Market-Based Valuation : PE Justification

$$PEG = \left[\frac{P_0}{E_1}\right] / g \quad ; \quad g = \text{Long-term growth rate}$$

Pros: Long-term growth is an important factor of Equity Valuation

PE/g provides a standardized measure of valuation multiplier.

(Lower PEG is better)

$$PE = \frac{P_0}{E_1} = \frac{1-b}{r-g} \Rightarrow \frac{\partial PE}{\partial g} > 0 \Rightarrow$$

Holding other factors constant,

Higher g ; Higher P/E

Thus, "high P/E of high Growth firm" does NOT necessarily mean "bad"

"Low P/E of Low growth Stock" does NOT necessarily mean "good"

Cons:

① PEG ignores the duration (length) of the growth

② PEG ignores differences in risk. (Liquidity risk ; Operating risk

Financial risk)

Market-Based Valuation: P/B (price to Book per share Ratio)

Let B_0 = the book value of equity per share today.

ROE_1 = Expected return on equity per share Next period

E_1 = Expected Earning per share Next period = $B_0 * ROE_1$

Gordon Model:

$$P_0 = \frac{(1-b)E_1}{r-g} = \frac{(1-b)\cdot B_0 \cdot ROE_1}{r-g} = \frac{B_0 \cdot (ROE_1 - \underbrace{bROE_1}_{\equiv g})}{r-g}$$

$$\frac{P_0}{B_0} = \boxed{\frac{ROE_1 - g}{r-g}} = \frac{(r-g)+(ROE_1 - r)}{r-g} = \boxed{\frac{\text{dividend yield} + \alpha}{r-g}}$$

(α ← Expected Residual Earning = αB_0)

$\boxed{\frac{ROE_1 - g}{r-g}}$ ← inconclusive

$$= 1 + \frac{\alpha}{r-g} = 1 + \frac{\frac{\alpha B_0}{r-g}}{B_0} = 1 + \frac{Ve_0}{B_0}$$

(Ve_0 ← present value of Residual Earnings)

$$\therefore \quad P_0 = B_0 + Ve_0$$

Market-Based Valuation : P/B Ratio

Example: J&J is a matured firm with a $P/B = 1.5$; the book value per share is #10; the dividend yield is 3%: what is the estimated α of J&J stock?

$$\frac{P_0}{B_0} = 1.5 \;;\; B_0 = 10 \;;\; P_0 = 15 = 10 + Ve_0 \;;\; Ve_0 = 5 = \frac{\alpha B_0}{r-g} = \frac{\alpha(10)}{3\%}$$

Thus, $\alpha = 1.5\%$

** P/B is suitable for firms with highly liquid assets (Mark-to-market)
- Banks, financial & investment firms.

*** If $P/B < 1$, then $\alpha < 0$

Pros:
① Book Value is more stable than EPS. (BV is cumulative)
② Book Value is rarely negative.

Cons:
① BV can be distorted by accounting choices
② BV is based on historical & depreciated values
③ P/B is inappropriate for firms that do not own the assets (using operating leases)
④ BV ignores intangible assets.

Market-Based Valuation: P/S (price to Sales per Share Ratio)

S_0 = Current Sales per share

PM_1 = Expected profit margin Next period $= \frac{E_1}{S_0}$

$$P_0 = \frac{(1-b)E_1}{r-g} = \frac{S_0(1-b)\frac{E_1}{S_0}}{r-g} \; ; \; \frac{P_0}{S_0} = \frac{(1-b)\cdot PM_1}{r-g}$$

So, $PM_1 = \frac{P_0}{S_0}.(r-g).\frac{1}{(1-b)} = (\text{Trailing P/S})(\text{Dividend yield})\left(\frac{1}{\text{payout Ratio}}\right)$

Example: J&J's Sales is 800 million dollars, the Current Share price is $30, dividend yield is 3% and the firm pays 50% of earning as cash dividend. There is 40 million shares outstanding. What is J&J's expected profit margin?

$$PM_1 = \frac{30}{20} * 3\% * \frac{1}{0.5} = 9\%$$

Market-Based Vaulation : P/S Ratio

Pros: ① Sales is top line revenue. It is less subject to accounting manipalation.

② It is less cyclical than earnings

③ P/S avoids the negative earning problems.

Cons: ① P/S ignores operating / financial risk.

② Sale may not be only source income for shareholders; firms may generate earnings from other sources such as asset management.

③ P/S ignores cost structure & business decision made by management.

Market-Based Valuation: Enterprise Value Multiple

$$\text{Enterprise Value} = EV = V_{\text{Fixed Asset}} + V_{\text{Intangibles}} + V_{\text{working capital}}$$

$$= V_{\text{Debt}} + V_{\text{common stock}} + V_{\text{preferred stock}} - \text{Cash or Cash Equivalent}$$

↑ paid out as Cash Dividends after purchase

$\Rightarrow$ Concept of <u>Pre-interest and pre-leverage</u>

$\Rightarrow$ EV is the price that the buyer would pay for the <u>whole firm</u>.

$$\text{multiplier}: \frac{EV}{EBITDA} \approx \frac{\text{Firm's Value}}{\text{Earnings for Both Share \& Bond holders}}$$

pros:
1. Useful in comparing firms with different Capital structure
2. Less affected by choices of depreciation & accounting methods.
   - Useful for capital intensive industry
3. Rarely negative.

** Depreciation/amortization can skew the bottom line of Net Income.

Cons: Ignores necessary investment in net working Capital and Capital expenditures.