PRICE - EARNING RATIO
& DIVIDEND DISCOUNT MODEL

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Price - Earnings Ratio and the Dividend Discount Model are two of the important stock valuation models in investment selection decisions and identifying mispriced securities. All methods of stock valuation should be recognized as alternatives to each other rather than recognizing one method as completely outweighing the other. Since the object of the exercise is to gain insight into the operations of the market place and interlinkages between macro economic factors, micro economic factors, every model has something to offer.

In its simplest form, price-earning ratio of a company can be interpreted as "a measure of esteem in which a company is held by investors"[1] and it is represented as the ratio of the stock price to the latest available earnings per share figure.

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$$\text{P/E Ratio} = \frac{\text{Stock Price}}{\text{Earnings per Share}}$$

Although it is expressed as a ·ratio, the resultant number is a multiple of earning per share giving us the price of the stock. ie. Stock Price = P/E x Earnings per Share.
As a method of stock valuation and as a basis for investment decisions, P/E ratios become meaningful in comparison with P/E ratios of other companies or industries. For example, what it means when a company's stock sells on a low or high P/E.
Assuming that a company's dividends are expected to grow at a steady rate, the company's current stock price is expressed by the following formula:

$$P_0 = \frac{DIV_1}{r-g}$$

where P_0 is the current stock price
DIV_1 is the expected dividend next year
r is the return investors expect from similar investments and   g is the expected rate of growth of dividends.

If we divide both sides of the equation by earnings per share, the left hand side of the equation becomes P/E Ratio :

$$\frac{P_0}{\text{Earnings per Share}} = \frac{DIV_1}{\text{Earnings per Share}} \times \frac{1}{r-g} = \text{P/E Ratio}$$

When P/E ratio is high, P/E may indicate one of the following:

1. Investors expect high dividend growth. This means that g is high and the higher the g, is the greater the P/E will be.

2. The stock has low-risk and therefore investors are content with a low prospective return ie. in terms of the formula r will be low and the lower r is, the higher the P/E shall be.

3. The company is expected to achieve average growth while paying out as dividend a high proportion of earnings. ie. in the formula the higher the DIV_1 is, as compared with earnings per share the higher the P/E Ratio will be. Conversely when the P/E ratio of a company is low, this may indicate a low dividend growth, or high prospective return or a low dividend pay out as compared with earnings per share. Since use of P/E ratios involve cross company and industry comparisons as well as comparisons of past realisations for the company as well as industry and the rest, there are several problems associated concerning accounting policies of different companies, different financial year ends

adopted by different companies and in terms of
timing being on the peak or trough of the
business cycle and so on. In trying to make
P/E model relevant and significant, financial
analysts have tried to make some adjustments
to the concept. For example, instead of using
earnings for troughs and peaks, attempts have
been made to normalize earnings by using
trends. Another example of this adjustment is
the use of P/E ratios for industries rather
than companies to iron out anomalies that a
use of company data may involve.

One important area of lively discussion in the
use of P/E ratios as the basis for investment
decision is the use of either high P/E
strategy or low P/E strategy. There have been
numerous studies in this field trying to
analyze and compare the performance of high
P/E based investment strategies and low P/E
based investment strategies. The findings of
most of these studies point in the direction
that low P/E strategies outperform high P/E
strategies. Although findings of researchers
point in this direction, studies carried out
amongst investors especially institutional
investors have shown that investors have a
tendency to go for high P/E strategy. This
discrepancy between the findings of studies
and preferences of investors and their reasons
for that is likely to occupy an important
stage for a long time [2]. One of the assumptions
of capital asset pricing model is the
presence of efficient markets for securities.
At the same time one of the most persistent
CAPM anomolies is the presence of low P/E

effect. The presence of long term abnormal rates of return from low P/E ratio stocks is what is termed as CAPM anomaly or low P/E effect.

David Goodman and John W. Peavy III, in trying to explain this anomaly, tested one-period, two-parameter CAPM by specifying risk factor differently and found that low P/E securities yield positive excess returns across all risk levels. This led them to explain this anomaly with market inefficiency thus refuting the efficiency of the CAPM.

There have also been some work to explain what is known as the low P/E ratio effect or CAPM anomaly namely the presence of long term abnormal rates of return from low P/E ration stocks. This is termed as anomaly because of its long-term and persistent nature. David Goodman and John P. Weavy III in trying to understand what gives rise to this anomaly tested one-period, two parameter CAPM by specifying risk factor differently and found that low P/E securities yield positive excess returns accross all risk levels. This led them to explain this anomaly with market inefficiency. This study is an attempt to explain reasons for persistent long term above average returns from investment in low P/E securities.

