<u>Asset Valuation using P/E Ratio : A Cross Sectional Analysis</u>

Among the most familiar and widely used valuation tools are price multiples. Price multiples are ratios of a stock's market price to some measure of value per share. The most widely used price multiples are

- Price to Earnings (P/E) ratio,
- Price to Book Value (P/BV) Ratio
- Price to sales (P/S) Ratio
- Price to cash flow Ratio (P/CF) Ratio
- EV / EBITDA Ratio where EV – Enterprise Value

The intuition behind price multiples is that we cannot evaluate a stock's price- judge whether it is fairly valued, overvalued or undervalued – without knowing what a share buys in terms of assets, earnings or some other measure of value. As valuation indicators price multiples have the appealing qualities of simplicity in use and ease of communication. A price multiple summarises in a single number the valuation relationship between a stock's price and a familiar quantity such as earnings, sales or book value per share.

Among all the price multiples the most widely used multiple for asset valuation is P/E ratio. There are several rationales for using P/E ratio in valuation, some of which are as given below :

- Earnings power is a chief driver of investment value, and EPS the denominator of the P/E ratio, is perhaps the chief focus of all the investors and analysts' attention. In one of the international surveys, earnings ranked first among the the four variables – earnings, cash flow, book value and dividends- as an input for valuation.
- The P/E ratio is widely recognized, used and easily understood by investors
- Empirical research shows that P/E differences are significantly related to long run average stock returns.

Drawbacks to using P/Es derive from the characterstics of EPS :

- EPS can be negative and the P/E ratio does not make economic sense with a negative denominator
- The ongoing and recurring components of earnings are most important in determining intrinsic value. Earnings however have volatile transient component, making analysts task difficult.
- Management's discretion within allowed accounting practices can distort reported earnings and thereby lessen the comparibilty of P/Es across firms.

Determining Earnings

In calculating a P/E, the current market price for a publicly traded co is generally easily obtainable and unambiguous. Determining the earnings figure, however is not straightforward. The following two issues must be considered.

- the time horizon over which earnings are measured, which results in two chief alternative definations of P/E; and
- adjustments to accounting earnings that the analyst may take, so that the P/Es can be compared across companies

The two chief definations of P/E are "Trailing P/E" and "Leading P/E". The difference between the two is how earnings is calculated.

- Trailing P/E uses earnings over the most recent 12 months. Trailing P/E is the P/E published in financial newspapers stock listings.
- Leading P/E ratio (also known as forward or prospective P/E) uses next year's expected earnings.

Logic sometimes indicate that a particular definition of P/E is not relevant. Trailing P/E is not useful in forecasting and valuation if firm's business has changed (eg , as a result of acquisition). Leading P/E may not be useful if earnings are suffuciently volatile so that next year's earnings are not forecastable with sufficient degree of accuracy,

Calculation of Trailing P/E

When calculating a P/E using Trailing earnings, following points must be considered while determining EPS in the denominator

- Transitory non recurring components of earnings that are company specific should be removed to arrive at underlying earnings. For eg, extraordinary items of income/expense like merger cost, gain and losses on sale of assets, provision for future losses and changes in accounting estimates. The identification of non recurring items often require detailed examination of income statement, the footnotes to income statement and Management discussion and analysis. One cannot rely on income statement classification in identifying non recurring components of earnings.
- Transitory components of earnings due to cyclicality (business or industry cyclicality). Because of cyclic effect the most recent four quarter earnings may not accurately reflect the average or long term earning power of business particularly for cyclical business. P/E for cyclical companies are often highly volatile over a cycle without any change in business prospects: high P/E on depressed EPS at the bottom of the cycle and vice versa. This problem can be addressed by calculating "Normalised EPS" – a level of EPS that business could achieve currently under mid cyclical conditions. Two of the several methods to calculate normal EPS are as follows

Histirical average EPS: Normal EPS over the most recent full cycle. But this method does not account for changes in business size.

The Method of Average Return on Equity (ROE):

EPS = Avg ROE for most recent full cycle * current Book value per share
This method by using book value per share, reflects more accurately the effect on EPS of growth or shrinkage in the company's size and hence is more preffered model.

One major issue concerning P/E that relate to their use in investment management and research is

1) Negative earnings : This leads to negative PE ratio that is not meaningful. Stock selection disciplines that use P/E often rank securities from highest value of multiple to lowest value of multiple. The security with lowest positive P/E has lowest purchase cost per unit of earnings among the securities ranked. However a negative

P/E will rank below the lowest positive P/E security but because the earnings are negative, it is actually most costly in terms of earnings purchased. In such a case one solution is to do ranking of securities by calculating **“Earning yield”** ratio (Earning/Price).

