

Chapter 3

Financial Statements Analysis (FSA) and Financial Models

Key Concepts and Skills

- Know how to standardize financial statements for comparison purposes
- Know how to compute, interpret and analyze important financial ratios (trend & peer analyses)
 - The Du Pont Identity
- Be able to develop a financial plan using the percentage of sales approach
- Understand how capital structure and dividend policies affect a firm's ability to grow
 - Relationship between external financing and growth

Chapter Outline

- 3.1 Financial Statements Analysis
- 3.2 Ratio Analysis
- 3.3 The Du Pont Identity
- 3.4 Financial Models
- 3.5 External Financing and Growth
- 3.6 Some Caveats Regarding Financial Planning Models

Financial Statement Analysis: Learning Objectives

After this session, you should be able to

- Identify relevant information from the financial statements for making financial decisions.
- Analyze the state of the “financial health” of a company based on:
 - *Short-term solvency or liquidity ratios* - the ability of a firm to meet its current obligations
 - *Efficiency or Asset management ratios* - how well the firm is using its investment in assets to produce sales
 - *Financial leverage or Long-term solvency ratios* - the degree to which debt has been used to finance the firm's asset purchases
 - *Coverage ratios* - the ability of a firm to meet obligations by paying related expenses
 - *Profitability ratios* - how profitable a firm has been over a period of time
 - *Market Value ratios*

3.1 Standardizing Financial Statements

- For comparing companies of different sizes within the same industry, or over time due to growth, by either
 - (1) standardizing the balance sheets and income statements of companies; or
 - (2) comparing their financial ratios.
- Common-size Balance Sheets
 - Express each item as a percentage of total assets
- Common-size Income Statements
 - Express each item as a percentage of total sales

3.2 Ratio Analysis

- Ratios also allow for better comparison through time and/or between companies.
- As we look at each ratio, ask yourself:
 - How is the ratio computed?
 - What is the ratio trying to measure and why?
 - What is the unit of measurement?
 - What does the value indicate?
 - How can we improve the company' s ratio?

3.2 Ratio Analysis: Short-term Solvency or Liquidity Ratios

- **Current ratio** = Current Assets/Current Liabilities
→ $\$708 / \$540 = 1.31$ times
 - Generally, a firm's current assets are converted to cash (collecting on accounts receivables or selling its inventories) and this cash is used to retire its current liabilities. We assess a company's ability to pay its bills by comparing the size of current assets to the size of its current liabilities.
- **Quick Ratio** = (Current Assets - Inventories)/Current Liabilities
→ $\$(708 - 422) / \$540 = .53$ times
 - Inventories are often the least liquid of the firm's assets. That's why you so often see "50% off" sales when firms are going out of business!
- Cash ratio = Cash/CL → $\$98 / \$540 = .18$ times
 - The most conservative measure of liquidity.

Long-Term Solvency Ratios: Leverage Ratios

- **Total Debt Ratio** = Total Debt/Total Assets
(= TD / TA) → $\$(3,588 - 2,591) / \$3,588 = .28$ times
 - Total debt = All long-term and short-term debts
= Total assets (TA) - Total equity (TE)
or Current Liabs. + Long-Term Debt
- **Debt-Equity ratio** = Total Debt/Total Equity
(= TD / TE) → $\$(3,588 - 2,591) / \$2,591 = .385$ times
- **Equity multiplier** = Total Assets / Total Equity
(= TA / TE) = $1 + \text{TD/TE}$ → $1 + .385 = 1.385$ times

Long-Term Solvency Ratios: Coverage Ratios

- Times Interest Earned (TIE) = $\text{EBIT} / \text{Interest}$

→ $\$691 / \$141 = 4.9 \text{ times}$

- Measures the ability of the firm to pay its interest obligations by comparing EBIT to interest expenses

- Cash Coverage = $\text{EBITDA} / \text{Interest} = (\text{EBIT} + \text{Depreciation} + \text{Amortization}) / \text{Interest}$

→ $\$(691 + 276) / \$141 = \$967 / \$141 = 6.9 \text{ times}$

- EBIT does not really reflect the cash that is available to pay the firm's interest expenses
- Depreciation has been subtracted in the calculation of EBIT
- EBIT + Depreciation + Amortization is EBITDA (Earnings before interest, taxes, depreciation and amortization) which measures the firm's ability to generate cash from operations.

