

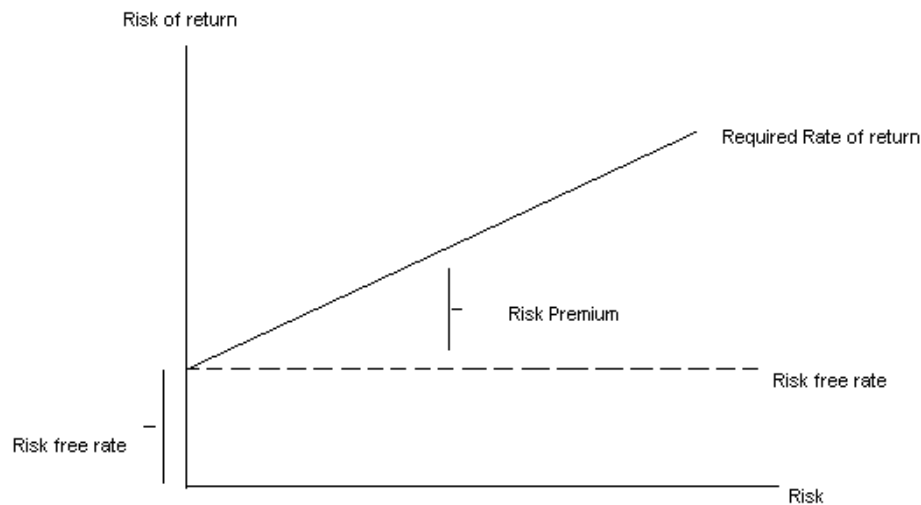
VALUATION OF SECURITIES

Investment process invariably requires the valuation of securities in which the investments are proposed. The value of a security may be compared with the price of the security to get an idea as to whether a particular security is overpriced, under-priced or correctly priced. A number of concepts of valuation have been used in the literature. Some of these are:

1. **Book Value (BV).** BV of an asset is an accounting concept based on the historical data given in the balance sheet of the firm. BV of an asset may either be given in the balance sheet or can be ascertained on the basis of figures contained in the balance sheet. For example, the BV of a debenture is the face value itself and is stated in the balance sheet. The BV of an equity share can be ascertained by dividing the net worth of the firm by the number of equity shares.
2. **Market Value (MV).** MV of an asset is defined as the price for which the asset can be sold. MV of a financial asset refers to the price prevailing at the stock exchange. In case a security is not listed, then its MV may not be available.
3. **Going Concern Value (GV).** GV refers to the value of the business as an operating, performing and running business unit. This is the value which a prospective buyer of a business may be ready to pay. GV is not necessarily the MV or BV of the entire asset taken together. GV may be less than or more than the MV/BV of the total business. Rather, GV depends upon the ability to generate sales and profit in future. If the GV is higher than the MV, then the difference between the two represents the synergies of the combined assets.
4. **Liquidation Value (LV).** LV refers to the net difference between the realizable value of all assets and the sum total of the external liabilities. This net difference belongs to the owners/shareholders and is known as LV. The LV is a factor of realizable value of an asset and therefore, is uncertain. The LV may be zero also and in such a case, the owners/shareholders do not get anything if the firm is dissolved.

5. Capitalized Value (CV). CV of a financial asset is defined as the sum of present value of cash flows from an asset discounted at the required rate of return. In order to find out the CV, the future expected benefits are discounted for time value of money. In the valuation of financial assets, the CV is most relevant concept of valuation and has been used in this text.

Required Rate of Return. In order to find out the CV, what is required is the determination of the required rate of return of the investor for the specific security being valued. This required rate of return is used as the discount rate to find out the present value. The required rate of return refers to the yield which the investor wants to earn by making investment. It is consisting of two elements – the risk free rate of return and the risk premium. These two elements have been presented in the figure below



The level of risk associated with a given cash flow can significantly affect its value. In terms of present value, greater risk is incorporated by using a higher discount rate/rate of return. Above figure shows that as the risk increases, the required rate of return also increases and the increase occurs because of the increase in risk premium. The risk-free rate, I_p remains the same for all levels of risk, and the risk premium, r_p , goes on increasing with the increase in risk. Thus, it may be said that the required rate of return is a factor of the following:

1. The risk free rate I_{pn}
2. The risk perception/attitude of the investors, and
3. The risk premium, r_p , i.e compensation required for bearing the risk.

