  - $Current\ ratio = \frac{Current\ Assets}{Current\ Liabilities}$
  - Acid test ratio=$\frac{Current\ Assets - Inventory}{Current\ Liabilities}$
    - Inventory is often the least liquid current asset. Excluding it from current asset gives us a stricter liquidity measure.
- Interpretation:
  - For each dollar of liabilities, how much liquid asset the firm has to cover it?
  - In most circumstances, we should expect a ratio of at least 1.
  - To a creditor—particularly a short-term creditor such as a supplier—the higher the current ratio, the better.
  - To the firm, a high current ratio indicates liquidity, but it also may indicate an inefficient use of cash and other short-term assets.

Liquidity Ratio Analysis: BW example

- Basket Wonders:
  - Current ratio=$\frac{1,195}{500} = 2.39$; Acid test ratio=$\frac{1,195-696}{500} = 1.00$
- Basket Wonder's time trend and comparison with the industry average is also given as follows:

	Current ratio			Acid-test ratio	
Year	BW	Industry		BW	Industry
2007	2.39	2.15		1.00	1.25
2006	2.26	2.09		1.04	1.23
2005	1.91	2.01		1.11	1.32

- What information can we draw?
  - Both ratios are higher than one, so the likelihood of the firm defaulting on short-term liabilities is low.
  - BW's current ratio is stronger than the industry average, but acid test ratio is weaker than the industry average and worsened over time.
  - Strong current ratio and weak acid-test ratio indicates a potential problem with the firm's inventory management.

Financial Leverage Ratios

- Another important concern about a firm is its ability to meet its obligations in the long run.
- Financial leverage ratios measures a firm's such abilities.
- Commonly used measures:
  - $Debt\ to\ equity\ ratio = \frac{Total\ debt}{Shareholders'equity}$
  - $Debt\ to\ total\ asset = \frac{Total\ debt}{Total\ asset}$
  - $Total\ capitalization = \frac{Long\ term\ debt}{Total\ capitalization} = \frac{Long\ term\ debt}{Long\ term\ debt+equity}$
  - $Coverage\ ratio = \frac{EBIT}{Interest\ expense}$
- Interpretation:
  - Lower debt level and higher coverage ratios generally indicate lower risk of insolvency.
  - However, as we will discuss in Capital Structure topic, leverage ratio varies substantially across industry. No one size fits all. Within industry comparison usually makes more sense.

Financial Leverage Ratios Analysis: BW example

- Basket Wonders:
  - $Debt\ to\ equity\ ratio = \frac{1{,}030}{1{,}139} = 0.9$
  - $Debt\ to\ total\ asset = \frac{1{,}030}{2{,}169} = 0.47$
  - $Total\ capitalization = \frac{530}{1{,}669} = 0.32$
  - $Coverage\ ratio = \frac{210}{59} = 3.56$
- Basket Wonder's time trend and comparison with the industry average is also given as follows:

	Debt-to-Equity Ratio		Debt-to-Total-Assets		Total Capitalization Ratio		Interest Coverage Ratio	
Year	BW	Industry	BW	Industry	BW	Industry	BW	Industry
2007	0.9	0.9	0.47	0.47	0.32	0.3	3.56	5.19
2006	0.9	0.9	0.47	0.47	0.32	0.31	4.35	5.02
2005	0.81	0.89	0.45	0.47	0.37	0.32	10.3	4.66

Financial Leverage Ratios Analysis: BW example

- What can we draw from the information?
  - The interest coverage ratio for BW has been falling since 2005. It has been below industry averages for the past two years.
  - This indicates that low earnings (EBIT) may be a potential problem for BW.
  - Debt levels are in line with the industry averages.

Activity Ratios

- The question: how effectively or intensively a firm uses its resources to generate sales?
- Activity ratios, also called as asset utilization ratios, analyze this question.
- Commonly used measures:
  - Receivable turnover= $\frac{annual\ net\ credit\ sales}{receivables}$
    - Indicates quality of receivables and how successful the firm is in its collections.
  - Average collection period= $\frac{days\ in\ a\ year}{receivable\ turnover}$
    - Average number of days that receivables are outstanding.

