PEG - Price/Earnings to Growth Ratio

The PEG ratio is another way to try and identify undervalued high growth stocks through a technical screen. It should not be used alone to select stocks, and should instead be complemented with a fundamental analysis of the market and company including a detailed discounted FCF model to value the stock properly.

The P/E ratio and PEG ratios are defined as follows:

$$\frac{P_0}{E_0} = \frac{PR_0\left(1 + g\right)}{r_E - g} \quad \text{and} \quad PEG = \frac{P_0 / E_0}{g}$$

Where:
P_0 = Current Stock Price
E_0 =Latest 12-Month Trailing Earning per Share (EPS)
PR_0 = Latest Payout Ratio of Earnings as Dividends and/or Stock Buybacks
r_E = Current Cost of Equity for the Firm (obtain from the CAPM)
g = Future Growth Rate of Earnings (use fractional form for P/E calculation, then whole% for the PEG. For example, a 5% growth rate should use 0.05 for the P/E formula, and 5 for the PEG formula)

P/E can obviously be calculated directly by taking the current stock price and dividing it by the current earnings, but what the equations above teaches us is that it is a function of the earnings paid to the investor versus retained, the growth of the firm (which is a function of the earning that are retained), and the required return r_E by the shareholders to compensate them for the risk level of the firm's cash flow, which is a direct reflection of the stability of earnings coming off of the firm, which in turn is set by the assets that the firm has chosen to invest in. So the simple equation of P/E quickly becomes a complex equation dealing with numerous intertwined variables, all of which are directly impacted by executive management and the decisions it makes. This is why a good management team is critical for the success of the firm.

Why would we want to divide P/E by g when g is already a prominent component of P/E? Well, P/E is usually high for a high growth firm such as a bleeding-edge technical firm, and low for a low growth firm such as a utility firm that only grows at the rate of population growth, and PEG attempts to normalize these thus assisting us in finding the winners and losers across the full spectrum of P/Es. The importance of growth can clearly be seen from the equations above since g adds to the numerator and takes away from the denominator. The problem with P/E is that it is not absolute because it is dependent on the irrationality of humans, and imperfections in the market. So a high growth company that is not priced correctly in the market (e.g., public opinion is temporarily out of favor for the firm but the firm's fundamentals are still solid) could have a P/E that is too low, or a low earnings firm could have an irrational price (e.g., market hype has bid up the latest technology stock). A high or low P/E cannot be deemed "good" then, but instead a fairly undervalued P/E is always excellent! - and PEG is trying to help us decipher this.

By dividing P/E by g, what we are emphasizing (and trying to compensate for) is that a company's stock price is all about growth, and are trying to make this more material in our technical analysis. If a firm is overvalued by hype, by calculating PEG the skew of the P/E will probably still be apparent in its PEG since it's g would not be large enough to overcome the hype (i.e., high stock price), but a firm that is undervalued due to current market

sentiment will benefit from PEG since it will have a low P and a normal or high g. And hopefully any fairly valued company will experience a neutral impact from PEG.

Literature quotes that anything with a PEG at or below unity (1) is fairly valued or undervalued, so a good investment. What this means is that any stock whose g ≥ P/E is a stock worth investing in. It is clear from this relationship that P/E is being used as a proxy for growth. This author believes that this is like trying to fit a square peg into a round hole - it is true that P/E is dependent on growth, but it is also a function of earnings, payout ratio, and the cost of equity. This does not mean that PEG may not have merit though and provide guidance. As seen in this Motley Fool article **Motley Fool Article**, they discovered that PEG did work as an initial screen of stocks, and found in their study of 3-years of stock returns that (quoted here):

- 92% of companies with PEG ratios of less than 1 beat the market.
- 68% of companies with PEG ratios of between 1 and 2 beat the market.
- 47% of companies with PEG ratios greater than 2 beat the market.

Since P/E and PEG are based on earnings, the future growth rate should be that of expected future earnings, and can be derived using either of the following two equations:

1 - assume that g = RR×ROE where RR is the retention ratio and ROE (the Return on Equity)

2 - assume that $g = (D_n/D_o)^n - 1$ where D_n is a future dividend some time period n, and D_o is the current dividend. The assumption here is that as net income grows, the firm will also grow its dividends proportionally.

Since we are discussing sustainable growth, this implies that the firm must be reinvesting some funds back into itself to sustain its depletion of assets (i.e., approximately equal to its depreciation rate), and an additional amount above this to grow the firm above its current level. This means that in order to have g, the firm must have a PR below 100%.