Another area of important debate concerning P/E ratios is the importance of risk and growth factors in explaining cross sectional differences in P/E ratios. In a study undertaken in 1978, Beaver and Morse[3] find that cross sectional differences in P/E ratios are persistent for many years i.e., P/E ratios do

not converge in the long term, observed P/E ratios are not related to earnings growth rates more than two years ahead and risk and realised earning growth rates account for only about half of the differences in P/E ratios. They concluded that differences in accounting methods employed by different firms are much more powerful in explaining differences in cross sectional differences in P/E's. This conclusion was not tested in their work but only accepted as a hypothesis.

Paul Zarowin[1] however using expectational database for long term, expected earning per share growth rate reached a totally different conclusion. His work showed that differences in expected long term growth rates explain differences in P/E ratios more powerfully than any other variable. He also states that insignificance of risk factor as an explanatory variable does not prove that this factor can be overlooked but rather further studies are required in specifying risk factor and testing it in empirical studies. There seems to be, in this study, an implicit belief in the signifance of the risk factor in explaining cross sectional P/E differentials.

Dividend Discount Model:

Dividend discount model is another model of stock valuation. The cash flows associated with an investment in any particular common stock are dividends that are expected to be paid throughout the future on the shares purchased and because capitalization of dividend is used to determine the intrinsic

value of a common stock this method is called DDM.

$$P = \frac{DIV_1}{(1+r)} + \frac{DIV_2}{(1+r)^2} + \ldots = \sum_{t=1}^{\infty} \frac{DIV_t}{(1+r)^t}$$

The calculation of P from the equation above is an impossible task since it requires the determination all future dividends. To reduce this form to a more manageable form, requires assumptions about dividend growth rates.
If we assume a constant dividend growth rate the $DIV_t = DIV_{t-} (1+g)^t$

$$P = \sum_{t=1}^{\infty} \frac{DIV_0 (1+g)^t}{(1+k)^t}$$

$$= DIV_0 \left[\sum_{t=1}^{\infty} \frac{(1+g)^t}{(1+r)^t} \right]$$

$$\text{if } r > g$$

$$= DIV_0 \left[\frac{(1+g)}{(r-g)} \right]$$

$$\text{Since } DIV_1 = DIV_0 \, (1+g)^t$$

$$P = \frac{DIV_1}{r-g}$$

CONCLUSION :

Price-Earnings ratios and Dividend discount models can be used as complementary to each other in investment decisions. P/E ratios are more related to the psychology of the market place reflecting how the investors value a stock in terms of risk and return. Discounted cash flow analysis is , on the other hand, more of an attempt to find the intrinsic value of a stock by making projections concerning future flow of dividends, dividend growth rate and expected rate of return. The comparison of valuations arrived at via different thinking may allow the analyst to attempt to know how the market evaluates the intrinsic value of a stock and the factors giving rise to divergence between different sets of values.

FOOTNOTES :

[1] Brealey, R.A and Myers, S.C "Principles of Corporate Finance" Third Edition McGraw-Hill (1988)   P. 659

[2] Gregg Johnke, Stephen J. Klaffe, and Henry R. Oppenheimer. "Price-Earnings Ratios and Security   Performance". The Journal of Portfolio management. Fall 1987

[3] Beaver, W., and D. Morse, 1978. "What determines price-earnings   ratios?" Financial Analysts   Journal (July-August), 65-78.

[4] Zarowin, P. : "What Determines Earning-Price Ratios : Revisited". Journal of Accounting &   Finance. Volume 5.3 Summer (199)

REFERENCES :

- Brealey, R. A. and Myers, S.C. "Principles of Corporate Finance" Third Edition.
  McGraw-Hill (1988)

- Cohen, J.B., Zinbarg, E.D., and Zeikel, A. "Investment Analysis and Portfolio Management"   Fourth Edition. Irwin Illinois 1982.

- Goodman, D.A. and Peavy, J.W. "The risk universal nature of the P/E effect." The Journal   of Portfolio Management, 1984 P. 14-16

- Gregg Johnke, Stephen J. Klaffe, and Henry R. Oppenheimer "Price-earnings ratios and security   performance". The Journal of Portfolio management, Fall 1987. PP 39-46.

- Levine, S.N., "The Financial Analyst's Handbook" Second Edition. Illinois : Dow Jones-Irwin   (1988)

- Malkiel, B.G., "A Random Walk Down Wall Street" Fifth Edition. USA : W.W.Norton (1990)

- Ross, A.S., Westerfield, R.W., and Jaffe, J.E. "Corporate Finance" Second Edition. (1990)
  Boston : Irwin (1990)

- Sharp, M.F., and Alexander, GJ. "Investment". Fourth Edition. USA : Prentice - Hall. Inc   (1990)