Equity Analysis and Valuation

VIII. Relative Valuation (I)

Text: Damodaran, A., 2012, Investment Valuation: Tools and Techniques for Determining the Value of any Asset, 3rd Edition, John Wiley & Sons.

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Key Learning Outcome:

I. The Essence of Relative Valuation
II. The Standardized Values and Multiples
III. Price Earnings Ratio (PE)
    1. PE Ratio
    2. PEG Ratio
    3. Earnings Yield and Dividend Yield
    4. Cyclicality of PE
IV. Enterprise Value to EBITDA Multiple (EV / EBITDA)
V. Book Value Multiples
VI. Sector-Specific Multiples

The Essence of Relative Valuation

- In relative valuation, the value of an asset is compared to the values assessed by the market for **similar or comparable assets**.
  - **The law of one price -** the economic principle that two identical assets should sell at the same price.

The Essence of Relative Valuation (cont.)

- The problem with multiples is not in their use but in **their abuse**. If we can find ways to frame multiples right, we should be able to use them better.
- Every multiple is a function of the same three variables—**risk, growth, and cash flow generating potential**. Firms with **higher growth rates, less risk, and greater cash flow generating potential** should trade at higher multiples than firms with lower growth, higher risk, and less cash flow potential.

The Essence of Relative Valuation (cont.)

- If we find that an asset is undervalued relative to a comparison assets, we may expect the asset to outperform the comparison assets on a **relative basis**.
- However, **what if the comparison assets not efficiently priced?** The stock may not be undervalued—it could be fairly valued or even overvalued on an absolute basis.

PE Ratio: Understanding the Fundamentals

PE = Market Price per Share / Earnings per Share

- **Price** is usually the current price (though some like to use average price over last 6 months or year)
- **EPS:**
  - Time variants: EPS in most **recent financial year** (current), EPS in **most recent four quarters (trailing)**, EPS expected in **next fiscal year** or **next four quarters** (both called **forward**) or EPS in **any future year**
  - **Primary**, **diluted** or **partially diluted** or **weighted average**
  - **Before** or **after extraordinary items** or **normalized**
  - Measured using **different accounting rules**

Intrinsic PE Ratio

- To understand the fundamentals, start with a basic equity discounted cash flow model. With a stable growth dividend discount model:

$$P_0 = \frac{DPS_1}{r - g_n}$$

- Dividing both sides by the **forward** earnings per share (EPS):

DPS1/EPS1

Forward EPS

$$\frac{P_0}{EPS_1} = PE = \frac{\text{Payout Ratio}_1}{r - g_n}$$

Current EPS

$$\frac{P_0}{EPS_0} = PE = \frac{\text{Payout Ratio}_1 * (1 + g_n)}{r - g_n}$$

* The model assumes stable payout ratio

- We can **state the payout ratio as a function of the expected growth** rate and return on equity and substituting back into the equation:

$$\text{Forward P/E} = \frac{P_0}{EPS_1} = \frac{\text{Payout Ratio}}{k_e - g_s} = \frac{1 - g_s/ROE_s}{k_e - g_s}$$

*Current or Trailing EPS = EPS in the past year. Forward EPS = EPS in the coming year.

PE Ratio: Understanding the Fundamentals (cont.)

- Other things held equal, **higher growth** firms will have **higher PE ratios** than lower growth firms.
- Other things held equal, **higher risk** firms will have **lower PE** ratios than lower risk firms
- Other things held equal, firms with **lower reinvestment** needs will have **higher PE** ratios than firms with higher reinvestment rates.
- Of course, other things are difficult to hold equal since **high growth firms, tend to have risk and high reinvestment rates**.

- For a **no growth firm**, P/E tells number of years it would take for the company to accumulate earnings equal to its share price (**pay back period**).

Example: The Fundamental PE Ratio

- Company A has a stable dividend payout policy of **50%**. Analysts expect company A's sustainable dividend growth of **5%**. What is the firm's **fundamental P/E** ratio at a required rate of return of **11%**?
  Answer: 8)
  - What is your recommendation for company if its stocks are traded at a forward P/E ratio of 9x?
- Company A has a dividend payout policy of **60%**. Analysts expect company A's sustainable dividend growth of **5%**. What is the firm's **fundamental P/E** ratio at a required rate of return of **11%**? **Answer: 10.0X = 0.6/(0.11-0.05)**
- Company A has a dividend payout policy of **60%**. Analysts expect company A's sustainable dividend growth of **4%**. What is the firm's **fundamental P/E** ratio at a required rate of return of **11%**? **Answer: 8.6X = 0.6/(0.11-0.04)**

$$\text{Forward P/E} = \frac{P_0}{EPS_1} = \frac{\text{Payout Ratio}_1}{k_e - g_s} = \frac{1 - g_s/ROE_s}{k_e - g_s}$$

What do you notice from the above examples?

The PEG Ratio

- The PEG ratio is the ratio of price earnings to **expected growth** in earnings per share.

PEG = PE / **Expected Growth** Rate in Earnings

- The growth rate used to compute the PEG ratio is the **expected growth** over the coming year or longer (2 years, 5 years).

