# ESTABLISHING THE PEG BENCHMARK FOR INDIAN STOCKS-A FUNDAMENTAL PERSPECTIVE AND COMPARISION WITH EMPIRICALLY OBSERVED PEG RATIOS FOR FEW NIFTY STOCKS (2014)

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**Abstract :** This paper discusses the proper application of PEG ratio, which is one of the popular relative valuation techniques amongst professional investors. Many professional investors in India have a tendency to use $PEG_T$ ratio of 1 for all stocks irrespective of their beta and profitability. In this paper PEG bands for different beta and profitability are determined using three stage discounted cash flow (DCF) models using suitable assumptions. This will establish the fact that some stocks can trade at higher PEG ratio (even greater than 2) and still may not be overvalued. In the second part of the paper, the PEG ratios are measured for stocks from few sectors (with different betas) and the empirically observed PEG ratios are quite similar to the one predicted by three stage DCF model.

**Key words:** PEG, $PEG_T$ , Beta, DCF, ROE, FMCG, IT, Pharmaceutical.

**1.1** **Introduction:** One of the common valuation methods about the relative cheapness of a stock (higher expected returns) is the Price to Earnings Ratio. (P/E). Since growth is one of the major determinants of P/E, dividing $P/E_T$ (Price per share today) by its 12 months trailing earnings per share (eps) by the stock expected short term growth results in the $PEG_T$ ratio-a measure popularised by Lynch. It is, in a way, normalised P/E ratio (normalised for growth). PEG ratio is commonly used by investors, professional Money Managers (a recent survey showed that 22 out of 43 professional money managers use this ratio as one of the valuation tools, Trombley (2008), to get an immediate idea of the relative pricing of a stock and its attractiveness.

**1.2** Many studies (discussed in literature survey) have suggested that PEG ratio can be significantly different for different sectors due to different risks (Beta), very few have focussed on explaining the variation in the PEG ratio within an industry. A major determinant of the PEG ratio is the opportunity cost of equity which reflects the risk. Trombley (2008) has suggested to use PEG ratio to compare companies within the same industry (same risk). Many studies in the past have explained the determinants of PEG ratio using either one stage or two stage theoretical discounted cash flow model (DCF), but none have tried to develop the PE/PEG Bands fundamentally for a particular stock market using the actual data such as risk free rate , risk premium, profitability, etc. The purpose of this paper is to first develop the $PEG_T$ bands (for different Beta Ranges/ sectors) for the Indian stocks using fundamental three stage discounted cash flow models (DCF); reason out the limitations of theoretically developed bands especially for very low beta stocks and compare these theoretical bands with the empirically observed $PEG_T$ Bands for stocks from few sectors. The highest $PEG_T$ that has theoretically been calculated using a high growth rate of 10% for 7 years and profitability of 500% and raw beta of 0.2 is 4.4. The author has Hindustan Unilever (HUL) in mind. HUL actually trades at a $PEG_T$, as on date of, 2.7 (assuming growth of 13%). The PEG ratio of 4.4 drops to 2.7 if the beta is increased to 0.4. Since many studies have suggested that beta is highly variable at stock and industry level, in the view of the author it's highly advisable to use Bloomberg beta (which adjusts the beta upwards from 0.2 to 0.47) especially for low beta stocks and this procedure basically sets an upper band on $PEG_T$ ratio. The author suggests a further research on this as to which beta the professional investor should use and how they adjust betas in their valuation models for low beta stocks (0.2-0.3).

**1.3** In the view of the author there is often confusion amongst the media and market participants about the proper application of the $PEG_T$ ratio and people have a tendency to use the PEG benchmark of "1" for all stocks ( irrespective of its Beta and profitability). This paper will clearly establish different $PEG_T$ bands for different Beta ranges. The confusion also pertains on whether to use the $P/E_T$ or $P/E_C$ or $P/E_F$ in determination of the PEG ratio. Lynch had used $P/E_T$ and in the view of the author $P/E_T$ is the best and

$P/E_F$ should never be used to determine the PEG ratio to compare the relative attractiveness of two stocks. This point will be clarified through an example in the section on theoretical discussion. The $PEG_T$ bands that have been developed in this paper using DCF models (High growth definition of 5 to 7 years) are surprisingly quite similar to ones developed by Lynch. The difference in the approach in this paper is to reclassify these bands based on the betas so that investors can clearly link the difference in the observed $PEG_T$ ratios across sectors like FMCG, Pharmaceutical and IT services in India. The author further suggests that similar methodology could be applied to develop the PEG bands for other stock markets using their existing fundamentals (Risk free rates, growth, risk premium etc.) and then compare the same with the empirically observed PEG bands.

**1.4** PEG ratio is typically higher at lower growth rates and lower cost of equity [Jacques A Schanbel (2009)]. Cost of equity depends on 10 year Treasury bond yield which can vary across countries depending upon long term inflation expectations. In other words PEG ratio can be country specific and even in a country it can vary depending upon the prevailing ten year bond yield. The $PEG_T$ bands developed in this paper are using the current 10 year bond yield of (8.75%) and estimated risk premium of 7.5% for Indian stock markets.

