

Financial Statement Analysis

15.511 Corporate Accounting
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Financial Statement Analysis: Ratio Analysis

- What is financial statement analysis?
- What is ratio analysis?
- The mechanics of and inferences from:
 - Profitability ratios
 - Risk ratios

What is Financial Statement Analysis?

- A comprehensive analysis of:
 - Strategy
 - Competition, regulation, and taxes
 - Past, current, and projected financial performance
 - Fundamental valuation in relation to stock price
 - Planning for the future
 - Operations
 - Investments
 - Financing
 - Our objective in this course is somewhat limited and will focus on financial performance.

Analyzing Financial Statements: Different Approaches

- Ratio analysis
 - The process of examining various financial statement items with the objective of assessing the success of past and current performance and, perhaps more importantly, of projecting future performance and financial condition.
- Analysis Approach
 - Comparisons across time
 - Trend and time-series analysis
 - Cross-Sectional Analysis
 - Within industry
 - Across sectors

Analyzing Financial Statements: Analysis Techniques

- Common-size financial statements
 - Common-size income statement – as a percentage of revenue
 - Common-size balance sheet – as a percentage of total assets
- Year-to-year growth analysis
- Ratio analysis
 - Enables inter-temporal and cross-sectional comparisons
 - Our primary focus

Why perform financial analysis?

- As a business owner, what performance indicators would you like to have?
 - How fast are the revenues growing (Demand Analysis)? – **Growth**
 - What is the operating margin? – **Profitability**
 - What is the efficiency of asset usage? – **Turnover**
 - Do I have an optimal mixture of debt and equity financing? – **Financial Leverage**

Why perform financial analysis?

- Historical, present, and future (expectations) ratios:
 - Pro forma financial analysis captures expectations
 - Expectations based on historical and current performance and market conditions
 - Useful for evaluation, planning, and valuation
 - 15.535 – Financial Statement Analysis course

Financial Ratio Analysis: Gateway and Dell Computers

- Profitability Ratios
- Risk Ratios
 - Short-Term Liquidity Risk
 - Long-Term Solvency Risk

Profitability Ratios

- Objective
 - Assess a firm's operating performance
- Return on Assets
 - Measures a firm's success in using assets to generate earnings, independent of the financing of those assets (i.e., debt v. equity).
 - The numerator is operating income after income taxes, excluding any financing costs.

Profitability Ratios:

Return on Assets (ROA)

- $ROA = (NI + (1 - T) I + MIE) / ATA$
 - NI... Net Income
 - T... Tax Rate
 - I... Interest Expense
 - MIE... Minority Interest in Earnings
 - ATA... Average Total Assets

Profitability Ratios:

Return on Assets (ROA)

- Gateway (NYSE:GTW) ROA
 - $(-525,950)/(.5(2,028,438+2,509,407)) =$
 - -0.23

- Dell (NasdaqNM:DELL) ROA
 - $(2,645 + (1-.29)(22))/(.5(19,311+15,470)) =$
 - 0.15

Profitability Ratios:

Return on Assets (ROA)

- Adding $(1 - \text{Tax Rate})(\text{Interest Expense})$ to Net Income provides an estimate of income as if the company were not to have any debt. For example:

■	With Debt	W/out Debt
■ Revenues:	1,000	1,000
■ COGS:	700	700
■ Interest:	100	0
■ Inc b/ tax	200	300
■ Tax (@40%)	80	120
■ Net Income	120	180
■ $\text{NI} + (1 - \text{Tax})(\text{Int Exp})$	$120 + 60$	180

- Thus, the effect of leverage on ROA is neutralized

Profitability Ratios:

Return on Assets (ROA)

- Decomposition of ROA
 - $ROA = \text{Profit Margin} \times \text{Total Assets Turnover}$
- Profit Margin = $(NI + (1 - T)(I) + MIE) / \text{Sales}$
 - Gateway PM = -.15
 - Dell PM = .06
- Assets Turnover = $\text{Sales} / \text{ATA}$
 - Gateway AT = 1.50
 - Dell AT = 2.38

Profitability Ratios:

Return on Assets (ROA)

- Decomposition of ROA
 - Profit margin
 - Measures a firm's ability to generate operating income from a particular level of sales.
 - One can identify reasons for changes in profit margin between years by studying relation between individual expenses and sales (i.e., by performing common-size analysis of the income statement).
 - Asset turnover
 - Measures a firm's ability to generate sales from a particular investment in assets.
 - May be further decomposed to examine turnover ratios for individual assets.

Profitability Ratios: Return on Assets (ROA)

- Summary of ROA Analysis
 - Calculate ROA.
 - Decompose ROA into profit margin and assets turnover.
 - Decompose profit margin into expense ratios for various cost items.
 - Decompose asset turnover into various individual turnover rates.