Asset Management or Turnover (Efficiency) Ratios

- **Inventory Turnover ratio = Cost of Goods Sold/Inventory**
 - The number of times that a firm replaces its inventories during a year
- **Days' sales in inventory = 365 Days/Inventory Turnover**
 - It tells how many days on average it takes to sell the inventory.
- **Receivable Turnover Ratio = Sales/Accounts Receivable**
 - Measures how well the firm is managing its accounts receivable
- **Days' Sales in Receivable = 365 Days/Receivable Turnover**
 - It is the average collection period (ACP), i.e. How many days it takes, on average, to collect on credit sales
- **Total (or Fixed) Asset Turnover = Sales/Total (or Fixed) Assets**
 - Higher is better
 - However some industries will naturally have lower turnover ratios

Asset Management or Turnover (Efficiency) Ratios

- Inventory Turnover = $\$1,344 / \$422 = 3.2$ times
- Days' Sales in Inventory = $365 \text{ days} / 3.2 = 114$ days
- Receivables Turnover = $\$2,311 / \$188 = 12.3$ times
- Days' Sales in Receivables (ACP) = $365 \text{ days} / 12.3 = 30$ days
 - One may want to compare ACP to the credit period!
- Total Asset Turnover = $\$2,311 / \$3,588 = .64$ times
 - Capital Intensity = $\$3,588 / \$2,311 = 1.55$ times
- Fixed Asset Turnover = $\$2,311 / \$2,880 = .80$ times
 - It is not unusual for capital intensive companies to have total₁₀ (or fixed) asset turnover ratios fall below 1.0!

Profitability Ratios

- Profit (or EBITDA) Margin = Net Income (or EBITDA) / Sales → $\$363 / \$2,311 = 15.7\%$ or $\$967 / \$2,311 = 41.8\%$

- Tells us the rate of return on sales
- Just rising net income is not enough, PM must also be expanding
- Profit margins are very different for different industries, e.g., Grocery stores (2%); pharmaceutical (18%).

- Return on Assets, ROA = Net Income/Total Assets

→ $\$363 / \$3,588 = 10.1\%$

- Return on Equity, ROE = Net Income/Total Equity

→ $363 / \$2,591 = 14.0\%$

- When ROE > ROA, the firm is using financial leverage.
- Note: Total Assets and Total Equity are book values.

Market Value Measures

- Price-Earnings Ratio = Current price per share/Earnings per share (EPS) → $\$88 / \$11 = 8$ times
- Market-to-Book Ratio = Market value per share/Book value per share → $\$88 / (\$2,591 / 33) = 1.12$ times
- Enterprise Value (EV) = Market capitalization + Market value of interest bearing debt - cash
→ $\$2,904 + \$ (196 + 457) - \$98 = \$3,459$
- EV measures how much it costs to pay for both debt and equity of a company
- EV Multiple = EV / EBITDA → $\$3,459 / \$967 = 3.6$ times
- NOT affect by capital structure and investment decisions of the company, or its tax policy

Price-Earnings (P/E) Ratio

- P/E ratio shows the relationship between the stock price and the earnings of the company
- It is often used as a measure to determine if stock is overpriced, fairly priced, or underpriced
- The P/E ratio can be thought as the number of years it will take the company to earn back the amount of your initial investment, assuming that the company's earnings stay constant (i.e., all future EPSs are the same as today's EPS)
- Without specifying, P/E refers to the “trailing P/E”, i.e., P_0/E_0

Value – P/E

- For example, today PFE P/E is 7.96, it is obtained by dividing the current price of \$28.65 by the company's EPS of \$3.60
- If you buy 100 shares of PFE for \$2,865, your shares will earn you \$360 in one year, and the original investment of \$2,865 will be recovered in approximately 8 years

P/E

- One way to start evaluating the P/E ratio of a company is to compare it with the industry's P/E ratio
- Next, track the P/E ratio back through several years to get a sense of its normal level
- Note that a company with a very high P/E ratio must have incredible earnings growth to justify the high price
 - McDonalds - in 1972 it had a P/E = 50 and a price of \$75, it was not possible to sustain such expectations and today the P/E ratio is 16.89
 - Ross Perot's company EDS in the late 1960 - P/E ratio was 500! The price declined from \$40 to \$3 in 1974
 - Polaroid - in 1973 it had a P/E of 50 due to high expectations from the new camera