High Positive Earning Yiled → Cheaper security

High negative Earning yield → Costlier security

Calculating a Leading P/E Ratio

In the definition of Leading P/E next years expected earnings are interpreted in two ways

- expected EPS over the next four quarters
- expected EPS for the next fiscal year

Justified P/E Multiple

Justified P/E multiple is what the multiple should be if the stock is fairly valued. If,

Actual Multiple is greater than justified Price Multiple – Stock is overvalued

Actual Multiple is less than justified Price Multiple – Stock is undervalued

A Justified P/E can be justified based on one of two methods:

1) The Justified P/E for the method of forecated fundamentals is the ratio of the value of stock from a discounted caash flow (DCF) valuation model divided by EPS. The economic rationale for the method of forecasted fundamental is that the value used in numerator is derived from a DCF model that is based on most basic concept in finance: Value is equal to present value of expected future cash flows discounted at the appropriate risk adjusted rate of return. The best way to analyse the fundamental factors that affect the P/E Ratio is the use of single stage Gordon Growth model:

Mahematically $V_o = \frac{D_o * (1+g)}{(r - g)} = \frac{D_1}{(r - g)}$

Where Vo = fundamental value

If we express Do as the product of current earnings per share (Eo) and the payout ratio (Do/Eo) and express retention rate as "b" then previous formula becomes trailing P/E

$$\text{Justified Trailing P/E} = \frac{Po}{Eo} = \frac{Do*(1+g)/Eo}{(r-g)} = \frac{(1-b)*(1+g)}{(r-g)}$$

Recognising that $E1 = Eo(1 + g)$ and $D1 = Do(1 + g)$, the Leading P/E is

$$\text{Justified leading P/E} = \frac{Po}{E1} = \frac{D1 / Eo}{(r-g)} = \frac{(1-b)}{(r-g)}$$

By examining the formulas for Justified (trailing and Leading) P/E, we can conclude that Justified P/E ratio is

- positively related to growth rate of expected cash flows, whether defined as dividend or free cash flow, all else equal
- Inversely related to stock's required rate of return, all else equal

Valuation using Method of Comparables

The method of comparables approach to valuation compares a stock price P/E to a benchmark of P/E using the following steps:

1) select the benchmark stock and calculatye the mean or median or its P/E over the group of comparable stocks
2) Compare the stock's P/E to the benchmark
3) When feasible assess whether differences between actual and benchmark values are explained by differeneces in fundamental determinants and make appropriate valuation adjustments before arriving at conclusion.

Frequenlty encountered P/E benchmark includes:

Peer Group, Sector or Industry Benchmark : Care should be taken to evaluate the representativeness of mean or median sector or Industry P/Es for benchmarking purposes. For eg : while the median does not reflect the impact of outliers, the mean does. Also Whether the stocks comprising the benchmark are efficiently priced when accessing whether the justified P/E baased on comparables differ significantly from intrinsic value. The following relationship for P/E hold, all else equal

- If the target stock has higher than average expected earningsgrowth, a higher P/E than the benchmark P/E is justified
- If the target stock has higher than average risk(operating or financial), a lower P/E than the benchmark P/E is justified

Equity Index Benchmark : While implementing this method one should be aware of the size differences between the target stock and the members of the benchmark index. For eg : Indexes that are market capitalization weighted allow larger cap stocks to influence the mean P/E more than smaller cap stocks and P/Es differs significantly across cap size.

Historical average P/E: The use of past values of a stock's own P/e is based on the assumption that a stock's P/e may regress to its historical average. The justified price in this approach is
Justified price = (benchmark value of own past P/Es)*(most recent EPS)
Normalised EPS replaces the most recent EPS when EPS is negative

Valuation

Firms with P/E below the benchmark P/E are undervalued and vice versa. However fundamentals of stock should be similar to the fundamentals of benchmark before we can make any direct comparision and draw any conclusion. In other words we have to ensure that we are comparing apples to apples.
As per our discussion above, the jusfified P/E is positively related to growth rates and inversely to expected return and risk. Suppose we determine that P/E of our stock is less than the benchmark, then there are atleast three possible explanations for this;

- The stock is undervalued
- The stock is properly valued but it has lower expected growth rate than the benchmark, which leads to lower P/E

- The stock is properly valued but it has a higher expected return (higher risk) than the benchmark, which leads to lower P/E.

In order to conclude that the stock is truly undervalued, we have to make sure that the stock is comparable to the benchmark ie it should have similar expected growth and risk.

Conclusion

Valuation based P/E ratio is relative valuation model and not absolute valuation. It doesnt give absolute value (fair or Intrinsic) of a stock rather it shows the direction as to whether a stock is overvalued or undervalued as compared to some benchmark. Hence if the benchmark is marred by mispricing, the relative valuation using P/E multiple will not give accurate picture of the stock's fainess of pricing.