**1.5 A word on Growth Period**

Peter . D Easton (2004) suggests that PEG ratio is superior to PE ratio but it ignores the long term growth prospects. Typically, the growth in the PEG ratio is short term growth. Steven A. Sharpe has estimated consensus long term growth forecast using sector and industry level portfolio of S&P 500 firms over 1983 to 2001 at typically between 5-10 years using linear regression method. In the view of the author, investors should look at minimum of the average next 3- 5 years growth and not one year expected growth. The idea behind this reasoning is that even if one year expected growth is down for a company due to firm specific reason, the professional investors ( efficient market hypothesis) will not bring down the stock price so much. In the $PEG_T$ bands developed in this paper, we have used high growth period of both 5 and 7 years (to set the upper range) and therefore the definition of growth in the $PEG_T$ is growth for next 5 to 7 years.

## 2. LITERATURE REVIEW

**2.1** The PEG ratio was conceived in 1960's by James D Slater and later popularised by Lynch (one of the most successful fund Managers) in 1989 through the best seller, "One up on the Wall street. Lynch's thumb rule was if a stock is trading at a trailing PE ratio of one time the short term expected growth(PE divided by the short term expected growth converted from percentage to a number) the stock is correctly valued. A PEG ratio of less than 0.5 the stock is most probably undervalued and greater than 2 the stock is most probably overvalued.

Estrada (2004), Trombley (2008) and Schanabel (2009) suggested that PEG ratio needs to be further adjusted for risk (Beta of a stock). Trombley (2008) showed that stocks with persistent high growth and lower cost of equity can have a PEG ratio of greater than 1. He cites Google as an example for that. A PEG ratio=1 (Lynch) is suitable for high growth and high risks firm.

Peter .D Easton (2004) suggests that PEG ratio is superior to PE ratio but it ignores the long term growth prospects. Typically, the growth in the PEG ratio is short term growth.

## 3. THEORETICAL BACKGROUND

**3.1** Let us first understand the determinants of the Price to Earnings Ratio (here it will be $P/E_F$ using the Gordon's dividend discounting model used for a mature company.
As per Gordon's formula $P_0 = DPS1 / (ke- g)$ ————-1.

Here $P_0$ is the price of the stock today, $DPS_1$ is the dividend per share expected next year, ke is the opportunity cost of equity (determined through CAPM Model) and g is the constant growth till perpetuity(less than Ke) g= ROE x b   Here ROE= Profit after Tax / Equity (Shareholders funds) and b is the Retention ratio (percentage of Profits ploughed back for growth)

The above equation can be rearranged as
$P_0 = EPS_1 *(1-b)/ke-g$ or $P_0/EPS_1 = (1-b)/ (ke-g)$   or
**$P_0/EPS_1 = PE_F (1-(g/ROE))/ (ke-g)$ Here $PE_F$ is the Price today divided by earnings one year forward**

1) If one looks at the last equation (in bold), one can conclude the following:
   High growth companies will trade at a higher PE ratio (since denominator is less)
2) Two Companies with the same growth potential, one with a higher ROE will command a higher PE ratio (b will be less)
3) Finally, controlling the growth and ROE, the company with a lesser ke (lower Beta) will have a higher P/E ratio

   Since one of the major determinants   of the PE ratio is growth, the PEG ratio can also be looked upon as normalising the PE ratio for growth.
   Let us see some of the implications of this model.

Two Companies with the same risk let's say cost of equity = 11%, growth = 7%. The multiple is $PE_F = (1-b) / (ke-g)$. A Company with a ROE of 350% b will be only 2%. Therefore the multiple will be (1/4%)*0.98=24.5.The PEG ratio accordingly will be 24.5/7=3.5. Another Company with a ROE of 35% the b (retention ratio) to achieve 7% growth will be 20%, therefore the multiple will be 80% of 25=20. The PEG ratio will be 20/7, little less than 3.

**Note:** The PE ratio calculated using a three stage model will also behave in a similar way (not exactly the same way) to the three variables namely growth (period of high growth will also become relevant), risk and ROE (profitability).

## 3.2 Which is better $PEG_T$ or $PEG_c$ ?

Let's  assume two companies with the following numbers in two scenarios
Scenario-1

| | Scenario 1 | | | Scenario 1 | |
|---|---|---|---|---|---|
| | Year$_{-1}$ | Year$_0$ | | Year$_{-1}$ | Year$_0$ |
| **Company A** | | | **Company B** | | |
| EPS | 5 | 5.5 | | 5 | 5.5 |
| G(Expected) | 10% | | | 10% | |
| G(Realised) | 10% | | | 10% | |
| G(Revised future) | | 10% | | | 10% |
| Price | 100 | 110 | | 100 | 110 |
| P/E$_c$ | | 20 | | | 20 |
| P/E$_T$ | | 22 | | | 22 |
| PEG$_T$ | | 2.2 | | | 2.2 |
| PEG$_c$ | | 2.0 | | | 2.0 |

In this case both $PEG_T$ and $PEG_c$ gives similar results. However in the table below when the growth expectation is revised downwards $PEG_T$ will give a better comparison than $PEG_c$

