Chapter 4 Notes

Ratio Analysis

5 Main Ratio Categories

1. **Liquidity Ratios** - Determine the Firms ability to pay off short-term debts (maturing within the next year)
2. **Asset Management Ratios** - Used to determine how efficiently the firm is using assets
3. **Debt Management Ratios** - Determine how much financing was used, and the firms ability to repay long term debts (maturing in longer than a year)
4. **Profitability Ratios** - Give an idea of how profitable the firm is as a whole and individual units, and how well firm assets are being used
5. **Market Value Ratios** - Determines 'value' of shares by reflecting what investors think about a firm and its future profitability

Liquidity Ratios

Current Ratio

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities}$$

- High ratio can mean either a strong cash-heavy position, or too much old inventory and too many old accounts receivable or that assets may not be being used efficiently
- Low Ratio can mean a company is paying back accounts payable more slowly and borrowing more short term loans (which increase current liabilities)

Quick Ratio

$$Quick\ Ratio = \frac{Current\ Assets - Inventories}{Curent\ Liabilities}$$

- Similar to Current Ratio, but without counting inventories as "liquid Assets"
- Determines firm's ability to pay off short term debt without selling out current inventories

Asset Management Ratios

Inventory Turnover Ratio

$$Inventory\ Turnover\ Ratio = \frac{Sales}{Inventories}$$

- Determine average number of times each item of inventory was sold and restocked in a year

- Low Ratio could mean a firm is holding on to too much inventory or goods worth less than stated by accounting (last year's models)
- Affects seasonal businesses differnetly

Days Sales Oustanding Ratio

$$Days\ Sales\ Outstanding = \frac{Recievibles}{Average\ Sales\ Per\ Day} = \frac{Recievables}{Annual\ Sales/365}$$

- How many days' sales spend time being converted to capital
- Represents Average length of time the firm must wait after making a sale before recieving cash
- Shorter is better

Fixed Assets Turnover Ratio

$$Fixed\ Assets\ Turnover\ Ratio = \frac{Sales}{Fixed\ Assets}$$

- Measures the ammount of fixed assets relative to sales
- Determines how efficiently these assets are being used to generate revenue
- Can be affected by the age of equiptment / the firm

Total Assets Turnover Ratio

$$Total\ Assets\ Turnover\ Ratio = \frac{Sales}{Total\ Assets}$$

- Measures how much sales are being generated given the Total Assets invested

Debt Management Ratios

Total Debt to Total Capital (%)

$$\frac{Total\ Debt}{Total\ Capital} = \frac{Total\ Debt}{Total\ Debt+Equity}$$

- Determines the % of the companies assets supplied by creditors
- *Creditors Prefer Lower Values* as it indicates a firm is more likely able to be liquidated at value in case of a default
- *Stockholders Prefer Higher Values* as they leverage the banks money to magnify earnings per share in good times (but also magnify losses in bad times)

Times-Earned-Interest Ratio

$$Times\ Earned\ Interest\ ratio = \frac{EBIT}{Interest\ Charges}$$

- Measures how much Operating Income can decrease before the firm cannot afford its annual interest payments
- Inability to afford interest typically results in bankrupcy

- Low ratios make it hard for firms to borrow additional money

Profitability Ratios

Operating Margin

$$Operating\ Margin = \frac{EBIT}{Sales}$$

- Determines profit per dollar of sales as a %

Profit Margin

$$Profit\ Margin = \frac{Net\ Income}{Sales}$$

- Determines how much profit they make on sales
- higher debt > higher interest charges > lower profit margin

Return on Total Assets (ROA)

$$Return\ on\ Total\ Assets\ (ROA) = \frac{Net\ Income}{Total\ Assets}$$

- A low ROA can be caused by a descision to finance the firm with a lot of debt which causes higher interest expenses and decreases net income

Return on Common Equity

$$Return\ on\ Common\ Equity\ (ROE) = \frac{Net\ Income}{Common\ Equity}$$

- ROE increases as debt increases
- Ratio teslls how much stockholders are making on the money they've invested

Return on Invested Capital

$$Return\ on\ Invested\ Capital\ (ROIC) = \frac{EBIT(1-T)}{TotalInvestedCapital} = \frac{EBIT(1-T)}{Debt+Equity}$$

- Measures total return a company provides for investors
- Differs from ROA because its based on total capital rather than total assets and after tax operating income(NOPAT) rather than net income
- NOPAT is available to creditors and shareholders, net income is only available to shareholders

Basic Earning Power (BEP) Ratio

$$Basic\ Earning\ Power\ (BEP) = \frac{EBIT}{Total\ Assets}$$

- Shows a firm's potential earnings before accounting for taxes and debts
- Good for comparing businesses with differnt debt / tax positions

Market Value Ratios

Price/Earnings Ratio

$$Price/Earnings\ (P/E)\ ratio = \frac{Price\ per\ Share}{Earnings\ per\ Share}$$