Profitability Ratios:

Return on Common Equity (ROE)

- Measures the return to common shareholders.
- $ROE = (\text{Net Income} - \text{Preferred Dividends}) / \text{(Average Common Equity)}$
- $ROE = \text{Profit Margin} \times \text{Turnover} \times \text{Leverage}$
 - $\text{Leverage} = \text{Assets} / \text{Shareholders' Equity}$
 - Gateway ROE = -0.55
 - Dell ROE = 0.47

Profitability Ratios:

Fixed Asset Turnover

- Measures the relation between sales and the investment in property, plant, and equipment.
 - How efficiently is the firm using its fixed assets to generate sales?
- Fixed Asset Turnover =
= Sales/(Average Fixed Assets)
 - Gateway Fixed Asset Turnover = 8.38
 - Dell Fixed Asset Turnover = 34.11

Profitability Ratios:

Fixed Asset Turnover

- Changes in the fixed asset turnover ratio can signal:
 - A firm making investments in fixed assets in anticipation of higher sales in future periods
 - A low or decreasing rate of fixed asset turnover may be an indicator of an expanding firm that is preparing for future growth.
 - Alternatively, a firm might cut back its capital expenditures if the near-term outlook for its products is poor.
 - Such an action could lead to an increase in the fixed asset turnover ratio.

Risk Ratios:

Liquidity and Solvency

- Short-Term Liquidity Ratios
 - Current Ratio
 - Quick Ratio
 - A/R Turnover
 - A/P Turnover
 - Inventory Turnover
- Long-Term Solvency Ratios
 - Long-Term Debt Ratio
 - Debt/Equity Ratio
 - Liabilities Assets Ratio

Short-Term Liquidity:

Current Ratio

- Sheds light on a firm's ability to pay for obligations that come due during its operating cycle (i.e., wages, purchases of inventory, etc.).
- Current ratio =
= (Current Assets)/(Current Liabilities)
 - Gateway Current Ratio = 1.67
 - Dell Current Ratio = 0.98
- It matches:
 - The amount of cash and other current assets that will become cash within one year against
 - The obligations that come due in the next year.
- Rule of thumb: A minimum current ratio of one.

Short-Term Liquidity:

Quick Ratio

- A variation of the current ratio is the quick ratio, also known as the acid test ratio.
- Quick Ratio = $(\text{Cash} + \text{Marketable Securities} + \text{A/R}) / (\text{Current Liabilities})$
 - Gateway Quick Ratio = 1.30
 - Dell Quick Ratio = 0.81
- The numerator includes only those current assets that the firm could convert into cash quickly.

Short-Term Liquidity: Accounts Receivable Turnover

- A/R Turnover measures how soon sales will become cash.
- $A/R \text{ Turnover} = \text{Sales} / (\text{Average A/R})$
 - Gateway A/R Turnover = 16.68
 - Dell A/R Turnover = 13.32

Short-Term Liquidity:

Accounts Receivable Turnover

- An intuitive measure of the rate at which receivables are being collected is the days receivable outstanding:
- Days Receivable Outstanding = $365 / (\text{A/R T})$
 - Gateway Days Receivable Outstanding = 21.88
 - Dell Days Receivable Outstanding = 27.39
- Interpretation:
 - Sustained increases might indicate a deteriorating customer base and/or that some customers are experiencing financial difficulties. It could also mean the credit department is doing a poor job.
 - Sustained decreases might indicated that the firm's credit department is being too aggressive.

Short-Term Liquidity: Accounts Payable Turnover

- Measures how quickly a firm is paying its suppliers.
- Accounts Payable Turnover =
= Purchases/(Average Accounts Payable)
 - Gateway A/P Turnover = 8.54
 - Dell A/P Turnover = 5.10
- Purchases can be measured as Cost of Goods Sold plus the change in the Inventory account balance.

Short-Term Liquidity:

Accounts Payable Turnover

- Days Payable Outstanding = $365 / (\text{A/P Turnover})$
 - Gateway Days Payable Outstanding = 42.76
 - Dell Days Payable Outstanding = 71.60
- Analysis
 - If the days payable outstanding is rising (i.e., A/P turnover falling) the firm is facing a financial difficulty.
 - Low days payable or high turnover rate might imply suppliers unwilling to offer credit (i.e., insist on cash payment).
 - Alternatively, it might be that the suppliers' cash discounts for prompt payments are too good to pass up.

Short-Term Liquidity: Inventory Turnover

- How quickly is inventory being sold?
- Inventory Turnover = $\text{COGS}/(\text{Average Inventory})$
 - Gateway Inventory Turnover = 28.97
 - Dell Inventory Turnover = 107.08
- Why is Dell's inventory ratio so high?
- A more intuitive measure of the rate:
- Days Inventory Held = $365/(\text{Inventory Turnover})$
 - Gateway Days Inventory Held = 12.60
 - Dell Days Inventory Held = 3.41

Short-Term Liquidity: Inventory Turnover

- Alternative interpretations:
 - A firm would like to sell as many goods as possible with a minimum of cash tied up in inventories.
 - An increase in the rate of inventory turnover between periods would suggest a more profitable use of the investment in inventory.
 - Alternatively, a firm does not want to have so little inventory on hand that shortages result, and the firm must turn away customers.
 - An increase in the rate of inventory turnover in this case may portend a loss of sales in future.
 - A low turnover rate might suggest that a portion of the firm's inventory is becoming obsolete and thus not selling.
- Firms must make trade-offs in deciding the optimum level of inventory to hold.