Activity Ratios

- Commonly used measures:
  - Payable turnover= $\frac{annual\ credit\ purchases}{accounts\ payables}$
    - Indicates the promptness of payment to suppliers by the firm.
  - Payable turnover in days=$\frac{days\ in\ a\ year}{payable\ turnover}$
    - Average number of days that payables are outstanding.
  - Inventory turnover= $\frac{cost\ of\ goods\ sold}{inventory}$
    - Indicates the effectiveness of the inventory management practices of the firm.
  - Total asset turnover= $\frac{net\ sales}{total\ assets}$
    - Indicates the overall effectiveness of the firm in utilizing its assets to generate sales.

Activity Ratios Analysis: BW example

- BW's activity ratios:
  - Assume all sales are credit sales:
    - Receivable turnover $= \frac{\$2{,}211}{\$394} = 5.61$
    - Receivable turnover in days$= \frac{365}{5.61} = 65$ days
  - Assume the BW's annual credit purchases=$1,551:
    - Payable turnover $= \frac{\$1{,}551}{\$94} = 16.5$
    - Payable turnover in days$= \frac{365}{16.5} = 22.1$ days
  - Inventory turnover$= \frac{\$1{,}559}{\$696} = 2.3$
  - Total asset turnover$= \frac{\$2{,}211}{\$2{,}169} = 1.02$

Activity Ratios Analysis: BW example

- Basket Wonder's time trend and comparison with the industry average is also given as follows:

	Average Collection Period		Payable Turnover in Days		Inventory Turnover Ratio		Total Asset Turnover Ratio	
Year	*BW*	*Industry*	*BW*	*Industry*	*BW*	*Industry*	*BW*	*Industry*
2007	65	65.7	22.1	46.7	2.3	3.45	1.02	1.17
2006	71.1	66.3	25.4	51.1	2.44	3.76	1.03	1.14
2005	83.6	69.2	43.5	48.5	2.64	3.69	1.01	1.13

  - BW has improved the average collection period to that of the industry average.
  - BW has improved the payable turnover in Days.
    - Is this necessarily a good thing?
  - BW has a very poor inventory turnover ratio.
  - BW has a weak total asset turnover ratio.

Profitability ratio

- The question: how efficiently a firm uses its assets to generate profits.
- The best known and most widely used ones:
  - Gross profit margin $= \frac{net\ income}{sales}$
    - Gross profit per dollar of sales
  - Net profit margin $= \frac{net\ income}{sales}$
    - Net profit per dollar of sales
  - Return on asset$= \frac{net\ income}{total\ assets}$
    - Profit per dollar of assets
  - Return on equity $= \frac{net\ income}{total\ equity}$
    - Profit per dollar of equity. The measure the shareholders care the most.

Profitability Analysis: BW example

- BW's profitability ratios:
  - Gross profit margin $= \frac{\$612}{\$2{,}211} = 0.277$
  - Net profit margin $= \frac{\$91}{\$2{,}211} = 0.041$
  - Return on asset$= \frac{\$91}{\$2{,}169} = 0.042$
  - Return on equity $= \frac{\$91}{\$1{,}139} = 0.08$
- Basket Wonder's time trend and comparison with the industry average is also given as follows:

	Gross Profit Margin		Net Profit Margin		Return on Assets		Return on Equity	
Year	*BW*	*Industry*	*BW*	*Industry*	*BW*	*Industry*	*BW*	*Industry*
2007	0.277	0.311	0.041	0.082	0.042	0.096	0.08	0.18
2006	0.287	0.308	0.049	0.081	0.05	0.091	0.094	0.172
2005	0.313	0.276	0.09	0.076	0.091	0.09	0.166	0.204

  - Compared to its competitors, BW has bee doing very poorly on generating profits.
  - The profitability ratios for BW have ALL been falling since 2005. Each has been below the industry averages for the past three years.
  - This indicates that COGS and administrative costs may both be too high and a potential problem for BW.
  - Note, this result is consistent with the low interest coverage ratio.