Required rate of return, k , may be defined as

$$k = I_p + r_p \quad \dots(1)$$

BASIC VALUATION MODEL

Basically, the valuation model can be presented in terms of the cash flows, their timings and the required rate of return. The value of a security is determined by discounting the expressed cash flows to their present value at a discount rate commensurate with the risk-return prospective of the investor. So utilizing the present value technique, the value of financial asset can be expressed as follows:

$$V_0 = [cf_1/(1+k)^1] + [cf_2/(1+k)^2] + [cf_3/(1+k)^n] \quad \dots\dots(2)$$

Where

v_0 = value of the security

cf = cash flows expected at the end of year i

k = appropriate discount rate and

n = expected life of the asset

Thus the value of a security is the sum of discounted values of expected future cash inflows. For example, an investment is expected to provide an annual cash flow of Rs.5000 p.m. for the next 5 years and the appropriate discount rate for the risk associated with the investment is 15% the value of the investment may be found as follows:

$$V_0 = \sum_{i=1}^n 5000 / (1 + .15)^i$$

After going through the basic valuation model, the next step is to understand the valuation of two basic financial assets, i.e. the bonds and the shares.

BOND VALUATION

A bond or debenture is a debt security issued by a borrower and subscribed/purchased by a lender/investor. Bond is a usual form of long-term financing used by the firms, which upon issuing a bond, promise to make certain cash flows in future (in the form of interest and/or repayment) under clearly defined terms and conditions. In order to understand the valuation of bonds, the understanding of the following basic terms is required:

1. *Par value.* The par value (also called the face value or nominal value) of a bond is the principal amount of a bond and is stated on the face value of the bond is stated on the face of the bond security. The par value of a bond may be Rs.100, Rs.1000 or any amount. The issue price, however, may be less than, equal to or more than the par value.
2. *Coupon rate.* This is the rate at which interest on the par value of the bond is payable as per the payment schedule. The interest may be paid annually or even monthly. The coupon rate is usually described as % rate and is applied to the par value to find out the periodic interest amount.

3. **Maturity.** The maturity of a bond refers to the period from the date of issue, after the expiry of which the redemption repayment will be made to the investor by the borrower firm.

the value of a bond may be defined as the sum of the present values of the future interest payments plus the present value of the redemption repayment. The appropriate discount rate to find out the present value would be the required rate if the return k_d , which depends upon the prevailing risk-free interest rate and the risk premium. The valuation model may be modified to find out the value of a bond as follows:

$$B_0 = \sum_{i=1}^n I_i / (1+k_d)^i + RV / (1+k_d)^n \quad \text{.....(3)}$$

B_0 = value of bond at present

I_i = Annual interest payment starting one year from now till the end of the year n

RV = redemption repayment at the end of the year n

k_d = appropriate discount rate.

A bond of Rs.1000 bearing a coupon rate 12% is redeemable at par in 10 years. Find out the value of the bond if:

1. Required rate of return is 12% or 10% or 14%
2. Required rate of return is 14% and the maturity period is 8 years or 12 years; and
3. Required rate of return is 12% and redeemable at Rs.950 or Rs.1050 after 10 years.

Solution

The value of the bond can be ascertained by the equation 6A.3 as follows:

$$B_0 = \sum_{i=1}^n [I_i / (1+k_d)^i] + [RV / (1+k_d)^n]$$

$$\text{Or } B_0 = I (PVAF_{i,n}) + RV (PVF_{i,n})$$

Where $(PVAF_{i,n})$ = present value annuity factor at the rate of interest i , and number of years n

$(PVF_{i,n})$ = present value factor for a given rate of interest i , and number of years n

These values may be found from the table A-4 and the table A-3 respectively. These tables are given in the appendix-III.

Now the value of the bond under different situations can be ascertained as follows:

1. Basic information - Coupon rate 12%
Redeemable at par
Maturity 10 years.

If required rate of return is 12%

$$\begin{aligned}B_0 &= 120(5.650) + 1000(0.322) \\&= 678 + 322 \\&= \text{Rs.}1000\end{aligned}$$

If required rate of return is 10%

$$\begin{aligned}B_0 &= 120(6.145) + 1000(0.386) \\&= 737.4 + 386 \\&= \text{Rs.}1123.40\end{aligned}$$

If required rate of return is 14%

$$\begin{aligned}B_0 &= 120(5.216) + 1000(0.270) \\&= 625.92 + 270 \\&= \text{Rs.}895.92\end{aligned}$$

2. Basic Information - Coupon rate 12%
Redeemable at par
Maturity 8/12 years.
Required rate of return 14%

If maturity period is 8 years

$$\begin{aligned}B_0 &= 120(4.639) + 1000(0.351) \\&= 556.68 + 351 \\&= 907.68\end{aligned}$$

If required period is 12%

$$\begin{aligned}
 B_0 &= 120(5.660) + 1000(0.208) \\
 &= 679.20 + 208 \\
 &= 887.20
 \end{aligned}$$

3. Basic information - Coupon rate 12%
 Required rate of return 12%
 Maturity 10 years.

If redemption amount is Rs.950

$$\begin{aligned}
 B_0 &= 120(5.65) + 950(0.322) \\
 &= 678 + 305.90 \\
 &= \text{Rs.}983.90
 \end{aligned}$$

