

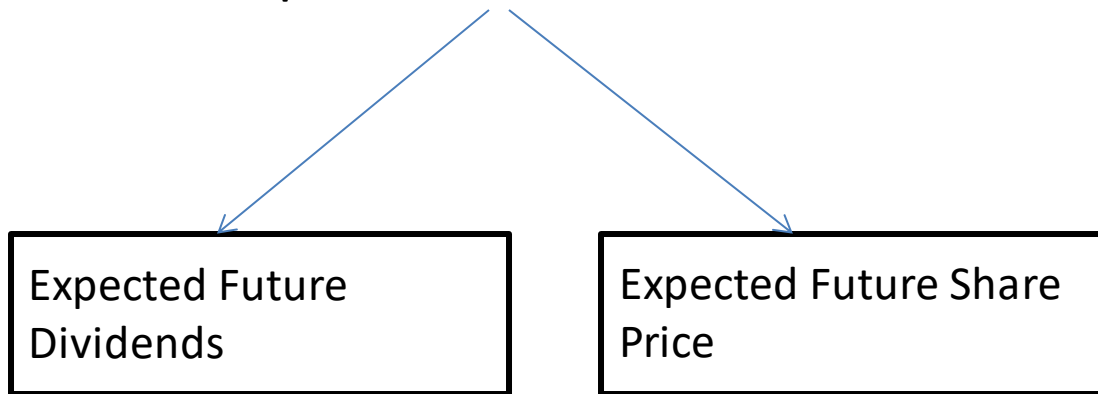
Valuation of Equity Shares

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DETERMINANTS OF VALUATION

Valuation requires determination of two things:

1. Estimation of Expected Future Cash Inflows,



2. The Required Rate of Return for these expected cash flows

Required Rate of Return = Risk free Rate + Risk Premium

Differences in valuation for different investors

WHY?

- Different Investors are likely to have different estimates of future cash inflows due to different set expectations.
- Different investors are likely to have different Required Rate of Return because of differences in perceived level of risk and different degrees of risk aversion.

Valuation Methods/ Techniques

Several methods of Valuation of Equity Shares and each method is likely to produce a different intrinsic value.

1. Dividend Discount Model/Method
2. Earnings Capitalisation Method/Model
3. Relative Valuation Methods/Models
4. Free Cash Flow Discounting Method

Dividend Discount Model

(A) Pre planned investment holding period

(1) One year holding period

$$V_0 = (D_1 + P_1) / (1 + K_e); \quad \text{Where } V_0 = \text{Value of share}$$

D_1 = Expected dividend next year,

P_1 = Expected price of share at the end of one year

K_e = Investor's required rate of return

Example 1: Current market price Rs. 80, next year's expected dividend Rs.4 per share, expected price of share after one year Rs. 90, required rate of return 18%. What should be the value of share and should it be bought at current market price?

Investment decision: If $V_0 >$ Current Market Price --- Buy

$V_0 <$ Price Don't buy, ---Sell if already holding

Solution: $D_1 = 4$, $K_e = .18$, and $P_1 = 92$

$$V_0 = (4+92)/(1+.18)$$

$$= 81.35 ; \text{Current market price} = \text{Rs. } 80$$

Decision: Since $V_0 >$ Market Price investor should buy the share.

(2) Multi year holding period

$$V_0 = D_1/(1+K_e) + D_2/(1+K_e) + \dots + P_n/(1+K_e)$$

D_1 = Expected dividends at the end of one year,

D_2 = Expected dividends at the end of 2nd year,

P_n = Expected price of share at the end of nth year

K_e = Investor's required rate of return

Multi year holding period

Example 2: Current market price =Rs. 60, Expected dividends for next 2 years Rs.3 and Rs.3.5, Expected price at the end of 2 years Rs.80, Investor's required return is 16%. What's the value of the share and should it be bought at Rs.60?

$$\begin{aligned}\text{Solution: } V_0 &= 3/(1.16) + 3.5/(1.16)^2 + 80/(1.16)^2 \\ &= 2.58 + 2.60 + 59.45 \\ &= 64.63\end{aligned}$$

Decision: Since $V_0 >$ Current market price of Rs. 60, investor should buy the share.