3.3 The DuPont Identity - Breakdown of the ROE

- Measure the performance of the company and identify areas of weakness by decomposing the ROE

$$ROE = \frac{NI}{TotalEquity(TE)}$$

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

$$ROE = PM \times TATurnover \times EquityMultiplier$$

$$\rightarrow ROE = 15.7\% * 0.64 * 1.385 = 14.0\%$$

- Profit margin measures operating efficiency
- Total asset turnover measures asset use efficiency
- Equity multiplier measures financial leverage
- Expanded DuPont Analysis examines several ratios at once, giving a bigger picture for room for improvement

Choosing a Benchmark

- Ratios on their own don't really tell us a whole lot, but when we compare them against previous years' numbers (time trend analysis), other companies, industry averages, (peer group analysis – SIC or NAICS codes) or the economy in general it can reveal a lot!
- Every ratio has its variations, some people exclude things that others include. Use what you feel comfortable with, but be sure to have consistency when comparing against other companies.

Potential Problems with FSA

- There is no underlying theory, so there is no way to know which ratios are most relevant.
- Benchmarking is difficult for diversified firms.
- Globalization and international competition makes comparison more difficult because of differences in accounting standards.
- Firms use varying accounting procedures.
- Firms have different fiscal years.
- Extraordinary, or one-time, events

3.4 Financial Models: Learning Objectives

After this session, you should be able to

- *Describe the process of corporate financial planning.*
- Describe and explain the Percentage Sales Approach.
- Describe and explain the **Pro Forma Statement Approach**.
- Define the determinants of growth.
- Identify some caveats of Financial Planning Models.

Long-Term Financial Planning

- It formulates the method by which financial goals are to be achieved.
- Investment in new assets - determined by capital budgeting decisions
- Degree of financial leverage - determined by capital structure decisions
- Cash paid to shareholders - determined by dividend policy decisions
- Liquidity requirements - determined by net working capital decisions
- It uses the financial statements to summarize the projected future financial status of a company (thus, the form used to record the forecast financial statements are known as the **pro forma statements or pro formas**).

Financial Planning Ingredients

- Economic Assumptions - explicit assumptions about the coming economic environment
- Sales Forecast - many cash flows depend directly on the level of sales (often estimate sales growth rate - pro forma income statement)
- **Pro Forma Statements** - setting up the plan as projected (pro forma) financial statements allows for consistency and ease of interpretation
- Asset Requirements - the additional assets that will be required to meet sales projections (LHS of the B/S)
- Financial Requirements - the amount of financing needed to pay for the required assets (RHS of the B/S)
- Plug Variable - determined by management decisions about what type of financing will be used (makes the balance sheet balance)

- *Economic Assumptions - explicit assumptions about the coming economic environment*

Percent of Sales Approach

- Some items vary directly with sales, others do not.
- Income Statement
 - Costs may vary directly with sales - in the case where all costs vary directly with sales, the profit margin would be constant
 - BUT depreciation and interest expenses may NOT vary directly with sales - if this is the case, then the profit margin will NOT remain constant over time!
 - AND dividends are a management decision and generally do NOT vary directly with sales - this affects additions to retained earnings (on the Pro Forma Balance Sheet)

Percent of Sales Approach

- Balance Sheet

- Initially assume all assets vary directly with sales.
 - BUT fixed assets may ***NOT*** vary directly with sales!
- Accounts payable also normally varies directly with sales.
- Long-term debt and equity generally do ***NOT*** vary with sales because they depend on management decisions about capital structure.
- The change in the retained earnings portion of equity will be determined by the dividend policy.

- External Financing Needed (EFN)

- The difference between the forecasted increase in assets and the forecasted increase in liabilities and equity.

What is the “plug variable” ?

➤ Compatibility across various growth targets will usually require adjustment in a third variable.

➤ Example:

SALES	2000
COSTS	1600
NET INCOME	400

ASSETS	1000	DEBT	500
		EQUITY	500
		TOTAL	1000

SALES INCREASE BY 25%

SALES	2500
COSTS	2000
NET INCOME	500

ASSETS	1250	DEBT	625
		EQUITY	625
		TOTAL	1250

HOW CAN NET INCOME IS \$500 AND EQUITY INCREASED BY ONLY \$125?

Possible answers

- The company must have paid a dividend or repurchased stock equal to $\$500 - \$125 = \$325$
- What if the company does not want to pay dividends or repurchase stock?