If redemption amount is Rs.1050

$$\begin{aligned}
 B_0 &= 120(5.650) + 1000(0.322) \\
 &= 679.2 + 338.1 \\
 &= \text{Rs.}1016.10
 \end{aligned}$$

Bond valuation Behavior: on the basis of the above calculation, certain conclusions regarding the behavior of the valuation of bond can be arrived as follows:

1. *Relating to the required rate of return:* If the required rate of return and the coupon rate are equal then the value will be equal to par value. Whenever the required rate of return differs from the coupon rate, the bond value also differs from the par value. When the required rate of return is less than the coupon rate, the bond has a premium value here as if the required rate of return is more than the coupon rate, the bond has a discounted value.
2. *Relation to maturity period:* Whenever the required rate of return is different from the coupon rate, the time to maturity also affects the value of the bond. In this respect the conclusion can be drawn with the reference to the remaining period of maturity. When the required rate of return is different from the coupon rate and assumed constant until maturity, the value of the bond will approach its par value as the remaining period approaches its maturity. Of course, when the approach rate of return is equal to the coupon rate, the bond value will remain the same at par until it matures. Further, the longer the time to maturity of bond, the greater its value changes in response to a given change in the required rate of return.

3. *Yield to maturity (YTM)*: it is already stated that the cash flows in relation to a bond are consisting of a regular interest payments and the redemption repayment. The rate of return k_d , which makes the discounted values of these cash flows equal to the bond's market value, is known as the YTM of the bond. So, a bond's YTM may be defined as the *Internal Rate of Return (IRR)* for a given level of risk. When an investor evaluates bonds in order to make a buy or not to buy decision, the evaluation is often done by finding out the IRR of the bond. The IRR of a bond is nothing but the value of k_d in equation 0:3. The YTM, i.e., the IRR of annual interest, I , the redemption value, RV and time to maturity, n . the rate of return expected from a bond if it is kept till maturity is called the YTM of the bond.

While finding out the YTM, an implied assumption is that all interest received are reinvested at a rate of return equal to bond's YTM. In order to find out the YTM of a bond, equation 0:3 is to be solved for various values of k_d until the rate causing the calculated bond value equal to its current value. The trial-and-error procedure required to find out the YTM can be explained with the help of a example as follows:

A bond of Rs.10,000 bearing coupon rate 12% and redeemable in 8 years at par is being traded at Rs.10,600. Find out the YTM of the bond.

At $k_d = 12\%$

$B_0 = 10000$ (at coupon rate = k_d)

This is less than the market price, so the k_d is reduced to 10%

$B_0 = \text{Rs.}1200(\text{PVAF}_{10\%*8\text{year}}) + 10000(\text{PAV}_{10\%.8y})$

$B_0 = 1200(5.335) + 10000(0.467)$
 $= \text{Rs. } 11072$

By interpolating between 12% and 10%

$K_d = 12\% - (600/600+472)*2$
 $= 12\% - 1.12$
 $= 10.88\%$

So, the YTM of the bond is 10.88%

A more practical alternative to this procedure to find out the YTM is the approximate yield formula as given in equation 4

$$\text{Approximate yield} = [I + (RV - B_0/n)] / (RV + B_0)^{1/2} \dots\dots 4$$

To continue with the same example, the YTM may be approximate with the help of equation 4 as follows:

YTM = $[1200 + (10000 - 10600)/8] / (10000 + 10600)/2$
= 10.92%

The approximate YTM is 10.92% and it is not significantly different from 10.88% calculated by the IRR methodology.

Valuation of convertible Debenture (CCD). In case of a CCD, the debenture holders get interest at a specified rate for a specified period after which a part or full value of the CCD is covered into specific number of equity shares. In case of partial conversion, the residential portion continues to earn interest for the remaining period after which it is redeemed. The cash flows involved in case of valuation of CCD are:

1. Periodic Interest receivable from the company.
2. Expected market price of the share received on conversion.
3. redemption amount, if any

The CCD can be valued as per the equation 5

$$B_0 (\text{CDD}) = \sum_{i=1}^n I_1 / (1+k_d)^i + mP_i / (1+k_e)^i + RV / (1+k_d)^n \dots\dots 5$$

Where

$B_0(\text{CCD})$ = value of CCD

k_e = interest amount receivable per year

m = number of shares received on conversion

P_t = share price received at the conversion time

RV = redemption value, if any
N = life of the debenture
 k_d = rate of discount

It may be noted that in case of partial convertible debentures, the annual interest before conversion and after conversion would be different. In case of fully convertible debentures, there will not be any RV.