Scenario-2

| | Scenario 2 | | | Scenario 2 | |
|---|---|---|---|---|---|
| | $Year_{-1}$ | $Year_0$ | | $Year_{-1}$ | $Year_0$ |
| Company A | | | Company B | | |
| EPS | 10 | 11 | | 10 | 9 |
| G(Expected) | 10% | | | 10% | |
| G(Realised) | 10% | | | - 10% | |
| G(Revised future) | | 10% | | | 9% |
| Price | 200 | 220 | | 200 | 198 |
| $P/E_c$ | | 20 | | | 22 |
| $P/E_T$ | | 22 | | | 19.8 |
| $PEG_T$ | | 2.2 | | | 2.2 |
| $PEG_c$ | | 2.0 | | | 2.44 |

If we use $PEG_c$, the stock (Company B) suddenly looks expensive as Price has corrected due to growth being negative and revised downward to 9% in future. Since both the prices have reacted negatively and growth revised downward, the PEG ratio should not change much. That is the case if we use $PEG_T$ which remains same and therefore in scenario 2, the two stocks are more comparable at $PEG_T$ Therefore, $PEG_T$ is better than $PEG_c$

$PEG_F$ should never be used for relative valuation:

This is fairly simple. If two stocks are trading at the same PEG ratio today. One is expected to grow at 10% and other at 9%. The $P/E_F$ will be lower for higher growth company and further dividing by higher growth will result in an even lower $PEG_F$ ratio compared to the lower growth company.

## 4.1 Theoretical PEGT Bands

In the first part of the Paper, the $PEG_T$ bands have been developed using the three stage DCF valuation model. This will enable the readers to understand the fundamental reasons for variation in the PEG ratio. This paper has assumed the growth in the PEG ratio as the growth in the high Growth stage. The High growth period is typically assumed to be between 3- 7 years. The paper has assumed high growth period of 5 years and 7 years to the see the difference in the PEG ratio. The paper has developed PEG bands for high growth between 10%-20%. In real life, professional investors may be using different growth period for different companies and the intent is to develop the $PEG_T$ upper band which in this paper will be for a high growth period of 7 years. The high growth is declined linearly to terminal (mature) growth in another 5 years and the mature growth is less than the nominal GDP growth (assumed 7% in the DCF model). When the growth in the $PEG_T$ is assumed as the high growth period (5/7 years in DCF model) in the $PEG_T$ ratio and combine this with terminal growth assumption, we are giving a long term growth perspective to the $PEG_T$ ratio. The approach followed in this paper is to calculate the $PEG_T$ ratio by fixing this high growth to same number of years, so that the variation in the $PEG_T$ ratio fundamentally can be linked to risk and profitability. The approach used is to control two parameters namely growth and risk and vary the profitability. This approach is basically to understand the variation of PEG with risk and within a risk category variation of PEG with profitability for a given growth. The $PEG_T$ bands have been established for growth between 10%-20% as most of the Indian companies are likely to fall in this range. As already known, that everything else being equal $PEG_T$ has an inverse relationship with growth, the lower and upper band developed in this paper can be expanded marginally for growth less than 10% and for growth greater than 20%.

### 4.1.1. Important Assumptions made in the DCF Model:

The Assumptions used in the DCF model especially for ROE and its sustainability is close to the actual observed numbers in many sectors and companies (in India) that we will take in section (5.2). In the DCF valuation model I have used the following range of high growth ROE and mature stage (terminal) ROE.

For Beta between 0.2-0.6

| ROE/ROE$_T$ | 20/15 | 30/20 | 50/25 | 75/37.5 | 100/50 | 200/100 | 500 /250 |
|---|---|---|---|---|---|---|---|

For Beta between 0.7-1.4

| ROE/ROE$_T$ | 20/18 | 25/20 | 60/30 | 80/40 | 100/50 | 200/100 | 500 /250 |
|---|---|---|---|---|---|---|---|

ROE$_T$ stands for ROE in the Terminal stage.

### High Growth ROE:

The starting point taken is 20% and highest as 500%. The starting point is at 20%, as a Company with a beta of 1 will have a cost of equity of 16.25%. The idea is to calculate the PEG ratio for positive residual income companies (growth stocks). The ROE of 20% to 60% is also observed in many companies in the IT services, Pharmaceutical sector and FMCG sector. The highest ROE (for beta between 0.2-0.6) is taken at 500% as this kind of core profitability is observed in companies like HUL and Nestle India (belonging to low beta sector). The range for ROE is brought down to 20% - 100% for companies with beta of 0.7-1.4.

### Terminal ROE :

While many valuation text books and economics theory suggest that terminal profitability should be either the ROE of mature company in the Industry or should be equal to cost of equity, A company like HUL which has a very high Sales to Asset turnover ratio, the profitability even in mature stage is expected to be very high (say 50%) of profitability today assuming if the profit margins drop to half as the asset turnover is not likely to drop. The same rationale can be used for an IT company like Infosys. The choice of ROE terminal is based on this view. Anyway even if the terminal profitability is dropped by 20-30% of what has been assumed, it will not impact the PEG ratio much. Further, to maintain consistency across different risks, the terminal ROE assumption has been kept the same.