- Use the **current PE ratio (trailing PE ratio). The forward PE ratio should never be used** in this computation, since it may result in a **double counting of growth**.

Example: The PEG Ratio (1)

- Assume that you have a firm with a current price of $30 and current earnings per share of $1.50. The firm is expected to **double its earnings per share over the next year** (forward earnings per share will be $3.00) and then have **earnings growth of 5 percent a year for the following four years**. Calculate **PEG ratio, using the average growth during the next five years.**
  - Current PE ratio = current price/current EPS = 30/1.5 = 20
  - Expected earnings growth =

    $= [(1 + \text{Growth rate}_{\text{year 1}})(1 + \text{Growth rate}_{\text{years 2–5}})^4]^{1/5} - 1$

    $= [2.00(1.05)^4]^{1/5} - 1 = .1944$
  - PEG ratio = 20/19.44 = **1.03**

Question: What would be the PEG Ratio, using the **expected growth over the coming year?**

Earnings Yield and Dividend Yield

- **The earnings yield** is the **inverse of the P/E ratio**.
- The earnings yield shows the **percentage of each dollar invested in the stock that was earned** by the equity holders' of the company. It is used by many investment managers to determine optimal asset allocations.

Earnings yield (%) = EPS/share price = 1/(PE ratio)

- **Dividend yield** is calculated by dividing the **annual dividend per share (DPS)** by the **price per share** or the **annual dividend** by the **market cap**. It can also be obtained by **multiplying earnings yield by the dividend payout ratio.**

Dividend yield (%) = DPS/share price = Earnings yield * Dividend payout ratio

- Earnings yield and dividend yield can be calculated based on the **current** EPS and DPS or **forward** EPS and forward DPS:

Example: Earnings Yield and Dividend Yield

- Assume that you have a firm with a current PE ratio of 10 times and a dividend payout ratio in the current year of 50%. Calculate **current year earnings yield and dividend yield** for the company.
- If the company has a stable growth rate of earnings per share and dividend per share of 5% and a stable dividend payout ratio of 50%, calculate **forward earnings yield forward dividend yield**.
  - Current earnings yield = 1/10 = 10%
  - Current dividend yield = 10%*.5 = 5%
  - Forward PE ratio = 10/1.05 = 9.52
  - Forward earnings yield = 1/9.52 = 10.5%
  - Forward dividend yield = 5.25%

PE Ratio: Cyclicality of PE

- **A countercyclical property of PEs** known as the **Molodovsky effect**. Named after Nicholas Molodovsky who wrote on this in the 1950s.
- For a cyclical company, **trailing earnings per share (EPS)** are often **depressed or negative at the bottom of the cycle** and unusually **high at the top of the cycle**.
- Empirically, PEs for cyclical companies are often **highly volatile over a cycle without any change in business prospects**: **high PEs** on depressed EPS **at the bottom** of the cycle and **low PE**s on unusually high EPS at the **top of the cycle**.
- **Normalized EPS** can be used to create **a normalized PE**.

Question: Do you think it is fundamentally reasonable for a cyclical company to have a high PE ratio at the bottom or the cycle and low PE ratio at the top of the cycle? Give reasons.

IV

Enterprise Value to EBITDA Multiple: Understanding the Fundamentals

- Unlike the earnings multiples, the enterprise value (EV) to EBITDA multiple is a **firm value multiple**.
- EV/EBITDA ratio looks at the **market value of the operating assets** of the firm **(Enterprise value or EV)** relative to **operating earnings (EBITDA).**

EV/EBITDA ratio = Enterprise value (or EV) / EBITDA

EV = Firm value = Market value of equity + Market value of debt – Cash

EBITDA = EBIT + Depreciation and Amortization

**** Since cash is netting out of firm value, interest income from the cash is not counted as part of the EBITDA.**

IV

Enterprise Value to EBITDA Multiple: Understanding the Fundamentals (cont.)

- This multiple can be compared (firm value relative to earnings) far more easily than other earnings multiples across firms with **different financial leverage**
  - The **numerator** is **firm value** and the **denominator** is a **pre-debt earnings**).
- EV/EBITDA multiple is particularly useful for firms in sectors that require **large investments** (**capital intensive sectors**) in infrastructure with long gestation periods. Telecom companies or energy and petrochemical companies would be good examples.
  - Companies in capital intensive industries are likely to report **negative earnings per share (EPS) during the start-up period** of their investments due to **large depreciation expenses**.
  - **Differences in depreciation methods** across different companies can cause differences in operating income or net income but will not affect EBITDA.

IV Enterprise Value to EBITDA Multiple for Firms with Cross Holdings

- The enterprise value to EBITDA multiple can be difficult to estimate for **firms with cross holdings** (i.e. a parent company holds stakes in subsidiaries or non-subsidiaries companies).
- **When a holding is categorized as a minority holding:**
  - The operating income of a firm does not reflect the income from the holding.
  - The numerator, on the other hand, includes the market value of equity, which should incorporate the value of the minority holdings.
  - Consequently, the value to EBITDA multiple will be too high for these firms, leading a casual observer to conclude that they were overvalued.
- **When a holding is categorized as a majority holding (subsidiaries):**
  - The EBITDA includes 100 percent of the EBITDA of the holding, but the numerator reflects only the portion of the holding that belongs to the firm.
  - Thus the value to EBITDA multiple will be too low, leading it to be categorized as an undervalued stock.