Valuation of deep discount bonds (DDB's). In recent years, some financial institutions have issued a debt instrument known as DDB. These DDB's have an issue price and a par value or a face value which is payable to the holder of DDB. For example IDBI issued the DDB- series 1 for a price of Rs.2700. These DDB's were mature able in 25 years from the date of issue at par value of Rs.100000. No interest or any other type of Payment is available to the holder before maturity. Since there is no intermediate payment between the date of issue and the maturity date, these DDB's may also be called the zero coupon bonds.

The valuation of DDB's can be made on the same lines as the ordinary bonds are valued. As DDB generates only one future cash flow at the time of maturity, the value of the DDB may be taken as equal to the present value of this future cash flow discounted at the required rate of return of the investor for the number of years of the life of DDB's. The value of DDB may be calculated with the help of equation 6.

$$B_0(\text{DDB}) = FV / (1+r)^n \text{6}$$

Where

$B_0(\text{DDB})$ = value of the DDB
FV = face value of DDB payable at maturity
 r = the required rate of return
 n = life of the DDB

For example, a DDB is issued for maturity period of ten years and having a par value of Rs.25000. Find out the value of the DDB given that the required rate of return is 15%

Applying the equation 6 the value of the DDB is

$$\begin{aligned} B_0(\text{DDB}) &= 25000 / (1+0.15)^{10} \\ &= 25000 * (\text{PVF}_{15\%*10 \text{ y}}) \end{aligned}$$

$$= 25000 \times 0.247$$

$$= \text{Rs.}6175$$

So the value of the bond is Rs.6175

VALUATION OF PREFERENCE SHARES

Preference share is a share which entitles the shareholder to receive (i) a dividend at a fixed rate for a given period (ii) a redemption amount at the time of preference share (in case of redeemable preference share) OR a dividend at the fixed rate perpetually till the liquidation of the company (in case of irredeemable preference share)

Assumptions. Two assumptions are relevant while ascertaining the value of preference shares are as follows:

1. the dividend on preference share are received once a year and that the first dividend is received at the end of one year from the date of acquisition / purchase
2. The company always intends to pay the preference dividend so that the stream of preference dividend is concerned to be known with certainty.

Redeemable preference share. The value of redeemable preference share may be defined as the present value of the cash flows expected from the company. The future cash flows associated with a redeemable preference share are (i) the stream of future dividends at a fixed rate of dividend (ii) the maturity payment at the time of redemption. These future cash flows are discounted at an appropriate rate to find out the value of the redeemable preference shares as follows:

$P_0 = [d_1/(1+k_p)^1] + [d_2/(1+k_p)^2] \dots\dots\dots [d_n/(1+k_p)^n] + [RV/(1+k_p)^n] \dots\dots\dots 7$
$P_0 = \sum_{i=1}^n [d_i/(1+k_p)^i] + [RV/(1+k_p)^n]$

Where

P_0 = value of preference share

D_i = annual fixed dividend

RV = redemption value of preference share

n = life of the preference share

k_p = required rate of return of the preference shareholders

It may be noted that equation 7 (valuation of preference share) is the same as equation 3 (valuation of bond) for simple reason that both of the preference shares and the bond have the similar future cash flow associated with them.

Irredeemable preference share. The value of irredeemable preference share may be defined as the present value of the perpetuity of the fixed dividend on the preference shares. Symbolically, it may be defined as

$$P_0 = D/k_p \dots\dots\dots 8$$

Where

P_0 = value of the irredeemable preference share

D = fixed annual dividend

k_p = required rate of return of preference shareholders

VALUATION OF EQUITY SHARES

Conceptually, the valuation of the equity share is the most typical because of its residential ownership character. The equity shareholders receive the residential profit and also the residual assets in case of liquidation. From the point of view of calculation also, the valuation of equity share is difficult for (i) the rate of dividend is not given, and (ii) unlike rate of interest or rate of preference dividend which remains constant over the life of the security. The rate of dividend on equity share may be varying over the years. So the normal valuation model as applied for valuation of equity shares

Assumption. With ascertaining the value of equity share, different assumptions are made regarding the company's future profits, the amount and the timing of the dividends, the required rate of returns, etc. Different approaches have been developed for the valuation of equity shares. These different approaches, however, make the following assumptions regarding the basic characteristics of equity shares.

1. Equity share does not have any redemption rate.

2. Equity share do not have any given redemption or liquidation value. In case of liquidation of the company, their claim is residual in nature and arising in the last (after paying all external liabilities and the preference shareholders).
3. Dividends on equity shares are neither guaranteed nor compulsory. Further, neither the rate nor the timing of dividend is specified. So, the dividend can vary in any direction.

Broadly the value of equity share may be found by following either of the two approaches:

1. Valuation based on dividends
2. Valuation based on earnings

VALUATION OF EQUITY SHARES BASED ON DIVIDENDS

An investor buys or acquires an equity share in expectation of (i) a stream of future dividends from the company, and (ii) resale price of the equity share after some time when he is no longer interested in holding the share. The owner of share receives the shares as a compensation for investing the firm. So, as long as the firm is operating profitably and the investor holds the shares, he would be expecting to receive a dividend from the company. So, the dividend plays a crucial and important role in determining the value of equity share. Though there is no legal compulsion to pay dividend on equity shares, still most companies prefer to pay dividends to satisfy the expectations of their shareholders.