SALES	2500
COSTS	2000
NET INCOME	500

ASSETS	1250	DEBT	250
		EQUITY	1000
		TOTAL	1250

- The company must retire $\$500 - \$250 = \$250$ debt

A Brief Example (with restrictive assumptions)

- Rosengarten Corporation has projected a 25% increase in its current sales of \$1,000 for the coming year.
- Total costs are expected to continue to run at 80% of sales <A simplifying but INVALID assumption>, and the tax rate will remain at 34%.
- The firm has a policy of paying out a constant fraction of net income in the form of a cash dividend (i.e., the payout ratio based on most recent year = $44/132 = 33 \frac{1}{3}\%$.) Thus, the retention or plowback ratio is $(1 - 33 \frac{1}{3}\%) = 66 \frac{2}{3}\%$.
- The firm believes that all of its assets grow directly with its level of sales (as a percent of sales, e.g. inventory is 60% of sales).
- The firm believes that only account payable varies with sales but not other items on the RHS of the B/S.
- Will the firm be able to finance growth in sales with retained earnings and new debt?

The Percentage Sales Method: EFN (Using equation)

- The external funds needed for a 25% growth in sales:

$$\left[\left(\frac{\text{Assets}}{\text{Sales}} \right) \times \Delta \text{Sales} \right] - \left[\frac{\text{SpLiab}}{\text{Sales}} \times \Delta \text{Sales} \right] - [PM \times \text{Projected Sales}) \times (1 - d)]$$

$$\left(\frac{\text{Assets}}{\text{Sales}} \right) = \frac{\$3000}{\$1000} = 3 \quad \left(\frac{\text{SpLiab}}{\text{Sales}} \right) = \frac{\$300}{\$1000} = 0.3$$

SpLiab = Spontaneous liabilities (those vary with sales)

PM = Net profit margin = 0.132;

d = Dividend payout ratio = 1/3

ΔSales = Projected change in sales = \$250

The Percentage Sales Method: EFN (Using equation)

- The amount of external financing needed

$$\left[\left(\frac{\text{Assets}}{\text{Sales}} \right) \times \Delta \text{Sales} \right] - \left[\frac{\text{SpLiab}}{\text{Sales}} \times \Delta \text{Sales} \right] - [PM \times \text{Projected Sales} \times (1 - d)]$$

$$= \left(\frac{3000}{1000} \times \$250 \right) - \left(\frac{300}{1000} \times \$250 \right) - (0.132 \times \$1250 \times 2/3)$$

$$= \$565$$

3.5 External Financing and Growth

- At low growth levels, internal financing (retained earnings) may exceed the required investment in assets.
- As the growth rate increases, the internal financing will not be enough, and the firm will have to go to the capital markets for (external) financing.
- Examining the relationship between growth and external financing required is a useful tool in long-range planning.

The Internal Growth Rate

- The internal growth rate tells us how much the firm can grow assets using retained earnings as the only source of financing, i.e., internal financing only!
- Using the information from the Hoffman Co.
 - $ROA = \$66 / \$500 = .132$
 - $b = \$44 / \$66 = .667$

$$\begin{aligned}\text{Internal Growth Rate} &= \frac{ROA \times b}{1 - ROA \times b} \\ &= \frac{.132 \times .667}{1 - .132 \times .667} = .0965 \\ &= 9.65\%\end{aligned}$$

The Sustainable Growth Rate

- The sustainable growth rate tells us how much the firm can grow by using internally generated funds and issuing debt to maintain a constant debt to equity ratio. *NO external equity financing!*
- Using the Hoffman Co.
 - $ROE = \$66 / \$250 = .264$
 - $b = .667$

$$\begin{aligned}\text{Sustainable Growth Rate} &= \frac{ROE \times b}{1 - ROE \times b} \\ &= \frac{.264 \times .667}{1 - .264 \times .667} = .214 \\ &= 21.4\%\end{aligned}$$

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

3.6 Some Caveats

- Financial planning models do not indicate which financial policies are the best.
- Models are simplifications of reality, and the world can change in unexpected ways.
- Without some sort of plan, the firm may find itself adrift in a sea of change without a rudder for guidance.

Quick Quiz

- How do you standardize balance sheets and income statements?
- Why is standardization useful?
- What are the major categories of financial ratios?
- How do you compute the ratios within each category?
- What are some of the problems associated with financial statement analysis?

Quick Quiz

- What is the purpose of long-range planning?
- What are the major decision areas involved in developing a plan?
- What is the percentage of sales approach?
- What is the internal growth rate?
- What is the sustainable growth rate?
- What are the major determinants of growth?