### Terminal Value

We have maintained the consistency that terminal reinvestment ratio= terminal growth/terminal ROE. To check the reasonability of our terminal assumptions I have also calculated the terminal P/E ratio defined as:

Terminal Value / EPS (T+1) = P/E$_F$ (Terminal). It typically falls between 50%-70% of existing P/E$_C$. This is another important aspect that many professional investors sometimes fix as an arbitrary multiple to determine the terminal value or sometimes grow the FCF by the terminal growth rate (Here they are not maintaining consistency between terminal growth, profitability and reinvestment ratio).

### PEG BANDS:

In this paper first the P/E$_C$ ratio is used to develop the PEG bands. Subsequently, the PEG$_C$ bands are multiplied by a factor of (1+growth) to develop the PEG$_T$ bands. Here it is logically assumed that EPS (0) is = (1+g) EPS (-1)

## 4.2 PART 2

The second part of this paper analyses the empirically estimated PEG ratios for companies in the FMCG, IT, Pharmaceutical and Banking sector. The $PEG_T$ ratios have been measured at different growth rates. These growth rates are based on the past growth rates, the short term growth guidance given by the Companies etc. In India no organisation has given medium term growth forecasts. The intent is to show the variation in the PEG ratio across sectors.

## 5.1 Theoretical PEG Ratios using three stage DCF Model:

### Table 5.11 (Ke= 8.75%+7.5%*  Beta ;    Growth=10%)

| ROE/ROE_T / BETA | 20/15 PEG(5)/ PEG(7) | 30/20 PEG(5)/ PEG(7) | 50/25 PEG(5)/ PEG(7) | 75/37.5 PEG(5)/ PEG(7) | 100/50 PEG(5)/ PEG(7) | 200/100 PEG(5)/ PEG(7) | 500 /250 PEG(5)/ PEG(7) |
|---|---|---|---|---|---|---|---|
| 0.2 | 2.07/2.16 | 2.56/2.68 | 2.89/3.03 | 3.24/3.39 | 3.40/3.57 | 3.67/3.84 | 3.82/4.00 |
| 0.3 | 1.67/1.74 | 2.08/2.17 | 2.35/2.46 | 2.63/2.74 | 2.77/2.89 | 2.97/3,11 | 3.10/3.24 |
| 0.4 | 1.40/1.45 | 1.75/1.82 | 1.97/2.07 | 2.20/2.31 | 2.32/2.43 | 2.50/2.61 | 2.60/2.71 |
| 0.5 | 1.21/1.25 | 1.51/1.57 | 1.71/1.78 | 1.91/1.99 | 2.00/2.09 | 2.15/2.24 | 2.24/2.33 |
| 0.6 | 1.06/1.09 | 1.32/1.38 | 1.50/1.57 | 1.67/1.74 | 1.76/1.83 | 1.89/1.96 | 1.97/2.04 |
| **ROE** | **20/18** | **25/20** | **30/20** | **50/25** | **60/30** | **80/40** | **100/50** |
| 0.7 | 1.03/1.05 | 1.14/1.17 | 1.18/1.22 | 1.34/1.40 | 1.41/1.48 | 1.51/1.57 | 1.57/1.63 |
| 0.8 | 0.92/0.94 | 1.02/1.05 | 1.06/1.10 | 1.21/1.26 | 1.28/1.33 | 1.36/1.41 | 1.42/1.47 |
| 0.9 | 0.83/0.85 | 0.93/0.95 | 0.97/1.00 | 1.10/1.15 | 1.16/1.21 | 1.24/1.29 | 1.29/1.34 |
| 1.0 | 0.76/0.77 | 0.85/0.87 | 0.89/0.92 | 1.02/1.06 | 1.07/1.11 | 1.14/1.18 | 1.18/1.22 |
| 1.2 | 0.64/0.65 | 0.72/0.74 | 0.76/0.78 | 0.87/0.90 | 0.92/0.96 | 0.98/1.01 | 1.01/1.05 |
| 1.4 | — | 0.64/0.63 | 0.66/0.68 | 0.77/0.79 | .80/.83 | .86/.88 | 0.89/.91 |