Assumption: Valuation of equity share based on dividends requires the following equation:

1. the dividends are paid manually
2. the first dividend is paid after one year from the date of acquisition/purchase.
3. sale of the equity share, if any, occurs only at the end of a year and at the ex-dividend terms.

The value of an equity share applying the basic valuation model (equation 2) may be defined as equal to the present value of all future benefits which the share is expected to provide in the form of dividend over the infinite period. The future capital gain/loss on sale, if any, is ignored because theoretically speaking, what is sold is the right to all future subsequent dividends. So, from valuation point of view only the infinite stream of dividends is relevant.

The value of equity share is the sum of the present values of future cash flows (in the form of dividends) discounted at the required rate of return of the investors. The valuation of equity shares may be ascertained with the help of equation 9.

$$P_0 = [d_1/(1+k_e)^1] + [d_2/(1+k_e)^2] \dots\dots\dots [d_n/(1+k_e)^n] \dots\dots\dots 9$$

Where

P_0 = value of the equity share

D_i = expected dividend over the year

k_e = required rate of return of the equity investors

As per the equation 9, the value of a share depends on the expected stream of dividends. However, the future dividend from the company may show different patterns. The company may pay dividends at a constant rate or otherwise. This uncertainty regarding the pattern of dividend is what makes the valuation of equity shares of a typical job. Three types of dividend pattern could be assumed and valuation of equity share under all these three types of patterns can be ascertained. These three assumptions of dividend patterns are:

1. zero growth in dividend or constant dividends,
2. constant growth in dividend
3. variable growth in dividends

Zero growth in dividend or constant dividends. This is the simplest type of dividend pattern in which the dividend amount remains constant over years. The dividend stream, therefore, is a long term annuity, or almost perpetuity. Symbolically

$$D_1 = D_2 = D_3 \dots\dots\dots = D_n$$

The value of equity share under constant dividend assumption by dividing yearly dividend by the required rate of return of equity investor as follows:

$$P_0 = D/k_e \dots\dots\dots 10$$

Where

P_0 = value of equity share

D = annual constant dividend

k_e = required rate of return of equity investor

This model requires no estimation of future dividends and no forecast of future selling price and, therefore, is simple to operate. Dividend expected at the end of the year 1 will have to find out the value of equity share.

A firm pays a dividend of 20% on equity share of face value of Rs. 100/- each. Find out the value of equity share given that the dividend rate is expected to remain same and the required rate of return of the investor is 15%.

Sol.

In this situation the following information is given :

$$k_e = 15\%$$

$$D = 20 \text{ (i.e., 20\% of Rs. 100)}$$

$$\text{Therefore, } P_o = 20/15 \times 100 = \text{Rs. } 133.33$$

(ii) Constant growth in dividends:- The assumption is that the dividends will grow constantly at a rate g , every year. If a firm pays a dividend of D_o at present then dividend at the end of year 1 will be D_1 , i.e., $D_o (1+g)$ and dividend at the end of year 2 will be $D_2 = D_o (1+g)^2$, and so on. Therefore, dividend payable in any future year can be ascertained with help of following:

$$D_t = D_o (1+g)^t$$

$$\text{Or, } D_t = D_{t-1}(1+g)$$

Under constant growth model, the value of a share will be found with the help of equation 11

$$P_o = D_1/k_e - g \quad \text{.....} \\ (11)$$

The Equation 11 explains the current price P_o in terms of expected dividends at the end of year 1, D_1 , the projected growth rate, g , and the expected rate of return of investors, k_e . Alternatively, the equation 11 can be used to find out an estimate of k_e from the given D_1 , P_o and g as follows:

$$k_e = (D_1/P_o) + g$$

So, k_e , which is also called the market capitalization rate is equal to the dividend yield, i.e., (D_1/P_o) plus the expected growth rate in dividends, g .

The valuation model given in equation 11 is easy to compute and apply and also recognizes the infinite stream of dividends with growth rate, g . Suppose, a share having a face value of Rs. 100/- is expected to pay a dividend of 12% at the end of year 1 and the growth rate of dividends is estimated to be 3%. If investor has a required rate of return of 16% the value of the equity share is :

$$P_0 = 12 / 16 - 0.3$$

$$= \text{Rs. } 92.30$$

The value of an equity share is positively correlated with growth rate and negatively correlated with the required rate of return. Suppose, a firm is expected to pay a dividend of Re. 1 which is expected to grow at growth rate g annually. The value of the share under different growth rates and different required rates of return have been summarized in table 1

Growth rate	Required rate of return			
	10%	12%	14%	16%
2%	12.50	10.00	8.33	7.14
4%	16.67	12.50	10.00	8.13
6%	25.00	16.67	12.50	10.00
8%	50.00	25.00	16.67	12.50

The value given in table 1 reflects the sensitivity of the growth rate and required rate of return. The higher the growth rate, higher will be the value for a given required rate of return. Further, the higher the required rate of return, lesser will be value for a given growth rate. The constant growth model is an extremely useful theoretical model to value the equity shares.