Indefinite Investment Holding Period

(a) Constant dividend (forever) assumption:

i.e. $D_0 = D_1 = D_2 = \dots$ Most simple but quite an unrealistic assumption

$$V_0 = D_0 / K_e \quad \text{OR} \quad V_0 = D_1 / K_e \quad \text{as} \quad D_1 = D_0$$

(b) Constant growth rate in dividends assumption

Investor assumes the future dividends to grow at a constant rate on the basis of dividend record of the company in recent past years and prospects of continued growth in future. Again, a simple but unrealistic assumption.

$$V_0 = D_1 / (K_e - g),$$

D_1 = Expected dividend next year, i.e. $D_1 = D_0 (1+g)$

g = Expected growth rate in dividends, and

K_e = Investor's required rate of return, and $K_e < g$

The growth rate (g) may be based on historical growth adjusted for future prospects of the company OR if growth is internally financed and current ROE is expected to be maintained in future,

Growth rate (g) = Retention ratio X ROE

Valuation formula with constant growth rate can be used to calculate Value of share at any point in future. For example:

$$V_2 = D_3 / (K_e - g),$$

where V_2 = Value of share at the end of 2nd year &

$D_3 = D_2 (1+g)$ -- Expected dividend at the end of 3rd year

Example 3: Given last year's dividend = Rs. 3 per share, expected growth rate 10% p.a., investor's required rate 16%. What should be the value of share to the investor? If current market price is Rs.52, should it be bought?

Solution: $V_0 = D_0 (1+g) / (K_e - g)$

$$= 3(1.10) / .16 - .10; = 3.30 / .06; = \text{Rs.55}$$

Using CAPM equation investor can determine the Required rate of return $=R_f + (R_m - R_f) \beta$

Decision: Since $V_0 >$ Market price, it should be bought.

Example 4: Risk free return is 8%, the return on market portfolio is 14%, and Delta Ltd.'s beta is 1.4. What should be the required rate of return for Delta's share? If it recently paid a dividend of Rs. 3.5 for the last accounting year and the expected growth rate is 10%, what should be its value/price? If its current market price is Rs. 65, should it be bought?

Solution: Required rate of return (K_e) $=R_f + (R_m - R_f) \beta$
 $= 8 + (14 - 8)1.4; =16.4\%$

$$\begin{aligned} V_0(\text{or } P_0) &= D_1 / (K_e - g); \text{ where } D_1 = D_0 (1+g); \\ &= 3.5(1.1) / (.164 - .10) \\ &= 60.15 \end{aligned}$$

Decision: Since $V_0 <$ Market price of Rs.65, it should not be bought.

Some More Examples

Example 5: Expected Earnings per share (EPS) of Sun Ltd. Is Rs. 7 and expected dividend per share (DPS) IS Rs. 3.5. Company's ROE is expected to be maintained at 20%. Investor's required return for Sun Ltd. Is 15%. What should be the value (or expected price) of its share? If current market price is Rs. 74, should it be purchased?

Solution: $EPS=7$; $DPS=3.5$; Retention Ratio= $1-(DPS/EPS)=0.5$

Expected growth rate (g) =Retention ratio x ROE = $(0.5) \times 20$
= $.10$ or 10%

$$V_0 = D_1 / (K_e - g); = 3.5 / (.15 - .10); = Rs70$$

Decision: Since $V_0 <$ Current market price of 74, **don't buy.**

Multiple Growth Rates

If investor estimates different growth rates for different years

Example of 2 applicable growth rates. Investor estimates that growth rate will be 10% for next 3 years and 6% subsequently. Here first growth rate (g_1)=10% & second growth rate (g_2)=6%

Example of 3 Estimated growth rates. Investor estimates the growth rate to be 10% for next 3 years, 8% for years 4 to 6, and 5% from 7th year onwards.