Long Term Solvency: Solvency Ratios

- Measure a firm's ability to meet interest and principal payments on long-term debt (and similar obligations, like long-term leases) when they come due.
- The best indicator for assessing long-term solvency risk is a firm's ability to generate earnings over a period of years.

Long-Term Solvency: Solvency Ratios

- Long-Term Debt Ratio =
= (LT Debt)/(LT Debt and S.H.E.)
 - Gateway Long-Term Debt Ratio = 0.13
 - Dell Long-Term Debt Ratio = 0.07
- Debt/Equity Ratio = (LT Debt)/(S.H.E.)
 - Gateway Debt/Equity Ratio = 0.15
 - Dell Debt/Equity Ratio = 0.08
- Liabilities/Assets Ratio = (Total L)/(Total A)
 - Gateway Liabilities/Assets Ratio = 0.64
 - Dell Liabilities/Assets Ratio = 0.67

Long-Term Solvency: CFO to Total Liabilities Ratio

- Measure the firm's ability to generate cash flows from operations to service debt.
- CFO to Total Liabilities =
= CFO/(Average Total Liabilities)
 - Gateway CFO to Total Liabilities = 0.06
 - Dell CFO to Total Liabilities = 0.31

Long-Term Solvency: CFO to Capital Expenditures

- This ratio assesses a firm's ability to generate cash flow from operations in excess of the capital expenditure needed to maintain and build plant capacity.
 - The “excess” cash flow can be used to service debt.
- $$\frac{\text{(Cash Flow Continuing Operations)}}{\text{(Capital Expenditures)}}$$

Long-Term Solvency: Interest Coverage Ratio

- Measures how many times a firm's net income before interest expense and income taxes exceeds its interest expense.

$$\frac{\text{Net Income} + \text{Interest Expense} + \text{Income Tax Expense}}{\text{Interest Expense}}$$

- Interest coverage ratios less than 2.0 suggest a risky situation.
 - If a firm must make other required periodic payments (i.e., pensions, leases) the analyst could include them as well. If so, the ratio is referred to as the fixed charges ratio.

Long-Term Solvency: Interest Coverage Ratio

- A criticism of the interest coverage ratio:
 - Uses earnings, not cash flows
 - Firms pay interest and other fixed charges with cash, not earnings.

- Interest coverage ratio using cash flows:
 - $(\text{CFO} + \text{Cash Payments for Interest} + \text{Cash Payments for Income Taxes}) / (\text{Cash Payments for Interest})$

Long-Term Solvency: Financial Leverage Ratios

- $\text{Liabilities}/(\text{Book Value of Equity})$
- $\text{Liabilities}/(\text{Market Value of Equity})$
- $(\text{Liabilities} + \text{Equity})/\text{Equity}$

- Remember that market values can be and generally are quite different from book values.

- Role of market-value-based leverage will become apparent in the finance courses in determining the cost of capital for a firm.

Long-Term Solvency: Financial Leverage Ratios

- Expected return increases in risk.
 - Equity has greater risk than debt, so
 - Expected return on equity is higher, so
 - Realized return, on average, must be higher, too.
 - i.e., interest rate paid to the lenders must be less than the rate of return earned by the owners or residual claimants
- Financial leverage is a double-edged sword.
 - Good times will reward equity holders substantially.
 - Bad times may wipe out the capital.

Financial Analysis:

Other General Considerations

- Earnings management using discretion allowed under GAAP:
 - Taking a bath:
 - Pre-booking expenses during bad times.
 - Creating hidden reserves:
 - Booking too many expenses during good times to avoid showing expenses during bad times.
 - Off-balance-sheet financing:
 - Undisclosed liabilities.
 - Overstating financial performance:
 - Aggressive accounting practices and fraud.

Financial Analysis:

Other General Considerations

- Inherent GAAP Limitations:
 - Value of R&D, goodwill, and other self-created intangible assets are not reported:
 - Nobody stops a manager from providing estimates (legal liability).
 - No adjustments for inflation in U.S.:
 - Where inflation has not been a big issue.
 - Expected performance is not shown:
 - Except in cases of liabilities or losses through conservatism.
 - Most assets stated at historical costs:
 - Consistent with conservatism, objectivity, and verifiability.

Financial Analysis: Concluding Remarks

- Earnings power:
 - A company's ability to increase its wealth through operations and generate cash in the future.
- Earnings quality:
 - A measure of the extent to which reported earnings reflect "true" financial performance.
- Earnings persistence:
 - The extent to which current income is a predictor of future income levels.
- Solvency:
 - A company's ability to meet its obligations.