### Table 5.12 (RFR= 8.75% ; RP=7.5% G=15%)

| ROE/ROE_T / BETA | 20/15 PEG(5)/ PEG(7) | 30/20 PEG(5)/ PEG(7) | 50/25 PEG(5)/ PEG(7) | 75/37.5 PEG(5)/ PEG(7) | 100/50 PEG(5)/ PEG(7) | 200/100 PEG(5)/ PEG(7) | 500 /250 PEG(5)/ PEG(7) |
|---|---|---|---|---|---|---|---|
| 0.2 | 1.71/1.90 | 2.19/2.46 | 2.51/2.83 | 2.84/3.21 | 3/3.39 | 3.26/3.67 | 3.4/3.84 |
| 0.3 | 1.35/1.49 | 1.75/1.95 | 2.02/2.07 | 2.29/2.57 | 2.42/2.72 | 2.62/2.95 | 2.75/3.08 |
| 0.4 | 1.11/1.21 | 1.45/1.61 | 1.69/1.88 | 1.91/2.13 | 2.02/2.26 | 2.19/2.45 | 2.29/2.56 |
| 0.5 | 0.93/1.01 | 1.24/1.36 | 1.44/1.60 | 1.64/1.82 | 1.73/1.92 | 1.88/2.08 | 1.96/2.18 |
| 0.6 | 0.80/0.86 | 1.07/1.18 | 1.26/1.40 | 1.43/1.58 | 1.51/1.68 | 1.64/1.82 | 1.71/1.90 |
| **ROE** | **20/18** | **25/20** | **30/20** | **50/25** | **60/30** | **80/40** | **100/50** |
| 0.7 | 0.78/0.83 | 0.90/0.97 | 0.95/1.03 | 1.1/1.23 | 1.19/1.31 | 1.28/1.42 | 1.34/1.48 |
| 0.8 | 0.69/0.73 | 0.80/0.85 | 0.84/0.91 | 1.0/1.1 | 1.07/1.17 | 1.15/1.26 | 1.20/1.32 |
| 0.9 | 0.6/0.64 | 0.71/0.76 | 0.76/0.82 | 0.90/0.99 | 0.97/1.06 | 1.04/1.14 | 1.09/1.19 |
| 1.0 | 0.55/0.57 | 0.65/0.68 | 0.69/0.74 | 0.83/0.90 | 0.88/0.96 | 0.95/1.04 | 0.99/1.08 |
| 1.2 | 0.45/0.46 | 0.54/0.56 | 0.58/0.61 | 0.70/0.76 | 0.75/0.81 | 0.80/0.87 | 0.84/0.91 |
| 1.4 | 0.38/.39 | 0.46/0.47 | 0.50/0.53 | 0.60/0.65 | 0.65/0.70 | 0.70/0.75 | 0.73/0.79 |

**Table 5.13 (RFR= 8.75% ; RP=7.5%  G=20%)**

| ROE/ROE$_T$ / BETA | 20/15 PEG(5)/ PEG(7) | 30/20 PEG(5)/ PEG(7) | 50/25 PEG(5)/ PEG(7) | 75/37.5 PEG(5)/ PEG(7) | 100/50 PEG(5)/ PEG(7) | 200/100 PEG(5)/ PEG(7) | 500 /250 PEG(5)/ PEG(7) |
|---|---|---|---|---|---|---|---|
| 0.2 | 1.66/1.89 | 2.11/2.54 | 2.45/2.97 | 2.80/3.39 | 2.97/3.6 | 3.22/3.92 | 3.38/4.11 |
| 0.3 | 1.24/1.44 | 1.67/1.98 | 1.96/2.35 | 2.23/2.70 | 2.38/2.87 | 2.59/3.12 | 2.71/3.28 |
| 0.4 | 0.99/1.15 | 1.36/1.61 | 1.62/1.93 | 1.85/2.21 | 1.97/2.36 | 2.15/2.58 | 2.25/2.70 |
| 0.5 | 0.81/0.93 | 1.15/1.34 | 1.38/1.63 | 1.58/1.87 | 1.68/2.00 | 1.83/2.18 | 1.92/2.29 |
| 0.6 | 0.69/0.77 | 0.98/1.14 | 1.19/1.4 | 1.37/1.62 | 1.46/1.73 | 1.66/1.88 | 1.67/1.98 |
| **ROE** | **20/18** | **25/20** | **30/20** | **50/25** | **60/30** | **80/40** | **100/50** |
| 0.7 | 0.67/0.74 | 0.80/0.91 | 0.86/0.98 | 1.05/1.22 | 1.12/1.32 | 1.23/1.32 | 1.29/1.51 |
| 0.8 | 0.58/0.63 | 0.70/0.79 | 0.75/0.86 | 0.93/1.08 | 1/1.17 | 1.09/1.28 | 1.15/1.34 |
| 0.9 | 0.51/0.55 | 0.62/0.69 | 0.67/0.76 | 0.84/0.97 | 0.90/1.05 | 0.98/1.14 | 1.03/1.2 |
| 1.0 | 0.44/0.47 | 0.55/0.61 | 0.60/0.68 | 0.76/0.87 | 0.82/0.94 | 0.89/1.03 | 0.94/1.08 |
| 1.2 | 0.35/0.36 | 0.45/0.48 | 0.50/0.55 | 0.63/0.72 | 0.69/0.78 | 0.75/0.86 | 0.79/0.90 |
| 1.4 | 0.28/0.38 | 0.37/0.39 | 0.42/0.46 | 0.54/0.61 | 0.59/0.66 | 0.65/0.72 | 0.68/0.77 |