Value of a share with 2 growth rates/ two stage model:

Step 1: Calculate expected dividend with 1st growth rate (g_1) for the applicable number of years(n). Suppose $g_1 = 10\%$ for next 3 years ($n=3$), and growth rate will be 6% there after. Then D_1, D_2, D_3 (for 3 years) need to be calculated with growth rate of 10%. $D_1 = D_0 (1+.10)$;

$D_2 = D_1(1+.10)$; $D_3 = D_2(1+.10)$.

Cont.....Multiple Growth Rates

Step 2: Estimate $D_4 = D_3(1+g_2)$ i.e. $D_4 = D_3(1+.06)$

Using D_4 and g_2 estimate $V_3 = D_4 / (K_e - g_2)$

Step 3: Find present value of expected D_1 , D_2 , D_3 , and V_3 .

$$V_0 = D_1 / (1+K_e) + D_2 / (1+K_e) + D_3 / (1+K_e) + V_3 / (1+K_e)$$

OR instead of V_3 , you may use $D_4 / (K_e - g_2)$ in the above equation.

Example 6: Hitech Ltd. Paid a dividend of Rs.5 per share for the previous accounting year. Growth rate is expected to be 12% for next 2 years and 8% thereafter. Investor's required rate of return is 18%. What's the value of share to the investor? If the current market price is Rs.62, should the investor buy it?

Cont.....

Solution: Estimate D_1 and D_2 using $g = 12\%$ and D_3 using $g=8\%$

$$D_1 = 5(1 + .12) = 5.6; \quad D_2 = 5.6(1 + .12) = 6.27;$$

$$D_3 = 6.27(1 + .08) = 6.77$$

$$V_0 = 5.6/(1.18) + 6.27/(1.18)^2 + [6.77/(-.18 - .08)] (1/1.18)^2$$

$$= 4.75 + 4.5 + 48.6$$

$$= 57.85$$

Decision: Since $V_0 <$ current market price of Rs. 62, investor should not buy the share.

Important : The Dividend Discount Model works / can be used only if the company is profitable and paying dividends.

Earnings Capitalisation Method/ Model

This method may be used for valuation of shares of companies which are profitable but not paying dividends or paying very little dividends.

$$V_0 = \text{EPS}_1 / K_e \dots\dots\dots(1) \quad \text{EPS}_1 = \text{Expected year end EPS.}$$

Equation 1 is also a special case of $\text{EPS}_1 = D_1$

However, if the company is not paying any dividends and retaining and reinvesting its earnings, there should be growth opportunities in earnings. Therefore, equation (1) should be:

$$V_0 = [\text{EPS}_1 / K_e] + \text{Present value of growth opportunities (PVGO)}$$

Where $\text{PVGO} = [\text{RE}_1(\text{R}/K_e) - 1] / (K_e - g)$

$$V_0 = [\text{EPS}_1 / K_e] + [\text{RE}_1(\text{R}/K_e) - 1] / (K_e - g) \dots\dots\dots(2)$$

RE_1 = Expected retained earnings per share, R = ROE, and

growth rate (g) = Retention ratio X ROE. **PVGO will be positive only if $\text{ROE} > K_e$, otherwise retention of earnings will lead to reduction in value.**

More Valuation Models

Walter's Valuation Model:

$$V_0 = (D/K_e) + [(EPS - D) R / K_e] / K_e$$

D = Expected Dividend per share,

EPS = Expected earnings per share,

R = ROE,

K_e = Investor's required rate of return.