- A below average P/E ratio can mean a company is percieved as risky or having poor potential for growth
- Vary considerably accross firms and industries

Market/Book Ratio

$$Book\ Value\ per\ Share = \frac{Common\ Equity}{Shares\ Outstanding}$$

- Measures the Value of each share based on common equity
  $$Market/Book(M/B)\ Ratio = \frac{Market\ Price\ per\ Share}{Book\ Value\ per\ Share}$$
- Measures how much more investors are willing to pay for a security than the underlying assets the security is entitled to are worth
- Typically rise above 1 (break even) and increase over time as inflation increases sales but doesn't re-evaluate past purchased assets

Enterprise Value/EBITDA ratio

- Relative market value of all a compan's financial claims
- Less influenced by companies debt and tax situation
  $$Enterprise\ Value(EV) = Market\ Value\ of\ Equity + Market\ Value\ of\ Total\ Debt + Market\ Value\ of\ other\ financial\ claims - Cash\ and\ Equivalents$$
- Market Value = Shareprice * # of Shares Outstanding
- Total Debt = Long Term Debt + Short Term Debt
  $$EV/EBITDA = \frac{EV}{Earnings\ Before\ Interest\ Taxes\ Depreciation\ Amortization}$$
- Lower ratios typically mean inefficient opperations as they control for financial situation

The Dupont Equation

$$ROE = ROA * Equity\ Multiplier = Profit\ Margin * Total\ Assets\ Turnover * Equity\ Multiplier = \frac{Net\ Income}{Sales} * \frac{Sales}{Total\ Assets} * \frac{Total\ Assets}{Total\ Common\ Equity}$$

- Profit Margin informs how much a firm earns on its sales, depending primarily on costs and sales prices
- Total Asset Turnover is a multiplier of how many times the profit margin gets earned each year

- Equity Multiplier to cancel out sales and total assets leaving with *Net Income / Total Common Equity* Larger numbers typically mean more debt and large numbers here are indicative of a firm being "more risky"
- This veiw allows a diagnosis of *WHY* ROE is where it is

Problems with ROE

- Roe Doesn't Factor in Risk
- ROE does not consider ammount of invested capital (proportional to amount of return)
- ROE can encourage managers to wait to invest in large projects that may bring down ROE (despite profitability) due to its use as a KPI

Economic Value Added (EVA)

$$EVA = EBIT(1-T) - Total\ Invested\ Capital * After\ Tax\ Cost\ of\ Capital$$

- Negative Values mean shareholders earned less than they could in other similarly risked stocks
  $EVA = Net\ Income - (Equity * Cost\ Of\ Equity)$
  or
  $EVA = (Equity) * (Net\ income/Equity) - (Cost\ of\ Equity)$
  or
  $EVA = Equity(ROE - Cost\ of\ Equity)$
- ROE represents Rate of Return
- Risk is measured by cost of equity and equity

Benchmarking

Comparing a company to the average of other companies in their industry based on similar metrics

Trend Analysis

Measuring a firm up against itself in previous years to gague momentum

Ratio Uses and Problems

Who uses Ratios?

1. Managers - for controlling operations
2. Creditors - Banks and loan officers
3. Stock Analysts - interested in company value and growth
4. Descision Makers

Problems with Ratios

1. Doesn't accurately portray firms with opperations in many industries
2. Average ratios for comparison are often less useful than ratios of industry leaders
3. Inflation distorts balance sheets and books, meaning firms at differnet points in time must be normalized
4. Seasonal Factors heavily influence ratios
5. Firms can use "Window Dressing" to influence their financial statements through clever accounting and debt accrual
6. Differing accoutning practices distort comparisons
7. High or Low figures can be "ambiguous" and indicative of potentially good or bad positions
8. Firms are often unbalanced, leaving it to the analyst to decide which are importaint given the situation and market conditions

Potential Firm Red Flags

- YoY companies report restructuring charges or writedowns (potentially to obfuscate operating expenses)
- A companies Earnings are propped up by acquisitions
- A company depreciates assets slowly compared to its peers (boosting current earnings at the detrement of earnings once depreciation is realized)
- A company has high earnings, but low cash flow
- Insiders are selling stock
- Company is making aggressive aquisitions in unrelated feilds
- A company's revenue is directly tied to one key customer, product, or supplier
- A company cannot face competition
- Companies that require continuous R&D (Pharma Companies) have earnings based on potential new products
- Firms in areas where politics and regulations may change (energy sector, insurance)

HW Problems:

- Baxley Brothers has a DSO of 50 days, and its annual sales are $9,855,000. What is its accounts receivable balance? Assume that it uses a 365-day year. Round your answer to the nearest cent.
$DSO = 50 = \frac{Recievibles}{9{,}855{,}000/365\ days} = 50 * 9,855,000/365\ days = \$1350000$