## 5.14  Summary of PEG$_c$ Bands

Summary of the observations made in section 5
Table for PEG$_c$ (PEG Current) Range for Different Raw Beta and Profitability (Growth 10%-20%).
Table 5.14A

| Raw Beta Range | Bloomberg Adjusted Beta | PEG BAND (RAW BETA) ROE (20%-50%) | PEG BAND (RAW BETA) ROE (50%-100%) | PEG BAND (RAW BETA) ROE>100% |
|---|---|---|---|---|
| 0.2-0.4 | 0.47-0.60 | 0.99 -1.33 | 1.62-3.57 | 1.97- 4.00 |
| 0.4-0.6 | 0.6-0.73 | 0.69-2.07 | 1.19-2.43 | 1.46-2.71 |
| **BETA  Range** | | **PEG BANDROE (20%-50%)** | **PEG BANDROE (50%-60%)** | **PEG BAND ROE>60%<100%** |
| 0.6-0.8 | 0.73-0.87 | 0.58-1.57 | 0.75-1.83 | 1.0-1.68 |
| 0.8-1. | 0.87-1.00 | 0.44-1.21 | 0.76-1.26 | 0.82-1.33 |
| 01.0-1.2 | 1-1.13 | 0.35 -0.92 | 0.63- 1.11 | 0.69-1.22 |
| 1.2-1.4 | 1.13-1.27 | 0.28-0.90 | 0.60-0.96 | 0.65-0.91 |

Table for PEG$_T$ ( P/E Trailing )( For Growth between 10% to 20%)

( The lower band for PEG$_c$  is increased by a factor of 1.2 assuming earnings a year ago were 1/1.2 and the upper band has been increased by a factor of 1.1 assuming earnings a year ago were 1/1.1, as the upper band is for lower growth rate)

**Table 5.14B**

| Raw Beta Range | Bloomberg Adjusted Beta | PEG BAND (RAW BETA) ROE (20%-50%) | PEG BAND (RAW BETA) ROE (50%-100%) | PEG BAND (RAW BETA) ROE>100% |
|---|---|---|---|---|
| 0.2-0.4 | 0.47-0.60 | 1.18-1.46 | 1.94-3.93 | 2.36-4.44 |
| 0.4-0.6 | 0.6-0.73 | 0.83-2.28 | 1.43-2.67 | 1.75-2.98 |
| **BETA Range** | | **PEG BANDROE (20%-50%)** | **PEG BANDROE (50%-60%)** | **PEG BAND ROE>60%<100%** |
| 0.6-0.8 | 0.73-0.87 | 0.70-1.73 | 0.90-2.01 | 1.2-1.85 |
| 0.8-1. | 0.87-1.00 | 0.52-1.33 | 0.76-1.26 | 0.82-1.33 |
| 01.0-1.2 | 1-1.13 | 0.42 -1.01 | 0.76- 1.22 | 0.83-1.34 |
| 1.2-1.4 | 1.13-1.27 | 0.38-0.99 | 0.72-1.06 | 0.78-1.00 |

## 5.14 Analysis of Data:

Theoretically, in the Indian context a $PEG_T$ ratio of 4.4 is also possible, for a stock with a raw beta of 0.2, profitability of 500% and a high growth of 7 years. In reality such a $PEG_T$ ratio is not observed, primarily due to the fact that no professional investor will discount the cash flows using a raw beta of 0.2. Since Beta at the company level and the industry level is highly variable, it's highly advisable to use Bloomberg adjusted beta (which takes the raw beta of 0.2 to 0.47 level). Therefore, in the table 5.14B the author suggests to use the minimum Beta range of 0.4-0.6. An increase in Beta for a 10% growth and a high profit company from 0.2 to 0.4 can bring the $PEG_T$ down from 4.4 to 2.98. Since Beta forecasting is difficult and Beta can change going forward, using Bloomberg Adjusted Beta is highly recommended for a very low Beta stock.

### 5.14.1 Beta Range 0.4 to 0.6: (Upper Range of $PEG_T$)

In the first profitability range (20%-50%), the range of $PEG_T$ ratio is 0.83-2.28. Typically for many FMCG and pharmaceutical stocks (low Beta stocks) the PEG ratio will be greater than one (1.2-1.8 observed), as profitability of 30%-50% is common. These stocks, if available at a $PEG_T$ ratio of less than one, definitely make good investment sense if one is right or confident about the growth estimate. The highest PEG ratio we get is 2.98 for a company with profitability of 500%. Some FMCG Companies in India like HUL and Nestle belong to this category. *Therefore, a stock in India trading at a PEG ratio of greater than 2 is most probably overvalued, unless it belongs to very low beta and very high profitability category. Even for such stocks a PEG ratio > 3 is definitely a case of overvaluation.* There are two main risks which an investor must evaluate before investing in such a stock (PEG>2). The price volatility and Beta in future period can be higher if the company misses the growth target which can bring down the price as both the PE and earnings come down. Alternatively, one can invest in such stocks if the growth priced in ( 5 years) is at the lower end of the range. HUL's EPS last year (2013) was 15.50. The price had hit a high of 725 sometime during the year. Using this Price and last year earning the PE ratio ( trailing by 6/7 months) turns out to be 46.77. A $PEG_T$ of 3.11 (at 15% growth) and 3.60(at 13% growth). The company had delivered an average growth rate of 16% in net profits for last 5 years. During the current year the growth expected is less and probably the investors have revised their growth estimates downwards. Today (Feb 2014) the stock trades at 560 (P/E trailing of 36.12). Assuming the next 5 years growth at 13%-15% the PEG ratio 2.78-2.41. The stock is probably fairly valued.