Book Value Multiples: Understanding the Fundamentals

P/BV = Market Price per Share / BV per Share

or

P/BV = Market Value of Equity / Book Value of Equity

- Market value of Equity is the market capitalization of the stock:

Market Capitalization of the Stock = Market Price per Share x Number of Shares

Intrinsic P/BV Ratio

- With a stable growth dividend discount model:

$$P_0 = \frac{D_1}{(k-g_1)} \quad \text{,and} \quad ROE_0 = \frac{EPS_0}{BV_0}$$

$$P_0 = \frac{BV_0 * ROE_0 * \text{Payout ratio}_0 * (1+g_1)}{(k-g_1)}$$

$$\frac{P_0}{BV_0} = \frac{ROE_0 * \text{Payout ratio}_0 * (1+g_1)}{(k-g_1)}$$

If the return on equity is based upon expected earnings in the next time period:

$$\frac{P_0}{BV_0} = \frac{ROE_1 * \text{Payout ratio}_0}{(k-g_1)} \quad \text{,with} \quad g_1 = (1-\text{Payout ratio}_0)*ROE_1$$

$$\frac{P_0}{BV_0} = \frac{(ROE_1 - g_1)}{(k-g_1)}$$

Question: What would be the P/BV if ROE = k?

Intrinsic P/BV Ratio (cont.)

- What will be the P/BV ratio if:
  - Earning power of the asset has increased since its acquisition?
  - Earning power of the asset has declined since its acquisition?
  - Earning power of the asset remains stable since its acquisition?

V

Example: Intrinsic P/BV Ratio

- Vodafone paid out 4,468 million BP in dividends on net income of 7,968 million BP in 2010, giving it a payout ratio of 55.82% (=4,468/7,968).
- Based on its book value of equity of 90,810 million BP at the end of 2009, the return on equity (ROE) generated by the firm in 2010 was 8.77% (=7,968/90,810).
- The expected growth rate, based on maintaining this payout ratio and ROE, is 3.88% (=(1-55.82%)*8.77%), which we will assume is the growth rate forever.
- To estimate the cost of equity, we will use the risk-free rate in British pounds (4%), an equity risk premium of 5%, assume a beta of 1 for the company: Cost of equity = 4% + 1(5%) = 9%.
- Two ways we estimate the price-to-book ratio for the firm:

P/BV = (ROE x Payout ratio)/(k-g) = (8.77%x55.82%) / (9%/3.88%)
or = 0.96
P/BV = (ROE - g)/(k-g) = (8.77% - 3.88%) / (9% - 3.88%) = 0.96

** The stock is expected to trade at slightly below book value, because its ROE is less than its cost of equity.

V P/BV Ratio: The Perfect Undervalued Company

- Given the relationship between price-book value ratios and returns on equity, the firms which should draw attention from investors are those which provide **mismatches of price-book value ratios and returns on equity** - **low P/BV ratios and high ROE** or **high P/BV ratios and low ROE**.
- We are looking for stocks that trade at **low price to book ratios, while generating high returns on equity, with low risk**.

VI

Sector-Specific Multiples: Understanding the Fundamentals

- Sector-specific multiples vary from sector to sector. In general, though, they share some general characteristics:
  - The **numerator** is usually **enterprise value—**the market values of both debt and equity netted out against cash and marketable securities.
  - The **denominator** is **defined in terms of the operating units that generate revenues and profits** for the firm (i.e. the **key earnings drivers of the firm**).
- For example:
  - The value of **steel companies** can be compared based on **market value per ton of steel produced**.
  - The value of **electricity generators** can be computed on the basis of **kilowatt hour (kwh) of power** produced.
  - The value of new technology firms can be compared based on multiples that range from **value per subscriber for online service** providers to **value per web site visitor for Internet portals** to **value per member for social media companies**.

VI Sector-Specific Multiples: Understanding the Fundamentals (cont.)

- In each of the cases we have discussed, the underlying reason that we a sector-specific multiple is because **the units** (whether they be barrels of oil, kwh "of electricity, or subscribers) **generate similar revenues,** i.e. the units used to scale value are **homogeneous.**
- Sector multiples become much more problematic when the units used to scale value are not homogeneous.

Assignments:

Damodaran, A., 2012, Investment Valuation: Tools and Techniques for Determining the Value of any Asset, 3rd Edition

- Read Chapter 17 – Fundamental Principles of Relative Valuation (pages 453 – 455, 460-461), Chapter 18 – Earnings Multiples (pages 470 – 471, 487 – 488, 500 – 501), Chapter 19 – Book Value Multiples (pages 511 – 516), Chapter 20 (pages 571 - 573)