(iii) Variable growth in dividends. The zero growth rate and constant growth rate assumptions of dividend patterns are extreme assumptions. In a practical situation, the dividend from a company may show one growth rate for few years, followed by another growth rate for next few years and then yet another growth rate for next few years, and so on. For example, for five years the growth rate in dividends may be 2% then it may be 3% for next 5 years then it may stick to 4% growth rate in infinitely. This means that the dividends will grow at 2% annually for years 1 to 5 at 3% annually for years 6 to 10 and at 4% annually from

the year 11 onwards. Equation 12 takes care of such growth situations to find out the value of the equity shares.

$$P_o = \sum_{i=1}^n [d_0 (1+g_1)^i / (1+k_e)^i] + n \sum_{i=5}^5 [d_6 (1+g_2)^{i-5} / (1+k_e)^{i-5}] + \sum_{i=10}^n [d_{10} (1+g_3)^{i-10} / (1+k_e)^{i-10}]$$

Where P_o = value of equity share,

g_1, g_2 and g_3 = different growth rates for different periods, and

k_e = required rate of return of equity investors

To find out the value of equity shares under varying growth rates as per Equation 12

The following procedure may be adopted:

Step 1. Find the value of cash dividend at the end of each year during the period over which the growth rate is changing. In the above eg., the growth rate is changing over 10 years (2% growth rate for 1st five years & 3% growth rate for next 5 years).

Step2. Find out the present values of these cash dividends for different years by discounting at the required rate of return, k_e . For this purpose, the cash dividend is to be multiplied by the respective discounting factor to find out the present value. Add up all these present values.

Step 3. Find out the value of the equity share at the end of the last year of the varying growth period, i.e., the 10th year as follows:

$$P_{10} = D_{11} / k_e - g_3$$

This value P_{10} represents the present value of all expected dividends from year 10 onwards at a constant growth rate in dividends, g_3 . Find out the present value of this year by discounting to period 0.

Step 4. Sum of the figures arrived in steps no.2& 3 is the value of the equity share. If there are more breaks in the growth rates, then the similar procedure may be adopted.

A firm is paying a dividend of Rs. 1.50 per share. The rate of dividend is expected to grow at 10% for next 3 years and 5% thereafter infinitely. Find out the value of the share given that the required rate of return of the investor is 15%.

Sol.

For this situation following information is available :

$$k_e = 15\%$$

$$D_0 = \text{Rs.}1.53$$

$$g_1 = 10\%(\text{for 3 years})$$

$$g_2 = 5\%(\text{infinitely})$$

Now, the value may be calculated as follows:

End of year	Dividend Amt(Rs.)	PVF _(15%, n)	PV(Rs.)
1	1.65	.87	1.44
2	1.82	.756	1.38
3	2.00	.658	1.32
Total			4.14

Rs.4.14 is the present value of dividends expected from the company for the first 3 years.

The value of equity shares at the end of year 3 will be as follows:

$$\begin{aligned} P_3 &= D_3(1+g)/k_e - g \\ P_3 &= 2(1.05)/15 - 0.05 \\ &= \text{Rs.}21 \end{aligned}$$

The value of the share at the end of the 3 years will be Rs. 21. Present value of rs. 21 is

$$= \text{Rs. } 21 * (\text{PVF}_{15\%, 3y})$$

$$= \text{Rs. } 21 * (0.658)$$

$$= \text{rs. } 13.82$$

The value of the share at present is Rs. 4.14 + 13.82 i.e. Rs. 17.96

Valuation of share currently not paying dividends there may be numerous cases where the firm is not able to pay any dividend on equity shares because of insufficient profits during early years or gestation period or otherwise. Sum of the form may not like to pay early dividends because they require funds for growth purposes. The dividend models discussed above can take care of this type of situations also. For example, a firm is not expected to pay any dividend for 1st 3 years but thereafter will be paying a dividend of Rs. 2

growing at 10% p.a. forever. The value of the share, given the required rate of return can be calculated as follows:

As per the constant growth rate model, the value of the share at the end of year 3
Will be

$$\begin{aligned} P_3 &= D_4 / k_e - g \\ &= 2 / 15 - 10 \\ &= \text{Rs.}40 \end{aligned}$$

Now , this is the value of the share at the end of year 3. This value should now be discounted at 15% to find out the present value.