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**Rule for Beta between 0.4-0.6**

$PEG_T$ ratio <0.8   Most Probably undervalued

$PEG_T$ ratio > 0.8 and <2   Fairly Valued

$PEG_T$ ratio > 2   Most Probably Overvalued ( Unless Nestle/HUL category)

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### 5.14.2. Beta Between 0.6-0.8:

Many companies will trade in this Beta Range (Example could be the IT industry). The profitability range is more likely between 20% - 50% (some exceptions could be there). Therefore a range of 0.7 to 1.73 is more likely. With more profitable companies likely to belong to higher range and less profitable companies the lower range.

> **Rule for Beta between 0.6 – 0.8**
> $PEG_T$ ratio : < 0.7 Most Probably undervalued
> $PEG_T$ ratio: 0.7- 1.7 Fairly Valued
> $PEG_T$ ratio > 1.7 Most Probably Overvalued

### 5.14.3 Beta between 0.8- 1.0

> **Rule for Beta between 0.8 – 0.10**
> $PEG_T$ ratio < 0.5 Most probably Undervalued
> $PEG_T$ ratio 0.5- 1.33 Fairly valued
> $PEG_T$ ratio > 1.33 Most probably overvalued

The thumb rule of $PEG_T$ of 1 can be applied to these beta companies with good profitability(30%-50%).

### 5.14.4 Where PEG ratio should not be used

In the Indian context using a PEG ratio of one-thumb rule (Lynch), is not at all correct for companies with low residual income. Normally these companies will trade at much lower PEG ratio. Using P/BV ratio or EV / EBITDA is a better way to see the relative attractiveness of such stocks. Similarly $PEG_T$ ratio for cyclical companies doesn't make sense. As both profitability (residual income) and growth are cyclical. Moreover these companies also have a higher Beta (often greater than one).

## 6. Observed PEG ratios for few sectors

### 6.1. IT Services Companies

| Company | Raw Beta (Last 5 years) | Bloomberg Adjusted Beta (5 years) | Long term Beta (No. of Months) |
|---|---|---|---|
| Infosys | 0.546 | 0.698 | 0.956(198) |
| TCS | 0.435 | 0.625 | 0.604(113) |
| WIPRO | 0.730 | 0.820 | 1.23(198) |
| HCL TECH | 0.758 | 0.838 | 1.01(168) |

**Source: Bloomberg**

As can be seen that long term beta is higher than present five year returns beta. As suggested earlier it makes sense to use the Bloomberg adjusted beta as going forward beta can be highly variable. The IT services companies typically have a ROE of 40% - 60%. Around 15% -20% growth rates, the DCF model based suggested $PEG_T$ Bands are between 1.0 to 1.44 (Assuming a Beta variation between 0.6 to 1.0). The following table gives the $PEG_T$ as on date between growth rates of 15% to 20%:

| Company | EPS (March 2013) | Price(20th Feb. 2014) | $PE_T$ | $PEG_T$ (15%) | $PEG_T$ (17%) | $PEG_T$ (20%) |
|---|---|---|---|---|---|---|
| Infosys | 0.546 | 3800 | 23.03 | 1.54 | 1.35 | 1.15 |
| TCS | 0.435 | 2200 | 30.98 | 2.07 | 1.82 | 1.55 |
| WIPRO | 0.730 | 575 | 22.99 | 1.53 | 1.35 | 1.15 |
| HCL TECH | 0.758 | 1540 | 26.48 | 1.77 | 1.56 | 1.32 |

Source : Bloomberg for EPS and Price

**Observations:**

1. All the stocks are priced at around 20% growth rates for the next 5 years, looking at the PEG bands. TCS and HCL Tech are priced at higher PEG compared to Infosys and Wipro. TCS had the lowest Beta in the past and also shown more consistent performance in the last 5 years.

2. If the past performance is ignored and it is assumed that all businesses grow in line with the industry then Infosys and Wipro are relatively better priced. TCS is very aggressively priced (like a FMCG stock) at 2.07 PEG, at 15% growth rate.

3. The data can also be read in terms of market expectations. TCS and HCL Tech are expected to grow their net profits at around 20% and Infosys and Wipro at around 15%, which is also in line with their past performance.

4. All the stocks look overpriced at growth below 15% for the next 5 years. NASCOM has given a guidance for (13%-15%) growth in dollar terms for the next one year.