Earnings capitalisation Method/ Walter's Model

Example 7: An investor expects that Kay Foods will have EPS of Rs. 5 at the end of current accounting year and is expected to pay dividend of Rs. 1 per share. Firm's ROE is likely to be 18% and investor's required return is 16%. Calculate value of share by applying (1) Dividend discount model, (2) Walter's model, (3) Earnings capitalisation model, using PVGO?

Solution: Value as per DDM: $V_0 = D_1 / (K_e - g)$,

$g = \text{ROE} \times \text{Retention ratio} = (.18)(.8) = .144$ or 14.4%

$$V_0 = 1 / (.16 - .144) = 62.5$$

Walter's Model: $V_0 = (D/K_e) + [(EPS - D) R / K_e] / K_e$

$$\begin{aligned} V_0 &= (1/.16) + [(5 - 1)(.18/.16)] / .16 \\ &= 34.37 \end{aligned}$$

Cont.....

Earnings Capitalisation Method:

$$\begin{aligned}V_0 &= [EPS_1/K_e] + [RE_1(R/K_e) - 1]/(K_e - g) \\ &= (5/.16) + 4 [(.18/.16) - 1]/(.16 - .144) \\ &= 31.25 + 31.25 \\ &= 62.5\end{aligned}$$

Relative Valuation Methods

These techniques attempt to determine the value of a company's shares on the basis of relative valuation ratios of firm's industry or similar firms. **These can be used to value shares for which Dividend Discount Models fail.**

Commonly used relative valuation include (1) P/E Ratio or Earnings Multiplier, (2) Price/ Book Value (P/B) Ratio, (3) Price/ Sales (P/S) Ratio.

Earnings Multiplier Model / P/E Ratio: P/E Ratio, also called Earnings Multiplier, is commonly used by practising equity analysts. $P/E = P_0 / EPS_1$

P_0 = Current market price,

EPS_1 = Expected year end Earnings per Share

Relative Valuation Methods

Cont....

Investor must decide if the P/E Ratio is too high or too low relative to other similar firms or relative to the average P/E of firm's industry. Investor can even look at the historical P/E of the firm. This helps in deciding if the share is currently overvalued or undervalued. **Differences in P/E Ratios should be explained in terms of differences in perceived risk or growth rates.**

$$V_0 = \text{Appropriate P/E} \times \text{EPS}_1$$

(P/E or Earnings Multiplier can be used only if the firm is/ expected to be profitable.)

Price/ Book Value (P/B) Ratio: Another valuation ratio widely used by analysts. P/BV is the ratio of current market price to the estimated year end book value per share.

Relative Valuation Methods

Cont...

Price/ Sales (P/S) Ratio: This is used for valuation of shares of a company which is not expected to be profitable in near future.

$$\text{Price/ Sales (P/S)} = P_0 / S_1$$

P_0 = Current market price

S_1 = Expected year end sales per share

Analysts use it with the belief that strong sales performance/growth is a fundamental requirement for a growth company.

Free Cash Flow Discounting Method

This Method is commonly used to value enterprises/ firms in acquisition process or for equity funding in unlisted companies.

Steps: 1. Calculate after tax operating cash flows= $EBIT(1-T)$

2. Calculate projected new investments in working capital (WC) and fixed assets,

Δ Operating assets = Δ WC + Δ Operating fixed assets.

3. Free Cash Flows (FCF)=After tax op. cash flows $-$ Δ Operating Assets.

4. $V_f = FCF_1 / (WACC - g) + \text{Non Operating Assets}$,

V_f = Value of firm; g = rate of growth in FCF over time,

WACC= weighted average cost of capital

Free Cash Flow Discounting Method

Value of Firm (V_f) = Value of Equity (V_e) + Market Value of Preference Capital (V_p) + Market Value of Debt (V_d)

Value of Equity (V_e) = Value of firm (V_f) – [Market Value of Preference Capital (V_p) + Market Value of Debt (V_d)]

Value per share (V_0) = Total Value of Equity (V_e) / N

N = total number of equity shares