The Du Pont Approach

- The DuPont approach, also known as DuPont analysis, is a framework for analyzing a company's return on equity (ROE) or return on asset by decomposing it into three key components: profitability, efficiency, and leverage. This approach allows analysts to understand the different factors contributing to a company's overall financial performance, particularly how efficiently it is using its resources to generate profits.
- Return on asset$= \frac{net\ income}{total\ assets}$

$$= \frac{net\ income}{net\ sales} * \frac{net\ sales}{total\ assets}$$

$$= \text{net profit margin} * \text{total asset turnover}$$

  - $ROI_{BW\ in\ 2007} = 0.041 * 1.02 = 4.2\%$
  - $ROI_{industry} = 0.082 * 1.17 = 9.6\%$
- Return on equity$= \frac{net\ income}{shareholders'equity}$

$$= \frac{net\ income}{net\ sales} * \frac{net\ sales}{total\ assets} * \frac{total\ assets}{shareholders'equity}$$

$$= \text{net profit margin} * \text{total asset turnover} * \text{equity multiplier}$$

  - $ROE_{BW\ in\ 2007} = 0.041 * 1.02 * 1.9 = 0.08$
  - $ROE_{industry} = 0.082 * 1.17 * 1.88 = 0.18$

Summary of Ratio Analyses

- Inventories are too high.
- May be paying off creditors (accounts payable) too soon.
- COGS may be too high.
- Selling, general, and administrative costs may be too high.

LIQUIDITY		
CURRENT	$= \frac{\text{Current assets}}{\text{Current liabilities}}$	Measures ability to meet current debts with current assets.
ACID-TEST (QUICK)	$= \frac{\text{Current assets less inventories}}{\text{Current liabilities}}$	Measures ability to meet current debts with most-liquid (quick) current assets.

LEVERAGE		
DEBT-TO-EQUITY	$= \frac{\text{Total debt}}{\text{Shareholders' equity}}$	Indicates the extent to which debt financing is used relative to equity financing.
DEBT-TO-TOTAL-ASSETS	$= \frac{\text{Total debt}}{\text{Total assets}}$	Shows the relative extent to which the firm is using borrowed money.
COVERAGE		
INTEREST COVERAGE	$= \frac{EBIT^*}{\text{Interest expense}}$	Indicates ability to cover interest charges; tells number of times interest is earned.
ACTIVITY		
RECEIVABLE TURNOVER (RT)	$= \frac{\text{Annual net credit sales}}{\text{Receivables}^{**}}$	Measures how many times the receivables have been turned over (into cash) during the year; provides insight into quality of the receivables.
RECEIVABLE TURNOVER IN DAYS (RTD) (Average collection period)	$= \frac{365}{RT}$	Average number of days receivables are outstanding before being collected.
INVENTORY TURNOVER (IT)	$= \frac{\text{Cost of goods sold}}{\text{Inventory}^{**}}$	Measures how many times the inventory has been turned over (sold) during the year; provides insight into liquidity of inventory and tendency to overstock.
INVENTORY TURNOVER IN DAYS (ITD)	$= \frac{365}{IT}$	Average number of days the inventory is held before it is turned into accounts receivable through sales.
TOTAL ASSET TURNOVER (Capital turnover)	$= \frac{\text{Net sales}}{\text{Total assets}^{**}}$	Measures relative efficiency of total assets to generate sales.

PROFITABILITY		
NET PROFIT MARGIN	$= \frac{\text{Net profit after taxes}}{\text{Net sales}}$	Measures profitability with respect to sales generated; net income per dollar of sales.
RETURN ON INVESTMENT (ROI) (Return on assets)	$= \frac{\text{Net profit after taxes}}{\text{Total assets}^{**}}$	Measures overall effectiveness in generating profits with available assets; earning power of invested capital.
	= NET PROFIT MARGIN × TOTAL ASSET TURNOVER	
	$= \frac{\text{Net profit after taxes}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Total assets}^{**}}$	
RETURN ON EQUITY (ROE)	$= \frac{\text{Net profit after taxes}}{\text{Shareholders' equity}^{**}}$	Measures earning power on shareholders' book-value investment.
	= NET PROFIT MARGIN × TOTAL ASSET TURNOVER × EQUITY MULTIPLIER	
	$= \frac{\text{Net profit after taxes}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Total assets}^{**}} \times \frac{\text{Total assets}^{**}}{\text{Shareholders' equity}^{**}}$	

*Earnings before interest and taxes.
**An average, rather than an ending, balance may be needed.