$$\begin{aligned} P_0 &= P_3 * (PVF_{15\% \cdot 3y}) \\ &= \text{Rs.}40 (0.658) \\ &= 26.32 \end{aligned}$$

So, the value of the share is Rs.26.32

VALUATION OF EQUITY SHARES BASED ON EARNINGS

Some firms have extensive growth opportunities and require funds to take up new projects. So these firms may retain profits (wholly or partially). This reduce the amount of dividends to the shareholders. The retained earnings are reinvested internally to generate higher profits in future. Investor are willing to forego cash dividends today in exchange for higher earnings and expectation of higher dividends in future. The value of an equity share in such a case, may be determined on the basis of the earnings of the firm. The earnings of the firm may be expressed as earnings as per share (EPS) which is ascertained from the accounting information of the firm. There are different approaches to find out the value of the equity share on the basis of the earnings of the firm. These include Gordon valuation model, Walter's Model, the P/E ratio approach and the explicit resale price model.

(a) The Gordon's Model. This valuation model presupposes that earnings of the firm are either distributed among the shareholders or are reinvested within the business. The growth in dividends in future would therefore depend upon the profits retained and the rate of return on these retained profits. The golden valuation model can be represented as follows:

$$P_0 = \text{EPS}_1 (1-b) / k_e - br \dots\dots 13$$

Where P_0 = price of a share

EPS_1 = EPS at the end of year 1

'b' = retention rate, i.e., % of earnings being retained

r = rate of return on reinvestments, i.e., ROI

k_e = required rate of return of the equity investors.

The detailed discussion on Gordon model may be found in chapter 4

(b) Walter's Model – The walter's model supports the view that the market price of a share is the sum of (i) present value of an infinite stream of dividends, and (ii) present value of an infinite stream of returns from retained earnings. The investors will evaluate the retention of earnings resulting in lesser dividends, in the light of (a) the rate of return, r, earned by the company on these retained earnings, and (b) the opportunity cost of equity investors, k_e . Depending upon the relationship between r and k_e , the investors will value the expected capital gains and will thus value the share. The Walter's Model can be presented as follows:

$$P = [D / k_e] + (k_e / r)(E - D) / k_e \dots\dots 14$$

The detailed discussion on Walter's Model may be found in chapter 4.

(c) Price earnings ratio(P/E ratio):- The P/E ratio is the most common earnings valuations Model. The P/E ratio between the price of a share & it is EPS. For eg., if a share whose EPS is Rs. 10 is having market price of Rs.250, then its P/E ratio is $250/10 = 25$. it means that the mp of the share is 25 times that of the EPS. As per P/E ratio approach the value of the share is expressed as

$$\text{Value} = \text{EPS} * \text{P/E ratio}$$

But there is a question as to how to estimate / forecast the P/E ratio? One method is to estimate the P/e ratio of the similar type of a company or the industry as a whole. Then those estimate may be further adjusted in the light of characteristics and features of the particular firm and its share. The P/E ratio before being applied to a particular case, to find out the value of the share may be analyzed for the risk involved in the firm, in the

share, growth prospects of the firm stability of earnings of the firm, etc. the higher the growth prospects of the firm and stability of a dividend, larger would be the P/e ratio. Similarly, higher the risk of firm, lower would be P/E ratio.

The P/E ratio as the basis of valuation of share has been quite common and is often used in business dailies and generals. The share quotations are often supplemented with the P/E ratios. It may be observed that some companies have very high P/E ratios while others have a low P/E ratio. The share price at any particular point of time reflects investor's expectation of future operating and investment performance of the firm. The shares of the growing firm shall act very high P/E ratio because investors are willing to pay a higher price now for expected higher returns in future.

VALUATION OF RIGHT

Some times, a company may issue right shares under sec 81 of the Company's Act 1956, to the existing share holders. Each holder owning shares as on a certain date (set at the time the issue is approved) receives an option to buy a certain number of new shares. The share holder is given a notice of this fact and is subsequently issued a form called a right which out lines the term and condition of the option. One right is issue for each share holder and total number of new share each shareholders may purchase with his right depend on the number of share he owes at the time of the right offering and the percentage increase in the total number of shares of the company represented by the new issue, i.e. each existing shareholders get an opportunity to subscribe to new shares in the same ratio in which he holds the shares.

It may be noted that the right is an option and not an obligation to buy a specific number of shares at a specific price per share over a fixed time interval. The shareholders have four option (i) to exercise the right, which means purchasing the new share s directly from the issuing company, (ii) to sell their rights, (iii) to hold the right until the expiry, (iv) to sell existing shares and simultaneously to purchase the new shares. If all the rights are exercised, the offering is fully subscribed and the company receives the target funds. However, if some rights are not exercised, then the company will be having lesser funds then required.