### 6.2. FMCG and Asian Paints( Low Beta Sector):

| Company | Raw Beta (Last 5 years) | Bloomberg Adjusted Beta (5 years) | Long term Beta (No. of Months) |
|---|---|---|---|
| Infosys | 0.082 | 0.388 | 0.512(198) |
| TCS | 0.298 | 0.532 | 0.579(200) |
| Asian Paints | 0.551 | 0.770 | 0.439(198) |

Source : Bloomberg

| Company | EPS (March 2013) | Price(20th Feb. 2014) | $PE_T$ | $PEG_T$ (15%) | $PEG_T$ (17%) | $PEG_T$ (20%) |
|---|---|---|---|---|---|---|
| Infosys | 15.5 | 560 | 36.13 | 2.79 | 2.41 | 2.01 |
| TCS | 9.69 | 317.6 | 32.78 | 2.52 | 2.19 | 1.82 |
| Asian Paints | 11.61 | 476 | 41.0 | 3.15 | 2.73 | 2.28 |

Source : Bloomberg for EPS and Price

**Observations:**

All the stocks are priced at a PEG ratio greater than 2 for growth below 17%. The $PEG_T$ ratio predicted by the DCF model in this paper and the empirically estimated $PEG_T$ ratios are quite similar. The $PEG_T$ ratios for FMCG sector are higher than IT sector because of lower beta and also higher profitability. In terms of Lynch's investment philosophy, we can't say that the stocks are overvalued. On a relative basis Asian Paints appear to be the most expensive stock.

6.3. Pharmaceutical Sector ( Low Beta Sector):

| Company | Raw Beta (Last 5 years) | Bloomberg Adjusted Beta (5 years) | Long term Beta (No. of Months) |
|---|---|---|---|
| Sun Pharma | 0.456 | 0.638 | 0.649 |
| Lupin | 0.447 | 0.631 | 0.785 |
| Cipla | 0.287 | 0.525 | 0.642 |

Source : Bloomberg

| Company | EPS (March 2013) | Price(20$^{th}$ Feb. 2014) | $PE_T$ | $PEG_T$ (15%) | $PEG_T$ (20%) | $PEG_T$ (25%) |
|---|---|---|---|---|---|---|
| Sun Pharma | 14.43 | 616 | 42.69 | 2.85 | 2.13 | 1.71 |
| Lupin | 29.39 | 935 | 31.81 | 2.12 | 1.57 | 1.29 |
| Cipla | 19.24 | 369 | 19.18 | 1.28 | 0.96 | 0.77 |

Source : Bloomberg for EPS and Price

Observations :

The Indian Pharmaceutical companies have experienced very high growth rate in the past and are currently priced at more than 20% growth which results in $PEG_T$ ratio less than 2 which is what they deserve based on their beta and profitability. The observed $PEG_T$ bands are between FMCG and IT sector.

6.4. Banking Stocks ( Higher beta and lower Profitability)

| Company | Raw Beta (Last 5 years) | Bloomberg Adjusted Beta (5 years) | Long term Beta (No. of Months) |
|---|---|---|---|
| HDFC Bank | 1.0 | 1.0 | 0.877(198) |
| ICICI Bank | 1.83 | 1.55 | 1.374(196) |
| Axis Bank | 1.67 | 1.44 | 1.18(181) |
| BOB | 1.23 | 1.16 | 1.17(198) |
| SBI | 1.39 | 1.26 | 1.20(200) |
| INDUSIND | 1.79 | 1.46 | 1.36(192) |
| KOTAK Bank | 1.61 | 1.40 | 1.41(198) |

Source : Bloomberg

| Company | EPS (March 2013) | Price(20$^{th}$ Feb. 2014) | $PE_T$ | $PEG_T$ (15%) | $PEG_T$ (20%) | $PEG_T$ (250%) |
|---|---|---|---|---|---|---|
| HDFC Bank | 29.1 | 662 | 22.75 | 1.52 | 1.14 | 0.91 |
| ICICI Bank | 83.29 | 1026 | 12.32 | 0.82 | 0.62 | 0.49 |
| Axis Bank | 121 | 1193 | 9.87 | 0.66 | 0.49 | 0.39 |
| INDUSIND | 21.83 | 390 | 17.87 | 1.19 | 0.81 | 0.71 |
| BOB | 116.7 | 518 | 4.44 | 0.30 | 0.22 | 0.18 |
| SBI | 266.82 | 1502 | 5.63 | 0.38 | 0.28 | 0.23 |

Source: Bloomberg for EPS and Price

**Comments:**

If we look at the private sector banks, the beta is varying between 1 to 1.5 and Private sector banks profitability in India is between 20% to 25%. According to our DCF models, the PEG range should be 0.34 to 0.73. The actual PEG$_T$ around 20% growth rate for AXIS Bank and ICICI Bank is in that range , however for two public sector banks, namely BOB and SBI , because of ROE< ke , and higher BETA, the PEG ratio observed is much less. HDFC Bank and Kotak Bank the other private sector banks look expensive even at 25% growth rate and between the two of them HDFC Bank looks better because of lower Beta.

NOTE: Professional Investors normally use Price/Book ratio for relative valuation of banks.

**Concluding Remarks:**

In the Indian context very few stocks trade at a PEG$_T$ ratio of greater than 2. These stocks are low beta stocks and have a very high profitability. Majority of the stocks trade at a PEG$_T$ ratio of less than 2.

Professional investors must be careful in applying a thumb rule of PEG$_T$ ratio of 1 to all the stocks. As we saw the Pharmaceutical stocks and the IT stocks trade at PEG$_T$ ratio of around 1.5. Therefore, if investors use the PEG bands developed for different beta ranges they would be in a much better position to find the relative attractiveness of a stock.

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