For example, a company requiring Rs.10,00,000 decides to offer new share at Rs.20 each (mp Rs.32 each). The number of new equity share to be issued is $\text{Rs.10,00,000} / 20 = 50,000$. if the company already has 2,50,000 or 1:5, i.e. 1 right share will be offered at Rs.20 each for every 5 existing shares held by a shareholder. Every registered share holders, on the record date, will get this opportunity. Further, that any

buyer of the share, on the stock exchange, before the record date, will also receive the right offer as he is purchasing the share on cum right basis. Investor buying the shares after record date, will not get the right offer as he is buying the share on ex-right basis. Since each share entitle the holder to get the right offer, cum right price, theoretically speaking, is equal to the ex-right plus the value of the right.

VALUATION OF THE RIGHT. The right offering are planned in such a way that it gives 'rights' a resale value or a benefit to the existing shareholders. This is accomplished by setting the opportunity it provides to purchase the share at a price less than the market price. The value of the right should be same if the share is being sold or purchase cum right. The value of right may be calculated as follows:

$$V_r = MP_{cr} - OP / N_0 + N_1$$

Where V_r = value of right

MP_{cr} = cum-right market price

OP = n offer price

N_1 = existing number of shares

N_2 = number of new share offered.

To continue with the above example, the value of the right is

$$\begin{aligned} V_r &= 32 - 20/5 + 1 \\ &= \text{Rs.}2 \end{aligned}$$

If a share is traded as ex-right, i.e., the value of the right is no longer included in the market price is expected to drop by the value of the right, the market value of the share trading as ex-right may be ascertained as follows:

$$\begin{aligned} MP_{ER} &= MP_{CR} - V_R \\ &= \text{Rs.}32 - 2 = \text{Rs.}30 \end{aligned}$$

The value of right when the share is trading ex-right, i.e., V_{ER} may be ascertained as follows:

$$V_{ER} = MP_{ER} - OP / N_0$$

In the above case the value of the right based on ex-right price is:

$$\begin{aligned} V_R &= 32 - 20/6 \\ &= \text{Rs.}2 \end{aligned}$$

So, the value of the right is the same whether the equity share is being traded at cum-right basis or ex-right basis

Duration of Bond:

Duration is the single point where the cash flows for a bond, with periodical interest payments equate the single payment for the dues for the same bond.

Seven golden rules for duration of bonds

1. The duration of a zero-coupon bond equals its time to maturity.
2. Holding maturity constant, a bond's duration is higher when the coupon is lower.
3. Holding the coupon rate constant, a bond's duration generally increases with its time to maturity. Duration always increases with maturity for bonds selling at par or at premium.
4. Holding other factors constant, the duration of a coupon bond is higher when the bond's yield to maturity is lower.
5. The duration of a level perpetuity is $(1+y)/y$. here duration and maturity can differ substantially.
6. The duration for a level annuity is equal to the following :

$$(1+y)/y - T/(1+y)^T - 1$$

7. The duration of a coupon bond equals the following:

$$(1+y/y) - \{[(1+y)^T + T(c-y)]\} / [c \{(1+y)^T - 1\} + y]$$

Valuation of bonds

Q 1 A Rs. 100 par value bond bearing a coupon rate of 12 percent will mature after 5 years. Find the value of the bond if the discount rate is 15%

Q 2 the market value of Rs. 1000 par value bond having a coupon rate of 14% is maturing after 5 years for Rs. 1050. What is the YTM. What is the realised YTM if the reinvestment rate is 12%

Q 3 A Rs. 100 par value bond have a coupon rate of 14 percent and matures after 5 years interest is payable semiannually. Calculate the value of the bond if the required rate is 16%

Q 4 The firm has paid a dividend of Rs. 2 last year. The expected growth rate of the dividends is 5%. Determine the estimated price of the share if the growth rate of the share rises to 8% calculate the new share price

Q 5 find the value of the share from the following data

Last dividend paid	Rs. 2.00 per share
Growth rate for the next 5 years	15%
Growth rate beyond 5 years	10%
Required rate of return	16%

Q 6 The current dividend on the shares of X Ltd. is Rs. 2.00. it is expected to enjoy an above normal growth of 18% for next 6 years. Thereafter the growth rate will fall and stabilize at 12%. Equity investors require a return of 16% calculate the value of the shares of X Ltd.

Q 7 A company pays a dividend of Rs. 2.00 per share with the growth rate of 7%. The risk free rate is 9% and the market rate of return is 13%. The company has a beta factor of 1.50. However due to the decision of the finance manager the beta factor changes to 1.75. Find out the present as well as the likely value of share after the decision

Q 8 the following data is available for the bond

Face value	Rs. 1000
Coupon rate	16%
Years to maturity	6
Redemption value	1000
Yield to maturity	17%

Calculate the price duration and the volatility of the bond. Calculate the expected market price if the change in the required rate is by 75 basis points